Thinks
Insight & Strategy

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Traffic Sign Symbols for Electric Vehicle Charging Points

An evaluation of options

Contents

1. Executive summary

This research set out to test the performance of three candidate symbols to represent electric vehicle (EV) charging points on traffic signs. Each symbol was tested in two variations: green with a white background (referred to as 'green' in this report) and white with a black or blue background (referred to as 'white' in this report). The aim was to identify the symbol that is most accurately interpreted, most consistently remembered and that stands out best in visually busy contexts. This was achieved by conducting an online experiment with 1,107 drivers that live in England in addition to some in-depth interviews.

The findings suggest that either of the two symbols depicting cars (Symbol - Fig. 2 and Symbol 3 - Fig. 3) would perform better than the one derived from the existing 'petrol pump' symbol (Symbol 1 - Fig. 1). The latter, it indicates, is too easily confused with the symbol for a petrol/diesel station – especially when seen in passing – and it was mentioned in the interviews that the 'flash' included in the symbol can have associations with fascism. There is also some suggestion that a side-on view of a car (Fig. 3) is more quickly and easily interpreted than a head-on view (Fig. 2), that the inclusion of a socket as well as a plug both aids interpretation and hinders it by over-crowding the symbol with imagery (Fig. 2), and that it is unhelpful to show a charging cable emerging from the bonnet of a car (Fig. 3).

Furthermore, the findings suggest that when other road signs are predominantly black/white and there is good visibility, green symbols stand out better. They are also more strongly associated with EV charging than are white symbols.

Unsurprisingly, those that had driven an EV in the previous month were more able to pick the symbols out from crowded scenes. There was no evidence, however, of them having a greater ability to derive their intended meaning.

In conclusion, the research provides evidence to suggest that a green version of one of the two 'car' symbols would be the best choice and that if Symbol 3 were chosen, it would benefit from minor modifications.
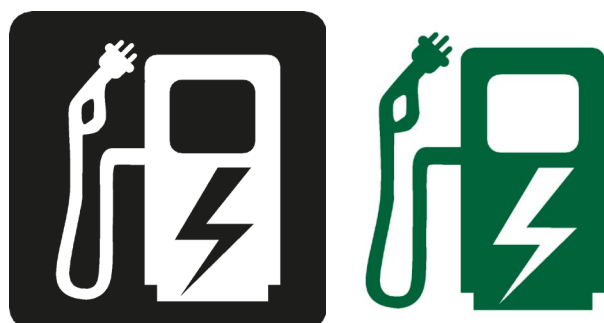

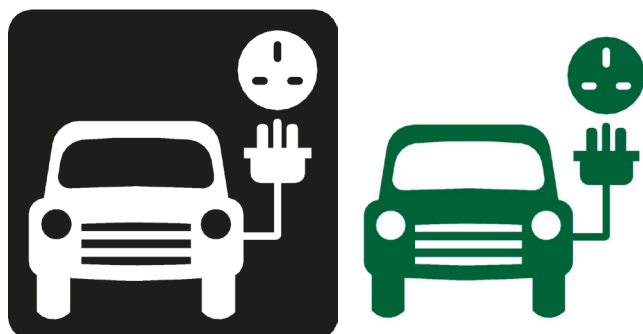Fig. 1 Symbol 1 in white (left) and green (right).

Fig. 2 Symbol 2 in white (left) and green (right).

Fig. 3 Symbol 3 in white (left) and green (right).

Summary of the differences between symbols for the interpretation of intended meaning:

- The data from the randomised controlled trial showed only one statistically significant and consistent finding, which indicated that Symbol 1 in green was less frequently recognised than other symbol designs in green.
    - One question (B2) tested intended interpretation of the symbols when shown on a motorway services sign.
        - Those shown Symbol 3 in green were significantly more likely to accurately identify the charging point symbol than those shown Symbol 1 in green (22%, compared to 12%).
        - There were no other significant differences in correct identification between symbol designs or colours.
    - A second question (C1) tested interpretation of the intended meaning of the symbols from a directional sign.
        - Those shown Symbols 2 or 3 in either colour were significantly more likely to identify the correct meaning of the symbol than those shown Symbol 1 in green.
        - There were no other statistically significant differences between symbol designs or colours in identification of the intended meaning.

Summary of differences between the symbols on how well they stand out:

- Findings from the experiment suggest that people are more able to pick out green symbols from a crowded group of road signs than they are the same symbols in white.

Summary of the differences between the symbol colour combinations

- Interpretation: There is no evidence of either colour being better than the other in aiding interpretation of the symbols.
    - There was no clear relationship between successful interpretation and symbol colour when the symbols were displayed to participants on a motorway services sign
    - When they appeared on a directional sign indicating a car park, colour made no significant difference to the proportions of people interpreting Symbol 1, Symbol 2 or Symbol 3 as intended.
- Standing out: The qualitative evidence was ambivalent about which colour combination stands out best when the symbols are displayed amongst predominantly black and white signs. However, the experiment data indicates that green symbols appeared to stand out better.
    - Respondents were more likely to pick out a green symbol from within a cluster of signs (74%) than they were a white symbol (58%).
    - Some participants in the qualitative research described green as easier to notice on cluttered road signs. Compared to white symbols, they reported that green more effectively captured their attention, especially when it was displayed amongst signs that were predominantly black and white.
    - However, some qualitative participants said the white symbols were more effective because they were more eye-catching than the green symbols.
- Recognisability: Green symbols appeared to be more recognisable than white.
    - After repeated viewings of the symbol they had been allocated, respondents were more likely to accurately recognise their symbol if it was green (88%) than if it was white (73%).
- Associations: Participants in the qualitative interviews tended to prefer green, as they considered it more eye-catching and because of its associations with electric charging.
    - Some interview participants said that they associated green with the environment, energy and charging, that the colour green aided with interpretation of the symbols, and that green was therefore the most suitable colour for the symbol.

Summary of the findings by symbol

- **Symbol 1** (charging point with a lightning bolt, Fig. 1)
    - Interpretation of intended meaning:
        - When shown Symbol 1 on a motorway services sign, the intended meaning of the symbol was correctly interpreted by 12% of participants in the randomised controlled trial shown the green version, and 18% of those shown the white version.

Larger percentages interpreted the symbol as relating to electricity, EVs or charging, without grasping the full extent of the intended meaning: 50% (green version) and 39% (white version).

- o Standing out:
  - When asked to find the symbol in an image showing a cluster of signs, 90% were quickly able to pick out the green version of Symbol 1 and 75% the white version.
- o Associations:
  - Symbol 1 is similar to the established road-sign symbol for a petrol/diesel filling station. Some participants in the qualitative interviews felt this helped with interpretation of Symbol 1. Others felt this created a risk that Symbol 1 would be interpreted as signifying a petrol/diesel pump – particularly when it was only seen briefly and was not displayed alongside the symbol for petrol/diesel.

- **Symbol 2** (front view of a car, with plug and socket, Fig. 2)
  - o Interpretation of intended meaning:
    - When shown Symbol 2 on a motorway services sign, the colour of the symbol had no statistically significant impact on the numbers interpreting the symbol as intended. 19% identified the green version as intended and 19%, the white version. Larger numbers interpreted the symbol as relating to electricity, EVs or charging without grasping the full extent of the intended meaning: 42% (green version) and 40% (white version).
  - o Standing out:
    - When asked to find the symbol in an image showing a cluster of signs, 84% were quickly able to pick out the green version of Symbol 2 and 72% were able to pick out the white version.
  - o Associations:
    - Symbol 2 is the only symbol to contain a car, plug and a socket. Some participants in the qualitative interviews felt inclusion of all three elements helped with interpretation of the symbol. Others felt this created a risk that Symbol 2 would be cluttered which could be confusing and negatively impact on interpretation. Some qualititative participants described the image of the car as old-fashioned and argued that as EVs are associated with the future, an image of a futuristic looking car could aid interpretation.

- **Symbol 3** (side view of a car, with lightning and plug, Fig. 3)
  - o Interpretation of intended meaning:

- When shown Symbol 3 on a directional sign, the colour of the symbol had no statistically significant impact on the numbers interpreting the symbol as intended. 22% identified the green version as intended and 20% the white version. Larger numbers interpreted that the symbol as relating to electricity, EVs or charging without grasping the full extent of the intended meaning: 45% (green version) and 41% (white version).
    - In the qualitative research, all participants shown Symbol 3 interpreted it as intended. Participants felt the inclusion of the plug on Symbol 3 helped convey the intended meaning.
- Standing out:
    - When asked to find the symbol in an image showing a cluster of signs, 89% were quickly able to pick out the green version of Symbol 3 and 73% were able to pick out the white version.
- Associations:
    - Some qualitative participants felt the side-on view of the car conveyed the intended meaning more clearly than did the front view in Symbol 2. Some thought it was unhelpful to show the charging cable emerging from the bonnet.
    - As for Symbol 3 the shape of the car in the symbol was considered old-fashioned. This created a slightly negative response in some, but no participants explicitly claimed that this negatively impacted on their ability to identify the intended meaning.

2. Aims and introduction

The Department of Transport is seeking to evaluate alternative symbols to represent EV charging facilities on motorway services signs, directional car park signs and signs marking road-side parking bays. Currently, such a symbol is only used on road-side parking bays and as an option on motorway service signs. The addition of such a symbol to directional parking signs is intended to improve the experience of using an EV by making it easier to locate charging points and reducing anxiety about running out of charge. Whilst EV drivers sometimes use apps to locate charging points, the visibility and immediacy provided by roadside signage will reinforce this communication mode and help those less able to use digital technologies.

By increasing the visibility of charge points to the general road-using public, the wider use of an EV charging point symbol should also reduce range anxiety, thereby facilitating the choice of EVs by those currently using hybrids or vehicles fuelled by petrol/diesel. Concern among current and potential EV drivers about the availability of publicly-accessible EV charging points is well-documented.[1]

Currently, the only official traffic signs to convey the presence of EV charging points are those indicating the proximity of roadside charging facilities and, occasionally, motorway services signs. This research compared the symbol currently used on these signs (see Figure 2, above) to two alternative symbols (Figures 1 and 3, above) provided by the Department for Transport. It also compared the effectiveness of two different colour options for these symbols: a green symbol (that would appear on a white background) and a white symbol (that would appear on a black background on directional signs or signs indicating parking bays with charging points, or on a blue background when used on motorway services signs).

There are advantages to continuing with the symbol already in use. The existing symbol has an established resonance in the public consciousness that would promote ease of recognition if it were used more widely. Furthermore, as existing signs for roadside charging would only gradually be replaced, the introduction of a new symbol would lead to the co-existence of two different symbols for a number of years. This research aims to provide an indication of the benefits of any change of symbol or colour so that these can be weighed against the benefits of no change.

The research therefore asks of the six symbol-colour combinations:

- Which most often conveys the intended meaning, and why
- Which stands out better to drivers when viewed on a busy sign or in a busy street-scene
- Which is most memorable

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[1] Marshall, B., Ginnis, S., De Lucia, S., Day, H. (2022) December 2021 Technology Tracker: Wave 8. Department for Transport/Ipsos

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- What connotations or cultural associations might lead to unintended consequences of its adoption
- To what extent the above vary between demographic groups: e.g. by age or extent of driving experience.

3. Methodology

The fieldwork for this project, conducted from 4th – 14th October 2022, comprised an 11-question online randomised controlled trial and fifteen 45-minute online depth interviews. This approach was used to inform and enrich our interpretation of the experimental results.

See Appendix A: Detailed Research Methodology for further details of the methodology, including the experimental design.

Randomised controlled trial

On behalf of DfT, Thinks Insight & Strategy conducted an 11-question online randomised controlled trial with 1,107 drivers in England. The sample was recruited through an existing online panel that has over 150,000 members from all over the UK, and was weighted to be nationally representative of drivers in England in terms of age, gender, social economic grade (SEG), ethnicity, and region. Of those panel members that were invited to participate in this randomised controlled trial, 10% agreed to do so. Data was collected between 5th and 11th October 2022. A full breakdown of the sample can be found in Appendix A.

The purpose of this randomised controlled trial was to understand: which of the three symbols is interpreted as intended by the largest proportion of the public, which stands out best in common road sign contexts, and how these two phenomena are affected by the colour of the symbol and repeated exposure to it. Throughout the report, differences are only reported where tests revealed them to be statistically significant (to the 95% confidence level).

Before launching the randomised controlled trial, informal cognitive testing of the questionnaire was conducted with six participants from different age groups. This was done to ensure the stimulus images were shown for an appropriate amount of time and to test that questions were understood as intended. The six participants completed the online randomised controlled trial with a researcher observing, and described their experience of answering the questions. Findings from this were used to amend and optimise the questions. For more information, see Appendix A: Detailed methodology: Cognitive testing.

In the final randomised controlled trial, each respondent was randomly allocated one of the six symbol/colour combinations and their questions focussed on this combination exclusively. As a result, a randomly selected sample of around 200 participants was asked about each symbol/colour combination.

Respondents were shown the symbol four times as part of four different questions:

1. Their first exposure to their allocated symbol/colour combination was when they were shown the symbol on a car park sign and asked to describe everything they thought the sign was telling them. This question was used to test interpretation of the symbol.

2. Next, respondents were shown the selected symbol on a motorway services sign that also displayed four other symbols. They were shown this sign for four seconds and then asked to describe all the services that they recalled being shown. This question was used to test how able people are to interpret the symbols in a challenging context.

3. Thirdly, respondents were shown a photo of a crowd of directional signs into which a sign had been added that used the symbol to direct drivers to the nearest charging point. Respondents were given a restricted period of time to locate the sign and identify where they would have to go to find an EV charging point. This question, too, was used to test how well each of the symbol/colour combinations stands out.

4. After some intervening questions on attitudes to EVs, respondents were shown all six symbol/colour combinations and asked to identify the symbol they had been shown earlier in the randomised controlled trial. This question was used to assess which symbol/colour combination was the most memorable.

Qualitative interviews

Between 4th and 14th October 2022, Thinks Insight & Strategy conducted fifteen 45-minute in-depth interviews with drivers in England. Data from these interviews supplemented the quantitative data by exploring the performance of each of the symbols and colour combinations in more depth. Ten interviews were conducted with drivers of internal combustion engine vehicles and five with drivers of battery electric vehicles.

To facilitate a wide geographic spread of participants at an economic price, the interviews were conducted online. Our recruitment partners used specialist market research recruiters, each of whom holds a database of potential participants for automative research in their particular recruitment region. The sample was selected to reflect a range of drivers in England. The sample comprised people aged 18 or over from across England and was spread across key demographics i.e. age, gender, socio-economic group, ethnicity and location. Detailed demographic information can be found in Appendix A: Detailed research methodology.

An introduction to the three symbols

Three symbols were tested: the symbol that is currently used on signs marking roadside EV charging points (the white version of Symbol 2, below) and two symbols that were designed by DfT as potential alternatives (symbols 1 & 3, below). Each was included in two colour formats: white on a black or blue background ('white') and green on a white background ('green').

Symbol 1: Fuel pump with lightning bolt

Symbol 1 mirrors the road-sign symbol currently used to represent a petrol station – but with the addition of a large zig-zag lightning bolt and the substitution of a plug for the fuel nozzle.
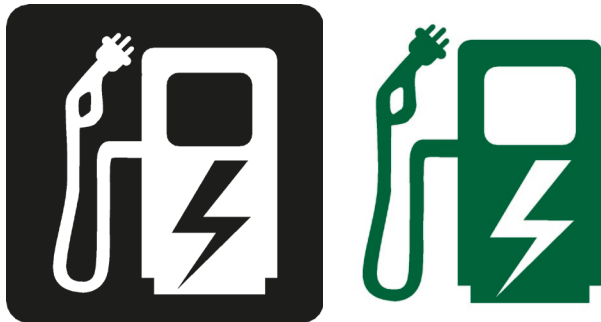

Fig. 4 Symbol 1 in white (left) and green (right).

Symbol 2: Front view of a car, with a plug and socket

Symbol 2 shows the front view of a small 1960s family car, with headlights and a radiator grill. Emerging from one side of the car is a three-pin plug directed upwards. Above the plug is a three-pin socket.
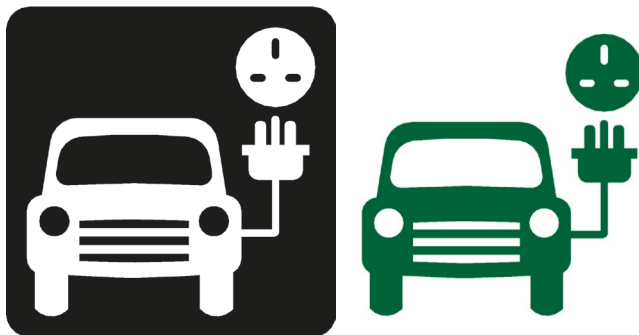

Fig. 5 Symbol 2 in white (left) and green (right).

Symbol 3: Side view of a car, with lightning cable and plug

Symbol 3 shows a side view of a small 1960s family car, with a cable and three-pin plug coming upwards out of the bonnet. The cable is shaped like a zig-zag to resemble a lightning bolt.

Fig. 6 Symbol 3 in white (left) and green (right).

5. Findings from the analysis of the randomised controlled trial

a. Interpretation when embedded in a busy sign

The first way in which the randomised controlled trial tested intended interpretation was to show participants an image of multiple symbols on a single road-sign (Fig. 7) and ask them to recall as many as possible. To add realism, participants in both the experiment and the qualitative research were given 4 seconds to memorise the symbols on the sign. This question aimed to test interpretation of the proposed symbols and how well they stand out in visually crowded contexts.

Fig. 7. B2: An image of a motorway from a driver's perspective, with a motorway services sign with six symbols: an EV charging point symbol (in this image, Symbol 1 in green), petrol/diesel filling station, café, liquid petroleum gas, and tourist information.

Analysis of the data from this question revealed just one statistically significant finding: those shown Symbol 3 in green were significantly more likely to accurately identify the charging point symbol than those shown Symbol 1 in green (22%, compared to 12%). Figure 8 visualises the full dataset for this question.
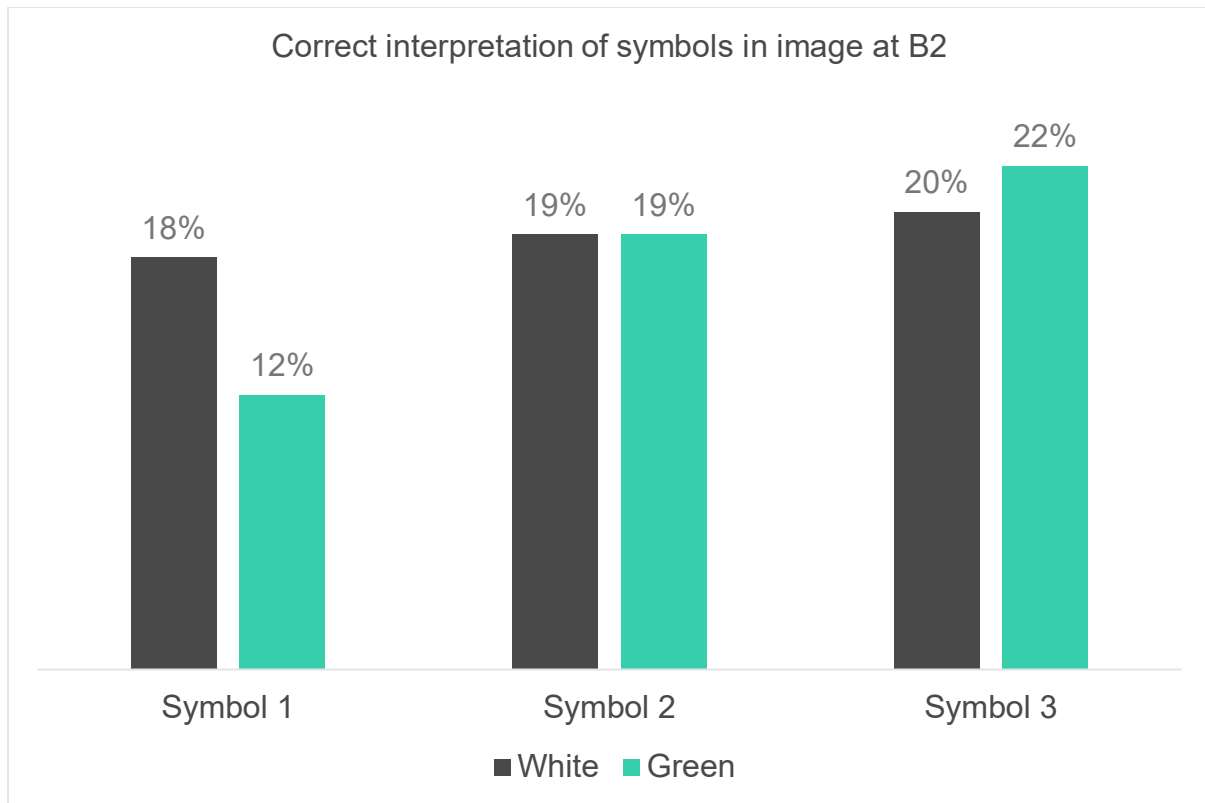
Correct interpretation of symbols in image at B2

Fig. 8 B2. '*Imagine you are driving and you see this sign. Please describe all the services that you recall being shown on this sign.*' Base: all who answered (n=1076); Symbol 1 white (n=184); Symbol 1 green (n=178); Symbol 2 white (n=184); Symbol 2 green (n=177); Symbol 3 white (n=173); Symbol 3 green (n=180).

b. Interpretation when on a directional sign with one other symbol

Fig. 9 C1: directional sign with an arrow to the left, the name 'Marketplace', a symbol for parking, and an EV charging point symbol (in this image, Symbol 1 in white).

Both respondents in the online randomised controlled trial and interview participants were shown a second image to test their ability to interpret the symbol as intended: a directional sign displaying the symbol for a car park, the name of the car park ("Marketplace") and the charging point symbol that they had been allocated (Fig. 9). To simulate the situation when such a sign is passed whilst driving, respondents were given 4 seconds to interpret the sign. This exercise aimed to further test interpretation of the proposed symbols.

As in question 1, Symbol 1 in green again fared least well. Those shown Symbols 2 or 3 in either colour were signficantly more likely than those shown Symbol 1 in green to correctly identify the meaning of the symbol (see Fig. 10). No other differences were statistically significant.
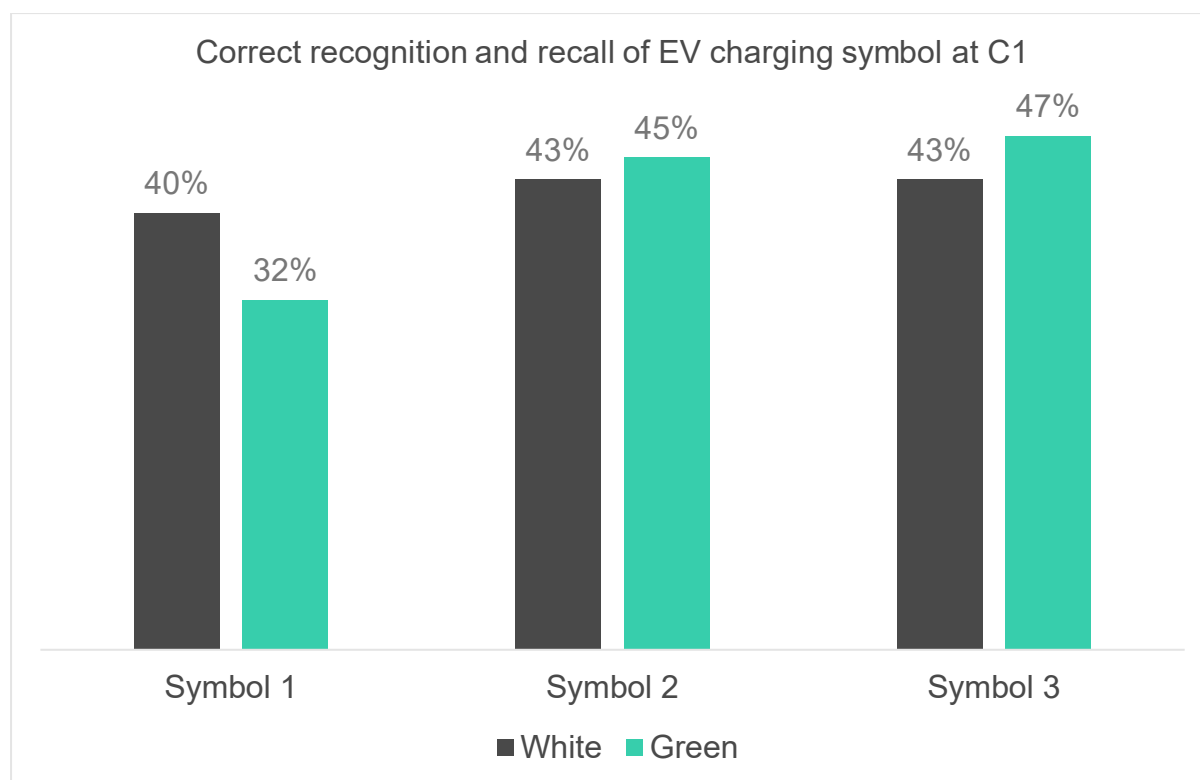
Fig. 10 C1. '*Now imagine you are driving in a town and you see this sign. Please describe everything you think this sign is telling you.'* Base: All who answered (n=1069)); Symbol 1 white (n=182); Symbol 1 green (n=180); Symbol 2 white (n=176); Symbol 2 green (n=177); Symbol 3 white (n=174); Symbol 3 green (n=180).

The qualitative research revealed nothing about the relative clarity of the symbols and colour combinations when they were displayed on this directional sign. However, it is perhaps interesting to note that some participants were not sure how to interpret the collocation of the parking and EV-charging symbols: some made assumptions about the speed of EV charging based on what they typically find in car parks and some were concerned that those unfamiliar with EVs might think the car park was exclusively for electric vehicles.

c. How well the symbols stand out in crowded scenes

Fig. 11 D1. A crowded scene with 7 different road signs showing multiple destinations and services, including a sign pointing to the left with the words 'High Street' and an EV charging point symbol (here Symbol 1 in green).

To test how well the symbols stand out in visually busy contexts, participants were shown a crowded group of road-signs amongst which was a sign that used their allocated symbol to direct them to a charging point (Fig. 11). They were then asked to report where they would need to drive to find this facility. Participants in the randomised controlled trial were shown the image for four seconds; participants in the qualitative interviews were allowed to study the scene for as long as they wished.

In the randomised controlled trial, correct identification of the charger's location was significantly higher among those shown any of the three symbols in green than it was for those shown the same symbols in white. (see Fig. 12).
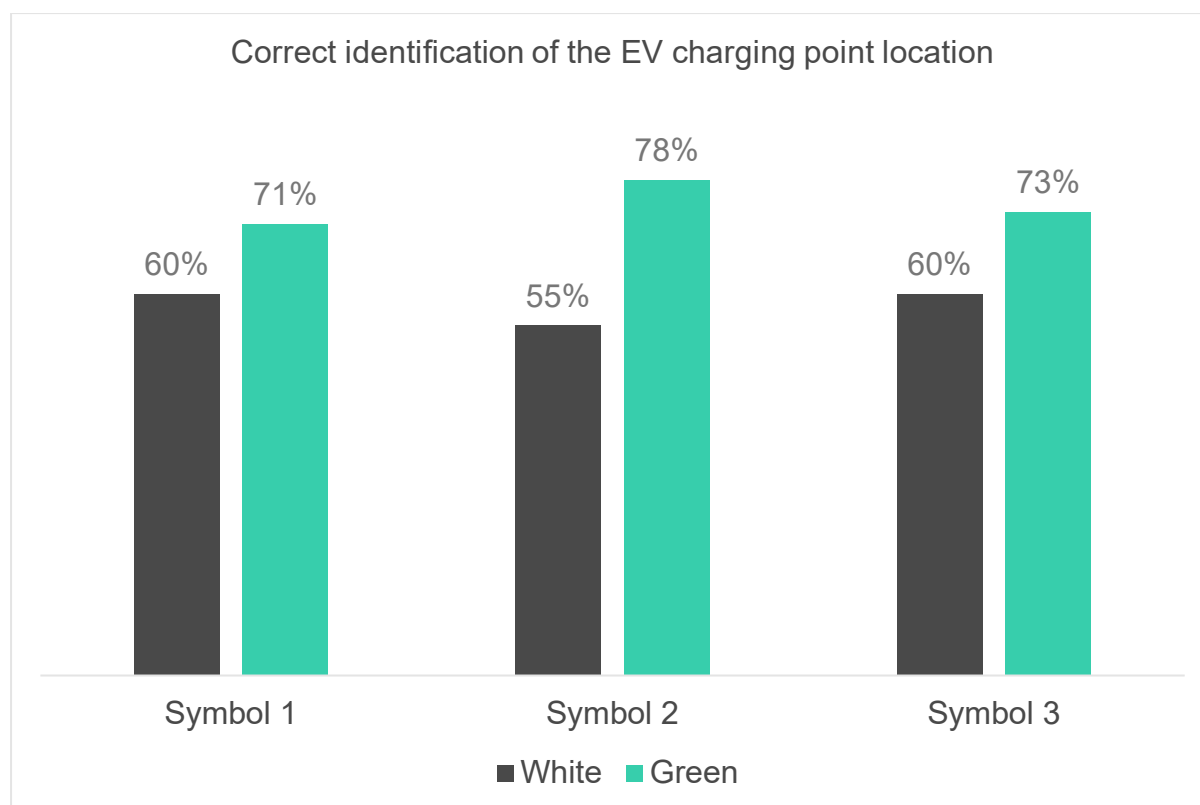
Fig. 12 D1. 'According to the road signs in the picture, where should you drive to find a charging point?' Base: All respondents (n=1107); Symbol 1 white (n=185); Symbol 1 green (n=184); Symbol 2 white (n=185); Symbol 2 green (n=184); Symbol 3 white (n=183); Symbol 3 green (n=186).

Some participants in the qualitative research said that the colour of the symbol influenced the ease with which it could be picked out from within a group of signs. Some of those shown a green symbol said that the green caught their eye, and some of those shown symbols in white suggested, unprompted, that the use of colour would make the symbol stand out more. (For a full discussion of symbol colour, please see Section 8: Differences by symbol colour.)

"I like that it's green and not black – it makes it stand out more."

EV driver

"If you really wanted to highlight the charging point, a different colour [than black] would be a good idea."

Non-EV driver

d. Recollection of the symbol

At the end of the randomised controlled trial, participants were shown all three symbols in both colour combinations and asked to identify which one they had been shown in the earlier questions. This test was designed to compare the symbol-colour combinations in terms of how memorable each was.

Analysis of the data from this question yielded two statistically significant findings. First, those allocated one of the green symbols were significantly more likely to identify their allocated symbol than those allocated one of the symbols in white (see Fig. 13). Secondly, more participants selected the green version of their symbol having been shown it in white than selected the white version having been shown it in green. These two phenomena suggest that the use of green not only makes the symbols more memorable but also provides a stronger association between the symbol and EV charging points.
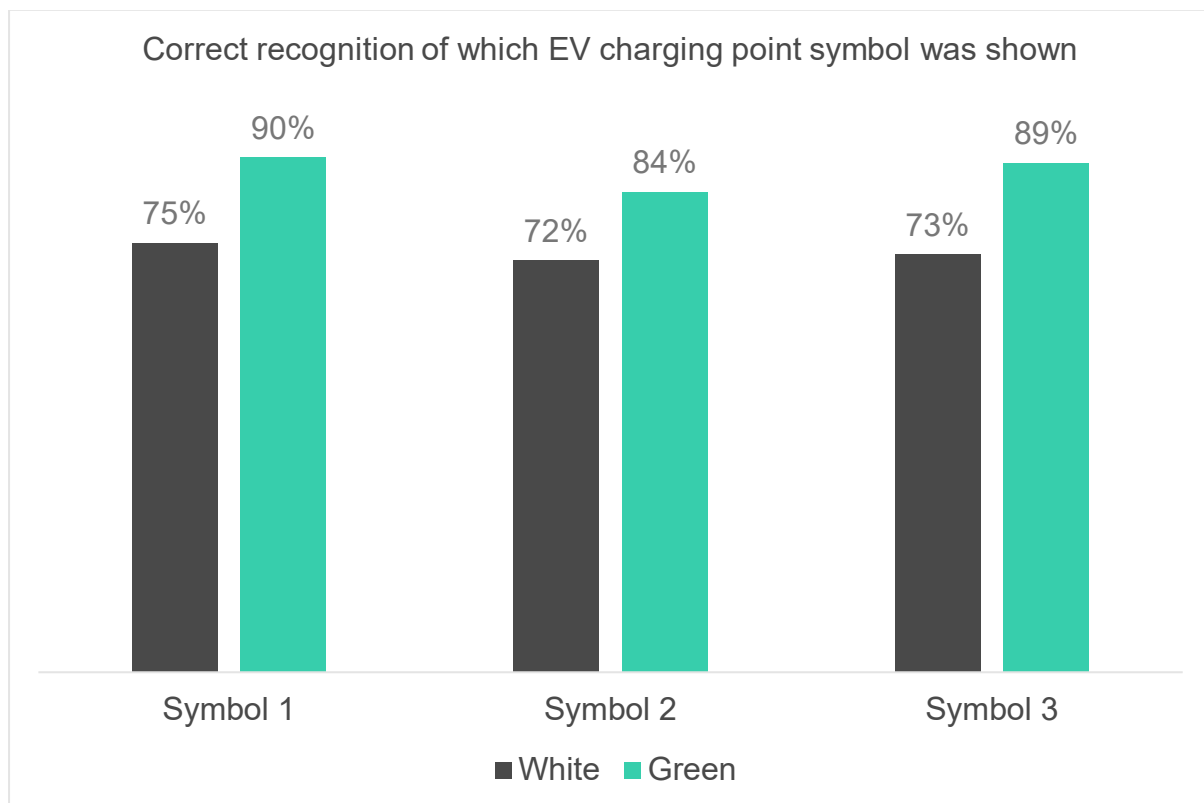

Fig. 13 H1. '*And finally, please look at these symbols. Which do you think is the symbol you saw in the earlier questions in this survey?* Base: All respondents (n=1107); Symbol 1 white (n=185); Symbol 1 green (n=184); Symbol 2 white (n=185); Symbol 2 green (n=184); Symbol 3 white (n=183); Symbol 3 green (n=186).

6. Summary of evidence for each symbol

This section summarises the research evidence gathered for each symbol.

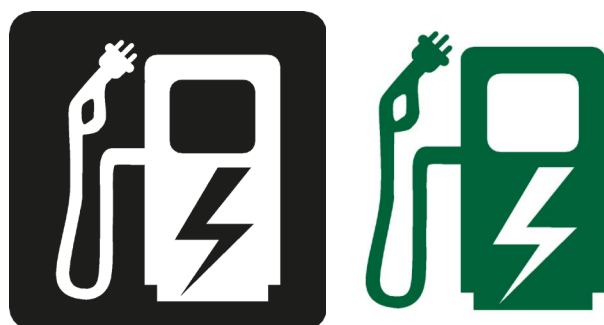**Symbol 1 – charging point with a lightning bolt**

Fig. 14 Symbol 1

This section reports the research data generated by the respondents in the randomised controlled trial and interview group participants that were allocated Symbol 1 as their primary symbol.

Interpretation of Symbol 1

When shown a motorway service station sign that included Symbol 1 (see B2) significantly more respondents in the randomised controlled trial interpreted the green version of this symbol as intended compared to the white version (18% vs 12%).

When shown a road sign displaying Symbol 1 alongside a 'P' parking symbol (see C1) significantly more respondents in the randomised controlled trial interpreted the white charging point symbol as intended than did the green symbol (32% for green, 40% for white). In fact, in this question, Symbol 1 in green performed less well than any of the other colour-symbol combinations. We surmise that this is perhaps explained by the similarity of Symbol 1 to the symbol commonly used for a petrol pump. When displayed together (as they were in the question on the motorway services sign) their appearance side-by-side alerted respondents to the differences between the two and obgliged them to try to interpret those differences. In this current question, in contrast, the absence of a comparison reduced the salience of the colour green and lightening flash; this may have reduced the number of accurate interpretations.

Participants in the qualitative research reported that the lightning symbol and the plug were the key features that led them to interpret Symbol 1 as depicting a charging point. Some said that its similarity to the familiar road-sign symbol for a petrol station was a positive feature; they believed that the familiarity of the petrol pump symbol would aid interpretation of the Symbol 1.

> "It was immediately obvious it was for EV charging. It flashed quickly
> [on the screen] but the electric bolt made it obvious."

Non-EV driver

However, not all interview participants interpreted Symbol 1 as intended. One (an occasional driver who had never driven an EV) described Symbol 1 as, "a car door with a car wire coming out of it" and commented that, "I don't know what [the plug] would be charging."

Effectiveness at catching the eye

Significantly more participants in the randomised controlled trial were able to pick the green version of this symbol out of a crowded group of signs than were able to pick out the white version (71% compared to 60%).

Associations and connotations

Associations with Symbol 1 that were revealed in the interviews were:

- of the lightning bolt with a "fascist symbol" (Non-EV driver)
- of the lightening bolt with hazard or danger (although in the given context it was said to be obvious that the bolt did not have this meaning) (Non-EV driver).
- the symbol being aimed at confident drivers (one inexperienced driver commented that, "[The symbol is] definitely not [aimed at] drivers like me… I'm not a confident enough driver." (Non-EV driver).

Potential improvements

Some participants in the qualitative interviews stated that the similarity with the existing fuel pump symbol made it more difficult to interpret Symbol 1 as intended; they believed some people might interpret it instead as a petrol symbol – especially if they only saw the sign briefly and if it was not not displayed alongside the petrol station symbol.

> "It looks like a petrol pump and even though it's got the lightning
> symbol on it, I think that could easily be confused with a petrol
> pump… It looks too much like a petrol pump."

Non-EV driver

Some qualitative participants stated that the the lightning bolt and plug were too small to clearly distinguish Symbol 1 from the regular petrol pump. Some said that the distinction between the two would be increased by having Symbol 1 in green and/or by increasing the size of the bolt and plug.

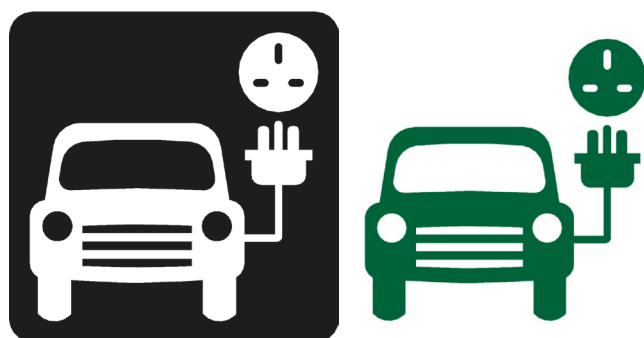## Symbol 2 – front view of small 1960s car, with plug and plug socket

Fig. 15 Symbol 2

This section reports the research data generated by the respondents to the randomised controlled trial and interview participants that were allocated Symbol 2 as their primary symbol.

Interpretation of Symbol 2

Amongst those shown a motorway service station sign that included Symbol 2 (see B2) there was no significant difference in interpretation between experiment participants that were shown the green version and those shown the white version – 19% of respondents were able to correctly identify each.

Nor was there any significant difference in interpretation between those shown the two colour versions on a road sign displaying Symbol 1 alongside a 'P' parking symbol (see C1) (45% interpreted the green symbol as intended; 43% for the white symbol).

Participants in the qualitative research that were shown Symbol 2 stated that the inclusion of the socket and the plug were the key features that allowed it to be interpreted as depicting a charging point.

> "The socket and plug [on Symbol 2] really take away any doubt that there is a point and a plug where you can bring the EV and plug it in."
>
> Non-EV driver

> "It's the lead and the plug. Symbols for [EV charging] are typically… something to signify power. So it's clear, definitely – car plus plug."
>
> Non-EV driver

Not all participants believed everyone would interpret Symbol 2 as intended however. Some believed that showing three pins on the plug rather than two could lead people to think this symbol indicates a charger that is particularly slow.

> "It's a three-pin charging point. People would assume they're not fast 7kw charging because it's like the granny chargers."

EV driver

Effectiveness at catching the eye

Significantly more participants in the randomised controlled trial were able to pick the green version of this symbol out of a crowded group of signs than were able to pick out the white version (78% compared to 55%).

Associations and connotations

In some cases, interviewers' probes on connotations and emotional responses to Symbol 2 produced little evidence: participants simply saw it as a practical indication of where to charge an EV.

Potential improvements

In the qualitative interviews, the inclusion of the car, plug and socket, was felt by some to make the symbol 'cluttered' and therefore harder to interpret – especially when only viewed briefly. Furthermore, some participants thought the image of the car too old-fashioned for modern services such as EV charging points and felt a more futuristic look would aid interpretation.

Symbol 3 – charging point with a lightning bolt

Fig. 15 Symbol 3

This section reports the research data generated by the respondents to the randomised controlled trial and interview participants that were allocated Symbol 3 as their primary symbol.

Interpretation of Symbol 3

The colour of this symbol made no significant difference to the proportion of respondents to the randomised controlled trial that interpreted it as intended: 20% interpreted the white version as intended; 22%, the green version (B2).

Nor was there any significant difference between the colours in how well participants interpreted and recalled the Symbols 3 on the directional parking sign (C1: 47% interpreted the green as intended; 43%, the white one).

Some interview participants felt that the side-on view of the car in Symbol 3 was more easily interpreted than the front view shown in Symbol 2 and was therefore preferable. It is worth noting that a side-on view of a vehicle tends to reveal more design cues to its identity so generally better facilitates easier recognition.

Effectiveness at catching the eye

Significantly more participants in the randomised controlled trial were able to pick the green version of this symbol out of a crowded group of signs than were able to pick out the white version (71% compared to 60%).

Associations and connotations

Some qualitative participants mentioned that they would assume Symbol 3 is a slow charger due to the three-pronged plug type some associated with older chargers, with some of these participants believing that it is intended for prolonged charging sessions.

For one participant who was shown Symbol 3 in white, the use of a private car in the symbol and the location of the charger in a public car park led them to expect a public charger only and one not intended for commercial vehicles.

> "Would expect it to be a public charger and other people might be using it. Expect it to be available and wouldn't expect to have to request permission to use and for it to not be used by commercial vehicles. E.g. some around town reserved for taxis….Also, "
>
> EV driver

Potential improvements

For some participants in the interviews, the image of the plug emerging from the bonnet was confusing and could be an obstacle to successful interpretation.

As with Symbol 2, the shape of the car in the symbol was thought to be old-fashioned by some participants. This created a slightly negative response. Participants did not, however, say that this affected their ability to interpret the symbol.

7. Evidence for the impact of colour

In both the quantitative randomised controlled trial and the qualitative interviews, we explored the impacts of the two different colour combinations: the green symbols on a white background ('green') and the white symbols on a black/blue background ('white'). In the randomised controlled trial, we compared the performance of the colour combinations by testing each of the white versions and each of the green versions with a different group of around 200 participants. In the qualitative interviews, we showed participants both colour-versions of the same symbol side-by-side and probed on their reactions to each and on their preferences. Both sets of data suggest that the green symbols more effectively convey the intended meaning than do the equivalent symbols in white.

Randomised controlled trial

The evidence from the randomised controlled trial indicates that the green versions of the three symbols stand out more than the white versions. When shown an image in which their symbol was embedded within a crowded group of signs, participants who were allocated the green symbol were more likely to pick it out (74%) than were those shown the white version (58%) – see Section 4c: Evidence for how noticeable the symbols are in crowded scenes.

The green symbols also seem to be more memorable than the white ones. When shown a line-up of all six symbol-colour combinations at the end of the randomised controlled trial, participants were more likely to pick out the symbol they had been shown during the randomised controlled trial (see Section 4d: Evidence of memorability of the symbols) if that symbol was green (88%) than if it was white (73%) (see Table 1). Furthermore, compared to those allocated a white symbol, those allocated a green one were less likely to make the mistake of picking out the differently-coloured version of their symbol.

For example, of those shown Symbol 1 in white, 75% correctly picked the white symbol from the line-up, 20% incorrectly picked out the green version and the remainder selected other options. By contrast, of those shown Symbol 1 in green, 90% picked out the correct symbol, 3% picked out Symbol 1 in white and 6% picked other options.

Among those that did not correctly recall the symbol they were shown, the most commonly selected symbol was the green version of Symbol 1 (30% of those who answered incorrectly). This suggests that the green version of Symbol 1 might be more strongly associated with EV charging points than the other five symbols.

Table 1: Correct identification of EV charging point location by symbol tested (participants who were able to pick out an EV charging symbol from within a group of signs)

Symbol shown	% Correctly identifying charge-point location
Symbol 2 green	78%
Symbol 3 green	73%
Symbol 1 green	71%
Symbol 3 white	60%
Symbol 1 white	60%
Symbol 2 white	55%
NET: Any green symbol	74%
NET: Any white symbol	58%

Table 1. Question D1. 'According to the road-signs in the picture, where should you drive to find a charging point?' Base: All respondents (n=1107). *All three green symbols were significantly more likely to be recognised compared with any of the white symbols. There were no significant differences beween symbols of the same colour.

In the qualitative research, some participants said they preferred green because it was more eye-catching and associated with electric charging. When presented with the two colour options for the same symbol, interview participants stated they thought green would be easier to notice on cluttered road signs: compared to the white symbols, they argued that the green ones stood out more, especially when most of the other symbols were black-and-white.

Some participants said that green was the most suitable colour for the symbol because they associated green with the environment, energy, and charging. Some believed these associations to be a useful aid for interpreting the symbols. (In contrast, some participants said that the greater contrast between white images and a black background made this colour combination stand out more than their green equivalents:

"[I prefer] green as it stands out more and you associate it with EVs. It [also] stands out more when you have lots of different signs together"

EV driver

"I don't like the black and white at all, it's not clear to me. It's the same picture, but it doesn't look nice…I think the box as well doesn't help, but the colours don't help [either]. I think if you're driving the black could be easily missed as well, you don't have time to get drawn in. It is [also] the colour association."

EV driver

"I prefer black and white, [it] stands out more. With the black background, out of those 2, that stands out definitely"

Non-EV driver

For some participants, the shade of green used in the green symbols was not associated with electric charging. It reminded them, rather, of agriculture, grass or hospitals. These participants argued that a brighter shade of green could strengthen the association with electric vehicles (EVs). (The current palette for road signs does not include such a green. For it to be used on future road signs, a sufficiently reflective new paint would have to be engineered and then added to the palette.)

"I'm just thinking of a hospital for some reason, I'm not sure why. Maybe I'm used to seeing old ambulances in those colours."

Non-EV driver

"Often when I've seen chargepoints in the past they're usually green or blue, energy focussed, I think. I don't know how [that] would clash with the A road [sign] obviously being green but maybe neon green would be helpful noticing something related to charging."

EV driver

8. Comparing EV drivers with people who do not currently drive EVs

To enable an exploration of the relationship between symbol interpretation and experiences of (and attitudes towards) EVs, the randomised controlled trial collected data about EV ownership, recent EV use and attitudes toward buying an EV. This chapter reports on the relationship between these factors and interpretation of the six symbol-colour combinations. Throughout this section we use 'EV drivers' to refer to individuals who claim to have driven an EV in the last month, and 'EV owners/leasers' for those who claim to either currently own or lease an EV (note: these sample groups overlap, i.e. an individual could have driven an EV in the past month but might or might not own/lease one; similarly an individual could own/lease an EV but might or might not have driven one in the past month).

In summary:

- Participants that had not considered buying or leasing an electric vehicle (EV) were less likely to interpret the symbols correctly when they were displayed on the motorway service station sign.
- EV drivers were more likely to identify the location of an EV charging point from a crowded group of symbols and more likely to correctly recall a symbol after being exposed to it multiple times.
- EV owners/leasers were more likely to incorrectly identify their symbol on repeated view, though this could potentially be due to familiarity with the current EV signage symbol (2).

Evidence from the randomised controlled trial – symbol interpretation

Across all six symbol-colour combinations, those who had not considered buying or leasing an EV or plug-in hybrid and did not currently own or lease one were significantly less likely to interpret the symbols as intended when they were displayed on a motorway service station sign.

Evidence from the randomised controlled trial – how well the symbols stand out

Across all six symbol-colour combinations, EV owners/ leasers were more able than non-EV-drivers to pick out the charging point symbols from amongst a crowd of road signs (see Section 4c: Evidence for how noticeable the symbols are in crowded scenes). 68% of those with recent experience of driving an EV picked their symbol out successfully, compared to 56% of those without such experience.

Evidence from the randomised controlled trial – symbol recall

When asked to select which EV charging point symbol they had been shown during the randomised controlled trial (see Section 4d: Evidence of memorability of the symbols), EV drivers were more likely to select the incorrect symbol (33% incorrect) than were non-EV drivers (19% incorrect). This could potentially be explained by the familiarity of the existing symbol for road sign charging points (Symbol 2), but there is no data explicitly supporting this.

9. Conclusion

One of the main findings of this research concerns the importance of colour. In comparison to the white symbols, those in green stood out more starkly in visually crowded contexts. Furthermore, through the association of the colour green with low-carbon technologies, green versions of the symbols more successfully conveyed the link to EVs. We also noted in the report some of the disadvantages of using green. Experts in road sign design argue that green shows up less well in conditions of poor visibility, and some participants remarked that the detail of the symbols was harder to discern in the green symbols. In addition, the ability of the green symbols to catch drivers' attention probably depends on the roadsign landscape being dominated by black-and-white signage. A proliferation of green (or other-coloured) signs might erode this advantage.

Of the three images tested, the evidence from this research favours the two that show images of cars over that based on the existing petrol-pump symbol. The latter was interpreted as intended by smaller proportions of participants in the experiment and some interviewees said that, when viewed in passing, it could be confused with the symbol representing a fuel pump.

According to interview participants, both of the car-centred symbols symbol designs have their faults. Neither outperformed the other in the experiment. Given that Symbol 2 is already visible on thousands of parking bay signs in England, this is perhaps surprising. However, Symbol 2 was described as rather cluttered and, because the vehicle is depicted head-on, as being less easily recognised as a car. Symbol 3 was also criticised by some participants: it was said to be more ambiguous because it does not include a socket and the cable is shown to emerge from the car's bonnet. In addition, interviewees argued that the inclusion of three-pin, rather two-pin, plugs on both symbols could lead people to assume that they refer to facilities that only charge EVs slowly.

Similarly, some participants argued that the car-based symbols would be more effective if they depicted modern cars. However, it is worth noting, in this regard, that the lexicon for UK road signs is comprised entirely of old-fashioned symbols in order to enable road users to pick them out more easily from other road-side images.

Unsurprisingly, those that had driven an EV in the previous month were more able to pick the symbols out from crowded scenes and, after seeing them repeatedly, were more likely to recall them accurately.

In summary, this research suggests that the green pump-and-flash symbol will be interpreted accurately by the smallest portion of the population but that the green, car-based symbols stand out better in crowded contexts and are most accurately recalled after repeated viewings. Improvements should be considered to whichever of the two car-based symbols is selected for use on motorway service stations signs and directional road signs.

10.   Appendix A: Detailed research methodology

Stimulus shown

During both the interviews and the experiment, participants were shown stimulus images containing the symbol allocated to them. Illustrations of these are shown below.

A motorway services sign that does not include any of the symbols being tested

Fig. 16 B1: motorway services sign without an EV charging point symbol.

A motorway services sign that includes one of the symbols being tested

Fig. 17 B2: motorway services sign with an EV charging point symbol (here Symbol 1 in green).

A directional sign to a car park that also includes one of the symbols being tested

Fig. 18 C1: simple sign with an EV charging point symbol (here Symbol 1 in white).

A crowd of signs amongst which included one of the symbols being tested

Fig. 19 D1. urban streetscape with one sign in a group containing an EV charging point symbol (here Symbol 1 in green).

Methodology of the randomised controlled trial

Cognitive testing

Before the randomised controlled trial was launched, informal cognitive testing was conducted to establish how the questions would be understood by participants and whether the randomised controlled trial would work as expected. The research team observed six participants (aged 18-67) describe their thought processes as they completed the questions.

As a result of the cognitive testing, the following change was made:

- A note was added to the question text to warn participants that the image would disappear after a short amount of time. This was presented before the first timed question.

Significance testing

To analyse the data in the Excel tables, we collaborated with our quantitative partners at Yonder Data Solutions to perform significance testing. They used a statistical test called 'T-tests' on column proportions. This test examines each row of the table independently and compares pairs of columns to determine if the proportion of respondents in one column is significantly different from the proportion in another column.

When a significant difference is found between two columns, the ID of the smaller column is displayed alongside the figures in the larger column. For instance, if we compare columns 'A' and 'B' in the complete dataset and find that 'A' is significantly smaller than 'B', we would label the figures in column 'B' with the letter 'A'.

This analysis helps us identify meaningful variations in the data and provides valuable insights for our research report.

Qualitative methodology

Qualitative Recruitment

We worked with our recruitment partners, Central Fieldwork, for this project. They used a number of recruiters that specialise in the recruitment of participants for automotive research. These companies are based in several regions of England, thereby allowing recruitment of respondents from in London, the South, the Midlands and the North and from a mix urban locations (population over 10,000), towns (population 3,000-10,000) and rural locations (population under 3,000, or more than a 20 minute drive from an urban area). Each recruiter has their own database of members of the public who have previously expressed an interest in taking part in market research and have agreed to be contacted if opportunities arise. Recruiters primarily invite participants to take part in research from these databases. However, to ensure that participants with a good range of demographic backgrounds are included and their database is regularly refreshed, they use additional

supplementary recruitment methods. This includes using a mix of recruitment methods, including but not limited to leafleting in local areas, 'snowballing' (encouraging existing contacts to refer others they know), or posting on social media (including on their own pages, local area groups, or interest-based groups). All potential participants are screened using a structured questionnaire or "screener" which checks that they fit the relevant sample criteria for inclusion.

Qualitative discussion guide

The following discussion guide was used by the interviewers that collected the qualitative data.

Front sheet

Interviewer objectives

The aim of the **interview** is to understand which of the proposed symbols is most effective at communicating the presence of an electric vehicle (EV) charging point. This discussion guide is designed to explore:

- Which of the proposed three symbols would be most effective at rapidly communicating the presence of an EV chargepoint when used on road signs
- Whether communication is more effective when the symbols are white or when they are green

This is underpinned by several more aims:

- Understand recognisability of a selection of EV charging symbols including:
  - Understand which symbol is most easily picked out from a busy streetscape
- Explore connotations of each symbol including:
  - Understand how the symbols affect the desirability of electric vehicles
- Explore the connotations of the symbols illustrated in green vs white including
  - Understand whether the green versions of the symbols reduce the effectiveness of other symbols when used on motorway service station signage
- Understand the effects on intended interpretation of repeated exposure

About this discussion guide

The purpose of this document is to serve as a guide to inform the flow of the discussions, rather than a definitive list of questions to cover. As these are qualitative sessions, the Interviewer will use the guide flexibly and be guided by what comes out of the discussions.

In this discussion guide, instructions to the Interviewer are *italicised* and key questions are **bolded**.

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Section	Key discussion points and probes	Time	Materials
Section 1: Introduction *Aim: Introduce research, explain terms and understand participants' backgrounds*	• *Before the commencement of the interview, Interviewer to ensure the participant has signed the consent form.* *Interviewer introduction:* My name is **[XXX]** and I'm a researcher from an independent research agency called BritainThinks. We conduct research on a range of topics, from understanding people's experiences of different products or services, how they feel about certain companies or organisations, or what they think about specific issues. This involves speaking to lots of different people all round the country and listening to what they have to say. *Explain the purpose of the session:* • Thinks Insight and Strategy is conducting this research on behalf of the Department for Transport. We are speaking to people who drive cars or vans. We are interested in how people, such as yourself, they find their way around when they're driving. • There is no obligation to answer questions that you would prefer not to. • We adhere to the Market Research Society Code of Conduct. This means that anything you talk about today will be confidential, and that you won't be identifiable in the reporting. But if you do say anything that gives us reason to believe you or anyone else may be at immediate risk of harm, we are obliged to pass this on to the relevant authorities. • We'll be talking for **up to 45 mins**.	5 mins (5)	

	Interviewer to obtain permission to video/audio record and recap that the recording will be used by BritainThinks for internal analysis only, and securely deleted at the end of the research project. **Before we start, it would be great if we could quickly get acquainted! Please could you tell me:** • Your Name • Where you live • Activities you enjoy in your free time		
Section 2: Symbol recognition on motorway sign Aim: *Understand whether EV charging point symbol is recognised and explore first impressions of the sign*	*Note for Interviewers: For this section, symbols will be randomly allocated to ensure participants will be shown one symbol (there are six images in total with different designs and colours). Please check profile sheet to ensure you show the right symbol.* • **I am now going to show you a motorway service station sign. Imagine you are driving, and you see this sign** *[SHOW STIM IMAGE 1 – motorway sign. CLICK FOR IT TO APPEAR, automatic disappear] Interviewer to share screen and display motorway service sign excluding EV charging point symbols [4 second exposure] and stopping screenshare before proceeding with question* • **Please describe everything you think this sign is telling you.** *Interviewer to note down all spontaneous recall suggestions and probe using questions in the row above* • **We are now going to show you a second motorway service station sign. Imagine you are driving, and you see this sign**	5 mins (10)	Stim slide

	*[SHOW STIM IMAGE **2 – motorway sign. CLICK FOR IT TO APPEAR, automatic disappear**] Interviewer to share screen and display motorway service sign including <u>one</u> of three EV charging point symbols [4 second exposure] and stopping screenshare before proceeding with question*		
	• **Please describe everything you think this sign is telling you.**		
	Interviewer to note down all spontaneous recall suggestions. If the EV charging point symbol is spontaneously recognised, Interviewer to probe using the question below to understand initial impressions of the symbol		
	• **What did you first notice when you saw this sign?** • **What is it about the charging point symbol that helped you know what it means?**		
Section 3: **Symbol recognition on car park sign** *Aim: Understand whether EV charging point symbols are recognised and explore first impressions*	• **Now imagine you are driving in a town, and you see this sign.** *[SHOW STIM IMAGE **3 – marketplace sign**] Interviewer to show same EV charging symbol shown to respondent in Section 2 (motorway sign recognition)* • **What comes to mind when you see this symbol? This could be any words, phrases or images** • **What do you think the symbol is illustrating?** *Interviewer to note down all spontaneous recall suggestions of EV chargepoint symbol.*	5 mins (15)	Stim slide

	Interviewer to consider using the following probes to reveal unconscious associations:
	
	 • **Tell me what springs to mind when you see this symbol**
	 • **Give me 3 words/3 emotions that you associate with this symbol?**
	    o *Why those words?*
	
	 • **Who do you feel this symbol was designed to appeal to? Why***?*
	 • *Imagine this symbol was a person speaking to you –*
	    o *What are they like?*
	    o *What would they be saying?*
	    o *How would they be saying it?*
	    o *How would they make you feel?*		

Section 4: **EV recharging point** *Aim: understand how well the symbol stands out in a busy scene*	**I would now like you to imagine that you are driving an electric car and looking for a charging point to recharge the battery. We are about to show you a set of signposts that you might see while driving. Please study the picture to find out where you would need to drive to find a charging point.** *[SHOW STIM IMAGE 4 – urban streetscape] Interviewer to probe using questions below judiciously depending on participants responses* • **According to the road-signs in the picture, where should you drive to find a charging-point?** • **What, if anything, stood out to you?** o **Did the charging-point sign stand out for you – why/why not?** • **How clearly does this sign communicate the location of the charging point?** • **Is there anything else that would make this sign clearer?**	5 mins (20)	Stim slide (Streetscape)

	• *[if the sign is shown in black/white]* **Would it be helpful if the symbol was green rather than black?** • *[if the sign is shown in green]* **Would it be helpful if the symbol was black rather than green?** • *[if the sign is shown in green]* **Does it make any difference that the symbol is green? Why?**		
Section 6: **Green v. black/white colour associations** *Aim: Understand differences between green and black/white colour associations*	**I'd now like to focus on the colour of the symbol.** *[SHOW STIM IMAGE **5 – black/green of same symbol**] Interviewer to show symbol shown in sections 2 and 3 in its green and black/white versions* • **Which of these two versions of the symbol do you prefer? Why?** • **Which do you think you would most easily spot on a busy road?** • **Looking at the symbol in green, what comes to mind? How does it compare to the black version of the symbol?** *Interviewer to probe on associations, images, ideas upon seeing the sign in green*	5 mins (30)	Stim slide
Section 7: General attitudes towards electric vehicles *Aim: Explore (current and potential) ownership, attitudes, and barriers to purchasing*	**I'd now like to ask you about your thoughts on electric vehicles** • **Do you own/lease/rent an electric car or van or are you thinking about getting one? Please just think about vehicles that run solely on electricity. This can be for your personal or business use** *Interviewer note, if the participant states they <u>do</u> own/lease/rent an EV, proceed with the following questions:* • **Where do you normally charge your vehicle? (for example at home, local changepoint, in public area etc.** • **[if charge outside the home] When you're away from home and**	5 mins (35)	

an electric vehicle	**need a charge-point, how do you go about finding one?** *Interviewer to note*: final question for all participants • **And finally, Has our discussion today changed the way you feel about electric cars? In what way? Why?**		
Section 8: **Symbol Preferences** *Aim: Explore recognition and preferential choice amongst all three symbols*	**The Department for Transport wants to make it easier to find electric charge points. I'd now like to show you six symbols that could be added to road signs. I'd like to hear what you think about them** *[SHOW STIM IMAGE 6 – all symbols together] Interviewer to show symbols and note the recognition of symbol shown to participant during section 2 and 3* • **Do you recognise any of these symbols?** • **Out of these symbols, which do you think is best at communicating the presence of an electric vehicle charging point? Why?** • **What is it about this symbol that suggests to you that it is an electric ChargePoint?** • **Which do you think would be the most noticeable symbol to spot if you were driving and looking for a charging point?** o **What is it about the other symbols that makes them less noticeable?** • **If you were to rank the symbols in order of preference, what order would you put them in and why?**	5 mins (25)	Stim slide
Section 9: Conclusion	*Thank and close:* • *Give details of incentive payment:* o *You will get an email from the website Ayda within 2 weeks of this interview. This email will tell you how to securely*	5 mins (40)	

| | claim your £50 incentive payment using the Ayda website. Using Ayda, payments can be made by bank transfer, voucher or PayPal. | | |
| | o [Note to moderator: If participant cannot use Ayda, offer bank transfer, or if not, voucher, or if not, cheque.] | | |

11.   Appendix B: Sample

Quantitative sample

Table 2: Vehicle ownership / leasing among randomised controlled trial participants

Vehicle ownership / leasing	% selecting this option
Own or lease a vehicle	91%
Do not own or lease a vehicle	9%

Table 2. Question E1. Do you own or lease a car or van? (Please include cars/vans that you've ordered but not yet received. Please do not include rentals from car clubs.) Base: All participants (n=1107).

Table 3: Car club use among randomised controlled trial participants who do not own or lease a car or van

Car club use	% selecting this option
Yes	4%
No	95%
Don't know	1%

Table 3. Question E2. Do you rent cars or vans from a car club? Base: all respondents who do not own or lease a car or van (n=98).

Table 4: Type of vehicles owned or leased by randomised controlled trial participants who own or lease a car or van.

Please the full dataset, see Section 7: Comparison of responses from those who do and do not drive an EV

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Type of vehicle owned/leased	% selecting this option
I own/lease a car or van that runs solely on fuel (e.g. petrol or diesel)	87%
I own/lease a hybrid car or van that combines a petrol or diesel engine with an electric motor but cannot be plugged into the mains	7%
I own/lease a car or van that is a plug-in hybrid	5%
I own/lease a car or van that runs solely on electricity	4%

Table 4. Question E3. What type of car do you own/lease? This can be for your personal or business use. (Please include cars/vans that you've ordered but not yet received. Please do not include rentals from car clubs). Base: All respondents who do own or lease a car or van (n=1005).

Table 5: Electric vehicle use in past month (randomised controlled trial participants)

Driven an electric vehicle in the past month	% selecting this option
Yes	14%
No	86%

Table 5. Question F1. In the last month (that is since [insert one calendar month prior to interview]) have you driven an electric car or van for any purpose? This could be a car or van that is your own, a company vehicle, part of a car club or a hired vehicle. Please just think about vehicles that run solely on electricity. Base: All respondents (n=1107).

Table 6: Consideration of buying or leasing an electric vehicle (randomised controlled trial participants who do not own / lease an EV)

Consideration of buying / leasing an electric vehicle	% selecting this option
I am thinking about buying/leasing an electric car or van quite soon	7%
I am thinking about buying/leasing an electric car or van, but I haven't thought about when I will get it	17%
I have thought about buying/leasing an electric car or van, but have decided not to right now	21%

Consideration of buying / leasing an electric vehicle	% selecting this option
I have thought about buying/leasing an electric car or van, but have decided I want to continue driving a petrol/diesel vehicle or hybrid for as long as I can	23%
I haven't really thought about buying/ leasing an electric car or van	31%
Don't know	1%

Table 6. Question F2. Are you thinking about buying or leasing an electric car or van (either for personal use or business use)? Please just think about vehicles that run solely on electricity, not hybrid vehicles. Base: all respondents who do not own or lease an electric vehicle (n=1065).

Table 7: Time spent driving per week (randomised controlled trial participants)

Time driving per week	% selecting this option
Up to 1 hour	13%
More than 1 hour, up to 5 hours	45%
More than 5 hours, up to 10 hours	23%
More than 10 hours, up to 15 hours	11%
More than 15 hours, up to 30 hours	5%
More than 30 hours	2%

Table 7. Question G1. In a typical week, how many hours would you say you drive? If the number of hours you drive each week varies a lot, try to give an average. Base: all respondents (n=1107).

Table 8: Most recent time driving an unfamiliar route (randomised controlled trial participants)

Most recent time driving an unfamiliar route	% selecting this option
In the last week	23%
More than a week ago, but in the last month	27%
More than a month ago, but in the last 3 months	21%

Most recent time driving an unfamiliar route	% selecting this option
More than 3 months ago, but in the last year	14%
More than a year ago	14%
Don't know	1%

Table 8. Question G2. When did you last drive to a destination that you had not driven to before? Base: All respondents(n=1107).

Table 9: Longest journey in the past month (randomised controlled trial participants)

Longest journey in the last month	% selecting this option
Up to and including 50 miles (80 km)	61%
More than 50 miles, up to and including 100 miles (80-161km)	23%
More than 100 miles (More than 161km)	15%
Don't know	1%

Table 9. Question G3. Thinking about your driving over the last month. What would you say was the length of your longest single trip? (Please just count a single journey, not a return trip if you spent time at your destination.) Was it… Base: All respondents (n=1107).

Table 10: Motorway driving in the past month (randomised controlled trial participants)

Motorway driving in the past month	% selecting this option
Yes	66%
No	34%

Table 10. Question G4. Have you driven on a motorway in the last month – that is since [insert date one calendar month prior to interview]? Base: all respondents (n=1107).

Table 11: Gender (randomised controlled trial participants)

Gender	% selecting this option
Male	52%
Female	48%

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Gender	% selecting this option
Other	<1%

Table 11. Base: all respondents (n=1107).

Table 12: Age (randomised controlled trial participants)

Age	% selecting this option
18-24	4%
25-34	24%
35-44	16%
45-54	17%
55-64	16%
65+	25%

Table 12. Base: all respondents (n=1107).

Table 13: Socio-economic group (randomised controlled trial participants)

Socio-Economic Group	% selecting this option
AB	31%
C1	24%
C2	23%
DE	22%

Table 13. Base: all respondents (n=1107).

Table 14: Region (randomised controlled trial participants)

Region	% selecting this option
North East England	5%
North West England	13%
Yorkshire and the Humber	10%
West Midlands	11%
East Midlands	9%
East of England	12%

Region	% selecting this option
London	12%
South East	16%
South West	12%

Table 14. Base: all respondents (n=1107).

Table 15: Ethnicity of randomised controlled trial participants

Ethnicity	% selecting this option
White	85%
Mixed / Multiple ethnic groups	3%
Asian / Asian British	8%
Black / African / Caribbean / Black British	2%
Other	<1%
Prefer not to say	1%

Table 15. Base: all respondents (n=1107).

Qualitative sample

Table 16: Electric vehicle use

Driven an electric vehicle in the past month	Number of participants
Yes	5
No	10

Table 16. Electric vehicle use among qualitative respondents (n=15).

Table 17: Type of car driven

Please see Section 7: Comparison of responses from those who do and do not drive an EV for full analysis.

Type of car driven	Number of participants
Petrol or diesel, including hybrids that cannot be plugged in to charge	10

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Type of car driven	Number of participants
Battery electric vehicle	5

Table 17. Type of vehicle driven by qualitative respondents (n=15).

Table 18: Time driven per week

Time driving per week	Number of participants
Up to 1 hour	3
More than 1 hour, up to 5 hours	1
More than 5 hours, up to 10 hours	4
More than 10 hours, up to 15 hours	3
More than 15 hours, up to 30 hours	2
More than 30 hours	2

Table 18. Time driven per week by qualitative respondents (n=15).

Table 19: Age

Age	Number of participants
18-24	1
25-34	3
35-44	2
45-54	2
55-64	1
65+	6

Table 19. Age of qualitative respondents (n=15).

Table 20: Gender

Gender	Number of participants
Male	8
Female	7

Table 20. Gender of qualitative respondents (n=15).

Table 21: Ethnicity

Ethnicity	Number of participants
White	9
Ethnic minority background	6

Table 21. Ethnicity of qualitative respondents (n=15).

Table 22: Socio-economic group

Socio-Economic Group	Number of participants
ABC1	11
C1DE	4

Table 22. Socio-economic group of qualitative respondents (n=15).

Table 23: Rurality

Rurality	Number of participants
Urban	6
Suburban	5
Rural	4

Table 23. Rurality of qualitative respondents (n=15).

12.   Appendix C: Key data tables

Table 24: Correct identification and recall of the EV charging point symbol on a motorway services sign – by symbol design shown

	All symbols	Symbol 1 white	Symbol 1 green	Symbol 2 white	Symbol 2 green	Symbol 3 white	Symbol 3 green
Mentions EV charging point or analogous term	18%	18%	12%	19%	19%	20%	22%
Mentions EVs, charging or electricity,	43%	39%	50%	40%	42%	41%	45%

	All symbols	Symbol 1 white	Symbol 1 green	Symbol 2 white	Symbol 2 green	Symbol 3 white	Symbol 3 green
but does not specify EV charging point							
No mention of EVs, charging or electricity	39%	43%	37%	42%	37%	39%	33%
'Don't know'	1%	0%	0%	0%	2%	<1%	1%

Table 24. Question B2 'Imagine you are driving and you see this sign. Please describe all the services that you recall being shown on this sign.' Base: all participants (n=1076).

Table 25: Correct identification and recall of EV charging point symbol from a single directional street sign, by symbol design shown

	All symbols	Symbol 1 white	Symbol 1 green	Symbol 2 white	Symbol 2 green	Symbol 3 white	Symbol 3 green
Mentions EV charging point or analogous term	41%	40%	32%	43%	45%	43%	47%
Mentions EVs, charging or electricity, but does not specify EV charging point	44%	42%	44%	44%	46%	43%	43%

	All symbols	Symbol 1 white	Symbol 1 green	Symbol 2 white	Symbol 2 green	Symbol 3 white	Symbol 3 green
No mention of EVs, charging or electricity	14%	18%	23%	13%	9%	13%	9%
'Don't know'	<1%	0%	1%	0%	1%	1%	1%

Table 25. Question C1. Now imagine you are driving in a town and you see this sign. Please describe everything you think this sign is telling you? Base: All respondents (n=1069).

Table 26: Correct identification of EV charging point location from a crowded group of signs, by symbol shown

Symbol shown	% correctly identifying the charging point location
Symbol 2 green	78%
Symbol 3 green	73%
Symbol 1 green	71%
Symbol 3 white	60%
Symbol 1 white	60%
Symbol 2 white	55%

Table 26. Question D1. 'According to the road-signs in the picture, where should you drive to find a charging point?' Base: All respondents (n=1107).

Table 27: Correct recall of which symbol had been shown during the randomised controlled trial, by symbol shown

Symbol selected	Exposed to Symbol 1 white	Exposed to Symbol 1 green	Exposed to Symbol 2 white	Exposed to Symbol 2 green	Exposed to Symbol 3 white	Exposed to Symbol 3 green
Symbol 1 white	75%*	3%	5%	1%	2%	0%
Symbol 1 green	20%	90%*	3%	6%	5%	3%
Symbol 2 white	<1%	0%	72%*	1%	4%	2%
Symbol 2 green	3%	1%	16%	84%*	2%	3%
Symbol 3 white	1%	0%	1%	0%	73%*	3%
Symbol 3 green	0%	2%	<1%	4%	14%	89%*
'Don't know'	2%	3%	3%	4%	1%	1%

Table 27. Question H1. And finally, please look at these symbols. Which do you think is the symbol you saw in the earlier questions in this survey? Base: All respondents (n=1107). *Indicates correct answers.