



Smart motorways: Road user perceptions of safety

Research Findings Debrief

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Background & Objectives



Smart Motorways

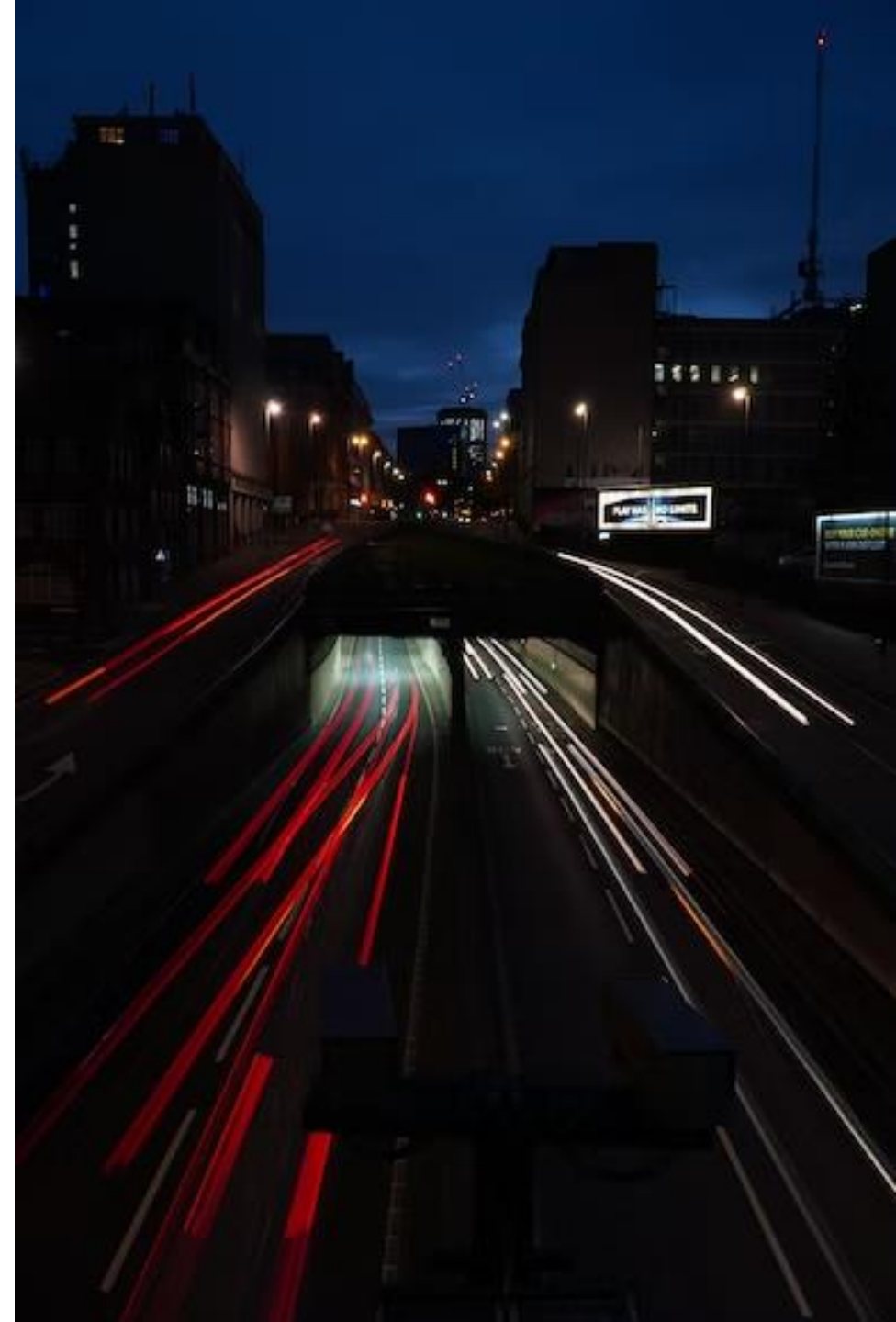
Smart motorways have proved controversial because many perceive them to be less safe than a conventional motorway.

There are three types of Smart Motorway:

- All-Lanes Running (ALR) – no hard shoulder, variable speed limits, emergency laybys
- Dynamic Hard Shoulder (DHS) – inside lane sometimes a hard shoulder and sometimes a running lane, variable speed limits, emergency laybys
- Controlled Motorways (CM) – traditional hard shoulder, variable speed limits

When the Government published its response to the Transport Select Committee's Inquiry *the roll-out and safety of smart motorways* it undertook to "work with Transport Focus to consider the benefits of more focused research to provide greater insight on safety perception".

The findings of the resulting research undertaken by Transport Focus are set out in this presentation.



Objectives

To help improve understanding of road user perceptions of safety and help inform the development of future policy relating to smart motorways

The key project objectives were to...

1. To understand the key themes driving perceptions of safety across smart motorways
2. To understand if perceptions vary depending on the type of smart motorway and driver type / level of confidence
3. To understand if perceptions vary depending on social factors
4. To uncover themes underlying what could be done to improve those perceptions

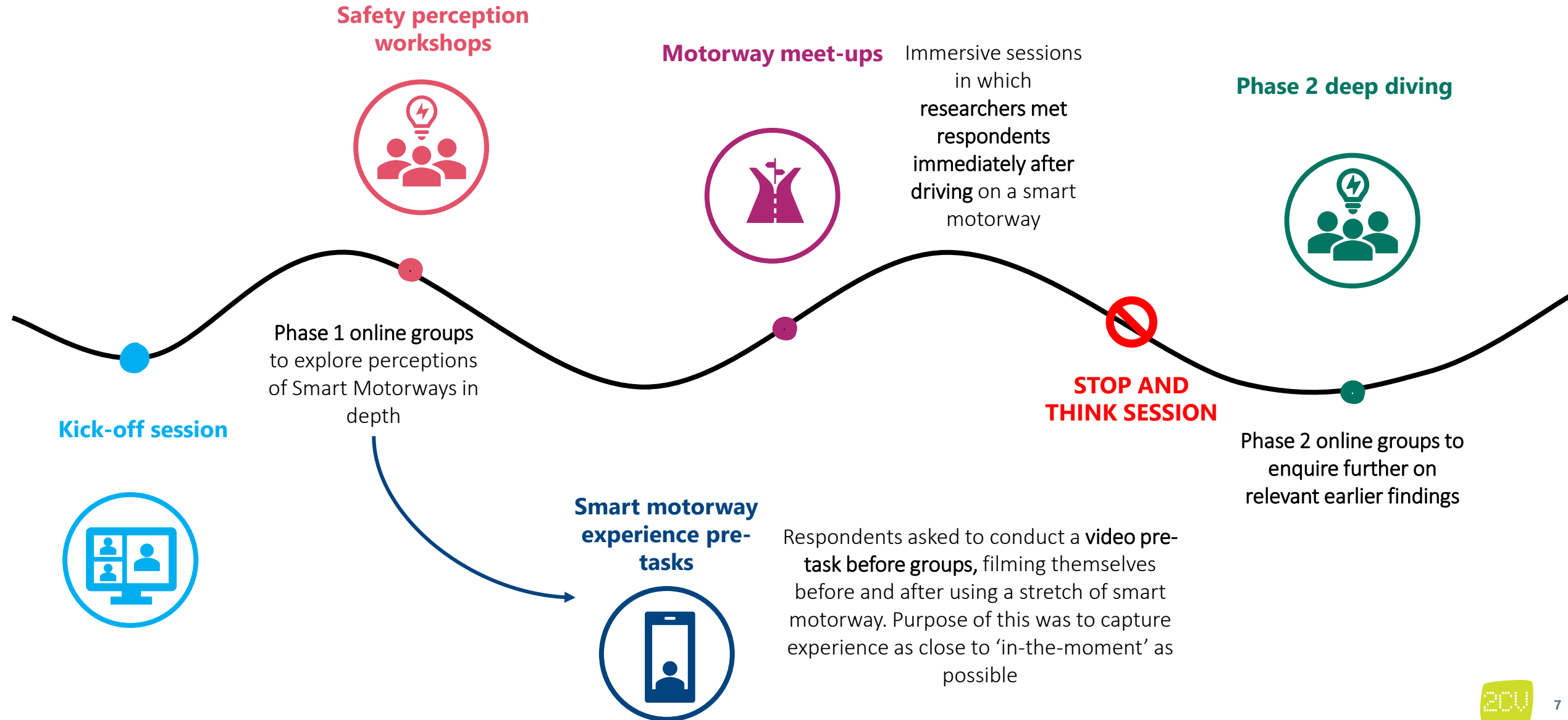




Methodology



Overview of our approach | An iterative, immersive approach



Sample

- Mix of drivers of different vehicle types: cars, lorries, motorcycles and professional drivers
- Mix of different confidence levels recruited attitudinally (a score of 5 and under for 'low' confidence and 6+ for 'high' confidence on a scale of 1 to 10 where 1 is very nervous and 10 is very confident)
- Mix of ages, length of time driving, socio-economic group (SEG) and frequency of Smart Motorway use



We've included quotes throughout and differentiated by high vs. low confidence

Quote

- Higher confidence, type of vehicle, primarily SM type

Quote

- Lower confidence, type of vehicle, primarily SM type

Summary sample table (groups)

Phase 1 - 8 x Safety Perception Groups (conducted online via Zoom)						Phase 2 - 6 x Further Deep Dive Groups (conducted online via Zoom)						
	Segment	Driver Type	Vehicle	SM type	Location & other considerations		Segment	Driver type	Vehicle	SM type	Location	Other considerations
1	Lower confidence	Mix of business, commuting and leisure drivers	car	Primarily ALR	For online groups, sample will be drawn from different locations across the SM network including London, the West Midlands and Leeds/Wakefield Gender (roughly equal split) Ages (older and younger) Mix of SEG Mix of frequency of SM use	1	Lower confidence	Mix of business and leisure drivers	car	Primarily CM	London	Gender (roughly equal split) Ages (older and younger) Mix of SEG Mix of frequency of SM use
2	Higher confidence		car	Primarily DHS		2	Higher confidence		car	Primarily DHS	Midlands	
3	Lower confidence		car	Primarily CM		3	Lower confidence		car	Primarily ALR	Leeds/Wakefield	
4	Lower confidence		car	Primarily DHS		4	Higher confidence		Motorcycle	Primarily DHS	London	
5	Higher confidence		car	Primarily ALR		5	Lower confidence		Motorcycle	Primarily ALR	Leeds/Wakefield	
6	Higher confidence		Motorcycle	Primarily CM		6	NA		Professional drivers and HGV drivers	Mix	ALR/DHS/CM	
7	Lower confidence		Motorcycle	Primarily ALR								
8	NA	Professional drivers and HGV drivers	Mix	ALR/DHS/CM								

Cars. Lower confidence = pragmatists & nervous; Higher confidence= opportunists/laid back/time pressed

Motorcycles. Lower confidence = Inexperienced riders /leisure riders; Higher confidence = delay dodgers/confident riders

All segments will be represented across the groups

Summary table for meet & greets

6 x meet & greets							
Session	Segment	Driver type	Vehicle	SM type	Disability	Location	Other considerations
1	Lower confidence	Business / Commuter driver	car	Primarily ALR	<i>3/6 participants to be affected by a physical or mental health condition</i>	London	Gender (roughly equal split) Ages (older and younger) Mix of SEG Mix of frequency of SM use
2	Higher confidence	Business / Commuter driver	car	Primarily DHS	<i>3/6 participants to be affected by a physical or mental health condition</i>	Midlands	
3	Lower confidence	Leisure driver	car	Primarily CM	<i>3/6 participants to be affected by a physical or mental health condition</i>	Leeds/Wakefield	
4	Higher confidence	Leisure driver	car	Primarily DHS	<i>3/6 participants to be affected by a physical or mental health condition</i>	London	
5	Lower confidence	Leisure driver	Motorcycle	Primarily ALR	<i>3/6 participants to be affected by a physical or mental health condition</i>	Leeds/Wakefield	
6	Higher Confidence	Business / Commuter driver	Motorcycle	Primarily CM	<i>3/6 participants to be affected by a physical or mental health condition</i>	Midlands	

Your audience

A few examples of some of the people we spoke to*:



- I drive pretty much everyday, mainly Monday to Friday. I'm usually on a small section of the motorway frequently
- There's no real difference between driving on different types of roads – I just get on with it
- I have to be on my toes when on a smart motorway, you don't know if a lane is going to be active or not – it feels confusing, especially if I haven't driven on a stretch of road regularly

High Confidence Driver



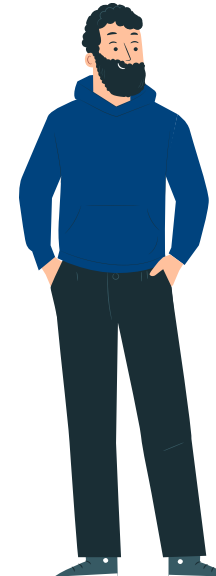
- I mainly use my motorbike for leisure purposes – meeting up with friends or go to events
- **Motorways are a means to an end for me**, sometimes the back roads can only get you so far
- As for smart motorways, I understand they help the volume of traffic but having a hard shoulder feels much safer, especially if an emergency vehicle needs to get through

Motorcycle Rider, High Confidence



- In a typical week, I drive almost everyday. Even though I work from home some days, I still have to take the kids to school or go shopping.
- **Driving on residential roads fits better for me, I feel like I'm in control** more. There's side roads, shortcuts you can take if you're stuck in traffic.
- I feel more at ease when there is a hard shoulder – I've never felt it's been safe to not have one permanently there

Low Confidence Driver



- I typically use my motorcycle more for leisure (will drive the car if I'm with my kids) a few times a week.
- I prefer to use it when the weather is good so less so in the winter.
- I have to be extra cautious on motorways which isn't very relaxing – constantly have to watch out for people speeding, undertaking. I feel a lot more vulnerable

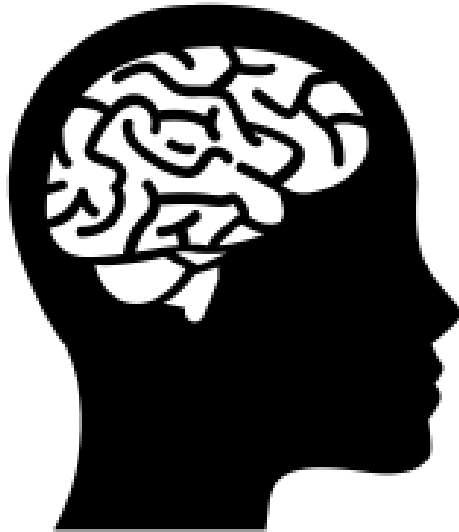
Motorcycle Rider, Low Confidence



Useful context on driving on motorways in general



Safety may be less 'top-of-mind' than convenience, but it is paramount



Convenience

- Especially for higher confidence drivers, convenience is initially a more immediate and top-of-mind topic than safety
- Motorways are designed to get to places quickly and this is what they want to be able to do on them

Safety

- While safety may be less top-of-mind (especially for more confident drivers), once it's put on the table, safety (and *feeling safe*) is vital
- Drivers have much to say about feeling safe – an emotional topic
- Ultimately, safety is more important than convenience

Convenience is a strong desire, but safety is a necessity. A benefit in convenience must show that it does not lessen safety, and ideally demonstrate that it improves it.

Closer look at safety

Feeling less safe involves feeling stress or anxiety that something dangerous could happen, ultimately, a fear of accident.

- Most common safety concern is **other drivers on the road** – drivers doubt others always have, and apply, a **proper understanding of how to drive on a motorway**.
 - Driving alongside **lorries** is a worry, particularly for the less confident drivers (as **lorries are wide, space is constrained** → feeling can be **intimidating** (being “sandwiched”))
 - The **number of vehicles on the road** is noted as both a general observation and a concern for some – both confident and unconfident drivers feel there are generally more cars on the roads over the years. Mentions (especially from less confident drivers) come up of feeling safer driving during lockdown as there weren’t many cars on the roads
 - **Inattentive behaviours** such as looking at phones, high speeding, sharp breaking etc. are cited as worries
 - **Fact that drivers do not need to drive on motorways to obtain a licence** also comes up to underline this ‘other driver’ safety concern
 - On motorways, vs. quieter roads, **drivers feel “less in control”** – bring up more vehicles on the road, faster speeds as reasons for this
- **Weather conditions** (esp. rain and fog) **accentuate the safety concern**. Conditions can make confident drivers feel they have to be extra alert, whereas unconfident drivers are more likely to opt to take a different route (if they cannot, some mentioned feeling really anxious about driving)
 - **Night-time also impacts safety**, particularly in winter time when it gets dark earlier. This is especially important to consider when driving on stretches of motorway that have **little lighting**

It is against this backdrop that Smart Motorways come into play. Smart Motorways operate in an area where there are already safety concerns. The ‘other driver’ concern will come to be especially pronounced in Smart Motorways...

Hard shoulders play an important role in increasing the feeling of safety

- Having a hard shoulder is **what people are used to** → familiarity is important
- Harks back to learning to drive – the purpose of a hard shoulder as a safe refuge is **what people have been taught in driving lessons**
- Hard shoulder seen as a **'just in case' safety feature** – if anything were to happen, it's there
 - Not only a safety zone, but also a place to go if needed for **emergency breaks** such as stopping if feeling unwell, children need to use the bathroom etc.
 - Several mentions that in some instances a break down does not happen immediately, so even if they are on far-right lane, they are likely to be able to transition to hard shoulder (evidence of **actual experience doing this**)
 - Hard shoulder's role as an **access lane for emergency vehicles** is also highlighted as vital
 - Hard shoulder is also a **safety zone** if one needs to leave car and get themselves personally to safety
- **A-road dual carriageways** as a comparison: the general consensus is that while there may be no hard shoulder on these roads, **the risk tends to be lower than on smart motorway**:
 - Often, people aren't driving as fast
 - A-roads can feel less overwhelming (less traffic, fewer lorries) and a sense that you may likely be on this type of road for less time compared to a motorway
 - A sense that other drivers may be more likely to go to 'autopilot' and lessen their level of attention when driving long stretches on a motorway
 - On A-roads there's often an area (e.g. grass verge) that can be used if one needs to leave the vehicle and get to safety

It's not even just accidents, I've been on a motorway many times with children who need an emergency toilet stop or someone who's sick

Low Confidence, Car, primarily CM driver, Phase 2

[About SMs] The only thing I'd be anxious [about]..., and we've seen it on the news – is when a car is broken down and they're stood there and there's a juggernaut coming at 50 miles an hour and hasn't realised. It's open to accidents.

High Confidence, Motorcycle, primarily DHS driver

Given the ingrained role of a hard-shoulder, removing it is met with strong resistance to change



Objective 1) Key themes driving perceptions of safety across smart motorways



Key themes: Unease and lack of understanding/ trust

While there is acknowledgement that smart motorways ease congestion, and most journeys ultimately go ahead without issues, the overarching themes underlying perceptions are:

Unease



- The thinking is that no hard shoulder at all or at times makes drivers feel like they have **"nowhere to go"** if they break down → Increases the risk of accident
- Concern regarding **how emergency vehicles will be able to quickly arrive to accident site** if the hard shoulder is live
- General unease about **not trusting others to drive cautiously comes to the fore in smart motorways** where there are more considerations for drivers to be aware of – e.g. if hard shoulder is live or not, paying attention and adjusting to variable speed limits

Lack of understanding



- Even though drivers may feel they know what a Smart Motorway is, there is **little understanding of the variation** in types
- Understanding of the **benefit of Smart Motorways and of the rationale for putting them in place is superficial** – drivers know Smart Motorways are supposed to ease congestion but lack detailed understanding of their safety
- Sometimes, there's a lack of understanding in-the-moment of whether a hard shoulder is 'live' or not, and a suspicion others may not know either

Lack of trust



- More driver **belief** needed regarding the benefit of Smart Motorways especially in relation to safety
- There's also a **lack of understanding - and therefore trust - in how Smart Motorways are operated** (e.g. how the 'smart' tech works and how reliable it is; in-the-moment doubts regarding the logic and timeliness of updates on variable speed limits and reasons behind lane closure)
- At worst, scepticism comes up in relation to motives for putting them in place (collect revenue from variable speed limit offences; avoid widening motorways) - minority

Themes come up across drivers of varying confidence levels. However, those with lower confidence feel them more acutely, whereas drivers with higher confidence are more likely to accept and make do.

A mix of both actual experience and worrying about eventualities inform perceptions

Actual personal and second-hand experience inform themes. Hypothetical concerns and a general resistance to change also influence perceptions.

Unease

Lack of understanding

Lack of trust

- Personal experience of using hard shoulder on a conventional motorway (e.g., in cases of breakdown or flat tyres) – concerning to imagine where they'd go and what they'd do without the hard shoulder
- Witnessing cars using hard shoulder in the past so knowing they are of use
- Witnessing, hearing and reading about accidents (including fatalities) on a hard shoulder in use as a live running lane due to broken-down car/ passengers not having anywhere to go
 - Observation that news stories/ TV coverage related to Smart Motorways are rarely positive
- Resistance to change – Hard shoulder is deeply ingrained as a safety zone, difficult to move away from this
- Hypothetical concerns – even if they have not had issues on Smart Motorways, there is a sense of unease when thinking about the eventualities (*what if...*: I need the Hard Shoulder; another vehicle needs it; emergency services need it) – more pronounced in lower confidence drivers
- Concerns about other drivers are especially triggered on Smart Motorways, given these roads are newer, different, and introduce change and a degree of added complexity for drivers to understand and adhere to:
 - First-hand experience of others not always adhering to variable speed limits on Smart Motorways comes up
 - First-hand experience of others not always respecting the red X signs comes up

What would normally be the hard shoulder was operating as a live lane. There was a bumper to bumper crash and [the passengers] had nowhere to go to pull the vehicles off the road. So they [got out of the car and] were actually out assessing the damage....A lorry driver speeded down, smashed into them and killed them both. It's not worth the risk.
Low Confidence, Car, Primarily DHS driver, Phase 2

In their own words

Unease

When I did my journey on Sunday, it was just a normal 3 lane stretch of motorway with a hard shoulder but there was a gentleman 3 or 4 cars in front in the offside lane who suddenly put his hazard lights on and made a dash for the hard shoulder, I presume he broke down and had to get off, where would he have gone on a 4 lane motorway?

Low Confidence, Car, Primarily CM driver

I think without a hard shoulder, if a vehicle does break down, you've got more vehicles swerving, you've got more vehicles adjusting speed, slamming brakes on, that tends to happen.

Low Confidence, Motorcycle, Primarily DHS driver, Phase 2

Lack of understanding

I don't understand how it's being called a smart motorway if they're removing the hard shoulder because it doesn't seem like a very smart thing to do because if someone does break down, like people aren't necessarily always going to break down right near a layby. So, if they do break down and it's not a hard shoulder that I don't understand what happens then.

High Confidence, Car, Primarily ALR driver

If people knew better how they worked, more information was given out, they could understand...who's controlling it, how it is controlled and whether it's all by AI, is there a final decision taken by a human being who can overrule? These smart motorways were brought in, as far as I'm aware, there was no major consultation with the end users.

Low Confidence, Car, Primarily CM driver

Lack of trust

Sometimes I think about it and worry about the fact that we're relying on the technology to make the decisions...and that's all great if it works, but we all know that technology doesn't always work and the fact that there are people behind [the tech] is great but how responsive are they?

Low Confidence, Car, Primarily CM driver

I mean quite often you can get on the motorway and they'd have put a 50 or 60 mile hour speed limit on and there's not any cars there. You think why have they got the speed limit down this low?

And other times where you could probably do with it and they haven't got anything like that. You have cars flying down some lanes and not going quite as fast in the other side.

High Confidence, Motorcycle, Primarily ALR driver



Objective 2) do perceptions vary depending on the type of smart motorway?



Perceptions by type or smart motorway

Across motorway types...

- The variable speed limit sounds good in theory, but in reality, many feel they are counterproductive due to the consistent slowing down/speeding up (a sense that this can cause accidents)
- Experience of variable speed limits is that they can feel illogical – desire a justification for why the speed limit has changed
- Emergency laybys lack clarity about how they are to be used, how far apart they are, how many cars can be in one at a time

All-Lanes Running

- Understanding of the additional lane and variable speed limit help ease congestion
- !! Not having a hard shoulder increases worry of a *'what if'* emergency when driving
- !! Emergency laybys are not seen as a suitable substitute for a hard shoulder – uncertainty of how far apart they are and if one is full, what would happen

Dynamic Hard Shoulder

- Slight comfort in there is an option to have a hard shoulder, even if it is only some of the time
- When there is a hard shoulder, drivers feel safer if it's in use as a live lane when the traffic is at a slower speed as the risk of accident is lower
- !! Lack of clarity and justification for when it is and isn't a live lane
- !! Variability of hard shoulder's purpose introduces ambiguity and complexity
- !! Likelihood for several of using the hard shoulder when it's live is low, unless exiting the motorway at next junction

Controlled Motorway

- Most positive perception of the three types of smart motorway – the closest to a 'normal' motorway
- Permanent presence of hard shoulder eliminates the worry about where to go in an emergency

In their own words

All-Lanes Running



You sometimes see signs like no hard shoulder for X amount of miles or whatever, and yeah, people do use it. Yeah. I mean obviously if someone breaks down, that's an issue.

High Confidence, Car, Primarily ALR driver

Dynamic Hard Shoulder



The lane had an X on it, so I couldn't go into it. But there wasn't a lot of traffic the day I did my drive. But I have been on that motorway when you can use it as like a live lane, so that the traffic can be decreased and the flow eases. But I always, always think, I hope I don't break down because I've nowhere to go
Low Confidence, Car, Primarily DHS driver

[about DHS] Very few people use the hard shoulder as an inside lane because all of a sudden it turns into a slip road for one of the exits, so they don't bother going on that hard shoulder because they know when they get to the next junction they're gonna have to come out again

High Confidence, Motorbike, Primarily CM driver

Controlled Motorway



I like the fact there is a hard shoulder there in case of emergencies and you need to pull over and that's kind of the difference with the smart motorways
Low Confidence, Car, Primarily CM driver



Objective 3) Do perceptions vary depending on social factors?



Factors affecting perceptions

- Younger, professional and higher confidence drivers feel less strongly about safety concerns on smart motorway networks than lower confidence drivers; however, all see safety risks
- Concerns are **felt much more acutely** by lower confidence drivers – and can act as a barrier to drive on Smart Motorways
- **Witnessing, reading and talking about** incidents and articles on Smart Motorways has a bigger effect on feelings of safety than direct first-hand experience of Smart Motorways. Few drivers have direct experience of accident / breakdown on Smart Motorways; but most have read about / discussed / witnessed incidents and can result in a focus on worst case scenario
- **Importantly, direct experience of having used the hard shoulder on regular motorways** makes drivers wonder what they would do if they had a similar experience on a smart motorway
- **Time of day** impacts feelings of safety. Night-time in particular can heighten concerns due to lower visibility amongst older drivers in particular; yet on the other hand, is perceived to be calmer, with fewer vehicles on the road – so can feel safer amongst higher confidence, younger and professional drivers.
- **Nature of journey** – general driving awareness is heightened during peak / busy periods on Smart Motorways amongst all drivers, and a heightened sense of personal safety is experienced amongst lower confidence drivers. Familiarity with stretches of smart motorway increases confidence amongst all drivers but can decrease attention span due to the effect of “driving on auto pilot”.
- **Accompanied v. Lone Driving** – motorists state being more cautious with children in the car or more easily distracted if friends are in the car. Lower confidence drivers state that having a passenger in a car helps reduce anxiety and improve feelings of safety / security by providing moral support / company.
- Perception of safety on Smart Motorways is heightened by **recency effect** on articles / stories / witnessing situations. Being able to recall reading about safety of smart motorways in press / social media heightens worries.

It is so true actually yeah, the stuff I have heard has always been negative, there's been no kind of 'journey times, Birmingham to London reduced by 20 minutes or something'

Low Confidence, Car, Primarily CM driver, Phase 2

Yeah, I think it's the safety thing because there's been a number of programmes on the TV that people say they've got into the refuge part, but because they're using that same lane [vehicles] come up behind them and smacked into the back of them.

High Confidence, Car, Primarily ALR driver



Objective 4) Themes underlying what could be done to improve perceptions



Education / Building Trust

Strong feeling across drivers that there is a need for more education on smart motorways and how to drive on these motorways. **Key knowledge gaps** are as follows:

What

- What is a Smart Motorway
- What are the different types
- What technology is used/ how reliable is it
- What safety measures are in place to ensure the tech is effective
- How are these motorways controlled when it comes to implementing variable speed limits

Why

- Why they were brought about (aside from easing congestion).
- What's the rationale in relation to safety
- Evidence of benefits including statistics

How

- Best practice, how to use Smart Motorways
- Smart Motorways for future drivers – how they'll be integrated into driving training
- Reliability of existing technology used on smart motorways

Spontaneous ideas/ views for where to inform and educate include:

- The 'Pass Plus' element of a practical driving test to incorporate smart motorway driving (view that it should be mandatory rather than optional, especially now smart motorways are becoming more common).
- Informative advertising (in a similar style as the 'Green Cross Code' ads) on TV and social media to educate on Smart Motorways

Clarity and justification of changes and disruptions

- There's an appetite for **further clarity and justification behind decisions** such as opening the hard shoulder to be live, lane closures and a change of speed limit
- This is in response to observations that sometimes information feels like **it's not up to date or not properly justified** (e.g., a reduced speed limit without understanding why)
- There is also a need for clearer information on how smart motorways are **operated and managed, especially when there has been an incident**. There is some concern on how incidents are picked up (whether by tech or person)
 - When asked about **'Stopped Vehicle Detection Equipment'**, most were unaware of the technology and thought information about it should be more widely known
- Clarity here is a **step towards increasing trust and confidence** in how smart motorways are operated

[Sometimes] you're driving along and all of a sudden the speed will drop to 50, you think there's an accident ahead and then there's nothing there, then it goes down to 40 and you think, 'what's going on?' and eventually you get back to 70

Low Confidence, Car, Primarily CM driver

They don't open [the hard shoulder] if there's a vast volume of traffic. They do all sorts of random things and it's not down to weather, it's not down to the volume of traffic, it doesn't seem to follow any sort of process at all.

High Confidence, Motorcycle, Primarily CM driver

I know on the A1 towards the M25, sometimes say for example, it will say 'object in the road' or something like that and it will give you an idea of what you're looking for, it will say 'object 2 miles ahead'

Low Confidence, Car, Primarily CM driver, Phase 2

More information on emergency areas is also required

- Seen positively in and of themselves but **not as a substitute for a hard shoulder**
- Seen as **useful but more so if you happen to be near enough** to one that is also free when needed
- Could be used as a hard shoulder alternative in case of vehicle breaking-down and being able to get to it, but the problem of not having a lane for emergency vehicles remains
- Many **questions** arise regarding emergency laybys which suggest they are not clearly understood
 - How large they are (even after the size is made explicit, drivers wonder how many cars can fit in that area)
 - How far apart they are
 - Where precisely they are located (e.g., M25 J4-J5)
 - Best practice in how to use them and how to re-enter the motorway (especially for lorries)
 - What to do if area is needed but it is already occupied by vehicles

*What if you pass it and there was a lorry there and a broken down vehicle changing the tire or something and that fills it the entire thing up? So if there's another breakdown... **what do you do?** Do you try and drive till the next one?*

High Confidence, Car, Primarily DHS driver, Phase 2

*I mean they're **better than nothing** but I don't feel they're a good substitute for a hard shoulder. I don't know the distance between them. Obviously if it were a longer distance you might not be able to make it*

Low Confidence, Car, Primarily ALR driver, Phase 2



Let's talk.



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