

Autonomous Shuttle Passenger Survey

SURVEY RESPONSE REPORT

06 June 2021 - 05 July 2021

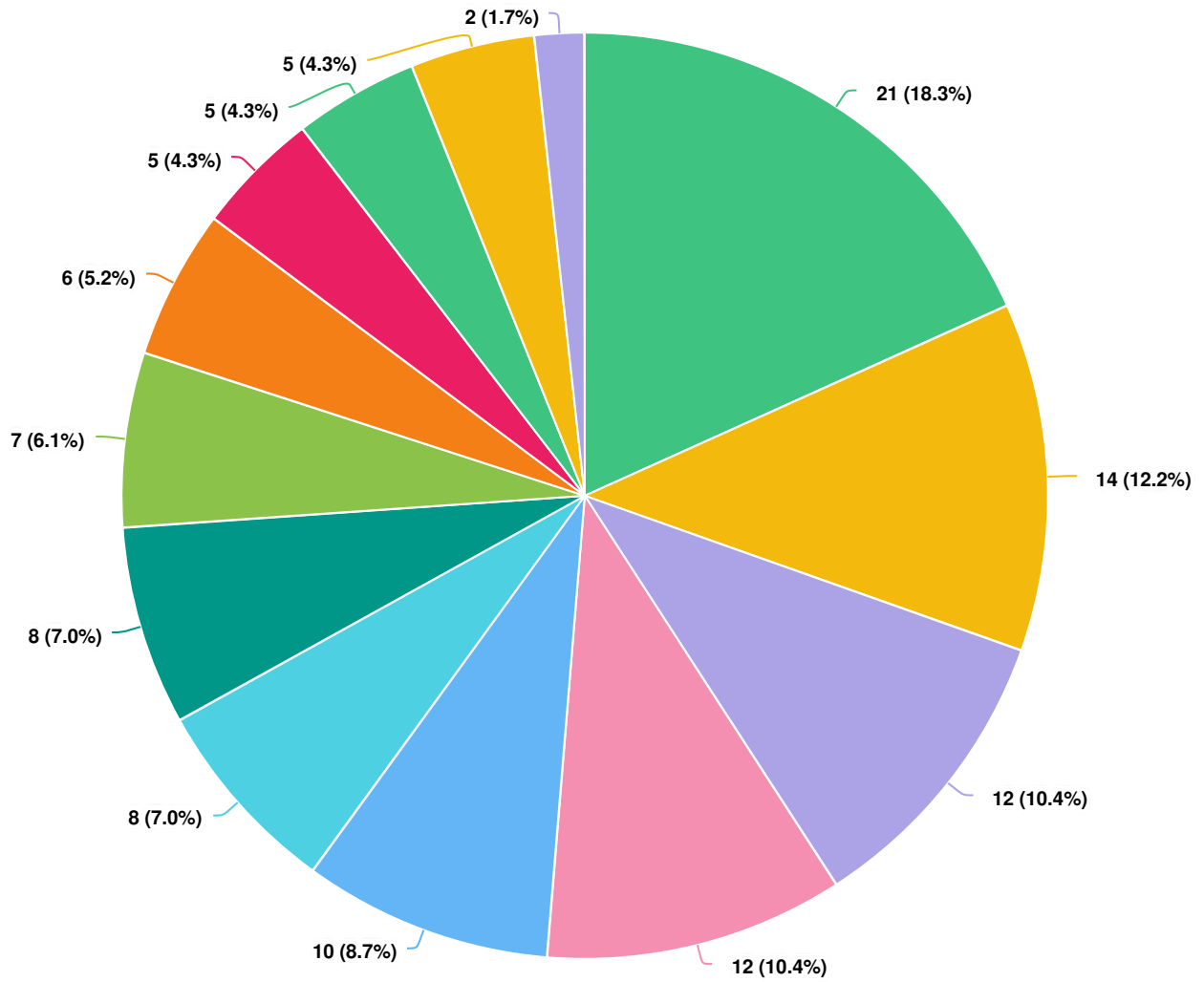
PROJECT NAME:

GCP / SMART Cambridge Autonomous Shuttle Trial



SURVEY QUESTIONS

Q1 When did you make your journey on the autonomous shuttle?

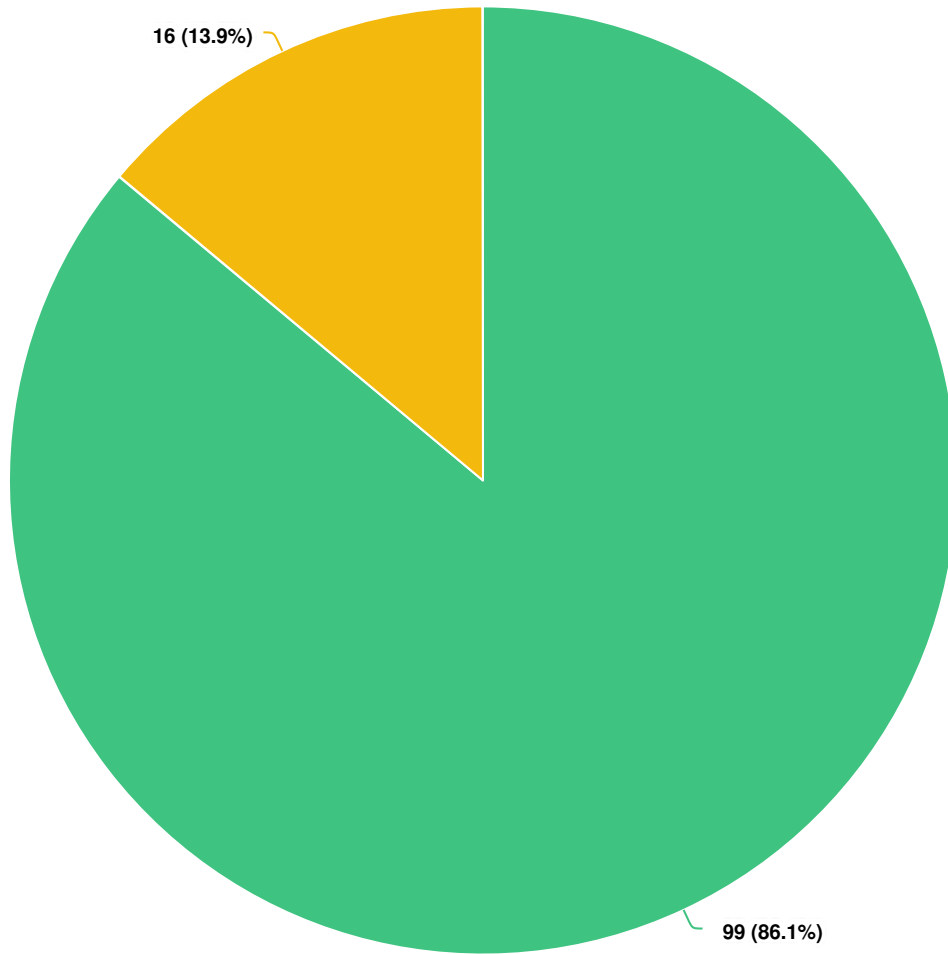


Question options

- 2021-06-24
- 2021-06-21
- 2021-06-28
- 2021-06-29
- 2021-06-23
- 2021-06-15
- 2021-06-22
- 2021-06-10
- 2021-06-17
- 2021-06-09
- 2021-06-14
- 2021-06-16
- 2021-06-08

Mandatory Question (115 response(s))
Question type: Date Question

Q2 Which shuttle did you take your trial journey on?

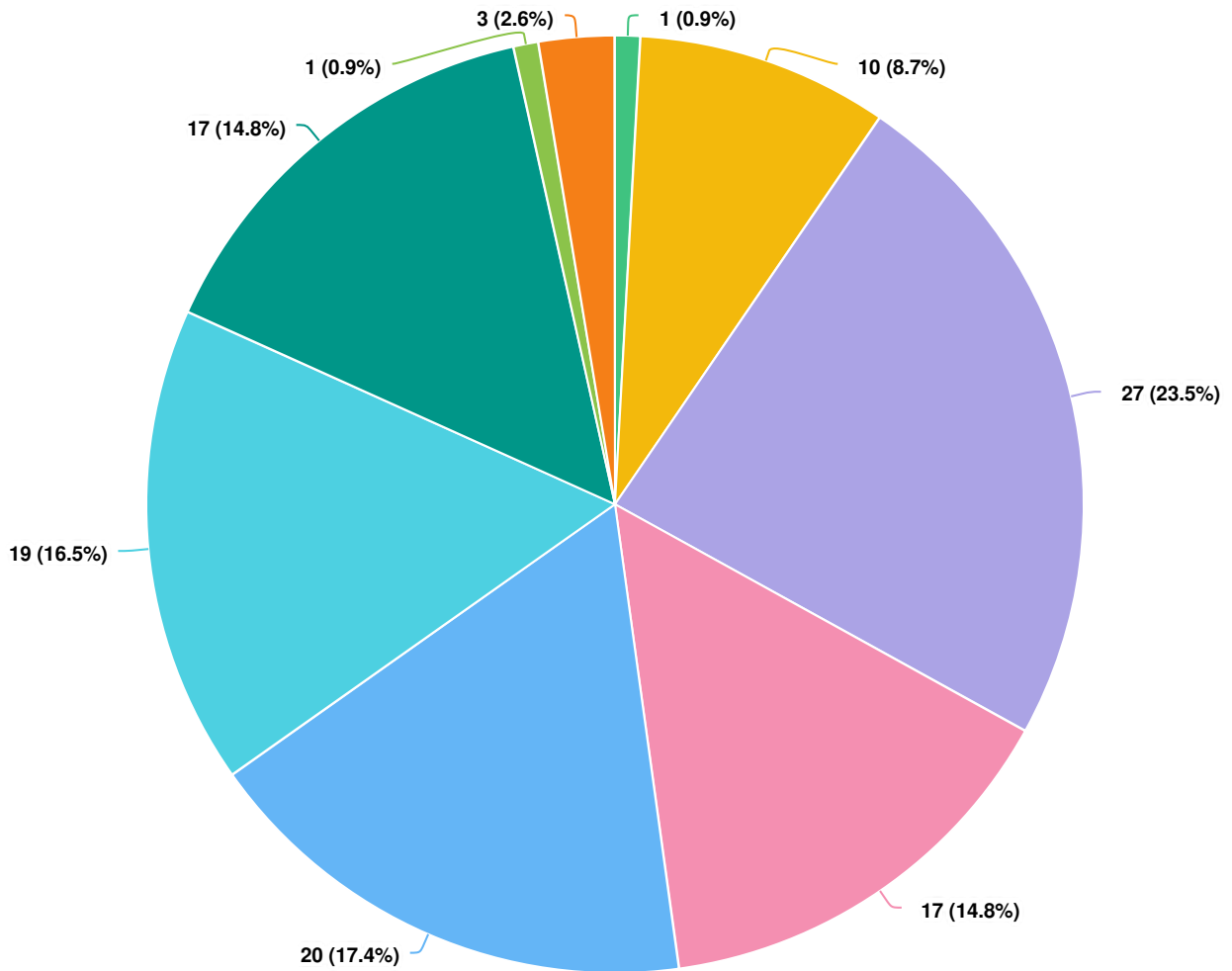


Question options

- Shuttle One (Union Jack design)
- Shuttle Two (Silver/Black design)

*Mandatory Question (115 response(s))
Question type: Radio Button Question*

Q3 Which of these age brackets are you in?

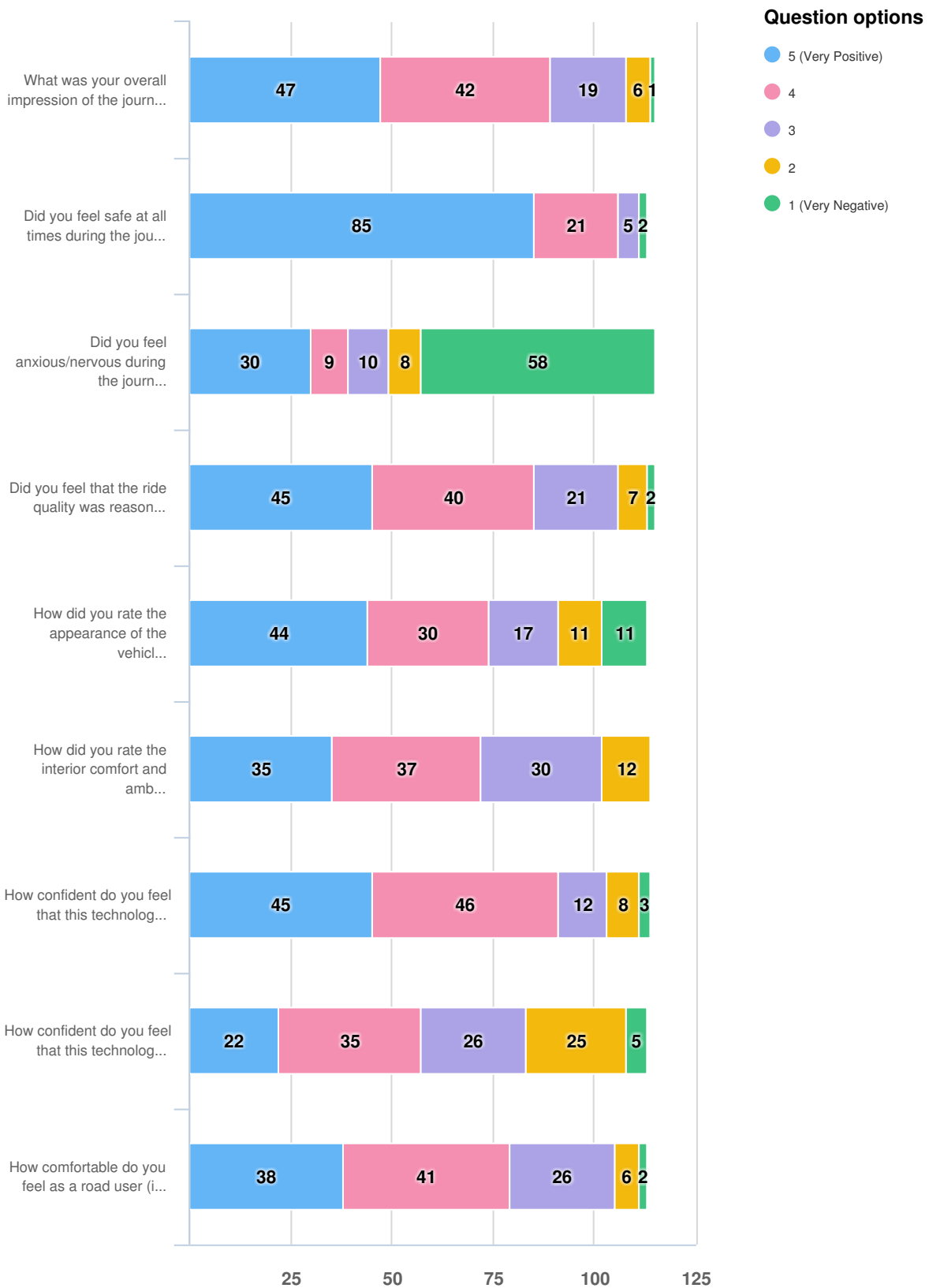


Question options

- Under 15
- 15-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75 and above
- Prefer not to say

Optional question (115 response(s), 0 skipped)
Question type: Radio Button Question

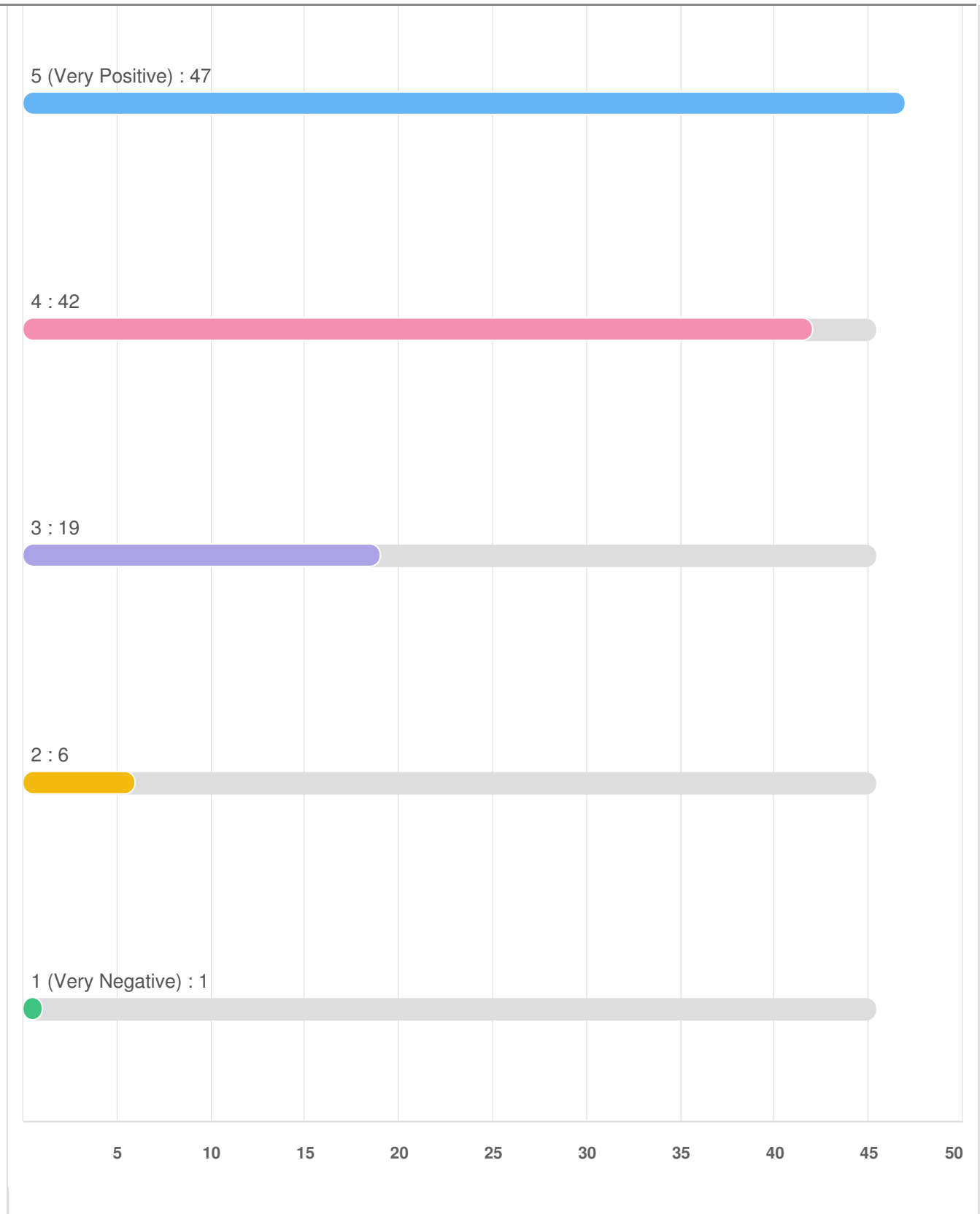
Q4 Based on the journey and route taken please, answer the following questions using a scale of 1 to 5, where 1 is Very Negative and 5 is Very Positive



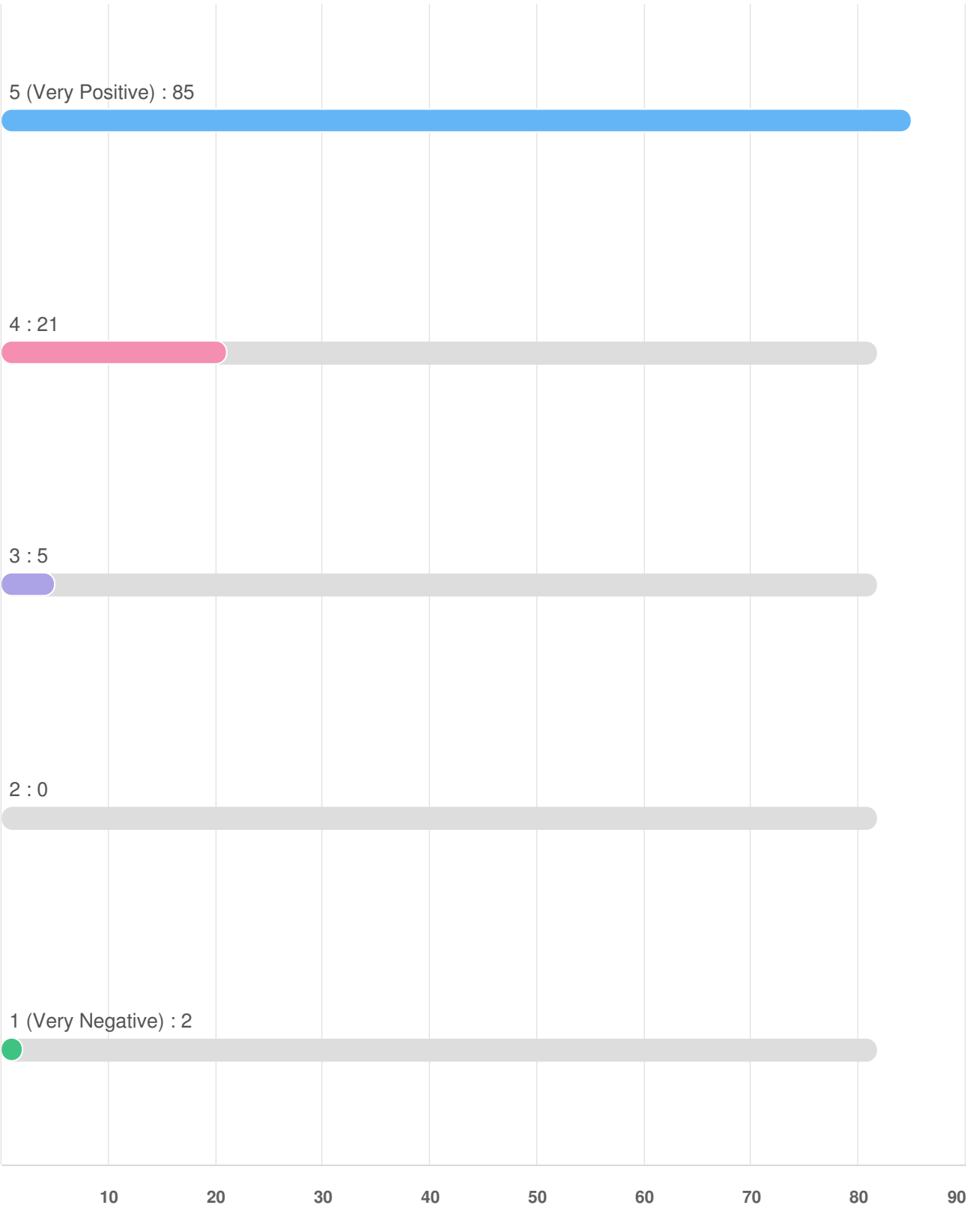
Optional question (115 response(s), 0 skipped)
 Question type: Likert Question

Q4 | Based on the journey and route taken please, answer the following questions using a scale of 1 to 5, where 1 is Very Negative and 5 is Very Positive

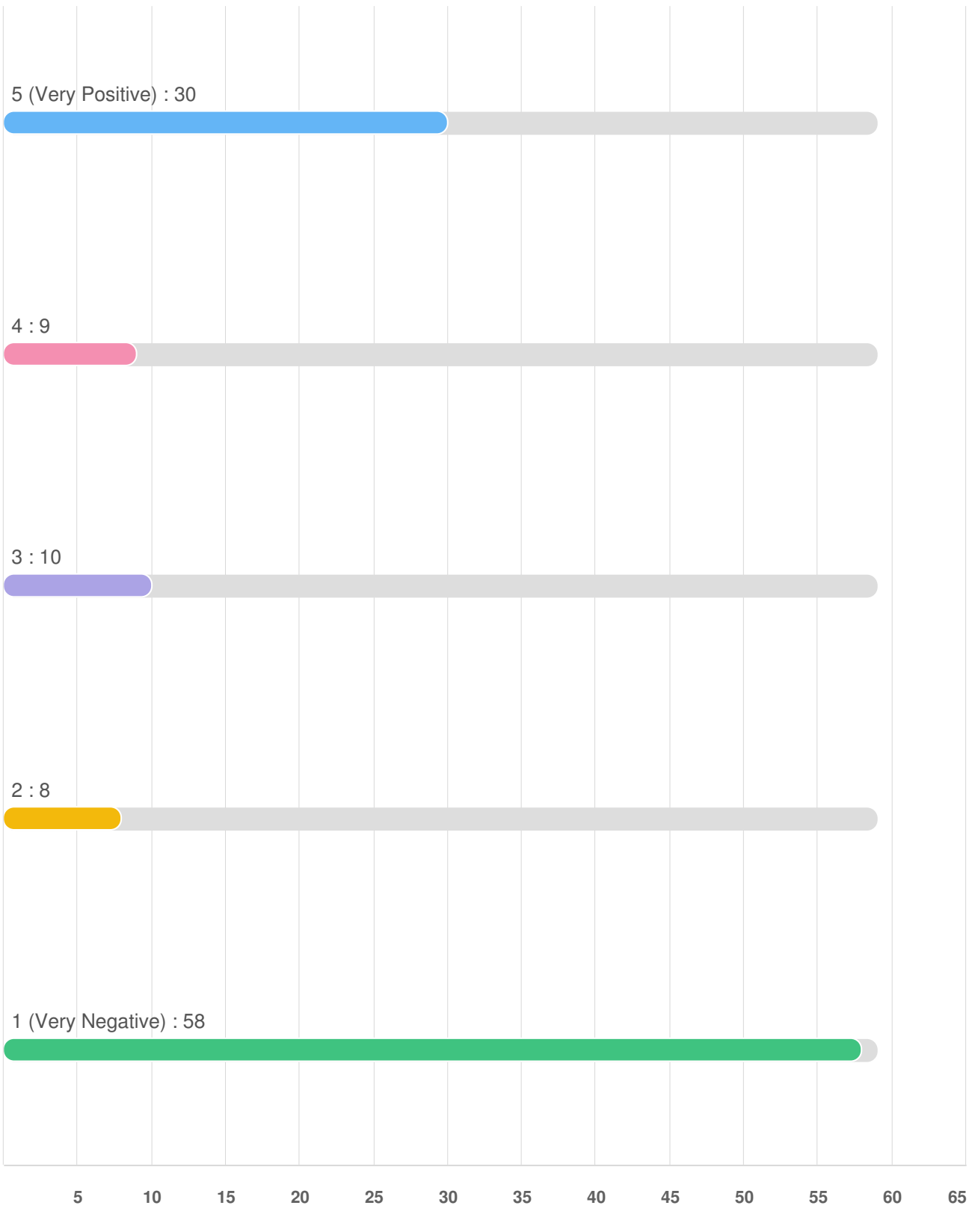
What was your overall impression of the journey?



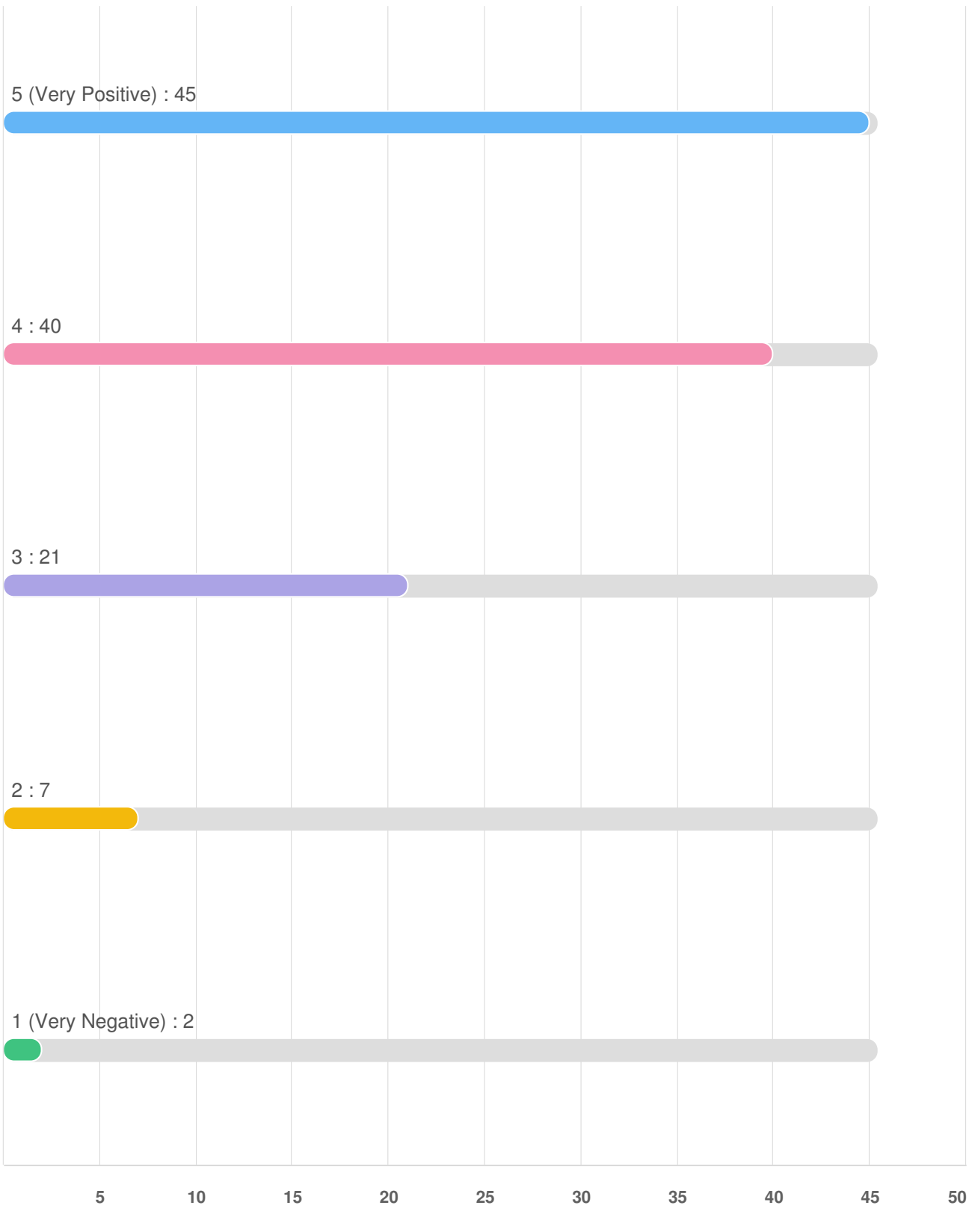
Did you feel safe at all times during the journey?



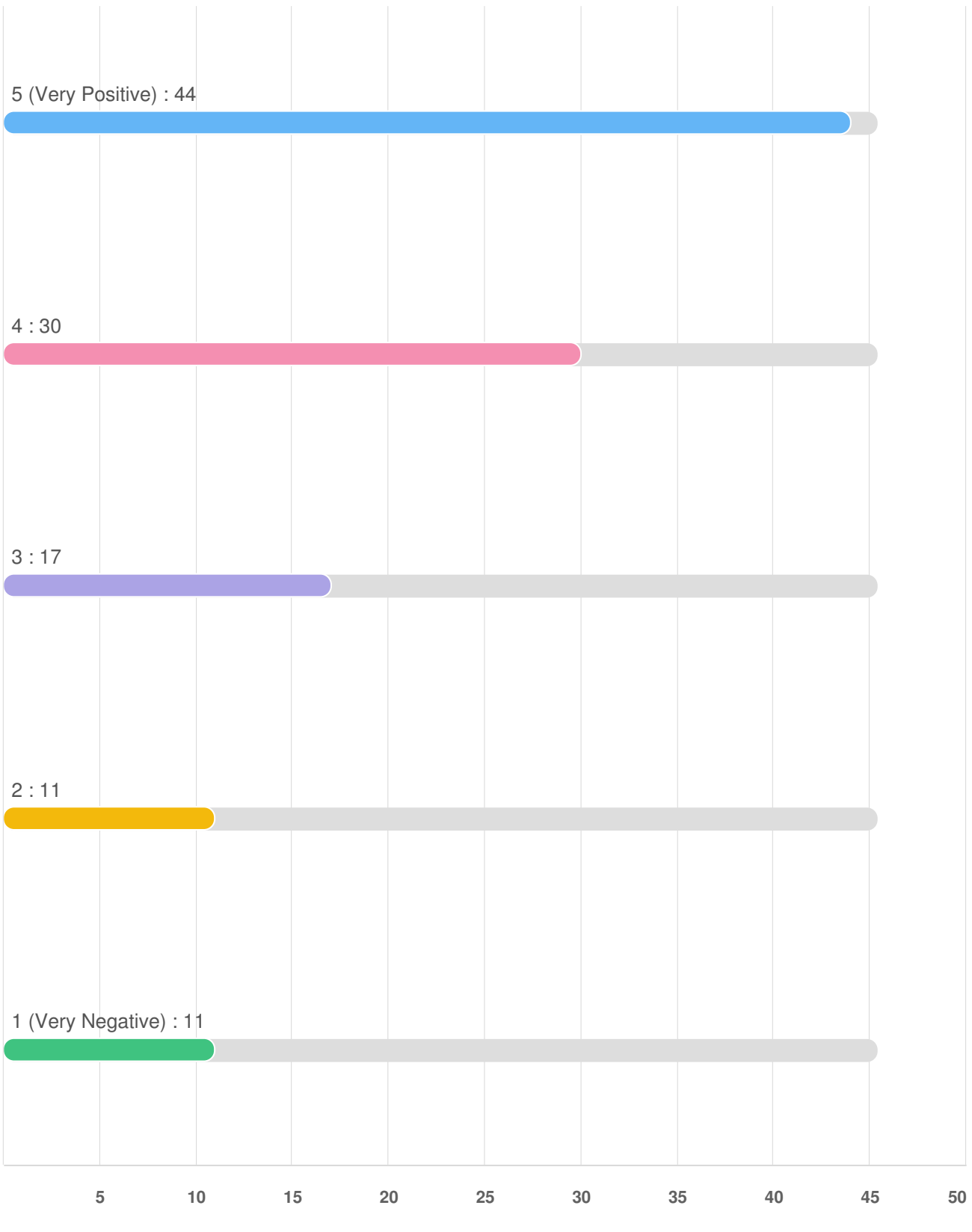
Did you feel anxious/nervous during the journey?



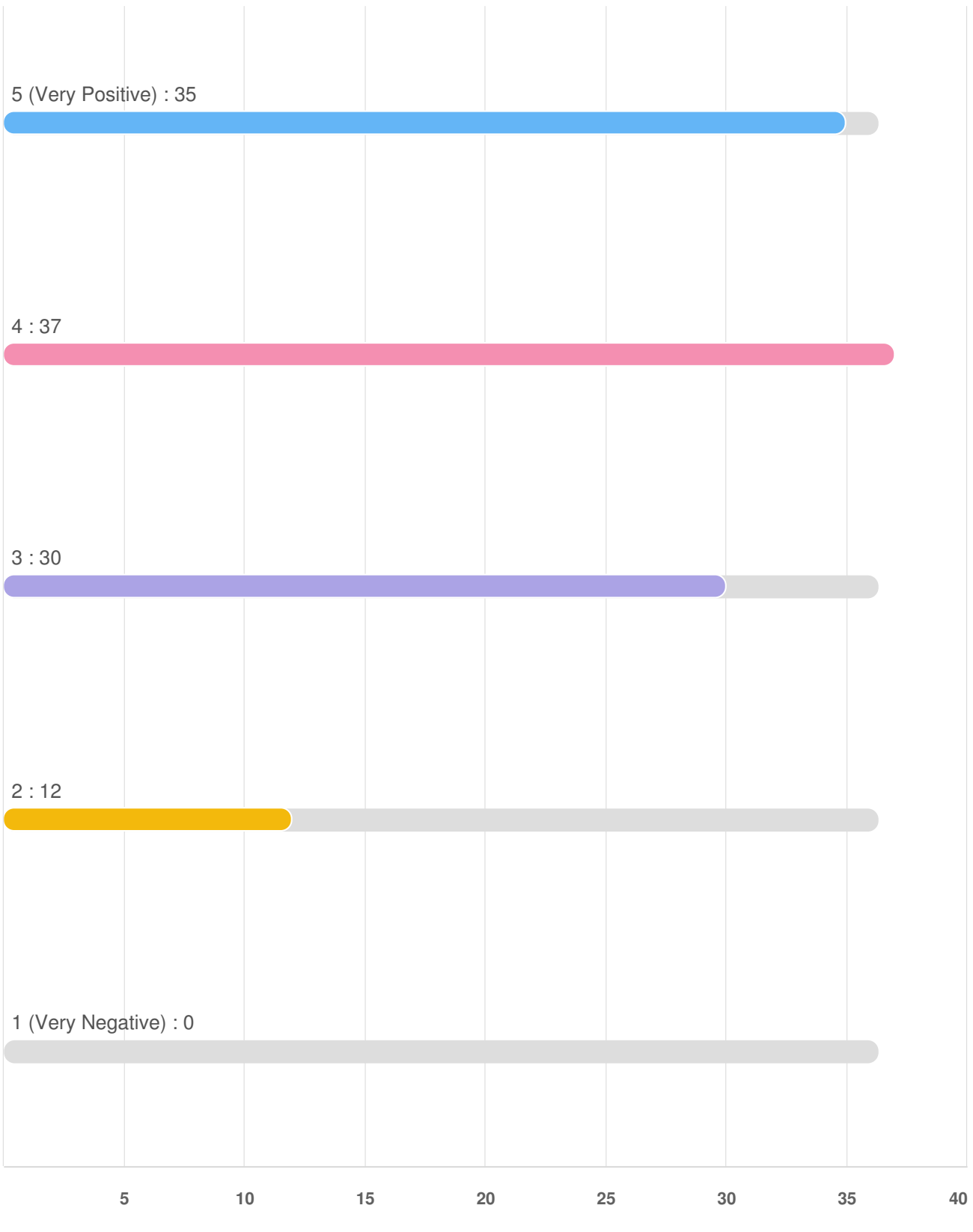
Did you feel that the ride quality was reasonably smooth?



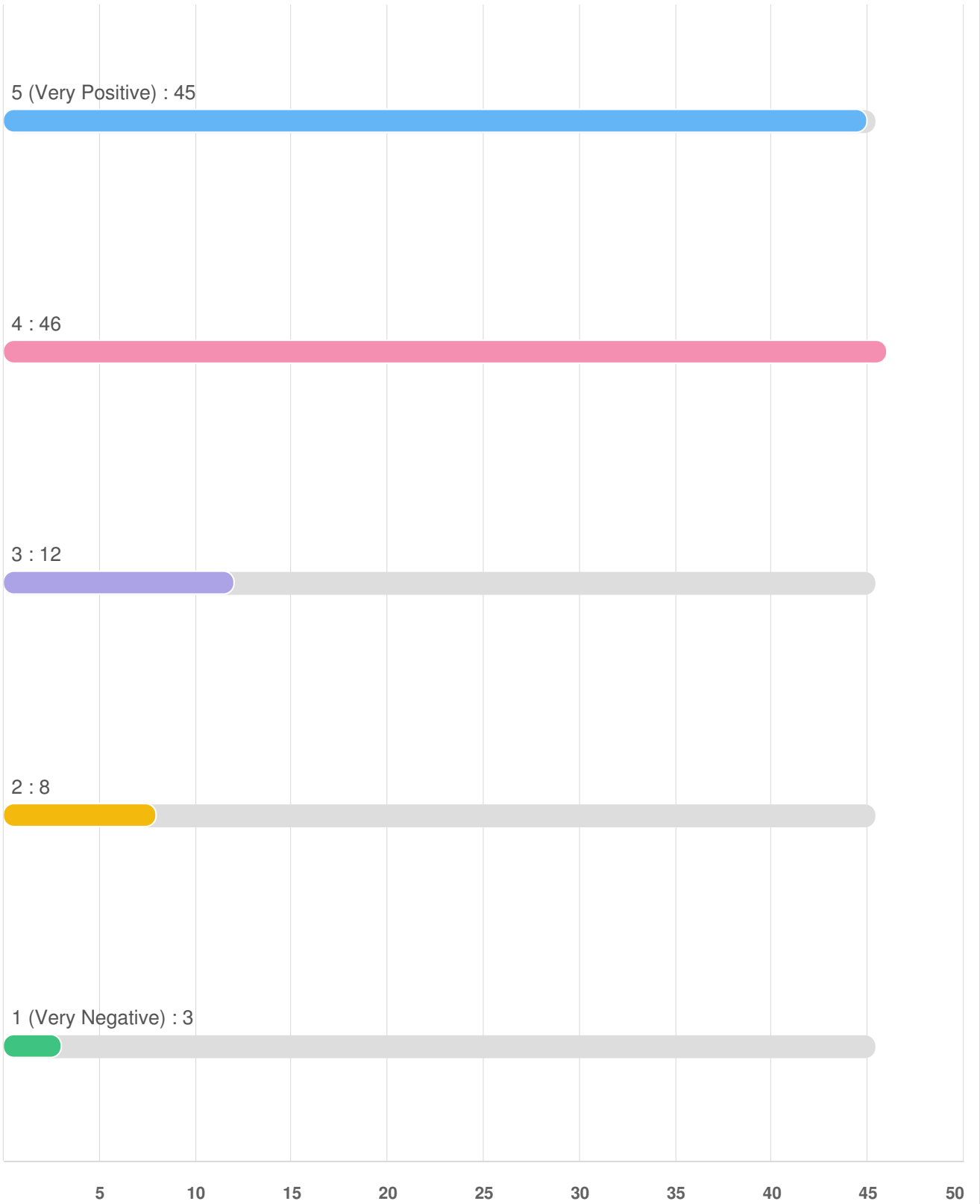
How did you rate the appearance of the vehicle?



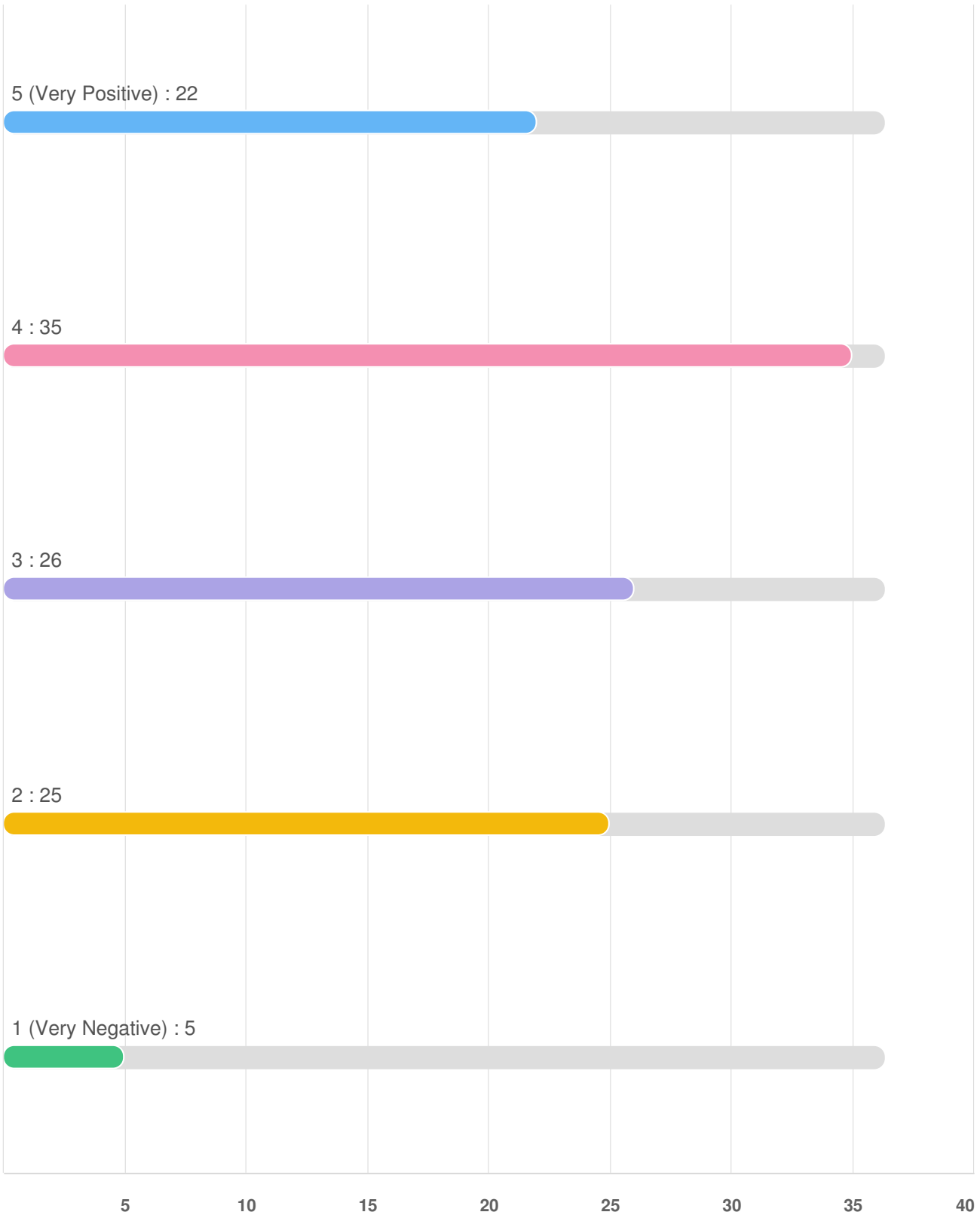
How did you rate the interior comfort and ambience of the vehicle?



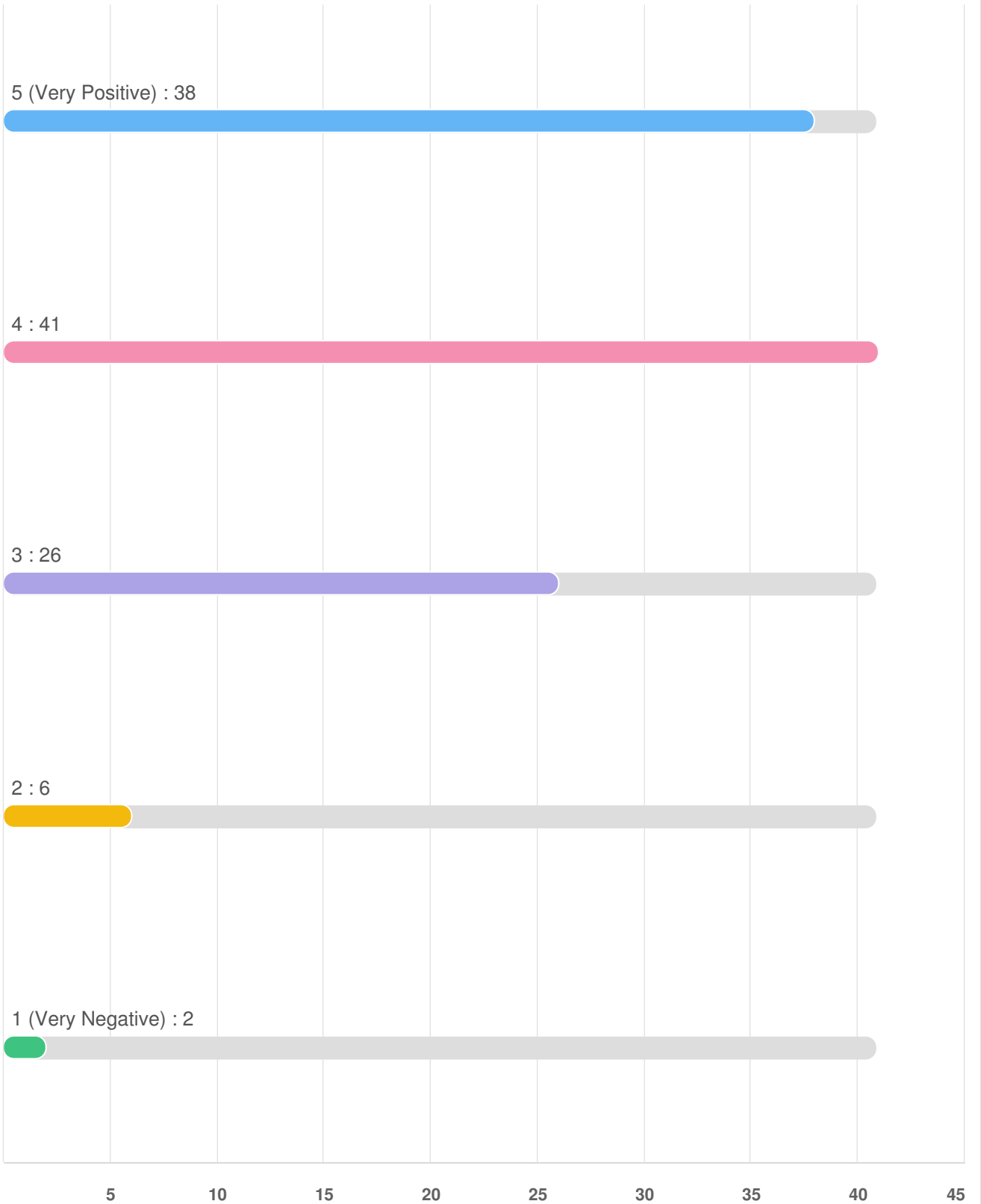
How confident do you feel that this technology can provide a safe alternative to a manually driven public transport vehicle on a route similar to the one taken today?



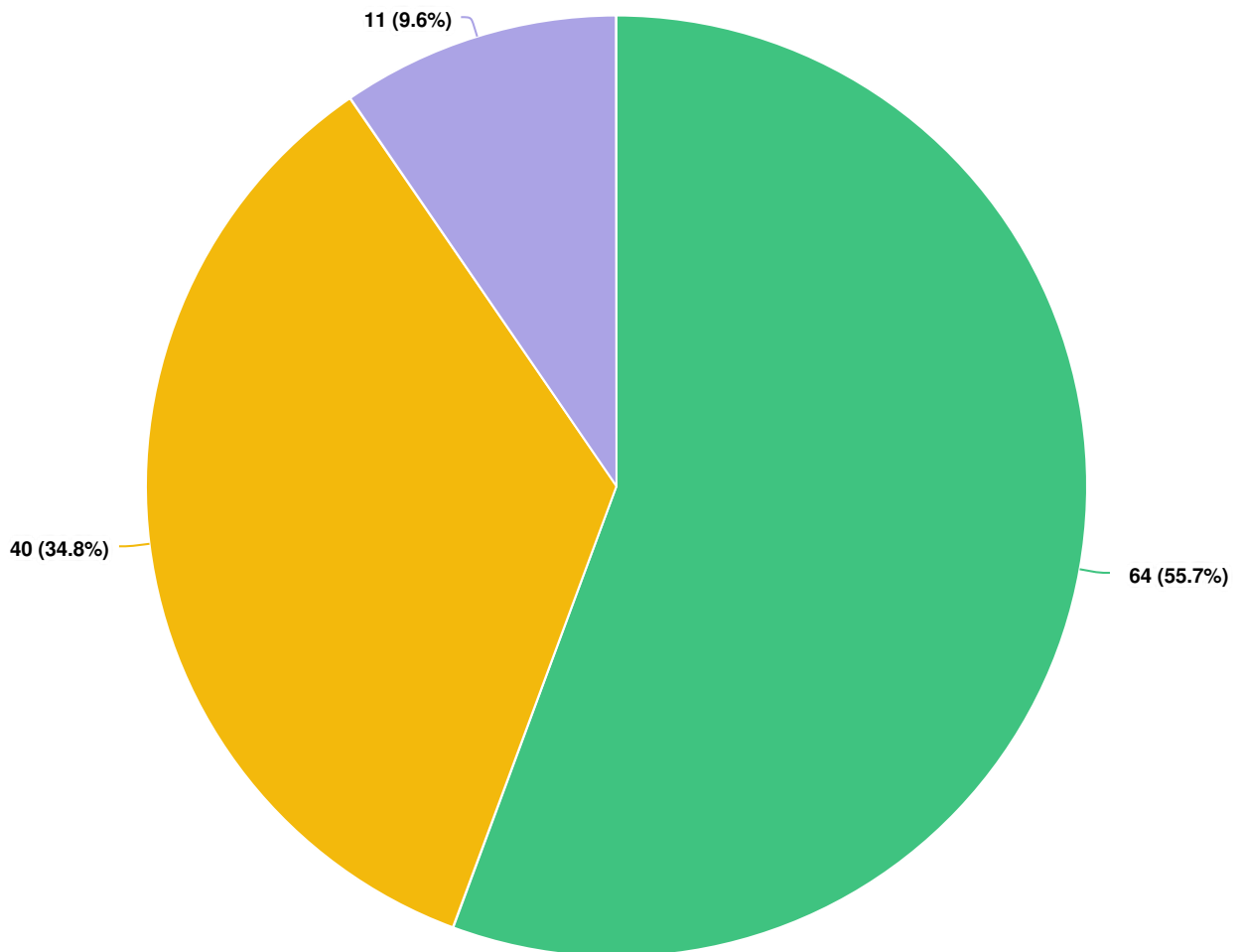
How confident do you feel that this technology can provide a safe alternative to a manually driven public transport vehicle on a route with higher volumes of traffic?



How comfortable do you feel as a road user (i.e. not passenger) knowing that there are vehicles like this one on the road in mixed traffic?



Q5 | Were you aware of any occasions during your journey at which the Safety Operator took control of the vehicle?

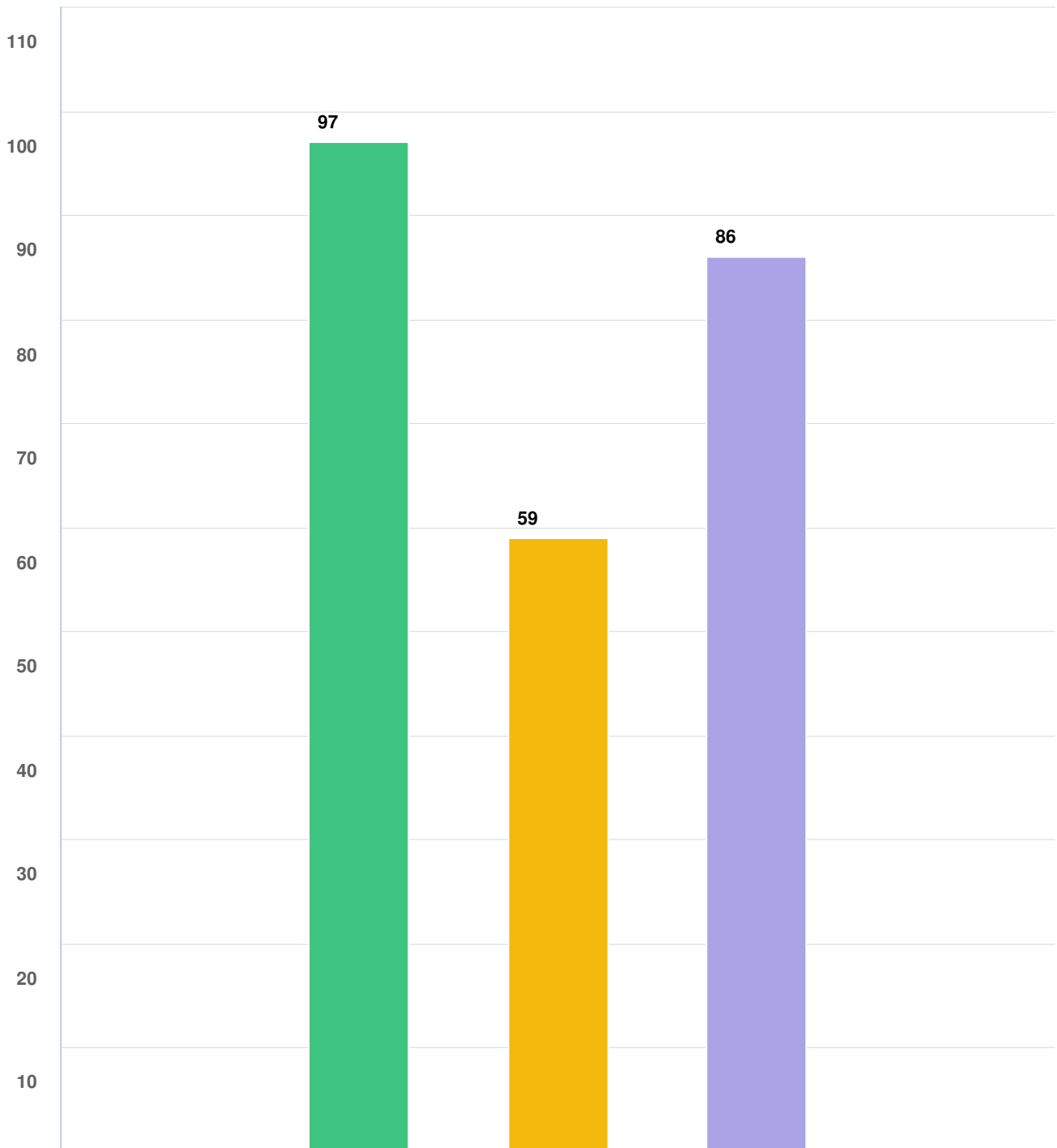


Question options

- I'm not sure
- No
- Yes

Optional question (115 response(s), 0 skipped)
Question type: Radio Button Question

Q6 In what scenarios could you see yourself using an autonomous shuttle in the future?
(Tick as many options as applicable)

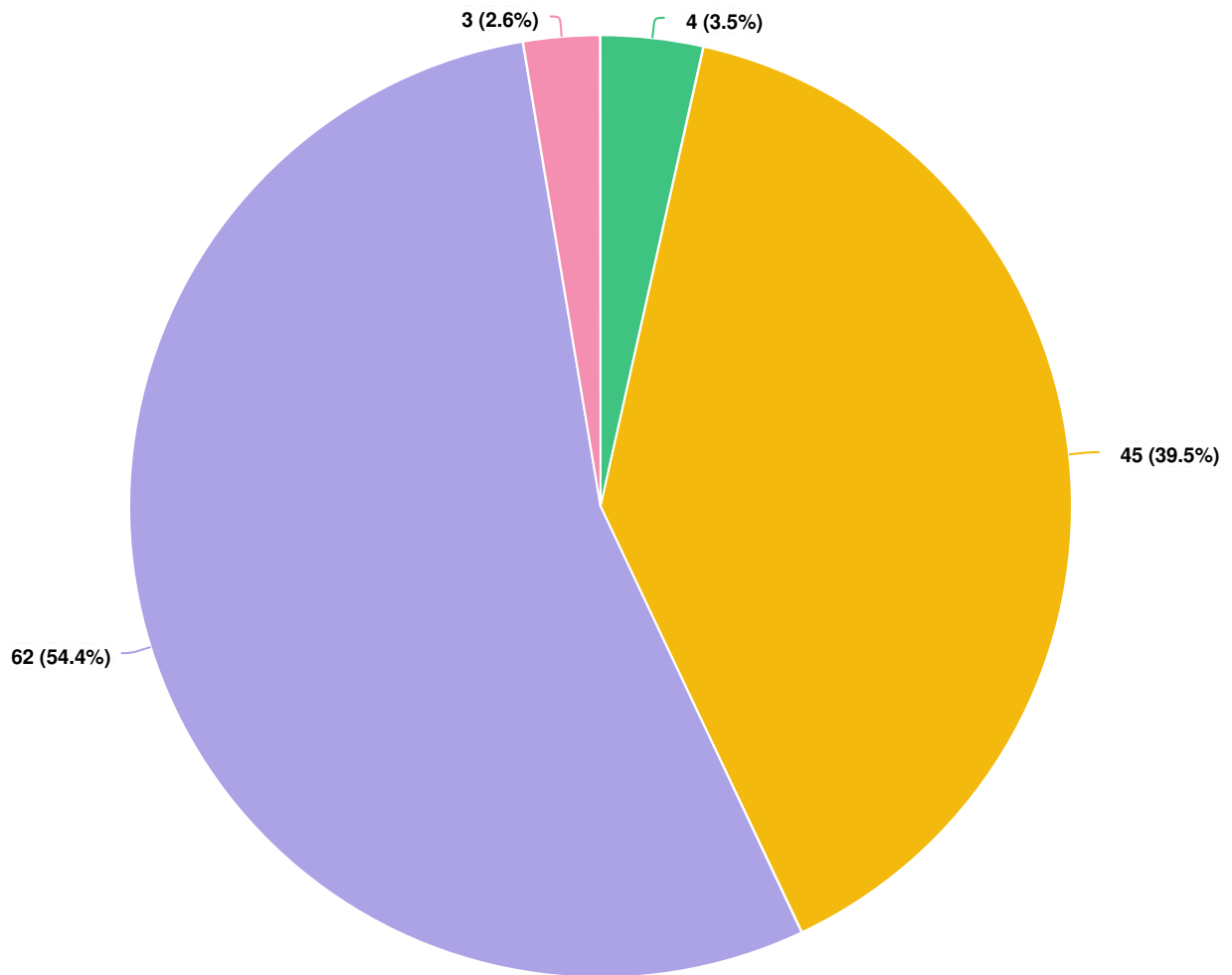


Question options

- As part of a local shuttle service which is limited to a particular Campus Site
- As part of a rural future public transport service
- As part of a city-wide future bus service

Optional question (112 response(s), 3 skipped)
Question type: Checkbox Question

Q7 How long would you be prepared to wait at the stop for a shuttle?

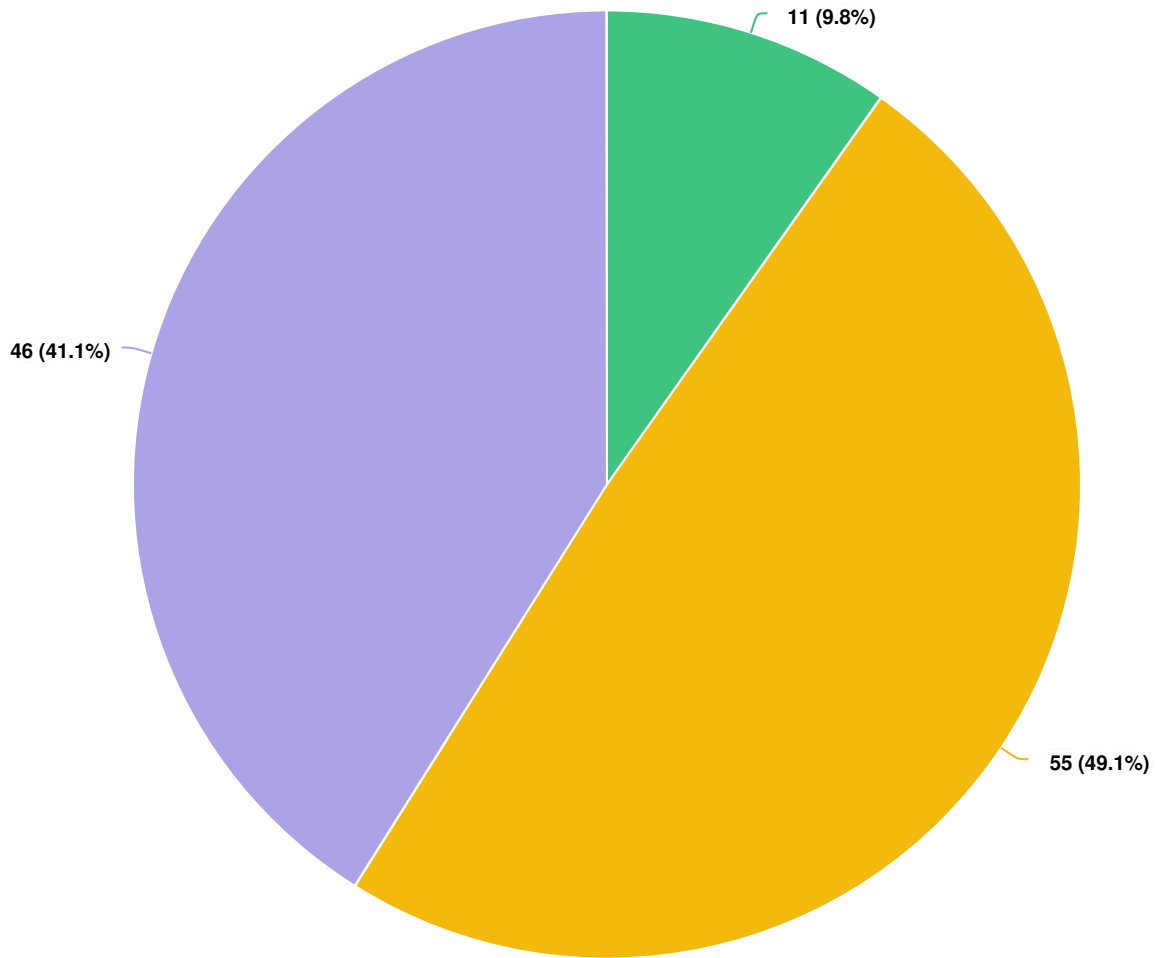


Question options

- Longer than 10 minutes
- Up to 10 minutes
- Up to 5 minutes
- Up to 3 minutes

Optional question (114 response(s), 1 skipped)
Question type: Radio Button Question

Q8 How much would you be prepared to pay for a daily ticket offering unlimited journeys?

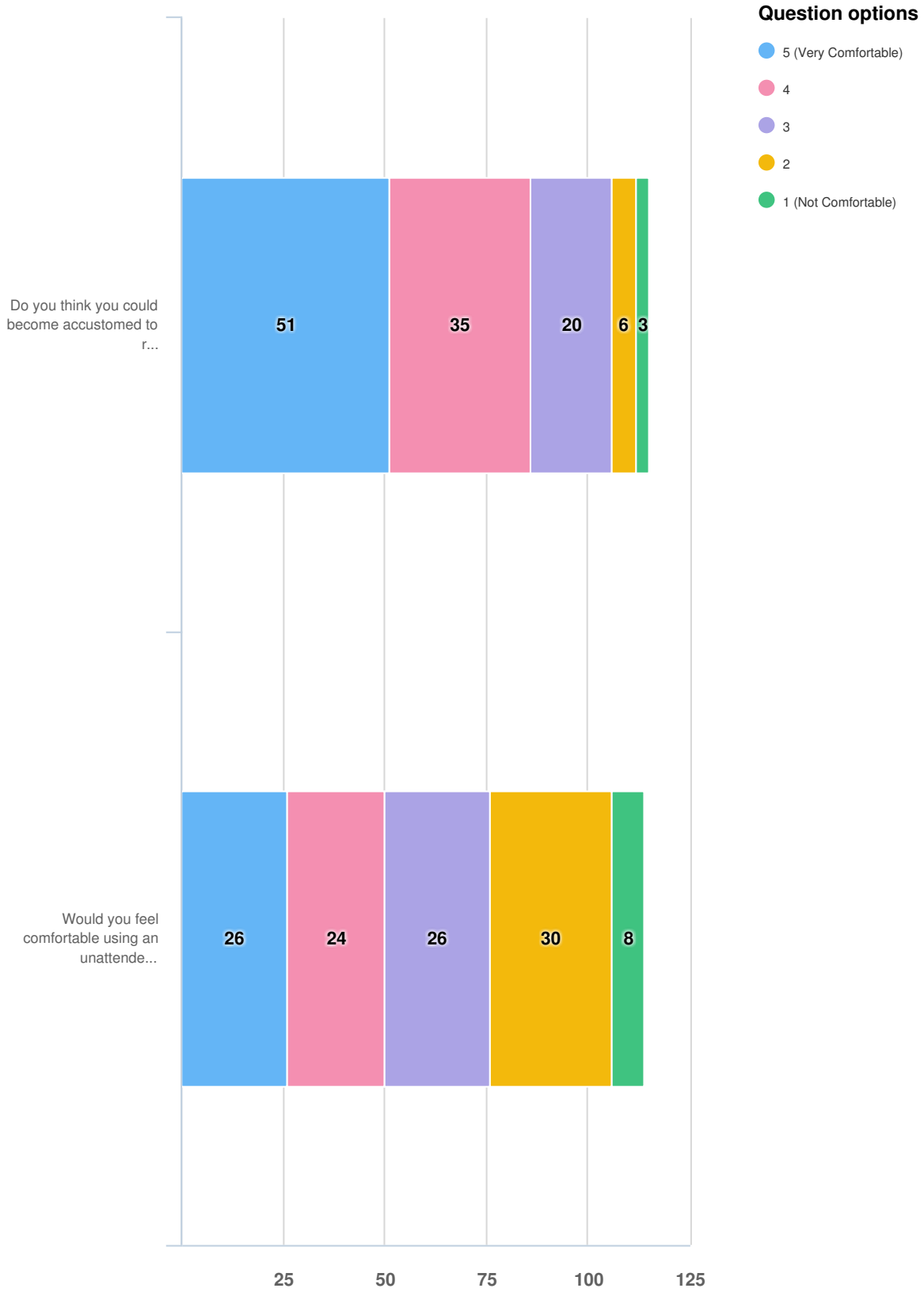


Question options

- £2 to £3
- £1 to £2
- Less than £1

Optional question (112 response(s), 3 skipped)
Question type: Radio Button Question

Q9 | The future:



Optional question (115 response(s), 0 skipped)
Question type: Likert Question

Q9 | The future:

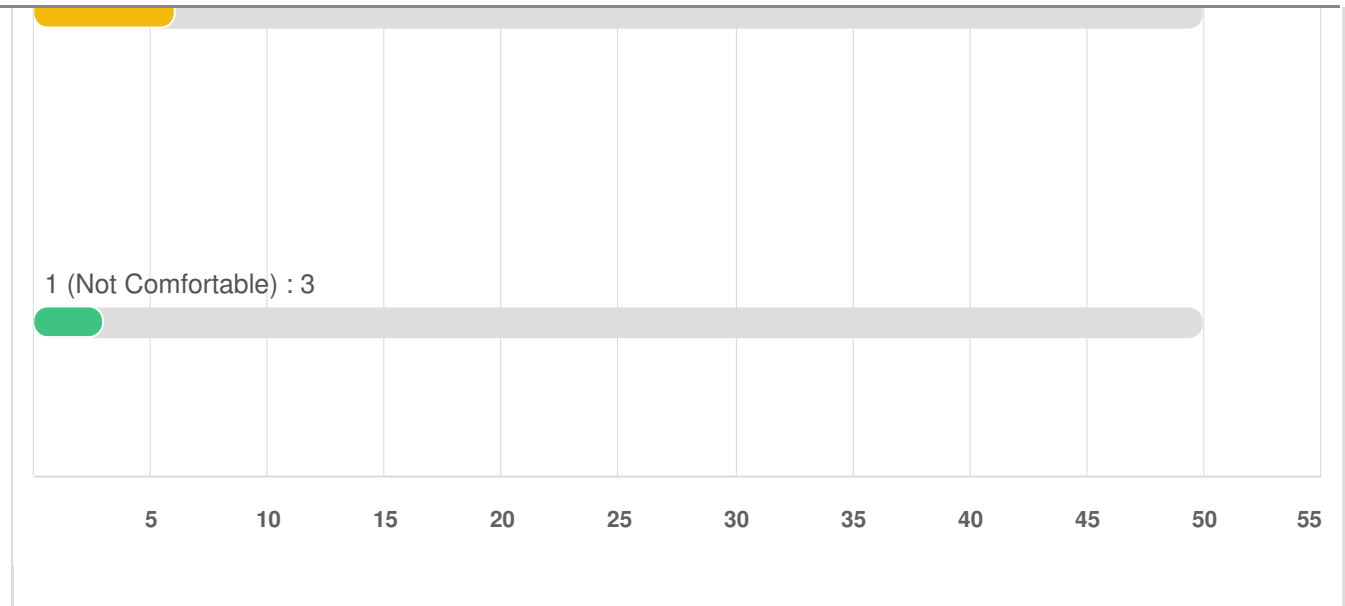
Do you think you could become accustomed to riding in a vehicle without a safety operator present?

5 (Very Comfortable) : 51

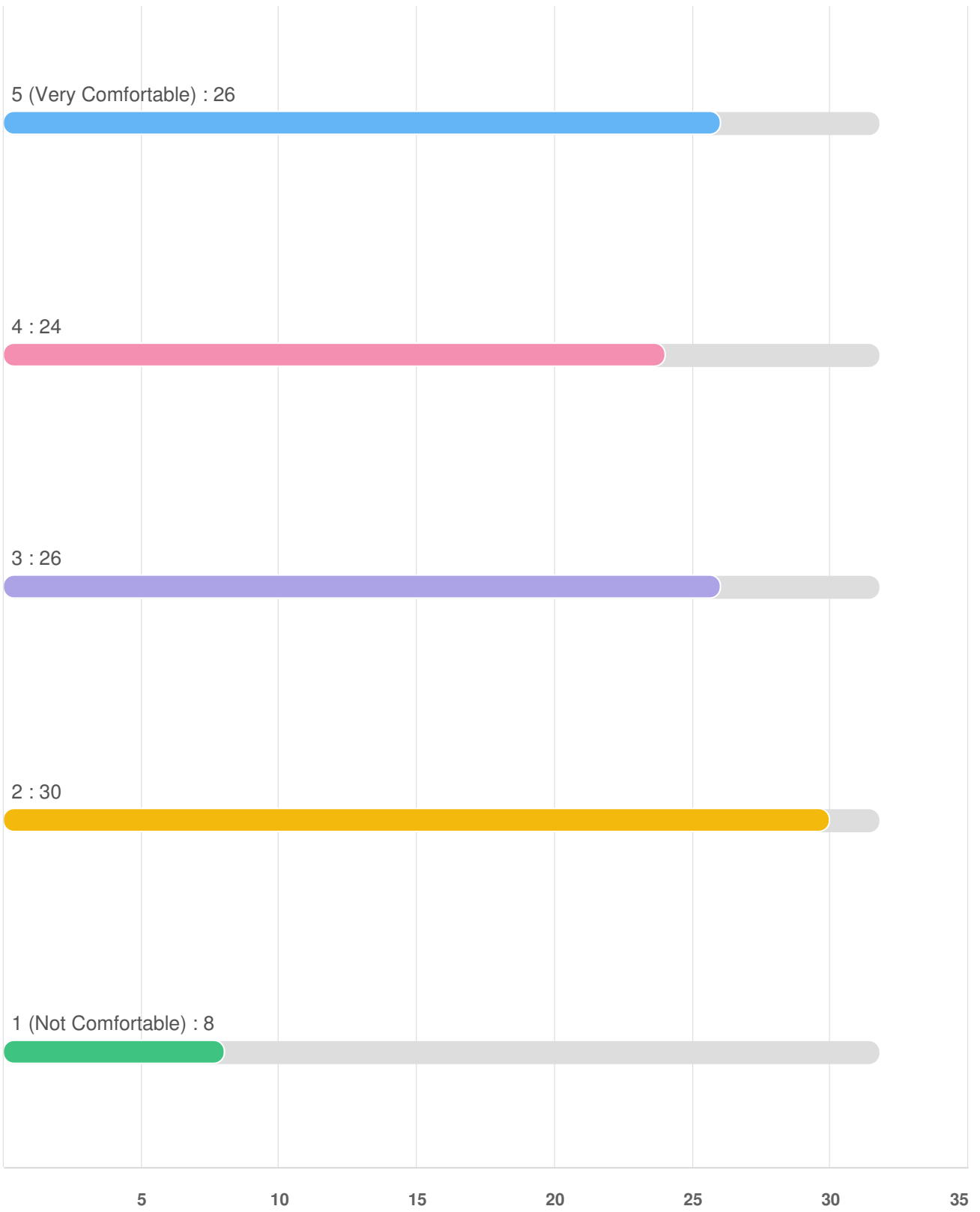
4 : 35

3 : 20

2 : 6



Would you feel comfortable using an unattended autonomous shuttle service late at night?



Q10 | Is there anything else that you would like to tell us about your experience today, the vehicle or the use of autonomous vehicles in the public transport system?

Anonymous

6/10/2021 08:14 PM

Two things - visibility from the shuttle was poor - could not see road ahead due to tv screens, maybe this was deliberate? Ride feel was of a nervous driver - seemed to be going slowly and shuttle slowed frequently and whenever it came across an obstacle. Could not see what was ahead, so maybe the shuttle speed and actions were all justified. Was not sure how to answer the "did you feel anxious" question above. I did not feel anxious. Not clear whether positive rating is agreeing with the statement (you felt anxious)?

Anonymous

6/10/2021 09:05 PM

The use / reliance on LiDAR technology and pre-scanned environments is the wrong approach for AEVs. The route taken was not as advertised due to the systems inability to deal with construction traffic and day-to-day movement of barriers! This further proves that the aforementioned technology will be obsolete long before this trial vehicle is developed (if ever) to a state which is commercially viable. I understand the cost limitations imposed on the design of the vehicle, however, the external design (mainly shape at the corners) will be detrimental to wider public acceptance of AEVs. The thin skin of the vehicle would also be concerning for safety.

Anonymous

6/10/2021 09:17 PM

I'm very positive about the approach, but safety wise I'd never use an unattended vehicle at later hours. I'd very confident to use it on a guided busway 'tho. The journey it self was smooth, didn't notice at all if it was the driver or the bus self driving and

Anonymous

6/10/2021 09:30 PM

the recycled materials are an extra to me. Thank you for the opportunity.

Air conditioning essential. Interior needs to be bright and clean, rather than dingy and cyber. Sort of unremarkable experience because we couldn't tell whether the operator was in control, no sense of autonomy from the backseat. Also disappointing ride as one expects a computer driving an electric vehicle to be the smoothest ride possible, but every set off and pothole felt heavy.

Anonymous

6/14/2021 03:41 PM

It was very very hot inside the passenger cabin, some ventilation or air conditioning would be a good idea!

Anonymous

6/14/2021 08:57 PM

No doubt this is the future for public transport, I would be happy to use it at anytime. I always felt safe.

Anonymous

6/16/2021 02:14 PM

Great to get to be a part of this trial and very excited for what the future brings in terms of autonomous vehicles. As always, the biggest concerns are other road users and potentially irrational actions by these users.

Anonymous

6/16/2021 02:15 PM

Frequency and speed will be key. The tech seems fine, but not quite ready yet, and limited to very finite ranges of situations, but would work in a shuttle or bus type service.

Anonymous

6/16/2021 02:41 PM

if you can account for lorries driving the wrong way, and cyclists cutting in front, you have it cracked

Anonymous

6/16/2021 02:45 PM

I am worried that the interiors will get trashed if unmanned.

Anonymous

6/16/2021 02:55 PM

If I was travelling on my own at times when there are very few other people around, I would like some reassurance that the Shuttle is monitored on CCTV at all times.

Anonymous

6/16/2021 03:44 PM

I think they could almost be safer than having a driver once the technology has been perfected. The only issue would be personal safety late at night and how that could be addressed. I really enjoyed it so thank you so much. The driver only took control on my journey to cross Madingley Road and not because something went wrong.

Anonymous

6/17/2021 05:35 PM

The correx cladding and 3d printed window handles was... funny, but probably don't use it in production! And the union jack design is awful

Anonymous

6/17/2021 06:53 PM

This was a very interesting experience and as I positioned myself to observe the "driver" I was able to understand when and where the autonomous features were working (i.e. we were driven by the driver out of the P&R site and across the main road, only running on its own in the science park. What I saw was fascinating and I was surprised that some of the cornering on a known route was a bit jerky and mathematically derived. I presume the top speed of 19.9kph is related to the licenced top speed in self-driving mode - the bus was noticeably more accelerative with a driver at the wheel. I would have like to see the vehicl interface more with pedestrians, cyclists and cars - sadly we didn't meet anyone on the autonomous section (or if we did, it was rendered invisible by the tv screens). In terms of construction, the engineering was clever but a bit scary as a an artic lorry ran close past. I speak as someone who has owned a flimsy Citroen2cv for 19 years so far and even driven it in the hurtling traffic of Spain - the Aurrego (?) felt less impact resistant than the 2cv, and more of a dinghy than a

strong shiny yacht. The panels were solid but there isn't much crumple zone. Overall I come away thinking that yes this can happen at some time in the future but I don't believe the current vehicle is the new Ford Model T that kickstarts the new industry. Thank you so much for setting up the demonstration.

Anonymous

6/17/2021 07:26 PM

The bus was manually driven on Madingley Road and the P&R, so this felt like a somewhat incomplete demo, not something very close to deployment for fully autonomous operation. It was difficult for me to see how I would feel about using the vehicle if it was unattended by any driver, because there was no detailed explanation what should happen or what I should do in case of some malfunction or emergency (e.g., no communication system with a remote operator like in a lift). The emergency exit actuators were somewhat hidden rather than clearly sign posted, the usual emergency-escape equipment found on public transport (fire extinguisher, window-breaking hammers, etc.) seemed missing, I didn't see any emergency stop/off switch accessible to passengers. As a result, it is difficult for me to give meaningful scores to many of the above questions, as they remain rather hypothetical. The vehicle didn't really seem fully set up yet for completely autonomous operation. It felt safe, especially since it never went above 18 km/h, i.e. very comfortable cycling speed. Regarding the appearance of the vehicle, it felt a bit like a prototype (glued plastic panels) rather than something mass produced. I assume the unusually pointy edges on the front are specifically designed to look a bit scary to pedestrians/cyclists and

keep them out of the way of the vehicle.

Anonymous

6/17/2021 08:11 PM

In order that autonomous vehicles provide an useful services for the public transport it has to be used for a long size or double decker busses where large number of passengers can be transported. The prototype shuttles that offers seats for 6 passengers are not an alternative for teh public transport but they are for private hires (taxis).

Anonymous

6/17/2021 10:38 PM

Needs to be a wider communication about potential uses, safety and security

Anonymous

6/17/2021 10:50 PM

First experience of an autonomous vehicle and very impressed. Probably felt more confident travelling on quieter roads but impressed by the vehicle manoeuvring around traffic calming areas etc.

Anonymous

6/18/2021 06:46 AM

All OK until the safety driver took over and crossed Madingley Road on an amber light. The technical advisor reported a challenge of developing the technology to account for the visual signals drivers exchange to determine who goes first at junctions, roundabouts and pinch points.

Anonymous

6/18/2021 09:38 AM

I felt there was an opportunity to give more information. The presence on site was limited to a small sign on a light column, that is easy to miss, and the four on bus screens were off apart from one that only showed logos. The drivers being isolated in a cab gave no information about which parts of the journey were autonomous. A friend who is a wheel chair user is unable to take advantage of the trial as the ramp isn't working, which doesn't give a good impression for an all user future hi-tec system. Especially as the air con wasn't switched on because I

Anonymous

6/21/2021 04:54 PM

understand the batteries aren't big enough.

It only dis autonomous on the easy bits. All the challenges of crossing Madingley Road were operator operated

Anonymous

6/21/2021 04:57 PM

The journey was not really representative of a journey into the city with other traffic so it is difficult to accurately judge the merits.

Anonymous

6/21/2021 05:07 PM

I'm sure a production model would remove unnecessary design elements (fins inside and out) and focus more on the function and durability required for mass transit. But an impressive prototype. Excellent to see a UK company in this space, competing with Navya, easymile, 2getthere, etc. UK should be investing in this technology! It is absolutely the future. Get diesel buses and personal cars out of city centres.

Anonymous

6/21/2021 05:55 PM

I have no issues with the technology. I think the problems are around other road users behaviour and the behaviour of the customers. It is a very small vehicle - there is no way to avoid the loud or the drunk and, without an operator, less inhibition. t might be possible make it more acceptable with supervised boarding but that affects the economics

Anonymous

6/21/2021 06:35 PM

It was good to do, but on a very lightly trafficked campus I didn't feel I was able to evaluate how it would manage at junctions or when more traffic around. But I did enjoy the opportunity, thank you!

Anonymous

6/21/2021 07:54 PM

The vehicle had a video about the autonomous shuttle but the sound had been turned off. I asked the operator why this was and he said it was because it was annoying. This

was frustrating as it meant that I finished the experience without any further information about the autonomous vehicle or about the trial.

Anonymous

6/21/2021 09:05 PM

The video that was running didn't have any sound though pole were obviously talking about the vehicle and the transport system.

Anonymous

6/21/2021 09:26 PM

It would be good to have the driver display visible to passengers. Some audio to go with the information videos might have been useful. I would have liked to see where I'm going, only the side windows where not obscured.

Anonymous

6/22/2021 01:53 PM

The seats of the current (I assume prototype?) vehicle are very high. 2 of the 4 people on my trip had their legs dangling... I assume that would be adjusted? I wasn't quite sure what positive or negative meant in response to the question above "Did you feel nervous/anxious during the journey". I felt very positive, did not feel anxious or nervous at all, rather excited (but I wasn't sure, if in that instance positive meant Yes in answer to the question?)

Anonymous

6/22/2021 04:10 PM

The vehicle needs A/C. The vehicle works, however it is far slower than a manual driver - the slow speed is a trade off for improved safety / caution - however this trade off needs to be more balanced.

Anonymous

6/22/2021 07:57 PM

I totally trust the software, if Tesla are already doing it on all public roads why can't this bus do it? The tech is there. I think this is the future. But if it goes as slow as it did today it's dangerous - other cars kept overtaking. It's behaviour is too cautious. It was smooth on the straight but quite wobbly on the corner which was unnerving. And I felt a bit car-sick both facing

backwards and not having great all-round visibility with all the livery on the vehicle. My reservations are the loss of employment for bus drivers, and what I hadn't thought of until you mentioned it today - feeling unsafe at night if it was only me and a stranger in the cabin. Oh and it looks hilarious. Like a derpy woodlouse. But looks don't really matter.

Anonymous

6/22/2021 08:19 PM

Brilliant. Only negative comment is my younger son felt a little sick (he doesn't get motion sickness usually) - we were sitting at the front of the bus so turning around may have contributed to this but also I think the backwards facing seats may need further consideration. It was also obvious the 'immaturity' of the technology is evident but experiencing the ride also showed how far its come and a confidence that eventually the technology side will only get better and better.

Anonymous

6/23/2021 07:58 AM

No

Anonymous

6/24/2021 12:26 PM

I noticed quite a lot of intervention by the operator and appreciate this was a trial. I found the layout of the cabin quite strange.

Anonymous

6/24/2021 01:16 PM

Qu 4 part 3 - I didn't feel at all anxious but not sure how your numbering system is working for that one. On the journey, I was impressed with how the shuttle dealt with an unexpected vehicle which should have given way and didn't - felt very safe.

Anonymous

6/24/2021 01:19 PM

We will have a wider variety of small vehicles on the road (more bicycles, e-scooters etc) in the near future so it is important to keep testing autonomous vehicles with these. Central Cambridge is a good test

area from this point of view. Have you thought of building a shuttle that can also carry bicycles? In Copenhagen, taxis are legally required to have bike racks. This kind of integration is the way to go if we are to achieve cleaner, more healthy transport systems.

Anonymous

6/24/2021 03:19 PM

thanks for getting us this far! hope we can start to use for real in the next few years

Anonymous

6/24/2021 04:34 PM

I think these smaller pods could be a great alternative for traditional large buses even without the autonomous feature. As a cyclist they are less threatening and seem more fit for the narrow roads/lanes in Cambridge.

Anonymous

6/24/2021 05:03 PM

Was a great experience, a very smooth although understandably quite cautious drive. I think this would be an absolutely perfect fit on the guided busway tracks around Cambridge. Would definitely feel comfortable riding an autonomous shuttle over a manned vehicle. To add detail to the question of late night use, I would suggest that after a certain time of night, only one booking (rider or group) would use the shuttle at a time, this would seem practical as late night demand would be lower. I would very much like to see a larger trial of the autonomous shuttle around Cambridge, a more complicated route and greater interaction with traffic lights and traffic. The busway would be a perfect addition to the route. As private cars begin to add greater autonomous features, it is important to stay up to date with the technology in public transport vehicles as well.

Anonymous

6/24/2021 07:25 PM

The styling and/or window masking made external views awkward - I suspect most prefer to have at least

the option to look outside. As the vehicles are likely to be relatively small, safety concerns would be greater in respect of potential fellow passengers; not an issue where vehicles are bigger and have reliably high loadings (as per automatic metro systems).

Anonymous

6/24/2021 09:16 PM

It was a great experience, the bus looked great and the staff were very friendly

Anonymous

6/24/2021 09:18 PM

Already had a BMW driving up the arsenal during the trip lol

Anonymous

6/24/2021 09:20 PM

The interior design is not inviting and feels claustrophobic. Though the roof is higher, there is false roofing with red colour and bar like lighting which is not inviting. It could look more so if it was operating in the night. White roof and more lighting will help make it look more safer and bigger space. Smaller spaces than this looks inviting and even cosy by design choices which is lacking here.

Anonymous

6/24/2021 09:24 PM

Use of an unattended bus would feel risky. However, if it were real-time monitored then I might be more willing to use at night. Also, bus capacity if akin to existing buses would make me feel less at risk, because more safety in numbers.

Anonymous

6/24/2021 09:27 PM

My wife was feeling sea sick because the ride was not as smooth as if it was operated by a human

Anonymous

6/24/2021 09:34 PM

The interior of the vehicle was garish in colour and design

Anonymous

6/24/2021 09:57 PM

Slightly jerky, overall very good experience

Anonymous

6/24/2021 10:23 PM

I would feel more confident if trials (with safety driver present) included busy streets with pedestrians and

cyclists.

Anonymous

6/25/2021 08:10 AM

I think Autonomous EV is the future in terms of city transportation, its almost inevitable we will move towards this, once all the teething problems are resolved

Anonymous

6/25/2021 08:24 AM

I felt that the trial experience would have benefited from more information about the development of the vehicles and how they operate. This could have been provided via the interior screens or by a member of the team as a 'guide during the route.

Anonymous

6/25/2021 12:34 PM

Much nicer than the usual buses - prefer small scale and eco. Far more comfortable and less rattle! Really enjoyed the trip - thank you!

Anonymous

6/25/2021 03:38 PM

A very impressive and encouraging experience. Clearly there is a lot of development work still to be done (not least to do with the use of shared space and/or segregated space) but it is great to see Cambridge leading the way helping with the development. There is no doubt that autonomous vehicles will and should become part of our daily lives.

Anonymous

6/28/2021 05:12 PM

It was really cool! I've never been driven by a driverless car, and I think I would definitely like to try again in future. It would be really helpful around Cambridge for students.

Anonymous

6/28/2021 05:17 PM

I assumed that driverless public transport would not happen for a few years at least, so it was very exciting to personally experience it! The ride was very smooth and comfortable. I usually get travel sick when I ride a bus, but it didn't happen during this journey! I loved being able to see the object detection system that the vehicle uses, and how it plans its

trajectory. My main criticisms are that the shuttle itself was quite dark on the inside, and that because it doesn't carry many passengers I could imagine there being a lot of people left unable to get a space! It also went quite slowly (good for my travel sickness) but that is probably due to the early stage of the technology.

Anonymous

6/28/2021 05:33 PM

It would be useful to have a sign for all passengers to see whether vehicle was on manual or autonomous. I knew as I could see through the screen. The indicators seemed to need manual intervention. I was impressed by the smoothness over speed bumps, didnt notice them. Also the quietness of the vehicle. Like the 19km/hr speed. Would worry about VOI scooters cutting under and electrical bikes moving so fast and shifting lanes. I think taxis would need to be removed from the streets av travel along. I found the safety belt only just long enough to put on me! I wondered about people bringing buggies, cases on the buses and how that would work. An overhead luggage trolley with a lift might work? It would be good to have a voice or notice of the stop names. I noticed one layby was filled with parked cars so the av could not pull in.

Anonymous

6/28/2021 05:58 PM

Pity that passengers were not informed when switch from driver control to driverless was made. Pity that the front windows were opaque.

Anonymous

6/28/2021 06:33 PM

I was hoping that the bus would impress me with state-of-the-art technology. I was very disappointed. The vehicle's driving was extremely timid: it gave me the impression that it did not have a good understanding of its surroundings - e.g. it

sometimes stopped for no obvious reason (maybe confused by the plants beside the road? who knows) and stopped when cars or busses passed in the opposite direction on the other side of the road (does the bus not know how wide it is? can it not see that the car will pass safely?) At one point the bus failed to navigate through a traffic calming chicane: it overshot and crashed into the curb on the other side of the road. (I gather the sticky-outy vanes got scraped but no serious harm was done.) This is extremely worrying to me: the bus is running a regular route, it should have a good map providing a solid idea of where the edges of the road are. Even if it doesn't have a map, it clearly can't accurately see the edge of the road when moving at below walking pace. There were screens inside the bus but most of them were off - a missed opportunity to display telemetry from the bus's computer, showing things like its view of the road and what objects it has identified, etc. The exterior design of the vehicle looks like it is intended to do maximum possible injury to pedestrians or cyclists if the bus happens to drive into them (as seems likely). Surely the front should be rounded so that a glancing blow is less likely to hurt, rather than surrounded with blades. My impression of the bodywork was that it seemed to be very flimsy fibreglass, and there was very little sign of any side-impact protection or rollover protection. I was not confident that the bus would be safe in a collision with another vehicle. I don't think this vehicle is safe to drive at any significant speed or on the public highway.

Anonymous

6/28/2021 06:36 PM

I felt the autonomous system still had a long way to go: it was "nervous" in the presence of other road vehicles, and we never saw it reverse. It was pretty slow - but better slow and cautious than recklessly fast. I think there is definitely a role for autonomous vehicles in the public transport mix in the future, and I hope to see it come to pass. I thought the outer design of Shuttle One was very garish - I am not keen on sticking the flag on everything - and both shuttles seemed unfriendly to other road users. Lots of sharp edges and corners, no bumpers or crumple zones.

Anonymous

6/28/2021 08:15 PM

Concern of personal safety & security on a bus if there isn't a company employee on board - would not like this to be left to remote security. I would feel uncomfortable to use late at night. The vehicle was comfortable and well designed. Having the drivers present during the journey added to the experience.

Anonymous

6/29/2021 08:50 AM

i love the idea of it however my future concerns would be safety of persons travelling alone at night - is there an emergency button straight to police?

Anonymous

6/29/2021 05:34 PM

Excellent experience, thank you. Regarding feeling safe using an unattended service late at night, it really depends on the safety features being used e.g. passenger identification, CCTV etc

Anonymous

6/29/2021 07:17 PM

The autonomous bus didn't drive as smoothly as a human, which I hadn't expected. Overall, it felt like an enormous amount of progress has been made on self-driving. But I was also aware that it's a very limited route, suggesting the bus is some way off being able to navigate more

varied roads. Reminded me of the saying that “self-driving cars have been 5 years away for at least 5 years”. Excellent progress, though. I wish you all the best.

Anonymous

6/29/2021 07:22 PM

I believe that AV's will be the future, however, I also think we are a long way from being able to safely integrate AV's with normal manually driven vehicles/cyclists/pedestrians and all the other changing environments on modern roads without a safety driver present.

Anonymous

6/30/2021 06:32 AM

Poor driving of other vehicles is likely to be a major issue.

Anonymous

6/30/2021 09:06 AM

Needs more focus around the autonomy of the relationship between vehicle and user, rather than just vehicle and environment. User experience could be improved by developing the emotional understanding of the autonomous system.

Anonymous

6/30/2021 09:08 AM

The experience felt very slow, at points I felt like I could walk faster.

Anonymous

6/30/2021 12:18 PM

Not sure how the autonomous vehicle can cope with unexpected situations (e.g. cyclists coming out from nowhere) in Cambridge city centre if this bus is to operate nearer there.

Anonymous

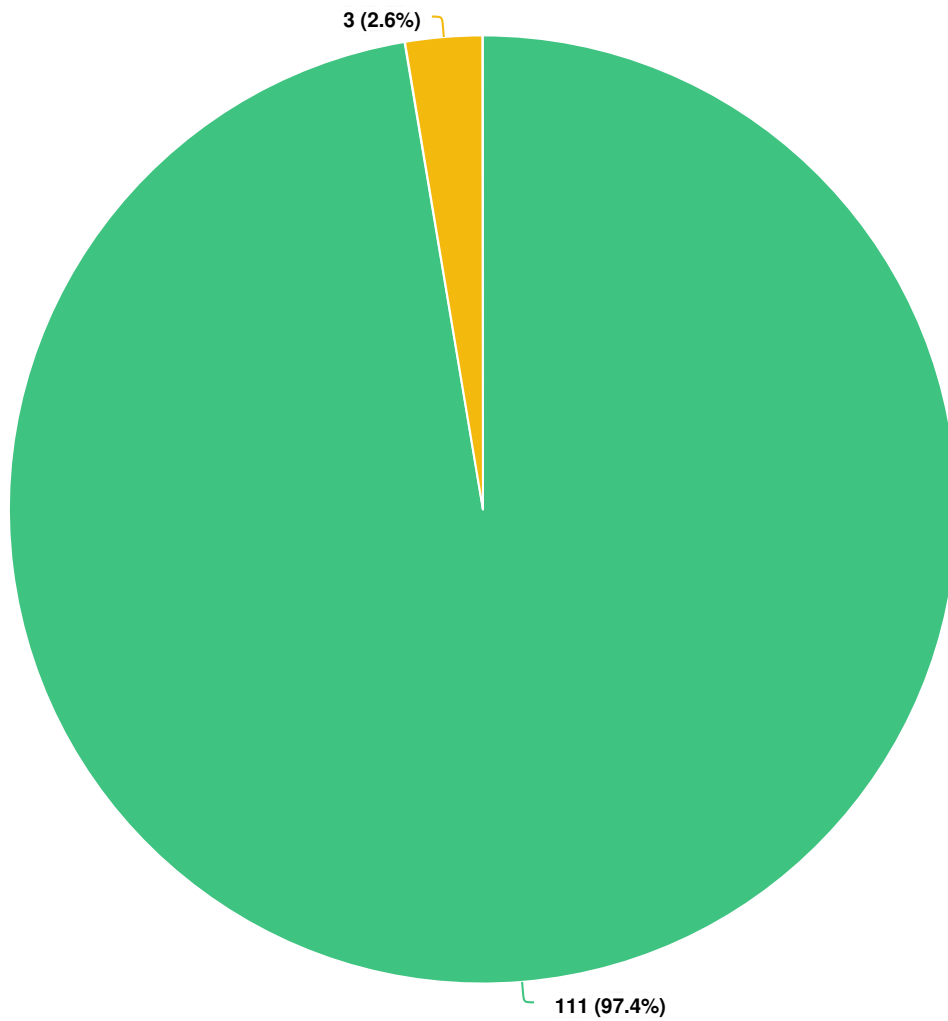
7/02/2021 10:38 AM

I really enjoyed the ride and was very impressed with the technology. The operator explained everything that was going to happen during the journey and that made me feel quite relaxed. I look forward to the time when such shuttles will be a common mode of transport. Thank you.

Optional question (68 response(s), 47 skipped)

Question type: Essay Question

Q11 | Would you get on an autonomous shuttle again?



Question options

- No
- Yes

*Optional question (114 response(s), 1 skipped)
Question type: Radio Button Question*