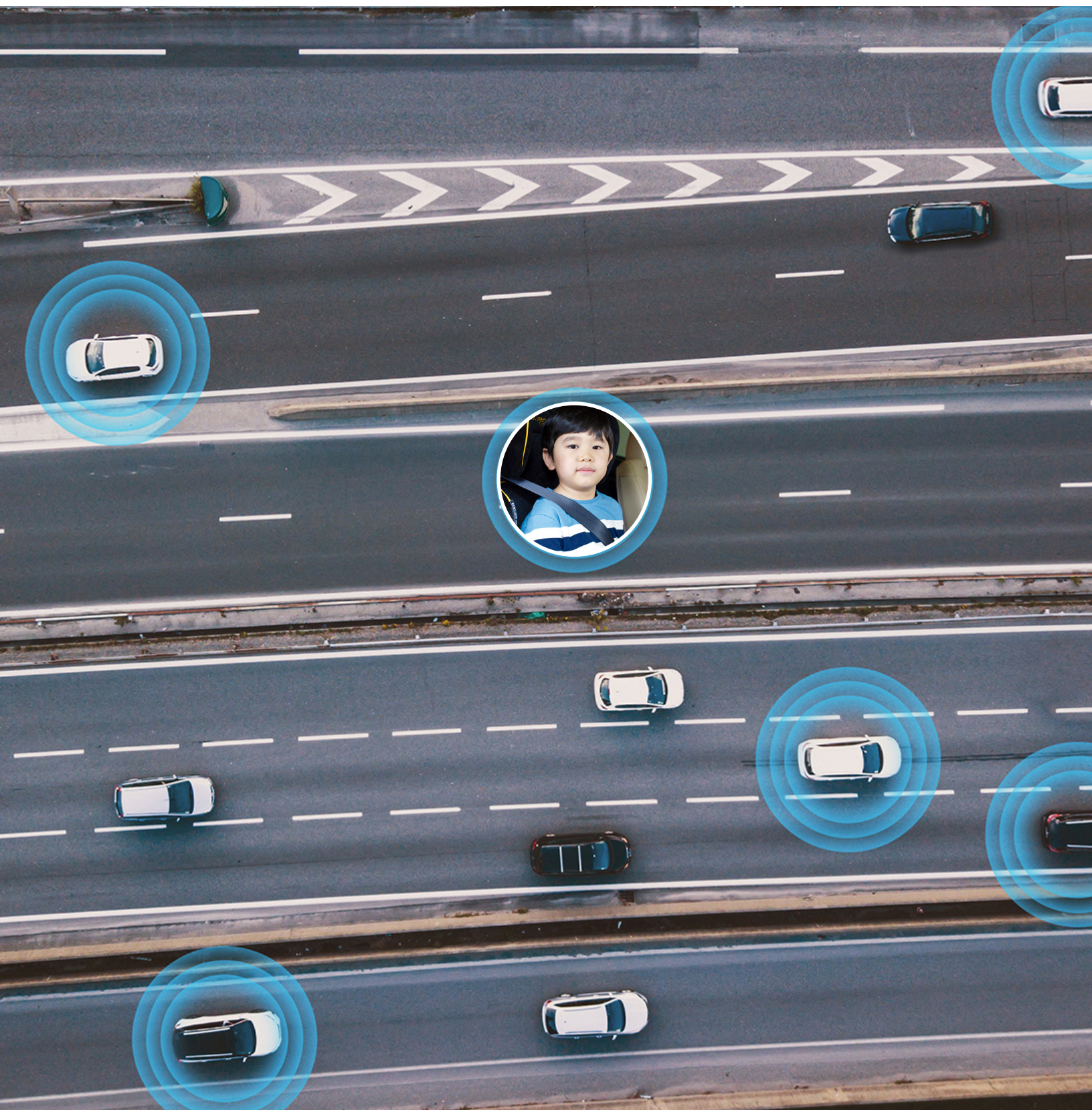


Automated Vehicles (AVs): A Survey of Parental Awareness, Attitudes and Beliefs

April 2021



Executive Summary

Fully automated vehicles (AVs), vehicles designed to drive themselves without the attention or action of a human, are an inevitable part of the U.S. transportation system's future. In anticipation of that future, Safe Kids is seeking to understand the potential challenges to child passenger safety (CPS) created by AVs and the anticipated shift in education and awareness-raising efforts that will be needed to ensure the safety of children in the future.

To understand parents' perceptions of the situation in 2020 and help inform future messaging and programming, Safe Kids fielded a national online survey to 1,000 parents of children under age 15 years to assess their awareness, attitudes and beliefs regarding AVs and AV safety, particularly related to child passengers.

Overall, familiarity with AVs among parents was quite low, with only 1 in 5 parents being "very familiar" with AVs and the remainder having only passing familiarity or no familiarity at all. When given a description of AVs, 6 in 10 parents prefer the less formal term "self-driving car" over "autonomous vehicle." Despite a low level of familiarity with AVs, 7 in 10 parents indicated that they think it is likely that AVs will be a major part of the transportation system within 5 years, and a similar number indicated they would be interested in riding in an AV. However, there is some indication that the public does not understand the distinction between fully automated vehicles and the many advanced driver-assist safety features currently available in some vehicles, as 1 in 5 parents indicated they had ridden in an AV, even though AVs are not yet available to consumers.

Results also indicate that parents generally perceive AVs to be safe, but slightly less so for pedestrians and bicyclists sharing the road with an AV than for AV passengers. Most parents (6 in 10) would allow their child to ride in an AV with them, although only about half would allow their child to ride in an AV without them. When asked at what age they would be comfortable allowing these two behaviors, the ages ranged from 1 to 17 years, with an average age of 12 years for riding with an adult and 15 years for riding without an adult. Unknowns, such as not knowing how the AVs will protect their child in dangerous situations, not knowing if the child is okay during transit and concerns that someone could enter the car and harm their child were the concerns around letting their child ride in an AV without an adult that were most frequently selected by parents.

The findings of this survey suggest that despite having a low level of familiarity with AVs, parents recognize their inevitable place in society and are at least open to the idea of riding in them themselves and even letting their children ride in them. However, that willingness does come with some significant concerns related to a child's safety and wellbeing in a vehicle. This suggests that future messaging and educational programming for parents should focus on concerns parents have regarding the safety aspects of children in AVs. The 2020 survey will serve as a baseline against which future surveys can assess for shifts in parental awareness of and concerns related to child passengers and AVs.



Introduction

In 2019, a total of 2,724 children and 26,634 adults were killed on U.S. roadways as occupants in motor vehicle crashes.¹ Experts predict that fully automated vehicles (AVs), vehicles that fully drive themselves without the attention or action of a human, could help to significantly lower the incidence of such serious motor vehicle crashes — 94 percent of which are due to human error or decision.²

Although fully automated vehicles are not yet publicly available, their availability to consumers may be quickly approaching.³ Partially automated vehicle safety features, such as lane-keeping assist systems, adaptive cruise control, blind-spot monitoring and self-parking, are already readily available in newer vehicle models and are helping to keep roads safer, both for passengers and other road users. According to the National Highway Traffic Safety Administration (NHTSA), as automotive technologies continue to advance, fully automated vehicles may be a reality on our roads as early as 2025.³

Safe Kids has been looking to the future of child passenger safety (CPS) as it relates to AVs for several years and in 2018 hosted a Blue Ribbon Panel to ensure the needs of child passengers are met throughout the development of AVs. The Children in Autonomous Vehicles (AVs) Blue-Ribbon Panel Report outlines a set of eight recommendations and calls to action across policy, advocacy, enforcement, communications and research arenas.⁴ Safe Kids addressed one of the recommendations in 2019, convening a consortium of child safety advocates and transportation experts for an 18-month effort to focus on the safety needs of child passengers in this evolving transportation field.

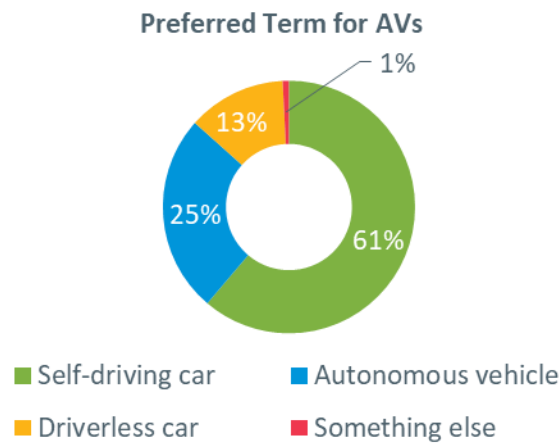
As part of efforts to inform future CPS programming and messaging specific to AVs, Safe Kids conducted a national survey of parents to assess their current awareness, attitudes and beliefs related to AVs, both in terms of AVs in general and AV safety, particularly as it relates to children. The survey was administered online to 1,000 parents of children under age 15 years in August 2020 with the support of General Motors. This report details the survey findings.



Survey Results

Q: [After being given a description of AVs]¹ What would you call these kinds of automobiles?
Which of the following is the term that makes the most sense to you? (N=1,000)

Most parents prefer the plain- language term “self-driving car” over “Autonomous vehicle.”



Group differences:

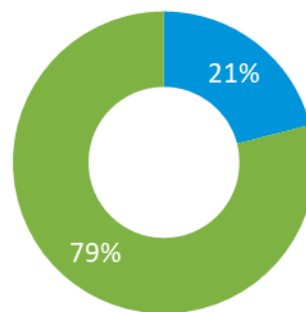
- **Sex:** Parents of both sexes most often indicated they preferred “self-driving car” to refer to “autonomous vehicle”; however, females preferred “self-driving car” more often than males (67 percent vs. 53 percent). With respect to other terms, males were more likely than females to select “autonomous Vehicle” (33 percent vs. 20 percent).
- **Interest in AVs:** Parents who expressed an interest in AVs were more than twice as likely to prefer “autonomous vehicle” than those who did not (29 percent vs. 15 percent).
- **Rideshare use:** Parents who use rideshares weekly were more likely to prefer “autonomous vehicle” than parents who use rideshares less than weekly (30 percent vs. 24 percent).

¹ Description of AVs given in survey: “This next set of questions is about autonomous vehicles. Sometimes people call them self-driving or driverless cars. Regardless of what they are called, an autonomous vehicle is an automobile that can sense its environment and operate without a human driver.”

Q: Have you ever ridden in an AV? (N=1,000)

1 in 5 parents surveyed indicated they had ridden in AVs.

Experience with AVs



■ Have ridden in AV ■ Have not ridden AV

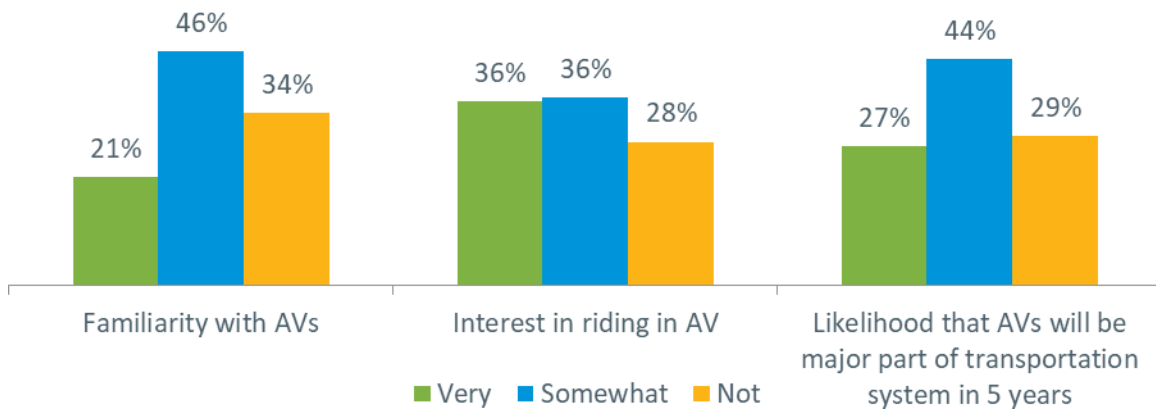
Note: Although there are several advanced driver safety features currently available in some newer vehicles, AVs are not currently available for consumer purchase.

Group differences:

- **Sex:** Male parents were more likely to indicate they have ridden in an AV than female parents (29 percent vs. 16 percent)
- **Rideshare use:** Parents who use rideshares weekly were more likely to indicate they have ridden in an AV than those who use rideshares less often (27 percent vs. 13 percent).
- **Race/Ethnicity:** Hispanic parents were more likely to indicate they have ridden in an AV than non-Hispanic White parents (29 percent vs. 19 percent).
- **Interest in AVs:** Parents who indicated an interest in AVs were more likely to indicate they have ridden in one (28 percent vs. 5 percent).

Q: How familiar are you with AVs? (N=1,000)
 Q: How interested are you in riding in an AV? (N=1,000)
 Q: How likely do you think it is that AVs will be a major part of the transportation system where you live in the next 5 years? (N=1,000)

While few of the parents surveyed are familiar with AVs, many are interested in riding in what they see as a soon major part of the transportation system.



Group differences:

➤ AV familiarity:

- **Sex:** Male parents were more likely to indicate they were very or somewhat familiar with AVs than female parents (81 percent vs. 57 percent).
- **Education:** Parent familiarity with AVs increased with education level (54 percent among those with a high school degree or less, 64 percent among those with some college or technical degree and 74 percent among those with a 4-year degree or higher).
- **Rideshare use:** Parent familiarity with AVs was higher among parents that use rideshares weekly compared to those that use rideshares less often (85 percent vs. 60 percent).

➤ Interest in riding in AV:

- **Child's age:** Parents of younger children were more likely to indicate they were very or somewhat interested in riding in an AV than parents of older children (79 percent of parents

with children under 4 years of age, 75 percent of parents with children ages 4–6 years and 67 percent parents with children ages 7–14 years).

- **Sex:** Male parents were more likely to be very interested in riding in AVs than female parents (50 percent vs. 27 percent).
- **Education:** Parents with the highest levels of education were most likely to be very interested in riding in an AV (44 percent of those with a 4-year/advanced degree vs. 30 percent with some college or technical degree and 26 percent with a high school degree or less).

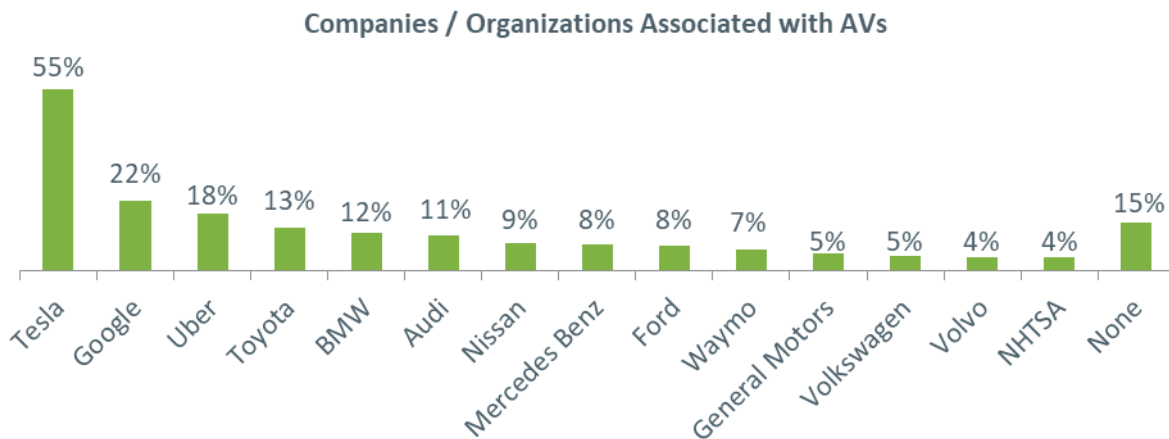
➤ **Likelihood that AVs will be a major part of the transportation system in 5 years:**

- **Interest in AVs:** Parents with an interest in AVs were more likely to believe AVs will be a major part of the transportation system in 5 years compared to those who weren't interested in AVs (83 percent vs. 41 percent).
- **Sex:** Male parents were slightly more likely to believe AVs will be a major part of the transportation system in 5 years compared to female parents (76 percent vs. 68 percent).
- **Education:** Parents with a 4-year degree or higher were more likely to believe AVs will be a major part of the transportation in 5 years compared to those with less education (33 percent of parents with a 4-year degree or higher vs. 22 percent of those with some college or technical degree and 24 percent of those with a high school degree or less).
- **Race:** Non-Hispanic Black parents were more likely than non-Hispanic White parents to believe AVs will be a major part of the transportation system in 5 years (78 percent vs. 69 percent).



Q: Which, if any, of the following companies and organizations do you associate with AVs?
(N=1,000)

Tesla is, by far, the company most associated with AVs by parents surveyed.



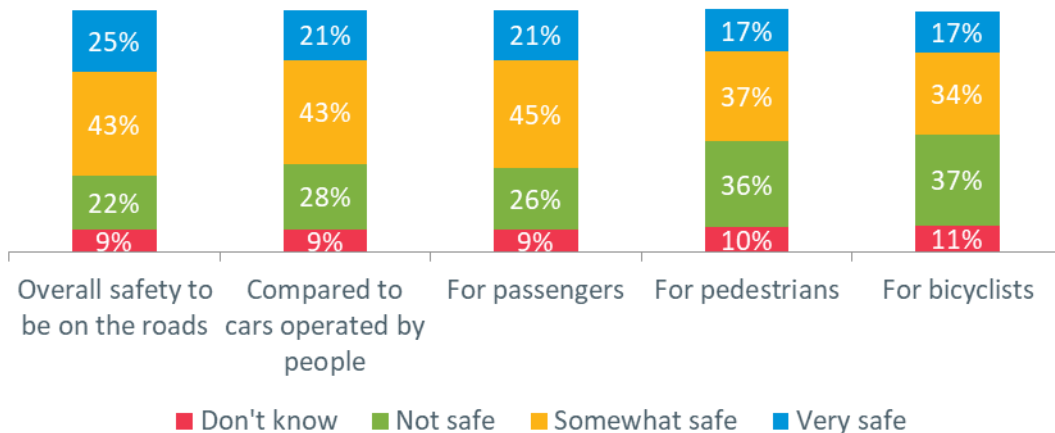
Group differences:

- **Rideshare use:** Interestingly, parents who use rideshares less than weekly were more likely to associate Tesla with AVs than parents who use rideshares weekly (62 percent vs. 36 percent).
- **Education:** Parents with some college and 4-year degree or higher were more likely to associate Tesla with AVs than parents with a high school degree or less (56 percent and 60 percent vs. 45 percent).

Q: Generally speaking, and based on what you know now, how safe are AVs for each of the following currently? (N=1,000)

Parents perceive AVs as safe, though slightly less so for pedestrians and bicyclists.

Perceived Safety by Scenario



Group differences:

- **Sex:** Male parents were more likely than female parents to perceive AVs as being very or somewhat safe for being on the roads (81 percent vs. 60 percent), compared to cars operated by people (75 percent vs. 56 percent), for passengers (73 percent vs. 60 percent), for pedestrians (66 percent vs. 47 percent) and for bicyclists (62 percent vs. 44 percent).
- **Rideshare use:** Parents who use rideshares weekly were more likely than parents who use rideshares less-than-weekly to perceive AVs as being very or somewhat safe for being on the roads (85 percent vs. 63 percent), compared to cars operated by people (78 percent vs. 59 percent), for passengers (75 percent vs. 62 percent), for pedestrians (71 percent vs. 49 percent) and for bicyclists (72 percent vs. 44 percent).
- **Interest in AVs:** Parents with an interest in AVs were more likely than parents without an interest in AVs to perceive them as being very or somewhat safe for being on the roads (84 percent vs. 27 percent), to be safe compared to cars operated by people (77 percent vs. 29 percent).

percent), to be safe for passengers (79 percent vs. 30 percent), to be safe for pedestrians (69 percent vs. 17 percent) and to be safe for bicyclists (65 percent vs. 17 percent).

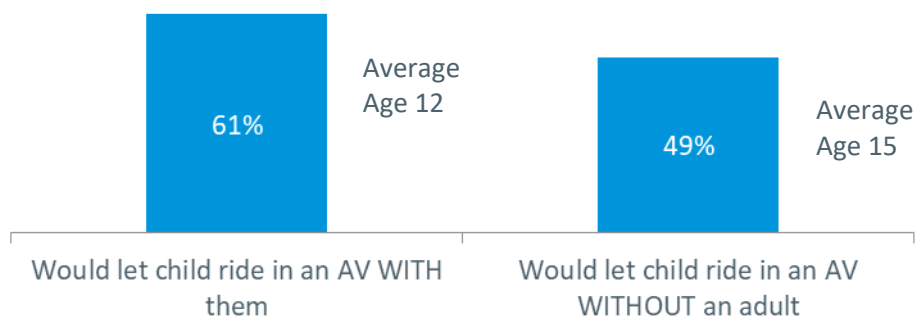
- **Education:** In general, parents with higher levels of education perceived AVs to be safe across the five presented topics. Parents with either some college or technical degree (69 percent) or a 4-year degree (72 percent) were more likely than parents with a high school degree or less education (60 percent) to perceive AVs as being very or somewhat safe for being on the road. There were differences between the most and least educated parents as well — parents with a 4-year degree or higher were more likely than parents with a high school degree or less education to perceive AVs as safe compared to cars operated by people (68 percent vs. 56 percent), to be safe for passengers (69 percent vs. 60 percent), to be safe for pedestrians (58 percent vs. 46 percent) and to be safe for bicyclists (55 percent vs. 43 percent).

Q: At what age would you let your child ride WITH you in an AV? (N=1,000)

Q: At what age would you let your child ride WITHOUT an adult in an AV? (N=1,000)

Most parents surveyed would let their child ride in AVs with them, and half would allow their child to ride alone without an adult, but only when the child is older.

Would Allow Child to Ride in AV



Group differences:

➤ Would let their child ride in an AV WITH them

- **Child's age:** Interestingly, parents of older children (ages 7–14 years) were more likely than parents of younger children to say that there is no age at which they would let their child ride in

an AV with them (42 percent for parents of children ages 7–14 years vs. 35 percent for parents of children ages 4–6 years and 36 percent for parents of children under 4 years of age).

- **Sex:** Female parents were more likely than male parents to indicate there is no age at which they would let their child ride in an AV with them (45 percent vs. 29 percent).
- **Education:** There was an inverse relationship between parent education level and their willingness to ever let their child ride in an AV with them — as education level increased, the proportion indicating there is no age at which they would let their child ride in an AV with them decreased (50 percent among those with a high school degree or less, 40 percent among those with some college or technical degree and 33 percent among those with a 4-year degree or higher).
- **Interest in AVs:** Parents who indicated they were not interested in AVs were nearly 3 times more likely than those who expressed an interest in AVs to indicate that there is no age at which they would let their child ride in an AV with them (72 percent vs. 26 percent).

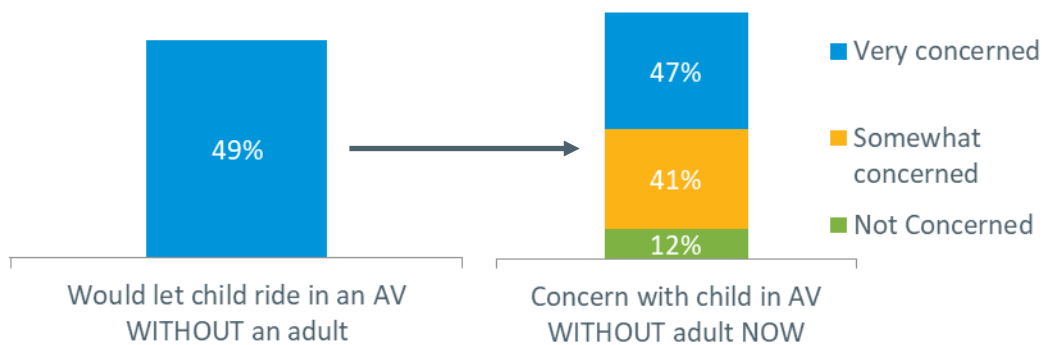
➤ **Would let their child ride in an AV WITHOUT an adult**

- **Sex:** Females were more likely than males to indicate that there was no age at which they would let their child ride in an AV without an adult (60 percent vs. 37 percent).
- **Education:** Parents with some college or technical school or less were more likely than those with a 4-year degree or higher education to indicate that there was no age at which they would let their child ride in an AV without an adult (60 percent vs. 37 percent).
- **Rideshare use:** Parents who were less-than-weekly rideshare users were more likely than weekly rideshare users to indicate that there was no age at which they would let their child ride in an AV without an adult (56 percent vs. 38 percent).
- **Interest in AVs:** Parents who indicated they were not interested in AVs were twice as likely as those who expressed an interest in AVs to indicate there is no age at which they would let their child ride in an AV without an adult (82 percent vs. 39 percent).



Q: How concerned are you about your child riding in an AV without an adult?
[Asked of those who indicated they would ever let their child ride in an AV without an Adult
(N=488)]

Of the parents surveyed who indicated they would eventually let their child ride in an AV, most expressed concern with letting their child ride in an AV right now.



Group differences:

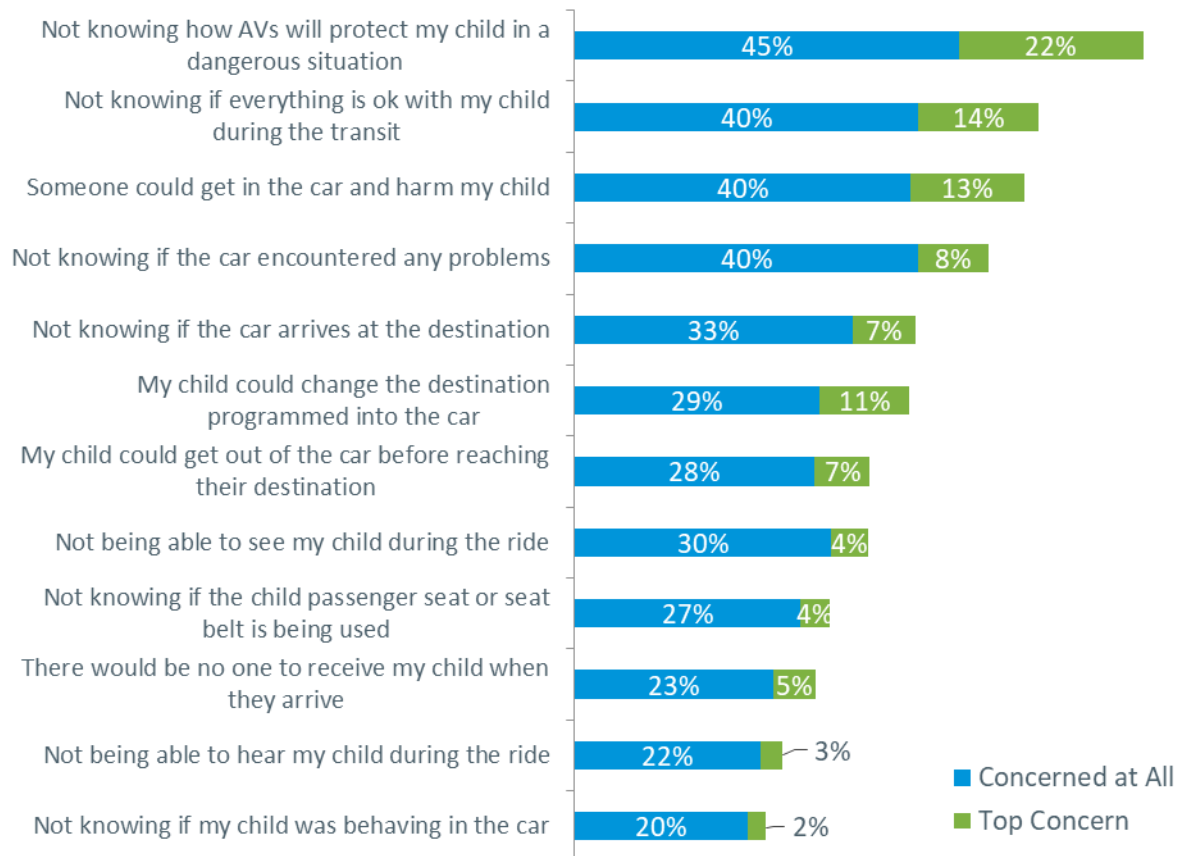
- **Interest in AVs:** Parents interested in AVs were more likely to be very or somewhat concerned about their child riding in an AV without an adult than were those who were not interested in AVs (89 percent vs. 78 percent).
- **Rideshare use:** Parents who use rideshare weekly were more likely to be very concerned about their child riding in an AV without an adult than those who use rideshare less often (56 percent vs. 43 percent).

Q: Which, if any, of the following items are you concerned about when it comes to your child riding without an adult in an AV? (N=1,000)

Q: Which are you most concerned with? (N=1,000)

While parents surveyed are most concerned with how AVs will protect their child in a dangerous situation when considering their child riding in an AV without an adult, no single scenario was selected by more than half of parents.

Concerns with Child in AV WITHOUT Adult



Group differences:

- **Sex:** How AVs will handle dangerous situations was parents' top concern related to children riding in an AV without an adult, more so among female parents than male parents (26 percent vs. 18 percent).
- **Child's age:** Parents with children below age 4 years were more likely to indicate that how AVs will handle dangerous situations was the top concern related to children riding in an AV without an adult compared to those with older children (31 percent for parents of children under 4 years of age vs. 18 percent of those with children ages 4–6 years and 19 percent of those with children ages 7–14 years).
- **Rideshare use:** Parents who use rideshares less than weekly were more likely to indicate that how AVs will handle dangerous situations was the top concern related to children riding in an AV without an adult compared to those who use rideshare more frequently (25 percent vs. 14 percent).

Implications

The survey findings reveal several key points relating to parental awareness, attitudes and beliefs regarding AVs, particularly when it comes to their children. The results indicate that while, for the most part, parents are not familiar with AVs, they are confident that AVs will play a significant role in transportation in the near future. Among many recognizable brands, parents overwhelmingly associated AVs with the company Tesla — a manufacturer of vehicles that feature advanced autopilot capabilities but are not considered fully automated. However, given that fully automated vehicles are not yet available to consumers, the fact that 1 in 5 parents indicated they had ridden in an AV suggests that the public may be confusing fully automated with some of the advanced driver-assist safety features currently available from a number of vehicle manufacturers. This potential misunderstanding needs further exploration and should be kept in mind when developing educational materials for parents and other stakeholders addressing children and AVs.

While most parents indicated a willingness to let their child accompany them in an AV, only about half would let them ride alone in an AV. Although the age at which they would be comfortable allowing their child to ride alone ranged from 1 to 17 years, the average was 15 years of age, suggesting that most parents don't think their child would be safe alone in an AV until they are in their teens.

In general, parents perceive AVs to be a safe form of transportation. Yet, the survey results suggest parents have a number of concerns with the idea of their child riding in an AV without an adult present. Although none of the 12 potential concerns presented in the survey were chosen by more than half of



parents, nine were chosen by at least 25 percent of parents. These concerns align with previous findings in the literature. Lee et al. (2020) found that parents who were less willing to use an AV to transport their child were more likely to be concerned about how AVs would protect their child, the possibility of someone harming their child inside the AV, whether there would be a designated adult at the destination and whether the AV would have cameras and microphones equipped so they could directly monitor their child.⁵ Haboucha et al. (2017) surveyed parents and found that only 13% felt they would be willing to have an empty AV pick their child up from school.⁶ While Hand and Lee (2018) found that only 7% of parents surveyed said “I would definitely use an AV to transport my child without another adult in the car,” another 52% reported they were “hesitant but not certain one way or another.”⁷

The current survey findings add to a body of research indicating a clear hesitancy among parents to allow their children to ride in AVs alone. Such findings suggest that communications to parents should focus on concerns regarding safety aspects of children in AVs. The 2020 survey reported here will serve as a baseline against which future shifts in parental awareness of and concerns related to child passengers and AVs can be assessed.

Methods and Sample Distribution

Safe Kids Worldwide conducted a national survey of 1,000 parents from August 5–19, 2020. One goal of the survey was to measure parental awareness, attitudes and beliefs related to children and AVs. Recruitment aimed for a split of 500 parents with children younger than age 7 years and 500 parents with children ages 7–14 years.

The majority (66 percent) of respondents were White or Caucasian, 17 percent were Black or African American, 11 percent were Asian and 6 percent identified as Other race. Nearly 1 in 5 (18 percent) respondents identified as Hispanic or Latino. Most respondents were female (60 percent) and under the age of 45 years (79 percent). The parents were highly educated, with half (49 percent) having a 4-year degree or higher education level, and 29 percent having some college or technical degree. The income distribution of the respondents was relatively even. Among the 9 Census Division, South Atlantic had the highest proportion of respondents (20 percent), while New England had the lowest (4 percent) (see table below).

Demographic Characteristics of Parent Respondents.

| Parent Age | | N (%) | Census Division | | N (%) |
|---------------------------|----------------------------------|-----------|------------------|----------------------|-----------|
| | 18–34 | 390 (39%) | | Pacific | 160 (16%) |
| | 35–44 | 400 (40%) | | Mountain | 70 (7%) |
| | 45+ | 210 (21%) | | West South Central | 130 (13%) |
| Parent Gender | | N (%) | | East South Central | 60 (6%) |
| | Female | 600 (60%) | | South Atlantic | 200 (20%) |
| | Male | 400 (40%) | | West North Central | 60 (6%) |
| Parent Race and Ethnicity | | N (%) | | East North Central | 150 (15%) |
| | White or Caucasian | 660 (66%) | | Middle Atlantic | 130 (13%) |
| | Black or African American | 170 (17%) | | New England | 40 (4%) |
| | Asian | 110 (11%) | Household Income | | N (%) |
| | Other | 60 (6%) | | \$150,000 or more | 140 (14%) |
| | Hispanic or Latino | 180 (18%) | | \$100,000 –\$149,999 | 190 (19%) |
| Parent Education | | N (%) | | \$75,000–\$99,999 | 180 (18%) |
| | 4-year degree or higher | 480 (48%) | | \$50,000–\$74,999 | 160 (16%) |
| | Some college or technical degree | 290 (29%) | | \$35,000–\$49,999 | 120 (12%) |
| | High school degree or less | 240 (24%) | | Less than \$35,000 | 210 (21%) |

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