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Willing to Downsize?

Understanding Consumer Demand for SUVs in Metro Vancouver

February 2022

Prepared for the David Suzuki Foundation by:
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ABOUT THE SUSTAINABLE TRANSPORTATION ACTION RESEARCH TEAM (START)

We take an interdisciplinary approach to low-carbon transportation solutions, integrating relevant insights from quantitative and qualitative research methods, such as statistical analyses, energy-economy modeling, consumer and citizen surveys, stakeholder interviews, media analysis and policy analysis. Our current research focus is on four main themes:

- MARKETS FOR LOW-CARBON TRANSPORT
- LOW-CARBON TRANSPORT FUEL SUPPLY AND INFRASTRUCTURE
- ACCEPTANCE OF ALTERNATIVE FUELS AND POLICY
- MODELING OF LOW-CARBON TRANSPORT SYSTEMS

ISBN Print: 978-1-988424-80-4
ISBN Digital: 978-1-988424-79-8

Canadian Cataloguing in Publication Data for this report is available through Library and Archives Canada.

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FUNDERS

Funding for this report was made possible through the generous support of the Real Estate Foundation of B.C., the Bullitt Foundation and the Claudine and Stephen Bronfman Family Foundation.

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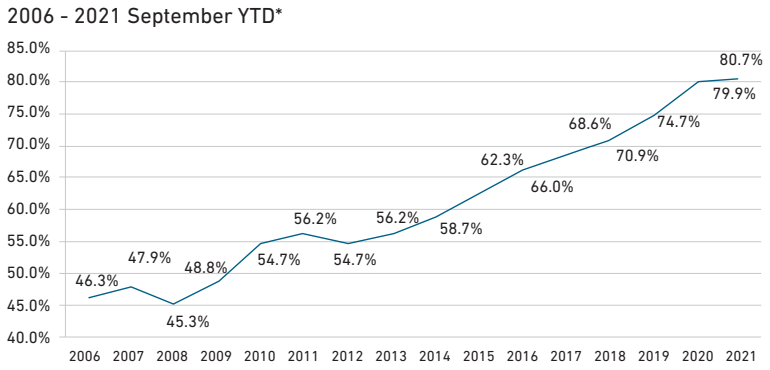
BACKGROUND AND GOALS

In Canada and globally, the growing share of sport utility vehicles in the passenger market is challenging various sustainability goals, especially efforts to decarbonize the transportation system. Alarmingly, light-duty trucks made up 80% of new vehicle sales in Canada in 2020 and 2021, compared to 54% in 2010 (Figure E1).[1] Larger and heavier vehicles require more energy per kilometre, emit more greenhouse gas emissions and present increased safety risks compared to smaller vehicles. In this report, we explore what motivates consumer interest in SUVs, and what conditions might lead consumers to shift toward smaller vehicles.

Figure E1: The share of light-duty trucks in Canada's passenger vehicle market[1]



Source: DesRosiers Automotive Consultants Inc.
**2020 and 2021 data is an estimate*

FRAMEWORK AND OBJECTIVES

Drawing from the literature, our research design considers consumer perceptions of functional, symbolic and societal aspects of SUVs and cars, while also assessing SUV drivers' willingness to downsize. We also consider the roles of social norms, social influence and the present culture of car dominance ("automobility"). Focusing on Metro Vancouver residents, the research questions guiding this analysis include:

1. What motivated the purchases of currently owned vehicles (car, SUV or no vehicle)?
2. What are the perceived strengths and weaknesses of SUVs versus cars?
3. What images/identities are associated with SUVs?
4. What are the perceived societal impacts of SUVs (e.g., environment and safety)?
5. For SUV drivers, what is their "willingness to downsize"?
6. What policies or strategies might be most effective in encouraging vehicle downsizing?

OUR APPROACH

To explore these research questions, we utilize a mixed-methods approach. We draw quantitative insights from a descriptive survey of Metro Vancouver citizens (n=986), and identify qualitative insights from a subset of those same individuals via six focus groups (n=37). The survey provides generalizable, quantitative estimates from a representative sample, while the qualitative work provides more detail on the motivations and "stories" behind the numbers.

RESULT #1: SUV DRIVERS SEE SUVS AS FUNCTIONALLY SUPERIOR

SUV drivers expressed numerous functional motives for their SUV purchases and usage. Major categories include:

- **Safety:** SUV drivers are significantly more likely to perceive that SUVs improve "the safety of the transportation system" (49% of SUV drivers compared to 30% of car drivers and 21% of non-drivers) and "safety for pedestrians and cyclists" (29%, compared to 19% of car drivers and 14% of non-drivers). In focus groups, about half of the SUV drivers mentioned that they "feel safe" in their SUV, especially in the event of an accident. Some described the importance of sitting higher in traffic to further improve their feeling of safety.

- **Space for lifestyle:** SUV drivers are significantly more likely to place importance on fitting "lots of stuff" (74% of SUV drivers rate as important, compared to 54% for car drivers) or "lots of people" (55%, compared to 35% of car drivers) in their vehicle. In focus groups, SUV drivers describe this added space as important for their lifestyle, including family-oriented living, as well as engaging in recreation; e.g., skiing, surfing or golfing. Relatedly, SUV drivers are more likely to place importance on "access to recreation" than car drivers.

- **Handling:** SUV drivers are significantly more likely to place importance on "ability to drive in snowy/wet conditions" (90% of SUV drivers rate as important, compared to 70% of car drivers). In focus groups, several SUV drivers described their vehicle as being effective for driving in bad weather or on rough roads.
- **Fun:** SUV drivers are more likely to place importance on their vehicle being "fun to drive" (74% of SUV drivers, compared to 63% of car drivers). In the focus groups, about half of the SUV drivers described their vehicle as "fun," or otherwise mentioned how they used the vehicle for "pleasure trips."
- **Less concern about finances:** SUV drivers tend to be less sensitive to financial costs than car drivers, and statistically less likely to describe fuel efficiency as important in their vehicle choice (78% of SUV drivers, compared to 87% of car drivers). In focus groups, SUV drivers were less likely to mention financial factors — other than mentions of getting a "good" deal. In contrast, car drivers often mentioned how their vehicle was cheaper to buy and cheaper to drive than an SUV.

RESULT #2: SUVS CAN SEND A VARIETY OF SYMBOLIC MESSAGES

Symbolism and imagery can play an important role in vehicle purchase. First, **SUVs can communicate different messages to different people.** When asked about SUVs in general, SUV drivers are significantly more likely to identify the image of being "reliable" (53% compared to 40% of car drivers) and "sensible" (36% compared to 24% of car drivers). Car drivers and non-drivers were less likely to have positive associations with SUVs. In short, SUVs are more likely to send positive messages to other SUV drivers, but potentially less positive (or negative) messages to other consumer segments.

Second, about half of participants perceive SUVs as a "**status symbol**" — mentioned equally by SUV drivers, car drivers and non-drivers alike in focus groups. Communication of status was linked to particular cultural backgrounds, as well as the general image of being "successful." Though, some participants explained that brand (especially a luxury brand) is more associated with status than vehicle type (SUV versus car).

RESULT #3: SUV PURCHASE IS LINKED TO SOCIAL SUPPORT

Social norms and social support play particularly important roles in SUV purchase. First is the notion of **descriptive norms**,[2] where SUVs are seen as increasingly common or normal. In the survey, SUV drivers are more likely to perceive that their friends and family own SUVs (63% of SUV drivers, compared to 45% of car drivers and 35% of non-drivers). In focus groups, several SUV drivers mentioned that SUVs tend to "blend in" with others. Most of the SUV drivers state that at least one other in their social group is driving an SUV.

Related is **injunctive norms**, which is the perception of what others support or think is the "right thing to do."[2] In the survey, SUV drivers are more likely to perceive that their friends or family

have a positive view of SUVs (72% vs. 42% of car drivers and 38% of non-drivers) and would "approve" of buying an SUV (66% vs. 41% of car drivers and 36% of non-drivers). Further, social support for SUVs proved to be one of the strongest statistical predictors of SUV purchase in the regression analysis.

RESULT #4: SUV DRIVERS DOWNPLAY THE ENVIRONMENTAL AND SAFETY IMPACTS OF SUVS

For most drivers in our sample (SUV or car), perceptions of environmental and other societal impacts did not play a strong role in purchase decisions. Both segments placed relatively low importance on minimizing environmental impacts, reducing GHG emissions, reducing air pollution or improved safety for other road users. SUV drivers and car drivers also expressed similar beliefs about the positive versus negative impacts of SUVs on climate change, though SUV drivers were less likely to perceive negative air pollution impacts.

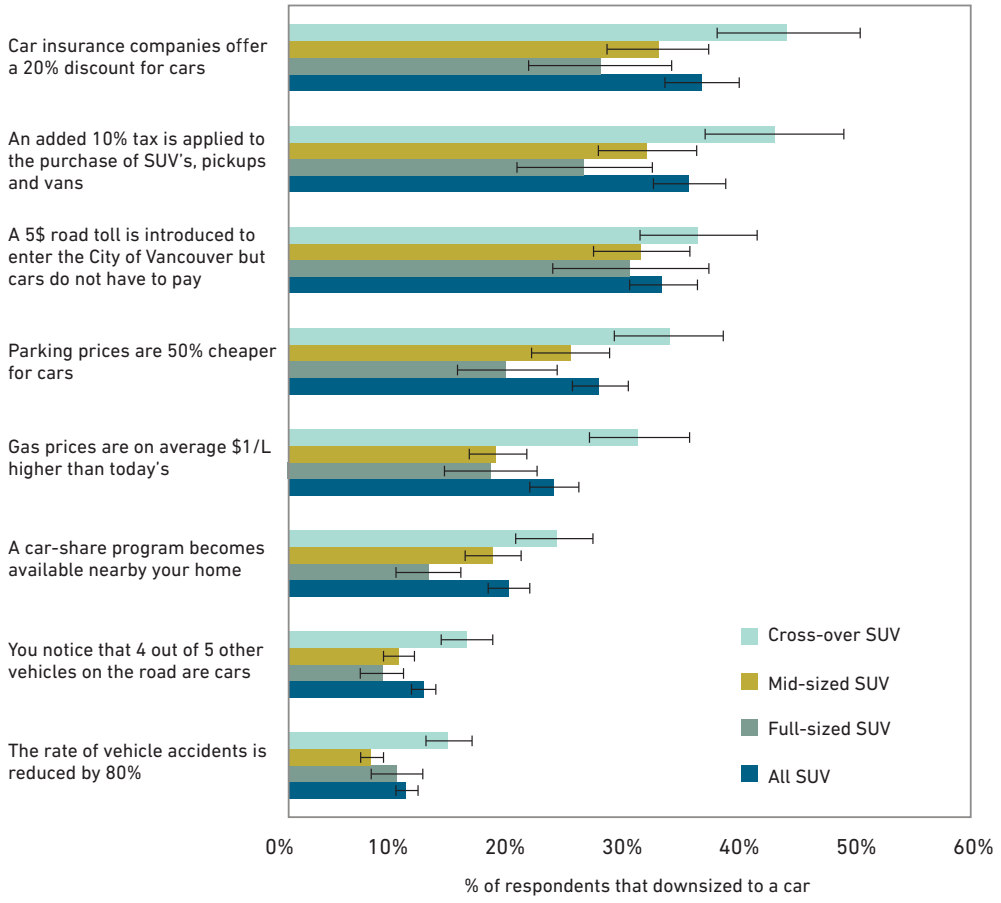
When asked about environmental impacts, SUV drivers tended to downplay the role of SUVs. In focus groups, several SUV drivers restated a belief that they needed their SUV for functional reasons such as safety or space. Several SUV drivers explained that SUVs did not emit any more pollution or GHG emissions than a car. Rather than switching to a car, about half of SUV drivers mentioned that switching to a hybrid or electric SUV would be more effective for reducing environmental impacts.

However, having **higher societal concern** (agreeing with statements such as "car use is causing climate change") is positively and significantly associated with willingness to downsize among SUV-drivers.

RESULT #5: SUV DRIVERS ARE RELUCTANT TO DOWNSIZE, ALTHOUGH FINANCIAL INSTRUMENTS HELP

In the survey, across all SUV intenders (those intending to buy an SUV), willingness to downsize to a smaller vehicle was highest with financial measures (Figure E2): 36% would downsize if there were a 20% insurance discount for cars, 35% for a 10% purchase price tax for SUVs, 33% for a $5 road toll to enter the City of Vancouver for SUVs and 27% for parking prices that are 50% cheaper for cars. Stated interest in downsizing was lower for other conditions, such as increasing car-share availability, increasing "norms" of cars (80% cars on road), or reduced vehicle accidents. In the focus groups, almost half of SUV drivers stated opposition to downsizing under any conditions. A few others stated that they might be motivated to downsize if the smaller vehicle were clearly more fuel-efficient.

Figure E2: SUV drivers' willingness to downsize to a car for next vehicle purchase, with changes in policy or conditions (average likelihood of downsizing; SUV intenders only; whiskers represent 95% confidence intervals)



RESULT #6: ALL DRIVERS TEND TO OPPOSE POLICY THAT ENCOURAGES DOWNSIZING

In the survey, SUV drivers were significantly more likely to oppose (and less likely to support) policies that penalize SUV ownership, or favour car ownership, including free parking for cars (62% oppose, 22% support), taxes/tolls for SUVs (64% oppose, 17% support), cheaper insurance for cars (43% oppose, 31% support) and a ban on SUV-related advertising (50% oppose, 13% support). In focus groups, reasons for opposition included perceptions that there are better ways to reduce environmental impact (efficiency or electrification), government control threatens personal liberty, there would be negative impacts on lifestyle or work needs, the policy would be classist, and policy might be inauthentic or a way for the government to make money.

POLICY IMPLICATIONS

Though this study is not intended as a policy analysis, we can offer insights into a number of policy options related to downsizing vehicle class:

- **Financial incentives for smaller vehicles (purchase subsidies, insurance discounts and parking discounts):** As noted, about one-third of SUV intenders are willing to consider downsizing with such a policy. Generally, subsidies are perceived as more politically acceptable,[3] though they can be costly in terms of government expenditure, and can lead to inequitable outcomes. That said, all else held constant, subsidizing the purchase or use of smaller vehicles could lead to more overall vehicle ownership and driving overall. Ideally such a policy would be paired with a financial penalty for larger or heavier vehicles (such as a feebate).

- **Financial disincentives for SUVs or large/heavy vehicles (purchase taxes, adding parking or insurance fees):** 35% of SUV intenders expressed interest in downsizing if a 10% SUV purchase price tax was implemented, and 33% expressed willingness to downsize for a $5 road toll to enter the City of Vancouver for SUVs. However, financial disincentives were strongly opposed by most SUV drivers, and in most cases by car drivers and non-drivers as well. Vancouver city council recently sent a parking proposal that favours smaller vehicles over SUVs back to staff for further study.

- **Feebates:** A feebate program could charge purchase taxes for vehicles with higher GHG emissions per kilometre (including larger, heavier gasoline vehicles) while subsidizing lower-emissions vehicles.[4] Our present study did not address feebates in particular, though it stands to reason that the combination of a purchase incentive and disincentive could be as effective in stimulating vehicle downsizing as either instrument on its own. Further, a revenue-neutral feebate would avoid the challenges of government expenditure for subsidy programs. However, there is still likely to be opposition to a feebate if it is perceived as a tax on SUVs and large vehicles.

- **Banning SUV advertising:** Recent research suggests that SUV-related advertising (such as billboards) be banned, in an effort to reduce consumer demand for SUVs.[5] While a ban may help, other efforts would be needed to trigger a cultural shift.

- **Information campaigns:** A more comprehensive effort to shift consumer preferences and perceptions toward smaller vehicles could possibly also be effective. An information effort could target the factors that our statistical analysis found to be important predictors of SUV purchase and willingness to downsize: SUV social norms (having friends and family that have and approve of SUVs), and societal concern (perceptions that vehicles contribute to climate change, air pollution and safety threats). Regarding societal concern, it is possible that communication of some societal messages (facts and/or engaging narratives about vehicle safety, and energy use and GHG emissions per

km for larger vehicles) could potentially help to sway the opinions of some consumers, but more research is needed to understand which strategies might be effective, and what the magnitude might be.

- **Regulations:** In Canada, both the vehicle emissions standard and zero-emissions vehicle mandate are meant to incentivize improved vehicle efficiency and increased penetration of ZEVs while being relatively neutral about vehicle class. Some argue that the vehicle emissions standard in particular provides relatively less stringent standards for larger vehicles, such as SUVs, which may have perversely incentivized the current trend towards SUVs.[8] Removal of such exemptions or loopholes could improve the efficacy of low-carbon regulations. For example, a vehicle emissions standard could be based simply on gCO_2e/km, without variations for different vehicle classes, size, weight or footprint. Such a revision to regulations would more fairly include vehicle downsizing as one of the many potential compliance pathways for increasing vehicle energy efficiency.

- **Car-sharing programs:** 19% of SUV drivers expressed willingness to downsize if a "car-share program becomes available near your home." The idea is that some consumers may not need to have many of the attributes of an SUV (handling for weather, extra passenger and cargo space) on a day-to-day basis if they can instead access an SUV (or other larger vehicle) only for the trips when they need one.

1. INTRODUCTION

Photo: Adobe Stock Images

"My apartment building, the underground parking. It is a sea of SUVs. Absolute sea of SUVs. There are just no small cars there at all. All SUVs and trucks." (Theresa, SUV driver)

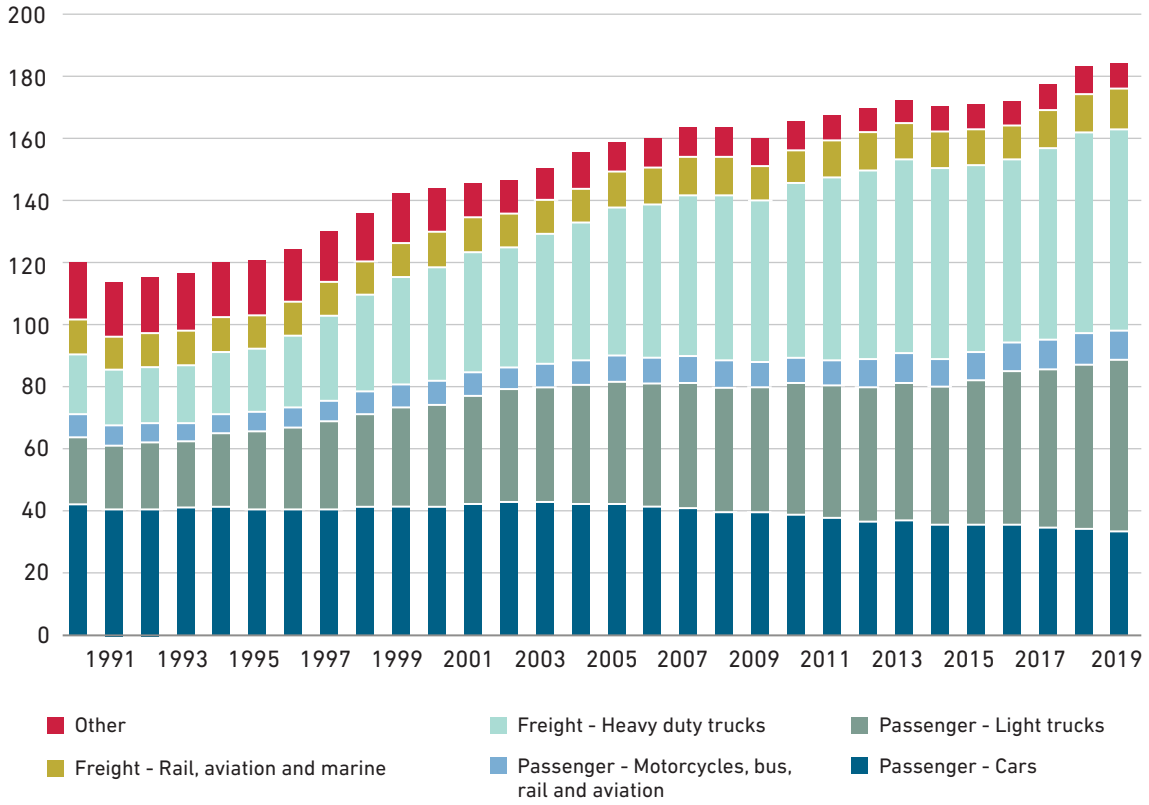
"A small car emits less pollution. But it's not as safe. I think a big car is more safe." (Tammy, SUV driver)

"For us we would feel it would be a prejudice to forcing us into a small car. And it would be unhealthy for us." (Betsy, SUV driver)

In Canada and globally, the growing share of sport utility vehicles in the passenger vehicle market is challenging various sustainability goals, especially efforts to decarbonize the transportation system. Larger and heavier vehicles require more energy per kilometre, emit more greenhouse gas emissions and present increased safety risks compared to smaller vehicles. We explore what motivates consumer interest in SUVs, and what conditions might lead consumers to shift toward smaller vehicles.

The transportation sector represents about 30% of GHG emissions in Canada,[9] and 45% of emissions in Metro Vancouver.[10] Between 2005 and 2019, GHG emissions in Canada's road transport sector grew by 18%.[9] As portrayed in Figure 1, light-duty passenger trucks (which includes SUVs, as well as minivans and pickup trucks) is one of the fastest-growing sources of GHG emissions in Canada's transport sector. Following this trend, Canadian GHG emissions from light-duty gasoline cars went down 19% from 1990 to 2018 while emissions from light-duty gasoline trucks went up 160%.[11]

Figure 1: Growing GHG emissions in Canada's transportation sector[9]

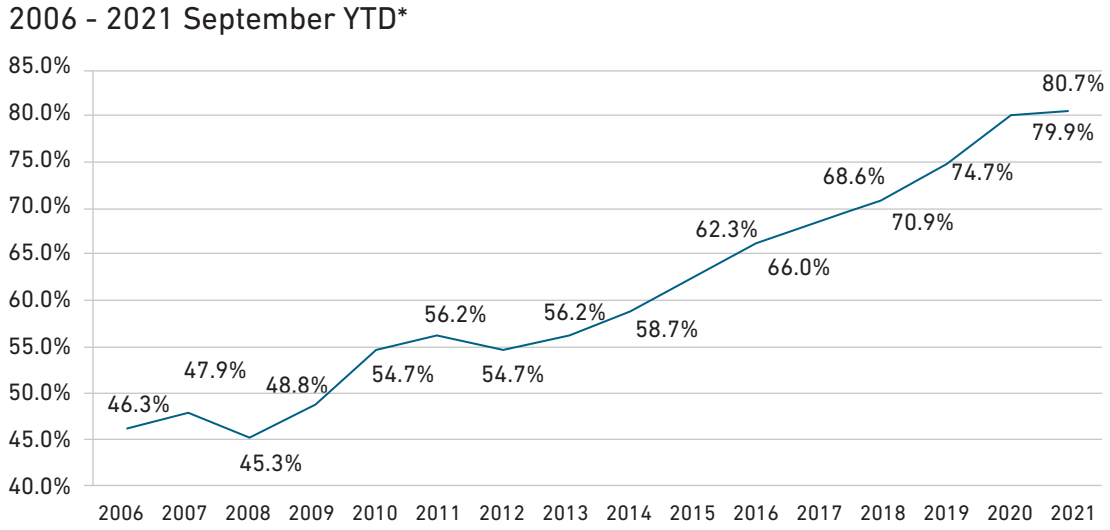


(Source: Environment and Climate Change Canada, 2021)

In this report we seek to understand the increasing share of SUVs as passenger vehicles. SUVs can range widely in size, including crossover, mid-sized and full-sized. From 1990 to 2018 in Canada, the number of cars on the road went up by 10%, while the number of light-duty trucks went up by a factor of three (from 3.4 million to 13 million).[11] Although policy (notably the national vehicle emissions standard) is driving continual improvement in the fuel efficiency of light-duty cars and trucks in Canada,[8] the increasing number of light-duty vehicles and the increasing share of light-duty trucks within that total is outpacing fuel efficiency improvements.[9] From one analysis, the switch from cars to SUVs and other light-duty trucks is responsible for about nine megatons of GHG emissions increase between 1990 and 2018 (controlling for improvements in fuel efficiency and increases in vehicle population).[11]

Alarmingly, SUV sales continued to increase over the past few years. Light-duty trucks made up 80% of new vehicle sales in Canada in 2020 and 2021 — compared to 54% in 2010 (Figure 2).[1] These trends are occurring globally as well, where the share of SUV sales among passenger vehicles has increased from 17% in 2010 to 39% in 2018.[12] During this same time, SUVs represented the second-fastest growing source of GHG emissions globally, after the power sector, but higher than heavy industry, heavy-duty trucks and aviation.[12]

Figure 2: The share of light-duty trucks in Canada's passenger vehicle market[1]



Source: DesRosiers Automotive Consultants Inc.
**2020 and 2021 data is an estimate*

One of the simplest problems with light-duty trucks is that they are less efficient than cars. In Canada, light-duty trucks emitted 31% more GHGs per kilometre than cars in 2018.[11] Globally, SUVs use on average 25% more energy (per km) than midsized cars.[12] The implication is that increased SUV usage can counteract the GHG benefits of improved vehicle efficiency and increased electric vehicle sales. SUVs have also been getting heavier over time, with a seven% increase (136 kg) in average weight since 1990.[13]

An increasing share of SUVs has also reduced transportation system safety.[13] SUVs are disproportionately more likely to injure or kill pedestrians relative to cars.[14] In a collision with a smaller vehicle, the SUV is 28% more likely to kill the other driver — showing that cars and SUVs are "incompatible," due to differences in mass and bumper height.[15] With every 500 kilogram difference between vehicles in a collision, the probability of death for passengers in the smaller vehicle increase by 12%.[16] Pedestrians who are struck by heavier vehicles are also at higher risk. A U.S. analysis suggests that if the residents who switched to SUVs over the past 20 years had stuck with cars, more than 1,000 pedestrian deaths could have been avoided.[17]

Frustratingly, although increasing the mass of the vehicle fleet reduces overall transportation system safety, consumers typically perceive themselves as being safer inside SUVs. This can be described as the difference between the "passive safety" offered by SUVs (hitting or getting hit by something), while smaller cars are better at "active safety": handling, braking and avoiding collisions.[18]

For the most part, climate policies do not directly address the trend toward light-duty trucks. Canada's vehicle emissions standard in particular has weaker standards (in terms of gCO_2e per km) for larger vehicles.[8] Both the zero-emissions vehicle mandate (used in British Columbia and Quebec) and low-carbon fuel standard (in British Columbia and forthcoming nationally) focus on fuel switching, with no emphasis on reducing vehicle size. In theory, a technology-neutral policy such as carbon pricing should incentivize consumers to shift toward more efficient vehicles in general (leading to reductions in size and mass). Yet, so far, most consumers have shown to have low responsiveness to increases in gasoline or carbon prices, at least when it comes to their decisions about vehicle type.

That said, climate policies could put more focus on vehicle class, such as a road-pricing or parking scheme that provides exemptions or lower costs for smaller vehicles. As one example, in 2021, the City of Vancouver proposed a Climate Emergency Parking program that would have included annual "pollution charges" for new vehicles to park in the city, at $1,000 for gasoline-powered sports cars and large SUVs, and $500 for smaller SUVs.[i] Relatedly, a national "feebate" program could be designed to charge purchase taxes for vehicles with higher GHG emissions per kilometre (including larger, heavier gasoline vehicles) while subsidizing lower-emissions vehicles.[4]

The purpose of this report is to explore reasons underlying consumer demand for SUVs, and to identify potential strategies to motivate SUV buyers to instead select a car. We focus on the case of Metro Vancouver, a region that has set deep climate-mitigation goals, and already has existing mixes of climate policies for road transportation in place at the national, provincial and metro and/or city levels. Further, Metro Vancouver and its various city and municipal governments are not yet on track to meet GHG goals for 2030 and beyond. Policy-makers are considering a range of strategies to address the "climate emergency," which could include policies designed to encourage consumers to buy smaller vehicles.

i The proposal was sent back to staff for further study in October 2021. Details of the proposal are available here: https://www.cbc.ca/news/canada/british-columbia/vancouver-city-council-scraps-controversial-climate-emergency-parking-program-1.6202580

2. LITERATURE REVIEW: CONSUMERS AND SUVS

Photo: Adobe Stock Images

Within the literature on sustainable and low-carbon transportation, there is relatively little research describing consumers' choice of vehicle class, such as car versus SUV. Much more research is published on consumer interest in zero-emissions vehicles and other alternative fuels, as well as mode choice, such as driving versus cycling or using public transit. Here, we summarize insights from the available literature on SUV consumer demand.

Some of these studies focus on identifying the characteristics of SUV drivers compared to owners of other vehicles and users of other travel modes. One earlier (1998) study of residents of the San Francisco Bay Area found that SUV owners (compared to others) were more likely to have stronger positive preferences toward travel freedom and urban living.[19] Further, SUV owners were more likely to be younger, have higher education, earn higher incomes and live in larger households.[19]

Other studies consider which SUV attributes consumers value, such as safety. Thomas and Walton (2008) found SUV use to be strongly related to perceptions that large vehicles are safer, useful for off-road and prestigious.[20] Focusing on safety perceptions, they find that SUV drivers are particularly driven by the egocentric notion that "bigger is safer," considering personal collision safety rather than safety for overall road users. Paradoxically, while the increasing share of larger, heavier vehicles reduces the safety of the transportation system, the drivers of these larger, heavier vehicles report that they feel safer. Gladwell describes this phenomenon as the difference between the "passive safety" offered by SUVs (getting hit by something), while smaller cars are better at "active" safety: handling, braking and avoiding collisions.[18] As argued by Gladwell, the preference for "passive" safety represents how "feeling safe has become more important than actually being safe." (p30)[18]

One 2017 U.S. survey explored a broader set of functional explanations for light-duty truck demand.[21] The top reasons that light-truck owners chose to purchase their vehicle (over a smaller vehicle) were "greater general utility" (19% of light-truck owners surveyed), "need larger vehicle due to family size" (14%), "need to move large or heavy items" (10%), "just always owned this vehicle type" (10%), "better off-road 4x4 capabilities" (9%), and "greater safety" (8%). Safety was the mostly commonly reported (24%) secondary reason for purchase of a light-duty truck. In contrast, when passenger car owners in this study were asked about their purchase of a car over a light-duty truck, the most frequently mentioned reasons were "better fuel economy/lower fuel costs" (25%), "lower initial purchase price" (12%), "just always owned this type of car" (11%), "easier to drive or maneuver" (9%), "prefer the image more than other vehicles" (6%), and "more environmentally friendly" (5%).

This U.S. study is also one of the few to ask consumers about their interest in downsizing their vehicle. More than a third (36%) of light-truck-owning respondents reported that they would not consider a smaller vehicle or an electric vehicle even if there were a large increase in gas prices. The most frequently mentioned disadvantages of switching to a smaller vehicle were reduced cargo capacity (66% of light-truck-owning respondents), reduced hauling capacity (29%), reduced safety (28%), and "dislike the image of this vehicle type" (16%).

A few studies have looked beyond functional attributes, considering the additional roles of social norms and social influence in SUV demand. A 2021 study in Germany investigated the specific role of social norms (defined as "shared behavioural rules", p3) in trends toward SUV ownership.[22] They find that SUVs (along with luxury cars and off-road vehicles) are perceived by some consumer segments as a "status good" that "individuals buy to increase/solidify their social status" (p8). The authors find that social norms regarding image and prestige are more influential for higher-income individuals, whereas middle- to low-income people are more focused on price, fuel consumption and comfort.

Relatedly, the uptake of SUVs can be viewed as a type of socially embedded consumption due to the visible and social nature of consumption practices.[23] Dasgupta et al. describe two different types of socially embedded consumption. First is competitive consumption, defined as trying to meet the average consumption level of peers; for example, buying an SUV because everyone else in your social circle seems to have one. Second is consumption norms, defined as using consumption to signal a desire to conform to the status quo or a desire to oppose the status quo. This latter norm can better explain heterogeneity in the market, where members of one group buy SUVs to conform to their group's norms, while members of other groups might instead buy small cars or avoid vehicle ownership altogether as a resistance to the SUV norm.

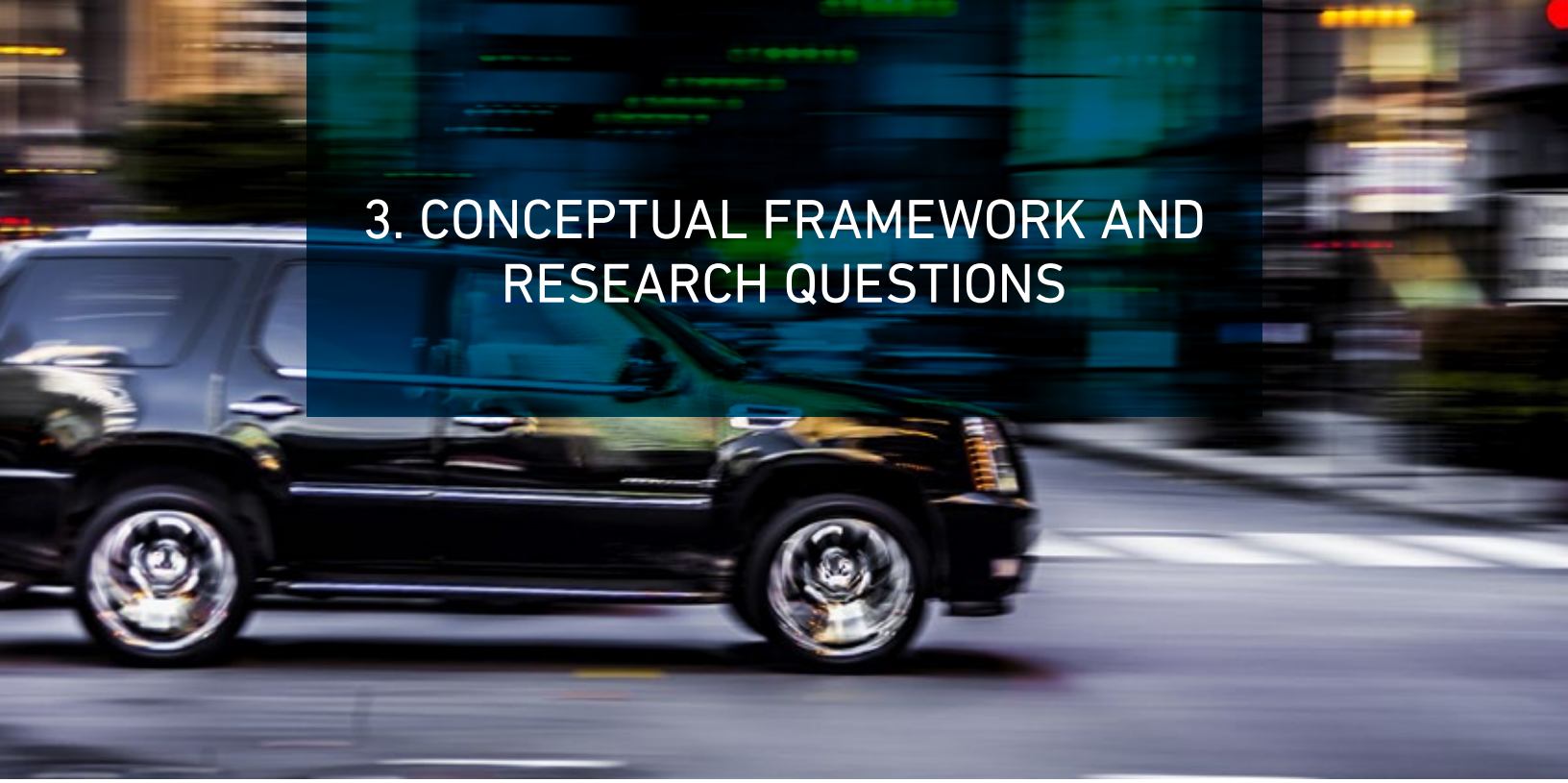
The most relevant and comprehensive Canadian study of consumer demand for SUVs was conducted by Equiterre and researchers at Hautes Études Commerciales (HEC) Montreal (published only in French).[24] The researchers used surveys, interviews and focus group to explore SUV perceptions via a framework that addressed functional motives (safety, comfort

and fuel efficiency), symbolic motives (images and social norms) and emotional motivations (the pleasure of driving). The study identifies a wide range of findings about Canadian SUV drivers, including the following: [24]

- **Demographics:** SUV drivers tend to be higher-income, to have larger family/household sizes and are more likely to be women.
- **Motivations:** SUV purchase is driven by perception of the SUV's superiority, with importance placed on vehicle attributes such as comfort, sitting in a higher driving position, positive appearance and having four-wheel drive. SUV buyers typically did not mention carbon emissions or brand.
- **Safety:** SUV drivers place importance on safety in terms of impact (collision) and safety for weather conditions, but expressed little concern about the safety impacts of the SUV on other people (pedestrians or drivers/passengers of other vehicles).
- **Values:** SUV drivers place a high priority on values such as ambition, power, influence and authority. These drivers are less likely to have a strong environmental identity.
- **Emotion:** SUV drivers are more likely to enjoy the "pleasure of driving," as well as the feeling of ruggedness, stability and sense of control.
- **Social norms:** The authors describe the approval of others as the single-most important factor that relates to SUV purchase, where owning an SUV is seen as "normal."

In a related study, Equiterre explored the role of advertising in the consumer trend toward SUVs.[5] The study uses content analysis of 132 ads from Canadian newspapers and magazines published in 2019 and 2020. They found that ads for light-duty trucks mostly use depictions of nature (68% of ads), attractive financing deals (77%), technology-related features (83%) and safety (66%) in promotion of light-duty trucks. Fuel economy is only mentioned in five per cent of ads. Few ads feature urban activities, families or manufacturer's suggested retail price of the vehicle. The authors argue that SUV advertising is too influential in the market, and can convey unrealistic messages about safety, while omitting environmental concerns and fuel consumption.

Finally, we note two Canadian studies that explore how ZEV preferences vary between SUV and car drivers. SUV drivers express a lower intention to purchase a ZEV relative to all car buyer segments.[25] While SUV drivers feel more societal pressure to "think green" regarding their next vehicle purchase, they are less likely to be influenced by personal moral norms such as concern for the environment.[25] Compared to other consumer segments, SUV owners are more concerned about the driving range and acceleration of a ZEV, and less concerned about purchase price and fuel costs.[26]



3. CONCEPTUAL FRAMEWORK AND RESEARCH QUESTIONS

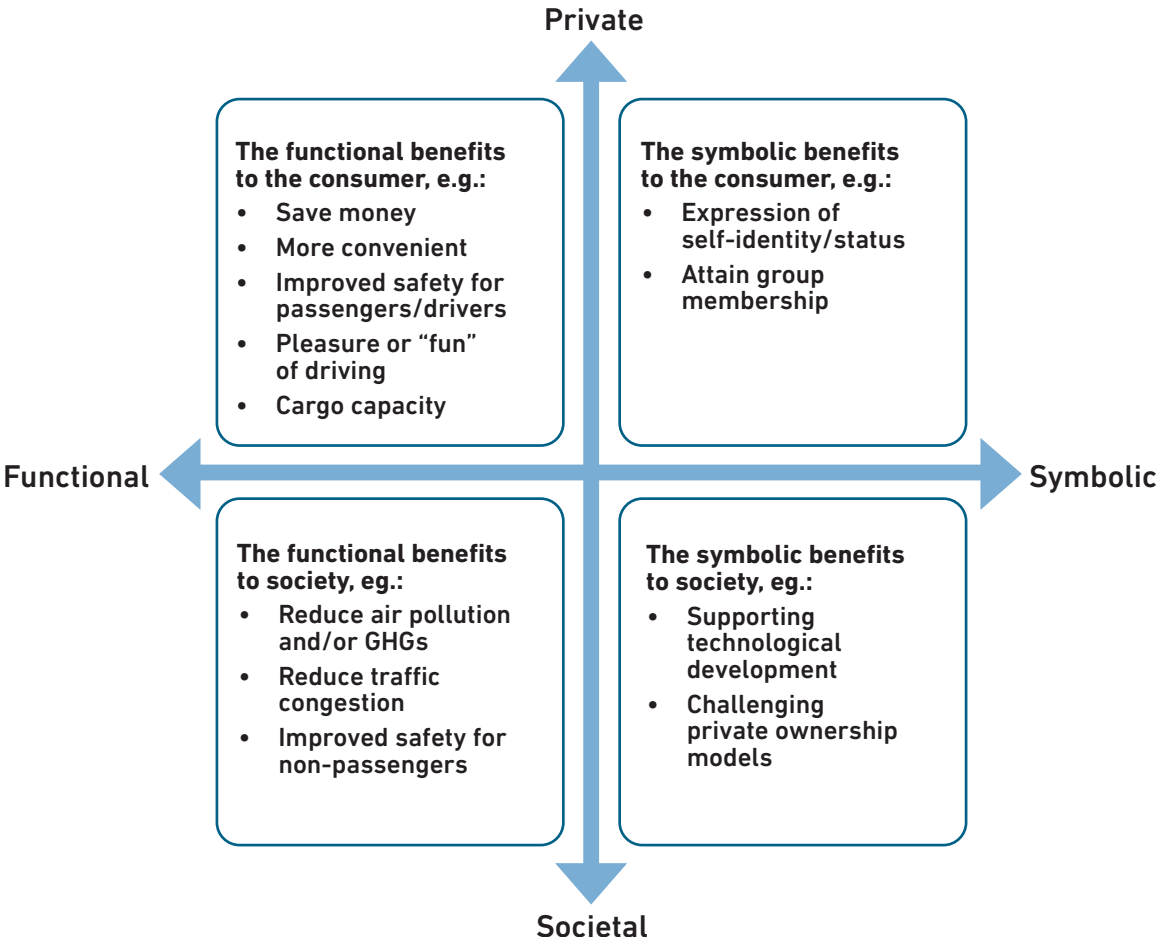
PHOTO Adobe Stock Images

Drawing on the insights in this literature, our present research approach combines three frameworks to help us to understand consumer perceptions, social norms and culture.

First, to help organize different dimensions of consumer perceptions of SUVs, we use a framework that categorizes the attributes of vehicles (or perceived benefits and drawbacks of vehicles) along two dimensions (Figure 3): functional versus symbolic aspects and private versus societal aspects. This framework has been used in several studies to explore the complexities for consumer perceptions toward various transport technologies: [6,27,28]

- The private-functional category addresses what the vehicle does for the consumer, such as financial costs or savings (price, fuel costs and maintenance costs), performance, personal safety, convenience and reliability.
- The private-symbolic category acknowledges that forms of mobility can express self identity, convey personal status or signal membership in a particular group[29,30].
- The societal-functional category includes the vehicle's direct societal impacts, including environmental and land-use impacts, energy usage and safety impacts to other road users.
- Last, the societal-symbolic category relates to the vehicle's ability to inspire other users and stakeholders (e.g., drivers, companies, governments) to engage in activities that in turn impact society more broadly, such as supporting further technological advancement, or challenging conventional vehicle ownership models — or even challenging the incumbent system of automobility.[31] This category can include perceptions of contributing to formal social movements, as well as less formal messaging or social negotiation of norms and values.

Figure 3: Categorizing consumer perceptions of SUVs



The second component of our framework considers social influence and social norms (which can overlap somewhat with the symbolic category noted above). Extensive research has shown that social influence can play a strong role with vehicle purchase decisions and the formation of preferences, including processes of learning from others, identifying what is "normal" or commonly done by others and reflecting on how the image conveyed by a vehicle fits (or not) with the driver's self identify.[6,32,33] As noted in our literature review, a recent Canadian study found that the social norms (or approval of others) appeared to be one of the strongest drivers of SUV uptake.[24] While it can be difficult to observe social influence directly, our present study includes survey and focus group questions relating to social influence processes. We also look for evidence that SUVs (or usage of other vehicles or other modes) are a type of socially embedded consumption where car buyers feel pressure to meet the average level of peer consumption (competitive consumption), or otherwise use the consumption method as a way to either conform (or oppose) the status quo (consumption norms).[23]

The third component applies a broader cultural or system perspective: automobility. Sociologists have developed the concept of automobility to explain the dominance of the fossil fuel–powered car, including technology, infrastructure and cultural elements.[31,34,35] To explore automobility at the individual consumer level, SFU PhD student Viviane Gauer has developed a quantitative survey framework that identifies several categories of automobility, including perceptions of car dependence, car identity, positive driving emotions, societal concern and societal benefits.[36] Previous application of this approach finds that perceived car dependence and norms for active/transit (non-car) travel are predictors of interest in most new mobility innovations (automated, electric and shared mobility).[36] This framework is detailed further in Section 4.1.

We take these frameworks together to guide this study's effort to describe citizen and consumer perceptions of SUVs in Metro Vancouver and opportunities to encourage more sustainable (smaller, lower emissions) vehicle choices. The research questions guiding this analysis include:

1. What motivated the purchases of currently owned vehicles (car, SUV or no vehicle)?
2. What are the perceived strengths and weaknesses of SUVs versus cars?
3. What images/identities are associated with SUVs?
4. What are the perceived social impacts of SUVs?
5. What conditions might lead consumers to choose smaller vehicles? For SUV drivers, what is their "willingness to downsize"?
6. What policies or strategies might be most effective in terms of encouraging vehicle downsizing?

4. THE MIXED-METHODS APPROACH: SURVEY AND FOCUS GROUPS

Photo: Adobe Stock Images

To explore these research questions, we utilize a mixed-methods approach, integrating insights from quantitative and qualitative research approaches.[37] Quantitative research can produce insight into the proportion of consumers or SUV drivers that have certain perceptions or characteristics. It can also produce insight into statistical relationships between different variables, such as understanding what household characteristics are associated with SUV interest or willingness to downsize. Qualitative research provides more in-depth insight into consumer behaviour, and can also help to generate new, unexpected insights.[38] A mixed-method approach integrates both types of insights, providing a more comprehensive and rigorous perspective than one method alone.

In this case we integrate quantitative insights from a descriptive survey of Metro Vancouver citizens (n=986) with qualitative insights from a subset of those same individuals via six focus groups (n=37). The survey provides quantitative estimates across a representative sample, while the qualitative work provides more detail on the motivations and "stories" behind the numbers. We next describe each method in turn.

4.1 Survey method

We designed a web-based survey, which in August 2021 was administered to a total of 986 respondents residing in Metro Vancouver, all aged 19 or older. Respondents were recruited by a market research company, which provided respondents with a $2.20 incentive for completing the survey. The survey required about 10 minutes to complete on average. The survey instrument consisted of the five sections portrayed in Figure 4 (see Appendix for full survey). Note that Section B (vehicle purchase motivations) was excluded for respondents who did not regularly drive a vehicle. Other questions in the survey were framed so that they would apply to drivers and non-drivers alike.

Figure 4: Summary of survey flow

Section A: Travel patterns and vehicle ownership details

- Number and type of vehicles owned
- Identification of "primary vehicle"
- Frequency of mode usage

Section B: Vehicle purchase motivations

- Functional, symbolic, societal reasons for purchasing primary vehicle
- Image associations with primary vehicle
- Sources of information used when shopping for primary vehicle

Section C: Future vehicle purchase

- Future vehicle purchase intention
- Likelihood of purchasing different vehicle sizes and fuel types
- Willingness to downsize to smaller vehicle in general and under policy scenarios

Section D: Perceptions of SUVs

- Image associations with SUVs
- Social norms regarding SUVs
- Perceived impact of SUVs

Section E: Policy support and respondent details

- Support and opposition to policies promoting small vehicles
- Automobility engagement
- Lifestyle engagement
- Values
- Demographics
- Optional opt-in to focus groups

Many of the survey questions were straightforward, asking about travel patterns, vehicle ownership and frequency of using different modes. The distributions of responses to particular questions are summarized in Section 5. A few of the questions or question scales came from existing sources, notably:

- **Values:** Were assessed via Stern et al.'s 15-item value scale derived from the Schwartz Value Survey,[39] which asks respondents to rate the importance of statements relating to biospheric, altruistic, traditional, egoist and openness to change values on a four-point scale ranging from 1 ("not at all important") to 4 ("extremely important"). Biospheric value questions include statements about respecting and protecting Earth and unity with nature. Altruistic value questions include statements about social justice and equality. Traditional value questions focus on family security, self-discipline and showing respect. Egoist value questions include statements about the role of authority, social power and wealth. Openness to change values focus on attraction to novelty, new experiences and curiosity.

- **Lifestyle:** These questions are derived from lifestyle theory, which defines "lifestyle" as a set of related practices and activities that relate to an individual's self-concept or identity.[40,41] Lifestyle engagement is measured via a 10-item scale developed by Axsen et al.,[40] which consists of questions about how often respondents engage in 10 activities (five each for technology- and environment-oriented lifestyle) on a five-point scale ranging from 1 ("never") to 5 ("very frequently"). The five technology-orientation measures include activities such as researching new technology and working on tinkering with technology, while the environmental-orientation measures included activities such as promoting environmental conservation and attending environmental meetings.
- **Social support for SUVs:** Given the importance of social influence and social norms for vehicle choice in general, and SUV interest in particular,[24] we developed a six-item question scale regarding social support for SUVs (with five-point scales for agree/disagree responses). Two of these items were adapted from survey questions used in the 2021 Equiterre SUV study.[24] The items and responses are shown in Section 5.5.
- **Automobility scale:** As summarized in Section 3, automobility represents the culture of car dominance and dependence. We utilize a 32-item scale (with five-point scales for agree/disagree responses). As summarized in Table 1, these items correspond with eight categories of automobility perceptions used to explain consumer perceptions of vehicle and mobility technology.[36] Note that in this framework, "car" is meant to refer to privately owned passenger vehicles in general, including cars, SUVs, pickup trucks and vans.

Table 1: Automobility construct key (32 items)

Automobility category	Survey question items (for agree/disagree statements)
Car dependence	• I need a car to fulfil my everyday obligations. • I need a car for my job. • It is easy to plan my day without a car. (reversed) • Sometimes I feel too dependent on my car. • In my area, every household needs a car. • It is difficult for me to access my friends and family without a car.
Car identity	• I want my car to represent my personality. • I often feel emotionally connected to cars. • Owning a car shows that I am successful. • You can learn a lot about someone by looking at their car. • A car is just a way to get around and nothing more. (reversed) • I often talk about cars with my friends. • Buying a car is an important milestone in life.
Positive driving emotions	• I enjoy driving. • The idea of driving makes me tired. (reversed) • I feel in control when I am driving. • Driving is stressful. (reversed) • Driving makes me feel free. • Being inside a car feels like a safe, protected space.
Societal concern	• Air pollution from cars is a serious problem. • Car use is causing climate change. • Cars, streets and parking take away too much public space.
Non-car travel norms	• Many of my friends commonly walk or bike to get around. • Many of my friends are trying to reduce their car use. • I know a lot of people who use public transit.
Preference for home ownership	• My ideal situation is to live in a private, detached home. • It is important for me to own my home. • I prefer to live away from urban centres.
Preference for transit and walkability	• It is important for me to live in a place where I can easily access transit. • It is important that I live in a neighbourhood where I can walk to destinations.
Societal benefits of car use	• Widespread car use is needed to support jobs and the economy. • Overall, car use is good for society.

Most analyses of the survey data are descriptive, including distributions of responses for different consumer segments. Following our research questions, we consider three comparative groups: SUV drivers, car drivers and non-drivers. Where appropriate, we show 95% confidence intervals to help identify significant differences between segments or categories. As one final analysis, we use regression analysis to identify the factors that best explain key outcomes. We run four regression models, each with different dependent variables, as follows:

- choice of SUV as the most likely next vehicle purchase (binary variable, logistic regression);
- likelihood of downsizing to a smaller vehicle, for those who intend to purchase an SUV (continuous variable, linear regression);
- choice of a smaller car under the condition of an added 10% tax for SUV purchases, for those who intend to purchase an SUV (binary variable, logistic regression); and
- choice of a smaller car under the condition of a $5 road toll for SUVs entering the City of Vancouver, for those who intend to purchase an SUV (binary variable, logistic regression).

Regression analyses were conducted in IBM SPSS Version 26. We first specified our models (dependent and independent variables) based on our conceptual framework, including hypotheses drawn from the literature review. We then followed multiple quantitative approaches to identify the "best fit" models for our current research questions. After initial model runs, we conducted forward and backward stepwise runs to confirm that patterns of significant variables emerged consistently. We then removed variables that were consistently not significant to reduce "noise" in the model. We also experimented with the specification of variables (e.g., continuous, categorical or dummy coding) to ensure all variables were optimally specified. In all models, we assessed independent variables for multicollinearity by examining correlation, variance inflation factor (VIF) and tolerance statistics. No variables showed evidence of multicollinearity according to rules of thumb for assessing these statistics; that is, no significant correlations, VIF values all less than 3 and tolerance values all above 0.2.

4.2 Focus group method

The qualitative component of our research design used focus groups, which allow researchers to simultaneously question groups of five to 15 people. Focus groups can also be thought of as a group interview or guided discussion.[42] The primary advantages of focus groups (compared to other qualitative methods) are that they are socially oriented (observing a group), flexible and relatively low in cost, while potentially providing quick results.[42] Focus groups are also seen as an excellent complement to survey research, either to explore certain issues before designing a survey, or in our present case, to follow up on a survey to explore particular issues in more depth.[43] While designing and running these focus groups, we followed a number of best practices, such as having some homogeneity (or common link) in each group, keeping group size to five to 10 individuals and having at least three to five focus groups per project.[43]

Focus groups are based on group interaction, so it is important to carefully design the composition of each group. In particular, there should be some degree of homogeneity in each

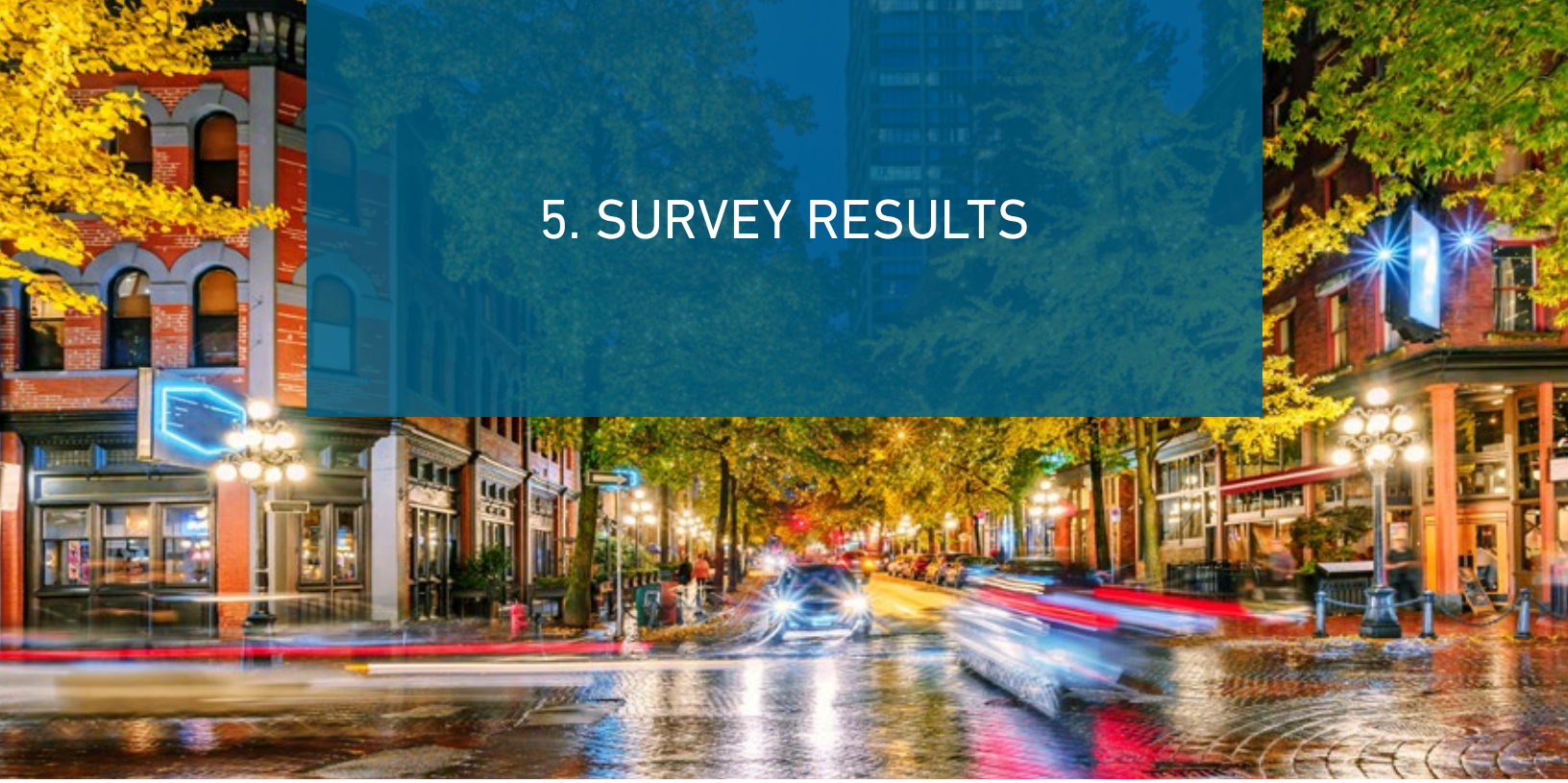
group — some shared experience that unites them and serves as a basis for the discussion.[43] Given our research objectives, the focus groups were organized around the participants' primary vehicle, either SUV, car or no vehicle. Because we are particularly interested in the perceptions of SUV drivers and their willingness to downsize, we completed four focus groups with SUV drivers, and one group each with car drivers and non-drivers. The resulting focus groups are more fully described in Section 6.1.

The focus group moderator guide is posted in Appendix B. To strike a balance between structured and unstructured questions, we follow a "funnel" approach that starts with more general, open-ended questions before proceeding to more specific, structured questions.[43] One goal of focus groups is to move beyond the results on "attributes and opinions" that were generated by the survey research, toward deeper "experiences and perspectives."[42] The moderator would encourage participants to give specific responses, sharing examples of a particular story that illustrates their feeling, perception or opinion.

All six focus groups took place in Google Meet, and each was completed in about one hour. Each focus group was recorded and transcribed. We then coded statements and mentions according to the framework in Table 2, which was derived from our conceptual framework (Section 3) and also adapted based on observations in the study. Section 6 summarizes the mentions of each theme and sub-theme, for each segment (SUV driver, car driver and non-driver). We also provide illustrative quotes for the key themes.

Table 2: Overview of themes used in focus group guide

Category	Theme	Example sub-themes
Private-functional	Financial	Purchase price, fuel costs, good price
	Safety	Visibility, protection in crashes
	Space for lifestyle	Space for family, gear
	Handling/reliability	In rain/snow, on rough roads
	Comfort	Spacious interior, handling
	Pleasure	Fun trips
Symbolic/social	Status	Being successful
	Other images	Outdoorsy, environmental, functional
	Social interactions	Perceptions of others
Societal	Environment	Climate change, air pollution
	Other issues	Congestion, safety
	Fuel type for SUV/vehicle	Hybrids, electric
Downsize/policy	Downsize potential	Yes/no, for what reasons?
	Downsize policy	Negative/positive reaction



5. SURVEY RESULTS

Photo: Adobe Stock Images

5.1 Describing the sample

Table 3 summarizes the sample distributions for various demographic characteristics, and compares them to a Metro Vancouver population (according to the 2016 Canadian Census, Statistics Canada, 2021). Generally, our sample distributions align with the target population, with slightly more respondents aged 55 or older (40% over 36%), slightly more female respondents (55% over 49%) and more respondents with at least a bachelor's degree (55% over 33%). Household income levels are similar on average, though our sample has lower proportions of the lowest- and highest-income categories. Urbanization level is difficult to define, and the split of urban (61%) and suburban (38%) is based on respondent's self-categorization.

Of focus in this study, 20% of respondents are categorized as "non-drivers" (they either do not have a driver's licence, do not drive a vehicle at least once a week or drive a vehicle owned by someone outside of their household only, at least once a week). The remaining 80% drive some sort of household vehicle regularly. In our sample (including non-drivers), 47% drive some sort of car and 28% drive some sort of SUV. The sample included very small numbers of respondents who drive pickup trucks (n=30, or 3% of the sample), or minivans (n=22, or 2% of the sample). Given these small numbers, we decided to remove these 52 respondents from the sample, and focus analyses on differences between non-drivers, car drivers and SUV drivers — or for some questions, just car drivers versus SUV drivers.

Table 3: Metro Vancouver sample and population demographic characteristics

	Metro Vancouver sample	Metro Vancouver population (2016)*
Sample/population size	**986**	**1,990,405**
Age		
19-24	6%	10%
25-34	18%	18%
35-44	19%	17%
45-54	18%	19%
55-64	19%	17%
65 or older	21%	19%
Education		
High school or less	18%	39%
Some university/college	29%	28%
Bachelor's degree	32%	21%
Graduate degree	22%	11%
Household income (pre-tax)		
Less than $40,000	17%	27%
$40,000-$59,999	18%	15%
$60,000-$89,999	20%	19%
$90,000-$124,999	24%	16%
$125,000 or more	20%	24%
Gender		
Female	55%	49%
Urbanization level (self-reported)		
Urban	61%	
Suburban	38%	
Rural	1%	
Primary vehicle (of respondent)		
Non-driver	20%	n/a
Car	47%	
SUV	28%	
Truck	3%	
Van	2%	

*Source: Vancouver [Census metropolitan area], BC Census Profile, 2016 Census. Statistics Canada. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.

Tables 4 and 5 compare these three segments by various characteristics. Most of the biggest differences are between vehicle drivers (car or SUV) and non-drivers. For example, vehicle drivers are more likely to be older, more highly educated, higher-income and male. Drivers, and especially SUV drivers, tend to have larger household sizes, to live in suburban neighbourhoods and to own multiple vehicles. (Note that the non-drivers' household may still own one or more vehicle.) The vast majority of car drivers (89%) and SUV drivers (91%) describe their vehicle as using a conventional gasoline drivetrain. One to four per cent indicate ownership of a gasoline hybrid, diesel, plug-in hybrid or battery electric vehicle.

Table 5 summarizes additional differences. All respondents have similar levels of car-share experience (past or present), while SUV drivers have the lowest interest in future car-share usage. SUV drivers are also most likely to want to buy a new vehicle within the next five years. The segments also differ by various attitudes and values (bottom of Table 5). In particular, SUV drivers have statistically significant (95% confidence) higher scores for traditional values, egoist values and technology-oriented lifestyles — but significantly lower environment-oriented lifestyle scores. By contrast, non-drivers have significantly higher scores for altruistic and biospheric values.

Table 4: Comparing driver category by demographic and travel characteristics

	Non-driver	Car driver	SUV driver
Sample size	**199**	**460**	**275**
Age*			
19-34	30%	24%	23%
35-54	36%	35%	36%
55+	34%	41%	42%
Education***			
High school or less	28%	14%	15%
Some university/college	26%	27%	33%
Bachelor's degree	25%	35%	32%
Graduate degree	21%	23%	21%
Household income (pre-tax)***			
Less than $40,000	37%	14%	12%
$40,000-$59,999	20%	21%	15%
$60,000-$89,999	16%	21%	21%
$90,000-$124,999	19%	24%	29%
$125,000 or more	10%	21%	24%
Gender***			
Female	65%	53%	55%
Male	35%	48%	46%
Household size***			
1	39%	24%	14%
2	34%	36%	42%
3+	28%	40%	44%
Urbanization level (self-reported)***			
Urban	75%	63%	51%
Suburban	25%	37%	48%
Rural	0%	0%	1%
Number of household vehicles * **			
0	58%	0%	0%
1	32%	59%	53%
2	6%	35%	39%
3+	4%	6%	8%
Distance travelled per year (in primary vehicle, without lockdown)			
Less than 10,000km		41%	34%
10-20,000km		35%	45%
21-30,000km		11%	13%
30,000km or more		12%	8%
Primary vehicle drivetrain*			
Gasoline		89%	91%
Diesel		2%	3%
Hybrid (gasoline)		4%	4%
Plug-in hybrid		2%	1%
Battery electric		4%	1%

Notes: *** is significant association at 99% confidence level, ** is significant association at 95% confidence level, * is significant association at 90% confidence level

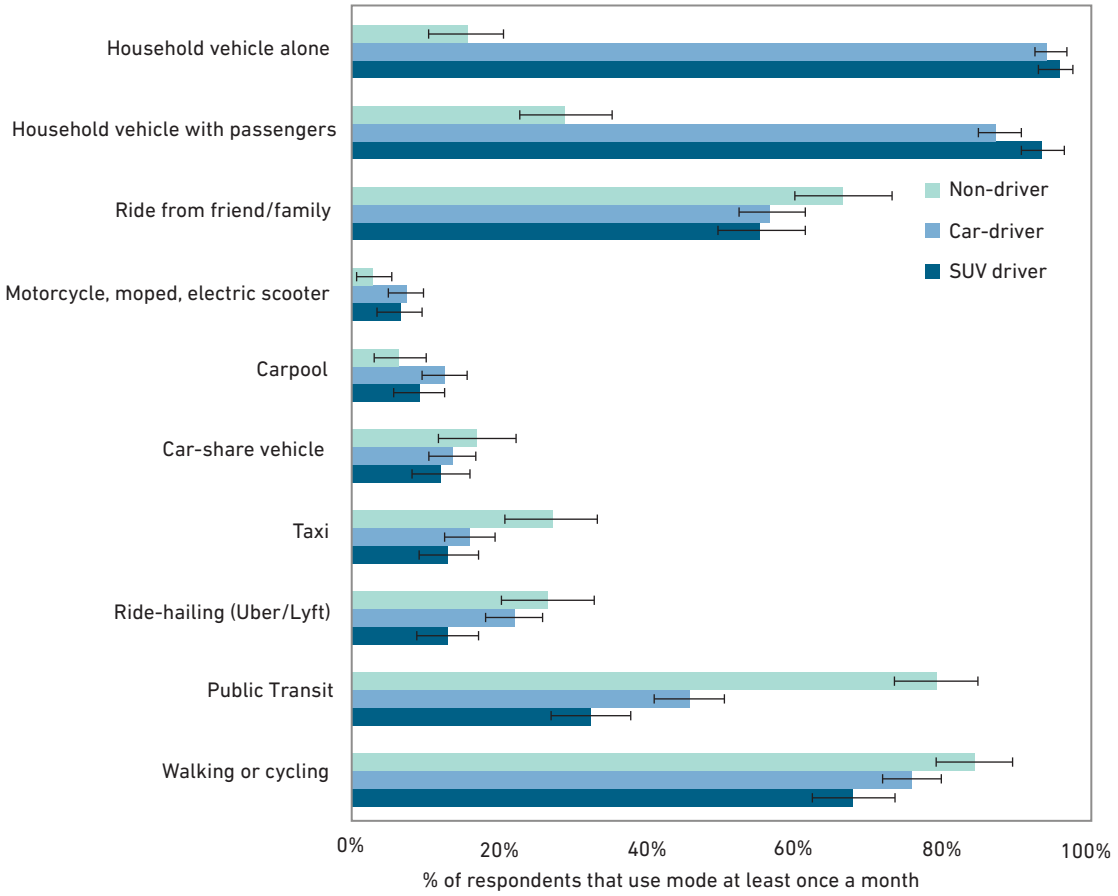
Table 5: Comparing driver category by other characteristics

	Non-driver	Car driver	SUV driver
Sample size	199	460	275
Car-share experience (A6a/b)			
Current member	14%	15%	12%
Member in past	7%	10%	9%
"Interested" in future usage**	41%	40%	31%
Five-year purchase plans (QC1a)**			
Plan to buy a new vehicle	19%	45%	48%
Plan to buy a used vehicle	13%	15%	14%
Other values/attitudes			
Traditional values (1-4)	3.39	3.43	3.49
Biospheric values (1-4)**	3.44	3.28	3.31
Altruistic values (1-4)**	3.56	3.43	3.47
Egoist values (1-4)***	2.33	2.43	2.55
Openness to change values (1-4)	2.95	2.94	2.99
Technology-oriented lifestyle (1-5)***	2.43	2.63	2.69
Environment-oriented lifestyle (1-5)	2.64	2.62	2.58

Notes: *** is significant association at 99% confidence level, ** is significant association at 95% confidence level, * is significant association at 90% confidence level

Finally, Figure 5 depicts driver categories by mode usage. Car drivers and SUV drivers are mostly identical in terms of vehicle usage and usage of other modes, although SUV drivers are least likely to have used public transit or ride-hailing at least once in the past month. Non-drivers are most likely to have used public transit or a taxi in the last month.

Figure 5: Comparing driver category by mode usage (% of respondents who use mode at least once a month; whiskers indicate 95% confidence interval)



5.2 Interest in vehicle type

We compare the three consumer segments by their preferences for vehicle class in terms of general positive or negative ratings (Figure 6) and purchase intention (Figure 7). Not surprisingly, SUV drivers have more positive perceptions of SUVs (in general), and car drivers have more positive perceptions of cars. Non-drivers and car drivers have similar levels of positive/negative perceptions of SUVs. All three segments have similarly positive and negative perceptions of pickup trucks and vans.

Figure 6: Comparing vehicle ratings across driver categories (% of respondents who rate vehicle type as positive or negative; whiskers indicate 95% confidence interval)

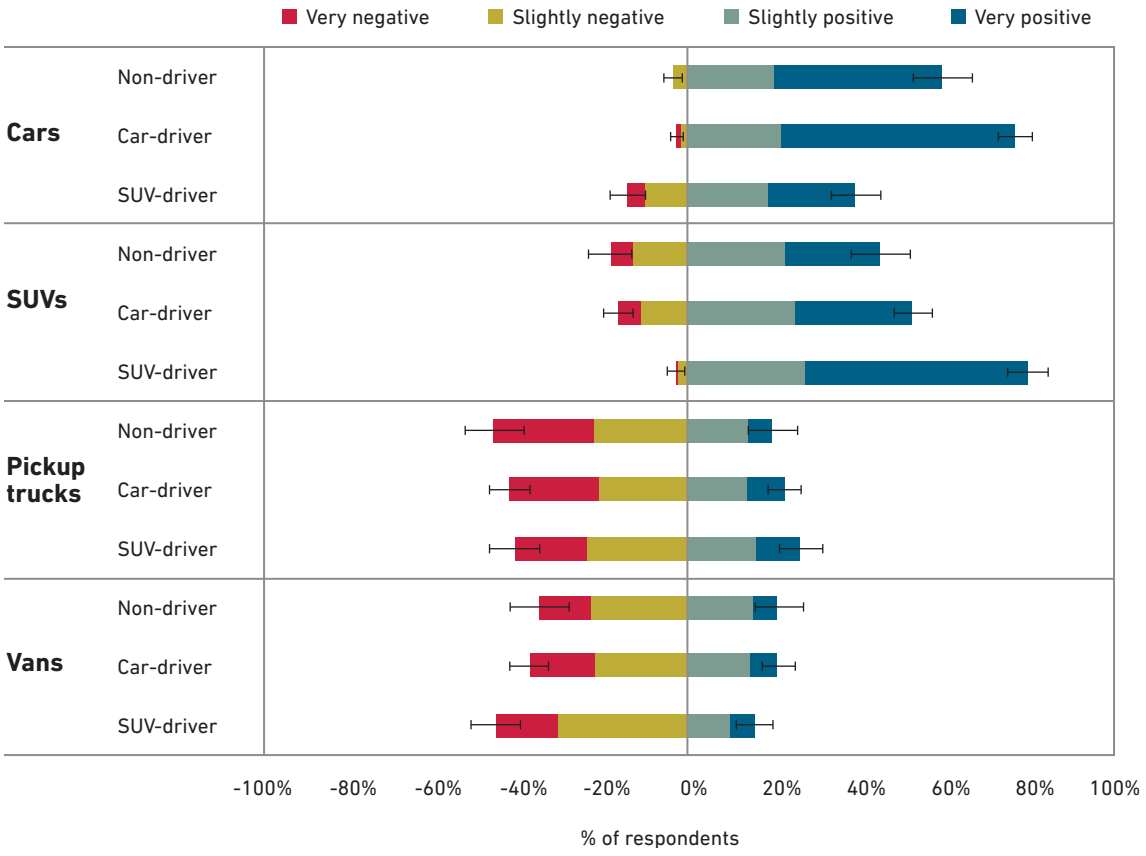


Figure 7 provides a more nuanced perspective on respondent interest in different vehicle sizes for future purchase intention. The non-drivers (if they "had to buy a vehicle") are most likely to prefer the smallest model in the list (compact car), with a sedan as second most likely. Car drivers gravitate instead toward the sedan, followed by compact car, then crossover SUV. SUV drivers on average are most likely to select mid-sized SUV, followed by crossover SUV, then full-sized SUV.

Figure 8 summarizes future purchase intention regarding vehicle drivetrains. Surprisingly, about half of car drivers and SUV drivers say they are at least 50% likely to purchase a hybrid, plug-in hybrid or battery electric vehicle as their next purchase.[ii] Non-drivers expressed slightly lower probabilities for all drivetrains, though these differences are not statistically significant.

ii The survey question did not require probability percentages to add up to 100%.

Figure 7: Comparing vehicle class purchase intention across driver categories
(% of respondents who state they are least 50% likely to purchase from a given class; whiskers indicate 95% confidence interval; survey question did not require probability percentages to add up to 100%)

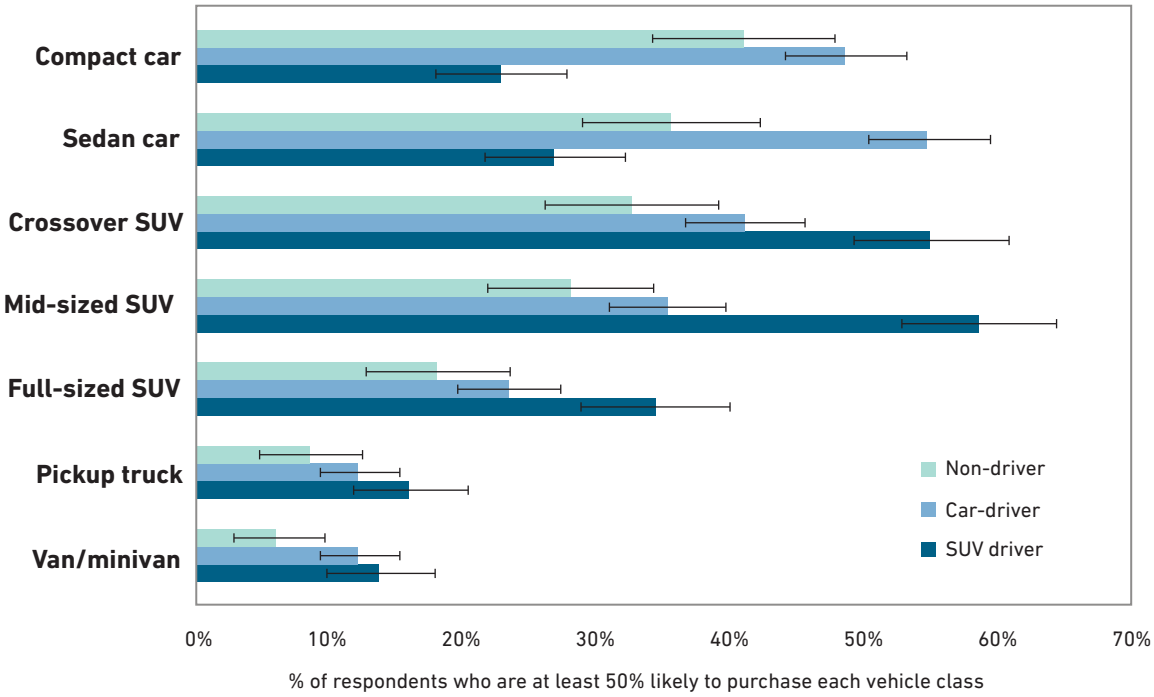
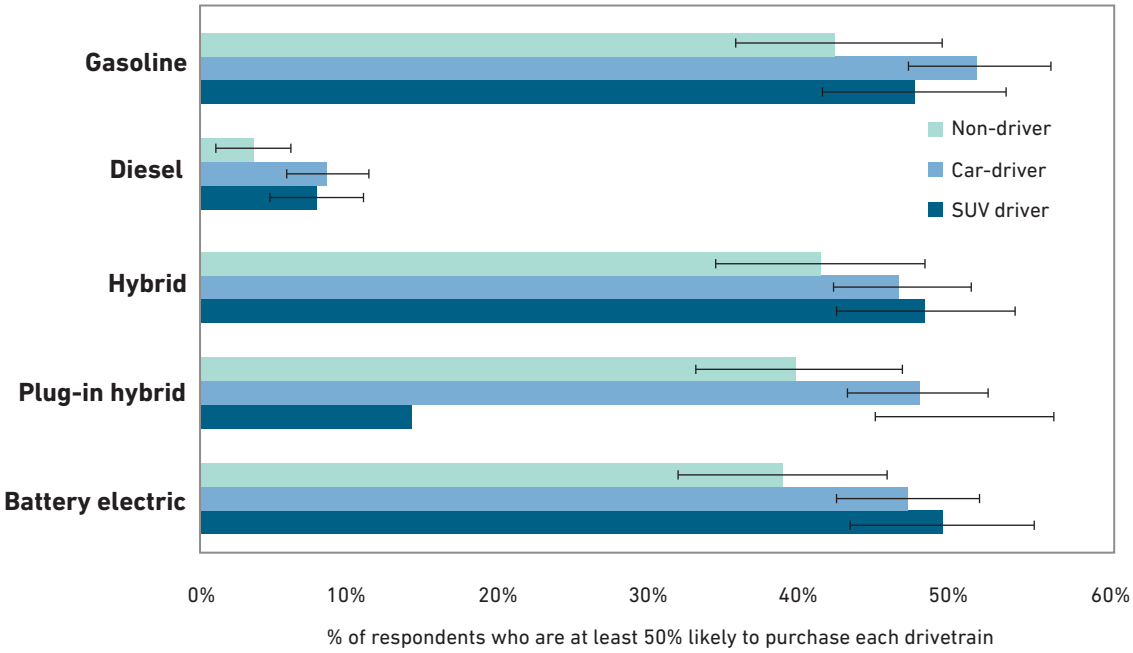
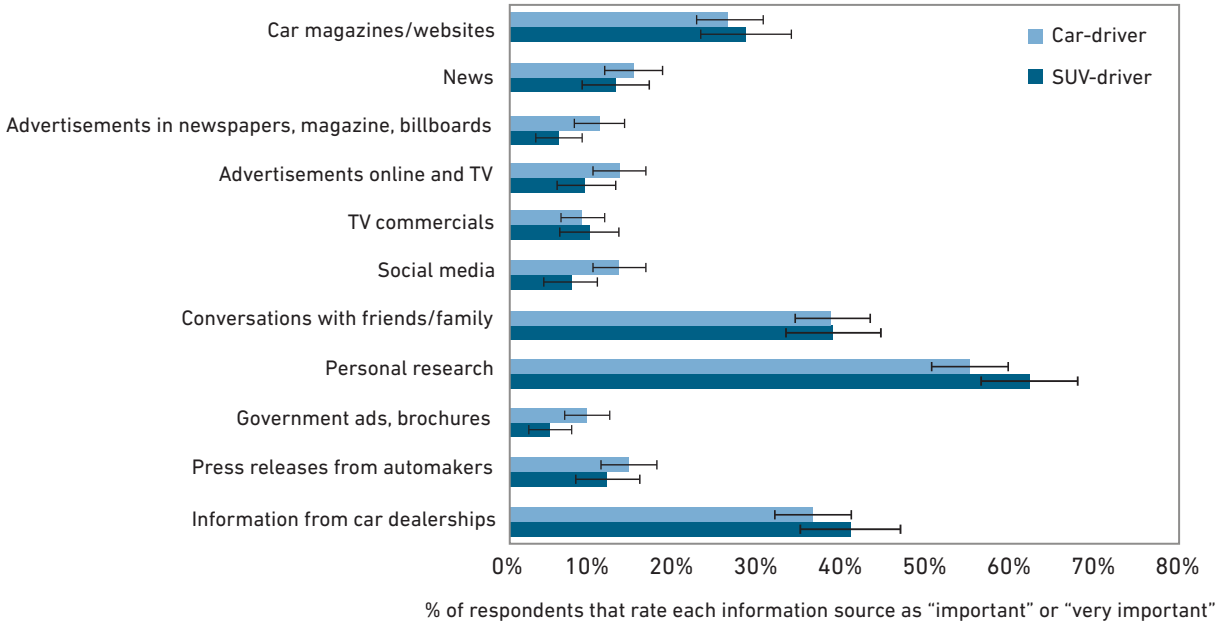


Figure 8: Comparing vehicle drivetrain purchase intention across driver categories
(% of respondents who state they are least 50% likely to purchase a given drivetrain; whiskers indicate 95% confidence interval; survey question did not require probability percentages to add up to 100%)



The survey also asked respondents to rate the importance of various information sources they might have used in the purchase of their primary vehicle (Figure 9). The sources that were most likely to be rated as "important" were personal research (rated as important by 55% to 62% of respondents), conversations with friends/family (39%), information from car dealerships (36% to 41%) and car magazines/websites (26% to 28%). We observed no statistical differences in responses between car drivers and SUV drivers.

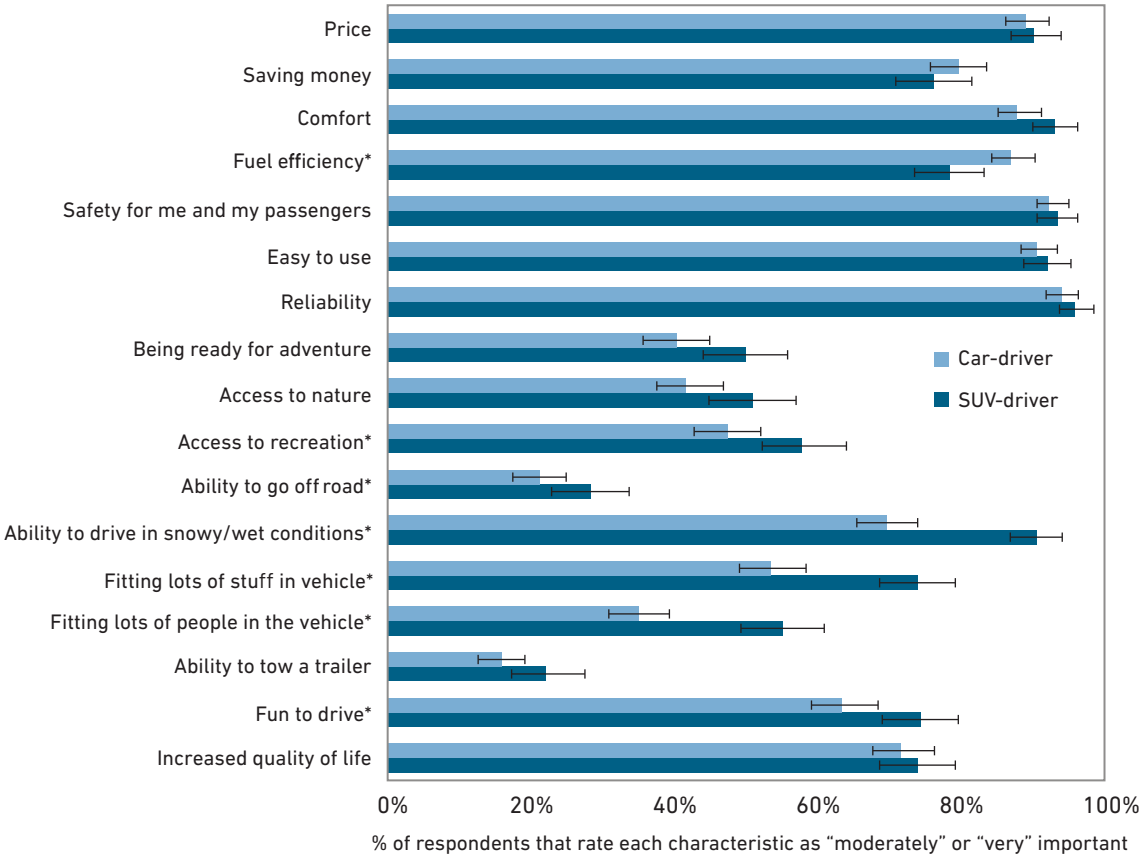
Figure 9: Rated importance of information sources in primary vehicle purchase
(% of respondents who rate each information source as "important" or "very important"; whiskers indicate 95% confidence interval)



5.3 Motivations for vehicle type

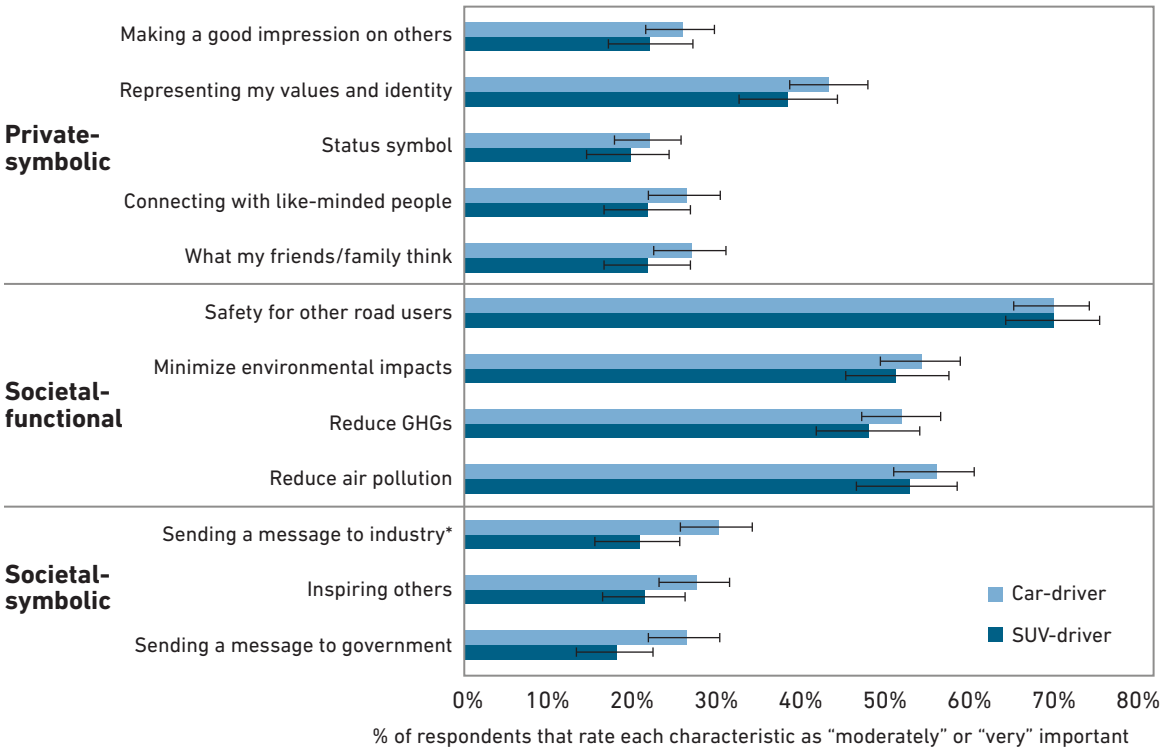
For car drivers and SUV drivers, we compare responses to a set of survey questions asking about the importance of various attributes in the selection of their primary vehicle. Overall, responses were very similar across the two segments, with few statistically significant differences. Figure 10 portrays responses to private-functional attributes, where car drivers and SUV drivers assign similar importance to price, saving money, comfort, reliability, safety and quality of life. Car drivers are statistically more likely to rate fuel efficiency as important (95% confidence level). SUV drivers are more likely to assign importance to being able to access recreation, to drive in snowy and wet conditions and to have added space to fit people as well as gear or cargo/luggage. SUV drivers are also more likely to assign importance to a vehicle being "fun to drive."

Figure 10: Private-functional motivators for vehicle interest (% of respondents who selected attribute as "moderately important" or "very important" in their purchase decision; whiskers indicate 95% confidence interval; asterisk represents significant difference between SUV-driver and car-driver responses)



There are even fewer differences in how the two groups assign importance to symbolic and societal attributes (Figure 11). Responses are similar for questions regarding their vehicle's ability to make a good impression on others, represent values and identity and be a status symbol. Responses are also similar for the importance of reducing GHG emissions, reducing air pollution and minimizing environmental impacts more generally. The one significant difference in Figure 11 is that car drivers are more likely to see their vehicle as "sending a message to industry."

Figure 11: Symbolic and societal motivators for vehicle interest (% of respondents who selected attribute as "moderately important" or "very important" in their purchase decision; whiskers represent 95% confidence intervals; asterisk represents significant difference between SUV-driver and car-driver responses)



5.4 Images of vehicle type

Related to the "symbolic" questions noted above, the survey also asked respondents to consider which "images" they associated with vehicles. We first asked this regarding their primary vehicle (car or SUV). As shown in Figure 12, the two groups express very similar (and statistically identical) responses to all image types. The item that was closest to a significant difference is "family-oriented," which was higher on average (but not quite significant) for SUV drivers.

The survey also asked respondents in all three segments (non-drivers, car drivers, SUV drivers) to assess their association of the same images described above, but now in association with SUVs in general rather than their primary vehicle (Figure 13). Again, we see a lot of similarities between responses from car drivers and SUV drivers. The exception is that SUV drivers are significantly more likely to associate an SUV with the image of being "reliable" and "sensible," while car drivers are more likely to associate SUVs with the image of being "unattractive" and "conceited." Non-drivers generally made fewer associations between SUVs with the images presented in the survey. This are statistically significant differences for associations between SUVs and the images of being "innovative," "intelligent," "independent," "reliable," "fun," "sensible," "family-oriented" and "powerful."

Figure 12: Images associated with primary vehicle (% of respondents who selected image as "mostly" or "very much" associated with their primary vehicle; whiskers represent 95% confidence intervals)

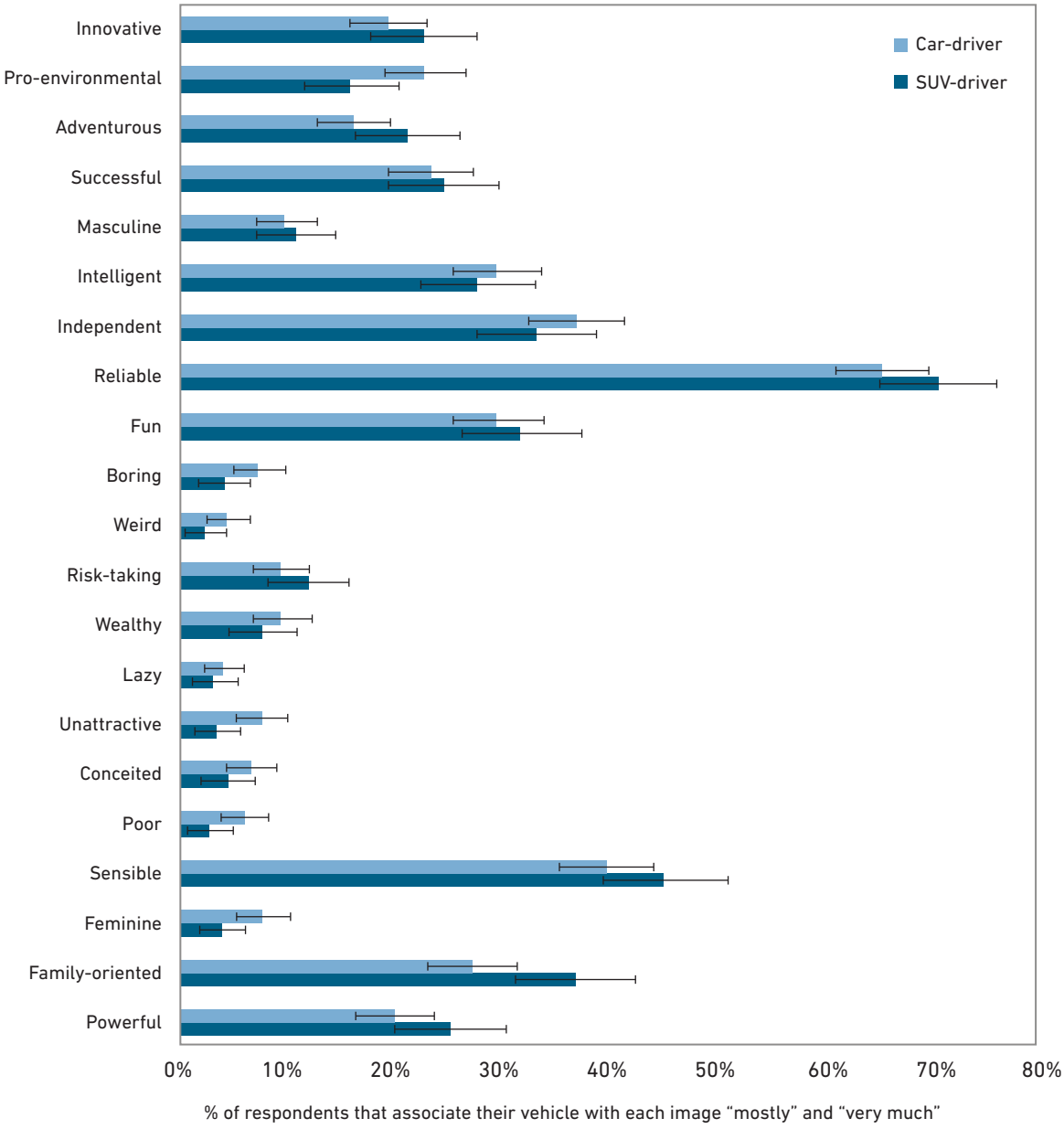
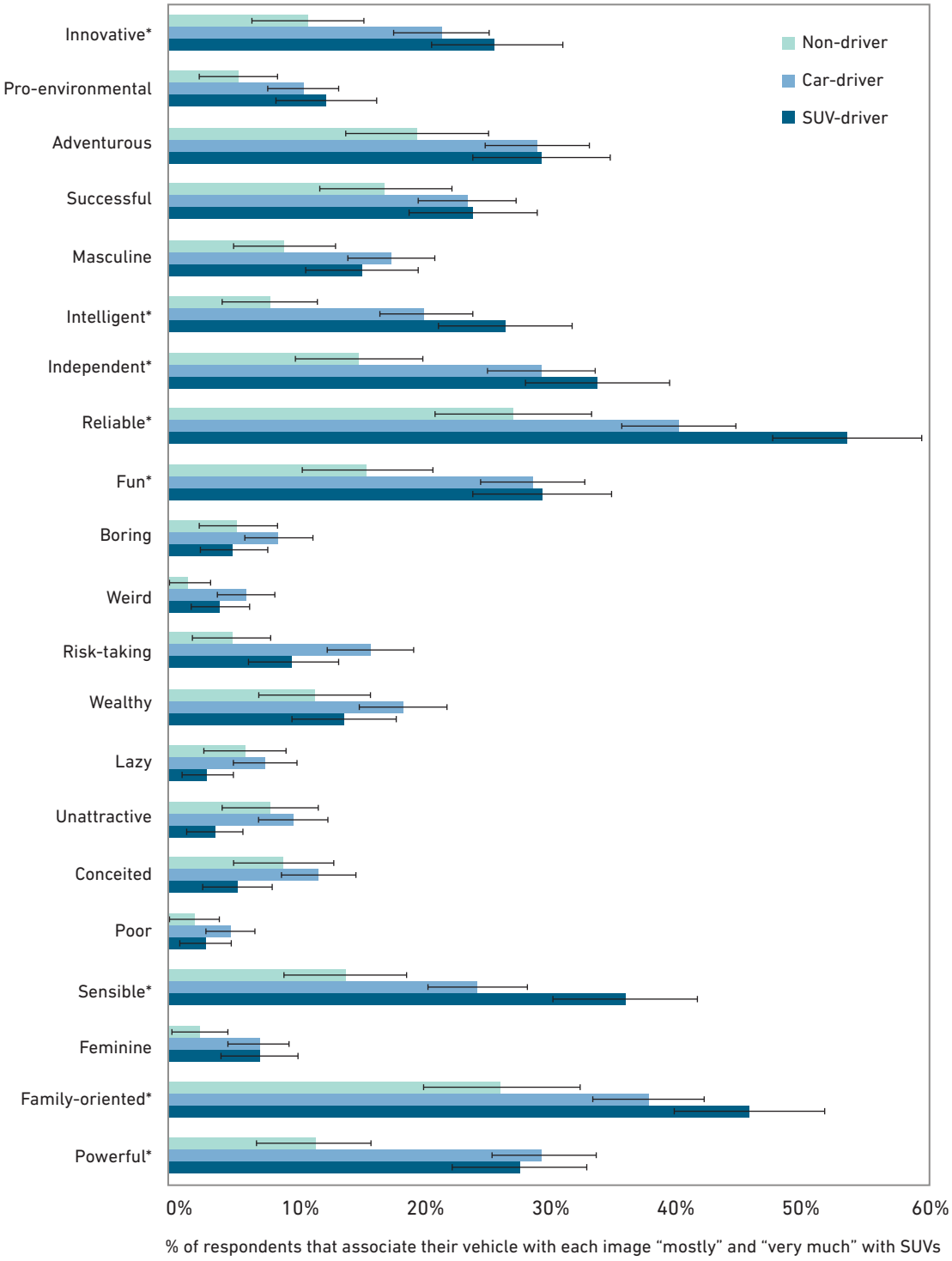


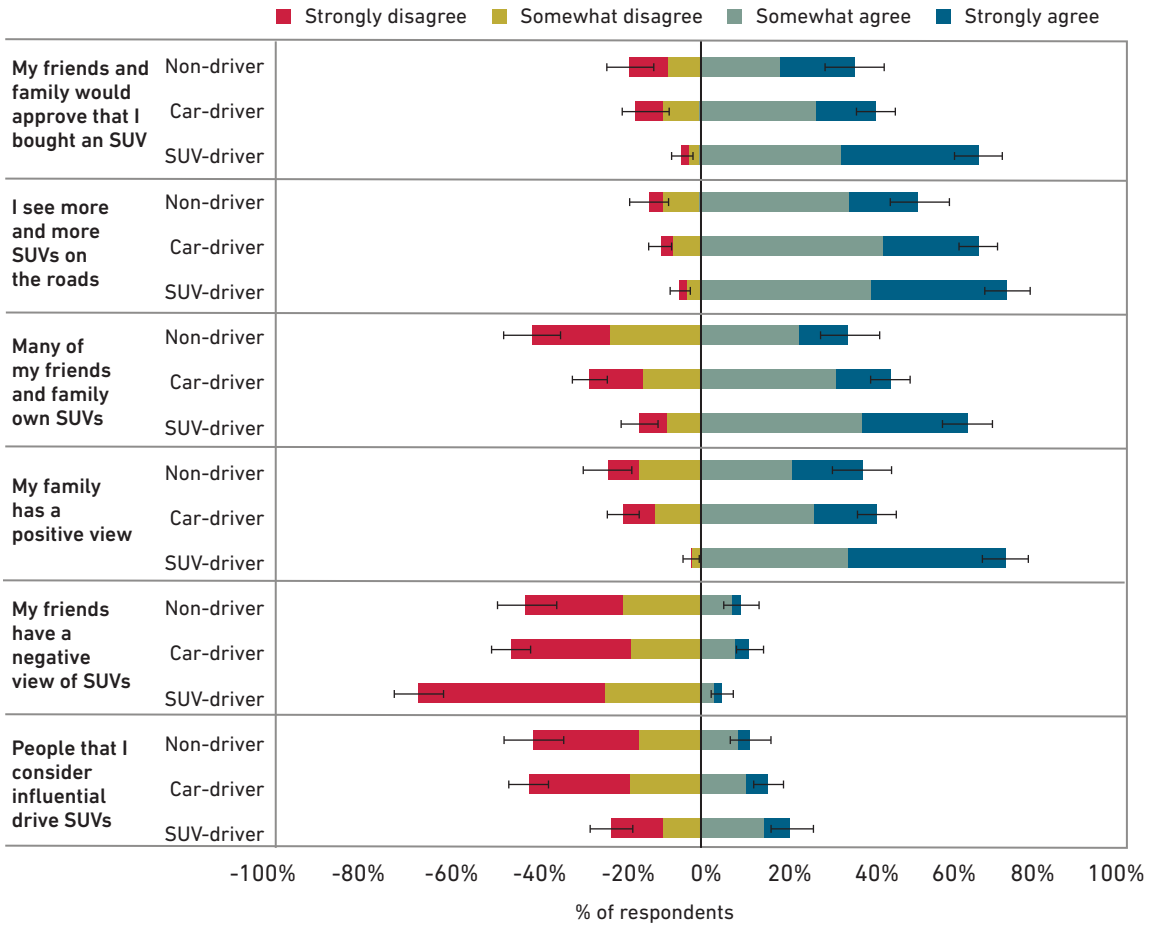
Figure 13: Images associated with SUVs in general (% of respondents who selected image as "mostly" or "very much" associated with SUV; whiskers represent 95% confidence intervals; asterisk represents significant difference between SUV-driver and car-driver responses)



5.5 Social support for SUVs

To further assess the roles of social influence in SUV ownership, the survey included a question scale with six agree-disagree items on this theme (Figure 14). SUV drivers are significantly more likely to agree with statements that their friends and family "would approve" of buying an SUV, many of their friends and family own SUVs and their family has a positive view of SUVs. SUV drivers are also least likely to agree that their friends have a negative view of SUVs.

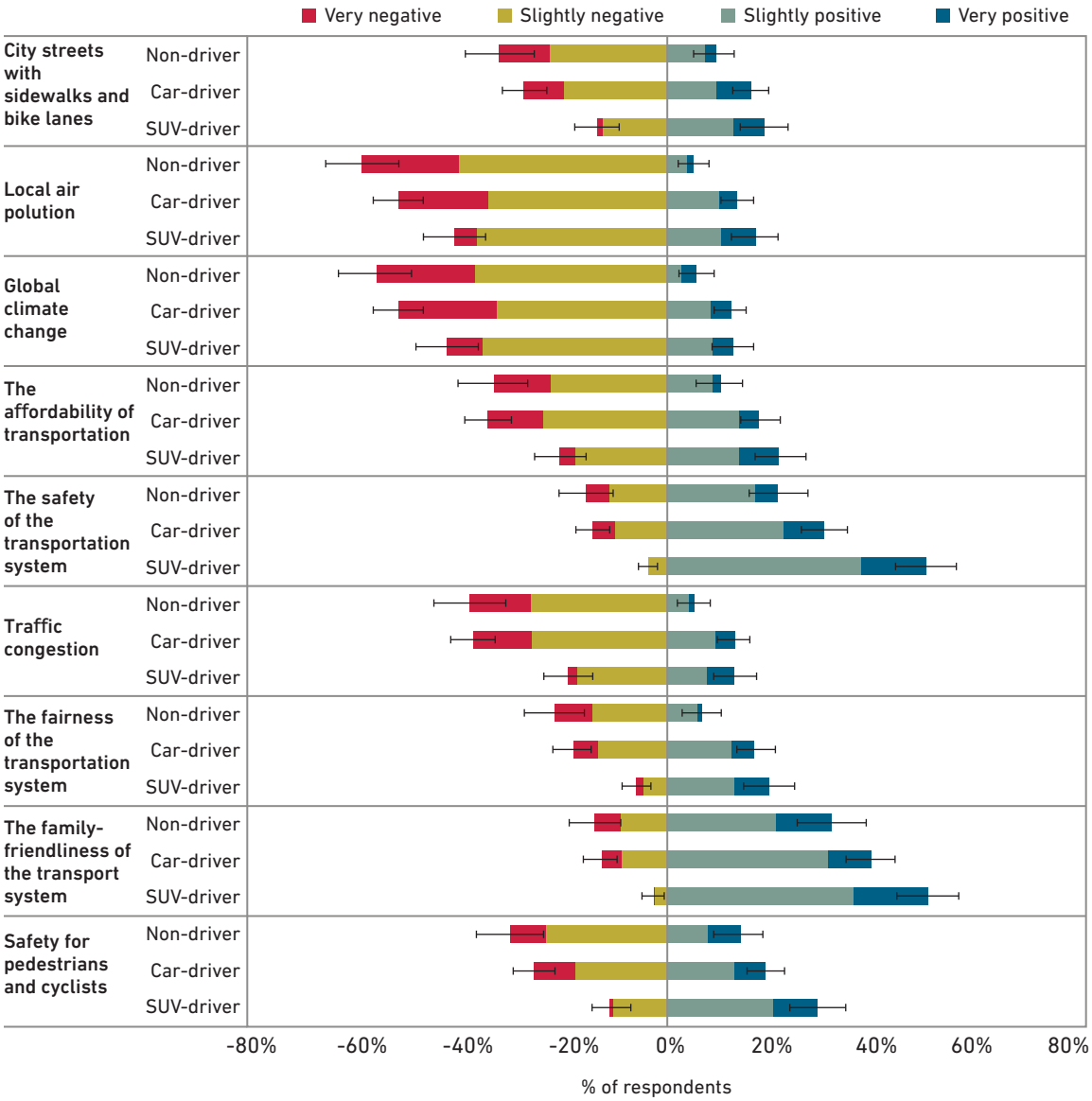
Figure 14: Responses to statements of social support for SUVs (% of respondents who agree or disagree with each statement; whiskers represent 95% confidence intervals)



5.6 Perceptions of SUV societal impacts

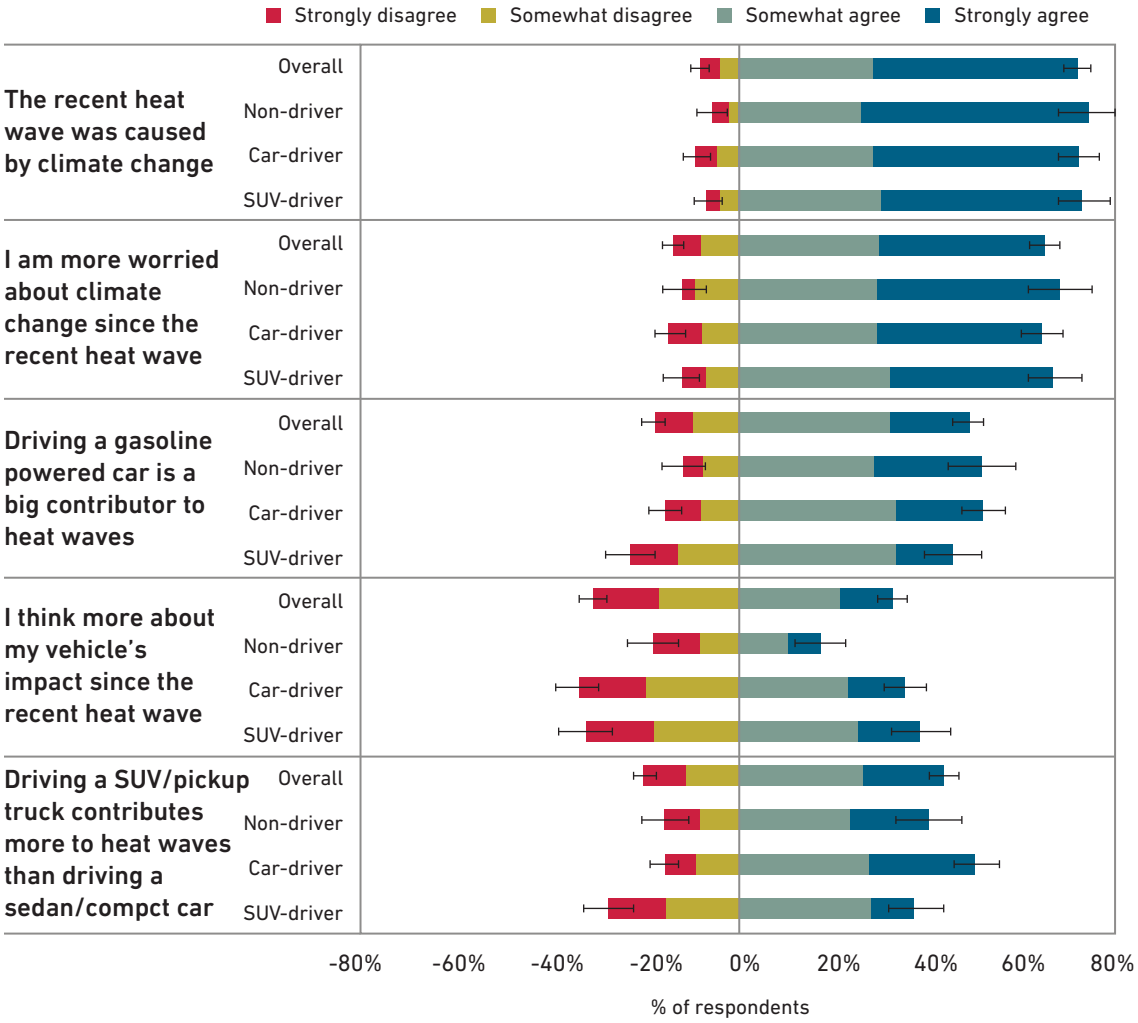
Respondents were also asked to evaluate the various societal impacts of SUVs, as having a negative, neutral or positive impact (Figure 15). SUV drivers are more likely to see SUVs as having a positive influence in a few categories, notably "the safety of the transportation system," "the family-friendliness of the transport system" and "safety for pedestrians and cyclists." SUV drivers also are less likely to perceive negative impacts for most societal categories, including impacts on "city streets with sidewalks and bike lanes," "local air pollution," "global climate change," "the affordability of transportation" and "traffic congestion."

Figure 15: Evaluation of SUV societal impacts (% of respondents who selected positive or negative impact for each category; whiskers represent 95% confidence intervals)



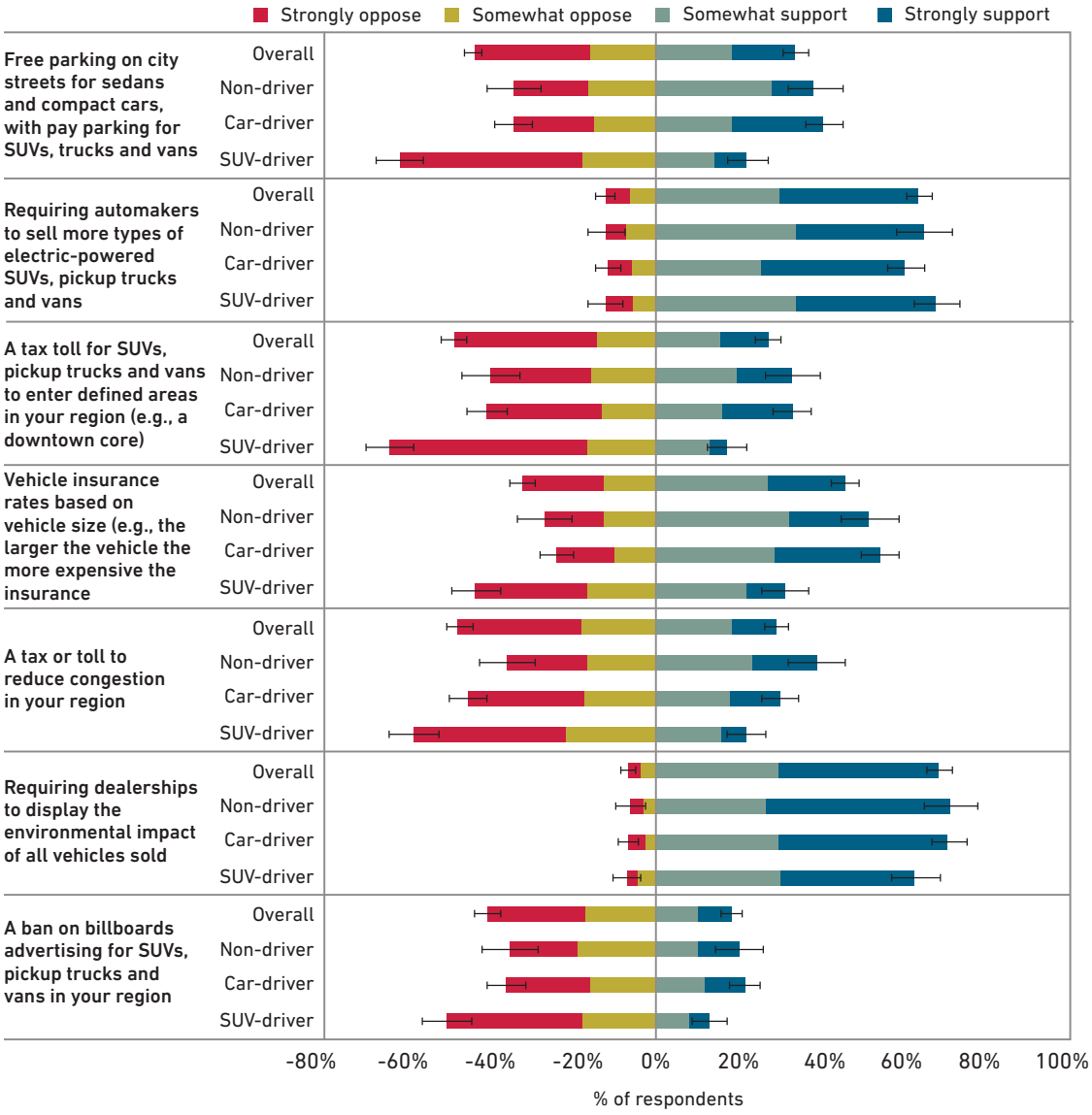
The survey also asked several questions relating the respondent's vehicle to climate change trends and impact, and in particular the heat wave that struck Canada in summer 2021 (two months before the survey was completed). Generally, most respondents (in all segments) agree that the heat wave was caused by climate change, and most respondents express more worry about climate change since the heat wave. Although respondents are likely to see a link between gasoline-powered vehicles and the heat wave, responses differ between SUV drivers and car drivers. Car drivers are significantly more likely to agree that larger vehicles contribute more to climate change.

Figure 16: Evaluation of vehicle connections to climate change and heat wave
(% of respondents who selected positive or negative impact for each category; whiskers represent 95% confidence intervals)



The survey also asked respondents to indicate their level of support or opposition to a variety of policies (Figure 17). SUV drivers are significantly more likely to oppose (and less likely to support) policies that penalize SUV ownership, or favour car ownership, including free parking for cars, taxes/tolls for SUVs, cheaper insurance for cars and a ban on SUV-related advertising. Interestingly the SUV drivers are more likely to oppose a general tax/toll for congestion, but express similar support levels as other segments for a ZEV-mandate style policy, or a requirement for environmental labelling at a dealership.

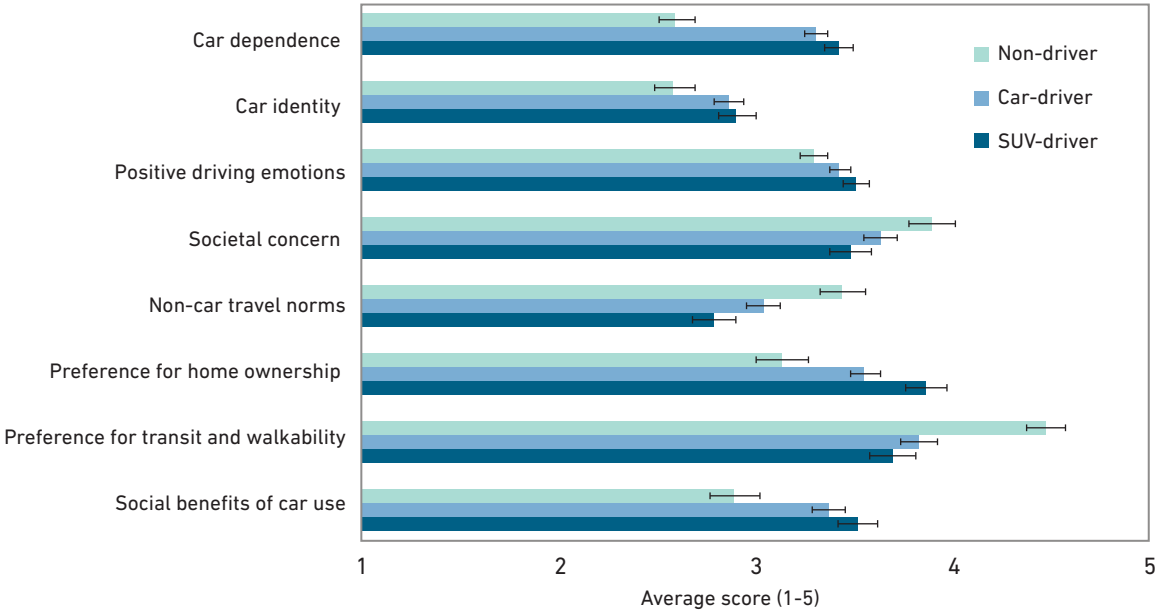
Figure 17: Evaluation of SUV societal impacts (% of respondents who selected positive or negative impact for each category; whiskers represent 95% confidence intervals)



5.7 Automobility perceptions

As described in Sections 3 and 4.3, the survey included a 32-item question scale relating to eight different components of automobility (Figure 18). Non-drivers have lower scores on most constructs, but higher scores on "societal concern" (seeing vehicle use as a serious problem for climate change and air pollution), "non-car travel norms" (having friends that commonly walk, bike or use transit) and "preference for transit and walkability" (placing importance on living with accessibility for walking or transit). SUV drivers and car drivers are quite similar, although SUV drivers have higher home-ownership preference and lower norms for non-car travel.

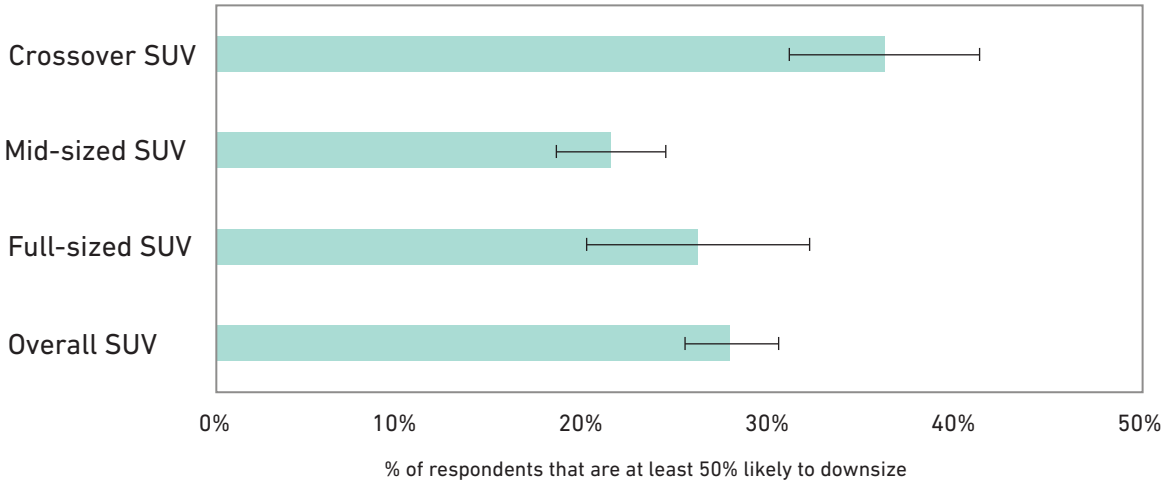
Figure 18: Average respondent scores on automobility perceptions scale
(average score among respondents among items in each category; whiskers represent 95% confidence intervals)



5.8 Willingness to downsize

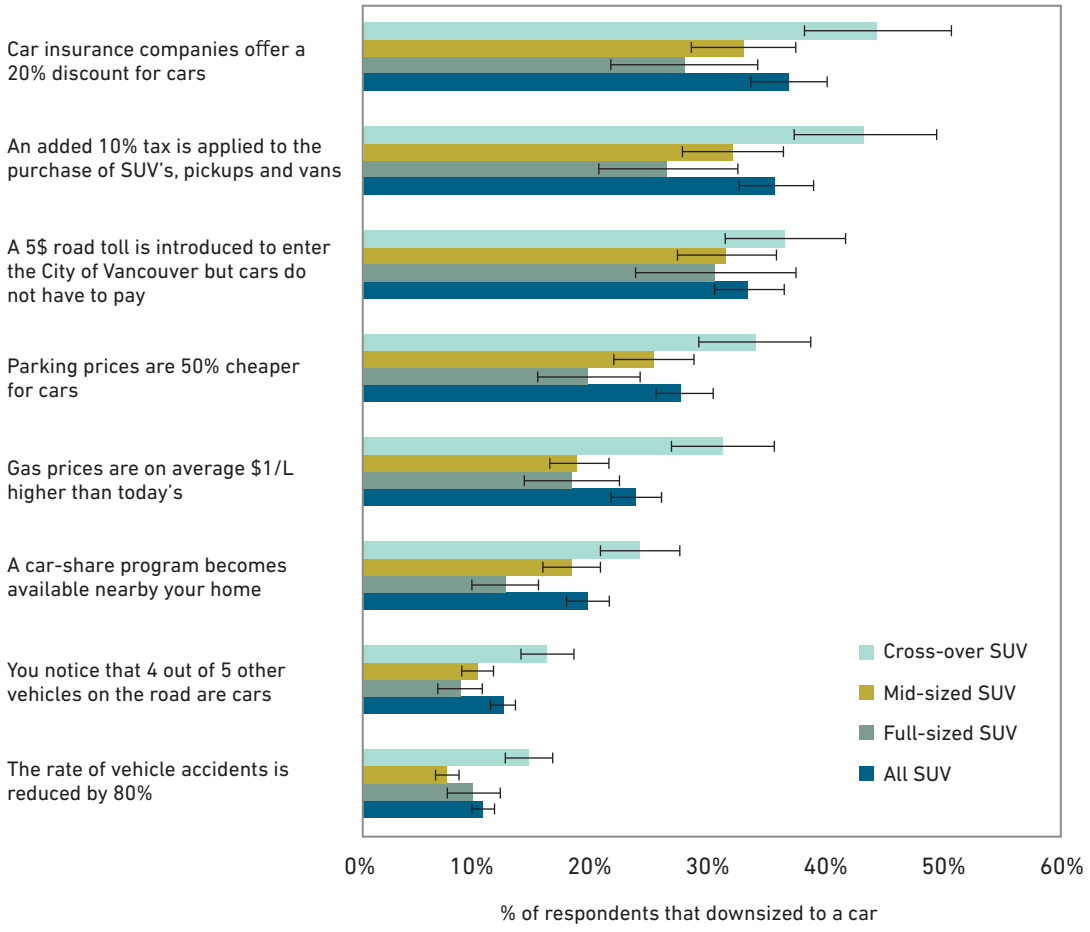
Moving toward the focus of this study, the survey asked SUV intenders (respondents who plan to purchase an SUV as their next vehicle) to indicate their willingness to downsize (with no change in policy or conditions). Overall, 28% of SUV intenders reported that they are at least 50% likely to downsize to a car (Figure 19). Among SUV intenders, crossover SUV intenders are most likely to be willing to downsize (significantly higher than overall SUV intenders and mid-sized SUV intenders), while mid-sized SUV intenders are least likely to be willing to downsize.

Figure 19: SUV drivers' willingness to downsize to a car for next vehicle purchase, with no change in conditions (average likelihood of downsizing; SUV intenders only broken down by type of SUV expected to be purchased; whiskers represent 95% confidence intervals)



We also asked about willingness to downsize under different policies or conditions (Figure 20). Across all SUV intenders, willingness to purchase a smaller vehicle was highest with financial measures: 36% for a 20% insurance discount for cars, 35% for a 10% purchase price tax for SUVs, 33% for a $5 road toll to enter the City of Vancouver for SUVs, and 27% for parking prices that are 50% cheaper for cars. There was relatively less willingness to downsize in response to changes in conditions (without a financial penalty or incentive) such as increasing car-share availability, increasing "norms" of cars (80% cars on road), or reduced vehicle accidents. Across all policies and conditions, crossover SUV intenders were generally more likely to downsize.

Figure 20: SUV drivers' willingness to downsize to a car for next vehicle purchase, with changes in policy or conditions (average likelihood of downsizing; SUV intenders only broken down by type of SUV expected to be purchased; whiskers represent 95% confidence intervals)



5.9 Explaining SUV and downsize interest (with regression)

As our final quantitative analysis, we implemented regression analysis to identify the factors that best help to explain SUV interest and willingness to downsize. We estimated four regression models (Table 6), each with different dependent variables: selection of SUV, and willingness to downsize the next intended SUV purchase under three different policies. The regressions include a broad selection of independent variables for respondent attitudes and values, context, and demographics. For each model, we note several observations:

Model 1 – Higher likelihood of intending to purchase an SUV is:

- Positively associated (at 99% confidence level) with having higher **SUV social norms** (based on the six questions in Section 5.5).
- Positively associated with having **positive perceptions of SUV impacts** on climate change (95% confidence), safety for the transport system (95% confidence) and safety for pedestrians/cyclists (90% confidence).
- Negatively associated with several automobility perceptions: preference for transit and walkability (95% confidence), car identity (90%) and perceived societal benefits of car use (90%).
- Positively associated with having **more household members** (90% confidence level) and living in **an attached house** (99%).
- Negatively (but weakly) associated with higher education.

Model 2 – Stated willingness to downsize from an SUV to a smaller vehicle (with no policy or change in conditions) is:

- Positively associated with **societal concern for automobility** (i.e., causes air pollution, climate change, uses up public space), and **non-car travel norms** (i.e., knowing people who walk, bike, use transit, try to reduce car use) (both at 95% confidence level).

Model 3 – Stated willingness to downsize under policy condition of 10% SUV tax is:

- Positively associated with greater **societal concern** with automobility (95% confidence level).
- Positively (but weakly) associated with higher biospheric/altruistic values.
- Positively (but weakly) associated with high car dependence and positive driving emotions.
- Negatively (but weakly) associated with car identity.
- Lower for those who purchase a **mid-size SUV** (rather than crossover or full-size).
- Negatively associated with **age** (i.e., older people are less willing to downsize) (99% confidence level).

Model 4 – Stated willingness to downsize under policy condition of $5 SUV road toll for City of Vancouver:

- Positively associated with greater **societal concern** with automobility (95% confidence level).
- Positively (but weakly) associated with positive driving emotions.
- Positively (but weakly) associated with living in an attached house.
- Negatively associated with **age** (i.e., older people are less willing to downsize) (99% confidence level).
- Higher (but weak association) for males and higher income households.

Table 6: Regression analyses explaining SUV choice and willingness to downsize

	1. Choose SUV (logistic)	2. Willingness to downsize (linear)	3. Willingness to downsize to car given 10% tax on SUVs (logistic)	4. Willingness to downsize to car given $5 cordon toll for SUVs (logistic)
Attitudes/values/beliefs				
SUV social norms (continuous)	1.36***	-0.08	0.18	-0.06
Positive perceptions of SUV impacts...				
...on global climate change (continuous)	0.20**	0.07	0.017	-0.05
...on safety of transport system (cont.)	0.25**	-0.07	0.09	-0.12
...on safety of ped/cyclists (cont.)	0.22*	0.01	-0.06	-0.03
Biospheric-altruistic values (continuous)	0.09	-0.006	0.37*	0.33
Automobility perceptions				
Car dependence	-0.04	-0.03	0.31*	0.09
Car identity	-0.19*	0.05	-0.27*	-0.14
Positive driving emotions	-0.06	-0.002	0.31*	0.29*
Societal concern	-0.18	0.14**	0.33**	0.44***
Non-car travel norms	-0.05	0.12**	-0.006	-0.01
Preference for home ownership	0.14	-0.006	-0.007	0.007
Preference for transit and walkability	-0.21**	0.04	0.09	0.24
Societal benefits of car use	-0.18*	-0.005	-0.06	0.08
Context				
Household size (continuous)	0.22*	-0.05	-0.16	-0.23
Number of household vehicles (continuous)	0.03	0.05	-0.17	0.10
Attached house/apartment (base = detached)	0.58***	0.01	0.36	0.45*
Suburban neighbourhood (base = urban)	0.04	-0.002	-0.33	0.03
Car type (base = crossover SUV)				
Mid-sized SUV	n/a	-0.08	-0.51**	-0.39
Full-sized SUV	n/a	-0.01	0.11	-0.20
Demographic				
Gender (base = male)	-0.06	-0.05	-0.02	-0.42*
Household income (base = <$50k)				
$50k-$100k	0.30	-0.02	-0.11	-0.11
> $100k	0.34	0.03	0.19	0.57*
Education (base = less than bachelor's				
Bachelor's degree	-0.29*	0.06	-0.13	-0.05
Graduate or professional degree	0.32	-0.04	-0.22	-0.03
Age (continuous)	-0.02	-0.03	-0.20***	-0.37***
Sample size	986	470	470	470
Model fit				
-2 Log likelihood	1086.86		556.87	522.07
Cox & Snell R Square	0.24		0.098	0.18
Nagelkerke R Square	0.31		0.16	0.19
R Square		0.1		
Adjusted R-Square		0.049		

Notes: *** is significant association at 99% confidence level, ** is significant association at 95% confidence level, * is significant association at 90% confidence level

Across the models we observe several important patterns:

- **SUV social norms** is a strong predictor of SUV purchase, but not related to willingness to downsize.
- **Concern about the societal impacts of automobility** is a consistent predictor (moderate to strong) of willingness to downsize.
- **Positive perceptions of SUV impacts on society (GHGs and safety)** are moderate predictors of SUV purchase, but not downsizing.
- **Living in a detached home** is a strong predictor of SUV interest.
- **Being younger** can increase willingness to downsize with some policies.
- **Other context and demographic variables** are not predictors of SUV interest or willingness to downsize (or else are inconsistent or weak predictors).

6. RESULTS FROM FOCUS GROUPS

Photo: Adobe Stock Images

In this section we describe our focus group analysis. We start with the details of the sample, then overview the general themes before going into each theme in more depth.

6.1 Describing the focus groups

In total, 37 people took part in the focus groups. We conducted four focus groups with SUV drivers (n=22), one focus group with car drivers (n=5) and one focus group with non-drivers (n=10) (Table 7). As described in Section 4, all participants were recruited from the survey sample. We followed a purposive sampling technique to recruit focus groups that were homogenous in terms of vehicle type (SUV as primary vehicle, car as primary vehicle or no primary vehicle), while also including individuals from a range of income levels, household sizes, Metro Vancouver neighbourhoods, age groups and genders. Matching with our survey findings, non-drivers were more likely to live in the City of Vancouver, while SUV drivers and car drivers were more likely to live in "near" suburbs (outside the City of Vancouver but north of the Fraser River), or "far" suburbs (south of the Fraser River). The vast majority of vehicle drivers own conventional vehicles powered by gasoline, though a few owned hybrids or diesel-powered vehicles.

6.2 Overview of themes

The focus groups covered a variety of topics, which we coded using the framework introduced in Section 4.2 (Table 2). Table 8 summarizes the number of participant mentions of each theme and sub-theme, broken down by respondent sector. Each count indicates that one participant mentioned that sub-theme at least once. For example, in the top-left cell, three (out of 22) SUV drivers mentioned getting a "good purchase price" for their SUV. We focus the analysis on mentions related to SUVs; that is, how SUV drivers talked about their primary vehicle, and how car drivers and non-drivers talked about SUVs. The next subsections summarize insights from each theme in Table 8.

Table 7: Summary of focus group participants (all names are pseudonyms)

		Age group	HH income ($k)	Gender	# in HH	Neighbourhood	# of HH vehicles	Fuel
SUV drivers	Bill	25-34	$125-$150	Male	2	City of Vancouver	1	gas
	Oscar	35-44	$50-$59	Male	1	Near suburb	1	gas
	Carl	55-64	$80-$89	Male	1	Near suburb	1	gas
	Mike	65+	$150+	Male	1	City of Vancouver	1	gas
	Tammy	55-64	$10-$19	Female	1	Near suburb	1	gas
	Nicole	65+	$50-$59	Female	1	Near suburb	1	gas
	Kip	25-34	$80-$89	Male	1	Vancouver suburb	1	gas
	Stuart	35-44	$150+	Male	2	City of Vancouver	1	gas
	Tim	45-55	$50-$59	Male	2	Near suburb	1	gas
	Quinn	25-34	$150+	Female	5	Near suburb	5	gas
	Maureen	25-34	$100-$124	Female	2	City of Vancouver	1	gas
	Marissa	35-44	$40-$49	Female	3	Far suburb	1	gas
	Ben	35-44	$90-$99	Male	3	City of Vancouver	2	diesel
	Matt	45-54	$90-$99	Male	2	City of Vancouver	2	gas
	Ed	55-64	$100-$124	Male	1	Near suburb	1	diesel
	Denise	35-44	$125-$150	Female	3	Near suburb	2	gas
	Betsy	55-64	$60-$69	Female	2	Far suburb	2	gas
	Elenor	35-44	$10-$19	Female	1	City of Vancouver	1	hybrid
	Tess	55-64	$70-$79	Female	3	Far suburb	1	hybrid
	Unice	55-64	$150+	Female	2	Near suburb	2	gas
	Theresa	55-64	$40 -$49	Female	1	Near suburb	1	gas
	Brett	55-64	$125-$150	Male	1	City of Vancouver	1	diesel
Car drivers	Sam	35-44	$100-$124	Male	4	Near suburb	1	gas
	Stan	65+	$90-$99	Male	1	Near suburb	1	hybrid
	John	65+	$40-$49	Male	2	Far suburb	1	gas
	Nadia	45-54	$20-$29	Female	1	Near suburb	1	gas
	Tanya	55-64	$100-$124	Female	2	Near suburb	1	gas
Non-drivers	Bobby	65+	$90-$99	Male	2	City of Vancouver	0	
	Daren	45-54	$100-$124	Male	2	Near suburb	0	
	Bruce	45-54	$50-$59	Male	1	City of Vancouver	0	
	Kent	35-44	$30-$39	Male	1	City of Vancouver	1	
	Aaron	under 25	<$10	Male	1	City of Vancouver	0	
	Nick	under 25	<$10	Male	1	Near suburb	0	
	Winny	35-44	$90-$99	Female	2	City of Vancouver	0	
	Brittney	65+	$20-$29	Female	2	Near suburb	0	
	Fran	under 25	$150+	Female	5	City of Vancouver	1	
	Charlotte	55-64	$100-$124	Female	4	Near suburb	1	

Table 8: Count of mentions by different driver groups (count if individual mentions once)

Category	Theme	Sub-theme	SUV-driver (n=22)	Car-driver (n=5)	Non-driver (n=10)
Private-functional	Financial	Good purchase price	3	0	0
		SUVs are expensive	0	2	1
		Fuel cost	2	4	0
	Safety	Visibility (sitting higher)	10	0	1
		Poor weather	4	0	1
		Feeling safe	8	1	2
	Space for lifestyle	Family	7	2	1
		Pets	5	0	0
		Hauling gear	12	2	1
		Towing	0	0	0
	Handling/reliability	Rain/snow	5	0	0
		Rough roads	3	0	0
	Comfort		5	0	0
	Pleasure	Fun trips	11	2	0
		Pleasure of driving	5	0	0
Symbolic/social	Status	Status symbol - applies	9	2	6
		Status symbol - doesn't apply	6	0	4
		Successful	2	0	0
	Other images	Outdoorsy (or not)	3	1	0
		Durability	3	0	0
		Family-oriented	1	2	1
		Environmental	0	1	0
		"Functional" image	2	2	0
		Blending in	6	1	1
	Social interactions	Perceptions of others with SUVs	18	4	1
		Socializing by driving others	2	0	3
Societal	Environment	Climate change - general	0	0	1
		Air pollution	1	1	2
		"Environment" - general	10	1	4
		Climate and SUV	2	0	2
	Other issues	Congestion	4	0	1
		Safety for non-driver	1	0	3
	Fuel type for SUV/vehicle	Hybrid	4	3	0
		Electric	12	3	6
Downsize/policy	Downsize potential	Would not downsize	9	0	0
		More fuel efficient	3	0	0
		HEV	2	0	0
		EV	8	0	4
		More space	3	0	0
	Consider upsizing?	Consider SUV	0	5	3
		Not consider SUV	0	0	7
	Downsize policy	Negative reaction	11	3	0
		Positive reaction	3	1	7
	EV/HEV policy	Negative reaction	0	0	0
		Positive reaction	4	2	0

6.3 Private-functional aspects of SUVs

Most focus group discussions started with a summary of private-functional attributes, which we break down into six sub-themes: financial, safety, space for lifestyle, handling/reliability, comfort and pleasure. As a reminder, all names are pseudonyms.

Financial: SUV drivers infrequently mentioned financial considerations. Three (of 22) mentioned that they attained a "good" purchase price for their SUV (e.g., Denise: "at the time, Mitsubishi had a great deal, and they have extended warranty"), and two mentioned the relatively high fuel costs of SUVs. In contrast, most of the car drivers (4 of 5) mentioned the relatively low fuel costs of their vehicle, and two pointed out that SUVs are expensive. As examples:

> *"It would have to be comparably priced, you know, I don't want to spend a lot more for an SUV if I can get a car that would do the trick." (Tanya, car driver)*

> *"I want to have something where I fill it up at the beginning of the month and I don't have to worry about until the end of the month." (Stan, car driver)*

Feeling safe: SUV drivers were especially likely to mention the importance of safety. Almost half of SUV drivers mentioned that the enhanced visibility of sitting higher, primarily as a safety feature (10 mentions). Examples include:

> *"I was really a nervous driver and scared to drive so for me I felt safer in an SUV where if I were to get into an accident. … I also like the fact that I'm higher up and I have better vision. I can kind of see everything a little bit better. I'm a shorter person so being higher up helps…I just feel more protected in an SUV versus a car." (Quinn, SUV driver)*

> *"Sitting higher I feel more safe or safer than sitting lower in the car." (Matt, SUV driver)*

Others mentioned safety as either generally feeling safe or feeling protected in a crash (8 mentions). As examples:

> *"So for me it's mainly about safety and just feeling safe in my car." (Nicole, SUV driver)*

> *"I mean, it's very aggressive as smaller vehicle out there on the highway, you almost feel like you're going to get crushed." (Ed, SUV driver)*

> *"I like to shred the slopes up at Whistler so we wanted to have something that … we feel like we were safe. The Jimmy is solid like it's surrounded by lots of metals, so if there was a rollover or if we were smacked, I'd feel pretty safe." (Tim, SUV driver)*

Space for lifestyle: Another common sub-theme for SUV drivers was having extra space, either for fitting family members (7 mentions), fitting pets (5) or hauling gear (12). As examples:

> *"... I was never an SUV guy, always had smaller cars or sporty cars. Before I had a family. And literally, there's nothing you can use with a family unless it's an SUV or minivan.... I think as long as we're family, we're going to have an SUV. I don't see any way around it." (Ben, SUV driver)*

> *"I had a smaller car before and going on camping trips was a bit of a struggle. So I wanted something I could take...all around the province. Or you know, if I wanted to go on a road trip that I could have no problem packing in snowboards or surfboards or camping gear or whatever." (Bill, SUV driver)*

> *"I wanted to make sure that I had a car that could fit me and other people and our ski gear." (Maureen, SUV driver)*

Handling/reliability: Several SUV drivers like that their vehicle could drive well in rain or snowy conditions (5 mentions) or rough roads (3). Interestingly, these were general observations, and participants did not describe particular cases where such handling was useful. Quotes were more general, such as:

> *"I like driving it in the remote areas and the mountainous areas, so it's definitely a fun vehicle to have...Even the regular roads within the city or rough...they're patched up...they're not fun to drive on, so an SUV I think is appropriate for that." (Oscar, SUV driver)*

Comfort: several SUV drivers mention that their SUV is comfortable (5 mentions), such as getting in and out, and loading it with gear. For example:

> *"I used to have a Honda Civic and that's a very low car. So I decided to buy a bigger kind of car so my back is not painful. So I don't have to bend my back so often." (Tammy, SUV driver)*

Pleasure/fun: SUV drivers commonly mentioned that their SUVs were good for taking "fun" trips (11 mentions), or otherwise mentioned the "pleasure" of driving their SUV (5 mentions). For example:

> *"It's a fun vehicle." (Oscar, SUV driver)*

> *"I love to drive, my God, I love to drive. I'm one of those people who...if I have a problem or whatever I will get in the car and I will just drive to Whistler and back." (Theresa, SUV driver)*

6.4 Symbolic aspects of SUVs

Participants from all three segments discussed the symbolic and social nature of SUVs. Here we divide these into the themes of "status symbol" and other images, while the next subsection focuses on social interactions in more detail.

Status symbol: In each driver segment, about half of participants mentioned SUVs as a status symbol: nine of 22 SUV drivers, two of five car drivers and six of 10 non-drivers. Generally, the notion of status symbol is discussed in a neutral or negative way. Some participants explain the importance of status symbols in their cultural background (e.g., Persian or Asian), or how status symbol seems to be an unfortunate driver of vehicle demand. We provide example quotes from SUV drivers and non-drivers:

> *"I'm Persian and in our community car is everything. … it's a very very important thing in our culture and…it's kind of a status symbol, shows your success." (Ben, SUV driver)*

> *"There's a thing in Vancouver. It's like people judge you on what you drive. You know, and everybody has to have like the best newest car." (Tim, SUV driver)*

> *"I hear a lot of people talk about status as if it's a bad thing. But, as a person of color, I do have to say that it's kind of also a safety thing…Even though Canada is a lot better than other places, we still get stereotyped really easily, and we just found that with having an SUV just lowers the chances of that happening. So yeah, it is a status thing, but it's also kind of just how this society is, so we kind of have to, in a way." (Nick, non-driver)*

> *"I've always seen SUVs as more status symbols for many people than useful vehicles. I see where in some situations, depending on work and uh business needs to cart stuff around that makes sense, but we have uh a flotilla, pardon the bad pun, of pickup trucks and SUV's running around the city that are just purely for status." (Bobby, non-driver)*

The idea of "status" is rarely explained in depth, though a couple of participants related it to the image of being "successful." For example:

> *"Yeah, I think [my SUV] definitely says that…kind of successful. And that's for sure. I mean versus getting a kind of a car…I mean, if you get a like a Range Rover, that means you're really, really successful." (Carl, SUV driver, luxury model)*

Another participant notes that the vehicle brand (especially luxury vehicle) is more likely to convey status than the vehicle class (SUV vs. car): "The brand to me tells the status more than the type of car they drive." (Winny, non-driver)

Several SUV drivers (6) and non-drivers (4) brought up the idea of an SUV as a status symbol, but emphasized that they oppose it or it does not apply to them. For example:

> *"Now if you appreciate the car what it's worth, it's features, its workmanship, and you enjoy it for what it is, that's a different story. But I just personally don't think it should be used as a means to elevate one's a social position…. I think using a vehicle as a status symbol is morally wrong." (Oscar, SUV driver)*

Other images: Some participants mentioned other images that might be associated with driving an SUV, though there was no consensus on any one image. Three SUV drivers mentioned the image of being "outdoorsy" or "sporty":

> *"It says something in a 4Runner. You can say that, yeah, you know I'm a lot more outdoorsy. Q5 is kind of like a wannabe and a Honda Civic It's you know, more city and more urban." (Carl, SUV driver)*

> *"I have a sport model so I guess I see myself as sporty. I don't know that other people see me that way. Probably not, just normal person in in my SUV." (Theresa, SUV driver)*

Several participants mentioned that SUVs might have the image of being "family-oriented": "If people see me with a SUV like that they look at me as a family car." (Tammy, SUV-driver).

One non-driver mentions the image of dominance:

> *"I'm big. I'm strong, I'm overpowering. Uh, get out of my way, 'cause I can run over you." (Bobby, non-driver)*

Several SUV drivers (6 of 22) mention that SUVs are more likely to "blend in" rather than send a unique signal or symbolic message. For example:

> *"It's not flashy by any means…it blends in with everything else on the road and it's smaller… it's more discreet, I guess you could say you're not really asking for more attention." (Quinn, SUV driver)*

6.5 Social interaction regarding SUVs

To further explore the symbolic and social aspects of SUVs, we asked participants if others in their social network (friends, family and acquaintances) tended to drive SUVs, and if they tend to support or oppose the use of SUVs. Generally, we found that participants tended to perceive that the vehicles and travel decisions by their peers were more in line with their own.

To start, the majority of SUV drivers (18 of 22) perceived that at least one other in their social groups (and in their region more generally) were also driving SUVs.

> *"Right now, I can't think of one person who doesn't have an SUV." (Ben, SUV driver)*

> *"I have one family or one friend that has a small sedan that's an electric vehicle, but most of them are pickup trucks or SUVs." (Betsy, SUV driver)*

> *"There's a lot of SUVs on the road and it's not that we have to live our lives according to what other people do, but sometimes it's a little bit of a monkey see, monkey do. If there is so many SUVs on the road and they look good. Hey, if I can afford to drive one, why not?" (Matt, SUV driver)*

"The ones that can afford to, you know, to get a new car, get the SUVs. It's the in thing." (Nicole, SUV driver)

"I'll tell you my neighbors, they love SUVs…they're everywhere here." (Elenor, SUV driver)

"My apartment building, the underground parking. It is a sea of SUVs. Absolute sea of SUVs. There are just no small cars there at all. All SUVs and trucks." (Theresa, SUV driver)

One SUV driver suggested that such perceptions of widespread SUV uptake could be more important than the functional reasons that drivers often provide. He describes the functional motives as an "excuse":

"My friends also have got SUVs and they say that they've got kids, so they need the space and all that. But…I think it's just an excuse…they wanted a SUV. And they just say, well, you know it's higher. It's safer for my kids and I could put a lot more stuff in there and all that, but truly I think that's just an excuse. … you see that, you know, it's around everybody, a lot of people drive SUV, especially…in your social circle. Everybody drives an SUV. Then you kind of feel like well, I gotta drive an SUV." (Carl, SUV driver)

In contrast, car drivers and non-drivers are more likely to perceive a range of vehicle types across their peers:

"So I think for me, my friends and family are kind of all over the map. Some cars, some SUVs, some trucks, and all of everybody is happy with what they've got for themselves…. as you get further away from the city, the vehicles seemed to get bigger." (Tanya, car driver)

"My friends, those who live downtown and in Vancouver, some of them even get rid of their vehicle because they're using Evo or Modo or whatever…. An adult who lives out of town or downtown they own big SUVs or pickup trucks." (Nadia, car driver)

"Most of my friends drive and I would say half of them have a SUVs and the other half they would have hybrid or electric vehicles. But all the ones that have bigger vehicles, they live further out. They don't live in right in the city." (Daren, non-driver)

As a final note about social interactions, two SUV drivers and three non-drivers explained that social interactions could be facilitated by giving rides to others (where SUVs provide more space to do so. For example:

"I have a lot of friends that I golf a lot with. They all have cars, so it's obvious why I ended up to be the designated driver. Mine will hold all the golf clubs." (Mike, SUV driver)

6.6 Societal impacts of SUVs

Our focus groups were designed to ask several general questions, to observe where participants would take the discussion. The moderator held back on mentioning some themes that might unduly lead or direct the conversation. In particular, we wanted to see if participants would bring up environmental issues themselves, and when prompted, which environmental issues they would mention. Here we organize insights into the themes of environment, other societal issues and alternative drivetrains.

Generally, SUV drivers did not mention the environmental impacts of their vehicles. And if environmental impacts were mentioned, they did not see SUVs as being an important source of the problem. Most mentions by SUV drivers were of the "environment" in general (10), with one mention of air pollution in particular and two mentions linking SUVs to climate. For example:

> *"Yes, cars do create a lot of pollution, and during the pandemic…there was less driving and we could…see the birds and smell the flowers…It was better. But you know when you when you talk about pollution, the big industries, they're the worst polluters of anyone and we don't hear a lot about [that]." (Nicole, SUV driver)*

> *"Obviously the fuel consumption and that has an environmental impact, but I'm also concerned about the fuel costs. So indirectly … [the environmental impact] I do think about it, but it's not top of mind." (Carl, SUV driver)*

Some SUV drivers mentioned environmental impacts, but quickly justified their personal interest in an SUV. For example:

> *"A small car emits less pollution. But it's not as safe. I think a big car is more safe." (Tammy, SUV driver)*

One SUV driver expressed the desire to downsize for environmental reasons:

> *"I'm looking to go to something that doesn't burn fossil fuel. … I would downgrade into something that would allow me not to spend or harm the environment anymore than how I feel we already are as a society…that's really important to me and it's become important in the last couple of years." (Tim, SUV driver)*

As opposed to downsizing, SUV drivers were more likely to mention the potential to switch to a hybrid version (4 mentions) or electric version (12 mentions) for environmental reasons. Electric vehicles were also mentioned (unsolicited) by most car drivers (3 of 5) and most non-drivers (6 of 10). Example quotes include:

> *"My next car will realistically be in an EV or hybrid. Strictly because I can't in good conscious conscience buy another fuel emitting car. I worked in oil and gas up in northern Alberta when I bought this car, but I don't want to contribute to that anymore." (Maureen, SUV driver)*

"I can see that it's a new trend now, with the people getting more conscious with environment and we just moved into a new place and our car garage, are pretty much all hooked up with all those plug-in hybrids." (Denise, SUV driver)

"And now I understand the hybrids are much better and much more reliable, so I would also consider a hybrid SUV again." (Mike, SUV driver)

"I want to go electric. But I also want to be smart about it. I don't want to just because it's, you know the car Du Jour." (Brett, SUV driver)

"I'm seeing more and more electric sedans as opposed to as many as SUVs as they used to be. And right now, if there was a suitable hybrid electric range extended SUV out there for everything that I'd be zeroing in on it like crazy." (Unice, SUV driver)

6.7 Willingness to downsize (or upsize)

The moderator asked respondents about their willingness to change vehicle types — for SUV drivers to downsize, and for car drivers to upsize. Many SUV drivers (9 of 22) stated that they were not interested in downsizing:

"My husband 6'8. Our kids are 6'3, 6'2 and 6'1 so there's no small cars in our future." (Betsy, SUV driver)

"I'd go to a truck before I go back to a car." (Tess, SUV driver)

"I will open up the hatchback and then I will sit in the back of the vehicle and I will paint so I do not anticipate not having an SUV at any point in my life." (Theresa, SUV driver)

"I wouldn't change anything. I just I would not go smaller. Nothing. Unless well... The only way I would probably go make a lateral move into a Tesla." (Elenor, SUV driver)

Some would be motivated to downsize if the vehicle was a hybrid, or more fuel efficient. As examples:

"I probably would consider a nice station wagon ... I guess it's probably a little bit easier, I would assume, on the gas." (Carl, SUV driver)

"I'd certainly want to move I think to something that consumes either less fossil fuels in general or less gas, or has a better gas mileage." (Kip, SUV driver)

"I would definitely consider a hybrid just because of the price of gas in the lower mainland." (Marissa, SUV driver)

All of the car-drivers (5 of 5) mentioned the potential to upsize to an SUV, though the intentions were generally not strong:

"I've been considering a SUV. ... Well, I've always bought Fords, and Ford doesn't make a car anymore, so I'd have to go to a SUV." (John, car driver)

"Definitely considered a bigger vehicle, but they tend to be a little bit more pricey and also worse on gas, so that was the main drawback for my family to just get a four door sedan instead of SUV." (Sam, car driver)

Most of the non-drivers (7 of 10) were not considering an SUV or any other type of vehicles.

"I'm not interested in getting the car right now....my decision was very much guided by my belief about my personal impact on the environment and the damage that I believe that fossil fuel vehicles wreak on the environment and the climate, and I think that's getting more and more evident as time moves on." (Bobby, non-driver)

"I'm not planning on buying another vehicle ...It would be a waste of my money and like the carbon footprint so not interested." (Brittney, non-driver)

"I don't think that an SUV would ever be in my world." (Bruce, non-driver)

6.8 Response to policy (downsizing, efficiency and electrification)

As noted in the previous sections, SUV drivers were not likely to associate their vehicles with negative environmental impacts, and many were not interested in downsizing. SUV drivers are more likely to be attracted to a more efficient (hybrid) or electric version of an SUV rather than downsizing. At the end of each focus group, the moderator directly asked participants about their support for policy efforts to encourage vehicle downsizing, as well as their own interest in downsizing.

Downsize policy: It was not surprising that the SUV drivers were more likely to have a negative reaction to vehicle downsizing policy (11 of 22) rather than a positive reaction (3 mentions). Interestingly, most car drivers (3 of 5) also resisted the idea of downsizing policy. As illustrated in these quotes, reasons for opposition included: there are better ways to reduce environmental impact (efficiency or electrification), worry about personal liberty versus government control, impacts on lifestyle or work needs, the potential for policy to be classist, and the policy being inauthentic or a way for the government to make money.

"In my opinion you can get SUVs that are more environmentally friendly than smaller cars." (Bill, SUV driver)

"Governments have no place telling me what I should drive and what I shouldn't drive. Governments should be more concerned on creating systems and policies to allow us to make decisions that are economical and good for the planet...I already pay enough in taxes, I don't need to be told what I should be buying with my money. I just find that really intrusive for a government, whether provincial or federal." (Tim, SUV driver)

"I must admit there are those who buy trucks for their own personal status symbols and it is bad and it is horrible...But to impact the gross percentage of them for the few is probably a... shot in the wrong direction." (Kip, SUV driver)

"Becomes pretty classist. Maybe you need that car for your job for your family, for your whatever, for your livelihood. Why do you have to pay more taxes if it's a requirement for you to live your life?" (Maureen, SUV driver)

"It's really worrying to me because for the sake of virtue of whatever the government is pushing everyone to live a certain way or push a certain lifestyle or car. And especially coming from Middle East and I know Eastern European friends of mine feel the same way.... It's extremely troubling to me." (Ben, SUV driver)

"We should have our own liberty to choose what we want and whether it's car or SUV, I think it will be up to us, not the governments pushing us to buy this or use that just because it's more convenient for them." (Denise, SUV driver)

"For us we would feel it would be a prejudice to forcing us into a small car. And it would be unhealthy for us." (Betsy, SUV driver)

"They're trying to...social engineer their way of life." (Ben, SUV driver)

"I think it's just a cash grab from the city or from the governments just to fill their own coffers with more and more money... now they want parking to pay for parking...Cash grab." (Matt, SUV driver)

Several SUV drivers express the complexity in the issue, where it is hard to trade off individual freedom with societal goals. Further, the particular culture and travel patterns in Canada may serve to further lock in the need for larger vehicles. As examples:

"You could make bigger, larger vehicles more expensive...but then it be classist in a way, because if people cannot afford to buy a vehicle, they might need. How is that sustainable for society as well so? I don't know, it's a complicated matter. There's no, there's no simple answer for sure...I can see both perspectives here." (Stuart, SUV driver)

"Yes, it's a great idea, you know to reduce emissions, but...Canada is just one country or ... even Vancouver to initiate this? How much of an effort is that really gonna be...it needs to be widespread...on the global level and hardly do global leaders...converge on the same ideas." (Quinn, SUV driver)

"When you go to Europe, they all drive small vehicles...small transport trucks...It's because of our demographic. It's absolutely impossible because of how much trucking we do...I don't want to be a small car driving with some of these big transport trucks...I've driven lots of places in Europe and feel much more comfortable because in a small car you're the same as everybody else." (Tess, SUV driver)

Only the non-drivers were more likely to support downsizing efforts (7 of 11). Reasons included improved safety, reduced environmental impact, the potential to reduce the normalization of SUVs and the potential to shift automaker efforts. Example quotes from this segment include:

"I think it would be safer for us if we all went back into midsize or smaller vehicles. You know we had big family. We managed with smaller cars we didn't need SUV to get around." (Brittney, non-driver)

"If we can move away from…having the SUV…be the goal for some people. I think that would be ideal … I would hope that if smaller cars can become more normalized and seen as more desirable then the necessity for some people of color to have to drive an SUV in order to avoid being stereotyped might also change…I would hope." (Aaron, non-driver)

"I'm European so I always thought that it was a North American thing to have a bigger car and I never understood it…maybe I don't see the status thing on owning a bigger car. And I think that we should go and have smaller cars, encourage everyone to have a smaller car." (Daren, non-driver)

"If there's a shift in the way people see status and the correlation between that and the vehicle you own, and in this case, going towards smaller, maybe sedans or vehicles like that. I think that would help." (Nick, non-driver)

"If the makers of the cars would make them smaller then we would buy them. Shouldn't it be? Shouldn't the onus be on the makers to not make larger cars and then people would have no choice but to go with a smaller car?" (Charlotte, non-driver)

Efficiency/EV policy: Several SUV drivers (6) and car drivers (2) were more supportive of efforts to improve the efficiency of vehicles, or to support electric vehicles. Many conveyed that SUVs are not as problematic as fuel consumption in general. As examples:

"It shouldn't matter what size vehicle is because everyone's lifestyle demands different capacities in their transportation. So what they should be focusing more on is how do we drive down the emissions? How do we drive down fuel costs? How do we make the cars more effective and efficient regardless of what size they are?" (Tanya, car driver)

"Not necessarily smaller cars, more fuel-efficient cars. So you can have ones where you're just not having as much of an imprint upon the society…if you have a smaller hybrid vehicle of some sort, you're not spending as much on fuel. It's good for the consumer. It's also good for everybody else because they're taking up less room and putting less stuff into the air." (Stan, car driver)

"The objective is to reduce fuel consumption….And I think that's where they should be putting their priorities on. So it's…having higher fuel efficiency standards and promoting EVs and EV charging infrastructure and that kind of thing rather than getting people into smaller vehicles." (Carl, SUV driver)

7. SUMMARY OF KEY FINDINGS

Photo: Adobe Stock Images

In this section, we integrate and summarize the key findings from our mixed-method research design. We first organize insights of this research according to our conceptual framework, including functional motives given for SUV ownership, symbolic attributes linked with SUVs, societal impacts of SUVs and willingness to downsize to a smaller vehicle class.

7.1 Functional motives

SUV drivers expressed numerous functional motives for their SUV usage, generally perceiving their SUVs as superior to other vehicle classes. Major categories include improved safety, more space, improved handling and more fun.

First, SUV drivers tend to describe a strong "feeling of safety" in their SUV, especially in protecting themselves (or their passengers) in a collision. While survey responses regarding the importance of personal and passenger safety were similar for SUV drivers and car drivers, SUV drivers were much more likely to perceive that SUVs improved "the safety of the transportation system" (49% of SUV drivers compared to 30% of car drivers and 21% of non-drivers) and "safety for pedestrians and cyclists" (29%, compared to 19% of car drivers and 14% of non-drivers). In focus groups, about half the SUV drivers mentioned that they "feel safe" in their SUV, especially in the event of an accident. Some described the importance of sitting higher in traffic, which they said helped them to drive more safely. Numerous Canadian and U.S. studies report similar findings that SUV drivers tend to feel safe.[20,21,24] Safety was also found to be a common theme in SUV advertisements.[5] In particular, we find more mentions of a preference for "passive safety" of SUVs (safer when hit),[18] though the mentions of sitting higher and better handling for SUVs suggest a perception of "active safety" as well.

Second, SUV drivers tend to emphasize the size and space of their vehicle. In the survey, they are statistically more likely to place importance on fitting "lots of stuff" (74% of SUV drivers rate as important, compared to 54% for car drivers) or "lots of people" (55%, compared to 35% of car drivers) in their vehicle. In focus groups, SUV drivers describe this added space as important for their lifestyle, including family-oriented living, as well as engaging in recreation (e.g., skiing, snowboarding, surfing, camping and golfing). Relatedly, SUV drivers are more likely to place importance on "access to recreation" (58% rate as important) than car drivers (47%). The desire for space has also been found in other U.S. and Canadian studies. [21,24]

Third is the perception of improved handling and reliability for SUVs. SUV drivers are more likely to place importance on "ability to drive in snowy/wet conditions" (90% of SUV drivers rate as important, compared to 70% of car drivers). In focus groups, several SUV drivers described their vehicle as being effective for driving in bad weather or on rough roads.

Fourth is importance of "fun." In the survey, SUV drivers are more likely to place importance on their vehicle being "fun to drive" (74% rate as important, compared to 63% of car drivers). In the focus groups, about half of the SUV drivers described their vehicle as "fun," or otherwise mentioned how they used the vehicle for "pleasure trips." This emphasis on pleasure or fun was similarly found in the Equiterre SUV study.[24]

Fifth, we find that SUV drivers tend to be less sensitive to financial costs than car drivers and non-drivers. In the survey, car drivers were statistically more likely to describe fuel efficiency as "very important" (87% compared to 74% of SUV drivers) in their vehicle choice. In focus groups, SUV drivers were less likely to talk about purchase price or fuel savings — and when purchase price was mentioned, it was framed as getting a "good" deal. In contrast, car drivers often mentioned how their vehicle was cheaper to buy and cheaper to drive than an SUV. A U.S. study found similar differences in SUV drivers and car drivers,[21] while Canadian research also indicates that SUV drivers tend to have less sensitivity to purchase price and fuel costs.[26]

7.2 Symbols and social support

We find evidence of the importance of symbolism and imagery in vehicle purchase. First, we find that SUVs can be associated with different symbols than cars. Interestingly, in the survey, car drivers and SUV drivers tend to associate their vehicles with the same images (with no statistically significant differences). But when asked about SUVs in general, SUV drivers were significantly more likely to identify the image of being "reliable" (53% compared to 40% of car drivers) and "sensible" (36% compared to 24% of car drivers). Car-drivers are more likely to associate SUVs with the image of being "unattractive" and "conceited." Non-drivers generally had lower positive associations with SUVs, with lower associations of being "innovative," "intelligent," "independent," "reliable," "fun," "sensible," "family-oriented" and "powerful." A few focus group participants also mentioned the images of being "outdoorsy" or "sporty" being associated with SUVs. These findings suggest that SUVs are more likely to send positive messages to other SUV drivers, but potentially negative (or less positive) messages to other segments, namely car drivers or non-drivers. Other research finds that a dislike of the car (versus SUV) "image" can be a reason for SUV drivers to prefer not to downsize.[21]

Further, many participants expressed the perception that some SUVs can be thought of as a "status symbol." About half of SUV drivers mentioned this in each focus group segment (SUV driver, car driver and non-driver). The idea of status being communicated was linking to particular cultural backgrounds, as well as the general image of being "successful." Though, some participants explained that brand (especially a luxury brand) is more associated with status than vehicle type (SUV versus car). A German study similarly explains how SUV purchase can be used to increase or solidify social status.[22]

We also observed evidence for the importance of social norms and social support for SUV purchase. First is notion of descriptive norms,[2] where SUVs are seen as increasingly common or normal. In the survey, SUV drivers are more likely to perceive that their friends and family own SUVs (63%, compared to 45% of car drivers and 35% of non-drivers). In focus groups, several SUV drivers mentioned that SUVs tend to "blend in" with others. Most of the SUV drivers (18 of 22) perceived that at least one other in their social group was driving an SUV. Another Canadian study finds similar perceptions of SUVs as "normal," which is a motivator for purchase.[24]

Related is injunctive norms, which is the perception of what others support or think is the "right thing to do."[2] In the survey, SUV drivers are more likely to perceive that their friends/family have a positive view of SUVs (72% vs. 42% of car drivers and 38% of non-drivers), and more likely to perceive that their friends/family would "approve" of buying an SUV (66% vs. 41% of car drivers and 36% of non-drivers). Further, these survey questions on social support for SUVs proved to be one of the strongest predictors of SUV purchase in the regression analysis. Our results echo one Canadian study that found "social approval" is the most important factor in SUV purchase.[24]

7.3 Societal impacts

Perceptions of environmental impacts did not play a strong role in most vehicle buyers' purchase decisions. In the survey, SUV drivers and car drivers placed similar importance on societal-functional attributes, namely minimizing environmental impacts, reducing GHG emissions, reducing air pollution or safety for other road users. SUV drivers and car drivers also expressed similar beliefs about the positive versus negative impacts of SUVs on climate change, though SUV drivers were less likely to perceive negative air pollution impacts. In focus groups, SUV drivers usually did not mention environmental impacts until prompted by the moderator.

When environmental impacts were mentioned, SUV drivers tended to downplay the role of SUVs. In focus groups, several SUV drivers restated a belief that they needed their SUV for functional reasons such as safety or space. Several SUV drivers explained that SUVs did not emit any more pollution or GHG emissions than a car. Rather than switching to a car, about half of SUV drivers mentioned that switching to a hybrid or electric SUV would be more effective for reducing environmental impacts. Other Canadian consumer research has also found that SUV drivers were not likely to mention carbon emissions as an important consideration,[24] and that SUV drivers tend not to have strong environmental concern relating to vehicle choice, despite perceived social pressure to "think green."[25]

Although expression of environmental concern was not particularly common, it does seem to play an important role in willingness to downsize among SUV drivers. In particular, the automobility construct of "societal concern" emerged as consistently important, which is based on responses to statements that "air pollution from cars is a serious problem," "car use is causing climate change" and "cars, streets and parking take away too much public space." Having higher societal concern (agreeing with these statements) was positively and significantly associated with all three measures of willingness to downsize among SUV drivers.

7.4 Willingness to downsize

We find that most SUV drivers are reluctant to switch to smaller vehicles. About one-third of SUV drivers might be willing to downsize under particular conditions, but there is also a substantial amount of opposition to policy that would require or incentivize that change. Such findings are unique to our present study, as past research has not explored willingness to downsize in depth.

In the survey, across all SUV intenders (i.e., those intending to buy an SUV), willingness to downsize to a smaller vehicle was highest with financial measures: 36% would downsize if there were a 20% insurance discount for cars, 35% for a 10% purchase price tax for SUVs, 33% for a $5 road toll to enter the City of Vancouver for SUVs, and 27% for parking prices that are 50% cheaper for cars. Stated interest in downsizing was lower for other conditions, such as increasing car-share availability, increasing "norms" of cars (80% cars on road) or reduced vehicle accidents. In the focus groups, almost half of SUV drivers seemed to oppose downsizing under any conditions. A few others stated that they might be motivated to downsize if the smaller vehicle were clearly more fuel-efficient.

SUV drivers tended to express particularly strong opposition to policies that would encourage vehicle downsizing. In the survey, SUV drivers were significantly more likely to oppose (and less likely to support) policies that penalize SUV ownership, or favour car ownership, including free parking for cars (62% oppose, 22% support), taxes/tolls for SUVs (64% oppose, 17% support), cheaper insurance for cars (43% oppose, 31% support) and a ban on SUV-related advertising (50% oppose, 13% support). In focus groups, half of SUV drivers explained their resistance. Reasons for opposition included perceptions that there are better ways to reduce environmental impact (efficiency or electrification), government control threatens personal liberty, there would be negative impacts on lifestyle or work needs, the policy would be classist, and policy might be inauthentic or a way for the government to make money. In contrast, in surveys and focus groups, SUV drivers were more likely to support policies that encourage improved fuel efficiency or electrification of vehicles.

8. POLICY IMPLICATIONS

Photo: Adobe Stock Images

This study provides an in-depth, mixed-method perspective on consumer perceptions regarding vehicle types, and of SUV drivers' willingness to downsize. It is not intended as a policy analysis, as one would need to analyze a broader set of criteria for different policy options, such as effectiveness at achieving sustainability goals in the long run (decarbonization and reduction of air pollution), economic efficiency and equity impacts. However, we can offer insights into a number of policy options related to downsizing vehicle class.

Financial incentives for smaller vehicles: Instruments can include purchase subsidies, insurance discounts or parking discounts for smaller vehicles. Our survey finds that about one-third of SUV intenders would be willing to seriously consider downsizing with such a policy, including a 20% insurance discount, or a 50% discount on parking prices. Generally, subsidies are perceived as more politically acceptable,[3] though subsidies are vulnerable to a high amount of free-ridership, can be costly in terms of government expenditure and can lead to inequitable outcomes. That said, all else held constant, subsidizing the purchase or use of smaller vehicles could lead to more overall vehicle ownership and driving overall — ideally such a policy would be paired with a financial penalty for larger or heavier vehicles (such as a feebate.)

Financial disincentives for SUVs (or large or heavy vehicles): Instruments include purchase taxes on SUVs, as well as added fees (parking or insurance) or added tolls for SUVs. In our survey, 35% of SUV intenders expressed interest in downsizing for a 10% SUV purchase price tax, and 33% expressed willingness to downsize for a $5 road toll to enter the City of Vancouver for SUVs. However, taxes of all types tend to face the highest levels of public opposition.[3] In our survey, financial disincentives were strongly opposed by most SUV drivers, and in most cases the survey showed high levels of opposition among car drivers and non-drivers. Vancouver city council recently sent a parking proposal that favours smaller vehicles over SUVs back to staff for further study. So, while effective, such a policy would be politically risky.

Feebates: A "feebate" program could charge purchase taxes for vehicles with higher GHG emissions per kilometre (including larger, heavier gasoline vehicles) while subsidizing lower-emissions vehicles.[4] Our present study did not address feebates in particular, though it stands to reason that the combination of a purchase incentive and disincentive could be as effective in stimulating vehicle downsizing as either instrument on its own. Further, a revenue-neutral feebate would avoid the challenges of government expenditure for subsidy programs. However, there is still likely to be opposition to a feebate if it is perceived as a tax on SUVs and large vehicles.

Banning SUV advertising: Recent research by Equiterre has suggested that SUV-related advertising (such as billboards) be banned, in an effort to reduce consumer demand for SUVs.[5] In our survey, SUV drivers and car drivers both reported low levels of importance (~10-15%) to "advertisements online and TV," "TV commercials" and "advertisements in newspapers, magazines and billboards." More importance was placed on personal research (rated as important by 55% to 62% of respondents), conversations with friends/family (39%), information from car dealerships (36% to 41%) and car magazines/websites (26% to 28%). That said, advertising can play a role in shaping cultural norms and consumer expectations. While a ban on advertising may help, surely other efforts would be needed to trigger a cultural shift.

Information campaigns: a more comprehensive effort to shift consumer preferences and perceptions toward smaller vehicles could possibly also be effective. While our present study was not designed to test out the effectiveness of particular messages on changing consumer preference, we can draw hypotheses from our findings. We note that consumer interest in SUVs and willingness to downsize are strongly related to SUV social norms (having friends and family that have and approve of SUVs), and societal concern (perceptions that vehicle contribute to climate change, air pollution and safety threats). Regarding societal concern, it is possible that communication of some societal messages (facts and/or engaging narratives about vehicle safety, and energy use and GHG emissions per kilometre for larger vehicles) could potentially help to sway the opinions of some consumers. But more research is needed to understand which strategies might be effective, and what the magnitude might be.

Regulations: Some environmental regulations are effective in helping to decarbonize vehicles in Canada, while providing no direct incentive for vehicles to downsize. In particular, both the vehicle emissions standard and ZEV mandate are meant to incentivize improved vehicle efficiency and increased penetration of ZEVs, while being relatively neutral about vehicle class. Some argue that the vehicle emissions standard in particular provides less stringent standards for larger vehicles, such as SUVs, which may have perversely incentivized the current trend toward SUVs.[8] Society could be more effective in achieving various sustainability goals if such loopholes were removed. For example, a vehicle emissions standard could be based simply on gCO_2e/km, without variations for different vehicle classes, but size, weight or footprint. Such an edit would more fairly target vehicle downsizing as one of the many potential compliance pathways for increasing vehicle energy efficiency.

Car-sharing programs: Around 19% of SUV drivers expressed willingness to downsize if a "car-share program becomes available near your home." The idea is that some consumers may not feel the need to have many of the attributes of an SUV (handling for weather, extra passenger and cargo space) on a day-to-day basis if they can instead access an SUV (or other larger vehicle) only for the trips when they need one.

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APPENDIX A: SURVEY INSTRUMENT

WELCOME

Welcome to the survey. We would like to learn about how you get around, your thoughts on vehicles, and your opinions on your transportation system in Metro Vancouver.

This study is funded by a non-profit organization that seeks to understand transportation uses. The non-profit is independent of government and corporations. Results will be used to help inform transportation policy and planning in Metro Vancouver and British Columbia.

All responses will be analyzed in aggregate, and your personal responses will be kept confidential.

Please answer each question to the best of your ability.
The survey will take around 10 minutes to complete.

Which province do you live in?
This information is used only for statistical purposes.

[drop down menu of Canada's provinces] [if anything other than BC, terminate session]

E8. Please indicate your age group.
This information is used only for statistical purposes.

- ◯ 19 to 24 years
- ◯ 25 to 34 years
- ◯ 35 to 44 years
- ◯ 45 to 54 years
- ◯ 55 to 64 years
- ◯ 65 years or over

E9. Please indicate the gender that you identify with.
This information is used only for statistical purposes.

- ◯ Male
- ◯ Female
- ◯ Do not identify with either
- ◯ I'd prefer not to disclose

A. YOUR TRAVEL PATTERNS

In this section, we ask you about your household vehicles and how you get around.

A1. Do you have a driver's license?

- ◯ Yes
- ◯ No [Categorize as "Non-driver", ask A2 and then skip to A5]

A2a. How many vehicles does your household currently own or lease that are driven regularly (at least once a week)?
Your "household" includes you as well as any people you live with who you often consult to make important decisions. As such, your household may just be you.
By "vehicles" we mean cars, trucks, vans, minivans, and sport utility vehicles (SUVs) - any sort of motor vehicle a household normally uses for day-to-day travel. Please do not include motorcycles, scooters, e-bikes, recreational vehicles, car share memberships, or motor homes.

- ◯ 0 [Categorize as "Non-driver", skip to A5]
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 or more

A2b. Which type(s) of vehicle does your household currently own?
By "vehicles" we mean cars, trucks, vans, minivans, and sport utility vehicles (SUVs) - any sort of motor vehicle a household normally uses for day-to-day travel. Please do not include motorcycles, scooters, e-bikes, recreational vehicles, car share memberships, or motor homes.

Select all that apply:

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

A3. Do you drive a vehicle at least once a week for personal travel?
By "personal travel" we mean to get to work or school, pick up or drop off family members, run errands, go shopping, or to get to recreation and social activities.

- ◯ Yes, a vehicle owned by myself
- ◯ Yes, a vehicle owned by someone else in my household
- ◯ Yes, a vehicle owned by someone outside my household [Categorize as "Non-driver", skip to A5]
- ◯ No [Categorize as "Non-driver", skip to A5]

For the following questions, we want to learn about your **primary vehicle**. This is the vehicle that you personally drive most often. This is a vehicle that you or someone in your household owns – not a vehicle owned by an employer.

By "vehicles" we mean cars, trucks, vans, minivans, and sport utility vehicles (SUVs) - any sort of motor vehicle a household normally uses for day-to-day travel. Please do not include motorcycles, scooters, e-bikes, recreational vehicles, car share memberships, or motor homes.

A4a. Please tell us the following details about your vehicle. *Please answer to the best of your ability.*

	Your primary vehicle	
Model year (e.g., 2010)		[open-ended, only allow numeric values]
Make (e.g., Honda):		[open ended]
Model (e.g., Accord):		[open ended]
Purchased, leased, or company car:		[drop down menu, "purchased", "leased", "company car"]
[If "Purchased," ask if new or used]:		[drop down menu: New, Used]
Who is the primary driver?		[drop down menu: Me, Another member of my household , Multiple people drive this vehicle regularly, Other]
Powered by		[Drop down: gasoline, diesel, hybrid (does not plug-in), hybrid (does plug-in), electricity only (plugs-in]

A4b. Which vehicle category best describes your [Make Model from A4a]?

- ◯ Compact car [Categorize as "Car-driver"]
- ◯ Sedan car (mid-sized or full-sized) [Categorize as "Car-driver"]
- ◯ Cross-over SUV [Categorize as "SUV-driver"]
- ◯ Mid-sized SUV [Categorize as "SUV-driver"]
- ◯ Full-sized SUV [Categorize as "SUV-driver"]
- ◯ Pickup truck [Categorize as "Truck-driver"]
- ◯ Van or minivan [Categorize as "Van-driver"]

A4c. Approximately how far is your [Make Model from A4a] driven each year, in 'normal" times (without COVID lock-down protocols)? *Please answer to the best of your ability.*

- ◯ Less than 10,000km
- ◯ Between 10,000 and 20,000km
- ◯ Between 20,000 and 30,000km
- ◯ Between 30,000 and 40,000km
- ◯ Between 40,000 and 50,000km
- ◯ More than 50,000km
- ◯ I don't know

A5. We are also interested in how you get around more generally (with a vehicle or otherwise).

Think about the last month. How did you get to destinations outside of your home? This includes going to work or school, driving others, shopping or running errands, and getting to recreation, leisure, and social activities.

How often did you use the following types of transportation in the last month?
Please answer to the best of your ability – it's okay if you don't remember perfectly. Please include weekdays and weekend days. Please note: this does not include travel that is your work (for example, if you are a professional chauffeur, driver or delivery person).

	Never	Once a month	Once a week	Several times a week	Once a day or more
Your household's vehicle driving alone	○	○	○	○	○
Your household's vehicle with one or more other passengers	○	○	○	○	○
Ride from a friend or family member	○	○	○	○	○
Your own motorcycle, moped, or electric scooter	○	○	○	○	○
Organized carpool or vanpool	○	○	○	○	○
Car-share program (as a driver or passenger)	○	○	○	○	○
Taxi	○	○	○	○	○
Uber or Lyft (or similar service)	○	○	○	○	○
Public transit (bus, streetcar, subway, metro, rapid transit)	○	○	○	○	○
Walking or cycling (bicycle or e-bike)	○	○	○	○	○

A6a. We would like to know about your experience using car-sharing services.
Car-sharing is a type of self-service car rental that allows members to book, pay for, and use vehicles belonging to the network, which may be parked in specific places or be locatable through an app or website. Please note: This does not include car rental companies, informal loaning of cars between peers, or peer-to-peer car-sharing programs (where the vehicles are owned by private households).

Have you ever been a member of a car-sharing service (such as Evo, Modo, Car2Go, or other service)?

○ Yes, I am currently am a member of one [Skip A6b]

○ Yes, I have been a member in the past (but not currently)

○ No, I have not been a member

A6b. How interested are you in becoming a member of a car-sharing service (such as Evo, Modo, Car2Go, or other service) in the future?
Car-sharing is a type of self-service car rental that allows members to book, pay for, and use vehicles belonging to the network, which may be parked in specific places or be locatable through an app or website. Please note: This does not include car rental companies, informal loaning of cars between peers, or peer-to-peer car-sharing programs (where the vehicles are owned by private households).

- ◯ Not at all interested
- ◯ Somewhat interested
- ◯ Moderately interested
- ◯ Very interested
- ◯ I don't know

B. MOTIVATIONS FOR VEHICLE PURCHASE

["Non-drivers" skip Section B]

Thank you for completing Section A. In this section we would like to learn more about your primary vehicle and your reasons for purchasing it.

B1. How involved were you in the purchase of your [A4b vehicle class]?
By "involved" we mean that you either made the decision yourself, you provided important input into the decision, or were otherwise considered in the decision-making.

- ◯ Not at all involved [skip to B3]
- ◯ Somewhat involved
- ◯ Moderately involved
- ◯ Highly involved
- ◯ I made the decision by myself

B2. Please think about your household's decision to purchase your [A4b vehicle class]?
What considerations were important when your household purchased your [A4b vehicle class]?

Please rate how important each of the following characteristics were when deciding to buy your [A4b vehicle class]:

	Not at all important	Somewhat important	Moderately important	Very important	I don't know
Price	○	○	○	○	○
Saving money	○	○	○	○	○
Comfort	○	○	○	○	○
Fuel efficiency	○	○	○	○	○
Safety for me and my passengers	○	○	○	○	○
Easy to use	○	○	○	○	○
Reliability	○	○	○	○	○
Being ready for adventure	○	○	○	○	○
Access to nature	○	○	○	○	○
Access to recreation	○	○	○	○	○
Ability to go off road	○	○	○	○	○
Ability to drive in snowy or wet conditions	○	○	○	○	○
Fitting lots of stuff in the vehicle	○	○	○	○	○
Fitting lots of people in the vehicle	○	○	○	○	○
Ability to tow a trailer	○	○	○	○	○
Fun to drive	○	○	○	○	○
Increased quality of life	○	○	○	○	○
Making a good impression on others	○	○	○	○	○
Representing my values and identity	○	○	○	○	○
Status symbol	○	○	○	○	○
Connect with like-minded people	○	○	○	○	○
What my friends/family think	○	○	○	○	○
Safety for other road users	○	○	○	○	○
Minimize environmental impacts	○	○	○	○	○
Reduce greenhouse gas emissions	○	○	○	○	○
Reduce air pollution	○	○	○	○	○
Sending a message to industry (energy and car companies)	○	○	○	○	○
Inspiring others	○	○	○	○	○
Sending a message to government	○	○	○	○	○

B3. I associate my [A4b vehicle class] with the image of being...

	Not at all	A little bit	Somewhat	Mostly	Very much	I don't know
Innovative	○	○	○	○	○	○
Pro-environmental	○	○	○	○	○	○
Adventurous	○	○	○	○	○	○
Successful	○	○	○	○	○	○
Masculine	○	○	○	○	○	○
Intelligent	○	○	○	○	○	○
Independent	○	○	○	○	○	○
Reliable	○	○	○	○	○	○
Fun	○	○	○	○	○	○
Boring	○	○	○	○	○	○
Weird	○	○	○	○	○	○
Risk-taking	○	○	○	○	○	○
Wealthy	○	○	○	○	○	○
Lazy	○	○	○	○	○	○
Unattractive	○	○	○	○	○	○
Conceited	○	○	○	○	○	○
Poor	○	○	○	○	○	○
Sensible	○	○	○	○	○	○
Feminine	○	○	○	○	○	○
Family-oriented	○	○	○	○	○	○
Powerful	○	○	○	○	○	○

B4. What sources of information did you use when shopping for your [A4b vehicle class], and how important were those sources in influencing your decision to buy it?

		I HAVE USED THIS SOURCE				
	I HAVE NOT USED THIS SOURCE	Not important	Somewhat important	Important	Very important	I don't know
Car magazines/websites (e.g., Car and Driver, Motor Trend)	○	○	○	○	○	○
News (e.g., radio, online news articles, or newspaper)	○	○	○	○	○	○
Advertisements in newspapers, magazines, or billboards	○	○	○	○	○	○
Advertisements online or on TV	○	○	○	○	○	○
Television commercials	○	○	○	○	○	○
Social media (e.g., Facebook, Twitter, Instagram)	○	○	○	○	○	○
Conversations with family and friends	○	○	○	○	○	○
Personal research (internet, books, movies, talks, etc.)	○	○	○	○	○	○
Government (ads, brochures, etc.)	○	○	○	○	○	○
Press releases from automakers	○	○	○	○	○	○
Information from car dealerships	○	○	○	○	○	○

SECTION C: YOUR FUTURE VEHICLE PURCHASE

[All respondents complete Section C]
Thank you for completing [Last Section]. In this section we will ask you about your plans, if any, to purchase a vehicle in the future.

C1a. Does your household plan to buy or lease a new or used vehicle in the next 5 years?
By "vehicles" we mean cars, trucks, vans, minivans, and sport utility vehicles (SUVs) - any sort of motor vehicle a household normally uses for day-to-day travel. Please do not include motorcycles, scooters, e-bikes, recreational vehicles, car share memberships, or motor homes.

- ◯ No [Skip to C1e, f, g]
- ◯ Yes, a new vehicle [complete C1b, c, d, and skip C1e, f, g]
- ◯ Yes, a used vehicle [complete C1b, c, d, and skip C1e, f, g]
- ◯ I don't know [Skip to C1e, f, g]

C1b. When your household buys its next vehicle, what type of vehicle will it be?
How likely is your household to buy each type of vehicle?

Please click and drag the slider to the appropriate point on the scale.

Compact car

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Sedan car (mid-sized or full-sized)

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Cross-over SUV

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Mid-sized SUV

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Full-sized SUV

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Pickup truck

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Van or minivan

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

C1c. Again, imagine this next vehicle purchase.
Which one of the following vehicle types is it mostly like to be?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C1d. Again, imagine this next vehicle purchase.
Now we want to know more about how this vehicle will be powered.

How likely is your next vehicle to be powered by the following fuel types?
Please click and drag the slider to the appropriate point on the scale

Gasoline only

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Diesel only

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Hybrid (does not plug in)

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Plug-in hybrid (that does plug in)

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Electricity only

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

[Reminder: Questions C1e, C1f, C1g are only for respondents that select "No" or "I don't know" in C1a]

C1e. Imagine that your household has to buy or lease a new or used vehicle, and that it will be used the same way as your [A4a Make Model].

How likely is your household to buy each type of vehicle?

Please click and drag the slider to the appropriate point on the scale.

Compact car

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Sedan car (mid-sized or full-sized)

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Cross-over SUV

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Mid-sized SUV

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Full-sized SUV

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Pickup truck

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

Van or minivan

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

C1f. Again, imagine this next vehicle purchase.

Which one of the following vehicle types is it mostly like to be?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C1g. Again, imagine this next vehicle purchase.

How likely is your next vehicle to be powered by the following fuel types?

Please click and drag the slider to the appropriate point on the scale.

Gasoline only

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Diesel only

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Hybrid (does not plug in)

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Plug-in hybrid (that does plug in)

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

Electricity only

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

☐ I don't know

[If C1c OR C1f = SUV, truck or van, proceed with C2, otherwise skip C2 only]

C2. You selected a [C1c/C1f vehicle class] as your most likely next vehicle purchase.

If you had to buy this new vehicle today, how likely would you be to consider a smaller vehicle instead (such as a compact car or sedan)?

Not at all likely (0%) | Moderately likely (50%) | Completely certain (100%)

We would like to learn if you might choose a different vehicle type under different conditions.

Please consider only one condition at a time.

Under the following conditions, which vehicle type are you most likely to buy?

C3a. Gasoline prices average a dollar per litre higher than today's price.

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

[repeat with the following conditions]

C3b. Parking prices are 50% cheaper for cars (compact or sedan).

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C3c. An added 10% tax is applied to the purchase of SUVs, pickup trucks and vans.

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C3d. A car-share program becomes available nearby your home, giving you access to larger vehicles (SUVs/trucks) when you want them.

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)o Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C3e. Car insurance companies offer a 20% discount for cars (compact or sedan).

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C3f. You notice that 4 out of 5 other vehicles on the road are cars (compact or sedan).

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C3g. The rate of vehicle accidents (cars, SUVs, vans and trucks) is reduced by 80%.

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

C3h. A $5 road toll is introduced to enter the city of Vancouver, but cars (compact or sedan) do not have to pay.

Everything else is the same as current conditions.

Which type of vehicle are you most likely to buy?

- ◯ Compact car
- ◯ Sedan car (mid-sized or full-sized)
- ◯ Cross-over SUV
- ◯ Mid-sized SUV
- ◯ Full-sized SUV
- ◯ Pickup truck
- ◯ Van or minivan

Section D: Perceptions of vehicle types

[All respondents complete Section D]

Thank you for completing Section [Last Section]. In this section we would like to learn more about your opinions of different vehicle types.

D1. In general, what is your opinion of each vehicle type?

	Very negative	Slightly negative	Neutral Slightly positive	Very positive	I don't know
Car (sedan or compact car)	○	○	○	○	○
YSUV (crossover, mid-sized, or full-sized)	○	○	○	○	○
Pickup Truck	○	○	○	○	○
Minivan	○	○	○	○	○

We want to know more of how you think about SUVs in general.

This includes cross-over SUVs, mid-sized SUVs, and full-sized SUVs.

D2. Consider someone else driving an SUV. *Compared to other vehicle types, do you associate their SUV with the image of being...*

	Not at all	A little bit	Somewhat	Mostly	Very much	I don't know	Innovative
Pro-environmental	○	○	○	○	○	○	○
Adventurous	○	○	○	○	○	○	○
Successful	○	○	○	○	○	○	○
Masculine	○	○	○	○	○	○	○
Intelligent	○	○	○	○	○	○	○
Independent	○	○	○	○	○	○	○
Reliable	○	○	○	○	○	○	○
Fun	○	○	○	○	○	○	○
Boring	○	○	○	○	○	○	○
Weird	○	○	○	○	○	○	○
Risk-taking	○	○	○	○	○	○	○
Wealthy	○	○	○	○	○	○	○
Lazy	○	○	○	○	○	○	○
Unattractive	○	○	○	○	○	○	○
Conceited	○	○	○	○	○	○	○
Poor	○	○	○	○	○	○	○
Sensible	○	○	○	○	○	○	○
Feminine	○	○	○	○	○	○	○
Family-oriented	○	○	○	○	○	○	○
Powerful	○	○	○	○	○	○	○

D3. How much do you agree with the following statements?

	Strongly disagree	Somewhat disagree	Neutral Somewhat agree	Strongly agree	I don't know
My friends and family would approve that I bought an SUV	○	○	○	○	○
I see more and more SUVs on the roads	○	○	○	○	○
Many of my friends and family own SUVs	○	○	○	○	○
My friends have a negative view of SUVs	○	○	○	○	○
People that I consider influential drive SUVs	○	○	○	○	○
SUVs represent a high social status	○	○	○	○	○

D4. We would like to know more about your opinion of SUVs. *What impact do you think SUVs have on the following aspects:*

Impact of SUVs on...	Very negative impact	Somewhat negative impact	None/ neutral impact	Somewhat positive impact	Very positive impact	I don't know
City streets with sidewalks and bike lanes	○	○	○	○	○	○
Local air pollution	○	○	○	○	○	○
Global climate change	○	○	○	○	○	○
The affordability of transportation	○	○	○	○	○	○
The safety of the transportation system	○	○	○	○	○	○
Traffic congestion	○	○	○	○	○	○
The fairness of the transport system	○	○	○	○	○	○
The family-friendliness of the transport system	○	○	○	○	○	○
Safety for pedestrians and cyclists	○	○	○	○	○	○

Section E: More about you

[All respondents complete Section E]

Thank you for completing [Last Section]. In this final section, we would like to find out more about you and your views on transportation.

E1. We will now ask your opinion on some policies related to driving in your region.

Based on the information provided, we would like to know how much you would support or oppose these policies if there were a referendum (vote) on implementing or keeping them in your region. By policy we mean a government action taken to achieve a specific goal.

How much would you support or oppose...

	Strongly oppose	Somewhat oppose	Neutral	Somewhat support	Strongly support	I don't know
Free parking on city streets for sedans and compact cars, with pay parking for SUVs, trucks and vans	○	○	○	○	○	○
Requiring automakers to sell more types of electric-powered SUVs, pickup trucks and vans	○	○	○	○	○	○
A tax or toll for SUVs, pickup trucks and vans to enter defined areas in your region (e.g., a downtown core)	○	○	○	○	○	○
Vehicle insurance rates based on vehicle size (e.g., the larger the vehicle the more expensive the insurance rate)	○	○	○	○	○	○
A tax or toll to reduce congestion in your region.	○	○	○	○	○	○
Requiring dealerships to display the environmental impact of all vehicles sold	○	○	○	○	○	○
A ban on SUV, pickup truck and van advertising on billboards in your region	○	○	○	○	○	○

E2. We would like to find out more about your attitudes towards vehicle ownership and use. We would like to know your thoughts even if you do not own a vehicle or have never driven a vehicle before.

Please indicate your level of agreement with each of the following statements in the way that best fits your situation. If you are not sure, please select "I don't know"."

Recall that by "vehicles" we mean cars, trucks, vans, minivans, and sport utility vehicles (SUVs) - any sort of motor vehicle a household normally uses for day-to-day travel. Please do not include motorcycles, scooters, e-bikes, recreational vehicles, car share memberships, or motor homes.

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree	I don't know/ Not applicable
Owning a car is important to me.	O	O	O	O	O	O
If possible, I'd prefer not to own a car.	O	O	O	O	O	O
I am (or would be) comfortable lending my car to a friend.	O	O	O	O	O	O
I don't (or wouldn't) want to drive a car that someone else was previously driving.	O	O	O	O	O	O
It is (or would be) important that I keep my car a particular way (seat, mirrors, cleanliness, etc.).	O	O	O	O	O	O
I need a car to fulfill my everyday obligations.	O	O	O	O	O	O
It is easy to plan my day without a car.	O	O	O	O	O	O
It is difficult for me to access my friends and family without a car.	O	O	O	O	O	O
In my area, every household needs a car.	O	O	O	O	O	O
I need a car for my job.	O	O	O	O	O	O
Sometimes I feel too dependent on my car.	O	O	O	O	O	O
It is important that I live in a neighbourhood where I can walk to shops and other destinations.	O	O	O	O	O	O
It is important for me to live in a place where I can easily access transit.	O	O	O	O	O	O
My ideal situation is to live in a private, detached home (not apartment or townhome).	O	O	O	O	O	O
It is important for me to own my home.	O	O	O	O	O	O
I prefer to live away from urban centers.	O	O	O	O	O	O

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree	I don't know/ Not applicable
I don't (or wouldn't) mind having a long commute to work.	○	○	○	○	○	○
I enjoy (or would enjoy) driving.	○	○	○	○	○	○
Driving is stressful.	○	○	○	○	○	○
The idea of driving makes me tired.	○	○	○	○	○	○
I feel (or would feel) in control when I am driving.	○	○	○	○	○	○
Driving makes me feel (or would make me feel) free.	○	○	○	○	○	○
Being inside a car feels like a safe, protected space.	○	○	○	○	○	○
Owning a car shows (or would show) that I am successful.	○	○	○	○	○	○
I want (or would want) my car to represent my personality.	○	○	○	○	○	○
You can learn a lot about someone by looking at their car.	○	○	○	○	○	○
Buying a car is an important milestone in life.	○	○	○	○	○	○
A car is just a way to get around and nothing more.	○	○	○	○	○	○
I often feel emotionally connected to cars (or my car).	○	○	○	○	○	○
Most of my friends own a car.	○	○	○	○	○	○
I know a lot of people that use public transit (bus, subway, etc.).	○	○	○	○	○	○
Many of my friends are trying to reduce their car use.	○	○	○	○	○	○
Many of my friends commonly walk or bike to get around.	○	○	○	○	○	○
I often talk about cars with my friends.	○	○	○	○	○	○
Air pollution from cars is a serious problem.	○	○	○	○	○	○
Car use is causing climate change.	○	○	○	○	○	○
Our transportation system is ineffective for less privileged people (e.g., those with disabilities or lower incomes).	○	○	○	○	○	○
Widespread car use is needed to support jobs and the economy.	○	○	○	○	○	○
Overall, car use is good for society.	○	○	○	○	○	○
Cars, streets and parking take away too much public space.	○	○	○	○	○	○

E3. We would like to learn about your thoughts on the recent heat wave in BC.

Please indicate how much you agree or disagree with the following statements:

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree	I don't know/ Not applicable
The recent heat wave was caused by climate change.	○	○	○	○	○	○
I am more worried about climate change since the recent heat wave.	○	○	○	○	○	○
Driving a gasoline powered car is a big contributor to heat waves.	○	○	○	○	○	○
I think more about my vehicle's impact since the recent heat wave.	○	○	○	○	○	○
Driving a SUV/pickup truck contributes more to heat waves than driving a sedan/compact car.	○	○	○	○	○	○

E4. How frequently do you engage in the following activities?

Think about how often you engaged in these activities, or how much time you devoted to these activities, over the past year.

	Never	Rarely	Occasionally	Frequently	Very frequently
Researching new technology.	○	○	○	○	○
Shopping for new technologies.	○	○	○	○	○
Using new technologies.	○	○	○	○	○
Talking about new technologies.	○	○	○	○	○
Working on or tinkering with technology.	○	○	○	○	○
Thinking about protecting the environment.	○	○	○	○	○
Trying to help the environment through daily actions.	○	○	○	○	○
Attending environmental meetings.	○	○	○	○	○
Engaging in environmental conservation activities.	○	○	○	○	○
Promoting environmental conservation (talking to people about the environment).	○	○	○	○	○

E5. Consider each of the items below and indicate how important each value is as a guiding principle in your life.

	Not at all important	A little important	Somewhat important	Extremely important
Family security, safety for loved ones.	○	○	○	○
Honoring parents and elders, showing respect.	○	○	○	○
Self-discipline, self-restraint, resistance to temptation.	○	○	○	○
Respecting the earth, harmony with other species.	○	○	○	○
Protecting the environment, preserving nature.	○	○	○	○
Equality, equal opportunity for all.	○	○	○	○
Social justice, correcting injustice, care for the weak.	○	○	○	○
Unity with nature, fitting into nature.	○	○	○	○
A world at peace, free of war and conflict.	○	○	○	○
Influential, having impact on people and events.	○	○	○	○
Authority, the right to lead or command.	○	○	○	○
Wealth, material possessions, money.	○	○	○	○
Curious, interested in everything, exploring.	○	○	○	○
A varied life, filled with challenge, novelty and change.	○	○	○	○
An exciting life, stimulating experiences.	○	○	○	○

E6. How many people live in your household (including yourself)?

This information is used only for statistical purposes.

○ Only myself

○ 2 people

○ 3 people

○ 4 people

○ 5 or more people

E7. What is the highest level of education you have completed?

This information is used only for statistical purposes.

- ◯ No certificate, diploma or degree
- ◯ High school certificate or equivalent
- ◯ Apprenticeship or trades certificate or diploma
- ◯ College, CEGEP, or other non-university certificate or diploma
- ◯ University certificate or diploma below bachelor level
- ◯ Bachelor's degree
- ◯ University certificate or diploma above bachelor level
- ◯ Master's degree
- ◯ Professional degree in medicine, dentistry, veterinary medicine, optometry, or law
- ◯ Doctorate or PhD degree

E10. What pre-tax income category does your household fit into? *Please provide your 2020 income.*

This information is used only for statistical purposes.

My household's 2020 pre-tax annual income is:

- ◯ Less than $10,000
- ◯ $10,000 to $19,999
- ◯ $20,000 to $29,999
- ◯ $30,000 to $39,999
- ◯ $40,000 to $49,999
- ◯ $50,000 to $59,999
- ◯ $60,000 to $69,999
- ◯ $70,000 to $79,999
- ◯ $80,000 to $89,999
- ◯ $90,000 to $99,999
- ◯ $100,000 to $124,999
- ◯ $125,000 to $150,000
- ◯ Greater than $150,000

E11. In what city do you live?

[Drop down menu of cities/municipalities in Metro Vancouver]

E12. Do you own or rent your residence?

- ◯ Own
- ◯ Rent
- ◯ Not applicable

E13. How would you describe your residence?

- ◯ Detached house
- ◯ Secondary suite in detached house
- ◯ Attached house (e.g., townhouse, duplex, triplex, etc.)
- ◯ Apartment - 'high-rise' (five or more storeys/levels)
- ◯ Apartment - 'low-rise' (fewer than five storeys/levels)
- ◯ Mobile home
- ◯ Other - please specify: ____

E14. Which of the following categories best describes the area where you live?

- ◯ Urban (city center with dense housing)
- ◯ Suburban (just outside a city, with more spread out housing)
- ◯ Rural (far away from a city, with very spread out housing)

E15. Would you like to participate in further research?

We are seeking participants for a follow-up group interview for additional compensation. As part of that interview, we would ask you and other participants several extra questions about your vehicle interests. *The interview would be online and last 1 hour. If you are selected to complete the group interview, you will be rewarded with $25, 25 000 LEO points, or 625 Aeroplan points.*

Email:

Phone number:

E16. Would you like to tell us anything more about your thoughts on vehicles, transportation, or about the survey?

APPENDIX B: FOCUS GROUP GUIDE

Notes on flow and group dynamics/management (for moderators):

- Will follow the "funnel" approach, going from general to specific (prompts are optional)
- Flow will be somewhat organic. The black headings below are general ways to organize input. We'll want to hit on all those topics. But we won't force a particular order
- Common intervention will be to move beyond general statements. Follow up with: can you give a specific example? Can you share a story about that?
- Keep talking about experienced and perspective (not opinion and attitude).

Moderator's Introduction (takes 5-10 min)

Hello, my name is XXXX and I'm leading this project. To start, please enter your Personal ID into the text box. That way, we have a proper record, and can make sure you receive your rewards.

Welcome to this group interview. Over the next hour, we want to learn about you. We especially want to learn your thoughts on different types of cars, trucks and SUVs. Best of all: your specific stories!

This study is funded by a non-profit organization that seeks to understand transportation uses. The non-profit is independent of government and corporations. Results will be used to help inform transportation policy and planning in Metro Vancouver and British Columbia.

All responses will be analyzed in aggregate, and your personal responses will be kept confidential. We will record this interview, and keep the video in a password protected database, separate from your contact information. When we report on the results, we won't mention your names or other personal details.

The guidelines are pretty simple:

- Only one person talking at a time.
- Try not to interrupt. If someone else is talking, put up your hand, write in chat box. Zoe will keep track of a speaker's list.
- Try not to dominate
- When you share, try to be specific. Give a specific example. Share a particular story.
- I also may call on you by name –you can always say "pass"

Questions (and prompts)

A. (0:10) Your current vehicle (~15 min)

Everyone here owns and regularly drives an SUV (Enter your make/model into the chat). Let's start by hearing from each of you:

1. (Go around the room). Tell us about your SUV: type, how long you've had it, how you use it?

- Please be specific:
- Are you usually/always the driver?
- How many times did you drive it in the last week? Where did you go?
- time permitting: what are the strengths and weaknesses of your SUV?

2. Why did you choose an SUV rather a different vehicle type – car, truck or van?

- What factors did you consider? Did you compare different vehicles?
- What was the biggest influence on your decision?
- Does the SUV fit with your lifestyle?

B. (0:25) Your next vehicle (~10 min)

3. Would you consider owning/using a smaller vehicle (car) instead? Under what conditions?

- What would have to change for you to seriously consider owning a car?
- Bring up motivations that they mention before (potentially with reminders from Zoe via chat)
- If you had to replace your SUV tomorrow, would you get another SUV or something else?
- take note of mentions

C. (0:35) Influence of others (~10min)

4. Do your family and friends drive SUVs? Do they like or hate SUVs?

- Do you talk about your SUV with friends and family?
- Did your family/friends influence your decision to purchase the SUV?
- Do you think SUVs are popular?
- Share a specific conversation

D. 0:45 Symbolism (~10 min)

5. Does your SUV say something about you?

- What would a stranger think about you, if they see you drive up in your SUV?
- How would it be different if you drove up in a car?
- What kind of person drives an SUV?
- Does your vehicle feel 'normal"? Does it "stick out"? Do you like that?

E. 0:50 Policy & environment (~10 min)

6. Should government try to get people into smaller cars? Why or why not?

- What kind of policy might be effective? Can you think of one?
- (See if environment is mentioned as motive, or fuel economy)

7. (Optional) We had several questions on the survey about policy. For example (pick one):

a. makes paid parking 50% cheaper for cars?
b. adds a 10% purchase tax for SUVs/trucks/vans
c. gives a 20% insurance discount to cars
d. adds a $5 toll to enter City of Vancouver with SUV/truck/Van

- Would this influence your behaviour? The car you buy? How you drive it?
- How would you feel about this policy? Would you support it? Oppose?

8. Do you think about the environmental impacts of your SUV?

- What are the impacts?
- Would it be different for a car versus SUV? How?
- Is it a serious problem? Does is concern you?

Founded in 1990, the David Suzuki Foundation is a national, bilingual non-profit organization headquartered in Vancouver, with offices in Toronto and Montreal.

Through evidence-based research, education and policy analysis, we work to conserve and protect the natural environment, and help create a sustainable Canada. We regularly collaborate with non-profit and community organizations, all levels of government, businesses and individuals.

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