Content Analysis of Unique Auto Ads in the United States: 2005, 2012, 2015, and 2017

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Executive Summary

This project identifies the prevalence of themes in unique ads for light-duty vehicles released in the United States in 2005, 2012, 2015, and 2017. These years were selected to maximize variation in national economic conditions and fuel prices. A team of researchers reviewed stratified random samples of 513 and 627 ads derived from a larger population of unique ads provided by a media monitoring company.¹ The project is important because there has been little systematic analysis of the messages that auto ads in the United States convey to consumers, despite the fact that auto advertising is a multi-billion dollar industry.

Almost all ads analyzed—95%—contain emotive appeals. The second-most-common theme is performance; 45% of sampled ads feature this theme. Performance is followed closely by sales, emphasized in 44% of ads. The less prevalent themes are, in order: Quality (23% of sampled ads), safety (16%), fuel economy/green (15%), comfort/convenience (15%), luxury (13%), passenger/cargo capacity (10%), and reliability/durability (9%); see Figure E.1.



Themes related to vehicle performance are approximately three times more common in unique auto ads than themes related to safety or fuel economy/green, which rank fifth and sixth in prevalence, respectively, among the ten themes identified; performance ranks second.

¹ This collection of ads does not permit analysis of the frequency with which identical ads were released in different markets or repeatedly. An ad appears once in the dataset upon being released.

In addition to identifying prevalence of these ten themes, the analysis identified whether ads emphasized subjective, perceptual, or personal attributes of vehicles, vehicle buyers, or the vehicle purchasing process, tagging such ads with the overall "emotional" theme; or emphasized objective and physical dimensions of vehicles, tagging these ads with the overall "physical" theme. Emotional appeals are substantially more common in unique auto ads than appeals based on the physical attributes of vehicles. A comparison to another common feature of auto advertising—price/sales promotions—contextualizes the prevalence of the aggregate emotional and physical themes: both are more likely in unique ads than promotions; see Figure E.2.



The report focuses closely on the themes of fuel economy/green, performance, and safety, breaking down ads with these themes by the vehicle type promoted, brand, and parent company. The fuel economy/green theme is most prevalent in ads from 2012, the year in the sample characterized by poor economic conditions and high gas prices. Indeed, the percentage of ads featuring fuel/economy green in 2012 (30%) is twice the percentage in 2015 (15%), more than three times the percentage in 2005 (9%), and more than four times the percentage in 2017 (7%). 2012 is also the year wherein the gap between the percentage of ads containing fuel economy/green references and those containing themes of performance, physicality, and emotive themes is smallest, suggesting that fuel economy/green gained ground on these themes in that year. However, the gaps are still large: In 2012, performance was featured in 15% more ads than fuel economy/green, physical in 38% more, and emotional in 67% more.

Ads for pickups and SUVs appear most likely to promote fuel economy/green, while ads for sports cars appear least likely. Ford appears most likely to emphasize fuel economy/green in ads, while Nissan appears least likely. Figure E.3. displays the prevalence of fuel economy/green of the 10 parent companies with greatest representation in the 4% dataset.



Performance is one of the top themes among sampled vehicle ads. Although its prevalence declines slightly across the period examined, falling from 50% in 2005 to 40% in 2018, statistical testing (χ^2 test) suggests that this difference could be due to chance. Pickups and sports car ads appear most likely to emphasize performance, while cars and minivans appear least likely. Honda appears one of the least likely brands/parent companies to emphasize performance in its unique ads.

Turning to safety, this theme is about equally prevalent to fuel economy/green, found in 15% of ads in the 4% sample. Safety promotion is most common in ads for SUVs (including luxury SUVs) and, in the all years sample, minivans. Ads for pickup trucks and sports cars are least likely to emphasize safety. Although safety advertising is 6-8% lower in 2012 than in other years analyzed, statistical testing (χ^2 test) suggests that this difference could be due to chance. Volkswagen, Hyundai, and Toyota appear most likely to emphasize safety in ads, while Nissan appears least likely.

In conclusion, auto ads vary in their emphases by brand, vehicle type, and year. Across all years considered (2005, 2012, 2015, and 2017), the relative incidence of emotive and physical themes remain several times that of safety and fuel economy/green. Performance and sales/incentive themes are also highly prevalent, found in nearly 50% of all ads on average. Auto advertisers appear to prioritize appealing to consumers' emotions, give lesser but still strong emphasis to providing information about physical attributes of vehicles, and then promote vehicle performance and sales/deals in equal but still lesser measure.

1. Introduction

Researchers analyzed 513-627 ads for light-duty vehicles in the United States released in 2005, 2012, 2015, and 2017.² Ad platforms included digital video, internet, press (newspaper and magazine), and television. The ads represent a 4-5% sample of a population of 12,528 ads collected by a media monitoring company. This report calculates descriptive statistics for that larger population, presents analysis of the 4-5% sample, and (in the Appendix) briefly describes results of a secondary automated content analysis of textual summaries of ads. That automated analysis identifies the same broad themes as the manual analysis with generally similar frequency ordering, suggesting that the trends identified in the manual analysis are consistent with those in the population of 12,528 and vice-versa. The research sought to answer three questions:

- 1. What are the most common themes in auto ads in the United States?
- 2. What is the relative attention given by auto ads to safety, vehicle performance, and fuel economy?
- 3. What is the relative emphasis placed by auto ads on emotional appeals vs. promotion of physical features vs. promotion of sales?

These questions are important on multiple levels. First, there has been relatively little investigation of the contents of U.S. auto advertising, with an eye to how the messaging therein might be influencing consumers. The last comprehensive assessment was published in 2003 (Ferguson et al. 2003). This is despite the fact that the U.S. auto industry invests heavily in advertising, spending nearly \$14 billion per year between 2008 and 2014. The auto industry spends heftily to communicate and influence consumers—this report will explore what is being communicated.

Advertising can have a range of goals and/or outcomes, including informing a consumer about a product, encouraging positive views on the product, developing a desire to purchase the product, and facilitating actual purchase (Lavidge and Steiner 1961). Some experts suggest that in advertising for consumer light-duty vehicles, emotive appeals—wherein ads seek to convince consumers that a vehicle purchase is actually about obtaining a desirable set of emotions or experiences or a way of life—are common (Bayley 2009; Heffner et al. 2007; Stokes and Hallett 1992). This report examines this proposition while seeking more generally to understand what automakers are emphasizing to consumers.

Second, investigating the contents of U.S. advertising over the period on which this report focuses—2005 through 2017—is particularly important because the U.S. auto industry grappled with significant challenges and changes over this period. Major automakers accepted federal bailout monies during a recession that was the nation's longest economic downturn since World War II (Rich 2013). The industry also grappled with a changing regulatory landscape, in particular the tightening of Corporate Fuel Economy (CAFE) standards under Presidents George W. Bush and Barack Obama. It is worth assessing how the messaging produced by the auto industry reflects the status of the industry and its engagement with consumers. Did advertising messaging change during

² The sample of 627 (5% of the population) is used in analyses by vehicle category and the sample of 513 (4%) is used in other analyses. After stratified random sampling was used to produce the latter, some vehicle categories had fewer ads than was desirable for statistical analysis. Additional ads were selected in these categories, also via stratified random sampling, such that no vehicle category had fewer than 50 ads. This resulted in the 5% sample. Because the 5% sample over-represents certain vehicle types, it is used only for analysis of vehicle types.

the Great Recession and its aftermath in ways that address the economic difficulties consumers were experiencing? Do automakers, faced with more stringent fuel economy and greenhouse gas standards that presumably reflect a societal priority on efficiency and/or reduction of carbon emissions, signal their embrace of that priority by emphasizing fuel economy or eco-awareness in their advertising?

The analysis answers these questions by demonstrating that:

- 1. Emotional appeals of a variety of types are by far the most prevalent theme in auto ads in the years examined. These ads also frequently highlight vehicle performance and sales/incentive promotions of many types (e.g., bonus cash, low APR, sale events).
- 2. Themes related to vehicle performance are approximately three times more common in auto ads than themes related to safety or fuel economy/green. On average, themes of safety and fuel economy/green are present with roughly the same lower frequency.
- 3. Emotional appeals are substantially more common in auto ads than appeals based on the physical attributes of vehicles. Both emotional and physical appeals are more likely than appeals based on sales/promotions.

2. Data and Basic Trends

The years for analysis were selected to examine auto advertising given different settings on two potentially salient variables: health of the national economy and gas prices (cost for vehicle fuel at the pump). In 2005, 2015, and 2017, the United States had a relatively robust economy. Unemployment was 5.30% in 2005, 5.70% in 2015, and 4.80% in 2017. Economic struggles associated with the Great Recession dominated in 2012, when unemployment rose to 8.30% (U.S. BLS 2018). Gas prices were relatively low in 2005 (\$2.27/gallon on average), medium in 2015 (\$2.43/gal) and 2017 (\$2.42/gal), and high in 2012 (\$3.62/gal) (U.S. EIA 2018).

Advertisements were obtained from the media monitoring company Ebiquity (EBQ). EBQ collects unique ads published in high-circulation media outlets and associated with paid advertising efforts. In the United States, the company monitors advertising in 81 print publications (e.g., *Entertainment Weekly, Bloomberg Businessweek*), 8 major TV stations (e.g., ABC, NBC), 86 websites (e.g., aol.com, autotrader.com), and 4 digital video sites (e.g., YouTube News, YouTube VEVO). EBQ aims to cover major national daily newspapers and key magazines covering office technology, cars, finance, and women's/men's interests.

Below are basic trends in the dataset containing all 12,528 ads.

2A. Vehicle Type Trends

- Cars were promoted most frequently among the ads identified by EBQ (over 37% of ads in the sample), followed at some distance by luxury cars and SUVs (20% and 19% of the EBQ sample, respectively).³
- Cars were promoted more frequently among ads appearing in 2012 and 2015 than in 2005 or 2017, registering approximately an 8.5% increase between 2005 and 2012, and a 10% decrease between 2015 and 2017. A χ^2 test suggests that this unequal distribution of unique car ads across years is unlikely to be due to random chance ($p \le 0.00$).

³ Hereafter, most percentages are rounded to the nearest whole number.

- Unique advertisements for pickups, SUVs, and minivans were less common in 2012 and 2015 than other years; this trend was statistically significant (p≤0.00, χ²). These trends may reflect the Great Recession and recovery, combined with the relatively high average cost of these vehicles.
- Except for a dip in 2012, the incidence of unique ads promoting SUVs appears to be increasing, rising by about 6% between 2005 and 2017. This trend is statistically significant (p≤0.00, difference-of-proportions test between noted years).
- Unique advertising for plug-in/electric vehicles increased from 0% in 2005 to 1.41% in 2017; this unequal distribution across years is unlikely to be due to random chance (p≤0.00, χ²).⁴

Brand and Parent Company Trends

In the full population of ads provided by EBQ, ads promoting cars are most common, following at some distance by ads for luxury cars and SUVs. In 2017, these trends change slightly (see Figure 2). Car ads are still most prevalent. However, SUVs rather than luxury cars are second in prevalence;



luxury cars are third.

⁴ The year-by-year plug-in/electric vehicle advertising numbers are displayed in a graph in the Appendix.



2B. Vehicle Brand and Parent Company Trends

When examining the population of ads by brand, Chevrolet has the greatest total number of such ads, comprising over 9% of the population (see Figure 3). Toyota has over 8% of all ads while Ford and Honda are the only other brands exceeding 5%. In 2017, the ordering of top brands remains similar, with Honda overtaking Ford for third-most advertisements. No other brands exceeded 5% of the corpus of 2017 ads, but Jeep and Ram increasing their exposure and Hyundai registers a significant drop. There are 66 brands in the total corpus of advertisements across all years but only 40-47 brands with ads in any particular year. Within the study period, some brands ended production (e.g., Pontiac) while others began (e.g., Tesla). It follows that a brand's unique ads as a percentage of all such ads in a particular year (specifically 2017, Figure 4), will generally be higher than a brand's unique ads as a percentage of such ads for all brands across all four years (Figure 3).





Figure 5 presents the frequency of the parent companies in the dataset. Methodological choices made regarding parent company categorizations are described in the Appendix. The field is clearly led by General Motors (21.5% of all ads in the population provided by EBQ), followed after a nearly ten-point drop by Toyota (12.6%), Fiat Chrysler (approximately 12%), and Ford (10.6%). The top three advertisers remain the same in 2017 (Figure 6), but Ford and Honda, fourth and fifth respectively in the overall population, switch rankings in 2017.





2C. Manual Sample

In Figure 7, ads in the 5% manually analyzed sample are displayed by parent company and vehicle type. General Motors had the greatest number of ads in the sample, totaling almost one-fifth of all ads. Fiat Chrysler, Toyota, Ford, and Honda round out the top five parent companies in terms of total ads sampled. Cars are most frequently promoted in ads for 6 of the top 10 parent companies. Toyota had the most unique ads for cars, with 30, followed by General Motors with 28. Three of the remaining four parent companies (BMW, Daimler AG, and Volkswagen) are dominated by unique ads for their luxury car brands (BMW, Mercedes-Benz, and Audi, respectively). Fiat Chrysler's ads are dominated by their SUV and minivan vehicles, like Jeeps and Chrysler minivans, but feature a large number of such ads for their car and pickup categories as well. Sports cars and luxury SUVs are the least-represented vehicle types in the sample, with the largest shares of ads in these categories featuring Ford's Mustang and Toyota's Lexus SUV models, respectively.



3. Past Research

A literature review was used to understand the state of research on themes in auto advertising. Thirteen articles were identified after a search that excluded studies exclusively about motorcycle advertising, or which analyzed auto ads as part of a larger project considering content across a range of types of ads. Most of the articles analyzed the contents of auto ads released outside the United States. Table A4 (in the Appendix) describes the 13 articles. In sum:

- Performance is regularly one of the most prevalent themes in auto advertising (Bristow 2002; Ferguson et al. 2003; Sheehan et al. 2006; Watson et al. 2010). Its incidence can be affected by codes of practice or other governance measures (Schonfeld et al. 2005; Sheehan et al. 2006).
- Emotional appeals are very frequent in auto advertising (Bayley et al. 2009), as are themes related to sales, incentives, and promotions (Bristow 2002; Ferguson et al. 2003; Sheehan et al. 2006).
- Ads are generally less likely to feature safety than performance, sales, or some types of emotional appeals (Bristow 2002; Ferguson et al. 2003; Sheehan et al. 2006; Watson et al. 2010; Wilson et al. 2007). The incidence of safety advertising can be shifted via governance measures (Burns and Lynch 2003).
- Ads advertising fuel efficiency and/or low emissions appear relatively rare (Wilson et al. 2008).

4. Themes Developed and Used in Present Analysis

The themes identified in the ads are described below. In the 4-5% manual analyses which provide this project's primary findings, an ad was associated with a theme when a human coder identified the theme upon viewing/reading the ad. Themes are associated with ads in a binary manner; an ad took a 1 for a theme when the theme was present, and 0 otherwise. Themes are not mutually exclusive; on average, an ad contained 3.19 themes (σ =1.54). Since this approach is binary, it does not distinguish between ads that contained multiple theme-associated words or images versus those that contained one. Table 1 summarizes each theme briefly. The methodology for theme identification, as well as a more comprehensive description of themes, are provided in Appendix Table A3.

Table 1. Themes and Descriptions			
Primary Theme	Description		
Comfort/Convenience	The vehicle interior is described or specifically depicted as		
	spacious, well-appointed, accessible, convenient, and/or		
	comfortable.		
Fuel Economy/Green	The ad references fuel economy, efficiency, MPG, or related		
	themes. The ads may reference efficiency pursued for the sake of		
	the environment or environmentally friendly options.		
Luxury	The ad contains language and images associated with luxury,		
	wealth, and/or the good life.		
Other Emotion	The ad includes words or images intended to evoke emotional		
	responses across a variety of dimensions that are not captured in		
	other categories.		
Passenger/Cargo Capacity	The ad references or exhibits features that allow it to seat or		
	contain more than other vehicles.		
Performance	The ad promotes performance along one or more of a variety of		
	dimensions: speed, power, offroad, acceleration, aerodynamics,		
	hauling, maneuverability, traction, and other.		
Quality	The ad uses language or images associated with quality, and/or		
	demonstrates people being impressed by the quality of the ride		
	or their experience in purchasing or driving.		
Reliability/Durability	The ad suggests that the vehicle is reliable or durable.		

Safety	The ad discusses or displays features that could prevent an			
	accident or protect a driver or passenger in a crash, or uses			
	language generally associated with safety.			
Sales/Price	The ad promotes vehicle price, sales, deals/offers, and value.			
Aggregate Themes	Description			
Aggregate Themes Emotional	Description The ad references attributes of vehicles that are perceptual,			
Aggregate Themes Emotional	Description The ad references attributes of vehicles that are perceptual, subjective, and/or personal.			
Aggregate Themes Emotional Physical	Description The ad references attributes of vehicles that are perceptual, subjective, and/or personal. The ad references attributes of vehicles that are objective and			

5. Thematic Analysis Results

This section discusses overall themes identified in the ads and focuses on the themes of fuel economy/green, performance, and safety. Overall thematic analyses use the 4% sample constituting 513 ads. Analyses of themes by vehicle type use a 5% sample of 627 ads; both samples are described in the Appendix.

In the analyses of prevalence of themes of fuel economy/green, performance, and safety, the themes are analyzed across 10 parent companies with the largest number of ads in the 4% sample and the population of 12,528 unique ads: BMW, Daimler AG, Fiat Chrysler, Ford, General Motors, Honda, Hyundai, Nissan, Toyota, and Volkswagen. Themes are also analyzed across 17 brands with the greatest representation in the 4% sample and the 12,528 population: Audi, BMW, Buick, Cadillac, Chevrolet, Dodge, Ford, Honda, Hyundai, Jeep, Kia, Lexus, Lincoln, Mercedes-Benz, Nissan, Toyota, and Volkswagen.

Since data are analyzed across four years, inter-year differences are sometimes discussed. However, the focus is generally the overall (all years) sample, as this maximizes use of the data. When possible (given sufficient sample sizes), results from 2017 are highlighted because they characterize present and potentially future conditions.

5A. Themes Overall

Appeals to emotion are more frequent than any other thematic element in the vehicle ads evaluated. Indeed, the number of ads categorized as featuring an emotional appeal is more than twice the number associated with the second-ranked theme; see Figure 8. After emotional appeals, ads emphasizing performance and those containing sales/price promotions jockey for second versus third-most common themes.

At the other end of the spectrum, the reliability/durability theme is the least common in the overall sample. Across the four years considered, it never ranks higher than eighth out of 10. The themes of luxury and passenger/cargo capacity are eighth- and ninth-most common in the overall sample. In year-by-year analysis, neither ever ranks higher than fifth. Themes of quality, safety, fuel economy/green, and comfort/convenience occupy the middle ground, generally neither the most nor least prevalent.

Emotional, perceptual, and subjective dimensions of vehicle advertising are aggregated in an aggregate emotional theme; physical and objective dimensions are grouped into a physical theme. Overall and in all four years, a substantially larger number of ads feature the emotional theme than

the physical one (see Figure 9). In both 2017 and overall, the emotional theme leads the physical theme by more than 30 percentage points. The sales/price promotion theme is displayed alongside these aggregate themes to show its relative importance. This theme is less prevalent than the emotional or physical theme, both overall and in 2017.





In the overall sample, luxury cars (99% of sampled ads) and minivans and sports cars (96% of sampled ads) have the greatest prevalence of ads with emotional appeals; see Figure 10. Pickups (86% of sampled ads) and minivans (84%) have the greatest prevalence of the physical theme, while sports cars (54%) and cars (55%) are least likely to promote physical attributes. The greatest gap between emotional-physical theme presence occurs for sports cars (42 percentage point gap between emotional and physical theme presence, where 96% of ads have emotional appeals and 54% feature physical attributes), and cars and luxury cars (both with a 38 point gap). The slimmest margin between emotional and physical occurs for pickups (10 percentage points) and minivans (12 points).



→ <u>Key Points</u>

- Most ads contain emotional appeals.
- A substantially smaller number emphasize vehicle physical attributes.
- Sales/price promotions are less frequent than physical or emotional appeals across all years and vehicle categories.
- Ads for pickups and minivans appear most likely to emphasize physical features, while sports car ads appear least likely.
- Emotional appeals, performance, and sales/promotions are the most prevalent themes in the sample of ads. Reliability/durability, luxury, and passenger/cargo capacity are the least prevalent.

5B. Fuel Economy/Green

Fifteen percent of the ads in the sample feature the fuel economy/green theme. This theme was most prevalent in 2012, appearing in 30% of the unique ads sampled that year. This theme is less common in other years, appearing in 9% of unique ads in 2005, 15% in 2012, and 7% in 2017. A χ^2 test suggests that the unequal distribution of this theme across years did not occur by chance

 $(p \le 0.00)$, i.e., a systematic process likely explains it. It is notable that this spike in fuel economy/green promotions occurs in the year in the sample with poorest economic statistics and highest gas prices.

Among the 10 primary themes analyzed, fuel economy/green ranks sixth, appearing in 15% of all sampled ads. It appears more frequently than themes of comfort/convenience, luxury, passenger/cargo capacity, and reliability/durability. It is less common than emotional appeals, sales/price promotions, and themes of performance and quality. It is nearly equivalent in frequency to the theme of safety. However, in 2017, fuel economy/green falls to the 10th most common theme.

Ads for particular vehicle categories feature fuel economy/green at somewhat different frequencies. Pickup ads lead the pack, with 23.53% of the sampled ads containing the fuel economy/green theme. SUV ads closely follow at 19%; see Figure 11. Sixteen percent of sampled car ads contain the



fuel economy/green theme, followed by minivans (10% of ads), luxury cars and luxury SUVs (9%), and sports cars (6%). Although Figure 11 shows similar calculations for 2017, they are not particularly meaningful because only 5-7% of any of that year's ads (depending on the sample) contain this theme.

Among the 10 parent companies considered, those whose ads employ the fuel economy/green theme most frequently are Ford (approximately 29% of this parent company's sampled ads), Fiat Chrysler (25%), and

Toyota (20%); see Figure 12. Those employing the theme least frequently are General Motors (8% of GM's sampled ads), Honda (7.5%), and Nissan (3%).

Among the 17 brands considered, those whose ads employ the fuel economy/green theme most frequently are Ford (34% of this brand's sampled ads), Dodge (nearly 28%), and Lexus (approximately 26%); see Figure 13. Those employing the theme least frequently are Audi (5.56% of this brand's sampled ads), Nissan (4%), and Cadillac (0).



Finally, it is important to note that the fuel economy/green theme contains references to ecofriendliness and greenness that are not necessarily tied to specific, physical features of a vehicle that deliver fuel economy. If the data were restricted to only such features, this theme likely would be less prevalent.



→ <u>Key Points</u>

- The fuel economy/green theme is most prevalent in ads from 2012, the year in the sample characterized by poor economic conditions and high gas prices.
- Overall, fuel economy/green falls roughly in the middle of 10 content themes ordered by prevalence, though it ranked 10th out of 10 in 2017.
- Ads for pickups and SUVs appear most likely to promote fuel economy/green.
- Ads by parent company Ford appear most likely to emphasize fuel economy/green, while ads by Nissan appear least likely.

5C. Performance

Forty-five percent of all ads in the sample feature the performance theme. Ads referencing performance were most common in 2005, when this theme appeared in approximately 50% of sampled ads. This theme declined in frequency across the three subsequent years studied, reaching 40% of the sample in 2017. However, a χ^2 test suggests that this trend is not statistically significant.

Among the 10 primary themes, performance ranks second in prevalence. Only emotional appeals are more common in the sampled ads than performance, though performance is followed closely in frequency by sales/price promotions (44%). In 2017 the ordering of these themes flips such that sales/price ranks second and performance third.

Pickup ads employ performance themes much more frequently than ads for other vehicle types, using this theme in 74.51% of all sampled ads; see Figure 14. Performance is second-most common in sports car advertisements (50%), followed closely by luxury cars, luxury SUVs, and SUVs, with



prevalence values all within less than 3 percentage points of one another. The performance theme is less common in car ads (found in 37%) and much less common in ads for minivans (approximately 14%). In 2017, pickups and sports cars again lead the pack for performance promotion, with luxury cars having the thirdstrongest representation on this theme that year.



Among the 10 parent companies, those whose new ads employ the performance theme most frequently are Fiat Chrysler (68% of this parent company's sampled ads), Daimler AG (61%), and BMW (59%): see

ads), Daimler AG (61%), and BMW (59%); see Figure 15. Those employing the theme least frequently are General Motors and Toyota, both using performance in 36% of sampled ads, and Honda (22.50%).



Among the 17 brands considered, those whose ads employ the performance theme most frequently are Dodge (78% of this brand's sampled ads), Jeep (71%), and Mercedes-Benz (65%); see Figure 16. Those employing the theme least frequently are Hyundai (26% of this brand's sampled ads), Buick (23%), and Honda (17%).

→ <u>Key Points</u>

- Performance is one of the top themes among sampled vehicle ads.
- Pickups and sports car ads appear most likely to emphasize performance in ads, while cars and minivans appear least likely.
- Honda appears to be one of the least likely brands/parent companies to emphasize performance in its ads.

5D. Safety

15.59% of the ads in the sample contain the safety theme. In 2005, 2015, and 2017, the prevalence values for this theme are within 2 percentage points of one another, ranging from approximately 16% to 18%. Safety-themed ads were somewhat less common in 2012, when they constituted roughly 10% of sampled ads. This varied distribution across years is not, however, statistically significant (χ^2 test).

Among the 10 primary themes analyzed, safety ranks fifth. It appears more frequently than themes of comfort/convenience, luxury, passenger/cargo capacity, and reliability/durability. It is less common than emotional appeals, sales/price promotions, and themes of performance and quality. It is marginally more prevalent than the fuel economy/green theme, ranked sixth. Safety also ranks fifth among the 10 themes in 2017, found in 17.56% of ads sampled that year.

In the overall sample, minivans are the vehicle type most likely to be promoted with a safety-themed ad, with 28% of minivan ads featuring this theme; see Figure 17. SUV ads also rank highly, with safety featured in approximately 26% of those sampled. All other vehicle types have prevalence values 10 or more percentage points lower than the SUV value. The vehicle types with the fewest



safety-themed ads are sports cars (theme appearing in 6% of sampled ads) and pickups (nearly 4%). In 2017 there are (anomalously) no sampled minivan ads that feature safety. In that year, SUV ads have the greatest prevalence of safety themes, followed by luxury SUVs.



Among the 10 parent companies considered, those whose ads employ the safety theme most frequently are Volkswagen and Hyundai (each featuring safety in roughly 26% of their sampled ads) and Toyota (25%); see Figure 18. Those employing this theme least are Nissan (3% of sampled ads) and Fiat Chrysler (1.47%).



Among the 17 brands, those whose ads employ the safety theme most frequently are Volkswagen (roughly 36% of sampled ads for this parent company) and Toyota (roughly 34%), with Honda (roughly 27%) and Hyundai (roughly 26%) directly below them; see Figure 19. Those brands employing the theme least frequently are Jeep and Cadillac, both of which had no safetythemed ads in the sample, and Nissan (roughly 4%).

- → <u>Key Points</u>
 - Safety falls roughly in the middle of 10 ad content themes ordered by prevalence. It is similar in prevalence to the fuel economy/green theme.
 - Minivans and SUVs appear most likely to have ads emphasizing safety, while pickup and sports car ads appear least likely.
 - The parent companies Volkswagen, Hyundai, and Toyota appear most likely to feature safety in ads, while Nissan and Fiat Chrysler appear least likely.

5E. Additional Thematic Analyses

In the Appendix, graphs of all themes by brand, parent company, and vehicle type are displayed.

6. Automaker Advertising and Sales

Vehicle advertising is a major industry in the United States. Over the period 2008-2014, automotive dealers spent an average of \$5.46 billion a year on advertising. The automotive sector overall spent



an average of \$13.75 billion per year over the same period. Among the top 10 largest advertisers in the United States in 2016, two—Ford and General Motors—are auto companies; see Figure 20.





Some companies engage in more advertising than others. While the EBQ data does not speak to frequency of advertising directly, because EBQ collects unique ads released in the United States but not all ads (i.e., duplicates/re-released/re-aired ads), this analysis proceeds on the assumption that an automaker's extent of unique advertising, as tracked by EBQ, could be reasonably expected to be proportional to its volume of advertising overall. To explore advertising choices, a ratio was created of number of unique ads released in 2017 by brand to the brand's market share in 2017, using selected brand data from goodcarbadcar.net.

Companies with large values in Figure 23 had a large number of ads relative to their market share in 2017. Companies with low values had low numbers of ads relative to their market share. Volkswagen, General Motors, and Fiat Chrysler/Chrysler have the largest advertising-market share ratios, while Nissan/Mitsubishi, Ford, and Subaru have the smallest.



Conclusion

This analysis demonstrates that unique ads for light-duty vehicles released in the United States in 2005, 2012, 2015, and 2017 rely heavily on emotion when appealing to consumers; 97% of the sample's ads contained an emotional theme. Auto ads also emphasize physical attributes of vehicles at a lower but still robust rate; nearly 65% of the sampled ads contained these theme.

The overarching physical and emotional themes were disaggregated into ten more nuanced categories. This analysis indicates that the most common themes in vehicle advertising during the study period focus on emotion (95% of sampled ads), performance (45%), and sales (44%). These findings align with most of the literature on thematic content of auto ads, the majority of which has focused on advertising outside the United States. The less prevalent themes identified in this analysis are, in order: Quality (23% of sampled ads), safety (16%), fuel economy/green (15%), comfort/convenience (15%), luxury (13%), passenger/cargo capacity (10%), and reliability/durability (9%).

It is notable that fuel economy/green ranks sixth out of the ten themes. There has been little focused study of the extent to which auto ads emphasize fuel efficiency/greenness. Wilson and coauthors (2008) are an exception. Their analysis of auto ads in New Zealand in the early 2000s found a substantially lower prevalence of fuel economy/eco promotion than is shown in the present analysis. Although this report does not find a significant upward trend in the incidence of fuel economy/green ads in the United States between 2005 and 2017, it may be that there is more advertising on this theme than at the start of this century, even as its emphasis remains low relative to other attributes. Automakers appear to have promoted fuel economy/greenness in more ads during times of economic duress and high gas prices, as demonstrated by the statistically significant uptick in fuel economy/green advertising in this analysis in 2012.

Vehicle types, brands, and parent companies often exhibit patterned behaviors with respect to advertising. For example, ads for pickup trucks appear particularly likely to emphasize physical features and fuel economy/greenness and less likely to emphasize safety. Ads for minivans appear especially likely to emphasize physical features and safety and especially unlikely to emphasize performance. Ads for sports cars appear particularly likely to use emotional appeals and emphasize performance, and particularly unlikely to emphasize fuel economy/greenness or safety. Ford appears particularly likely to focus on fuel economy/greenness; Volkswagen, Hyundai, and Toyota appear particularly likely emphasize safety.

In conclusion, auto ads vary in their emphases by brand, vehicle type, and year. Across all years considered (2005, 2012, 2015, and 2017), the relative incidence of emotive and physical themes remain several times that of safety and fuel economy/green. Performance and sales/incentive themes are also highly prevalent, found in nearly half of all sampled ads on average. Auto advertisers appear to prioritize appealing to consumers' emotions, give lesser but still strong emphasis to providing information about physical attributes of vehicles, and then promote vehicle performance and sales/deals in equal but still lesser measure.

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Methods Appendix

A1. Data Provided by EBQ

EBQ provided records for 12,591 digital video, internet, press (newspaper and magazine), and TV ads circulated in the United States in 2005, 2012, 2015, and 2017. EBQ collects unique ads published in high-circulation media outlets and associated with paid advertising efforts. In the United States, the company monitors advertising in 81 print publications (e.g., *Entertainment Weekly, Bloomberg Business Week*), 8 TV stations (e.g., ABC, NBC), 86 websites (e.g., aol.com, autotrader.com), and 4 digital video sites (e.g., YouTube News and YouTube VEVO). EBQ aims to cover major national daily newspapers and key magazines covering office technology, cars, finance, and women's/men's interests.

After consultation with Consumers Union, ads for vehicle brands that are not sold in the U.S. lightduty market and/or are exclusively associated with motorhomes or motorcycles were removed, resulting in a sample of 12,528. These ads were associated with 66 different brands (e.g., Toyota). All those brands with five or fewer ads were categorized as "other," leaving 47 brands that engaged in a non-trivial level of advertising.

The data provided by EBQ documented 17 different categories of vehicles (e.g., subcompact, compact). The International Council on Clean Transportation (ICCT) categorized these into 11 categories: sports car, luxury car, plug-in/electric, car, SUV, luxury SUV, minivan, pickup, corporate range, other luxury, and NA. 12,097 of the 12,528 ads (approximately 96.56%) promoted vehicles in these categories. For ease of analysis, and based on consultation with Consumers Union, vehicles were further aggregated into: car, luxury car, luxury SUV and other luxury, pickup, plug-in/electric, SUV, minivan, and sports car. The distribution of ads across vehicle category and year are in Table A1.

Table A1. Unique Ads by Vehicle Type and Year: Number and (Percent of Annual Ad							
Total)	Total)						
	2005	2012	2015	2017	Total		
Car	1347	1088	1014	1126	4575		
	(37.09%)	(45.60%)	(41.07%)	(31.19%)	(37.82%)		
Luxury Car	751	507	499	636	2393		
-	(20.68%)	(21.25%)	(20.21%)	(17.62%)	(19.78%)		

Luxury SUV,	391	173	224	390	1178
Other Luxury	(10.08%)	(7.19%)	(8.93%)	(10.43%)	(9.40%)
Minivan	84	29	38	82	233
	(2.31%)	(1.22%)	(1.54%)	(2.27%)	(1.93%)
Pickup	365	158	148	371	1042
_	(10.05%)	(6.62%)	(5.99%)	(10.28%)	(8.61%)
Plug-in/Electric	0	21	4	51	76
	(0.00%)	(0.88%)	(0.16%)	(1.41%)	(0.63%)
Sports cars	60	99	81	107	347
	(1.65%)	(4.15%)	(3.28%)	(2.96%)	(2.87%)
SUV	632	311	461	847	2251
	(17.40%)	(13.03%)	(18.67%)	(23.46%)	(18.61%)
Total	3632	2386	2469	3610	12097
	(30.02%)	(19.72%)	(20.41%)	(29.84%)	(100%)

Note: The numerator in these calculations is the number of ads in a vehicle category in a year (or in all years, in the final column) and the denominator is the number of ads in that year. We include in the denominator, but do not present, data for 433 vehicles with blank, N/A, or "corporate/range" assigned as their vehicle type.

A2. Parent Company Categorizations

Automobile brands were grouped by parent company as of March 2018. Changes to brand parent companies took place in the study period, but current ownership situations are displayed for ease of analysis. For example, all Volvo advertisements are classified into the Geely parent company even though there are ads from 2005, when Volvo was a subsidiary of Ford Motor Company. The same is true for all Chrysler brands, currently part of Fiat Chrysler Automobiles. Chrysler, Jeep, and Dodge were under parent DaimlerChrysler during the 2005 study period and Chrysler Group LLC during 2012. Fiat Chrysler Automobiles has been the parent company since 2014.

The one exception to the current parent company approach involves advertisements listed under the DaimlerChrysler brand. These ads have been categorized into the DaimlerChrysler parent company despite the fact that this parent company no longer exists. The six ads with this brand tag appeared in 2005 and primarily promoted the entire group of brands for corporate fleet vehicles, rather than a particular Chrysler brand.

A3. Manual Analysis Methods

A3A. Sample Selection

In most of the manual analysis, a sample of approximately 4% of the corpus of ads is used. For analyses by vehicle type, a larger sample of approximately 5% is used. These percentages were selected to balance the twin goals of generating a sample larger enough for statistical inference but small enough to be analyzed by a small team of coders over a few months.

To construct the 4% sample, this analysis arrayed the 12,528 ads by vehicle type, calculated 4% of vehicles in each vehicle type (e.g., the number constituting 4% of all pickup-featuring ads), and rounded to the nearest whole number. Dividing the number of ads in each category by four generated a roughly equal number of ads to analyze in each of the four years. Dividing each of these values by four again generated a roughly equal number of ads per year per each of the four media types. After each step, values were rounded to the nearest whole number (whole ad). Once the

number of ads in each year x media type category was selected, ads were randomly selected within these categories.

Digital video sampling is a caveat. Since there is a relatively small number of digital videos (215 in the entire dataset), and a large majority of these (210) are in 2015 and 2017, for some vehicle types it was not possible to find a sufficient number of digital videos per year. In these cases, satisfying the quantity goal was prioritized rather than the distributional goal; for example, all four digital video ads for minivans are from 2017.

Table A2 summarizes basic statistics of the 4% sample of ads used in the manual analysis on which the primary findings are based.

	2005	2012	2015	2017	Total
Car	45	44	44	44	177
	(36.59%)	(36.07%)	(35.20%)	(34.65%)	(35.61%)
Luxury Car	24	24	24	24	96
	(19.51%)	(19.67%)	(19.20%)	(18.90%)	(19.32%)
Luxury SUV,	15	15	15	13	58
Other Luxury	(12.20%)	(12.30%)	(12.00%)	(10.24%)	(11.67%)
Minivan	3	3	2	5	13
	(2.44%)	(2.46%)	(1.60%)	(3.94%)	(2.62%)
Pickup	9	9	12	12	42
	(7.32%)	(7.38%)	(9.60%)	(9.45%)	(8.45%)
Sports cars	3	3	5	5	16
	(2.44%)	(2.46%)	(4.00%)	(3.94%)	(3.22%)
SUV	24	24	23	24	95
	(19.51%)	(19.67%)	(19.40%)	(18.90%)	(19.11%)
Total	123	122	125	127	497
	(25.26%)	(24.55%)	(25.15%)	(25.55%)	(100%)

Note: An additional 16 vehicle ads, 4 per year, were analyzed to bring the total sample to 513. These ads were assigned an "N/A" category by ICCT. The Plug-in/Electric vehicle categories from Table 1 did not contain enough ads to be represented in the 4% sample. The numerator in these calculations is the number of ads in a vehicle category in a year (or in all years, in the final column) and the denominator is the number of ads in that year. Difference-of-proportions tests suggest that differences in vehicle category proportions in the Total columns of Table 1 and Table 2 are small enough to be likely due to random chance ($p \le 0.00$).

The steps noted above resulted in a structured semi-random sample of 513 unique ads; this sample is used in many, but not all, of the manual analyses. Analyses by vehicle type use an additional 114 ads, creating a 5% sample of 627 unique ads. These additional ads were added to vehicle categories where the above-noted process resulted in fewer than 50 ads per category. When this occurred, the analysis used the year x media type-guided random selection approach described above to supplement the category.

It is worth noting that neither sample contains ads for electric or plug-in vehicles, or "corporate/range" ads, because these were not sufficiently numerous in the overall sample to have a quantity larger than zero (rounding to the nearest whole number) in any year x media type cell.

A3B. Coding

Human coders analyzed the textual, visual, and in some cases auditory dimensions of each unique ad, creating binary thematic variables. The coding schema was primarily based on words and phrases found in ads, with the understanding that the visual and auditory instantiations of concepts captured by these words and phrases would also be used as thematic indicators. For example, the words "cows" and "barn" were cues for an ad having the theme of rurality (rurality subsequently was aggregated into the other emotion primary theme and emotional aggregate theme). Visuals of cows and barns constituted cues for rurality. Other visual cues or auditory cues did not have textual analogs; for example, visuals of a car with blurred surroundings and/or blurred edges usually indicated speed, while a voice-over with an upper-class British accent usually indicated luxury or prestige (aggregated into the luxury category). Table A3 describes the themes and the cues used to code ads to them.

Table A3. Themes and Descr	riptions
Primary Theme	Description
Comfort/Convenience	The vehicle interior is described or depicted as spacious and/or well-appointed (e.g., extra legroom, zero-gravity seats); the vehicle is described or depicted as easily accessible (e.g., sliding doors, keyless entry); features are included that can enhance comfort (e.g., climate control); and/or the ad references general themes of comfort and/or convenience.
Fuel Economy/Green	The ad references fuel economy, efficiency, MPG, or related themes. The ads may reference efficiency pursued for the sake of the environment, the environmental friendliness of the vehicle, or eco- options. NOTE: In the text analysis summarized in the Appendix, Fuel Economy excludes environmental references, instead including them in the Other Emotion primary theme and Emotion aggregate theme.
Luxury	The ad contains language and images associated with luxury, wealth, and the good life. Words include "hand-stitched" and "elite"; images include those of people attending a black tie gala or those visually highlighting leather seats.
Other Emotion	The ad includes words or images not captured in other categories and intended to evoke emotional responses across a variety of dimensions. These include references to a vehicle's visual or intangible (i.e., "personality") attractiveness; the newness or innovativeness of the vehicle or its features; awards received by the vehicle or its brand/maker; celebrities or famous people promoting or pictured with the vehicle; charities supported by the brand/maker or its positive community impacts; positively characterized social interactions involving families, family life, friends, social gatherings/engagement, and the people (adults, parents, children, grandparents, etc.) and pets involved therein;

	the customer's experience buying or driving the vehicle,
	including happiness, satisfaction, excitement, and sense of
	freedom or adventure; sexual themes, where a vehicle is
	attractive because it is sexy or suggests that its driver is; exciting
	locations to which the vehicle can be driven (e.g., mountains) and
	activities that can occur there, facilitated by the vehicle (e.g.,
	camping, hiking, stargazing): American patriotism and pride:
	other countries, especially if they are associated with fun or
	excitement (e.g., Italy's Fiat) or craftsmanship (e.g., German
	precision): the proud/storied history/legacy of the vehicle.
	brand, or maker: holidays and seasons and their celebration:
	sports (including autoracing), sports competition, athleticism.
	and parallels between human and vehicle athleticism and
	propensity to win competitions: the advanced technology in or
	tech-sayviness of the vehicle: concern over the environment and
	features of the vehicle or practices of the company that help
	protect or clean it (distinct and/or in addition to references to
	fuel economy): and urban or rural living through images of (for
	example) skyscrapers city streets barns cows in a field and
	similar
Passenger/Cargo Capacity	The ad references or exhibits features that allow it to seat or
assenger, Gargo Gapaerty	contain more than other vehicles such as a crewcab or supercab
	liftoate or tailgate and "6-seat "7-seat" and "8-seat"
Performance	Ads promoted performance along a variety of dimensions which
renomance	we analyzed separately and then aggregate here. These include
	we analyzed separately and then aggregate here. These include
	auickly, blurred surroundings, and words such as "speed" and
	"car chase": hower where add may show a vehicle revying its
	engine or traversing rugged terrain (also an indicator of affrad
	see below) and use words like "mighty" "homi" and "row
	see below) and use words like inighty, field, and faw
	power ; <i>diteletation</i> , where add may show a vehicle accelerating
	rapidly from a starting position of use language such as 0 to
	60"; <i>aerodynamics</i> , where ads may use language such as "sleek" and
	"no drag"; hauling, where ads may show a vehicle towing/hauling
	a large load or use those or related words; <i>maneuverability</i> , where
	the ad may use words such as "nimble" and "agile" or show a
	vehicle making sharp turns or skillfully evading obstacles; <i>traction</i> ,
	where ads address how well the car grips by using words such as
	"traction" and "automatic rear locking differential" or showing
	successful braking under difficult conditions (e.g., ice); offroad,
	where ads may use words such as "AWD" and "all-terrain" or
	show a vehicle driving over open land (no streets, potentially no
	paths); and other performance, where the ads references concepts
	generally associated with performance, such as "hard-working"
	and "protessional grade."
Quality	The ad uses language associated with quality, such as "excellent"
	and "impressive", and/or demonstrates people being impressed

	by the quality of the ride or their experience. Ads also may
	highlight quality engineering or construction through use of
	words such as "craftsmanship" and "engineered" or showcasing
	images of careful construction or design.
Reliability/Durability	The ad suggests that the vehicle is reliable by using language such
	as "dependable" and "daily driver", or indicates durability by
	using words such as "warranty" and "longest-lasting." Images
	may show the vehicle lasting over many years and/or through
	rough conditions, or being there (available) when needed.
Safety	The ad discusses or displays features that could <i>prevent</i> an
-	accident, such as alertness monitoring, antilock brakes, and
	collision warning, or features that could <i>protect</i> a driver or
	passenger in a crash, such as airbags and safety seats. The ad may
	show vehicles avoiding a crash or experiencing minimal damage.
	The ad may use language generally associated with safety, such as
	"safe and sound." or may reassure buyers that the brand/maker
	prioritizes safety.
Sales/Price	The ad promotes vehicle price; discusses low or complimentary
,	maintenance or need for repair; discusses overall car value (e.g.,
	"best buy," "resale value"); uses language associated with deals
	on buying a vehicle, such as "APR" and "financing"; includes
	vehicle trade-in offers; includes sales language, such as "offer"
	and "clearance", or mentions holidays (because holidays are
	typically promoted as times to buy gifts or celebrate by buying a
	vehicle).
Aggregate Themes	Description
Emotional	The ad references attributes of vehicles that are perceptual,
	subjective, interpretable, and/or personal. It encompasses all the
	ads associated above with Other Emotion, as well as those
	associated with the themes of Luxury and Quality. It also
	contains subcomponents of some primary themes with both
	physical and emotional aspects. It encompasses ads for
	performance focused on aerodynamics, speed, and subjective
	assessments of power (e.g., "mighty") and performance
	("professional grade"), as well as ads that reference safety
	generally (e.g., "safe and sound").
Physical	The ad references attributes of vehicles that are objective and
	physical. It encompasses ads associated with the themes of
	Comfort/Convenience, Fuel Economy, Passenger/Cargo
	Capacity, and Reliability/Durability. It also contains
	subcomponents of some primary themes with both physical and
	emotional aspects. It encompasses ads for performance focused
	on power, acceleration, hauling, maneuverability, traction, and
	offroad capability: ads that specifically feature safety features
	Ontoad capability, and that specifically realure safety realures

ads that feature technological amenities for use in the vehicle
cabin, such as 4G LTE.

Intercoder reliability is a central concern of content analyses performed by teams. To establish it, the three researchers on this project created a written codebook wherein each theme and its keywords and visual/auditory cues were documented. This codebook was developed by the team based upon review and extensive discussion of 435 ads selected via stratified random sampling (see Section A4A below for details on this process). The team members completed a standardized coding sheet which contained each thematic option.

After using the assay of 435 to create the initial codebook, a second pilot sample of 50 ads was selected via stratified random sampling, where roughly equal numbers of ads across all four media types and all four years were sought, and then random selection occurred within those parameters. Team members discussed the codes at length and then independently coded the same 16 ads (of the 50). Each pair's coding decisions were compared and discussed (three sets of decisions) in person, and decision rules for marginal or difficult-to-code cues were added to the codebook to improve harmonization. This process was iterated for another 14 ads, for a total of 30 ads mutually coded across two rounds.

In the third round, each team member independently coded the same 20 ads (the remaining 20 in the pilot sample of 50). Intercoder reliability statistics were calculated before the team met to discuss results. Across all three pairs, intercoder agreement—calculated by counting a "win" when each member of the pair chooses 0 or each chooses a 1, and a "loss" when there is a divergence—ranged from 92.40% to 93.70%, with an average of 92.92%. Percent agreement rates of above 90% are generally considered very or sufficiently robust in social science research (Lombard et al. 2002; Neuendorf 2002).

A more rigorous approach involves calculating Cohen's Kappa (K), which statistically accounts for the possibility of agreement occurring by chance. The K statistics for each pair ranged from 0.52 to 0.60, where 0 is the minimum and 1.00 is the maximum; the average was 0.56. A K statistic of 0.40-0.60 indicates moderate agreement, and one above 0.60 indicates good agreement (Altman 1991); moderate agreement or greater is generally considered acceptable for peer-reviewed research. After these statistics were calculated and points of divergence discussed, the codebook was amended with decision rules for a third time. After that point, team members began independently coding ads. During the independent coding of the 627 ads, which took approximately 1.5 months, the team met three times to discuss progress and challenges. Team members also consulted nearly daily via an online chat, with the goal of ensuring harmonization in coding choices.

One potentially significant and promising caveat concerning intercoder reliability is that, at the time the intercoder statistics were calculated, the team was coding across 73 different themes and subthemes. These themes were subsequently aggregated to the 10 primary themes and 2 aggregate themes described in Table A3. Were intercoder statistics calculated based on these 10 or 2, where agreement within the collection of subcomponents (but not necessarily between each specific subcomponent) could count as agreement at the primary/aggregate theme level, intercoder statistics would likely be even higher.

A4. Previous Research

Table A4 summarizes literature that has pursued content analysis of auto ads.

Table A4. Existing Thematic Analyses of Auto Ad Content				
Citation	Research Focus	Vehicle	Analysis	Theme Results
		Types,		
Bayley et al. (2009)	Content and presentation of auto ads to younger demographics (13-16 year olds) in the UK	Sample Collected print ads from 10 top magazines and newspapers, as well as television programs, popular among UK youth; extracted 42 car ads from 2006	Two researchers with ad expertise coded all ads, then press ads additionally coded by two lay persons. All worked independently. Varying level of agreement,	Three main categories: product values, customer values, and other values. All ads had at least one "product values" hit. Customer values strongly represented. Emotive appeals are as or more important than promotion of "hard" features
			highest being 80% between two coders	
Bristow (2002)	Signals being received about vehicles by consumers from TV, newspaper, and magazine advertisements in the UK	129 TV, newspaper, and magazine ads for vehicles recorded between January 2000 and January 2001	Author assessed signals (themes) in each ad	Top signals (themes): finance/affordability, desirability/treasured possession, speed/power/handling (tied), and comfort. Newspapers had more luxury themes; tabloids had more affordability themes. Women's magazines advertised smaller cars; men's covered a wider range (with speed and power being common themes)
Burns and Lynch (2003)	How the National Highway Traffic Safety Administration's 1979 mandated federal auto crash testing program impacted the content of auto ads	Content analysis from 351 vehicle ads published in the magazine <i>Newsweek</i> , 1977-1981	Individual coders; no interrater reliability mentioned	An increase in safety mentions occurred after 1977, particularly among the Big Three automakers, by 1981. However, automakers are reluctant to discuss safety in ads, as they want consumers to

				believe that all cars are engineered for safety
Donovan et al. (2011)	How ads depicting unsafe driving behavior communicate messages to consumers, and how consumer perceptions contrasted with those of the Australian Advertising Standards Board	Selected 3 ads (Ford, Mazda, Jeep) that had received complaints to the Ad Standards Bureau. Each respondent (n=463 14-55 year olds) was randomly assigned 2 of the 3 ads to view	Respondents drawn from a commercial organization's database and surveyed about ad perceptions post-exposure	Consumers generally perceived the ads to be promoting speed and other reckless driving behaviors. Authors conclude that ads may implicitly encourage such behaviors by not portraying them negatively
Ferguson et al. (2003)	Themes in US TV advertising	100 ads each in 1983, 1988, 1993, and 561 in 1998; light- duty vehicles excluding light- duty trucks and SUVs	Five human coders; interrater reliability confirmed	Top themes, by order of frequency: Performance, incentives/sales, economy/value, new/different features, and quality/reliability/durability
McGwin et al. (2006)	Prevalence of safety behaviors in US primetime TV and commercials	One month of commercials in 2005, top 20 primetime programs across 4 networks, 507 ads with transportation scenes out of 21,670 commercials and 79 programs	3 human coders; interrater agreement confirmed	TV programs: 62% of relevant scenes use seatbelts, 47% use motorcycle helmets, 9% use bike helmets. Commercials: 82% of relevant scenes use seatbelts, 100% use motorcycle helmets, and 84% use bike helmets.
Schonfeld et al. (2005)	Changes in content after Australia's code of practice was passed (limiting advertisements of unsafe driving behavior)	Sample taken before code implementation (168 TV ads, 1999-2002) versus after (115 ads, 2004). Also included	3 trained coders; high level of agreement confirmed	Prevalence of themes of performance, exciting/fun, and luxury/prestige decreased after code adoption. Performance theme's prevalence dropped from 56% to 32% after code adoption.

		ads after code revision (97 ads. 2005)		Themes of incentives/sales increased in incidence
Sheehan et al. (2006)	The extent to which the voluntary code of practice and its revision in Australia changed themes and driving practices in auto ads	Randomly selected 444 ads broadcasted on Australian TV between 1999- 2004 (168 pre- code, 175 interim, 101 after 2004 revision)	2 coders developed rules and coded independently after training on 20 ads. (Separate survey component of this research not discussed)	Prevalence of themes of performance, exciting/fun, and luxury/prestige decreased after code adoption. Themes of incentives/sales increased in incidence. (Substantially same findings as Schonfeld study)
Shin et al. (2005)	The extent to which unsafe driving behavior is depicted in North American TV auto ads, as well as the extent to which safety is promoted/disclaimers are mentioned	All available auto ads that were at least 30 seconds long airing on major networks in North America during January and July, 1998- 2002; 250 commercials	Three raters; each ad was viewed by at least two and agreement achieved among at least two	Overall, high prevalence of unsafe driving behavior in North American ads; 45% of ads assessed contained such behaviors. Low prevalence of safety promotion (12% of ads)
Tansey et al. (1990)	Do Brazilian and U.S. advertisers employ different themes in print advertisements?	Unclear how ads were selected, how many, or their source	No interrater reliability mentioned	Urban themes were more prevalent in Brazilian ads, leisure more prevalent in U.S. ads, and work themes equally prevalent in both. Work themes became increasingly prevalent in U.S. ads as the 1970s progressed
Watson et al. (2010)	Prevalence of unsafe/aggressive driving in auto advertising in Canada, and themes more generally	Random sample of 200 print and TV advertisements run/aired in Canada in a one-year period (2006-2007)	Two human coders; interrater reliability confirmed	18% of ads show unsafe/aggressive driving; 25% reference safety. TV ads are more likely than print to show unsafe/aggressive driving and less likely to mention safety. Performance was the most common theme, in 59% of ads. Print ads contain nearly twice as

				many themes focused on power.
Wilson et al. (2007)	Examine content and trends of safety- related consumer information in New Zealand magazine vehicle ads	Hand-selected 541 print ads in two high circulation New Zealand current affairs magazines (2001-2005 issues); only considered SUV and light- duty vehicle ads	One coder; validation study confirmed interrater reliability	Only 27% of analyzed ads contained safety information. Speed and power themes became increasingly frequent over the five-year study period
Wilson et al. (2008)	Examination of the content and trends of greenhouse gas emissions and air pollution-related information in New Zealand vehicle ads	514 ads pertaining to specific models were selected from two of the highest circulating monthly magazine issues (2001-2005). Ads were selected if they took up over a quarter page and referenced a specific vehicle model	One coder; validation study confirmed interrater reliability	Very little advertising for emissions efficiency of vehicles: 3% of ads mention fuel efficiency and 4% mention emissions. These rates do not change significantly over the study period, though reports of engine size became increasingly common over this period

A5. Text Analysis Methods

Automated techniques were used to analyze the text of all of the ad titles, endlines, and descriptions (the "meat" of the ad), as provided by EBQ. The combination of a title, endline, and description constituted the text for any given ad. This content is not based on precise transcription. Essentially, EBQ employees wrote summaries of the key points, themes, scenes, and events in each ad. Those summaries were analyzed. A challenge of this approach is that summaries varied in comprehensiveness. Another is that key aspects of ads as interpreted by EBQ's European employees might not map precisely to American priorities and sensibilities vis-à-vis vehicles and their advertising. These challenges underscore the importance of the manual analysis, and are why this report's findings are based primarily on the manual analysis.

A5A. Coding Schema Development

Initially, coding schema was based on analyses of auto ads completed by Ferguson et al. (2003) and Sheehan et al. (2006), with some modifications that capture trends observed in the EBQ data. This

analysis subsequently aggregated many of these themes into umbrella themes (e.g., the theme performance was previously disaggregated by multiple dimensions of performance, such as speed and power) into umbrella categories specified by Consumers Union. The coding schema was developed in the following steps:

- 1. Researchers reviewed the text of 435 ads selected by stratified random sampling, extracting key words and phrases. (Visual and auditory cues within ads were also discussed at this time and formalized for manual coding.) Each member of the three-person team analyzed 10 randomly selected ads per year (2005, 2012, 2015, 2017) for three of the ad types (press, internet, and television). For the fourth ad type, digital video, no videos were available for 2005 and only five were available for 2012. Each team member analyzed the five available for 2012 and 10 ads each in the final two years. Additional digital video ads from the latter two years were sampled to reach the sample of 435. In addition, any duplicates were replaced via randomly selected ads.
- 2. Because safety is a particular concern for Consumers Union, keywords and phrases were added to the safety theme by consulting web resources such as https://www.usaa.com/inet/wc/advice-auto-safetyfeatures?akredirect=true.
- 3. Researchers sought feedback from Consumers Union on a draft list of the thematic categories and associated keywords, and revised accordingly.
- 4. Ad texts were inputted into the qualitative data analysis program NVivo. The corpus of ads was queried the entire corpus for each keyword previously identified; NVivo identified synonyms as well as stemmed words. The NVivo "hits" were reviewed and the researchers added synonyms and stemmed words to the keyword list as appropriate.
- 5. In the synonym searching process, ads were inspected to identify "stopwords" which indicated an inappropriate or unintended usage of a keyword. For example, when considering a theme heritage/Americana, a keyword was "flag" and stopwords were "racing flag" and "checkered flag." For the theme speed, a keyword was "fast" and a stopword was "fast cut," a descriptor used to describe fast camera movement in digital video and TV ads.
- 6. Additional keywords and stopwords were identified via sampling, as described below.
- 7. Consumers Union reviewed the resulting list of keywords and stopwords and provided final amendments. The Consumers Union-approved list was used in analysis.

A5B. Coding

Textual analysis was performed with a combination of R-based data manipulation and analysis, using the TM package, and Excel function-based analysis. These tools were used to query each ad for keywords and stopwords. Then, for each thematic category, a minimum of 20% of all ads with keywords was sampled to determine if the keywords were used appropriately and whether keywords needed to be added or subtracted from the master list. Similarly, a minimum of 20% of all ads with stopwords was sampled to determine if they were appropriate and whether the stopword list required amendation. The keyword/stopword lists were revised and then analysis was re-run.

At this point, a 1 was assigned in a given thematic category to an ad with one or more relevant keywords, and a 0 in the absence of keywords, except in cases where the ad registered both a keyword and a stopword for a given category. In these cases, each ad was manually inspected to determine if the keyword or stopword was determinative, and a 1 or 0 was assigned to the ad accordingly. Vehicle model names were included as stopwords when these names might have been associated with themes in the coding schema. For example, the Subaru Legacy would have been categorized under the theme heritage/other because "legacy" is a keyword for the heritage/other

theme (subsequently aggregated under the primary theme other emotion and aggregate theme emotion).

A6. Text Analysis Results

Text analysis results are not presented in as much detail as the manual ones because of space limitations, and because the automated textual analysis of ad summaries does not appear to identify themes as comprehensively as manual analysis of ads themselves. This analysis found 1.75 primary themes (σ =1.29) for an average ad in the text analysis, but found an average of 3.19 themes (σ =1.54) per ad in the manual analysis. This difference is statistically significant (p<0.00, difference-of-means test), and reasonably so: manual coders can observe and record visual cues not captured by text-only analysis, and can inspect all dimensions of an ad rather than just the high points described in the EBQ textual ad summaries.

These caveats aside, broadly consistent trends are observed when the results of the text and manual analyses are compared. In the text analysis of all 12,528 unique ads and the 3,738 from 2017, the aggregate emotional theme is more prevalent than the physical theme. It is present in 73% of all ads and in 77% in 2017. The aggregate physical theme is present in 21.56% of all ads and 30% of ads in 2017. As in the analysis of manual ads, ads are more likely to contain emotive appeals than promotions of physical features. In contrast to the manual analysis, sales/price promotions are identified as more prevalent than physical themes in the textual analysis of the overall population and in 2017. This may be the case because sales/price promotions are generally more likely to have textual cues (e.g., "end of season sale" and "0% APR" printed on an ad or flashing onscreen) than some dimensions of physical performance, such as offroad capability (visually signaled by a vehicle adeptly navigating rugged terrain) and maneuverability (visually signaled by a vehicle cornering agilely or swerving to avoid a hazard).

When comparing the rank ordering of themes in the manual analysis sample and the population of textual summaries, a large majority of themes (8 out of 11 when comparing manual and text analyses for overall samples, and 9 out of 11 when comparing in 2017 only) are within 2 ranks of one another. That is, in the manual analysis, sales/price promotions are the third-most common theme in the overall sample (n=513). Sales/price promotions are second-most common in the text population (n=12,528). These themes are within one rank of one another. In the overall sample, the reliability/durability theme ranked 10th in prevalence in the manual analysis, but 7th in prevalence in the text analysis. These themes are within three ranks of one another. Both overall and in 2017 alone, the top four most prevalent themes were the same across the manual and text analyses: other emotion, performance, sales/price, and quality. When these top four themes differed in ordering between the manual versus text analysis, they only varied by one rank.

These results suggest that the textual analysis captured the same broad themes as the manual analysis, but with less granularity.

A7. Advertising Data Notes

The data in Figure 20 are from Kantar Media and Advertising age, released in June 2017. Statistica reports that "The figures include measured-media advertising spending (source: Kantar Media) and unmeasured spending (estimated by Advertising Age). Measured media from WPP's Kantar Media based on spending in 19 media: consumer magazines, Sunday magazines, local magazines, business-to-business magazines, local newspapers, national newspapers, free-standing inserts, broadcast network TV, broadcast spot TV, national syndicated TV, network cable TV, network radio, national

spot radio, local radio, Spanish-language media (magazines, newspapers, TV networks), outdoor and internet (display advertising; excludes paid search, video and other forms of internet advertising). Unmeasured spending figures are Ad Age DataCenter estimates including direct marketing, promotion, internet paid search, social media and other forms of spending not included in the 19 measured media."

The data in Figures 21 and 22 come from Kantar Media and were released in March 2015. Figures from 2008-2013 come from earlier Kantar Media releases. The data exclude FSI or PSA activity.

Figure 23 combines EBQ data with data from goodcarbadcar.net. The latter were released in January 2018. They were manipulated such that, when brand categories provided by this data source did not match those provided by EBQ (e.g., EBQ separates Nissan and Mitsubishi, whereas they are combined by goodcarbadcar.net), EBQ brand categories were combined to match.

A8. Additional Analyses

Here we present the 10 themes by year, and then by brand, parent company, and vehicle type. These analyses use the 4% and 5% manual samples. A few graphs present fewer than 10 themes because there was no (0%) representation on the excluded themes. The final graph presents the frequency of plug-in/electric vehicle in the population of unique ads provided by EBQ.















Comfort and Convenience

Fuel Economy/Green

Reliability and Durability

Safety

Luxury

Quality

0%

Other Emotion

Sales and Price

Performance

























A9. Appendix References

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