Buying a family car: relevant factors for teenagers

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Abstract

Purpose – The purpose of this paper is to find out the relevant factors, according to teenagers, that influence the buying decision of the family car.
Design/methodology/approach – Research carried out in three stages: one qualitative research (by using focal groups), and two quantitative research studies (descriptive and cross-sectional).
Findings – The authors identified three factors that are important for teenagers when influencing the purchase of the family car: safety, sportiness and comfort. The identification of these factors shows that the millennial generation tends to emphasize aspects of individual interest, such as status and performance, and family context, such as safety and comfort, rather than social aspects, such as the type of fuel and environmental impact.
Practical implications – The authors recommend the development of automobiles that prioritize the three factors mentioned herein in order to reverse the trend of declining car purchase.
Originality/value – The authors presented the relevant attributes in buying decisions of family cars according to teenagers. The authors also indicated the automobile attributes that are relevant for a more informed, connected, and with an increasing purchase power generation in contrast with previous generations, whose social context was prior to the emergence of social media.

Keywords Teenagers, Automobile attributes, Family decision making, Millennials

Paper type Research paper

1. Introduction

Members of the same family can play different roles in the purchase process, such as initiator, influencer, information gatherer, gatekeeper, decision maker and purchaser (Lien, Westberg, Stavros, & Robinson, 2018). This paper intends to investigate the participation of teenagers as influencers in the buying decision of a family car in order to find out the relevant factors related to their preferences.

Even though the role played by the teenager as an influencer in the decision-making process in his/her family has stimulated interest in some researchers (see Foxman, Tansuhaj, & Ekstrom, 1989; Beatty & Talpade, 1994; Palan & Wilkes, 1997), social and economic changes may not represent exactly the decision-making process of the family (Wang, Holloway, Beatty, & Hill, 2007). Palan and Wilkes (1997) indicate, specifically, that there is a lack of research that details the interaction level between teenagers and their parents during the decision-making process in consumption.

Choosing an automobile as a product whose purchase will be evaluated is justified by the relevance of such product in the Brazilian context, considering that automobile sales were

responsible for 4 percent of the country's GDP, employing 1.3m people, generating R$39.7bn in taxes and producing 2,156,356 automobiles – with these numbers, Brazil became the world's tenth largest producer of automobiles (ANFAVEA, 2016). Besides, bearing in mind that the purchase of such product is an important decision for the family and that an automobile is a durable good, buying a car can be seen as a complex purchase due to the values involved in the acquisition, specially taking into account that an automobile will serve the family for a considerable amount of time (Rivara, Rivara, & Bartol, 1998; Martinez & Polo, 1999; Nascimento, 2014).

The study by Nascimento (2014) investigated the determining factors for the purchase decision of new automobiles and pointed out that influencers may affect even an individual decision. Before such condition, our study, which intends to fill this gap, is guided by the following research question:

RQ1. What are the main factors considered by teenagers when purchasing an automobile?

It is important to emphasize herein that we do not intend to focus our analysis on the family as a decision-making unit, even though the results contribute for understanding the decision-making process of a single item in a specific way. The teenager, as part of the nuclear family – a couple and their children (Lien *et al.*, 2018) – can be seen as the one who points out characteristics and alternatives or tries to persuade his/her parents to acquire the automobile considered the best choice.

Previous studies already investigated the role played by the wife in the decision making of household products, such as furniture and decoration articles, and the patterns of husband influence on car purchases (see Martinez & Polo, 1999). Other research studies that investigated the influence of teenagers in the purchase decision making adopted different ranges to select the respondents; for instance, Beatty and Talpade (1994) investigated teenagers that were 16–19 years of age, while Wang, Holloway, Beatty, and Hill (2007) decided to research teenagers between 13 and 15 years. In our research, we decided to adopt a wider range, i.e. between 13 and 19 years, due to the representativeness of such group – this number corresponds to 4.2 percent of the 208m Brazilian inhabitants (IBGE, 2010). We also adopted the criteria proposed by Klein and Smart (2017) to identify teenagers as the ones who were born after the year 2000, a generation known as millennial, N or Z (Eisner, 2005). This segmentation is relevant because marketing studies have been identifying that different generations may present different consumption behaviors according to each generational profile (Noble, Haytko, & Phillips, 2009).

Even though, herein, we intend to approach Brazilian teenagers, some data related to the importance of such public in other countries must be observed. In the USA, the share of the population that corresponds to current teenagers represent 25 percent of the total; some predictions indicate that by 2020 adolescents will be responsible for 30 percent of consumption in the country (Miller, Yan, Jankovska, & Hensely, 2017). In China, children influence almost 69 percent of regular purchases, and approximately 24 percent of durable goods purchases (Wang *et al.*, 2007).

Considering the behavioral characteristics of millennials and the context of broad communication, in which the free, social and less controlled sharing of information seems to prevail, it becomes difficult to identify the preferences of this generation regarding automobiles. As such, we took into account 54 attributes brought up by Nascimento (2014) in order to analyze automobile purchase.

Our study also indicates practical and academic contributions. In the theoretical field, it contributes to literature regarding family decision making. It also approaches the attributes of automobiles that are relevant for a well-informed, connected and with an increasing purchase power generation, especially in comparison with other previous generations,

whose context was prior to the emergence of social media (Steg, Perlaviciute, Werff, & Lurvink, 2014).

For practitioners, our study enables a greater efficiency of decision-making processes of automobile manufacturers when choosing the attributes that a car should have – advertising campaigns could also be guided by our study as they could focus on the attributes presented herein (Noble *et al.*, 2009). Another important issue is the decrease of the Brazilian production over the past three years (ANFAVEA, 2016), which indicates a higher competitiveness in the sector. Before such context, it is relevant to find out which attributes are taken into consideration by teenagers, who can become influencers when purchasing a family car.

2. Theoretical review

2.1 The family as consumption unit and the influence of the teenager

The concept of family as a consumption unit has been adopted in the field of consumer behavior (see Epp & Price, 2008). Literature differentiates nuclear from extended family: the first one represents a set composed of a couple and their children, the latter aggregates other relatives, e.g. grandparents, uncles and aunts, cousins, etc. (Lien *et al.*, 2018).

Epp and Price (2008) affirm that the family presents a set of characteristics: collective, small groups (siblings, couples, for instance), relational and individual. According to the authors, regardless of the characteristic observed, it will be associated with its own rituals, social drama, history, daily interactions and, most importantly, intergenerational transfers.

The purchase decision-making process can be influenced generally by how much he/she knows about the product (Steg *et al.*, 2014). However, consumption choices are not only oriented by individual factors; other individuals may affect such consumption, especially in family circles. Research on the family consumption behavior usually emphasizes the capacity of influence of the members – father, mother or children (Batra & Ali, 2015).

The influence occurs when the influencer provokes an intentional change in the behavior of another individual, i.e. when the impact is significant (Wang *et al.*, 2007). When considering the family as a group, teenagers become an object of interest of the marketing field because they can be agents in three different markets: primary, in which they are consumers; influencer, where their needs, desires and opinions matter for family consumption decisions; and future, as potential consumers of products they have contact with currently, i.e. one of the most profitable markets for several businesses (Batra & Ali, 2015).

In the specific case of the influence of the teenager over the parents' choice, which is the central theme of this paper, it will be based on the perceived importance of the product, on the motivational aspect related to the anticipation in using the product (projective characteristic), and on the level of knowledge about the product (Wang *et al.*, 2007). The authors mention that teenagers are seen by their parents as "knowledge authorities" taking into consideration that they are more used to online research and have a relative "power" to look for information, which is the second stage of the purchase process.

This affirmation was supported by Singh and Kumar (2014), who showed that the influence of the teenager in family purchases increases due to their ability to search for information on the product, for spending a significant amount of time watching online videos, and for being affected by sponsored contents (Jans, Cauberghe, & Hudders, 2018). This way, teenagers tend to take into consideration different attributes in comparison to other social groups (Rivara *et al.*, 1998; Noble *et al.*, 2009; Batra & Ali, 2015).

2.2 Millennials and relevant attributes in car purchasing

Millennials were born in an already technological wireless technology, with the presence of computers in their residence, as well as internet and mobile telephony. These information paths became the most transparent and rapid world borders in several subjects, especially

with regard to globalization and global warming (Williams, Page, Petrosky, & Hernandez, 2010). Among general characteristics, literature has emphasized that millennials accept they do not know everything, believe they can make a better future, have a strong sense of autonomy, are adaptable and comfortable in several occasions, are selfish, live for the moment and spend a lot of money (Eisner, 2005).

About general aspects related to consumption, millennials know about brands, appreciate high-quality products when sold at a fair price, prefer direct and objective advertisements (Nowak, Thach, & Olsen, 2006), decide where and how companies will communicate with them, accept high levels of bank debt in order to have a good home and particular consumption patterns and prefer manufacturer over retailing brands (Parment, 2013).

Generally, family is important to teach teenagers the rational basic aspects of consumption in which some dimensions are used to compare and evaluate brands, with a predominance of perceived over functional characteristics (Capon & Kuhn, 1980). However, teenagers also influence the decisions of family purchases. Singh and Kumar (2014), for instance, found clear evidence of the influence of children over parents regarding purchase decisions in the different stages of the buying processes and in the product *per se*.

Parment (2013) highlights an aspect known as social risk of buying, according to which millennials consider how their buying behavior can affect the perception of their peers about themselves. The concern about the possible reactions in their social environment can affect their consumption pattern, e.g. when buying a vehicle in a context in which social and environmental aspects are desired. Among the driving items of consumption preferences, the ecological aspect has influenced the willingness of consumers to by vehicles that use cleaner fuels, but characteristics such as autonomy, speed and fuel economy still favor conventional vehicles (Oliver & Lee, 2010). However, in the twenty-first century, issues related to environmental degradation brought new elements to consumer preferences regarding the purchase of cars, such as emission of polluted gases, energy efficiency and alternative fuels (Haan, Peters, & Mueller, 2006).

A generation that has more access to information can become more specific and demanding regarding consumer preferences – such as the interest attributes of automobiles, considering that the preference for one specific car can be linked to rational, symbolic and emotional considerations. Instrumental aspects, like autonomy, comfort, speed, fuel economy, safety and cargo capacity are considered in the cost-benefit relationship of consumers when evaluating an automobile for private or family use; there are also symbolic and emotional aspects, like power, control, prestige, identity, pleasure and status (Steg, 2005). Specifically on teenagers, the research by Rivara, Rivara, and Bartol (1998) indicates that among the attributes that may influence the decision making of parents when purchasing an automobile for teenagers, one may emphasize costs with insurance (93.6 percent), price (87.2 percent), fuel economy (77.2 percent), anti-lock braking (ABS) system (72.9 percent), and airbags (64.5 percent). When choosing a family car, parents tend to emphasize self-shifting transmission (66.8 percent), fuel economy (51.2 percent), airbags (48 percent) and ABS system (57.3 percent). However, the research by Cardenas (2013) shows that millennials are less interested in cars, which may be linked to culture changes caused by mobile internet, urbanization and economy.

The results described above indicate a shift in the classic consumer behavior theory, which determines that among a set of options the individual presents a clear preference or utility order (Shafir, 1993). The fact that the decision maker establishes preferences in the decision-making context according to the available information indicates a new approach in the decision-making process (Hoefler & Ariely, 1999).

Considering that teenagers establish consumption preferences based on the regular contact with reference groups online (Abraham & Harrington, 2015), one may expect

that the factors declared as relevant have a certain relationship with social prestige. However, the millennial generation may present different attributes when trying to influence the purchase of a family car.

3. Method
The research presented herein is composed of three stages: on the first qualitative stage, we collected the most important attributes considered by teenagers when purchasing the family car. On the second stage, we gathered the attributes by means of an exploratory factor analysis (EFA), which lead to the final third stage, in which we validated the factors identified through a confirmatory factor analysis (CFA).

3.1 Stage 1
In order to accomplish all methodological procedures, we followed the recommendations by Boateng, Neilands, Frongillo, Melgar-Quiñonez, and Young (2018), in which the development of a determined scale is divided into three phases and nine steps until its full validation. Initially, a qualitative research was carried out, a method used to obtain data and information that express the perspectives of the research participants and their diversity, enabling the establishment of relationships between individuals and objects, or between consumers and markets (Flick, 2008). The technique chosen was the conduction of a focus group because it allows the generation of attributes based on the insights of the research participants, which would be less accessible without the interaction verified in a group according to Flick (2008).

After a disclosure in a private school, students were invited to take part in a broad discussion about automobiles; 17 teenagers agreed to take part in it. All of them were between 13 and 19 years, which met, therefore, the main selection criterion related to the age group.

In order to balance the focus groups, we decided to divide the participants into three groups. Groups 1 and 2 took place on the same say, with six and five respondents, respectively; there were both male and female respondents, who were between 15 and 16 years. Group 3 was composed of six male respondents, who were 13–18 years of age, and took place ten days after the accomplishment of Group 2.

The focus groups lasted 30 min on average and took place in the city of Vitoria, the capital of the state of Espírito Santo, Brazil. In this occasion, the moderator presented himself to all participants and explained they were meeting in order to discuss issues related to automobiles. He explained that all dialogues would be stored and latter transcribed for analysis purposes, and specified the basic rules of the development. Before starting to record, he asked if any one of the participants would like to leave the research, but nobody did.

The conduction of the session occurred through a semi-structured script, which presented previously elaborated questions that were discussed by the participants: first, are there automobiles in your family? How many? From which brand/model?; second, did you take part in the decision-making process when buying these automobiles? In case you did, please tell us how it happened; third, if you had to take part in the decision-making process of purchasing a new family car, what would be important to consider and why?

In order to organize and systemize the data collected, we used the content analysis technique (Bardin, 2011). This technique enables the systematization and explanation of the content of the messages generating inferences in communication and is composed of three phases: pre-analysis, analytical description and inferential interpretation. After transcribing the speeches of the focus group and verifying the content, we submitted the document to the pre-analysis, emphasizing the content, in order to classify the answers according to the theoretical framework (Bardin, 2011).

In the analytical description, we chose the recording units and accomplished the encoding process taking into account the convergence with the phenomenon. Data were analyzed and underpinned by the theoretical framework, which enabled the establishment of analytical categories that presented the relevant attributes for teenagers when purchasing the family car in order to provide inferences and interpretation of the content provided by the participants of this study (Bardin, 2011).

3.2 Stage 2

After obtaining the attributes in the previous stage, we decided to conduct a descriptive and cross-sectional survey. Therefore, we applied a questionnaire whose answers allowed grouping the already identified attributes. The population consisted of teenagers between 13 and 19 years; in this study, we made use of a non-probabilistic convenience sampling.

In order to collect research data, we elaborated an auto-complete electronic questionnaire on an online platform, in which we presented the research briefly, and then gave extra information about the completing of the questionnaire, the privacy statement, and the presentation of the researcher. The data collection instrument presented two initial questions that guaranteed that the respondent was part of the research object: are you between 13 and 19 years?; and does your family own an automobile? Next, we presented questions about the attributes, which were created based on the conversion of the attributes presented in the former stage into Likert scale-type affirmations, ranging from 1 (strongly disagree) to 5 (strongly agree). It is important to highlight that each attribute identified in the previous stage was converted into a sentence that approached the opinion of the teenager regarding his/her influence on parents' decision making (e.g. every time my parents are going to buy a car, I tell them that internal storage place is important). The final questions aimed to characterize the respondents according to demographic queries about gender, age, family income and number of family cars.

First, we carried out a semantic pre-test, accomplished with an eight-respondent group that presented characteristics (age, gender and family income) similar to the target audience of the research (Hair, Anderson, Tatham, & Black, 2009). During the pre-test procedure, we did not observe any issue that demanded an alteration of part(s) of the questionnaire. Next, we used the snowball sampling technique, which means that focus group participants received the questionnaire and used it to recruit participants from among their acquaintances. Additionally, we spread the research on the researchers' Facebook private profiles. The data collection occurred between October and November 2017.

We received 290 answers, but 17 had to be deleted for not attending control questions; therefore, the final sample corresponded to 273. The average age was 17 years (20.9 percent). Concerning the gender of the interviewees, it is possible to affirm that the sample was balanced (male = 49.2 percent; female = 50.8 percent). Regarding family income, most of the respondents claimed that it was above 30 minimum wages (37.7 percent). Regarding the number of family cars, 62 percent of the respondents claimed that there were between one and three cars in the household; this percentage corresponds to the group with most participants. The profile of the respondents validates the sample, once it presents teenagers of both genders, belonging to high-income families with several automobiles – such profile is the most indicated to answer the research, considering that their families are financially successful and possesses several types of automobiles.

The answers were then analyzed through the EFA, whose main objective is to reduce a large amount of variables into a smaller number of factors in order to explore the relationship between a set of variables, identifying correlation patterns, and verifying the correlation among several attributes (Hair et al., 2009). Hair, Anderson, Tatham, and Black (2009) define factor as the linear combination of the original variables.

In the analysis, we used the varimax rotation because in this sort of analysis several factors go through a rotation becoming independent among themselves, which indicates a zero intercorrelation. This way, according to the factor loadings obtained for each variable, which represents the correlation between the original variable and the factor, it is possible to group loadings in factors that are the linear combination of the variables, indicating how much each variable is associated with each factor generated – the retained factors should have a loading greater than 0.4 (Hair *et al.*, 2009).

Next, we used the KMO and Bartlett's test of sphericity. KMO is a test that identifies if the factor analysis being used is properly adjusted to the data by testing data consistency. This test verifies if the variance of the data can be explained simultaneously by the set of variables by analyzing if the sample size is proportionate to the number of variables. Values between 0.5 and 1.0 are acceptable; however, values closer to 1 indicate that the sample is more adequate (Mingoti, 2005). Bartlett's test of sphericity, in turn, was used in order to verify the correlation level of the sample data. For a sample to be valid, the p-value must be significant, enabling the factor analysis (Mingoti, 2005).

The communalities of the variables were verified, which demonstrates the fraction of the variance in the observed variable that is accounted for by the factors, i.e. the percentage of the variance that can be explained by the common attributes of the factors (Hair *et al.*, 2009). In business administration, values above 0.3 are considered acceptable; above 0.5 moderately important; and above 0.7 highly important (Hair *et al.*, 2009). In order to complete the communality analysis, we used an anti-image correlation matrix by observing if all variables on diagonal of correlation matrix presented values above 0.5 in order to be kept in the analysis.

Next, we defined the number of factors through the total variance explained and the reliability indicator (Cronbach's α). Hair *et al.* (2009) classify the reliability of the factors in five levels: low and unacceptable (values lower than 0.6); moderate (values between 0.6 and 0.7); satisfactory (values between 0.7 and 0.8); very satisfactory (between 0.8 and 0.9) and excellent (above 0.9). In order to make use of the EFA technique, we obtained a sample that was at least five times greater than the number of variables used (Hair *et al.*, 2009).

3.3 Stage 3

After grouping the attributes into factors, we adopted a quantitative, descriptive and cross-sectional survey-type approach in order to validate the factors identified in Stage 2. For such, we applied a questionnaire whose answers allowed such validation. The non-probabilistic convenience sampling was composed of 214 teenagers, different ones from the previous stage.

The data collection was carried out through an auto-complete electronic questionnaire available online; we considered the questionnaire applied in the previous stage as reference, in which the attributes were grouped into factors. The beginning and the first two questions were the same of the ones presented in the previous stage. We kept the questions about the attributes of the questionnaire used in Stage 2, presenting them in an organized way according to the factors identified in the previous stage of the research. The answer options were the same from Stage 2. In the end of the questionnaire, we introduced some extra questions to characterize the respondents.

In the initial application of the questionnaire, we conducted a semantic pre-test with group composed of ten respondents with similar characteristics (age, gender and family income) from the target audience (Hair *et al.*, 2009). For the pre-test, we used social media (WhatsApp) and e-mail to spread the questionnaire – there was no need to modify it. Next, we spread the questionnaire on social media (WhatsApp), making the link available from November 2017 to January 2018.

We obtained 214 answers; however, 13 had to be deleted because they were not part of the population of this phase. The final sample, therefore, presented 201 teenagers. In this

phase, the most predominant age was 15 years (26.2 percent) and females corresponded to 51.9 percent of the sample size, which is similar to the results obtained during Stage 2. Regarding family income, the average of 30 minimum wages prevailed one more time (25.2 percent). With regard to the number of family cars, 40.2 percent affirmed there were two automobiles in the household. In line with the results presented in Stage 2, the profile of the respondents validates the sample; we emphasize that the sample of this stage of the research is different from the one presented in the previous stage. The profile of the respondents is, however, similar.

After collecting data, the answers were analyzed by means of correspondence factor analysis (CFA), a data analysis technique that allows the researchers to test if a determined number of variables are enough to represent a concept/dimension. In our research, the variables are indicators that consist of values observed that are used as measurement of a concept or construct (Hair *et al.*, 2009).

During the analysis, in order to validate the constructs, we observed the factor loadings and the convergent and discriminant validities. We used the factor matrix to demonstrate the correlation among the indicators measured by the construct. If the correlation level is high, the indicators are associated and measure the construct analyzed (Hair *et al.*, 2009). The convergent validity of the sample, in turn, was observed through the composite reliability and average variance extracted (AVE). According to Fornell and Larcker (1981), in order to establish the existence of convergent validity of a model, the AVE must be above 0.5. Hair *et al.* (2009), on the other hand, affirm that reliable models must present a composite reliability above 0.7. The discriminant validity, i.e. an indicator that tests whether two measures that are not supposed to be related are in fact unrelated (Hair *et al.*, 2009), presents two approaches to test for discriminant validity: the one presented by Fornell and Larcker (1981), who affirm that the discriminant validity can be verified by examining if the correlations presented among constructs are lower than the AVE's square root; and the assessment if the factor matrix indicates distinct factors due to factor loadings. If one can verify these elements, the constructs are different from one another (Hair *et al.*, 2009).

4. Data analysis
4.1 Stage 1
We elaborated three focus groups. Through the answers obtained from the question "If you had to take part in the decision-making process of purchasing a new family car, what would be important to consider and why?" and applying the technique of content analysis on the data collected in media, we can highlight a few categories (attributes).

By observing the attributes mentioned by the participants of the focus groups, it was possible to realize that Passenger space was the most cited category (11 in total), and it was present in all three groups. A possible explanation can be found in the work by Cardenas (2013), who indicates that the number of millennials driving cars is decreasing. Considering they do not drive, millennials do not care about the private space of the driver, since they need to share the interior of the car with other passengers. Such findings can also explain the fact that the attributes boot capacity and number of doors appeared in the three focus groups, and were mentioned by eight respondents.

The attribute fuel economy, cited by eight respondents and present in the three groups, appears on the study by Haan, Peters, and Mueller (2006), suggesting that this generation might be really worried about the deterioration of the environment. The research by Rivara *et al.* (1998) had already mentioned this category as one of the attributes that influence teenager's preferences over certain automobiles.

Another attribute that must be highlighted herein is Bluetooth/infotainment system, which was mentioned in all groups and cited by seven participants. This attribute relates to the research by Williams, Page, Petrosky, and Hernandez (2010), who characterize the

millennial generation as a generation born in a technological, wireless society, raised with computers in their residence, internet and mobile telephony.

Based on the attributes mentioned above and considering the recurrence criterion, Table I presents the most relevant factors according to the teenagers' perception.

4.2 Stage 2
In this phase of the research, we used EFA. In the analysis, we used varimax rotation because in this sort of analysis several factors go through a rotation becoming independent from one another, which indicates a zero intercorrelation. This rotation also maximizes the sum of variance loadings of the factor matrix (Hair *et al.*, 2009).

From the results presented in Stage 1, 24 variables were identified based on the respondents' speech (Table I). However, due to communality issues, 11 variables were deleted because they did not belong to any latent factor. After the orthogonal rotation, the 13 remaining variables were synthetized and resulted in three factors, described in Table II.

The loading of each component in the composition of the factors is presented in Table II. The result of the analysis organized the variables according to the importance of each variable for each factor. Each factor loading indicates the correlation between an original variable and the factor (Hair *et al.*, 2009), suggesting how each variable is associated with each factor generated. All variables met the criterion established by Hair *et al.* (2009), who consider 0.4 the minimum acceptable value for factor loading regarding the contribution of a variable.

Next, the KMO and Bartlett's sphericity test was carried out, whose use was already previously explained. The KMO test for sampling adequacy presented a value of 0.777. Values between 0.5 and 1.0 are acceptable, but values closer to 1.0 are ideal (Mingoti, 2005) – such analysis indicates that the sample used met the number of items investigated. It is also possible to observe in Table II that the result of Bartlett's sphericity test indicates that the p-value was 0.000, which allows the use of EFA (Mingoti, 2005).

Category	Frequency
Passenger space	11
Boot capacity	11
Fuel economy	8
Bluetooth/infotainment	7
Purchase price	6
Number of doors	6
Size of the car	6
Electronic stability control	5
Dealer's customer service	5
ABS system	4
Engine power	4
Automatic gearbox	4
Air conditioner	4
Insurance price	4
Airbag	3
Ground clearance	3
Leather seats	3
Rear view camera	3
4×4 systems	3
Comfort for children and babies	3
Extra headlights	2
More than 5 seats	1
Design	1

Table I.
Categories
of the study

Factor	Variable	Factor loadings	Rotation sums of squared loadings Total	% of variance	% cumulative	Cronbach's α
F1 – safety	ABS	0.751	2.849	21.913	21.913	0.78
	Airbag	0.708				
	Insurance price	0.694				
	Fuel economy	0.690				
	Electronic stability control	0.653				
F2 – sportiness	Speed	0.835	2.148	16.521	38.434	0.728
	Engine power	0.821				
	Extra headlights	0.537				
F3 – comfort	Design	0.756	2.088	16.060	54.494	0.62
	Bluetooth/infotainment	0.624				
	Size of the car	0.621				
	Air conditioner	0.580				
	Leather seats	0.537				

The communalities of the variables were also verified. The variables that met the already described criterion of Hair *et al.* (2009) were kept in the analysis: fuel economy, Bluetooth/infotainment, leather seats, engine power, design, speed, air conditioning, airbag, electronic stability control, ABS system, insurance price, extra headlights and size of the car; the communalities ranged from 0.395 (size of the car) to 0.727 (speed). It is worth emphasizing that the fact that the variables of the research stem from an exploratory research may have contributed to lower communality values, considering that this choice enabled, statistically, the best fit.

Another way to decide whether to exclude a variable or not is the observation of the variables on diagonal of the anti-image correlation matrix, in which all variables must present values above 0.5 in order to be kept in the analysis. All variables met such criterion, presenting correlations that ranged from 0.654 (design) to 0.868 (extra headlights). After the validity test of the analysis, we named the three factors that emerged, whose names were also presented in Table II.

By observing Table II it is possible to consider that the grouping of original variables allowed the generation of the three factors that are important for teenagers when purchasing the family car, which were defined based on the 13 variables tested with their respective variances and reliability indicators (Cronbach's α). This way, taking into consideration that the data used stem from an exploratory research, Factor 3 could be included (with moderate reliability), and Factors 1 and 2 present satisfactory reliability to explain the factor (Hair *et al.*, 2009).

It is also possible to verify in Table II that there is one value for each factor, as well as the respective variance. The three factors can explain concomitantly 54.49 percent of the total variability of the data. When taking into account the percentage of the variance of each factor, none of them prevails to explain the model suggested, which indicates that the factors may vary in the target audience of the research sample. Since the sample used herein is predominantly composed of respondents with a family income above 30 minimum wages with one to three automobiles in the household, the data indicate a high purchase power. This way, future studies could focus on the analysis of other samples composed of respondents that present different income ranges.

By observing individually each one of the factors generated, it is possible to observe that Factor 1, safety, which is responsible for the explanation of 21.91 percent of the variance, is underpinned by the research of Rivara *et al.* (1998), who show that the safety of a vehicle is an important element and taken into account by the members of the family. Among the several attributes of a vehicle, we highlight the ones related to personal safety, e.g. airbags

or ABS system. It is important to point out that the respondents of the questionnaire were not the parents, but the teenagers themselves, which is in accordance with the research of Batra and Ali (2015), in which they demonstrate that consumption choices are not oriented by individual factors; other individuals may influence these choices, which occurs in strict family circles. In other words, the respondents of the research presented choice patterns similar to the ones from their parents regarding the attributes of the family car.

The second factor, sportiness, which is responsible for explaining 16.52 percent of the variance, is in line with the research by Oliver and Lee (2010), who claim that characteristics like fuel autonomy, speed and time to refill the gas tank still favor traditional vehicles rather than vehicles that cause smaller impacts on the environment. This way, the answers of the research participants are not in accordance with the studies by Haan *et al.* (2006), who claim that the degradation of the environment presents new elements that may influence the preferences of consumers when purchasing cars; in our sample, however, the ecological appeal was not as important as the other characteristics of conventional vehicles.

Regarding the third factor, comfort, which explains 16.06 percent of the variance, the result indicates a similarity with the research by Steg (2005), who relates that the preferences of the public in general when buying an automobile may be related to both relational and symbolic-emotional aspects of the individuals when showing that instrumental factors, like flexibility, fuel economy and comfort, are considered in the cost-benefit relationship of consumers when evaluating the use of an automobile for own or family use. The percentage presented by this factor suggests that millennials consider the factor comfort is important when purchasing a family car.

Before the information presented in this section, the gathering of the three factors enables a clearer understanding of the most important attributes for teenagers when influencing the parents to buy a family car. Such gathering also allows new variables to be analyzed and included in further research, which could elucidate the purchase behavior of a generation characterized by car sales decline (Klein, & Smart, 2017) and reduction in the percentage of teenagers with driver's license (Noble *et al.*, 2009).

4.3 Stage 3
In order to validate the factors obtained in Stage 2 we used the CFA technique. Initially, we analyzed the factor loadings, which culminated in the exclusion of the indicator size of the car (i.e. fifth indicator of the factor comfort) because the loading factor value was below 0.5 (Hair *et al.*, 2009). After the exclusion, we carried out another CFA, whose results are presented in Table III.

Factor	Indicator	Safety	Sportiness	Comfort
Safety	Fuel economy	0.70		
	Airbag	0.74		
	Electronic stability control	0.82		
	ABS system	0.81		
	Insurance price	0.71		
Sportiness	Engine power		0.85	
	Speed		0.90	
	Extra headlights		0.64	
Comfort	Bluetooth/infotainment			0.74
	Leather seats			0.65
	Design			0.79
	Air conditioning			0.71

Table III.
Factor loadings matrix

After we identified the factor loadings, we verified the convergent validity. First, we compared the factor loadings of each indicator individually among the different factors. This way, it was possible to verify that the highest factor loadings were found in their respective factor – with a minimum value of 0.64 – indicating a positive correlation among them and suggesting that the indicators of each factor converge to the factor itself.

Next, it was possible to observe the AVE, whose results are presented in Table IV. All factors presented an AVE above 0.5, which validates the convergence. It was also possible to verify the composite reliability in order to meet the other criterion of convergent validity; all factors presented composite reliability values above 0.7 (Hair *et al.*, 2009), which also indicates the convergent validity of the indicators. The results of the composite reliability are also presented in Table IV.

Next, in order to verify how different the constructs are among themselves, we used the discriminant validity (Hair *et al.*, 2009), which is measured by two different approaches: the one presented by Fornell and Larcker (1981), who affirm that the discriminant validity can be verified by examining if the correlations presented among constructs are lower than AVE's square root; and the assessment if the factor matrix indicates distinct factors due to factor loadings. The analysis of the factor loadings matrix presented in Table IV indicates a confirmation of the three factors suggested in Stage 2, considering that the factor loadings indicate distinct factors. The factor correlation matrix shown in Table IV shows that every relationship among factors are lower than the AVE's square root, indicating that the factors are different from one another.

When analyzing each one of the factors tested, we observed that the validation of the factor comfort is in line with the studies by Steg (2005), who mentions that the preferences of the general public for an automobile may be related to rational and symbolic-emotional characteristics of the individuals because an instrumental factor like comfort is relevant when the purchase of an automobile being considered. The validation of the factor comfort, which is liked to technology, e.g. design and Bluetooth/infotainment, indicates the preference of millennials for this factor taking into account that they were already born in technological and wireless society (Williams *et al.*, 2010). The other indicators of the factor comfort (air conditioning and leather seats) can be explained by the characteristics of the respondents: most of them come from high-income families, who are more prone to expend more money on the purchase of an automobile and chose to have leather seats and air conditioning.

The validation of the factor sportiness indicates that the characteristics of conventional vehicles, like speed and engine power (indicators that compose the factor sportiness) have a relevant impact on the influence exercised by teenagers over the purchase of the family car, which is in line with the study by Oliver and Lee (2010). The validation of this factor indicates that aspects related to individual interest, like status and performance, are part of the influencing factors in the millennials' decision-making process of buying a car. One possible explanation for such statement is brought up by Eisner (2005), who indicates that one of the characteristics of the millennials is that they are selfish and live for the moment. However, the factor sportiness is also composed of the indicator extra headlights, which also

Factors	AVE	Composite reliability	Safety	Factor correlation Sportiness	Comfort
Safety	0.5766	0.8715	*0.76*	0.53	0.07
Sportiness	0.6485	0.8445		*0.81*	0.32
Comfort	0.5282	0.8167			*0.73*

Note: The values presented on diagonal of correlation table correspond to the square root of AVE

Table IV.
Average variance extracted (AVE), composite reliability and factor correlation matrix

contributed for the validation of this factor. The presence of this indicator – that can only be seen by somebody outside the automobile – suggests that millennials care about the opinions of their peers about themselves, which is in accordance with the research by Parment (2013), who brings up as aspect related to millennials known as social risk of buying, according to which their purchase behavior can affect the perception of their peers about themselves.

However, the validation of this factor contradicts the study by Haan *et al*. (2006), in which the ecological appeal is approached – the authors explain that the concern about the degradation of the environment may delimit the preferences of car consumers in general – and by Nowak, Thach, and Olsen (2006), who mention that millennials believe they can make the world a better place. In this sense, the results of Stage 3 indicate that, according to the respondents, the ecological appeal is less important than sportiness when purchasing the family car.

The validation of the factor Safety is in accordance with the studies by Rivara *et al*. (1998), who explored the attributes that teenagers' parents consider when purchasing a vehicle to be used by their children, whose results emphasize the attributes related to personal safety. Considering that the analysis approached the teenagers, not their parents, the results are in accordance with the research by Batra and Ali (2015), who demonstrate that the family circle influences purchase decision making; teenagers and teenagers' parents may consider the same attribute as relevant (Rivara *et al*., 1998). This way, regarding the attributes of the family car, the respondents of Stage 3 – as well as respondents of Stage 2 – presented choices similar to the ones of their parents.

In short, the verification of the factor loadings and the convergent and discriminant validity analyses indicate the validation of the factors obtained from Stage 2. The fact that the data collected from the answers of the questionnaire in Stage 3 stem from a different sample from the one used in Stage 2 demonstrates the reliability of the process, once that the results from Stage 3 are in accordance with the ones from Stage 2. This way, the results found in Stage 3 show that the factors comfort, sportiness and safety are factors taken into consideration by teenagers when trying to influence the purchase of the family car. The validation of these factors enables a greater efficiency of the decision-making process of automobile manufacturers when choosing attributes that a car should have in order to meet the requirements of millennials.

5. Conclusion and recommendation

In this study, it was possible to find out the relevant factors that influence the decision-making process of the family car according to teenagers. In the end of the analysis, we verified that the factors comfort, sportiness and safety are the most relevant for teenagers belonging to the millennial generation when buying the family car. This way, aspects related to the individual interest of the teenager, as status and performance, were set aside; they probably perceive the aspects considered relevant according to their parents, like safety and comfort. Such finding strengthens the logic that the individual sees other people's needs in a different way.

This way, the main theoretical contribution of this paper is related to the instability of the preference: that is, if the teenagers were the owners and drivers of the vehicle, they would have chosen different attributes than the ones chosen for their parents as conductors. Another important issue is that, due to the information to which they are exposed currently, the opinion of millennials can become more persuasive or strengthen parents' preferences. Therefore, the set of information generated by the teenager will be used as available information when making the decision representing a constructed preference, as advocated by Hoefler and Ariely (1999).

For practitioners, the results may guide automobile manufacturers to focus on the attributes that an automobile should have right in the conception of the project; this way,

automobiles will keep on being objects of consumption of the millennial generation. Once manufacturers focus on the relevant attributes for teenagers who can influence the purchase of the family car, they can develop advertising campaigns and products that present these attributes as strengths, which would contribute to reverse the tendency of car sales decline presented by this generation.

Besides, it is worth pointing out that there are other attributes that can be relevant for teenagers, as influencers in the purchase decision of the family automobile, and this is a limitation of this study. When presenting respondents whose families have greater purchasing power and present geographic proximity, the results may present a predominance of attributes that are relevant specifically for this audience. This issue can be solved by expanding the number of respondents, separating them into subgroups according to their income bracket, which would enable a comparison between results according to the family income of the respondents, or conducting the same study with groups geographically different from one another, which would provide more solid results.

Finally, for future studies, in order to approach the paradox that the ecological appeal still does not overlap the qualities of conventional vehicles, we recommend a behavior research through the accomplishment of an experiment, with emphasis on the sort of advertisement used to sell a vehicle, presenting options by which it would be possible to feel the ecological appeal. We recommend the reapplication of the methods used herein in the generation that will succeed the millennial one, once different generations present different consumer behaviors according to each generational profile. Future research can still explore if attributes tend to change when purchasing a second family car.

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