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**RESEARCH ARTICLE**

# Which factors distinguish the different consumer segments of green fast-moving consumer goods in Germany?

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**Abstract**

Consumer segmentation is an important tool for dealing with the often strongly differing consumer preferences in many markets for fast-moving consumer goods. Therefore, this study analyses the factors that can distinguish the different consumer segments for green all-purpose adhesives in Germany. On the basis of an online survey with 709 respondents, we performed a choice experiment and segmented consumers based on their preferences for this product. We identified six consumer segments of which in particular Green Consumer Value, Perceived Consumer Effectiveness and Trust separate eco-friendly consumers from the other groups. Our results give a deeper insight into the different consumer segments for green fast-moving consumer goods and facilitate the development of business and marketing strategies in a more targeted way.

**KEYWORDS**

choice experiment, consumer segmentation, green fast-moving consumer goods, influencing factors

## 1 | INTRODUCTION

Green consumption has become more than just a trend in the past few years. More and more consumers in Germany buy green, eco-friendly or sustainable products (Steinemann, Schwegler, & Spescha, 2017). Accordingly, green consumption has become an important field of research in marketing. Since the early 1990s, many studies have been published, which investigate the purchasing behaviour of green consumers or the motives for buying green products (Bänsch, 1990; Dembkowski & Hanmer-Lloyd, 1994; Kaufmann, Panni, & Orphanidou, 2012; Minton & Rose, 1997; Mohd Suki, 2016; Ritter, Borchardt, Vaccaro, Pereira, & Almeida, 2015). Most of these studies, including ours, understand 'green products' as products, which are designed to preserve the environment, for example, by reducing resource consumption or negative environmental impacts (Tsai, 2012; Tseng & Hung, 2013).

In Germany, the variety of green products is very wide today, ranging from electric cars, biofuels or green power, and green textiles to a broad variety of green fast-moving consumer goods (FMCGs). The specific characteristics of FMCGs are that many consumers regularly purchase and consume these products in their daily life and that these products are normally low-involvement products. Green FMCGs can replace conventional FMCGs, which are often based on fossil resources. A German study on sustainability in the FMCG industry shows that 80% of retailers and manufacturers rate sustainability for their companies as highly relevant and the greatest obstacle for its implementation in their companies is, among other things, the low level of customer interest and the desire for more support in end-consumer advertising. In addition, many retailers would like more information about consumer attitudes (Diekmann, Kölle, Laumann, & Geßner, 2015).

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Within the FMCG market, one can distinguish between food and nonfood products. In the past, many studies have focused on food FMCGs and the segmentation of consumers related to these products (Galati, Schifani, Crescimanno, & Migliore, 2019; Maciejewski, Mokrysz, & Wróblewski, 2019; Verain et al., 2012). However, there is a lack of deep insights into the field of consumer studies related to green nonfood FMCGs. Additionally, segmentation studies are often lacking for green nonfood FMCGs. Besides socio-demographic variables, attitudinal variables or motives like purchasing reasons, attitudes and values, or behavioural variables like activities or green buying frequencies are often used for segmentation (Balderjahn, Peyer, Seegebarth, Wiedmann, & Weber, 2018). Worldviews or lifestyles can also have an influence on green purchasing (Hedlund-de Witt, de Boer, & Boersema, 2014; Leiserowitz, Kates, & Parris, 2006). Peattie (2010) gives a broad overview of the influencing variables that could be used for segmentation in this field too.

To describe the specific characteristics of green consumers and how they differ from others, various segmentation studies already exist in the literature (Golob & Kronegger, 2019; Haan et al., 2018). They not only show the differences between green and nongreen consumers, but they also indicate that there are differences within the group of green consumers resulting in high heterogeneity among them. Additionally, many segmentation studies use different consumer attitudes for segmenting consumers in the case of green consumption, but it is known that environmentally friendly attitudes do not automatically lead to environmentally friendly purchase behaviour (Kollmuss & Agyeman, 2010). To give a deeper insight, this study analyses some of these potential influencing factors after a segmentation based on consumer preferences for a specific green nonfood product. Based on our findings, marketing strategies in different business sectors can be fine-tuned to reach consumers of green nonfood FMCGs more effectively.

Thus, in this study, we use a choice-based conjoint (CBC) experiment and latent class analysis (LCA) to segment consumers on the basis of their preferences towards a green nonfood FMCG. As a consequence, the derived segments are defined by choice behaviour and product categories and are not only based on attitudinal and socio-demographic data (Swait, 1994). Subsequently, we examine whether the identified consumer groups differ in their attitudes or socio-demographic characteristics.

In this study, we focus on all-purpose adhesives as a nonfood FMCG product that consumers regularly use in their private households. This focus is interesting because adhesives are usually petroleum based. However, on the German market, one can find bio-based adhesives, which are marketed under the umbrella of well-known brands, placed next to traditional adhesives on the shelves of many retail stores. Moreover, the consumer/DIY segment for adhesives in Germany had a market volume of €203.3 million in 2012. Fifteen percent of adhesives on the German market are bio-based, and forecasts predict that this share could increase in the coming years (FEICA, 2013; IVK, 2017). Additionally, some of the products already existing on the market not only have bio-based ingredients but also

have different types of green packaging, for example, recycled plastic or plastic from renewable resources. Owing to this situation, we were able to confront the participants in our experiment with a very realistic product selection. It is also currently still rather rare for well-known established brands to sell green products under the umbrella of the same brand. In summary, the facts given above show why this product is an interesting area of research.

Thus, the main purpose of this study is to analyse how consumers can be segmented based on their preferences for all-purpose adhesives. Furthermore, based on the segmentation, this study analysed whether different factors are suitable for distinguishing the segments and whether consumers that show a preference for the more environmentally friendly version of an all-purpose adhesive can be characterised by specific consumer characteristics. Because we assume that consumers show low-involvement when buying all-purpose adhesives, it should be possible to transfer these results to similar low-involvement products. Besides, our results not only give a deeper insight in the consumer behaviour towards green nonfood FMCGs, but also the characterisation of different consumer segments can help to develop marketing strategies in a more targeted way and to sell green products more efficiently.

## 2 | LITERATURE FINDINGS AND DERIVED HYPOTHESES

In 1990, a German study described a number of factors that lead to the nonpurchase of green products, like doubts about authenticity, lack of efficiency, image problems, price reservations, habit, approachability and feelings of irrelevance (Bänsch, 1990). Almost 30 years later, these findings are still in line with current studies, as shown in the following section.

The doubt in consumers' minds that a product is sustainable or that it is less effective than the conventional product owing to its sustainability can be an obstacle to purchasing. This perception of risk includes financial, performance, physical, psychological and social risks (Jacoby & Kaplan, 1972). The possibility of the negative effects of perceived risk on the purchase of products in general (Mitchell, 1999) and green products in particular (Kang & Kim, 2013) has been shown several times. By contrast, it has also been shown that the effects of perceived risk can be minimised if the trust of consumers in a product is high or can be increased (Chen & Chang, 2013; Chrisjatmiko, 2018). Further, in a review article of Joshi and Rahman (2015), it is shown that a lack of trust can act as a purchase barrier to green purchases. Thus, we hypothesise:

**Hypothesis 1.** Perceived risk is suitable for discriminating eco-friendly consumer groups from other consumer groups for all-purpose adhesives.

**Hypothesis 2.** Trust is suitable for discriminating eco-friendly consumer groups from other consumer groups for all-purpose adhesives.

Consumers often use the price of a product as a quality signal to avoid risks (Völckner & Hofmann, 2007; Zeithamel, 1988). Although studies show that there is only a small correlation between price and quality (Imkamp, 2008), the price of a product subconsciously has an influence on the expected product quality or product performance (Shiv, Carmon, & Ariely, 2005). From this point of view, price policy is very important, because higher prices can signal higher product quality and perceived high quality of the green product has a positive influence on green purchase intentions and behaviour (Smith & Paladino, 2010; Tsakiridou, Boutsouki, Zotos, & Mattas, 2008). On the other hand, a higher price usually leads to fewer buyers of this product. Thus, many studies found that the higher price of green products acts as a major purchase barrier (Barber, Bishop, & Gruen, 2014; Liobikienė & Bernatoniene, 2017). In line with this, Laroche, Bergeron, and Barbaro-Forleo (2001) show that only committed environmentally friendly consumers are willing to pay more for green products. The same effect was found by Scherer, Emberger-Klein, and Menrad (2018b) for bio-based sports equipment in Germany. In some cases, consumers expect higher prices for green products and trust them less when they have a lower price (Kahraman & Kazançoğlu, 2019). On the basis of the described findings, we hypothesise:

**Hypothesis 3.** The price–quality scheme is suitable for discriminating eco-friendly consumer groups from other consumer groups for all-purpose adhesives.

**Hypothesis 4.** Cost perception is suitable for discriminating between eco-friendly consumer groups and other consumer groups for this product.

Consumers not only use price as a one-dimensional product attribute in comparison with other multidimensional product attributes to simplify the purchase decision. The brand is also used by consumers as a simplifying attribute (Brucks, Zeithaml, & Naylor, 2000). Additionally, the influence of the brand name on the perceived quality has been shown (Rao & Monroe, 1989), especially for private label brands (Boyle & Lathrop, 2013; Méndez, Oubiña, & Rubio, 2008). It was also shown that consumers prefer their favourite brands to other green brands (Young, Hwang, McDonald, & Oates, 2009), but altogether, the influence of brands in the area of green consumption has been rarely analysed to date (Joshi & Rahman, 2015). Consumers with a high preference for specific brands often buy these brands regularly and thus create for themselves a kind of habit, and the negative influence of habits on the purchase of green products is shown in different studies (Joshi & Rahman, 2015). Thus, we assume:

**Hypothesis 5.** Habit is suitable for discriminating brand-affine consumers of all-purpose adhesives from other consumer segments for this product.

Consumers are sometimes unwilling to choose a green product or worse; they do not know that there is an alternative green product on

the market. A lack of related information can lead to a lack of motivation to engage in sustainable consumption (Shao, Taisch, & Ortega-Mier, 2016). When consumers sustain a high cost in terms of effort or time, this can be a significant barrier (Young et al., 2009). Approachability seems to be important in consumers' perception of the convenience of green products. If green products are easy to access, this can be a positive influence on the purchasing of green products (Vermeir & Verbeke, 2008). Appropriate information concerning green products is also an important factor influencing the purchase of such products. These aspects are combined in convenience perception according to Bänisch (1990). We hypothesise:

**Hypothesis 6.** Convenience perception is suitable for discriminating eco-friendly consumer groups of all-purpose adhesives from other consumer groups for this product.

Furthermore, consumer behaviour is often influenced by consumer attitudes (Fraj & Martinez, 2006). Attitudes towards the environment reflect a psychological tendency and represent an assessment of the environment with a degree of favour or disfavour (Milfont & Duckitt, 2010). Many recent studies show an influence of pro-environmental attitudes on the purchase of green products (Chekima et al., 2016; Klein, Emberger-Klein, & Menrad, 2020; Mishal, Dubey, Gupta, & Luo, 2017; Robinot, Ertz, & Durif, 2017; Scherer et al., 2018b; Scherer, Emberger-Klein, & Menrad, 2017). Additionally, it is also important whether consumers feel that their own behaviour is relevant or not. The feeling of being able to do something for the environment usually leads consumers to take the impact of their purchases on the environment into account and thus usually leads to a higher awareness of their environment (Roberts, 1996; Tan & Lau, 2011). The influence of perceived consumer effectiveness (PCE) was shown in recent studies (Diaz-Rainey & Ashton, 2011; Gleim, Smith, Andrews, & Cronin, 2013; Kang & Kim, 2013; McDonald & Oates, 2006; Rowlands, Scott, & Parker, 2003; Thompson, Anderson, Hansen, & Kahle, 2009). On the basis of these findings, we define the following hypothesis:

**Hypothesis 7.** Green consumer values are suitable for discriminating eco-friendly segments of consumers of all-purpose adhesives from other consumer segments for this product.

**Hypothesis 8.** Perceived consumer effectiveness is suitable for discriminating eco-friendly segments of consumers of all-purpose adhesives from other consumer segments for this product.

The results regarding the influence of socio-demographic variables on green consumption are controversial. Whereas older studies showed an influence (Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003; Jain & Kaur, 2006), more recent studies indicate that this influence is decreasing (Akehurst, Afonso, & Martins Gonçalves, 2012) or no longer present (Klein, Emberger-Klein, Menrad, Möhring, & Blesin, 2019; Nath, Agrawal, Gautam, & Sharma, 2015). However, it should be noted that for example Panzone, Hilton, Sale, and

Cohen (2016) show that age or gender can have a significant influence on green shopping in supermarkets. Therefore, we hypothesise:

**Hypothesis 9.** Age and gender are suitable socio-demographic variables for discriminating eco-friendly consumer groups from other consumer groups for all-purpose adhesives.

### 3 | METHODS

#### 3.1 | Data collection and sample characteristics

In this study, we used an online survey to collect data in Germany in July 2017. We subcontracted the recruitment to a market research company. The questionnaire included a CBC experiment: one-half of the respondents answered a CBC dealing with all-purpose adhesives; the other half answered a CBC dealing with glue sticks. We also used eight item scales to test our hypotheses. We modified some item scales according to the aim of this study. All scales and their items as well as their original sources can be found in Appendix A of this manuscript together with the mean of the items and their standard deviation. In this survey, we only asked individuals who bought all-purpose adhesives or glue sticks in the last year and set a quota for age and gender based on data from the database 'Best for Planning (2017)'. After excluding speeders, straightliners and people with illogical answers, we achieved a sample of  $n = 1,390$  respondents for the statistical analysis from  $n = 2,150$  individuals who originally had completed the survey. The subsamples that we use in this study are respondents who answered the CBC that dealt with all-purpose adhesives ( $n = 709$ ). We show the structure of our total sample and the subsample compared with the German population in Table 1.

#### 3.2 | Choice experiment

Originally developed for mathematical psychology, conjoint measurement was used in a marketing context by Green and Rao (1971) for the first time. The technique permits the quantification of consumers'

preferences and how consumers react to changes in products' characteristics. It is, today, one of the most applied consumer measurement methods (Green, Krieger, & Wind, 2001).

With a CBC it is possible to measure how much importance different product attributes have for the consumer as well as the utility of each attribute level of the product and its contribution to the total product utility (Backhaus, Erichson, & Weiber, 2011). For the experiment in this study, we selected the attributes and levels of the tested all-purpose adhesives based on Internet or local store checks. The selection aimed to simulate realistic purchase decisions. All attributes and levels included in the survey can be found in Table 2. We measured brand with three well-known brands (Brands A, B and C) and one retail brand (Brand D). All levels of ingredients and packaging used in the study were found on the German market. Three levels were selected for ingredients (70% natural ingredients, 90% natural ingredients and 'nothing special') and also for packaging (80% recycled plastic, 88% from renewable resources and 'nothing special'). It can be assumed that the use of natural raw materials as an adhesive and packaging as well as the use of recycled materials in packaging have a sustainable positive environmental impact. In the field of packaging, various review studies show that bio-based packaging is more environmentally friendly (Spierling et al., 2018) and attracts some consumer interest (Boz, Korhonen, & Koelsch Sand, 2020; Herbes, Beuthner, & Ramme, 2018; Ketelsen, Janssen, & Hamm, 2020). Additionally, five price levels for all-purpose adhesives were included to mimic the observed price range on the market. We designed the experiment with Sawtooth Software Version 8. Each respondent could choose one of three random products or the 'nonbuy' option for a total of 10 choices in the experiment. A graphical representation of the CBC experiment is shown in Appendix B. The wording for the individual levels was chosen in the same way as they appear on the manufacturers' packaging. Thus, in our experiment, the consumer had the same information that he would have had when buying the products in a store.

#### 3.3 | Latent class analysis

Based on respondents' decisions in the CBC experiment, we used LCA to segment the respondents to the survey. An LCA is a type of

	Total sample (n = 1,390)	All-purpose adhesives (n = 709)	German population <sup>a</sup>
Gender	%	%	%
Male	38.6	38.5	41.3
Female	61.4	61.5	58.7
Age	%	%	%
16–19	1.9	2.0	2.3
20–29	11.1	10.9	13.4
30–39	13.3	13.0	15.0
40–49	15.3	15.8	16.6
50–59	19.8	20.6	18.7
60+	38.6	37.8	34.0

**TABLE 1** Socio-demographic structures of the sample, CBC subsample and German population

<sup>a</sup>Best for Planning (2017).

**TABLE 2** Latent class analysis and results of the CBC experiment

All-purpose adhesive (n = 709)	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	CBC total sample
Segment size	14.9%	20.7%	16.8%	27.0%	8.3%	12.3%	
Average importance of attributes (%)							
Brand	15.44	4.69	3.16	5.15	6.6	56.87	14.49
Ingredients	39.21	29.37	3.34	6.15	1.31	7.01	16.72
Packaging	31.32	22.95	2.42	4.35	4.6	3.15	13.24
Price	14.02	43.00	91.08	84.35	87.48	32.97	55.55
Average utilities (zero-centred)							
Brand							
Brand A	20.33	11.97	7.84	5.30	-1.92	97.67	23.37
Brand B	17.88	0.8	-1.8	8.59	12.37	22.29	4.43
Brand C	3.25	-5.98	-1.22	-1.88	3.6	9.86	-0.79
Brand D	-41.45	-6.78	-4.82	-12.01	-14.05	-129.82	-27.00
Ingredients							
70% natural ingredients	15.11	16.12	1.69	-1.69	-3.26	2.16	7.09
90% natural ingredients	70.86	50.67	5.82	13.13	1.28	12.94	28.41
Nothing special	-85.97	-66.8	-7.52	-11.45	1.97	-15.1	-35.50
Packaging							
80% recycled plastic	19.76	18.93	1.98	-1.88	7.73	-3.86	6.57
88% from renewable resources	52.77	36.42	3.86	9.64	-10.69	8.23	19.26
Nothing special	-72.53	-55.36	-5.84	-7.76	2.96	-4.37	-25.82
Price							
€2.49	21.75	80.56	108.19	137.84	136.11	49.08	105.20
€3.09	14.09	42.89	70.46	87.25	106.16	43.45	52.85
€3.69	9.02	14.14	43.91	19.42	92.15	29.19	7.91
€4.29	-10.51	-46.15	33.57	-44.92	-213.83	-38.91	-54.19
€4.89	-34.35	-91.44	-256.12	-199.58	-120.59	-82.8	-111.78
None	-301.08	-24.23	86.91	-33.14	193.88	-19.67	-29.32

Abbreviation: CBC, choice-based conjoint.

multilevel cluster analysis. The method does not clearly allocate a respondent to one specific group, but to all possible groups. Nevertheless, it is possible to say to which group a respondent most likely belongs. To choose the right number of segments, different information criteria (e.g., Akaike information criterion [AIC] and consistent AIC [CAIC]) can be used (Sawtooth Software, 2004; Teichert, 2000). We used Sawtooth Software to estimate the LCA and calculated it for two to eight segments. On the basis of the minimum CAIC, we chose a six-segment solution.

results, we eliminated the second statement of the item scale perceived consumer effectiveness so that 33 statements were finally included in the principal components analysis (PCA). We used varimax rotation as the rotation method. The PCA resulted in eight components: these are the price-quality scheme, green consumer value, cost perception, convenience perception, habit, perceived risk, perceived consumer effectiveness and trust. All statements, their rotated component loadings and further information are shown in Appendix A.

## 4 | RESULTS

### 4.1 | Principal component analysis

As a first step, we checked the Cronbach's alpha values to prove the internal consistency of the different item scales. On the basis of the

### 4.2 | Characterisation of consumer segments

Table 2 includes the results of the six-cluster LCA solution. For each cluster, it shows the importance of each attribute and the part-worth utilities of the attribute levels per cluster. In the last column, we present the results for the total sample of the CBC experiment.

The results of the total sample show that Brand A has on average the highest part-worth of the tested brand levels. Utility decreases

from Brand A to Brand B to Brand C and is lowest in the case of Brand D, which is the retail brand product. For the attribute ingredients, the highest part-worth can be observed for 90% natural ingredients, followed by 70% natural ingredients and the level 'nothing special'. The highest part-worth for packaging has packaging made from 88% renewable resources, followed by 80% recycled plastic packaging and the level 'nothing special'. For the prices of all-purpose adhesives, consumers' utility decreases if price levels increase, which were expected according to economic theory. The respondents of the survey have a negative utility for the none option. Price has by far the highest average importance for respondents. Of second highest average importance are the ingredients, followed by brand and packaging.

The six identified clusters can be characterised by different part-worth utility profiles. Cluster 1 (14.9% of the sample) prefers Brand A, with 90% natural ingredients and a packaging made from 88% renewable resources. Compared with the other clusters, it has the highest importance for the attributes ingredients and packaging. So this cluster can be characterised as *very eco-friendly*.

Cluster 2 (20.7%) also prefers Brand A, with 90% natural ingredients and a packaging made from 88% renewable resources. Respondents of this cluster also show high importance for ingredients and packaging. However, price is most important for members of this cluster. Thus, Cluster 2 can be characterised as *eco-friendly and price-sensitive*.

Cluster 3 prefers Brand A, with 90% natural ingredients and a packaging made from 88% renewable resources. However, this cluster shows low importance for all of these three attributes. The highest importance is given to price compared with the other clusters. Furthermore, this cluster has a positive part-worth utility for the none option meaning that only product combinations with the lowest price can have a higher value than the none option. Thus, the respondents in this cluster can be characterised as *bargain hunters*.

Cluster 4 prefers Brand B, with 90% natural ingredients and a packaging made from 88% renewable resources. Moreover, like Cluster 3, the respondents of this cluster also show high importance for the attribute price. Therefore, these consumers can be characterised as *price-sensitive consumers*.

Cluster 5 also prefers Brand B for which nothing special is said about the ingredients and has 80% recycled plastic packaging. For respondents in this cluster, the attribute price is also very important. Nevertheless, the high part-worth of the none option shows that most of the respondents in this cluster selected the none option most times and not one of the presented all-purpose adhesives. Thus, the group can be characterised as *nonbuyers*.

Cluster 6 prefers Brand A, with 90% natural ingredients and packaging made from 88% renewable resources. Respondents of this cluster show the highest importance for the attribute brand. Thus, this cluster can be characterised as *brand-affine*.

### 4.3 | Multinomial logistic regression

Subsequent to the LCA, we estimated multinomial logistic regression with SPSS and checked whether the components are suitable for

discriminating between the identified consumer groups of all-purpose adhesives. Furthermore, we included gender and age groups in the regression. The pseudo- $R^2$  values of 0.377 (Cox and Snell) and 0.389 (Nagelkerke) indicated a good model fit.

Because multinomial regression always requires a reference group, we calculated the regression for all groups. Table 3 shows the reference group at the top. We use the odds ratios of the multinomial regression [Exp(B)] to interpret the results. Generally speaking, if the odds ratio is greater than 1, it is more likely to belong to the comparison group at a high value of the considered factor. If the value of the odds ratio is lower than 1, it is more likely to belong to the reference group.

If Perceived Risk increases, it is most likely that one can find consumers in the brand-affine consumer cluster compared with the other clusters. The same significant effect of perceived risk can be found for differentiating nonbuyers from the price-sensitive, price-sensitive and eco-friendly consumers and the Bargain hunters. In contrast, perceived risk does not significantly contribute to the differentiation of the other consumer segments (Table 3). Therefore, we can state that perceived risk is not a suitable factor for discriminating eco-friendly consumers from the other clusters. Thus, Hypothesis 1 is rejected.

Trust in bio-based adhesives or eco-friendly products or suppliers significantly contributes to distinguishing the group of eco-friendly consumers from the other five clusters. The same effects can be found when differentiating price-sensitive, eco-friendly consumers from the other identified groups (Table 3). Additionally, trust partially, statistically and significantly distinguishes the other clusters, without, however, showing clear patterns. Therefore, we regard trust as a suitable factor for distinguishing eco-friendly consumers from the other consumer groups. Thus, Hypothesis 2 is confirmed.

The factor price-quality scheme significantly contributes to the segmentation of the nonbuyers from all other identified consumer clusters. Participants in our survey more probably belong to the nonbuyers if their price-quality scheme decreases. The opposite is true to distinguish bargain hunters from eco-friendly consumers and brand-affine consumers (Table 3), although this factor does not show any significant effect in separating the other consumer clusters from each other. As the price-quality scheme mainly segments the group of nonbuyers and bargain hunters from the other groups, Hypothesis 3 must be rejected.

Additionally, the factor of cost perception significantly separates the group of nonbuyers from the other groups. Furthermore, it is more unlikely that a consumer belongs to the cluster of eco-friendly consumers than to another cluster if his cost perception increases. Moreover, this factor can help to segment price-sensitive consumers and bargain hunters from less price-sensitive consumers (Table 3). Thus, Hypothesis 4 is rejected.

Our results show clearly that the factor habit significantly segments the brand-affine consumers from the other consumer groups (Table 3). This means that it is more likely to belong to the group of brand-affine consumers if the habits level increases. Thus, Hypothesis 5 is confirmed.

**TABLE 3** Results of the multinomial logistic regression

		Reference group				
		Nonbuyers (Cluster 5)	Brand-affine consumers (Cluster 6)	Price-sensitive consumers (Cluster 4)	Bargain hunters (Cluster 3)	Price sensitive, eco- friendly consumers (Cluster 2)
Eco-friendly consumers (Cluster 1)	Perceived risk	0.716	0.642**	0.989	1.004	1.179
	Trust	2.642***	1.669**	1.641**	2.296***	1.413*
	Price-quality scheme	2.141***	1.088	1.202	1.521**	1.268
	Cost perception	0.239***	0.696	0.444***	0.385***	0.744
	Habit	0.967	0.580**	1.073	1.098	1.178
	Convenience perception	0.752	0.951	0.851	0.992	1.144
	Green consumer value	3.216***	3.165***	3.094***	2.538***	1.434*
	Perceived consumer effectiveness	1.506*	1.593**	1.453*	1.365	1.013
	Gender (m)	0.446*	2.340*	1.028	1.487	1.167
	Age 16–29	1.458	1.436	1.291	2.739	.514
	Age 30–39	3.396	4.034*	1.852	2.416	1.169
	Age 40–49	0.476	0.796	0.555	0.564	0.465
	Age 50–59	0.812	1.142	1.173	1.280	1.133
Price-sensitive, eco-friendly consumers (Cluster 2)	Perceived risk	0.607**	0.545***	0.838	0.852	
	Trust	1.870***	1.181	1.162	1.625***	
	Price-quality scheme	1.689**	0.859	0.948	1.200	
	Cost perception	0.321***	0.935	0.597***	0.518***	
	Habit	0.821	0.492***	0.911	0.932	
	Convenience perception	0.657*	0.831	0.744*	0.867	
	Green consumer value	2.242***	2.207***	2.157***	1.770***	
	Perceived consumer effectiveness	1.488*	1.573**	1.435**	1.348**	
	Gender (m)	0.382**	2.004*	0.880	1.274	
	Age 16–29	2.837	2.794*	2.511**	5.330***	
	Age 30–39	2.906	3.452*	1.584	2.067	
	Age 40–49	1.022	1.712	1.194	1.21	
	Age 50–59	0.717	1.008	1.036	1.130	
Bargain hunters (Cluster 3)	Perceived risk	0.713*	0.639**	0.984		
	Trust	1.151	0.727*	0.715**		
	Price-quality scheme	1.408*	0.716*	0.790		
	Cost perception	0.620**	1.806***	1.153		
	Habit	0.881	0.528***	0.977		
	Convenience perception	0.759	0.959	0.859		

(Continues)



TABLE 3 (Continued)

		Reference group				
		Nonbuyers (Cluster 5)	Brand-affine consumers (Cluster 6)	Price-sensitive consumers (Cluster 4)	Bargain hunters (Cluster 3)	Price sensitive, eco- friendly consumers (Cluster 2)
	<i>n</i> = 709					
	Green consumer value	1.267	1.247	1.219		
	Perceived consumer effectiveness	1.104	1.167	1.065		
	Gender (m)	0.300**	1.573	0.691		
	Age 16–29	0.532	0.524	0.471		
	Age 30–39	1.406	1.670	0.766		
	Age 40–49	0.843	1.412	0.984		
	Age 50–59	0.635	0.892	0.917		
Price-sensitive consumers (Cluster 4)	Perceived risk	0.724*	0.650**			
	Trust	1.610**	1.017			
	Price–quality scheme	1.782***	0.906			
	Cost perception	0.538***	1.566**			
	Habit	0.901	0.541***			
	Convenience perception	0.884	1.117			
	Green consumer value	1.039	1.023			
	Perceived consumer effectiveness	1.037	1.096			
	Gender (m)	0.434*	2.277**			
	Age 16–29	1.129	1.112			
	Age 30–39	1.834	2.179			
	Age 40–49	0.856	1.434			
Age 50–59	0.692	0.973				
Brand-affine consumers (Cluster 6)	Perceived risk	1.115				
	Trust	1.583**				
	Price–quality scheme	1.967***				
	Cost perception	0.344***				
	Habit	1.667**				
	Convenience perception	0.791				
	Green consumer value	1.016				
	Perceived consumer effectiveness	0.946				
	Gender (m)	0.191***				
	Age 16–29	1.015				
Age 30–39	0.842					

(Continues)

**TABLE 3** (Continued)

	Reference group				Price sensitive, eco-friendly consumers (Cluster 2)
	Nonbuyers (Cluster 5)	Brand-affine consumers (Cluster 6)	Price-sensitive consumers (Cluster 4)	Bargain hunters (Cluster 3)	
<i>n</i> = 709					
Age 40–49	0.597				
Age 50–59	0.711		Exp(B)		

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.00$ .

The factor convenience perception does not statistically significantly distinguish the different consumer groups of the analysed all-purpose adhesives (Table 3). Therefore, Hypothesis 6 is rejected.

The green consumer value significantly distinguishes the eco-friendly and the price-sensitive, eco-friendly consumers from the other consumer groups and both 'green' groups from one another (Table 3). Therefore, it is more likely that a consumer belongs to the cluster of eco-friendly consumers or price-sensitive, eco-friendly consumers than to another cluster if his green consumer value increases. The same effect is also true for the factor PCE, with the exception that this factor does not separate both 'green' groups from each other. Thus, the results show that it is more likely that consumers belong to the cluster of eco-friendly consumers or the cluster of price-sensitive eco-friendly consumers if their perceived consumer effectiveness increases. Therefore, Hypotheses Hypothesis 7 and Hypothesis 8 are both confirmed.

Finally, we analysed the influences of age and gender. In the group of nonbuyers, there is a higher probability of males compared with the other consumer segments. Additionally, in the brand-affine consumer group, there is a higher probability of females than in the eco-friendly consumers, price-sensitive, eco-friendly consumers as well as price-sensitive consumers. Concerning age, there are no clear results, although price-sensitive, eco-friendly consumers of the all-purpose adhesives tend to be younger. Thus, Hypothesis 9 must be rejected.

## 5 | DISCUSSION AND CONCLUSION

The purpose of this study was to analyse how consumers can be segmented based on their preferences for all-purpose adhesives. In the second step, we analysed whether or not consumers that have preferences for the more environmentally friendly version of an all-purpose adhesive can be characterised by specific consumer characteristics.

Although the price of all-purpose adhesives is of high importance, the other three attributes are of about equal importance in our CBC experiment. If we aggregate the relevance values for ingredients and packaging of the all-purpose adhesive, we get similar results to Scherer, Emberger-Klein, and Menrad (2018a). On the basis of the LCA, we were able to identify 6 different consumer groups. This

confirms the high relevance of heterogeneity among consumers of bio-based products.

Within these six different groups, we identified two segments that show clear preferences for bio-based all-purpose adhesives. Furthermore, two segments clearly prefer low prices in combination with more environmentally friendly alternatives too. Similar groups were found in previous studies (Scherer et al., 2017, 2018b). The nonbuyers segment is also relevant because this might include consumers that do not wish to convert from a fossil resource basis to biomass. A new segment was also found in this study that had not been identified in recent studies related to bio-based products. Around 12% of the consumers of all-purpose adhesives are highly brand-affine regarding environmentally friendly products or packaging attributes.

The second part of this study aims to identify such factors that can distinguish mainly eco-friendly consumer segments of all-purpose adhesives from the other consumer groups. Trust, green consumer value and PCE can significantly separate the clusters of eco-friendly consumers as well as eco-friendly and price-sensitive consumers from the other four identified groups. One insight that is supported by the findings of Joshi and Rahman (2019) is that PCE has a positive influence on consumers' sustainable purchase behaviour. Do Paço and Raposo (2009) also showed in their segmentation study that PCE discriminates eco-friendly consumers from less eco-friendly consumers. Furthermore, they showed that eco-friendly buying behaviour, a factor we call green consumer value (because they used very similar items), can distinguish consumer groups. The influence of trust is also indicated by Ricci, Banterle, and Stranieri (2018), who analysed the influence of Trust on consumer attitudes to food.

Another clear effect can be found when distinguishing nonbuyers from the other groups. In particular, the factors price-quality scheme and cost perception are responsible for this effect in our study. However, these factors are also relevant (at least in several of the calculated multinomial regression estimates) when distinguishing between price-sensitive and less price-sensitive consumer groups of all-purpose adhesives.

Habits are a significant factor that influences the brand-affine consumer group of all-purpose adhesives. This result can be expected because brand owners often concentrate their marketing strategies and activities to keep their customers and make them loyal to a specific brand (Kotler, Armstrong, Harris, & Piercy, 2016).

Socio-demographic variables show mixed results for distinguishing eco-friendly consumers of all-purpose adhesives from other groups. The dwindling influence of socio-demographic effects in the field of sustainable consumption has already been shown in previous studies (Klein et al., 2019; Panzone et al., 2016).

Convenience Perception does not contribute to group separation. This finding might be due to the availability of bio-based all-purpose adhesives almost everywhere in the major distribution channels in Germany.

## 5.1 | Recommendations

On the basis of the insights of the study and the consumer segments found, we can give some recommendations for possible business and marketing strategies. The product group examined in our study is characterised by the fact that the main brand manufacturers sell a green product variant under their well-established brand name. Whereas some companies integrate sustainability into their existing brands, other companies acquire emerging sustainability brands (Belz & Peattie, 2013). We assume that the second strategy is pursued much more frequently by companies. This is supported by Prakash (2002), who recommends that companies with a focus on their brand advantages prefer a strategy that makes the product, not the process, environmentally friendly. Because certain groups of consumers stick with their preferred brand if they feel comfortable with it (Kumar Mishra, Kesharwani, & Das, 2016), it could be difficult to convince them to buy a sustainable product that is not offered under the umbrella brand, not least because many consumers prefer to buy green products from established brands (Mooth, 2009). Therefore, FMCG manufacturers should consider including sustainable products under their established brand portfolio instead of designing a new brand for them, especially because it has been shown that a more environmentally friendly orientation can definitely increase the value of a brand (Butt et al., 2017; First & Khetriwal, 2009)

On the other hand, the green characteristics of a product are much more important than the brand name for pro-environmental consumers, which makes it possible for smaller and nonestablished companies to address this consumer segment (Borin, Lindsey-Mullikin, & Krishnan, 2013). However, this also presupposes that consumers are prepared to pay for the higher costs resulting from a more environmentally friendly approach (Orsato, 2006). Although companies should certainly develop green and sustainability-oriented strategies and also show an interest in doing so (Menrad, Klein, & Kurka, 2009), such strategies are particularly interesting for the targeting of pro-environmental consumers. Owing to higher costs for developing and introducing green products, the pricing strategy for these products is important (Borin et al., 2013) and has to be balanced with the willingness to pay of the interested consumer segments.

In summary, in our study, about 45% of the respondents reacted strongly to the product prices and can only be addressed by a targeted pricing policy that is oriented at the price level of conventional products. About 36% of consumers can be classified as

environmentally friendly. However, their positive environmental attitude does not result in product purchases or higher willingness to pay for bio-based products per se, but they can be addressed by FMCG companies in a targeted manner. These consumers can be assured if a convincing attempt is made to build up trust in the sustainability of the company and its products. This can often only be done over the long term.

An interesting segment is brand-affine consumers (12%) that had not been found in previous studies, most probably because there are not a lot of markets in which well-established brands have introduced 'green variants' of such brands. This segment can probably be attracted if their preferred brand brings a 'green product' to the market, as they rarely change their preferred brand. However, why major brand owners in other segments of FMCG markets are shying away from bringing green product variants under their umbrella brands to the market is an interesting research question for the future.

## 5.2 | Limitations

There are some limitations of this study that must be acknowledged. Because we have used a panel of a market research institute to collect data, fluctuating data quality cannot be ruled out. However, we have tried to counteract this effect by formulating valid questions and carrying out data cleaning.

An important data basis is our CBC experiment. Although we tried to show the respondents a selection decision that is as realistic as possible, the final purchase decision always remains hypothetical and might differ from that in a market environment. Therefore, it is recommended that field experiments be carried out in future studies related to bio-based products. Additionally, it cannot be definitively excluded that there are other unobserved factors that can have an influence on the purchase decision of the identified consumer groups of all-purpose adhesives.

We found six different consumer groups in this study. However, it cannot be excluded that there are other consumer groups in other countries because this study is related to Germany and the results are perhaps not fully transferable to other countries. Although we obtained very plausible results for the influencing factors we examined, there are most probably further influencing factors as indicated by the pseudo- $R^2$  values of 0.377 (Cox and Snell) and 0.389 (Nagelkerke). Therefore, we recommend extending the research design and transferring the approach to other countries in future studies.

This study has a narrow focus. We use a method that is common in marketing and investigate a special product field in Germany. This seems to us to be useful for the purpose of this study, but it should be mentioned that other researchers recommend that studies on sustainability should be more interdisciplinary (Reisch, Cohen, Thøgersen, & Tukker, 2016), that they be considered in a broader sociological context (Spaargaren, 2003) and that sustainability principles be more strongly integrated into consumer behaviour in order to go beyond the mere reduction of environmental impacts (Peattie, 2010). Further,

some studies recommend the use of far-reaching item scales for segmentations like the lifestyle or worldview of the consumers (Hedlund-de Witt et al., 2014; Leiserowitz et al., 2006).

As there are only a few studies, especially in the area of consumer segmentation in the field of green nonfood FMCGs to date, this study provides insight into various green FMCG buyer segments. The findings allow defining and fine-tuning related marketing strategies for interested producers or retailing companies of such products and support policy activities in this field.

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## APPENDIX A: APPENDIX

KMO	0.86		<i>n</i> = 1,390
Influencing factors and questionnaire items	Cronbach's alpha and rotated component loadings	Mean value items	Standard deviation
Price-quality scheme (Lichtenstein, Ridgway, & Netemeyer, 2011)	0.81		
Generally speaking, the higher the price of the product, the higher the quality.	0.78	2.4	0.96
The old saying 'you get what you pay for' is generally true.	0.76	2.5	1.03
The price of a product is a good indicator of its quality.	0.80	2.8	0.92
You always have to pay a bit more for the best.	0.78	3.2	1.01
Green consumer value (Haws, Netemeyer, & Bearden, 2011)	0.91		
It is important to me that the product I use does not harm the environment.	0.79	3.9	0.88
I consider the potential environmental impact of my actions when making decisions.	0.86	3.5	0.98
My purchasing habits are affected by my concern for our environment.	0.85	3.2	1.05
I am concerned about wasting the resources of our planet	0.75	3.9	0.99
I would describe myself as environmentally responsible.	0.79	3.5	0.89
I am willing to be inconvenienced in order to take actions that are more environmentally friendly.	0.80	3.4	0.97
Cost perception (Voon, Ngui, & Agrawal, 2011)	0.80		
Bio-based adhesives are too expensive.	0.74	3.3	0.86
Only higher income consumers can afford bio-based adhesives.	0.85	2.9	1.11
Bio-based adhesives are beyond my budget.	0.80	2.8	1.17
Convenience perception (Voon et al., 2011)	0.77		
Buying bio-based adhesives is highly inconvenient.	0.74	2.7	0.96
Bio-based adhesives are only available in limited stores/markets.	0.84	2.9	1.11
The stores that I frequently shop at do not sell bio-based adhesives.	0.80	3.3	1.09
Habit (Sproles & Kendall, 2011)	0.71		
I have favourite brands I buy over and over.	0.79	3.4	1.06
Once I find a product or brand I like, I stick with it.	0.81	3.4	0.99
I go to the same store each time I shop.	0.64	3.3	0.99
I change brands regularly.*	0.64	3.4	0.88
Perceived risk (Jacoby & Kaplan, 1972)	0.86		
If I buy a bio-based adhesive, there is a danger that I will lose money (e.g., the product does not work).	0.76	2.6	0.98

(Continues)

KMO	0.86		n = 1,390
Influencing factors and questionnaire items	Cronbach's alpha and rotated component loadings	Mean value items	Standard deviation
If I buy a bio-based adhesive, there is a danger that something does not work or it will not work properly.	0.76	2.8	1.01
If I buy a bio-based adhesive, there is a danger that it is not safe (e.g., it is harmful to your health).	0.74	2.3	0.92
If I use a bio-based adhesive, there is a danger that it will not fit in well with my self-image or self-concept (e.g., the way I think about myself).	0.68	1.8	0.93
If I use a bio-based adhesive, there is a danger that it will affect the way others think of me.	0.65	1.6	0.865
On the whole, considering all sorts of factors combined, it is risky to buy a bio-based adhesive.	0.77	1.9	0.95
Perceived consumer effectiveness (Roberts, 1996)	0.76		
It is worthless for the individual consumer to do anything about pollution.*	0.70	4.1	1.10
Whenever I buy products, I try to consider how my use of them will affect the environment and other consumers.	n/a	3.1	1.02
Because a lone individual cannot have any effect on pollution or the over-exploitation of natural resources, it does not make any difference what I do.*	0.70	4.2	0.94
Each consumer's behaviour may have a positive effect on society, provided that they purchase products sold by social responsible companies.	0.56	4.1	0.92
Trust (Voon et al., 2011)	0.90		
I trust that those selling or produce bio-based adhesives are honest about the bio-based nature of their products.	0.78	3.2	0.88
I trust that eco-friendly companies comply with environmental standards.	0.83	3.4	0.93
I trust eco-certification and eco-labels.	0.87	3.22	0.97
I trust the information on eco-labels.	0.87	3.2	0.97

\*Items have been recoded.

Note. 1 = *totally disagree*; 5 = *totally agree*.



## APPENDIX B

Example of a choice set in the choice-based conjoint (CBC) experiment. The brands have been made anonymous in this example

**Wenn dies ihre einzigen Möglichkeiten für einen Vielzweck-/Alleskleber wären, welchen würden Sie wählen?**

(1 of 10)

<b>Marke</b>			
<b>Inhalt (*inkl. Wasser)</b>	70% natürliche Inhaltsstoffe*	Keine Besonderheiten	90% natürliche Inhaltsstoffe*
<b>Verpackung (Klebebehälter)</b>	80% recycelter Kunststoff	80% recycelter Kunststoff	88% aus nachwachsenden Rohstoffen
<b>Preis</b>	2,49€	3,09€	4,29€
	Select	Select	Select

Ich würde keines dieser Produkte kaufen.

Select