VARIETY SEEKING BEHAVIOR IN THE WINE DOMAIN: A CONSUMERS SEGMENTATION USING BIG DATA

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Abstract

This study investigates variety seeking behavior in the wine domain. Since variety seeking depends on brand strategies and consumers' preferences for different types of vines and denominations, a bi-dimensional perspective is adopted. Two new variety seeking measures are defined, namely the Wine Index of Diversity and Brand Index of Diversity. A finite mixture regression model is implemented to identify and characterize groups of households sharing similar variety seeking behavior in a statistically representative sample of 8,313 Italian households. Four groups are identified based on consumer characteristics and their purchasing behavior. The largest group is "switchers," which includes consumers showing a relatively higher wine diversity than brand diversity. Estimates reveal the "habitual" group, that lives in the south and consumes wine less frequently than all other groups. The "loyal" group includes the youngest consumers with an above average income, who reside in the northern regions. Finally, the "variety seekers" are older, have the highest incomes, and live in the central regions. This grouping provides insights into the effects of brand and wine typology on consumers' choices.

KEYWORDS: Market research, Wine, variety seeking, segmentation, Italy, preferences

1.   Introduction

Satisfying curiosity and changing preferences are frequent processes in food consumption behavior, because consumers tend to diversify their choices to avoid repetitive food choices (Adamowicz and Swait, 2013). Novelty, change, and unpredictability are intrinsically satisfying (Berlyne et al., 1963). Therefore, four decades ago, the issue of variety seeking entered the marketing literature. Hirschman (1980) defined the search for variety as an inner impulse or force motivating individuals to seek new information, namely a "bank of potentially useful knowledge." People seek experiential knowledge through consumption to improve their decision making. McAlister and Pessemier (1982) presented a taxonomy of variety seeking behavior (VSB), arguing how consumers can satiate their desire for variety with product attributes, and highlighting that varied behavior depends on individual needs or is due to the feeling of reward stemming from changing choices. Kahn (1995) provides a systematic review of studies on VSB, defining variety seeking as an individual's propensity to seek diversity in services or goods during purchasing behavior. More recently, VSB has been defined as consumers' tendency to "switch from one brand to another," such that consumers' utility increases with the change (Meixner and Knoll, 2012).

Lately, academicians and marketers are increasingly exploring the mechanism of purchasing behavior aimed at searching for variety. The decision-making process does not always lead to the same choice: consumers' habitual choices can suddenly vary, and this change can increase their utility. Expected benefits, processing costs, and a variety premium strongly influence consumers' decisions because of highly heterogeneous decision strategies (Adamowicz and Swait, 2013). According to the classic marketing perspective, VSB takes place when consumers have low involvement with a specific product. Consumers tend to switch brands not because they are dissatisfied, but to obtain new stimuli and emotions related to variety (Raju, 1980). Consumers tend to change brands with ease in the presence of strongly perceived differences between brands (Kotler and Armstrong, 2010). In addition, switching behavior can be categorized in terms of the social and demographic variables, attitudes, and beliefs of consumers (Michaelidou, 2012).

The food and wine sectors demonstrate relatively low interest in consumers' variety seeking, and studies investigating VSB are limited. All empirical investigations examine consumer-stated preferences (Olsen et al., 2015; Ellis and Thompson, 2018), mostly without a representative sample of regional or national populations. To our knowledge, only random or convenience samples have been thus far considered, and no study has examined VSB using real wine market data.

To fill this gap, this study analyzes consumers' VSB in the wine domain using a big data approach. The hypothesis of this study relies on the existence of thousands of different types of

vines and winemakers, reflecting differences in taste and consumption experiences. This may lead to multifaceted VSB given the huge assortment consumers face. Starting from this assumption, the focus of this study is to analyze the VSB of wine consumers according to a bi-dimensional perspective based on wine typology and brand to identify the profile of Italian wine variety seekers.

The present study extends the current literature on wine variety seeking based on revealed preferences. Our analysis uses data on the full set of wines marketed in Italy for domestic consumption consumed by 8,313 households, which is statistically representative of the population. The methodology implemented, finite mixtures (FM) (McLachlan and Peel 2004; Melnykov and Maitra, 2010), identifies groups of households sharing similar VSB. The procedure is data-driven, and class-specific coefficients are computed without prior clustering knowledge or assumptions.

The remainder of the paper is organized as follows: The second section summarizes the recent literature on VSB. The third section describes the data and empirical strategy adopted to quantify VSB and characterize market segments. Section 4 presents and discusses the findings of the study. The final section concludes the study by highlighting the implications and limitations of this research.

2.   Literature Background

2.1 VSB and Brand loyalty

Researchers investigate various factors to explain wine consumers' involvement in searching for variety, such as their socio-demographic characteristics, curiosity, product involvement, and knowledge of wine (Orth and Bourrain, 2005; Olsen et al., 2015). All these elements seem to induce deviations in the usual consumer purchasing process as they seek wider variability in the choice of wine (Van Trijp, 1994; Dodd et al., 1996).

However, despite the increasing attention paid to the search for variety, the literature points out that consumer loyalty or disloyalty regarding wine is not a firmly established cognitive process, and research findings are controversial in many cases. In an earlier study (Trivedi, 1999), consumers were segmented according to the intensity and consistency of their VSB. Trivedi (1999) showed that favorite brands are more penalized by VSB. Other studies on variety seeking identified specific market segments, highlighting significant differences between groups. One study identified three consumer purchasing styles: "variety seekers," "variety neutrals," and "variety avoiders" (Dodd et al., 1996). Similarly, a more recent analysis delineated three categories of consumers: "high variety seeking," "moderate variety seeking," and "variety avoiders" (Olsen et al., 2015). Finally, another

3

study identified and characterized four categories: "loyals," "habituals," "variety seekers," and "switchers" (Knox and Walker, 2001). This classification included "loyals," consumers with an attitude opposite to those looking for variety.

Brand loyalty can be considered a primary strategy to reduce consumers' VSB, thus explaining reiterate purchasing (Knox and Walker, 2001). For instance, Knox and Walker (2001) identified strong brand disloyalty in variety seekers, who are characterized by a low/medium level of product involvement and a medium/low risk propensity. Moreover, the same authors identified as "switchers" a more extreme form of variety seekers: "Switchers," or "swingers," are buyers with lower brand loyalty that can be easily captured by another brand offering a better price or better buying conditions such as through coupons or discounts (Knox and Walker, 2001).

Other authors analyzed the effect of regional or collective branding on wine choice behavior with contrasting results. For example, while Rasmussen and Lockshin (1999) indicated that only a portion of consumers show loyalty to regional branding, Caracciolo et al., (2016) demonstrated that geographic designations represent a relevant quality cue, especially for high-price wines.

2.2 VSB and wine characteristics

The wine market is dominated by well-known grape varieties such as Pinot, Cabernet, Merlot, and Syrah (Waldrop et al., 2017), as well as local varieties that fill important niche markets (Pappalardo et al., 2019). Several authors regard grape variety as an important attribute (Mueller and Szolnoki, 2010), and consumers consider grape variety in their buying process, especially in the case of international variety (Mtimet and Albisu, 2006).

VSB strongly depends on the number of favorite grape varieties. Several studies pointed out consumers' interest in a specific wine variety (Mtimet and Albisu, 2006). Indeed, sensory stimulation is one of the most important motivations for VSB in terms of product and brand selection (Van Trijp, 1994).

Australian and English consumers are more inclined toward grape variety when selecting wine in a restaurant than French consumers, probably because of the limited supply of single-variety wines (Cohen et al., 2009). In addition, a study carried out on consumers in New Zealand showed that drinkers more involved with wine consider grape variety when choosing it (Jaeger et al., 2010).

Another study explored the importance of age in changing wine preferences, arguing that young wine drinkers have a wider preference for varietals than older consumers (Fountain and Lamb, 2011). Finally, a high appreciation for varietals and the regional origin of wines was ascribed to variety seeking consumers (Olsen et al., 2015). This result is confirmed by Inman's (2001) findings that distinguish two main forces of variety: flavor-based versus brand-based products. The study identified the prevalence of sensory-specific satiety, stating that consumers were more likely to seek variety in flavor than brand. Moreover, consumers expressed a higher VSB for sensory attributes than for brand for almost all categories of products examined (Inman, 2001).

2.3 VSB and consumer characteristics

The socio-demographic characteristics of consumers most willing to experience novel products have been discussed. Earlier studies showed that consumers more involved in variety seeking are young, highly educated, and have the highest incomes (Wang et al., 2006).

The role of age is confirmed for wine consumers as well: VSB decreases as age increases, and older consumers are less involved in seeking wine variety (Olsen et al., 2015). Looking at generational groups, millennials prefer a wider range than Generation X consumers. Older consumers are less likely to consider alternatives and experience new wine (Mueller et al., 2011; Olsen et al., 2015). However, one study points out the limited importance of variety seeking among young wine consumers (aged 18–30 years), highlighting the irrelevant role of variety when these wine drinkers choose a wine to consume at home with friends (Jarvis et al., 2010).

2.4 VSB and contextual factors

Context-specific factors affecting variety seeking include the external environment and social-cultural context. Both may influence exploratory tendencies and as such, consumers' predisposition for variety seeking (Kahn, 1995). Regarding the sales environment, it has been observed that several components of the store environment—music, light, assortment, employees, and layout— are significantly correlated with VSB (Mohan et al., 2012). In addition, consumers are willing to diversify their choices according to specific consumption events, but their choice varies depending on whether wine is consumed at home, at a restaurant (Mtimet and Albisu, 2006; Beldona et al., 2010), at a business banquet, or as a gift (Goodman, 2009).

Campbell and Goodstein (2001) noted that consumers have a greater preference for their usual choices when they consider purchasing risky. When consumers choose a good wine for a socially

important occasion, they prefer a product that corresponds to specific expectations to a new and unknown product. Similarly, food consumption away from home has several differences in VSB. The characteristics here can vary not only according to demographics such as age and education, but also as per culinary breadth (Beldona et al., 2010).

Finally, the influence of the external environment or outer events such as promotions or price discounts often lead to variety seeking (Kahn, 1995; Kahn and Raju, 1991). Consumers' VSB tends to increase when a gift is provided. In this case, VSB has a greater impact than a price discount or sales promotion (Roll and Pfeiffer, 2017). Price promotion tends to reduce VSB (Sajeesh and Raju, 2010).

2.5   *Other factors affecting VSB.*

According to the literature, other important factors influencing variety seeking include consumers' spending capacity, frequency of consumption, and wine knowledge. These factors may lead wine consumers to engage in different variety seeking behaviors (Dodd et al., 1996). For instance, those who consider themselves wine experts are prompted by a common desire to purchase new wine varieties (Ellis and Thompson, 2018).

In addition, "high variety seekers" are usually creative and tend to take risks (Olsen et al., 2015). These consumers are more likely to buy wine in a wine store, and have a high level of cognizance and involvement with the wine world (Olsen et al., 2015). "Moderate variety seekers" have a restrained approach to variety, demonstrate medium consumption frequency, and have a limited willingness to pay for novel or unknown wines (Olsen et al., 2015).

Product choices depend on the level of trial and risk (Campbell and Goodstein, 2001). Consequently, preference heterogeneity and perceived risk can explain the differences in incongruent choices such as experimental purchases. A study on variety seeking (Bruwer and Li, 2007) points out the importance of consumers with high levels of experimentation. This market segment, named "experiments when buying," includes drinkers with high income levels aged 45–55 years, who have graduated from high school and are employed as professionals or involved in a managerial occupation. Recent studies found that variety seeker consumers tend to be highly experienced, more involved in wine (Olsen et al., 2015), and heavy wine drinkers (Vigar-Ellis et al., 2015).

2.6   *Contribution of the study to the VSB literature*

Given the literature, the contribution of this study can be summarized as four main research questions:

1) Based on VSB, do well-established segments exist among Italian wine consumers? 2) Does VSB depend on wine typologies and brand loyalty? 3) Is VSB associated with specific socio-demographic characteristics of consumers and other contextual factors? 4) Are specific wine attributes associated with different degrees of VSB?

This paper addresses the abovementioned issues by analyzing a very large dataset comprising more than 160,000 purchases and by implementing a data-driven clustering approach through a finite mixture model. This approach is generally implemented using a single-equation regression. In what follows, a multivariate finite mixture regression is developed to extend the analysis of VSB to two-dimensional VSB with respect to wine typology and producer brand.

3.   Data and Methodology

3.1   Data

The analyzed sample comprised 166,890 purchases of wine made by 8,313 households in Italy in 2016. Data are statistically representative of the Italian population and were collected by AC Nielsen, a global marketing research firm, through a barcode scanner at home. Data included that on household purchases of 9,077 types of wine produced by about 1,290 wineries from 6,604 stores. For each purchase, information on the following variables was recorded: price (in euros), volume purchased (liters), product type (white, red, flat, sparkling), sales channel (hypermarket or other smaller shops), packaging (glass, carton, PET, bag in box), volume format, and the presence of geographic indication. The Nielsen database does not include consumption through HORECA channels (HOtels, REstaurants, and CAfés). However, Cembalo et al. (2014) reported that purchases for domestic consumption account for about 70% of the total consumption volume. In the database, purchases are also characterized by socio-economic variables that describe the purchasing households. The information on observable demographic characteristics of the households are household income class (1 - *lower than 580€ per capita per month*; 2 - *between 581€ and 959€*; 3 - *between 960 and 1475*; 4 - *more than 1475€ per capita per month*), age group of the household head (1 - *younger than 35 years*; 2 - *between 35 and 44*; 3 - *between 45 and 54*; 4 - *between 55 and 64*; 5 - *older than 64*), area of residence (north, south, or central Italy), household size, a dummy

equal to 1 if the family is classified as "*pre-family*" by Nielsen and a dummy equal to 1 if the family is classified as "*old single*" by Nielsen.

Table 1 reports the summary statistics of the selected variables in the empirical analysis, the choice of which is common in empirical studies (Cembalo et al., 2014; Caracciolo et al., 2016), and reflects the previous literature on variety seeking regarding general products and wines (Knox and Walker, 2001; Olsen et al., 2015).

Table 1: Summary statistics of the variables characterizing households

Households characteristics		Mean (% freq.)	std.dev
Income	Income class (1 low – 4 high)	2.46	1.00
	lower than 580€ per capita per month	*(20.6%)*	
	between 581€ and 959€	*(29.0%)*	
	between 960 and 1475	*(33.8%)*	
	more than 1475€ per capita per month	*(16.5%)*	
Age	Age class of the household head (1 younger than 35 – 5 older than 64)	3.29	1.28
	younger than 35 years	*(9.54%)*	
	between 35 and 44	*(22.06%)*	
	between 45 and 54	*(26.6%)*	
	between 55 and 64	*(28.62%)*	
	older than 64	*(23.18%)*	
North	1 if the household lives in North Italy	0.49	
South	1 if the household lives in Southern Italy	0.27	
Center	1 if the household lives in Center Italy	0.24	
HHsize	Family size	2.72	1.14
Prefamily	1 if the household is classified as "Pre-family"	0.05	
Oldsingle	1 if the household is classified as "Old-single"	0.07	
Wine purchases characteristics of the Households		Mean	std.dev
Tot. Purch.	Total purchases of wine in the year	22.46	35.40
Share hyper	Share of the purchases from Hypermarkets	0.37	0.39
Share promotion	Share of the purchases with promotional prices	0.35	0.33
Share certified	Share of the purchases of geographical certified wine	0.35	0.29
Avg. Price	Average paid price (euro per liter)	3.61	3.04

3.2 Empirical approach

This study assumed multifaceted VSB, since loyalty and disloyalty regarding wine depend on commercial brand strategies, and consumers' preferences for different types of vines and denominations. Specifically, a bi-dimensional perspective based on both wine type and brand was used to define VSB. In the first step of the empirical analysis, two new variety seeking measures,

8

Wine Index of Diversity (WID) and *Brand Index of Diversity* (BID), were defined. These two measures are related to the data on wines purchased in a finite mixture regression model (Melnykov and Maitra, 2010). The model attempts to identify and characterize groups of households that share similar VSB.

3.3 Variety seeking measures

Variety is frequently used in most scientific fields and conceptualized as a synonym of diversity (McDonald and Dimmick, 2003). Simpson's Diversity Index is a widely adopted measure of diversity (Simpson, 1949). In this study, the index is calculated as the sum of the squared share of purchases made by the ith household for the wth category of wine, n_{iw}, over the total number of purchases N:

$$\sum_w \left(\frac{n_{iw}}{N_i}\right)^2 \tag{1}$$

The index considers both the richness of the purchased wine categories and evenness of the various categories. The index ranges from 0 to 1, and peaks when the highest concentration is observed, which is when only one category of wine is purchased. Its inverse is used in this study to measure a household's VSB:

$$1 \Big/ \sum_w \left(\frac{n_{iw}}{N_i}\right)^2 \tag{2}$$

The smaller the share of purchases for each wine category, the higher the index.

Our analysis assumes that wine consumers may diversify their purchases according to the following characteristics: color, presence of denominations of origin (i.e Protected Geographical Indication (PGI), Protected Designation of Origin (PDO) and Controlled and Guaranteed Designation of Origin (DOCG)), and sparkling or flat. The variety index looking at these features is the WID. The greater the number of purchases for a wine characterized by the same characteristics, the smaller the index, and the higher the consumer preference for a specific type of wine. Table 2 reports the 17 categories of wine that characterize the WID and the overall share of purchases observed in the sample.

Table 2. Purchase of different wine typologies characterizing the *Wine Index of Diversity* (WID)

	Typology	Number of Purchases	Share of purchases
1	*Red wine (PDO)*	30,453	12.13
2	*Basic White wine*	30,447	13.88
3	*White wine (PDO)*	20,613	10.41
4	*Red wine (PGI)*	18,573	10.65
5	*Basic Red wine*	17,887	8.41
6	*White wine (PGI)*	13,185	9.39
7	*Dry Sparkling wine*	12,666	9.11
8	*Sweet Sparkling wine*	7,438	8.78
9	*Red wine (DOCG)*	5,157	4.87
10	*Basic Rosè wine*	2,455	1.64
11	*Sparkling wine (Champennoise)*	1,946	2.95
12	*Whine Wine (DOCG)*	1,721	2.51
13	*Foreign Wine*	1,658	1.75
14	*Rosè wine (PDO)*	1,404	1.51
15	*Rosè wine (PGI)*	1,283	1.37
16	*Champagne*	309	0.63
17	*Rosè wine (DOGC)*	4	0.01
	Total	167,199	100

PGI: Protected Geographical Indication; PDO: Protected Designation of Origin, DOCG: Controlled and Guaranteed Designation of Origin; Basic: without Designation of Origin.

A second diversity index was calculated by considering VSB toward different wine producers and wineries, namely the BID: The greater the number of purchases produced by the same producers, the smaller the index, and the higher consumers' level of loyalty toward the specific maker.

Table 3 shows the first 20 wineries included in the sample for the number of purchases. Both WID and BID were normalized to mean zero and variance, respectively, for a straightforward

comparison of the results. Figure 1 shows the frequency distribution of the two measures. While BID is distributed following a half-normal distribution, WID is close to a censored log-normal distribution.

Table 3. Purchase of wines by corporate brand characterizing the *Brand Index of Diversity* (BID)

	Winery	Number of Purchases	Share of purchases
1	CAVIRO	14,826	8.9
2	DUE TIGLI	5,405	3.2
3	CONAD	4,745	2.8
4	CALDIROLA	4,134	2.5
5	VERGA	3,836	2.3
6	COOP	2,970	1.8
7	EUROSPIN	2,858	1.7
8	LIDL	2,631	1.6
9	CIELO E TERRA	2,564	1.5
10	C.S. SOAVE	2,553	1.5
11	PIROVANO	1,983	1.2
12	SCHENK	1,904	1.1
13	CAVIT	1,900	1.1
14	GIV	1,897	1.1
15	LE CHIANTIGIANE	1,733	1.0
16	A&O SELEX	1,728	1.0
17	CAMPARI	1,702	1.0
18	GANCIA	1,697	1.0
19	COLTIVA	1,641	1.0
20	C.S. ABRUZZO	1,603	1.0
	Other	*102,889*	*61.5*
	Total	167,199	100.0

Figure 1. Frequency distribution of variety seeking normalized measures, WID and BID.
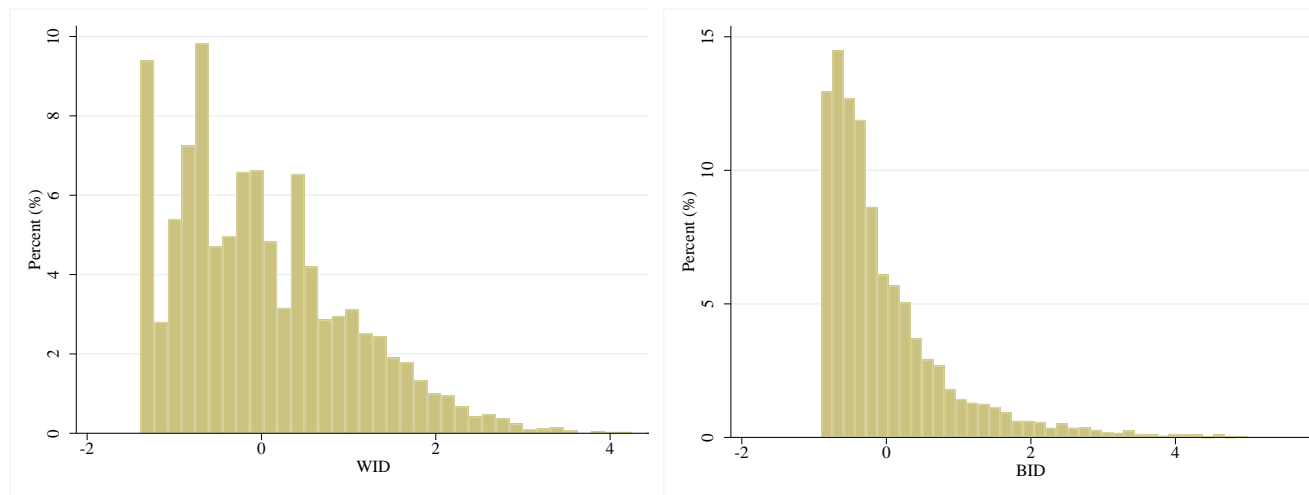
3.4   The finite mixture model

The FM approach is a data-driven method for identifying homogeneous groups within the sample meanwhile computing the coefficients of the regression model within each group (McLachlan and Peel 2004; Melnykov and Maitra, 2010).

The data are aggregated into clusters sharing functionally similar patterns, and the clustering process is simultaneous to the regression estimation process. FM have been seldomly used in market segmentation studies (Betrail and Callavet, 2008; Caudill and Mixon, 2016).

In this study, WID and BID represent our variables of interest to quantify and investigate VSB. Consumers with high levels of WID and BID can be defined as variety seeking. On the other hand, consumers with low levels of WID and BID show strong loyalty to a specific wine produced by an identifiable winery. Interestingly, consumers could show a high/low level of BID but a low/high level of WID, characterizing VSB between types of wines with the same producers or between producers with the same types of wine. Analytically, WID and BID are the dependent variables of a two-equation system where consumers are classified into specific clusters of WID and BID based on their socio-demographic characteristics and VSB patterns.

The maximum likelihood objective function explaining individual BID and WID is given by

$$\prod_n \pi_{ij} \, f(y_i, z_i = 1) \tag{2}$$

where π_{ij} is the probability of observation $i=1, \ldots, n$ to belong to a given cluster $j=1, \ldots, K$, where K is the optimal number of clusters in the model, y_i is the dependent variable (BID_i or WID_i) and z_i is a non-observable latent variable determining the involvement of each observation in one cluster or another. The likelihood combines the conditional likelihood of each latent class weighted by the associated latent class probabilities. Equation (2) is iteratively estimated because the finite mixture model updates the estimated probability π_{ij} and cluster-specific regression coefficients β_j. For each observation, the probability of inclusion in cluster j, π_{ij}, is a function of z_i, which assumes values 0 or 1 to define the exclusion or inclusion of the ith observation in the specific j[th] cluster

$$\pi_{ij} = \pi(z_i=1) = \exp(z_i)/\Sigma_{j=1,\,K} \exp(z_j) \tag{3}$$

Unfortunately, z_i is an unobservable latent variable; however, z_i can be approximated by a set of explanatory variables, x_{1i}, which in this model, describe consumers' characteristics. In our model, the q variables in x_{1i} are income class, size of the purchasing family, region of residence (north, center, and south), age class of the household head, number of purchases, average price of purchases, share of certified wine, share of purchases in promotion, purchases in hypermarkets, and buying of red wine. Equation (3) becomes:

$$\pi_{ij} = \exp\left(g(x_{i1}\,\theta_j)\right)/\Sigma_{j=1,K}\exp(g(x_{j1}\,\theta_j)) \tag{4}$$

where g(x_{i1} θ_j) is the function relating the probability of being in j cluster of the above consumer characteristics, and θ_j is a q-column vector of parameters.

Starting from initial prior probabilities, for instance $\pi_j^0 = 1/K$ with K, the number of clusters/classes, at iteration s, the expectation step computes the posterior probabilities as:

$$\pi_j^s = E(\pi_{ij}) = \frac{\pi_j^{s-1} f(x_{i2}\beta_j^{s-1})}{\sum_{j=1,K} \pi_j^{s-1} f(x_{i2}\beta_j^{s-1})} \tag{5}$$

In this model, x_{i2} is the constant term, and by modeling the separate distributions K, one for each cluster of consumers, the maximizing step computes in logarithms, $\sum_{i=1,n} \pi_j^s f(x_{i2}\beta_j)$, yielding an updated estimate of the p-vector $\hat{\beta}_j^s$. The iterations continue until convergence after m iterations, yielding final $\hat{\pi}_j^m$ and $\hat{\beta}_j^m$. The $\hat{\pi}_j^m$ provides for each observation the membership probability to each of the clusters, while the estimated coefficients of $f(x_{i2}\beta_j)$, the intercept within each cluster, separately characterize the BID and WID indices in each class.

The iterative approach described so far was implemented simultaneously for BID and WID with the two equations combined in one likelihood function to account for possible interrelations. The probability clusters and group coefficients were jointly computed for BID and WID, thus characterizing consumers' wine VSB in terms of both producer and wine characteristics. The multivariate estimation approach iterates between the class probability weights:

$$\pi_j^s = E(\pi_{ij}) = \frac{\pi_j^{s-1} f(x_{i2}\beta_j^{s-1})}{\sum_{j=1,K} \pi_j^{s-1} f(x_{i2}\beta_j^{s-1})} \tag{6}$$

and the system of equations explaining both variety indices:

$$\begin{cases} \prod_n \pi_{ij} f(BID_i, z_i = 1) \\ \prod_n \pi_{ij} f(WID_i, z_i = 1) \end{cases} \tag{7}$$

4. Results

The number of classes, K, providing the best fit was identified by examining the Akaike information criterion and Bayesian information criterion for model selection (Caracciolo and Furno, 2020). Both statistics provide empirical evidence that a four-class model ($K = 4$) yields the best fit for our sample.

Tables 4 and 5 report the final estimates, Table 4 provides an estimate of the average value of the WID and BID indices within each group, and the probability π for each household to belong to a specific cluster or group. Table 6 describes each group according to purchase characteristics (average share of each of the 17 wine categories that characterize WID, average price, average

number of purchased types, purchased brands, and total purchases). Group 2 mainly includes consumers with average VSB, as the estimated mean values of WID and BID are close to zero (Table 4). Borrowing–from Knox and Walker (2001), this group can be named *switchers* (the estimated frequency in the sample is 43%), which is characterized by consumers showing relatively high VSB for WID, not BID. The second group in terms of importance is the fourth (average frequency equal to 22%), the only one with positive mean values for WID and BID. Therefore, this group shows the most pronounced VSB in both the wine and producer dimensions, and is called the *variety seekers* group. Groups 2 and 4, which include around 66% of the sample, showed a positive diversity index for different wine typologies, demonstrating Italian wine consumers' propensity to regularly change their choice of wine.

Groups 1 and 3 have negative values for both WID and BID, indicating greater repetitiveness in their wine choices. However, there were some differences between them. Group 1, *habituals* (20% of average frequency), had similar values for WID and BID; thus, there were no specific behavioral differences in the two considered dimensions. Group 3, *loyals* (the smallest group with an average frequency of 14%) had the lowest variability for both wine type and brand selection, and relatively higher loyalty toward brand than wine type.

Table 4. *WID* and *BID* means estimates within each group and their probabilities

	Group 1 Habituals			Group 2 Switchers			Group 3 Loyals			Group 4 Variety seekers		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
WID	-0.759	0.017	0	0.121	0.018	0.000	-1.024	0.015	0	1.114	0.028	0
BID	-0.655	0.007	0	-0.135	0.010	0.000	-0.718	0.008	0	1.323	0.042	0
s^2(WID)	0.177	0.007		0.462	0.015		0.106	0.007		0.908	0.035	
s^2(BID)	0.021	0.001		0.122	0.005		0.022	0.002		1.729	0.063	
π	0.203	0.006		0.433	0.007		0.141	0.006		0.222	0.007	

Table 5 reports the estimated coefficients of class membership probabilities, reflecting the characteristics of each group with respect to the reference group, in this case group 2. The estimates in Table 5 indicate that *habituals* (group 1) live in the south, consume wine less frequently than the other groups, buy certified wine with a greater average price, and are interested in promotions. *Loyals* (group 3) are the youngest consumers, have an above average income, reside in the northern regions, buy larger quantities of wine than group 2, but with a lower average price. Next, *variety*

seekers (group 4) are older than the reference group (2), earn the highest incomes, live in the central regions, with larger family sizes, and buy greater quantities of wine with a greater average price. This group shops at hypermarkets, looks at wine certifications, and considers promotions.

Table 5. Probability of belonging to each group

	Group 1			Group 3			Group 4		
	coef.	std.err	p-value	coef.	std.err	p-value	coef.	std.err	p-value
Income	-0.132	0.093	0.156	**0.139**	0.082	0.091	**0.252**	0.056	0.000
Age	0.105	0.078	0.181	**-0.152**	0.069	0.027	-0.048	0.046	0.295
North	0.188	0.206	0.363	**0.317**	0.180	0.079	**-0.344**	0.112	0.002
South	**0.852**	0.242	0.000	**-1.125**	0.195	0.000	**-0.517**	0.147	0.000
HH Size	-0.008	0.084	0.926	-0.074	0.077	0.333	**0.092**	0.052	0.075
old single	-0.358	0.387	0.354	-0.042	0.292	0.887	-0.192	0.204	0.346
prefamily	-0.096	0.360	0.790	-0.621	0.382	0.104	-0.121	0.269	0.654
Total purchases	**-1.119**	0.103	0.000	**0.026**	0.004	0.000	**0.048**	0.004	0.000
Share Hyper	**-0.347**	0.207	0.093	-0.057	0.201	0.778	**0.614**	0.126	0.000
Share Promotion	**0.928**	0.249	0.000	**-2.289**	0.298	0.000	**1.831**	0.149	0.000
Share Certificated	**1.662**	0.340	0.000	**-2.686**	0.394	0.000	**1.442**	0.224	0.000
Average Price	**0.054**	0.026	0.036	**-0.290**	0.076	0.000	**0.088**	0.024	0.000
Constant	**4.096**	0.643	0.000	**2.647**	0.506	0.000	**-4.433**	0.347	0.000

Table 6 relates the four groups to the wine typologies. *Switchers* (group 2) and *variety seekers* (group 4) present the highest mean values in terms of number of purchased typologies and of purchased brands: 4.7 and 7.7 for the switchers and 7.8 and 21.6 for the variety seekers (Figure 2). Regarding average price, *habituals* pay the highest price on average for a bottle, followed by *variety seekers*.

Habituals tend to prefer sparkling wines, namely sweet sparkling wines, dry sparkling wines, and to a lesser extent, sparkling wine champenoise. For this group, we found PDO red and white wines, although these are mostly bought by the *switchers* and *variety seekers*. *Switchers*, besides PDO red wines, choose an intermediate hierarchical level of wine such as red and white wines with a protected geographical indication (PGI). *Loyals* prefer basic wines: white, red, and rose basic wines. We also found that *loyals* tended to prefer PGI white wines. Finally, *variety seekers* chose high-quality wines. In this group, we observed a clear preference for top-level wines such as red, white, and rose wines characterized by a controlled and guaranteed designation of origin (DOCG). Their top-level purchases include sparkling wines produced either as champenoise, the traditional method, or champagne. Finally, this group consumed all categories of rose wine (DOCG, PDO, and PGI) and PDO white wine.

Table 6. Wine typology purchases by group (avg. share)

	Group 1 Habituals	Group 2 Switchers	Group 3 Loyals	Group 4 Variety seekers
PDO Red wine	13.17	13.58	5.84	11.69
Basic White wine	17.97	13.49	30.96	9.11
PDO White wine	11.04	10.9	4.69	11.15
PGI Red wine	8.53	11.48	10.48	10.43
Basic Red wine	6.22	8.48	15.76	7.53
PGI White wine	6.92	9.66	9.61	9.75
Dry Sparkling wine	11.15	9.47	5.94	8.81
Sweet Sparkling wine	13.91	9.17	9.15	6.24
(DOCG)Red wine	2.95	3.95	1.21	7.31
Basic Rosè wine	0.69	1.6	2.56	1.78
Sparkling wine (Champenoise)	3.52	2.62	1.2	3.6
(DOCG)White Wine	1.64	1.81	0.68	4.04
Foreign Wine	0.39	1.17	0.57	3.07
PDO Rosè wine	0.64	1.02	0.21	2.64
PGI Rosè wine	0.45	1.13	1.01	2.02
Champagne	0.82	0.48	0.14	0.82
(DOGC)Rosè wine	0	0.01	0	0.02
Number of purchased typology (mean)	2.09	4.74	2.61	7.97
Number of purchased brands (mean)	2.48	7.72	3.83	21.6
Total purchases (mean)	3.26	16.9	20.53	52.14
Price (mean)	4.51	3.58	1.78	4.01

PGI: Protected Geographical Indication; PDO: Protected Designation of Origin, DOCG: Controlled and Guaranteed Designation of Origin; Basic: without Designation of Origin.

Figure 2. Number of purchased wine typologies by group (relative frequency)
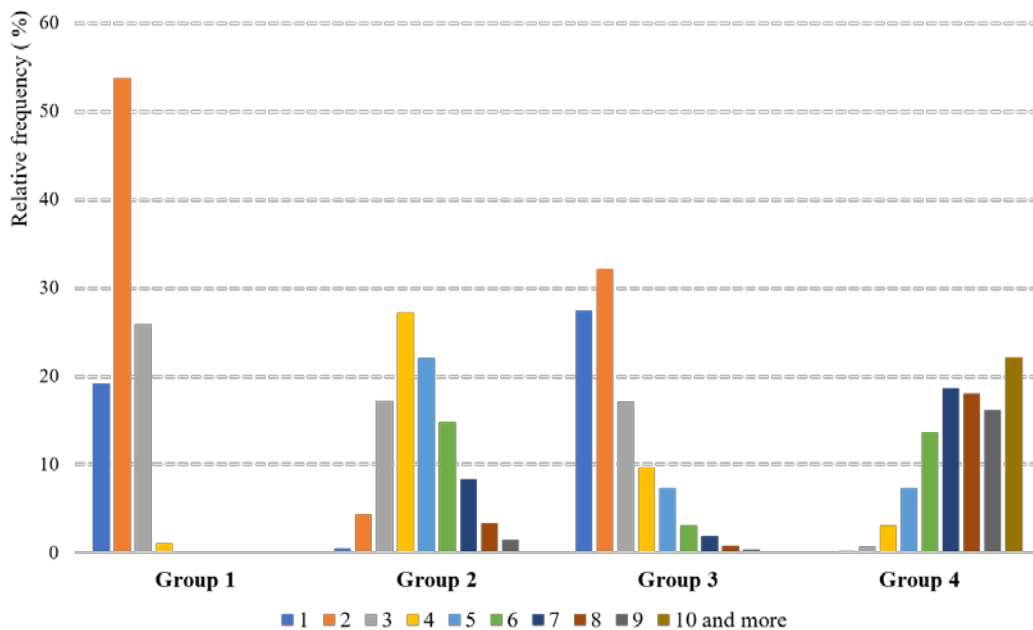
5.   Discussion

Kahn (1995) delineated the motivations driving variety seeking into three categories: a) the desire for change due to satiation or need for stimulation, b) influence of the external environment (situation or changes, such as promotions), and c) accidental or unplanned choices owing to specific or random purchase occasions (hedge against uncertainty in future tastes). In our study, we considered the first two categories, which are linked to consumers' subjective desires and external events, since their accidental or unplanned choices are not easily detectable in the analyzed data.

The methodological approach implemented, based for the first time on revealed preference for wine, enabled us to ascertain four consumer clusters (or groups) with different wine and brand preferences with different socio-demographic characteristics. The groups identified were classified as follows: 1) *habitual*, 2) *switcher*, 3) *loyal*, and 4) *variety seeker* (full variety seekers). These profiles are similar to those Knox and Walker (2001) identified in their analysis of a grocery market. By evaluating variety seeking versus brand loyalty, the authors identified four consumer purchasing styles. Our results confirm the presence of these groups, meaning that wine consumers can be clustered into four categories. This is aligned with the results of Olsen et al. (2015), although our study adds "variety avoiders" by distinguishing two segments, namely *habituals* and *loyals*, which demonstrate slight differences in behavior.

Our results indicated well-established market segments based on distinct VSB among Italian wine consumers. We identified a clear segmentation in terms of brand and wine typology. Specifically, VSB is more widespread for wine typologies than for brand, since consumers tend to reduce producer brand variety. This result seems consistent with that of previous research (Van Trip, 1994), which indicated that variety seeking is higher for food products with wide-ranging valid alternatives.

A broad spectrum of conditions results in repeat purchases (Dawes et al., 2020) that fragments wine consumers' behavior with respect to wine loyalty. This implies a positive answer to the second research question: Even consumers characterized by high and medium VSB (e.g., *switchers* and *variety seekers*) demonstrate switching regarding the producer brand and wine typologies. Consistent with Inman's (2001) findings, our outcomes show the prominent role of multi-attribute levels of product over brand in VSB. We innovatively highlighted the greater importance of wine typologies over producer brands in wine variety seeking.

Concerning the third research question, a desire to change is related to socio-demographic characteristics. Consumers within each group differ, which is consistent with previous studies that link variety seeking to consumers' personal traits (Orth, 2005). Income, geographic residence, and household size are the most relevant variables characterizing consumers' profile in each group.

Income was positively correlated with *variety seekers*, and a high income leads consumers to more frequently vary their selected brand and wine typology as they experiment with new flavors. We also uncovered the role of geographic differentiation: Consumers in the southern and northern parts of Italy selected common and traditionalist wines. They are not interested in wine typologies or brand varieties. Conversely, those in central Italy engaged more in VSB. Family composition was not a relevant socio-demographic characteristic in terms of wine typology or loyalty. However, VSB is more frequent in large families. Our results show that the purchasing environment influences the search for novelty. This result confirms previous empirical evidence on the role of stores and the external environment (Mohan et al., 2012). Purchasing wine at a supermarket and hypermarket increases variability, since large-scale distribution—due to the wide range of wines and brands on shelves—encourages consumers to engage in less habitual and loyal behavior.

VSB is also aided by sales promotion. This is in accordance with the literature on VSB (Kahn, 1995). Roll and Pfeiffer (2017) state that a price discount attracts customers and amplifies the variability in choice. The role of price in influencing *variety seekers* and avoiders was suggested in earlier studies as "fruitful areas for future inquiry" (Dodd et al., 1996). Sajeesh and Raju (2010) noted that VSB decreases alongside the "*willingness to pay for the product purchased on the previous purchase occasion.*"

In our study, certification and price attributes were associated with VSB. Geographic certification, such as PDO and PGI, demonstrated a similar effect on *variety seekers* and *habituals*. This is only partially consistent with the study of Dodd et al. (1996), where consumers acted as variety seekers when significantly wider information was available. In contrast, it corroborates the results of Chen and Lobo (2012), since we found a positive correlation between certified products and variety seeking. In addition, certified wines characterize the behavior of habitual consumers, showing that certification is not crucial for VSB. Seeking information helps reduce the risk faced by variety avoiders (Raju, 1980), bearing in mind that consumers' information acts differently during the purchasing process of known or unknown brands (Chen and Paliwod, 2004). We can conclude that consumers tend to reduce VSB in the presence of information and develop greater loyalty toward certified wines.

Finally, in our study, consumer variety increases as the quantity of wine purchased increases, suggesting that higher quantities of purchased wines "yield more variety seeking" (Simonson, 1990; Read and Loewenstein, 1995). We found a direct relationship between wine typology and consumer behavior, and directly related the hierarchical scale of quality wines with VSB. This is aligned with the findings of Di Vita et al. (2019), which highlighted that the determinants of purchases of wines varying in quality, such as PDO, PGI, and basic wines, differ significantly. Our study highlights for the first time that wine quality influences wine switching. As wine quality improves, a higher propensity for variety seeking is evident. High-end wines elicited more variety seeking than low-end wines. In fact, variety seekers mainly prefer top-quality wine production, such as DOCG (red, white, and rose wines), Champenoise sparkling wines, PDO (white and rose wines), and champagne.

This result is consistent with other studies stating that geographic indications characterized by higher quality (DOCG and PDO wines) increase the product substitution effect (Stasi et al., 2011), because consumer preferences are significantly heterogeneous with respect to these quality signals (Boncinelli et al., 2019; Bonnet et al., 2020). Therefore, high-end wines as products boost variety, and a high price and high quality enhance the search for new wine typologies and new brands, heightening the experiential aspect of consumption. The only exception is the PDO red wine category, since it is preferred by *switchers* that demonstrate medium VSB. However, red wine is a well-established common product; thus, it is less susceptible to variations.

Rose wines are powered by high VSB in all quality scale categories (DOCG, PDO, PGI). This could be explained by the characteristics of rose wines, which are viewed as feminine and consumed less frequently or occasionally because they are considered a seasonal drink (Velikova et al., 2015).

Intermediate quality wines such as PGI red and white wines are characterized by moderate VSB. This confirms the preference of medium-priced wines among consumers in Italy, where knowledge of PGI wines, wine production methodologies, and labels is slightly lower than that for DOCG and PDO (Caracciolo et al., 2016).

We found a direct correlation between basic wines and loyal consumers. This consumer segment buys large quantities of wine at a low average price, confirming the role of price regarding basic wines. This is likely because basic wine consumers are less involved in and informed about wines (Di Vita et al., 2019a), and demonstrate greater loyalty to specific brands (Cembalo et al., 2014). As such, they are less affected by quality signals such as PDO and PGI certifications, and VSB. The *habitual* group differs because their customary behavior indicates their preference of

wines with strongly defined and highly differentiated characteristics, namely sparkling wines. This confirms that sparkling wines are consumed by "routine" and exclusive followers who acknowledge the reputation and quality of these wines (Galletto et al., 2021).

6. Conclusion

This study assessed the VSB of wine consumers. The impact thereof was measured using consumers' preferences and big data of the Italian wine market, and brand and product differentiation were analyzed. The research related consumers' variety seeking desire to producer brand, wine typology, socio-demographic characteristics, the influence of the external environment, and other drivers linked to variety seeking.

This study defined the profile of Italian wine variety seekers and highlighted that more than half of Italian consumers engage in VSB. The latter is linked to socio-demographic characteristics such as income and geographic residence, and behavioral characteristics such as frequency of purchases. The role of certification and promotion is controversial, as these factors are distributed among seekers and habitual consumers.

Finally, we identified a relationship between consumer groups and wine typology. Wine variety seekers experiment with the highest quality and most expensive wines (red/rose/white DOCG and PDO wines, sparkling Champenoise wines). *Switchers* prefer medium-quality wines, mainly PGI labels, and *loyal* consumers purchase basic wines. The consumption of dry and sweet sparkling wines tends to be preferred by *habituals*, who are not inclined to change and are loyal to a few brands and producers.

This study provided insights into winemaking and bottling regarding the effects of brand and wine typology on consumer profiles. We identified perspectives to assure higher loyalty toward wine brands, highlighting that it is more difficult to reduce variety seeking in terms of wine typology. Large firms capable of producing novel wine products could be the most favored producers as they ensure wide product variability.

The analysis here should be extended to consumers in other European countries to detect differences or convergences. Future studies could focus on the hierarchical relationship between wine typologies and corporate brand (umbrella versus producer brand). This would enable a more in-depth analysis of the two dimensions of VSB. Finally, it would be interesting to investigate whether VSB changes between different wine price ranges.

22

Declaration of Competing Interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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