

Screw versus cork? New directions on quality perceptions from the perspective of Austrian wine consumers

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Abstract

Purpose – The purpose of this paper is to examine the influence of wine closure types on the quality perception of wine consumers in a traditional wine market, combined with the willingness to pay for red and white wines in bottles closed with screw caps compared with that for wines in bottles with a cork closure.

Design/methodology/approach – An online experiment with 436 Austrian wine consumers was conducted in a two-by-two between-groups design. To assess the quality of Austrian red and white wine, quality indicators such as origin, grape variety, awards, the content of residual sugar, vintage, geographical indication, ageing potential, organic certification, vineyard designation and brand (producer) have been applied. Furthermore, different involvement levels as well as willingness to pay were taken into consideration.

Findings – Contrary to earlier findings, results confirm that Austrian consumers do not generally perceive wines (both red and white) in a screw cap bottle to be lower or different in quality from those in a cork-closed bottle. However, consumers expect red and white wines in bottles with a cork closure to be higher in price than wines in bottles with a screw cap. Among established quality indicators, the present analysis shows that price is the strongest cue for quality when it comes to wines and indicates that wines in bottles closed with corks and bearing a higher price tag are considered to be of higher quality.

Research limitations/implications – This research comes with limitations, such as the absence of sensory differences. Moreover, the research design is based exclusively on the description of wines and a limited set of quality indicators and does not involve the actual tasting of wines.

Practical implications – Outcomes suggest that in the strategic positioning of wines, the difference in wine consumers' quality perceptions between wine bottles with screw caps and cork closures plays a smaller role than anticipated. Findings are relevant for practitioners, particularly in old-world wine markets where cork is still seen as the closure of choice for higher-quality wines.



Originality/value – The results of this survey contribute to understanding consumers of an established old-world wine market and their attitudes towards alternative bottle closure types such as screw caps. It adds new insights to the research stream of the quality perception of wines.

Keywords Wine closure, Quality perception, Price, Cork, Screw cap, Austria

Paper type Research paper

1. Introduction

Next to the single-piece natural cork stopper, wine producers can choose from several alternative bottle closures such as technical, cork-based colmated and agglomerated stoppers, synthetic closures, glass stoppers and screw caps. The single-piece cork accounts for only 10% of all closures produced and technical stoppers for 20%, whereas screw caps dominate the market with a 37% share (Diéval, 2020). The glass stopper, introduced in 2004, has not yet found widespread use in the wine industry. Screw caps are widely used for Austrian wines. This is compliant with the global trend that wines in bottles with screw caps already account for more than 30% of wine sales, with a growth rate of 4% in 2020 (Euromonitor, 2014; Aluminium Closure Group, 2021). In contrast to the widespread assumption that this holds particularly true for new-world wines, this specific type of wine closure is increasingly embraced by so-called traditional wine-producing countries. It is well-established in Germany, and even in France and Italy, recent figures indicate a slow growth in the usage of screw caps. In 2020, the share of screw cap-closed wines was at 70.7% in Germany, 17.2% in France and 16.5% in Italy (Aluminium Closure Group, 2021). Austria and Switzerland, however, play a significant role in this context, being among the first traditional wine-producing countries to adopt the screw cap.

When in 2003, Austrian winemaker Hans Hirsch filled his complete range of wines using bottles with screw caps, it caused an outcry, provoking Austria's leading wine writer to proclaim "[...]the end of wine culture" (Romé, 2006), even asking for a boycott of Hirsch's wines. Today, almost 20 years later, more and more screw cap closures – on at least part of their product range of Austrian wine producers – seem to be used, and screw cap-closed wines can be found in supermarket shelves, as well as in well-assorted wine shops.

After a lengthy period of research and development, in 1970, the first test batch of Swiss Chasselas was filled, and in 1972, the first commercially available wine was filled by Swiss winery Hammel with the new closure system: a screw cap with a plastic liner and a longer metal skirt to resemble the traditional foil wine capsule (Jackson, 2008). The new closure was subsequently patented in 1976 as the Stelvin Cap. Interestingly, in the early years the avoidance of cork taint was not in the focus of marketing activities – the closure was promoted with arguments of cost-effectiveness.

Even though the initiative for the new closure came from the new world, its first success came in Europe. By the mid-1980s, Swiss wine producers used screw caps by the millions, at a time when Australian producers had already swung back to natural cork, due to a lack of acceptance by Australian consumers (Mortensen and Marks, 2002). By the mid-1990s, the screw cap market had grown considerably, amounting to 60 million closures in Switzerland and 10 million closures for one single producer in California alone – Sutter Home (Courtney, 2004). In Europe, producers outside of Switzerland were hesitant to adopt the new closure. In France, a campaign to promote the screw cap had failed miserably, and in Italy, in 2006, a new law outlawed the use of alternative closures in general in a number of D.O.s. It was only as recently as 2012 that the Italian Ministry of Agriculture allowed the use of screw caps for a selected number of its highest-quality DOCGs (Ministro delle politiche agricole alimentari e forestali, 2012).

It was the early 2000s that saw the beginnings of widespread use of the screw cap in several European countries. In Germany, Rhenish-Hesse producer Gunderloch exported screw cap-closed Rieslings to the USA as early as 2001, followed by Fürstlich Castell'sches Domänenamt in Franconia, and in 2005, several German producers officially presented whole ranges of wines in bottles closed with a screw cap at ProWein, the leading trade fair for wines and spirits ([Deutsches Weininstitut](#)). In Austria, Kamptal winemaker Hirsch decided to use screw caps for his complete 2002 vintage. The decision came after a small batch of highly priced sweet late harvest Riesling was affected by cork taint ([Moser, 2011](#)). Frustrated and driven by first-hand experience with screw caps during internships in New Zealand, Australia, South Africa and California, Hirsch was the first in Austria's traditional wine market to offer screw caps, leading to strong refusal by leading domestic colleagues, wine-writers and critics.

Despite the widespread use of screw caps, for Austrian producers, the question arises of how consumers judge wines in bottles with screw caps and whether there is a significant difference in quality perception of Austrian wines when closed with this type of closure compared to a cork seal. Currently, the choice of closure in Austrian wine production, as in many other markets, is still widely intuitive, despite research showing that packaging design including closures determines buying decisions ([Ampuero and Vila, 2006](#)). With our research, we aim to further close the gap between the producers' rather intuitive choice of wine bottle closures and the wine consumer's point of view. We contribute to theory and practice on wine consumers' behaviour in the context of the significance of the most commonly used wine closure types. To date, no research on the impact the type of closure has on Austrian wine consumers' quality perception has been conducted. In addition, our research examines the influence on quality expectations of wine consumers with different involvement levels and the relevance of closure type as a quality cue among a set of other important quality indicators for wine consumers in an old world wine market.

2. Literature review and hypotheses development

2.1 *Wine quality indicators*

The issue of how consumers would assess the quality of wine has been widely discussed in the literature using different research approaches ([Charters and Pettigrew, 2007](#); [Veale, 2008](#); [Sáenz-Navajas et al., 2013](#)) and inducing a diverse set of cues based on which consumers predict the quality of wines. In consumption situations where there is no opportunity for consumers to taste the wine, extrinsic cues and their impact on the quality evaluation of wine are a focal point in marketing practice and research. Wine packaging elements such as closure type and information on the label usually comply with these extrinsic attributes of wine used to evaluate the wine and its quality. In line with the seminal studies of [Charters and Pettigrew \(2007\)](#), [Veale and Quester \(2008\)](#) and [Hirche and Bruwer \(2014\)](#) information on the origin, grape variety and price are considered to be the most important quality cues for wine consumers. In recent studies, the origin is further subdivided into dimensions consisting of the country where the wine is originated as the highest level of geographical information given and region or vineyard designation as lower dimensions of origin. Regional information on the wine bottle increases the quality perception of wine consumers ([Johnson and Bruwer, 2007](#)), even more for highly involved wine consumers than for the lower involved segment ([Hirche and Bruwer, 2014](#)). Geographical indication constitutes another important cue for quality ([Atkin and Johnson, 2010](#); [Sáenz-Navajas et al., 2013](#)). For Austrian consumers, the grape variety represents the most important cue when it comes to choosing a wine in a retail setting ([Goodman, 2009](#); [Sáenz-Navajas et al., 2013](#)).

An upcoming interest in awards and medals as a signal of quality and their positive effect on quality perception of wine was identified by Sáenz-Navajas *et al.* (2013), who found that vintage, ageing potential and the name of the producer or vineyard designation are significant extrinsic factors when consumers determine the quality of a wine. The appearance of the producers' name is of "great significance" for Austrian wine consumers and is used as a synonym for the brand name of the wine (König and Lick, 2014). Recently, a growing interest in sustainably produced products can be observed, leading to an increase in improved quality perception of wine, which is produced sustainably (Sogari *et al.*, 2015; Gassler *et al.*, 2019). Information about residual sugar levels on wine labels allows wine buyers to draw a conclusion on the gustatory dimension of wine quality, an intrinsic cue stated to be more important than any extrinsic cues (Charters and Pettigrew, 2007). Sena-Estevés *et al.* (2018) show that there is a strong link between the level of residual sugar and consumers' personal preferences regarding red wines, thereby influencing the esteem for wines. Research by Blackman *et al.* (2010), investigating sweetness acceptance for white wines, reveals that the level of residual sugar has a significant effect on acceptance for both high and low involved consumers.

2.2 Wine closure perception and research hypotheses

Prior literature informs us that the type of closure used for a bottle of wine does have an influence on the quality perception of consumers (Henley *et al.*, 2011). In the mind of "traditional consumers", screw caps are associated with rather inexpensive wines, whereas natural cork is the "historically accepted" closure for a bottle of premium wine (Garcia *et al.*, 2007). Bleibaum *et al.* (2005), however, state an apparent difference between US and Australian wine consumers and their preferences for bottle closures. In the US, 61% of consumers prefer wines in cork-closed bottles, whereas Australian consumers clearly favour the screw cap over natural cork: 49% prefer buying wine in bottles with screw caps, while 37% prefer cork (Abernathyin, 2017). This is an indication that the assumptions on quality perceptions of wine closures deserve to be more closely examined. Supposedly, increasing the use of screw caps and consequently, longer exposure to that type of bottle closure does indeed seem to change the quality perception of consumers. This is of particular interest for traditional wine markets like Austria. So far there is widespread consensus that in traditional markets there is a certain degree of consumer's resistance towards screw caps leading to the difference in quality perception of wines mentioned above. As described in the introductory part, screw caps do already exist for a considerable period in the Austrian wine industry and referring to insights presented by Bleibaum *et al.* (2005), this leads to the following research gap, questioning the accepted view: we hypothesize that the phenomenon of the diminishing importance of the difference of wine closures on quality perception holds true in the traditional old wine market of Austria.

To support our assumption, we base our research on the classic view on wine closures to investigate whether this view still holds true. Accordingly, a cork seal is seen as an "indicator" for the high quality of a wine (Duhan *et al.*, 2014; Barber and Almanza, 2007). Following the study of Martin *et al.* (2007) and Spence and Wang (2017), we therefore hypothesize wines in bottles with natural cork closures to be perceived as being of higher quality as opposed to those with a screw cap closure, which leads to the following first hypothesis:

- H1. The quality of Austrian wine in bottles with a cork closure is expected to be of higher quality than the same wine in a bottle with a screw cap.

Further, wine consumers assign the appropriateness of bottle closures based on the type of wine. For red wines, a stronger fit of cork closures can be observed (Duhan *et al.*, 2014), as this type of wine comprises premium-quality wines with ageing potential, while for white (and sparkling) wines screw caps are favoured (Woodard, 2009). Portuguese wine consumers accept screw caps on light, fresh and young wines but otherwise prefer cork (Madureira and Nunes, 2013). Also, consumers in the UK, where red wines placed on the market are typically closed with a cork, prefer this type of closure on red wines (Spence and Wang, 2017). As this is an established practice that can also be observed in the Austrian market, we suppose that Austrian consumers expect a bottle of red wine closed with a cork to be of higher quality than those closed with a screw cap, which results in the second hypothesis:

H2. Wine consumers perceive the quality of red wine in bottles with a cork closure to be higher than that of the same wine sealed in a bottle with a screw cap.

According to Nesselhauf *et al.* (2017), the involvement of wine consumers influences the acceptance of wine packaging innovation. Buying wine in places such as supermarkets, lower-involved wine consumers are more open to accepting convenience aspects such as an easy to open screw cap on a bottle of wine. Highly involved wine consumers and those who show a higher purchasing frequency prefer natural cork over a screw top as an appropriate closure type for wine (Duhan *et al.*, 2014; Barber *et al.*, 2009; Kelley *et al.*, 2015). Hence, high involvement consumers with a sound knowledge of the particular features of different types of wine closures are expected to rate Austrian wines in bottles with cork closures to be of higher quality, while low involvement consumers, purchasing wines mainly in supermarkets and who are not consuming wines on a regular basis, would not do so. We enunciate our fourth hypothesis, assuming that the opposite is true for low involved consumers:

H3. Highly involved wine consumers rate the quality of a wine in bottles with a cork closure higher than that of a wine in bottles with a screw cap.

Without being able to taste the wine, consumers rely on extrinsic attributes such as brand name, origin, wine label or price to assess the quality of a wine. An important quality dimension of wine is the price (Charters and Pettigrew, 2007). Price influences the quality prediction of consumers like no other extrinsic cue (Veale, 2008). Price is stated to have an even stronger influence on expected and experienced quality perception of wine than intrinsic attributes such as taste (Veale and Quester, 2008). Wang and Spence (2018) even show price to be the only attribute correlating to quality. Bleibaum *et al.* (2005) also investigate buying intentions for US customers for wines in bottles with different closure types. Results suggest that end consumers do prefer cork closures for higher priced wines. These findings are supported by several other recent studies which show that wines in bottles with cork closures are mostly associated with higher prices (Marin and Durham, 2007; Mueller and Szolnoki, 2010). As there is an obvious link between price and quality, and taking this price-quality relationship into consideration, it can be assumed that in line with *H1*, a wine in a bottle with a cork closure signals high quality and is, thus, expected to have a higher price than a screw cap-closed wine. This generates our third hypothesis:

H4. Consumers are willing to pay a higher price for wines in bottles with cork closures than for wine in bottles that are closed with a screw cap.

3. Research methodology

The method chosen to address these hypotheses was an online experiment. Participants were recruited via virtual snowball sampling between 25 September and 24 October 2019. Criteria for inclusion were participants of age at least 18 years, who had principal residence in Austria and who do not completely avoid drinking wine, thus ensuring a reliable quality assessment.

Given a power of 0.95, a Type I error rate of 0.05 and an expected small main effect size of $\eta^2 = 0.04$, the study would have required at least 314 participants. After 34 participants were not included due to not meeting the sampling criteria, valid answers were obtained from 436 survey participants. These were randomly assigned to one of four conditions in a two-by-two between-groups design. The conditions presented were white versus red wine, and cork versus screw cap closure.

Respondents' involvement was rated based on five dimensions being knowledge, interest, activity, relevance and risk perception (Hirche and Bruwer, 2014), using a seven-point Likert scale, with 7 = *strongly agree* and 1 = *do not agree at all*. Using a threshold value of 4, participants were further categorized as highly involved and lowly involved.

To assess the quality of Austrian white and red wines – without the option of actually tasting the wine – the design followed validated recommendations from prior studies: origin, grape variety, awards, the content of residual sugar, vintage, geographical indication, ageing potential, organic certification, vineyard designation and brand (producer). Some of the aforementioned quality cues had to be determined explicitly to ensure comparable results. In particular, country of origin was set “Austria”, grape variety was set either to “Blaufränkisch” or to “Grüner Veltliner”, the content of residual sugar was set to “dry”, vintage was set to “2017”, the geographical indication was set to “DAC” and ageing potential was set to “high”. The quality cues were rated using a seven-point Likert scale within a range of 7 = *very high quality* and 1 = *very low quality*.

Means were computed for both constructed scales. To assess the scale reliability, Cronbach's alpha values were calculated.

Finally, the willingness to pay was measured using Van Westendorp's Price Sensitivity Meter (PSM) (Van Westendorp, 1976). Compared to incentive-aligned methods to elicit willingness-to-pay, e.g. the Becker–DeGroot–Marschak mechanism (Becker *et al.*, 1964), the PSM may yield more risk of bias due to its hypothetical nature of questioning. However, besides its time and cost advantages, there is also evidence that the resulting optimal pricing point (OPP) yields similar prices compared to incentive-aligned methods (Kloss and Kunter, 2016). According to that, cheap, expensive, too cheap and too expensive prices were queried for the Austrian red and white wines. From the intersections of the cumulative response frequencies, the point of marginal cheapness (PMC), the point of marginal expensiveness (PME) and the OPP were calculated.

To address *H1*, *H2* and *H3*, a series of analyses of variance were used. With quality as the dependent variable, the main effects of closure, for both the whole sample as well as solely considering red wines, were investigated while controlling for participants' involvement.

To address *H4*, exact binomial tests with exact Clopper–Pearson 95% confidence intervals (Clopper and Pearson, 1934) were calculated using frequencies from the PSM. In particular, two separate tests were conducted: whether the OPP of an Austrian wine with a screw cap is considered too cheap by more participants and too expensive by fewer participants for wines in bottles with a cork closure.

p-Values were adjusted by means of Bonferroni correction (Dunn, 1961). Effect sizes *d* (Cohen, 1988) were transformed from the obtained η^2 values and odds ratios to further interpret significant results.

Additionally, a principal components analysis was conducted to compare the importance of price (interpreted from a willingness to pay) as a cue for quality predictions with the other quality indicators for wine. Price variability was measured group-wise (red/white wine by cork/screw cap closure by high/low involvement) OPPs.

4. Results and findings

Table 1 shows the demographic profile and the involvement level of the respondents. Their age ranged from 18 to 76 years, with an average of 32.92 years (SD = 12.57). The number of female respondents (55.50%) was higher than that of male respondents (42.43%), whereas some respondents were classified as diverse according to their own statements (2.06%). In total, 83.95% of the respondents came from the eastern part of Austria, i.e. the regions of Burgenland, Vienna and Lower Austria. These are regions where wine production and alcohol consumption is observably higher than in the western part of Austria (Wieschhoff et al., 2020; Uhl et al., 2009). About one-third of the respondents consume wine two or three times a month (32.11%), while 47.71% stated to have a wine consumption frequency of one or more times a week. Every fifth respondent reported lower consumption frequencies (20.18%).

Table 2 provides information about the constructs to elicit involvement and quality assessment. The participants' mean involvement amounts to 3.91 (SD = 1.59), with good scale reliability ($\alpha = 0.89$). After splitting the participants into two categories, the sample finally consists of 42.89% highly involved and 57.11% low involvement Austrian wines'

Characteristics	<i>n</i>	(%)
Age (years)		
18–24	150	34.40
25–34	134	30.73
35–44	62	14.22
45+	90	20.64
Gender		
Female	242	55.50
Male	185	42.43
Diverse	9	2.06
Region		
Burgenland	101	23.17
Vienna	136	31.19
Lower Austria	129	29.59
Other	70	16.05
Involvement		
High	187	42.89
Low	249	57.11
Wine consumption frequency		
1 time per month or less	88	20.18
2–3 times per month	140	32.11
1 time per week	123	28.21
Several times per week	85	19.50

Table 1.
Sample characteristics

Table 2.

Constructs to elicit involvement and quality assessment

Scale	Items	α^a	M ^b (SD) ^c
<i>Involvement</i> ^d	Other people often ask me for advice regarding wine	0.89	3.91 (1.59)
	I have a strong interest in wine		
	I regularly attend wine events/festivals		
	Wine is a significant part of my life		
	When I buy wine, I'm always sure it was the right choice		
<i>Quality</i> ^e	How do you assess the quality of the wine ^f if the following criteria are fulfilled?	0.85	5.37 (0.79)
	Origin: Austria		
	Grape variety ^g		
	Awards		
	Content of residual sugar: dry		
	Vintage: 2017		
	Geographical indication: "DAC"		
	Ageing potential: high		
	Organic certification		
	Vineyard designation		
	Known producer		

Notes: $n = 436$; ^aCronbach's α values for scale reliability; ^bscale mean; ^cstandard deviation; ^dexpression 7 = strongly agree, 1 = do not agree at all; ^eexpression 7 = very high quality, 1 = very low quality; ^feither red or white wine with either cork closure or screw cap; ^geither "Blaufränkisch" or "Grüner Veltliner"

consumers. Highly involved consumers were 49.73% of men and 38.84% of women. The total quality assessment of all presented Austrian wines is 5.37 (SD = 0.79), with good scale reliability ($\alpha = 0.89$).

Austrian consumers rate the quality of Austrian wines in bottles with a cork closure rather high (M = 5.42, SD = 0.73). This perception can also be observed for red (M = 5.41, SD = 0.69) and white wines (M = 5.44, SD = 0.77). Highly involved consumers attribute slightly more quality to wines in bottles with a cork closure (M = 5.62, SD = 0.63) than low involved consumers (M = 5.24, SD = 0.77). The perception of wines in bottles with a screw cap is also fairly high (M = 5.30, SD = 0.84). Similar variations to the perceptions of wines in bottles with a cork closure are measured for red wines (M = 5.26, SD = 0.89), white wines (M = 5.34, SD = 0.79), highly involved consumers (M = 5.49, SD = 0.78) and low involved consumers (M = 5.19, SD = 0.85). The results are summarized in Table 3.

n (%)	Cork 229 (52.50%)	Screw cap 207 (47.50%)	F	d
Quality	5.42 (0.73)	5.30 (0.84)	1.37	0.11
Red wine	5.41 (0.69)	5.26 (0.89)	1.96	0.19
White wine	5.44 (0.77)	5.34 (0.79)	0.03	0.00
High involved	5.62 (0.63)	5.49 (0.78)	1.32	0.17
Low involved	5.24 (0.77)	5.19 (0.85)	0.29	0.06

Table 3.

Quality assessment of wines in bottles with cork and screw cap by wine type and involvement

Notes: Data shown for group means and standard deviations (in parentheses). Response based on the seven-point scale with 7 = very high quality and 1 = very low quality. F and d refer to the univariate main effect of closure type. ⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$

H1 and *H2* claim that the quality of an Austrian wine in bottles with a cork closure is expected to be of higher quality than the same wine in bottles with a screw cap. Austrian consumers do not perceive the quality of wines (both red and white wines) in bottles with a cork closure ($M = 5.42$, $SD = 0.73$) to be different from that of those with a screw cap ($M = 5.30$, $SD = 0.84$) in a significant manner [$F(1,1430) = 1.37$, $p = 0.24$]. Thus, *H1* is rejected. One reason might be that consumers had no prior negative experiences with a screw cap-closed wine bottle. This is in line with the findings of [Bleibaum et al. \(2005\)](#) for Australian consumers and their change in acceptance of screw caps due to longer exposure to this closure type. Research among US consumers also shows a moderate increase in acceptance of screw cap closures within a single year ([just-drinks, 2005](#)).

The aforementioned also applies under the sole consideration of red wines [$F(1,207) = 1.96$, $p = 0.16$]. Thus, Austrian wine consumers do not perceive the quality of red wine in bottles with a cork closure ($M = 5.41$, $SD = 0.69$) higher than the same wine in bottles with a screw cap ($M = 5.26$, $SD = 0.89$). *H2* is, therefore, rejected ([Figures 1 and 2](#)).

According to *H3*, highly involved consumers were hypothesized to have a significantly higher quality expectation of Austrian wine in bottles with a cork closure. However, results show a different picture: the quality expectation of highly involved consumers is only marginally higher in respect to wines in bottles with a cork closure ($M = 5.62$, $SD = 0.63$) than for wines in bottles with a screw cap ($M = 5.49$, $SD = 0.78$), yielding in a non-significant difference [$F(1,184) = 1.32$, $p = 0.25$]. Thus, *H3* is rejected. An explanation for this outcome might be that cork closures are less valued by those who have a better understanding of wine and know more about the advantages of a screw cap closure ([Bekkerman and Brester, 2019](#)). [Atkin et al. \(2006\)](#) implicate that those who read more about wine (which can be assumed to be higher involved wine consumers) show a higher acceptance for screw caps ([Figure 3](#)).

H4 further posited that consumers are willing to pay a higher price for wines in bottles with cork closures than for wine bottles that are closed with a screw cap. The participants' responses yield an OPP of €10.00 ($PMC = 8.00$, $PME = 15.00$) for wines in bottles with a cork and €7.50 ($PMC = 6.00$, $PME = 10.00$) for wines in bottles with a screw cap. In particular,

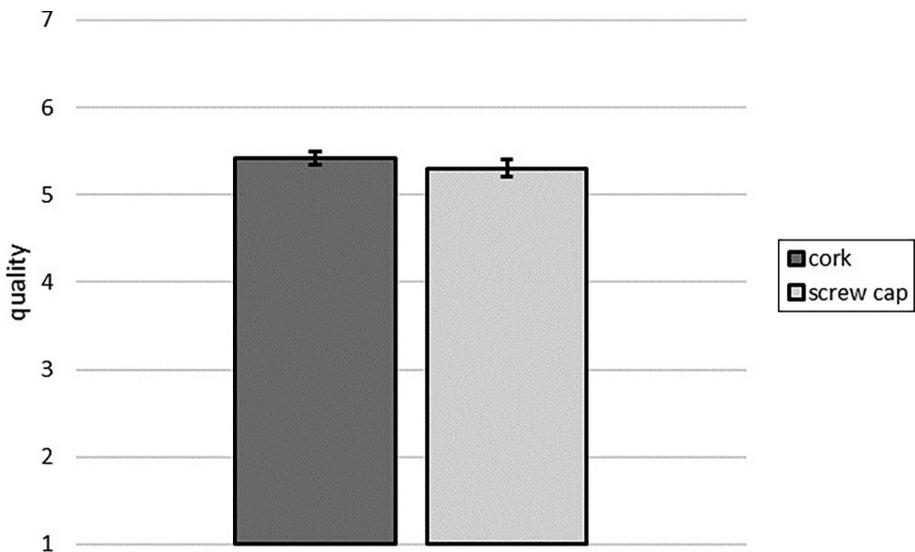


Figure 1.
Quality assessment of
wines in bottles with
cork and screw cap

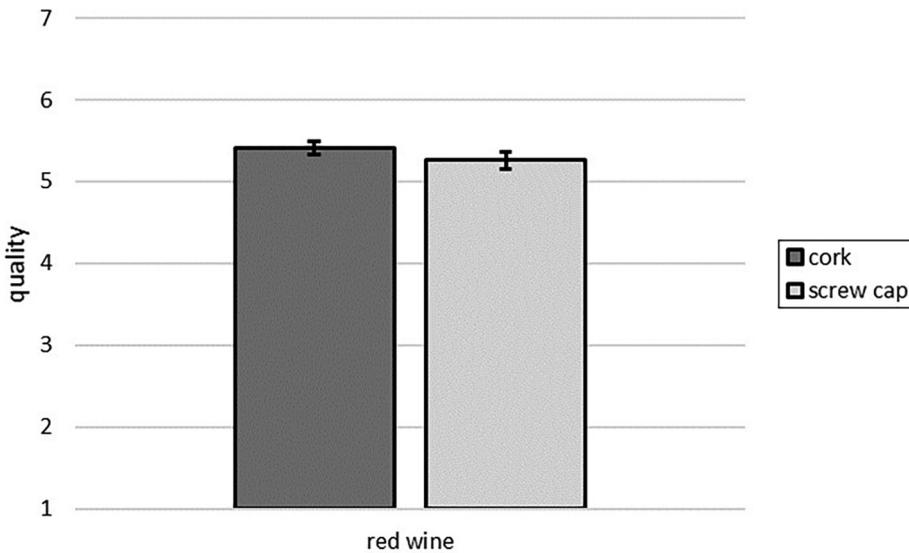


Figure 2. Quality assessment of red wines in bottles with cork and screw cap

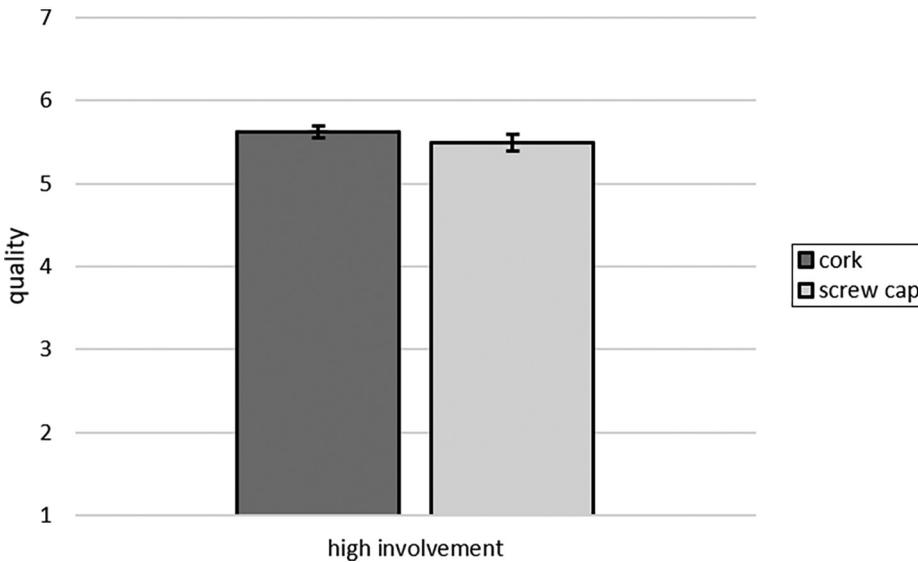


Figure 3. Quality assessment of wines in bottles with cork and screw cap by highly involved participants

the willingness to pay in the case of red wine is higher for wines in bottles with a cork closure (OPP = 15.00, PMC = 10.00, PME = 15.00) than for wines in bottles with a screw cap (OPP = 6.75, PMC = 5.50, PME = 9.00). Consequently, Austrian red wines do have the potential to achieve even higher prices if they were equipped with cork closures. In the case of red wines in bottles with a cork closure, highly involved consumers would be willing to

pay more (OPP = 15.00, PMC = 12.00, PME = 15.00) than low involved consumers (OPP = 11.50, PMC = 10.00, PME = 15.00). Low-involved consumers are willing to pay more for red wines in bottles with a screw cap (OPP = 6.50, PMC = 5.50, PME = 10.00) than highly involved consumers (OPP = 5.00, PMC = 4.50, PME = 10.00).

Another detail is particularly striking – the situation seems to be fundamentally different for white wines: Austrian white wine consumers are willing to pay almost the same price for a bottle, regardless of whether it has a screw cap (OPP = 8.50, PMC = 6.00, PME = 10.00) or a cork closure (OPP = 10.00, PMC = 8.00, PME = 12.00). Austrian consumers would further accept a screw cap for white wine (OPP = 8.50, PMC = 6.00, PME = 10.00) much more readily than one for red wine (OPP = 6.75, PMC = 5.50, PME = 9.00). This has potential implications for the pricing strategy of white wine producers, as they could charge higher prices for their white wines in bottles with this closure type (considering only price sensitivity and closure type). Furthermore, there is a lower willingness to pay for white wines in bottles with screw caps (OPP = 8.50, PMC = 6.00, PME = 10.00) than for white wines in bottles with a cork closure (OPP = 10.00, PMC = 8.00, PME = 12.00). Highly involved consumers are willing to pay considerably more for white wines in bottles with a screw cap (OPP = 10.00, PMC = 8.25, PME = 10.00) than low involved consumers (OPP = 8.00, PMC = 5.00, PME = 9.50). By contrast, the highly involved participants' willingness to pay is lower (OPP = 8.50, PMC = 8.00, PME = 10.50) than the low involved participants' (OPP = 10.00, PMC = 8.00, PME = 13.00) when wines in bottles with a cork closure are considered. Table 4 summarizes these results.

The OPP of both red and white wines in bottles with a screw cap yields €7.50. Hence, an equal share of subjects, i.e. 95.89%, perceives this price as optimal since 4.11% believe the product is too cheap or too expensive. An exact binomial test indicates that significantly more participants consider the OPP of an Austrian wine with a screw cap too cheap for wines in bottles with a cork closure [8.73%, CI = (5.86%, 100.00%), $p_{\text{adj}} = 0.003$, $d = 0.416$]. On the other hand, substantially fewer participants consider the OPP of an Austrian wine with a screw cap too cheap for wines in bottles with a cork closure [0.87%, CI = (0.00%, 2.72%), $p_{\text{adj}} = 0.008$, $d = 0.854$]. H_4 is, therefore, supported (Figures 4 and 5).

However, this is not in line with H_1 . When the price is such an important quality cue, one could assume that there is also no difference in the willingness to pay for cork- compared to screw cap-closed wines. In this case, we can support the results of Veale and Quester (2008), who find that price is the strongest cue for quality predictions and “overpowers” all other quality indicators for wine.

	<i>n</i> (%)	Cork	Screw cap
Total	436(100.00%)	10.00(8.00–15.00)	7.50(6.00–10.00)
Red wine	210(48.17%)	15.00(10.00–15.00)	6.75(5.50–9.00)
High involved	92(21.10%)	15.00(12.00–15.00)	5.00(4.50–10.00)
Low involved	118(27.06%)	11.50(10.00–15.00)	6.50(5.50–10.00)
White wine	226(51.83%)	10.00(8.00–12.00)	8.50(6.00–10.00)
High involved	95(21.79%)	8.50(8.00–10.50)	10.00(8.25–10.00)
Low involved	131(30.05%)	10.00(8.00–13.00)	8.00(5.00–9.50)

Table 4. Willingness to pay according to optimal pricing point and price range

Notes: Data are shown for group OPP and price range based on PMC and PME (in parentheses). Response in euro

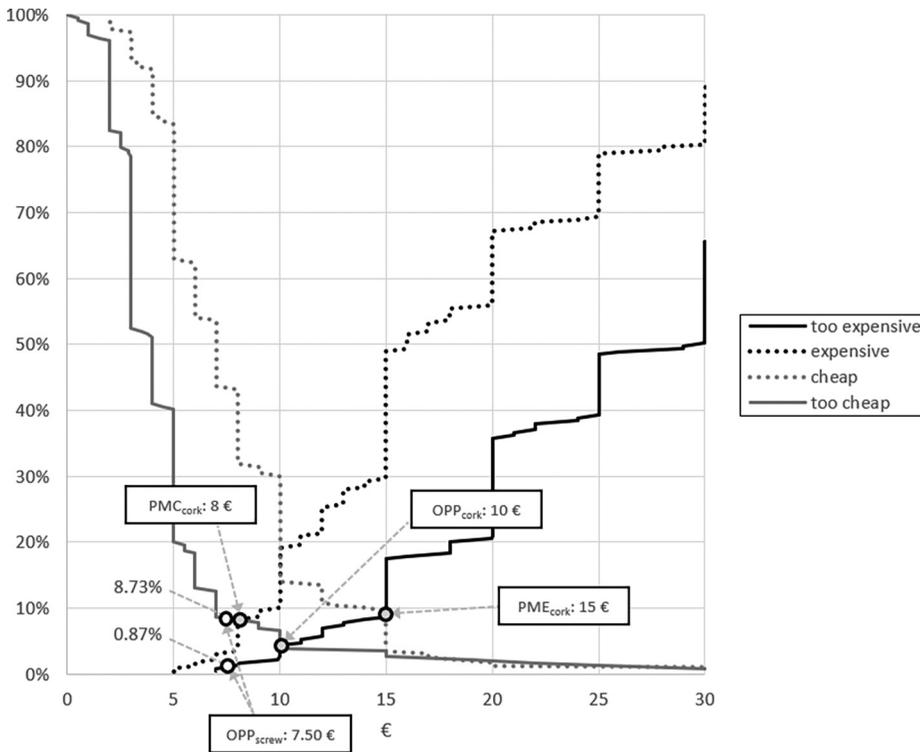


Figure 4.
Willingness to pay
for Austrian wines in
bottles with a cork
closure

A subsequent principal components analysis of the quality indicators used provides further support for this assumption. With a KMO score of 0.88, the patterns of correlations seem to be sufficiently compact. Thus, the sample is methodologically suitable for factor decomposition and leads to clear and reliable factors. The Bartlett test for sphericity was also highly significant [$\chi^2(66) = 1,596.98, p < 0.001$]. This result indicates relationships in the correlation matrix of the quality criteria. Both the KMO measure and the Bartlett test confirm the factor analysis as an appropriate instrument for this further analysis. After analysis of the covariance matrix, one eigenvalue has a value of $\lambda = 7.41$. The first principal component contributes 32.68% of the total variability in the data. According to this, “quality” could alternatively be considered as a unidimensional construct. Its weighted contributions of the single quality criteria are represented by loadings on the principal component.

The analysis of the corresponding scaled loadings shows that Austria as country of origin ($\gamma = 0.62$) and grape variety ($\gamma = 0.59$) are exemplary relevant indicators to represent quality, while a known producer plays a subordinate role ($\gamma = 0.38$). However, the strongest cue for quality is the price ($\gamma = 0.65$). A comparison of the loadings is shown in [Figure 6](#).

5. Conclusion

5.1 Conclusions

Our results show that based on quality indicators such as origin, variety, awards, the content of residual sugar, vintage, geographical indication, ageing potential, level of

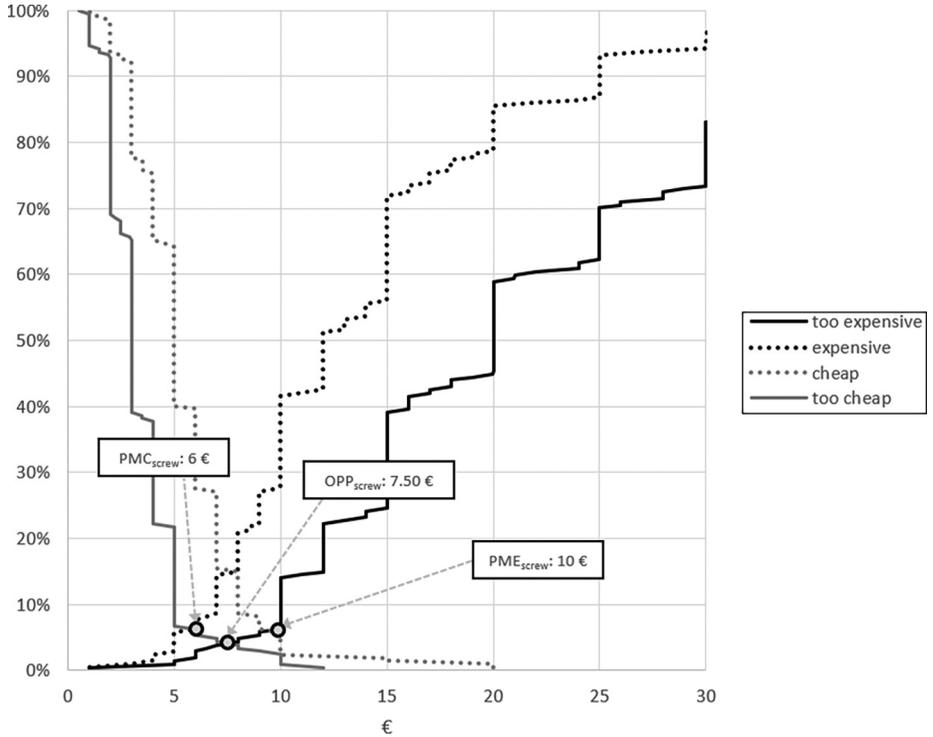


Figure 5.
Willingness to pay
for Austrian wines in
bottles with a
screw cap

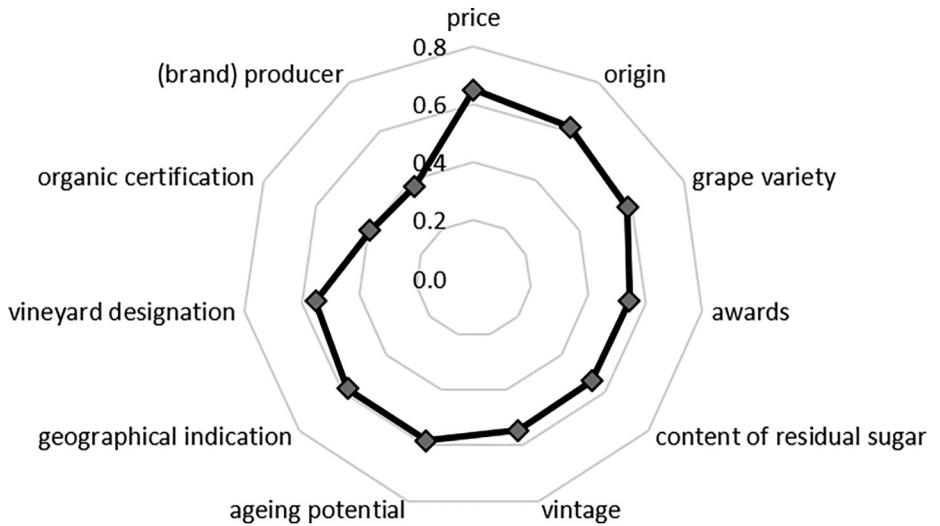


Figure 6.
Loadings of the
quality indicators on
the first principal
component

sustainability (organic certification), vineyard designation and brand (producer) a wine bottle closed with a cork is not predicted to have a better quality than the same wine being closed with a screw cap. Even highly involved Austrian wine consumers do not rate the quality of cork-closed wines differently or lower than screw cap-closed wines. Highly involved wine consumers appear to be well aware of the advantages of innovative wine packaging elements such as screw caps, and therefore do not automatically prefer cork closures (Atkin *et al.*, 2006), contradicting established research showing that the wine closure itself is deemed to have a crucial influence on the quality perception of wines.

However, it has to be taken into consideration that the price assessment of cork-closed wines is significantly higher than that of wines in bottles with a screw cap and price is an important signal of quality. We therefore assume that Austrian wine consumers do see differences in the quality prediction for wines in bottles with different closure types, based on price. This supports Veale and Questers' (2008) findings that price is over-powering all other quality signals. Consequently, one can argue that despite the decreasing importance of the bottle closure type, *per se*, cork-sealed wines with higher prices are still considered to be of higher quality. We conclude that price is the most important quality cue and every other product attribute of wine has to match the overpowering communication effect that price induces.

5.2 Practical implications

Findings indicate that the choice between cork and screw cap plays a subordinate role when it comes to communicating extrinsic quality indicators. Price as a quality cue is superior to closure. As the perception of quality is mainly defined through price, it can be enhanced by the choice of closure type. Consumers experience uncertainties when buying wine and producers aim at reducing perceived risks such as functional, physical, social, time and financial risk (Bruwer *et al.*, 2013). In the case of wine, choosing the right closure might minimize particularly functional, physical and financial risks for consumers to the benefit of producers.

5.3 Limitations

The following limitations to this research have to be stated: The design of this study is based exclusively on the description of wines and certain quality indicators and does not involve the actual tasting of wines. Our findings did not reveal whether different consumption occasions or distribution channels influence consumers' quality expectation or purchase intent of a bottle of wine sealed with different types of closure. The sample consists mainly of participants from the Eastern part of Austria, a region with higher wine consumption than in, e.g. the Western regions of Austria. The sample is, thus, not fully representative of the Austrian market and represents one of convenience.

5.4 Recommendations for future research

Further research needs to be conducted on the appropriateness of different wine packaging closures for different consumption situations. A cork closure might be more appropriate in hospitality situations than a screw cap (Duhan *et al.*, 2014). Qualitative research needs to be done to fully capture the motives behind the perception of these two wine closure types. Winemakers have to bear in mind that in the consumers' mind cork is still not merely a type of closure, but is an integral part of the long history and tradition of drinking and enjoying a glass of wine (Murray and Lockshin, 1997).

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