

The impact of wine design on the purchase decision involvement

Term paper

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Research management summary

Purpose

This study aimed to measure the impact of visual wine design on the buyer's behavior. The research investigated how much the design in the wine industry influences the consumer's decision for purchase. The survey attempted to consider wine design as the general perception of product design. The effect of the visual wine aesthetics was researched regarding the consumer's purchase decision involvement and the importance of the stimulus for a purchase decision, be that the product or the task.

Approach

An online survey was created and collected data from 90 participants. The survey's conceptual framework consisted of existing marketing scales with items, measuring the visual wine design, the purchase decision involvement and the stimulus for purchase. The questionnaire collected also demographic information about the sample. The data was manipulated and analyzed with R Studio. Two models were created to measure the design influence hypotheses regarding purchase involvement and regarding importance of the stimulus. The results were estimated with multiple linear regressions.

Findings

The outcome of the study revealed that it is not possible to confirm the positive impact of each dimension of design on the researched factors. The created models estimated different conclusions about the aspects of design. The design dimension "value" did not show a statistically significant relation with the involvement factors. However the "acumen" and "response" elements of design had a significant positive influence in the both models. The explanatory power of "acumen" was higher than the one of "response" in both models.

Implications

The final conclusions of the conducted research are that in general there are aspects of the visual design of wine, which have a positive effect on the purchase decision involvement. This effect can be examined more precisely and correctly by including additional and different factors of wine design and accommodating them to the situational context and perceived strategy.

1 Introduction

Nowadays there are various types and brands of wine on the market. Visiting a superstore customers usually have to select between very similar products regarding price category or wine heritage. It is therefore essential to distinguish the most prominent factors, which influence the choice of wine and have an impact on the buyer's behavior.

On the one hand wine is a consumable good and therefore it shouldn't require too complex decision making. On the other hand even the ordinary weekly grocery shopping might be affiliated with high decision involvement due to different product or situational factors (Beharrell and Denison, 1995). Further the wine aging ability is an example for an additional factor, which distinguishes it from other consumable goods.

Wine packaging characteristics, such as bottle shape, glass colour and label's layout are exogenous aspects and don't have an impact on the nature of wine. However these characteristics attract the consumer's attention at first and are used as basis for assumptions about the wine's quality (Rocchi and Stefani, 2006). Wine design has also psychological influence on the perception of taste and flavor. A study showed that participants were able to make more accurate findings about wine's fruit characteristics only after appraising the packaging and label information (Henley et al., 2011). In addition wine can be categorized as a hedonic good (Dhar and Wertenbroch, 2000).

The aim of this work is to provide insights for the following research questions. How to measure the visual aesthetics of wine? Does the design of wine packaging influence the purchase decision involvement? How is this reflected regarding the consumer's involvement profile?

2 Related Literature

Wine package design has a strong impact on purchase intention and is favorable for building brand personality (Boudreaux and Palmer, 2007). The cited research implies that among all design characteristics the label is the most relevant one to influence the decision for purchase, especially for occasional wine consumers. Although the study of Boudreaux and Palmer is focused on brand personality as a predictor for purchase intent, it contributes to the idea for a connection between wine layout and decision involvement by suggesting that specific design elements might arouse the interest of different personality types.

In contrast a research about the wine label's influence argues that label design, as exogenous factor, does not have a great impact on wine judgement and in this way on the decision for purchase (Sherman and Tuten, 2011). According to Sherman and Tuten the novelty in wine packaging design is perceived as a signal for a cheap product. Since participants in the study were more inclined to buy a wine bottle with a traditional label design, the work of Sherman and Tuten contends that the transformations of wine label's design concepts have not adjusted the consumer's opinion about the conventional wine label's composition. The influence of wine packaging is acknowledged only in the context of gift occasions (Sherman and Tuten, 2011). Nevertheless it is important to notice that the cited research faces limitations in terms of sample selection and homogeneity, as well as label's design suggestions and comparison.

The differences in the findings of the previous examples could be due to an analysis of different design strategies. While classical wine packaging design is typical for the old world wines (e.g. European wines), the producers of new world wines (e.g. New Zealand) strive to differentiate their products from the long-established standards by distinctive shape or flavor (Jennings and Wood, 1994). The example defines the spreading standardi-

zation in wine producing conventions as a threat for the ability to distinguish different wines on the market. As the few exclusive winemakers are able to stand out with their entrenched traditional approach, an option for the new world wine producers to overcome this could be the creativity in design packaging (Jennings and Wood, 1994). Wine packaging is highly significant not only because of the abundant alternatives on the market, but also because of the consumer's portion unable to assess wine goods (Thomas, 2000).

A suitable example for a new world wine, which managed to achieve a prominent success on the US market with its overall design among the severe competition of more than one thousand six hundred US wineries and old world import brands, is the brand yellow tail of Casella Wines (Kim and Mauborgne, 2005). Yellow tail offered simplicity to the customer by reducing the range and complexity of the wine. However one of the most important characteristics of the wine was the minimalistic approach towards the wine packaging. The brand offered minimalistic design with plain, state-of-the-art label, which eased the selection of wine.

Albeit the long term wine consumption depends on the actual taste and qualities of the wine, the design can give a better awareness of the consumer involvement by affecting the "before purchase" as well as the "actual purchase" decision (Jennings and Wood, 1994). Therefore the design factors should be interpreted as purchase decision factors, which strive to create an impression of the offered wine quality and provoke the user's involvement.

In order to encompass a wide range of design factors and characteristics irrespective of the wine type or business model strategy, this study aims to use a tool, representing the overall perception of wine design. Centrality of Visual Product Aesthetics (CVPA) is a unidimensional scale, measuring the overall level of significance, which the visual design has for the consumer, related to a specific product (Bloch, Brunel, and Arnold, 2003). This paper fo-

cuses on measuring whether this general visual product aesthetics affects the customer's purchase decision. The decision making process relies on the construct Purchase Decision Involvement (PDI), which defines to what extent a consumer is interested in making a purchase-decision task (Mittal, 1989). Additionally the study explores modified involvement scales of the construct with respect to visual aesthetics.

3 Conceptual framework

CVPA is considered to be a general consumer characteristic, unconnected with a particular product group or category, and represents the overall relevance of visual product aesthetics based on four related elements – value, acumen, response and determinacy (Bloch, Brunel, and Arnold 2003). The value of the visual product's design measures the ability of the product to improve the life quality – both personally and societal. Acumen indicates the competence to recognize and evaluate visual product aesthetics. Response measures the acknowledgement of design features and includes determinacy as product desires and satisfaction, based on the effect of visual aesthetic elements.

PDI is targeting at the situational purchase decision task (Mittal 1989). The construct was modified in 1995 along with three other involvement measures (Mittal 1995). The transformation of the concepts aimed to represent “the perceived importance of the stimulus; be that stimulus the product itself or the purchase decision task” (Mittal 1995). All modified scales in the study showed evidence of unidimensionality and internal consistency as a measure of purchase decision involvement and no scale was endorsed more than the others (Bearden and William, 2011). Nevertheless the modified three-item scale of the Laurent and Kapferer's (1985) Consumer Involvement Profile (CIP) was able to measure the product class involvement as well, considering the consumer's preferences. The current research aims to compare the models, which the classic PDI and the modified scales build

regarding to wine package design. In order to create an overall measure for the modified PDI, the study combines the modified PDI scale and the modified CPI scale. The following hypotheses were developed:

H1: Wine design value has a significant effect on the purchase decision involvement.

H2: Wine design acumen has a significant effect on the purchase decision involvement.

H3: Wine design response has a significant effect on the purchase decision involvement.

H4: Wine design value has a significant effect on the importance of the stimulus for the purchase decision involvement.

H5: Wine design acumen has a significant effect on the importance of the stimulus for the purchase decision involvement.

H6: Wine design response has a significant effect on the importance of the stimulus for the purchase decision involvement.

4 Data

4.1 Sample and data collection

The data for the research were collected via an online survey with the form & survey builder Typeform. The questionnaire was divided into two parts – the items for the conceptual framework and the demographic questions. The survey had 90 respondents, however some of the responses were duplicated or showed missing data. The report of the survey provided network IDs for the responses. Although these IDs could be assigned based on physical locations, meaning that respondents living on the same address share the same ID, there were 12 records from only 4 network IDs. Therefore these records were treated as duplicates and were subtracted from the sample. Additionally the missing values in the respons-

es affected the items from the conceptual framework and consequently were also removed from the sample. Table 1 summarizes the demographic characteristics of the final sample of 75 respondents.

Table 1: Demographic characteristics of the sample

	Frequency	Percentage		Frequency	Percentage
Gender			Age		
Male	35	46.67	Under 18	3	4
Female	37	49.33	18 – 29	53	70.67
No answer	3	4	30 – 42	6	8
Total	75	100	42 – 53	9	12
			54 – 64	3	4
			65 and over	1	1.33
			Total	75	100
Education			Income		
Bachelor's degree	29	38.67	0 - 250 euro	8	10.67
Master's degree	14	18.66	250 - 500 euro	12	16
Doctorate degree	4	5.33	500 - 1000 euro	21	28
Professional Degree	3	4	1000 - 1500 euro	6	8
High school degree	22	29.33	1500 - 2000 euro	4	5.33
Some high school	2	2.66	2000 euro or more	8	10.67
No answer	1	1.33	No answer	16	21.33
Total	75	100	Total	75	100
Employment			Marital status		
Employed for wages	32	42.67	Single	44	58.67
Looking for work	8	10.67	Married	18	24
Out of work	13	17.33	No answer	13	17.33
Self-employed	7	9.33	Total	75	100
Retired	1	1.33			
Unable to work	2	2.67			
No answer	12	16			
Total					

The sample consisted mainly of single young people, most of them students, with low to moderate income. The only factor, which provided a rather equal distribution among the population was gender.

4.2 Measures

The independent variable - visual wine design, was measured by the CVPA scale of Bloch, Brunel, and Arnold (2003). The scale includes three dimensions of visual product aesthetics – value, acumen and response, which were evaluated by 11 items scored on 5-point

Likert-type scales. The dependent variable for the first three hypotheses, purchase decision involvement, was measured by the PDI scale of Mittal (1989) with 4 items, scored on 5-point bipolar phrases. The dependent variable for H4, H5 and H6 - the importance of the stimulus, was measured by the combination of the modified PDI scale (Mittal, 1995) and the modified CPI scale (Mittal, 1995). The modified PDI scale included 3 items, scored on 5-point bipolar phrases. The modified CPI scale consisted of two dimensions – product class involvement and purchase decision involvement, and was measured by 6 items, scored on 5-point strongly disagree to strongly agree Likert-type scales. Originally the involvement scales of Mittal are scored on 7-point scales, however this study uses 5-point scale for all items in order to explain better the variables.

4.3 Validity and reliability

The Cronbach's alpha scores of the classic PDI were 0.762 (Table 2) and within the acceptable limits.

Table 2: Cronbach's alpha for PDI

Scale Items	Cronbach's alpha
PDI	0.762
In selecting from many types and brands of wine available in the market, would you say that:	
Do you think that the various types and brands of wine available in the market are all very alike or are all very different?	
How important would it be to you to make a right choice of wine?	
In making your selection of wine, how concerned would you be about the outcome of your choice?	

The alpha coefficients for WineDesign and the three sub-dimensions were also greater than 0.7 and respectively in the acceptable limits (Table 3).

Table 3: Cronbach's alpha for WineDesign

Scale Items	Cronbach's alpha
WineDesign	0.897
Value	0.818
Owning wine bottles that have superior designs makes me feel good about myself.	
I enjoy seeing displays of wine bottles that have superior designs.	
The design of a wine bottle is a source of pleasure for me.	
Beautiful wine bottle designs make our world a better place to live.	
Acumen	0.805
Being able to see subtle difference in wine bottle designs is one skill that I have developed over time.	
I see things in the design of a wine bottle that other people tend to pass over.	
I have the ability to imagine how a wine bottle will fit in with designs of other things I already own.	
I have a pretty good idea of what makes one product look better than its competitors.	
Response	0.860
Sometimes the way a wine bottle looks seems to reach out and grab me.	
If a wine bottle's design really "speaks" to me, I feel that I must buy it.	
When I see a wine bottle that has a really great design, I feel a strong urge to buy it.	

The items measuring the stimulus importance had also satisfying alpha coefficients. Lastly no items had to be eliminated because of the reliability analyses.

Table 4: Cronbach's alpha for the stimulus importance

Scale Items	Cronbach's alpha
Importance of the stimulus	0.904
Modified PDI	0.812
In selecting from many types and brands of wine available in the market, would you say that:	
How important would it be to you to make a right choice of wine?	
In making your selection of wine, how concerned would you be about the outcome of your choice?	
Modified CIP	0.888
Wine is very important to me.	
For me wine does matter.	
Wine is an important part of my life.	
I choose wine very carefully.	
Which wine I buy matters to me a lot.	
Choosing wine is an important decision to me.	

5 Model

5.1 Purchase decision involvement model

A linear regression analysis was used to test H1, H2 and H3. The first model (Model 1) investigated the effect of each dimension of visual wine design on PDI with a multiple linear regression of the form:

$$\text{PDI} = \beta_0 + \beta_1 \text{Value} + \beta_2 \text{Acumen} + \beta_3 \text{Response}$$

5.2 Importance of the stimulus model

A linear regression was also used to test H4, H5 and H6. The effect of each dimension of the visual wine design on the importance of the stimulus for a purchase decision involvement (PDI_Stimulus) was inspected with a multiple linear regression in the second model:

$$\text{PDI_Stimulus} = \beta_0 + \beta_1 \text{Value} + \beta_2 \text{Acumen} + \beta_3 \text{Response}$$

6 Results

6.1 Purchase decision involvement results

Table 5 offers a summary of the results from the multiple linear regression of the first model. The model has a significant overall probability value ($p < 0.05$). There are no subtle differences between the coefficient of multiple determination and its adjusted value. The model explains little more than 30% of the total variation. The resulted coefficients are presented in Table 6. H1 is rejected, because the Value's coefficient is not significantly different from zero ($p < 0.05$, $t \text{ value} < 2$). Acumen and Response have statistically significant coefficients. Therefore H2 and H3 can be accepted. The results reveal that wine design acumen and response are positively associated with the purchase decision involvement. If the other arguments in the regression are held fixed, for each change of Acumen with 1

unit, the purchase decision involvement changes with 0.30 units. Respectively for each change of Response with 1 unit, while the other arguments are held fixed, the PDI changes with 0.29 units.

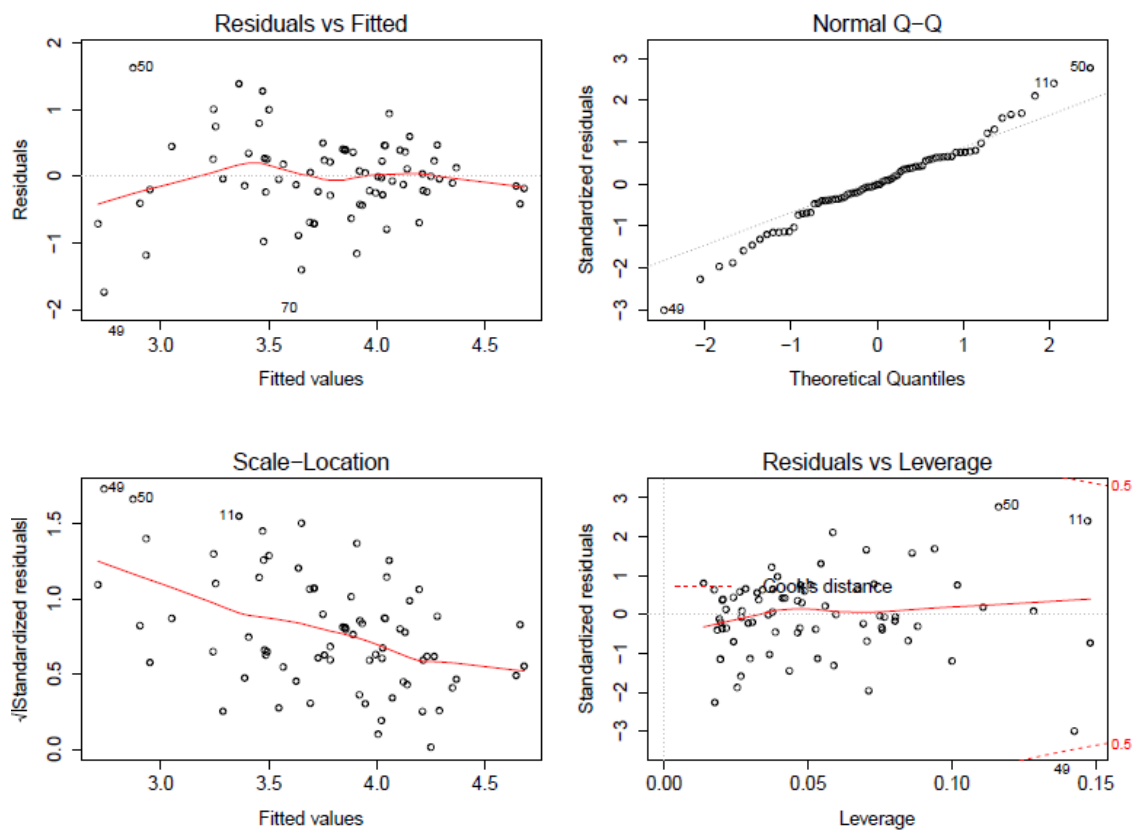
Table 5: Model 1 purchase decision involvement summary

Model	Regression	R_squared	Adj_R_squared	Sigma	F_Statistic	P-value
M1	$\text{PDI} = \beta_0 + \beta_1 \text{Value} + \beta_2 \text{Acumen} + \beta_3 \text{Response}$	0.340554461	0.312690565	0.624885224	12.22206906	1.55E-06

Table 6: Model 1 purchase decision involvement coefficients

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	2.251778	0.328247	6.86001	2.12E-09
Value	-0.11597	0.123321	-0.94041	0.350194
Acumen	0.305745	0.108596	2.815448	0.0063
Response	0.296283	0.095797	3.092818	0.002834

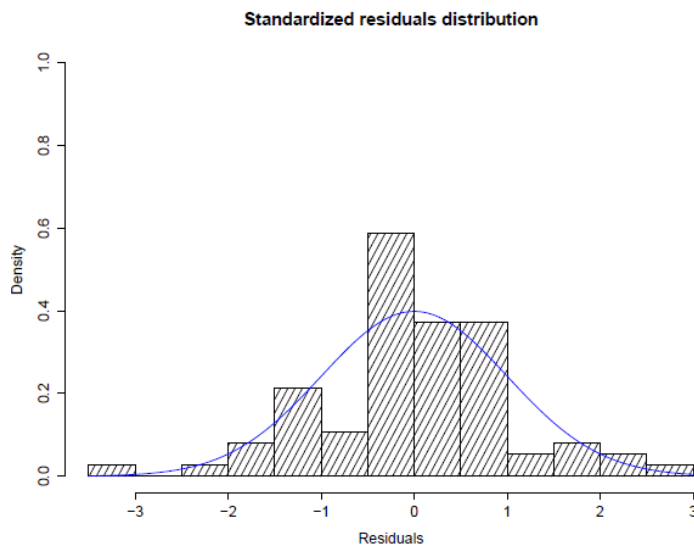
Figure 1: Model 1 purchase decision involvement plots



6.1.1 OLS Assumptions check

The plot in the top left corner of Figure 1 reveals slight curves in the linear relationship between the dependent variables and the residuals, but there are no strongly noticeable patterns. The standardized residual distribution on Figure 2 shows a rather normal distribution, however there are some deviations noticeable. The Normal Q-Q plot from Figure 1 depicts further a “heavy-tailed” distribution as the residuals are going away from the both ends of the theoretical line. However the results from the Shapiro-Wilk normality test give a p-value of $0.38 > 0.05$ and suggest that the null hypothesis cannot be rejected.

Figure 2: Standardized residuals distribution for Model 1



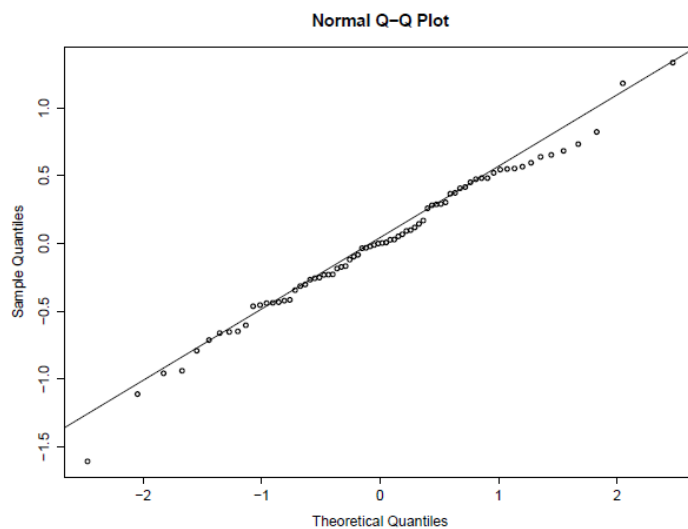
The VIF values of the independent variables are less than 2, which excludes the assumption of multicollinearity. The assumption for autocorrelation is excluded as the result from the Durbin-Watson-Test is 1.84, which is close to 2. There are additionally no time data. The Breuch-Pagan test rejects the presence of heteroscedasticity (p-value 0.0001049). The results from the test for outliers and the Cook’s distance plot (Figure 1) revealed a record, which had values of 1 on all items from the survey. After performing the regression without the particular outlier the regression coefficients became very significant (Table 7) and

the distribution of the residuals on the Q-Q plot improved considerably, but remained with slight deviations in the upper part of the theoretical line (Figure 3).

Table 7: Model 1 purchase decision involvement coefficients after excluding an outlier

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.700619	0.303711	5.599465	3.93E-07
Value	-0.16753	0.107811	-1.55393	0.12471
Acumen	0.429049	0.09325	4.601042	1.82E-05
Response	0.325801	0.082322	3.957643	0.000179

Figure 3: Model 1 Normal Q-Q plot after removing an outlier



6.2 Importance of the stimulus results

The results from the second model exposed that the visual wine design affects strongly the importance of the stimulus for a purchase decision. The summary of the model from the regression analysis depicts a very significant estimate (Table 8). The adjusted coefficient of determination is only slightly smaller than the multiple coefficient of determination and explains a little more than the half of the total variation (0.51), which is a considerable amount, regarding that the purchase decision involves different psychological factors. The coefficients from the model are listed in Table 9. As in the first model, the coefficient for value dimension of the visual wine design was not significantly different than zero (p-

value > 0.05) and therefore H4 was rejected. H5 and H6 were supported, as the coefficients for Acumen and Response were statistically significant (p-value < 0.05, t-value > 2). According to the results, the perception of visual wine design has a positive influence on the importance of the purchase decision stimulus. The model estimated that the explanatory power of Acumen is higher than the one of Response. A 1 unit increase of wine design Acumen would increase the importance of the stimulus with 0.44 units when the other factors are held constant.

Table 8: Model 2 importance of the stimulus summary

Model_No	Regression	R_squared	Adj_R_squared	Sigma	F_Statistic	P-value
	PDI_Stimulus = $\beta_0 +$ $\beta_1 \times \text{Value} +$ $\beta_2 \times \text{Acumen}$ + $\beta_2 \times \text{Response}$					
M2		0.53474	0.51508	0.5505	27.2013	8.02E-12

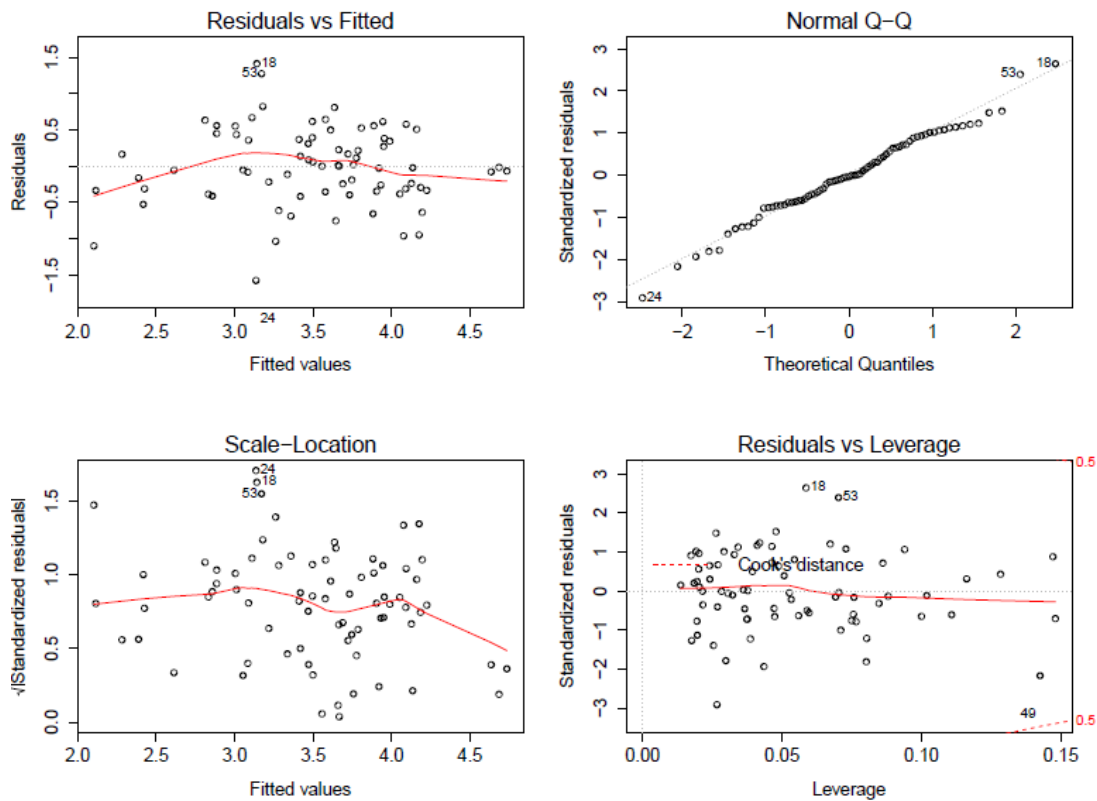
Table 9: Model 2 importance of the stimulus coefficients

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.446531	0.289174	5.002285	3.95E-06
Value	-0.12069	0.108642	-1.11086	0.270374
Acumen	0.440391	0.095669	4.603283	1.78E-05
Response	0.338067	0.084394	4.00583	0.00015

6.2.1 OLS Assumptions check

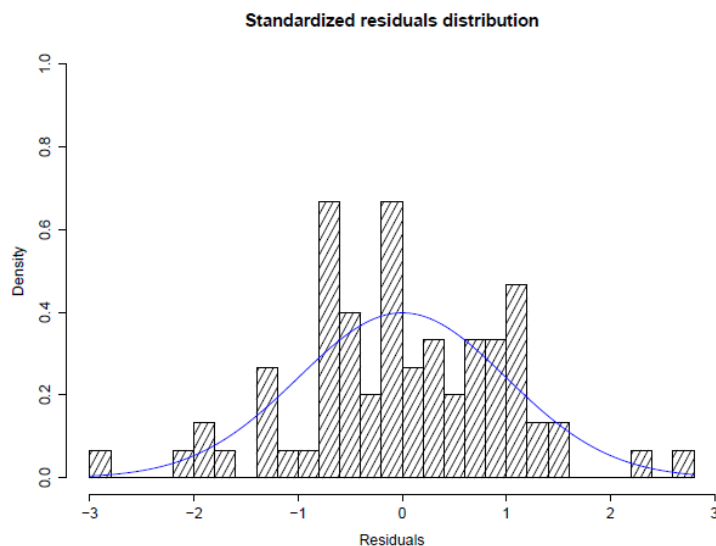
The linear relationship between the dependent variables and the residuals is similar to the one from the first model, without clear patterns and subtle differences in the variance, but with a smooth curve (Figure 4).

Figure 4: Model 2 importance of the stimulus plots



A histogram of the distribution of the standardized residuals suggest a rather normal distribution of error term with some moderate deviations. The Q-Q Plot from Figure 4 also shows that residuals follow the theoretical line with minor left skewness. With a significant p-value from the Shapiro-Wilk normality test the null hypothesis that the data came from a normally distributed population cannot be rejected.

Figure 5: Standardized residuals distribution for Model 2



Multicollinearity was excluded, as the independent variables had VIF values < 2 . The results from the Durbin-Watson-Test rejected also the assumption for autocorrelation. The p-value from the Breuch-Pagan test was 0.06 and indicated possible heteroscedasticity. Although the global validation of linear model assumptions confirmed that the assumptions for homoscedasticity were acceptable, a robust linear model for the regression was conducted, in order to check issues with heteroscedasticity or outliers. The resulted coefficient were not considerably different from the ones of the multiple linear model and therefore the assumption for heteroscedasticity should be rather accepted.

The test for outliers analogously revealed the same record as in the first model as a potential outlier. However in the model for stimulus importance the outlier was not outside the Cook's Distance line on the bottom right plot of Figure 4. Respectively the results from the regression without the outlier were not much different. The values of multiple and adjusted R-squared (0.49, 0.47) were even less, while the coefficients remained on the same significance level (Table 10). The results show that the exclusion of the outlier does not improve considerably the model.

Table 10: Model 2 importance of the stimulus coefficients after excluding an outlier

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.700619	0.303711	5.599465	3.93E-07
Value	-0.16753	0.107811	-1.55393	0.12471
Acumen	0.429049	0.09325	4.601042	1.82E-05
Response	0.325801	0.082322	3.957643	0.000179

7 Discussion

The conducted research aimed to reveal what influence have the three dimensions of visual wine design – Value, Acumen and Response, on the consumer's purchase decision involvement and on the importance of the stimulus for purchase regarding the consumers preference profile. The study estimated two different models to measure the impact of design.

The results can't confirm that all elements of wine design's relevance for the consumer have a positive effect on the measured aspects since the coefficient for Value dimension in each model was not significant. As Value measures the ability of the product to improve the life quality, the wine design either doesn't contribute to this ability or doesn't affect the purchase decision in this context, according to the sample. Nevertheless Acumen and Response provided significant results in both models, which means that the abilities to evaluate and acknowledge design features are relevant for the involvement and for the engagement stimulus.

The validity of the first model was somewhat questionable regarding fluctuations in the OLS assumptions, but these was improved by subtracting an influential outlier. The second model also faced doubts about heteroscedasticity, however a robust linear regression and additional tests suggested that the assumption is acknowledged. Removing outliers in the second model did not improved significantly its explanatory power.

8 Limitations

The conducted study faces some limitations. One of them is that the collected responses represented a rather homogenous sample of young people. The researched effects could be confirmed thoroughly only after the hypotheses are applied to a more representative population, since the current state of the sample would not provide much relevant insights about the influence of the demographic factors on the models.

Apart from that the analysis does not focus on a concrete type of wine, design or strategy, but attempts to create a general judgement of visual wine design in the context of purchase behavior. As suggested by some examples from the literature review, the importance of the wine design depends on the different situations and circumstances. In order to investigate the effects of a particular wine design, one should adapt the focus of the framework on the specific product.

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Statutory declaration

I herewith declare that I have composed the present thesis myself and without use of any other than the cited sources and aids. Sentences or parts of sentences quoted literally are marked as such; other references with regard to the statement and scope are indicated by full details of the publications concerned. The thesis in the same or similar form has not been submitted to any examination body and has not been published. This thesis was not yet, even in part, used in another examination or as a course performance.

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