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**Abstract**

A very traditional belief in the field of wine appreciation (i.e. oenology) is that the more frequently an individual tastes wine, the better he tastes wine in general. In other terms, competence or knowledge in the field of wine is supposed to increase with experience, according to a learning by drinking process.

In this article, we analyze the relationship between experience and wine knowledge. Does wine tasting experience determine the level of expertise in the field of wine as declared by the individuals or not ? In other terms, can rational determinants explain knowledge in a specific cultural field ? More generally, how does an individual build up his own (wine) cultural heritage?

To answer these questions, we empirically investigate what influence the level of expertise in matter of wine as perceived and declared by the individual. From survey data collected in 2001 in seven European countries, ordered probit equations are estimated for wine knowledge with several indicators like wine consumption frequency and socio-economic characteristics.

The overall results tend to prove the existence of a deterministic learning by drinking process. As expected, wine knowledge increases with wine consumption frequency, age, and varies from one social class to another one (upper class members estimate themselves more competent than lower class members). Other things being equal, women declare lower levels of knowledge than men, as well as -surprisingly- French and Belgian people in comparison with other European people. The learning by drinking process seems especially correlated with red wine consumption.

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## INTRODUCTION

A very traditional belief in the field of wine appreciation (i.e. oenology) is that the more frequently an individual tastes wine, the better he tastes wine in general, i.e. the better educated are his palate and his nose. In other terms, knowledge in the field of wine (ability to judge quality) increases with experience or practice thanks to a learning by consuming process, and more precisely a learning by drinking process.

An interesting feature of the learning by consuming process in the cultural field is that the improvement of individual skill is mainly subjective. Indeed, in matter of culture, individuals can say that they are more or less connoisseurs in a particular field (modern art, opera, wine,...). But this specific kind of competence come under an individual perception or judgement. We try in this article to assess if wine knowledge can be explained by objective elements derived from the learning by drinking process.

Does wine tasting experience determine the level of knowledge in the field of wine as declared by the individuals ? What about other variables ? More generally, how does an individual build up his own (wine) cultural heritage ?

To answer these questions, we empirically investigate what influence wine expertise as perceived by the individual. From survey data collected in 2001 in seven European countries, we estimate an ordered probit equation for wine knowledge from several indicators like wine consumption frequency and socio-economic characteristics.

This article is organised as follows : the first part study the relationship between taste and expertise ; the second one focus on the learning by drinking process ; the third one presents the data and the empirical strategy adopted here ; the fourth one is dedicated to the results and their comments.

## FROM THE CULTIVATION OF TASTE TO THE EXPERTISE

### *Taste and consumption*

An important object of study in cultural economics is taste formation and its link with art demand or consumption. It allows to understand why past consumption is an important determinant of current consumption.

For Pollak (1970), the consumer may be ignorant of consumption possibilities or of his own tastes outside the range of his past consumption experience ; moreover, past experience can influence formation of habits, so that an individual's current preferences depend on his past consumption patterns. As the author notes, " a change in prices or income will cause a change in consumption which will induce a change in tastes, which will cause a further change in consumption" (Pollak, 1970, p. 745). In this sense, tastes are endogenous. Stigler and Becker (1977) asserts that differences in individual consumption are due to miscellaneous investments of time and other resources in the accumulation of knowledge of the product, given that all individuals have identical tastes. According to this approach, the satisfaction associated with wine consumption increases with wine knowledge. Stigler and Becker's theory can thus explain that wine perceived quality<sup>1</sup> is different for experts and novices. Finally, the learning-by-consuming approach (Lévy-Garboua and Montmarquette, 1996) postulates that tastes are given, but unknown, and discovered by the individuals through repeated experiences in a sequential process of unsystematic learning by consuming. It can be maintained by the fact that most products are experience goods for which tastes have to be acquired by a temporal process of consumption (Blaug, 2001). McCain (1979) adopt this kind of view to explain the flowering of american demand for good wines in the 70's, which,

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<sup>1</sup> The notion of perceived quality (or expected quality) has been defined by Zeithaml (1988) as the judgement made by a consumer about a product's overall excellence or superiority (i.e. quality). The importance of perceived quality in decisions relating to cultural production and consumption has been stressed by Throsby (1990).

according to this author, reward a more educated palate, itself resulting from an increase of wine consumption, i.e. tastes discovery. A detailed review of the empirical literature is presented by Lévy-Garboua and Montmarquette (2002).

#### *Consumption as a way to improve competence*

Those approaches can be partially combined if the process of consumption is viewed as a kind of human capital investment and as a way of improving competence or knowledge. Experience in a specific domain influence expertise or skill in matter of this domain, and so on the choice of the goods belonging to this domain. This phenomenon does not necessary require that individual tastes are different. Individual cultural experience can in this way allow the formation of an individual cultural capital or heritage<sup>2</sup>. Hence, we postulate that the consumption process of a specific good - as other investments in human capital relative to this good - improves competence in the field of this good. This learning by consuming process links competence and past consumption instead of taste and past consumption.

#### *Economic involvements of competence*

The question of skill has several economic involvements, in particular on markets where the quality of the good is unknown before purchase (i.e. experience goods).

One good's perceived quality (before purchase) can be different between two individuals, according to their skill in matter of this particular good. Even quality is experienced differently between experts and novices. Oude Ophuis et al. (1995, p. 178) note that "as consumers differ in their perceptual abilities, personal preferences, and experience level, perceived quality will vary accordingly". These authors illustrate this idea in the case of wine : "A novice in wine tasting may judge the quality of a given wine quite differently from the expert who as a greater frame of reference, better developed senses and favourite taste and aroma tones". The same phenomenon is depicted by Dijk and Knippenberg (1998, p. 494) in term of characteristics : "whereas a novice may not differentiate between two bottles of red wine, a wine expert may differentiate, acknowledging that both wines have different characteristics". Ginsburgh and Weyers (1999) have compared quality judgements made by experts on the first hand, and by consumers in the second hand in another cultural field, the one of movies. More recently, Gergaud and Livat (2004) have shown, in the case of Bordeaux wines, that collective reputation phenomena are not the same among connoisseurs and non-connoisseurs. If purchase is connected with perceived quality, wine knowledge indirectly influence wine choice.

If different individuals (i.e. with different competences) would buy different wines because perceived quality is different according to their knowledge, producers can adjust their quality signals and even their supply. Moreover, skill or knowledge improvement can modify the buying behavior. It is well known that consumer behavior involves risk (Bauer, 1960). Indeed, in an imperfect information context, any choice situation involves an uncertainty of how likely this choice is to be wrong, and an uncertainty of the consequences of a possible wrong choice. Mitchell and Groatorex (1988) set off four major kinds of risk in the case of wine : A financial one, a functional one - which includes the taste of the wine and its suitability for a particular meal or occasion -, a physical one - relating the wine's components-, and a social wine - which involves choosing the right wine as defined by the reference group to which the buyer belong-. For these authors (1988, p. 7), "perceived risk would be an important factor in the buying decisions made for a particular wine or wine in general". One

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<sup>2</sup> Cultural capital here is viewed from an individual perspective, and is in this sense different from Throsby's definition (1999) of intangible cultural capital, which comprises the set of ideas, practices, beliefs, traditions and values which serve to identify and bind together a given group of people with the stock of artworks existing in the public domain.

could easily imagine that increasing or improving knowledge in matter of wine decreases risks associated with purchase.

## THE LEARNING BY DRINKING PROCESS

### *A theoretical model of skill*

An interesting feature of the learning by consuming process in the field of wine and more generally of culture is that the improvement of individual competence is mainly subjective. In matter of culture, individuals can say that they are more or less connoisseurs in a particular field (modern art, opera, wine,...). But this specific kind of competence come under an individual perception or judgement. We try here to assess which part of wine knowledge can be explained by objective elements derived from the learning by drinking process.

Our approach is not dynamic but based on a stock of competence accumulated by the individual. According to our learning by consuming hypothesis, a positive relationship should emerge between past experience of individual  $i$  in a particular field  $f$ , i.e. the stock of experience in this field  $f$  accumulated by  $i$  in  $t$  ( $E_{it}^f$ ), and competence or knowledge declared by  $i$  in  $t$  relative to the same field ( $K_{it}^f$ ). Several other factors can influence skill in matter of a particular activity (essentially individual characteristics).  $X_{jit}$  denotes a vector of  $J$  exogenous variables ( $j=1, \dots, J$ ), which can influence individual expertise. Hence, our theoretical model of knowledge in the field  $f$  has the following structure :

$$K_{it}^f = \alpha_f E_{it}^f + \sum_{j=1}^J \beta_j X_{jit} + \varepsilon_{it} \quad \forall i = 1, \dots, I \quad (1)$$

$\alpha_f, \beta_1, \beta_2, \dots, \beta_j$  are parameters to be estimated;  $\varepsilon_{it}$  is a well-behaved error term. According to the hypothesis that the more an individual tastes wine, the better he tastes wine in general, we anticipate  $\alpha_f \geq 0$ . Given the stock of experience accumulated by the individual in  $t$ , the model is static.

Of course, one could easily imagine a more sophisticated model embodying a crossed influence of experience, where expertise in matter of wine is function of experience in matter of wine and also of experience in matter of gastronomy, or perfume, for instance. Hence, if  $f$  and  $g$  are two related fields, with  $E_{it}^g$  the stock of experience in the  $g$  field accumulated by individual  $i$  in  $t$ , the theoretical model of skill becomes :

$$K_{it}^f = \alpha_f E_{it}^f + \alpha_g E_{it}^g + \sum_{j=1}^J \beta_j X_{jit} + \varepsilon_{it} \quad \forall i = 1, \dots, I \quad (2)$$

To our knowledge, there is no empirical study of how an individual estimates his own level or degree of competence as far as wine is concerned, except the succinct one of Vignes and Gergaud (2002), not grounded on our learning by doing hypothesis, but solely on socio-economic characteristics. We propose here a more detailed study which explore the validity of the learning by drinking hypothesis in matter of wine knowledge.

## DATA AND EMPIRICAL STRATEGY

*Data and empirical models*

The data are survey data<sup>3</sup>, collected in 2001 in western Europe. As a whole, 6394 wine consumers<sup>4</sup> have been surveyed in seven european countries : Belgium (1028 wine consumers), Denmark (613 wine consumers), Germany (1133 wine consumers), France (819 wine consumers), The Netherlands (1258 wine consumers), Switzerland (584 wine consumers), and United Kingdom (959 wine consumers).

This survey provides information concerning the socio-economic characteristics of the individuals (sex, age, socio-economic class, country and region of origin), and their judgement concerning their own wine knowledge. Table 1 presents in detail the data and provides some descriptive statistics. Their wine drinking habits are also available : for each consumer, we know his wine consumption frequency (see table 2).

**Table 1 : The data**

Variable	Description and type	Descriptive statistics
KNOWL <sup>w</sup>	Level of knowledge in matter of wine :	
	do not know = 0	0.83%
	no knowledge = 1	14.81%
	very limited knowledge = 2	33.52%
	novices = 3	18.69%
	fairly-knowledgeable wine-lover = 4	28.17%
	knowledgeable wine-lover = 5	3.29%
	expert = 6	0.68%
DAILY <sup>w</sup>	Daily consumption of wine (yes=1, no=0)	14.94%
WEEKLY <sup>w</sup>	Weekly consumption of wine (yes=1, no=0)	34.55%
MONTHLY <sup>w</sup>	Monthly consumption of wine (yes=1, no=0)	34.06%
QUARTERLY <sup>w</sup>	Quarterly consumption of wine (yes=1,	16.45%
EXCEP <sup>w</sup>	no=0)	0%
NEVER <sup>w</sup>	Exceptional consumption of wine (yes=1,	0%

<sup>3</sup> Source : Sociovision / CIVB 2001

<sup>4</sup> In this survey wine consumers drink wine at least once a quarter.

UNK <sup>w</sup>	no=0)	0%
SEX	Never drink wine (yes=1, no=0)	48.8%
AGE	Unknown wine consumption frequency	av.: 46.22, st.dev. :
UPPER	(yes=1, no=0)	16.33
AVERAGE	Sex of the individual (man=1, woman=0)	21.63%
LOWER	Age of the individual (quantitative)	60.65%
NC	Upper social class (yes=1, no=0)	17.19%
FRA	Average social class (yes=1, no=0)	0.53%
GERM	Lower social class (yes=1, no=0)	12.81%
UK	Social class not communicated (yes=1, no=0)	17.72%
BELG	France native (yes=1, no=0)	15%
SWITZ	Germany native (yes=1, no=0)	16.08%
DK	United Kingdom native (yes=1, no=0)	9.13%
NL	Belgium native (yes=1, no=0)	9.59%
	Switzerland native (yes=1, no=0)	19.67%
	Denmark native (yes=1, no=0)	
	The Netherlands native (yes=1, no=0)	

Actually, here none observations are associated with EXCEP<sup>w</sup> and NEVER<sup>w</sup>. Thus, the nature of the data allows us to derive a static empirical model from equation #1, where skill in matter of wine is function, among others, of wine consumption frequency :

$$\begin{aligned} \text{KNOWL}_{it}^w = & \alpha_{Dw} \text{DAILY}_{it}^w + \alpha_{Ww} \text{WEEKLY}_{it}^w + \alpha_{Mw} \text{MONTHLY}_{it}^w \\ & + \beta_S \text{SEX}_{it} + \beta_A \text{AGE}_{it} + \beta_{AV} \text{AVERAGE}_{it} + \beta_L \text{LOWER}_{it} \\ & + \beta_G \text{GERM}_{it} + \beta_{UK} \text{UK}_{it} + \beta_{BELG} \text{BELG}_{it} + \beta_{SWI} \text{SWITZ}_{it} \\ & + \beta_{DK} \text{DK}_{it} + \beta_{NL} \text{NL}_{it} + \text{resid}_{it} \end{aligned}$$

QUARTERLY<sup>w</sup>, UPPER and FRA are dropped to avoid the dummy variable trap and multicollinearity. Given the learning by drinking hypothesis, we expect  $\alpha_{Dw} \geq \alpha_{Ww} \geq \alpha_{Mw}$ .

The empirical model can be complexified by including wine consumption frequency by kind of wine, i.e. red wine, white wine, light-red wine and sparkling wine (w = red, white, light, sparkling ; see table 2 for the wine-drinking habits statistics). It adds several explicative variables to the previous empirical model which becomes :

$$\begin{aligned} \text{KNOWL}_{it}^w = & \alpha_{Dred} \text{DAILY}_{it}^{red} + \alpha_{Wred} \text{WEEKLY}_{it}^{red} + \alpha_{Mred} \text{MONTHLY}_{it}^{red} \\ & + \alpha_{Qred} \text{QUARTERLY}_{it}^{red} + \alpha_{Ered} \text{EXCEPT}_{it}^{red} \\ & \alpha_{Dwhite} \text{DAILY}_{it}^{white} + \alpha_{Wwhite} \text{WEEKLY}_{it}^{white} + \alpha_{Mwhite} \text{MONTHLY}_{it}^{white} \\ & + \alpha_{Qwhite} \text{QUARTERLY}_{it}^{white} + \alpha_{Ewhite} \text{EXCEPT}_{it}^{white} \\ & \alpha_{Dlight} \text{DAILY}_{it}^{light} + \alpha_{Wlight} \text{WEEKLY}_{it}^{light} + \alpha_{Mlight} \text{MONTHLY}_{it}^{light} \\ & + \alpha_{Qlight} \text{QUARTERLY}_{it}^{light} + \alpha_{Elight} \text{EXCEPT}_{it}^{light} \\ & \alpha_{Dsparkling} \text{DAILY}_{it}^{sparkling} + \alpha_{Wsparkling} \text{WEEKLY}_{it}^{sparkling} + \alpha_{Msparkling} \\ & \text{MONTHLY}_{it}^{sparkling} \\ & + \alpha_{Qsparkling} \text{QUARTERLY}_{it}^{sparkling} + \alpha_{Esparkling} \text{EXCEPT}_{it}^{sparkling} \\ & + \beta_S \text{SEX}_{it} + \beta_A \text{AGE}_{it} + \beta_{AV} \text{AVERAGE}_{it} + \beta_L \text{LOWER}_{it} \\ & + \beta_G \text{GERM}_{it} + \beta_{UK} \text{UK}_{it} + \beta_{BELG} \text{BELG}_{it} + \beta_{SWI} \text{SWITZ}_{it} \\ & + \beta_{DK} \text{DK}_{it} + \beta_{NL} \text{NL}_{it} + \text{resid}_{it} \end{aligned}$$

This specification allows to determine if the experience with each kind of wine has the same influence on the wine knowledge declared by the individual.

**Table 2:**  
**Wine-drinking habits (% of consumers)**

Consumption frequency	Red wine	White wine	Light-red wine	Sparkling wine
Daily	11.9	2.74	1.39	0.16
Weekly	26.48	19.44	7.57	2.25
Monthly	27.31	30.97	13.17	10.32
Quarterly	13.83	20.24	13.06	16.39
Exceptionally	9.37	15.56	27.79	47.04
Never	10.68	10.62	36.29	23.02
Do not know	0.43	0.44	0.73	0.81

### *Estimation strategy*

Six levels of skill in the field of wine are considered in the survey<sup>5</sup>. There is a clear ranking among those six categories - from 1 to 6 increasing with expertise -, but the differences among adjacent categories cannot be treated as the same. Our empirical models can thus be estimated through an ordered probit (Liao, 1994). Ordered-response models have been widely used for analyzing such kind of data (Maddala, 1983, pp. 46-49).

The individuals who do not know neither their skill in wine nor their wine drinking frequency, and/or who do not communicate their social class, are excluded from the original sample. The database thus comes down to 6307 individuals. Then, we estimate our model on the whole european sample, in order to test our learning by consuming hypothesis. A second estimation is ran to detect if each kind of wine has an identical influence on the level of knowledge declared by the individual<sup>6</sup>, thanks to the same technique.

### RESULTS AND COMMENTS

The results of the estimation of the skill model on the whole sample are presented in table 3 for the first empirical model and on table 4 for the second one.

Despite the debate around measuring the goodness of fit of such models (Maddala, 1992), we can consider that the pseudo- $R^2$  is here quite weak. Nevertheless, an important set of explicative variables exhibits significant coefficients, suggesting that a part of the phenomenon is well explained, but that objective elements are not sufficient to explain the subjective evaluation of knowledge in the field of wine.

<sup>5</sup> We disregard the individuals who have no idea of their own skill in wine.

<sup>6</sup> When wine consumption frequency is considered by kind of wine, the database comes down to 6200 individuals because some of them do not know their wine consumption frequency for each kind of wine.

**Table 3 : Wine knowledge model estimation  
(dependent variable : knowledge in matter of wine declared by the individual)**

	Coef.	z-stat.
<i>Socio-economic characteristics :</i>		
sex	0.152*	5.59
age	0.003*	3.5
upper social class	dropped	-
average social class	-0.291*	-8.57
lower social class	-0.515*	-11.36
<i>Country of origin :</i>		
France	dropped	-
Germany	0.086***	1.68
United Kingdom	0.089***	1.69
Belgium	0.042	0.84
Switzerland	0.282*	4.82
Denmark	0.408*	6.96
The Netherlands	0.213*	4.38
<i>Wine consumption frequency :</i>		
daily	0.882*	17.18
weekly	0.709*	17.02
monthly	0.354*	8.68
quarterly	dropped	-
<i>Ancillary parameters :</i>		
cut 1	-0.534	-
cut 2	0.552	-
cut 3	1.081	-
cut 4	2.454	-
cut 5	3.172	-
Number of observations	6307	
Pseudo-R <sup>2</sup>	0.041	

\*, \*\*, \*\*\* significantly different from 0 at respectively 1%, 5% and 10%.

**Table 4 : Wine knowledge model estimation given different kind of wine  
(dependent variable : knowledge in matter of wine as declared by the  
individual)**

	Coef.	z-stat.
<i>Socio-economic characteristics :</i>		
sex	0.123*	4.41
age	0.004*	4.44
upper social class	dropped	-
average social class	-0.241*	-6.98
lower social class	-0.411*	-8.81
<i>Country of origin :</i>		
France	dropped	-
Germany	0.095***	1.77
United Kingdom	0.231*	4.04
Belgium	0.07	1.34
Switzerland	0.209*	3.43
Denmark	0.413*	6.73
The Netherlands	0.289*	5.44
<i>Red wine consumption</i>		
<i>frequency :</i>	0.954*	14.89
daily	0.832*	15.53
weekly	0.573*	10.76
monthly	0.279*	4.65
quarterly	0.185*	2.92
exceptionally	dropped	-
never		
<i>White wine consumption</i>	0.564*	5.75
<i>frequency :</i>	0.296*	5.23
daily	0.086***	1.66
weekly	0.008	0.14
monthly	0.043	0.77
quarterly	dropped	-
exceptionally		
never	0.03	0.24
<i>Light-red wine consumption</i>	0.055	0.92
<i>frequency :</i>	0.102**	2.13
daily	0.101*	3.31
weekly	0.055*	2.74
monthly	dropped	-
quarterly		
exceptionally	0.055	0.15
never	0.253*	2.63
<i>Sparkling wine consumption</i>	0.274*	5
<i>frequency :</i>	0.195*	4.1
daily	0.121*	3.3
weekly	dropped	-
monthly		
quarterly	-0.101	-
exceptionally	1.013	-
never	1.552	-
<i>Ancillary parameters :</i>	2.956	-
cut 1	3.686	-
cut 2		
cut 3		
cut 4		
cut 5		
<b>www.vdqs.net</b>		
Number of observations	6200	
Pseudo-R <sup>2</sup>	0.055	

\*, \*\*, \*\*\* significantly different from 0 at respectively 1%, 5% and 10%.

### *A learning by drinking phenomenon*

The socio-economic variables effect is actually intuitive. On average, men declare themselves more competent than women ; competence also increase with age, but this influence is really weak ; we can note too that knowledge in the field of wine grows with the social class. There is no significant difference between French and Belgian people, probably because the latter one are close to the former one in cultural and wine-drinking habit terms, while individuals from other countries estimate themselves more competent than the formers.

The learning by drinking process is very clear. The first estimation exhibits the following properties :  $\hat{\alpha}_{Dw} > \hat{\alpha}_{Ww} > \hat{\alpha}_{Mw}$ , suggesting that the level of wine expertise declared by the individual increases with his wine consumption frequency. With the second estimation, the exogenous variables effect on wine knowledge is identical. But according to the kind of wine considered, the effect of wine consumption frequency seems more complex than previously. If the learning by drinking phenomenon appears with red and white wine consumption ( $\hat{\alpha}_{Dred} > \hat{\alpha}_{Wred} > \hat{\alpha}_{Mred} > \hat{\alpha}_{Qred} > \hat{\alpha}_{Ered}$  and  $\hat{\alpha}_{Dwhite} > \hat{\alpha}_{Wwhite} > \hat{\alpha}_{Mwhite}$ ), it doesn't with light-red and sparkling wines. In the first case, daily and weekly consumptions have no effect, while a monthly consumption has the greatest (positive) impact on wine knowledge ; in the second one, a daily consumption has no influence on wine expertise, while, again, a monthly consumption has the most important effect. These results are not so surprising given that very few people drink them with a high frequency (see table 2). Red wine consumption clearly emerges as the principal variable of the learning by drinking process and as the principal determinant of wine knowledge : wine expertise essentially increases with red wine consumption frequency. Thus, rational elements can explain the level of wine expertise declared by the individual.

### *Wine experts are they all alcoholic ?*

On average, the more an individual tastes wine, the better he tastes wine. Does it mean that every wine expert is alcoholic ? An affirmative answer can be derived from the previous ordered probit estimations, whereas a simple statistical analysis of the data shows that the individuals who declare the higher level of expertise do not systematically declare a daily consumption of wine (see table 5).

**Table 5 : Wine consumption frequency according to wine expertise level**

Declared level of wine knowledge	Wine consumption frequency			
	daily	weekly	monthly	quarterly
no knowledge	7,9%	40,9%	20,5%	30,7%
very limited knowledge	10,1%	37,7%	30,8%	21,5%
novices	16,3%	32,3%	40,5%	10,9%
fairly knowledgeable wine-lover	21,6%	29,0%	41,6%	7,7%
knowledgeable wine-lover	28,4%	23,2%	42,2%	6,2%
expert	27,3%	29,5%	27,3%	15,9%

This statement has to be examined thoroughly thanks to a DISQUAL procedure, which allows to see the problem as a discrimination one using multiple correspondence analysis (to be written).

#### CONCLUSION (to be completed)

The overall results tend to prove the existence of a deterministic learning by drinking process. As expected, wine knowledge increases with wine consumption frequency, age, and varies from one social class to another one (upper class members estimate themselves more competent than lower class members). Other things being equal, women declare lower levels of knowledge than men, as well as -surprisingly- French and Belgian people in comparison with other European people. The learning by drinking process seems especially correlated with red wine consumption.

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