



# Does good wine need any bush? Wine education in student tasting

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## Wine education in student tastings\*

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### Abstract

In this paper we look for evidence that wine tastes vary systematically between expert and non-expert tasters. We describe the results of a blind tasting experiment in which the ratings expressed by uneducated tasters are compared with those by individuals with some oenology background. Our subjects are students at the University of Padova's College of Agricultural Sciences. We examine the scores that 14 widely different wines received from students majoring in oenology and viticulture with those of students majoring in any other subject.

We find that, for all wines, the ratings do not differ significantly between the two groups of subjects. Furthermore, educated tasters as a group do not appear to agree on their ratings any more than ordinary tasters. Also, we find no association between the ratings expressed by our tasters and either the price, or the Wine Spectator score.

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## Introduction

At the time of purchase, many important attributes of a wine – for example taste, aroma and color – are unknown to potential buyers, so that choices have to be made relying on cues rather than full information. As with most commodities, a higher price is typically perceived as a sign of better quality (Tellis and Wernerfelt 1987). In the market for a number of experience goods (e.g. art, books, movies, music, and restaurants), a crucial role in guiding consumer choices is also played by expert opinions. In the wine market, positive associations between expert ratings and prices have been documented by a number of studies, e.g., Schamel and Anderson (2003). As an example of the influence of expert ratings on wine market outcomes, the judgments of a highly influential critic have been shown to affect to a significant extent the price of *en primeur* Bordeaux (Hadj et al. 2008; Dubois and Nauges Dubois and Nauges).

In fact, to what extent prices and expert opinions reflect the actual quality of a wine has been questioned in several research articles. A blind tasting experiment by Goldstein et al. (2008) finds that, when no price information is available, non-expert tasters do not rate relatively expensive wines any better than relatively cheap ones. In fact, people appear to appreciate a wine better if they know that it is expensive (Almenberg and Dreber 2009). Intriguingly, an experiment using functional magnetic resonance imaging showed that increasing the price can by itself make the same wine more pleasant to consumers (Plassman et al. 2008).

The role of wine experts has also received some criticism. Evaluations of a given wine by different writers seldom agree and, what is perhaps more relevant, judges at wine competitions have been shown to rate replicate samples of an identical wine inconsistently (Hodgson 2008). Quandt (2007) complains that the language of wine reviews is often meaningless and Weil (2007) finds that non-expert wine drinkers cannot match any better than chance wines with their descriptions written by wine critics. He also fails to find any evidence that tasters are able to distinguish reserve and ordinary versions of an otherwise similar wine, although the first was supposedly of better quality than the latter (Weil 2003).

There is another important reason why expert opinions may not be of much use for ordinary wine drinkers. It is possible that, as Goldstein et al. (2008) argue, experts and non-experts like different types of wine. For example, wine experts, who have a deeper understanding of viticulture and of the wine making process, may like or dislike a wine for reasons that ordinary consumers are not even aware of. Appreciation

of some types of wine may be acquired through iterated experience. Also, it is possible that people with specific wine sensitivities self-select themselves into the wine expert group.

In this paper we look for evidence that wine tastes vary systematically between expert and non-expert tasters. We describe the results of a blind tasting experiment in which the ratings expressed by uneducated tasters are compared with those by individuals with some oenology background. Our subjects are students at the University of Padova's College of Agricultural Sciences. We examine the scores that 14 widely different wines received from students majoring in oenology and viticulture with those of students majoring in any other subject.

## 1 Data

The data for this study have been collected during a series of blind tasting sessions we ran in the spring of 2009 with students of the University of Padova's College of Agricultural Sciences. In addition to degrees in food science, agricultural sciences, animal sciences, forestry, and a veterinary school, which operate on the main campus ('Agripolis'), the college offers a degree in Oenology and Viticulture on a separate campus. This is located in Conegliano, about 100 km away from Agripolis, in the heart of the Prosecco DOC production area. While students on the Agripolis campus are quite a diverse lot, students in Conegliano not only are majoring in the same subject, but also tend to share a similar background. Indeed, before enrolling in the university, a large share of these students have studied Oenology and Viticulture in a high school which is located on the same Conegliano campus. Furthermore, there is anecdotal evidence that a number of them come from families that are involved in the local wine industry.

To assess to what extent expert and non-expert tasters evaluate wine differently, we compare how oenology majors, which we take as representative of 'educated' drinkers, and all other students, which we consider 'ordinary' consumers, rated a given set of wines.

The students enrolled in the College of Agricultural Sciences are 2,658, of which 225 are majoring in Oenology and Viticulture in Conegliano. According to this different size, four wine testing sessions were organized on the Agripolis campus and two on the Conegliano campus, for a total of six sessions.

Regardless of his or her major or background, any student could just walk into a

room that was open from nine to six and participate in the wine tasting. Before the sessions began, the event was widely advertised, especially on the Agripolis campus, in order to maximize attendance by students with no specific interest in wine. A website was made available where students could get information about the research as well as pre-register in wine tasting. About 60 pre-registrations were received, even though only half of those students eventually showed up for the tasting. During the tasting, each subject was given a flight of 5 wines and asked to rate each of them on a four-point scale, where the available answers were 'bad' (1), 'okay' (2), 'good' (3) and 'great' (4). In the choice of this scale we followed Goldstein et al. (2008), on account that it seemed straightforward and friendly to non-experts. In addition to an overall rating of the wine, we asked the tasters to separately rate a few attributes of the wines: color, intensity of aroma, quality of aroma, quality of taste, intensity of taste, and persistence of taste. During the tasting experiment all extrinsic cues (price, brand name, reputation, geographic denomination, terroir, etc..) were hidden to remove their influence on the ratings.

To avoid the subjects influencing each other's ratings, each taster was given a different flight of wines and informed of this fact. Each flight was chosen from a pool of 14 wines listed in table 1. With substantial help from a professional wine expert, this list had been defined so that it would include both easy wines (e.g. Prosecco) and more complex red wines.

While the flights were different, each invariably consisted of one sparkling, one white, and three red wines. One of the red wines was always from Tuscany (Brunello di Montalcino or Chianti), one from Piedmont (Barbaresco or Barolo), and one from France (Bordeaux). Each red wine was differentiated from the others at least in terms of brand and vintage, and in some cases by reserve bottling. The white wine was chosen among two brands of Chardonnay and two brands of Lison, which is the new name of local wine formerly known as Tocai.

After the tasting, each subject was administered a brief questionnaire to collect information about basic demographic variables (sex, age, area of residence), wine education and drinking behavior.

## 2 Results

Data were collected from 247 tasters, for a total of 1,235 tastings. The ordinary and educated groups consist of 163 and 84 groups, respectively. The two groups represent

Table 1: List of the wines used in the tasting

Type	Wine	Brand	Year	Price €/bott	Wine Spectator	Wine Enthusiast	
1	Sparkling	Prosecco	Adami Vigneto Giardino	2008	8.40	84	88
2	Sparkling	Prosecco	Prime Gemme	2008	6.20	n.a.	n.a.
3	White	Chardonnay	Malleco Valley Sol de Sol (Chile)	2006	17.00	90	n.a.
4	White	Chardonnay	Masut da Rive	2008	6.3	80	n.a.
5	White	Lison	Ai Galli	2008	3.5	n.a.	n.a.
6	White	Lison	Beccarello	2008	3.2	n.a.	n.a.
7	Red (Tuscany)	Brunello di Montalcino	La Rasina	2003	22.3	88	91
8	Red (Tuscany)	Brunello di Montalcino	Ciacci Piccolomini D'Aragona	2004	30	92	91
9	Red (Tuscany)	Chianti classico	Castello Ama	2004	20.5	88	90
10	Red (Tuscany)	Chianti classico	Fonterutoli	1996	20.2	91	90
11	Red (Piedmont)	Barbaresco	Sottimano Fausoni	2005	29.5	93	n.a.
12	Red (Piedmont)	Barolo	Parusso Armando	2005	22.5	91	90
13	Red (France)	Bordeaux	Château G. Barrail Lamarzelle St. Emilion	2005	22.5	93	90
14	Red (France)	Bordeaux	Château Marsau Côtes de Francs	2004	15	86	n.a.

Table 2: Comparison of characteristics between educated and ordinary wine consumers

	Wine education		p-value for equality between groups
	No	Yes	
Age	23.53	23.07	0.435
Male	0.75	0.74	0.777
From out of region (0,1)	0.25	0.25	0.815
From major wine producing area (0,1)	0.43	0.33	0.100
Regular wine consumer (0,1)	0.65	0.88	<.001
Never drinks at home (0,1)	0.22	0.07	0.002
<i>N</i>	163	84	

6.1% and 37.3% of the students in Agripolis and Conegliano campus, respectively. Table 2 compares their composition in terms of basic demographic characteristics and attitudes towards wine. On the one hand, educated and ordinary tasters seem undistinguishable in terms of sex composition, age, and region of origin. While it is certainly not the case that students have been randomly assigned to the oenology major (as opposed to other majors in the area of agricultural sciences), our sample would not look much different if they had. On the other hand, the two groups report markedly different habits with regard to wine consumption. It appears that those in the educated group not only are receiving formal training, but they also have more familiarity with wine as consumers (whether this is a cause or a consequence of being oenology majors).

If expert drinkers like other wines than ordinary consumers, one would expect that – at least for some wines – the ratings expressed by the tasters differ systematically between the educated and the ordinary group. In principle, there is no reason to believe that the ratings that experts give to a specific wine should differ in a particular direction. However, if wines that are considered to be more complex to understand and difficult to appreciate (e.g. older red wines) scored higher among educated tasters, this would lend some support to the notion that the taste for such wines has an acquired component. Also, if there is some important characteristic of a wine that only experts are able to notice and appreciate, ratings by educated tasters should be less varied than those by ordinary tasters.

As a first step in the analysis, in table 2 we compare the mean overall ratings of

each wine between the educated and ordinary groups. Testing for differences using a regular  $t$  statistic shows no evidence that the ratings differ systematically for any of the 14 wines. We also look for evidence that the scores from the two groups are drawn from different distributions using a rank-sum test. Only for one of the Proseccos can we reject the hypothesis that the ratings by educated tasters and ordinary tasters come from the same population.

We further test for differences in group mean ratings and attempt estimate those differences using a program evaluation framework. For any given individual, one can imagine the tasting of the  $j$ -th wine as having two potential outcomes: the taster will give the wine some rate  $Y_{1j}$  if she is educated or some other rate  $Y_{0j}$  if she is not. Hence, the difference  $Y_{1j} - Y_{0j}$  measures the causal effect of wine education on the rating of the  $j$ -th wine. In practice, only one of those potential outcomes can be observed. If  $W$  is a dummy variable that denotes whether or not the taster has received any wine education, the observed rating of wine  $j$  can be written as

$$Y_j = Y_{0j} + (Y_{1j} - Y_{0j})W$$

Assuming that the causal effect of education is the same for every taster, say  $\rho_j$ , and rewriting  $Y_{0j}$  as the sum of its population mean  $\mu_{0j}$  and a random component  $v_j$ :

$$Y_j = \mu_{0j} + \rho_j W + v_j$$

Had tasters been randomly assigned to their wine education status, the causal effect  $\rho_j$  could be estimated by regressing  $Y_j$  on  $W$ . This assumption is clearly not true but, as we argued above, there is not much evidence suggesting that treating  $W$  as randomly assigned may lead to seriously biased estimates of  $\rho_j$ . To generate more precise estimates of  $\rho_j$ , however, covariates  $X$  are also included in the model. Therefore, the equation for the  $j$ -th wine becomes

$$Y_j = \alpha_j + \rho_j W + X' \gamma_j + \epsilon_j \tag{1}$$

In order to be able to make inferences involving more than one  $\rho_j$  at a time, the 14 equations in (1) are lumped into a single regression. The score in the tasting of an arbitrary wine can be written as  $Y_j = d_1 Y_1 + d_2 Y_2 + \dots + d_{14} Y_{14}$ , where  $d_j$  is a dummy variable that indicates whether or not the wine in question is the  $j$ -th. Therefore

$$Y = \sum_j \alpha_j d_j + \sum_j \rho_j d_j W + \sum_j d_j X' \gamma_j + u \tag{2}$$

Table 3: Mean wine rating by educational status (std. err. in brackets)

no.	Wine	Wine education		p-value for equal means*	p-value for same distribution†
		No	Yes		
1	Prosecco 2008	2.57 (.059)	2.71 (.074)	.14	.09
2	Prosecco 2008	2.60 (.090)	2.53 (.118)	.64	.59
3	Chardonnay 2006	2.25 (.135)	2.16 (.149)	.66	.59
4	Chardonnay 2008	2.16 (.103)	2.19 (.120)	.89	>.99
5	Lison 2008	2.00 (.112)	2.00 (.192)	>.99	.92
6	Lison 2008	2.40 (.129)	2.29 (.244)	.68	.71
7	Brunello 2003	2.17 (.135)	2.35 (.135)	.35	.36
8	Brunello 2004	2.58 (.106)	2.46 (.170)	.54	.52
9	Chianti 2004	2.26 (.155)	2.06 (.266)	.53	.52
10	Chianti 1996	2.41 (.157)	2.33 (.187)	.77	.61
11	Barbaresco 2005	2.42 (.085)	2.35 (.128)	.64	.78
12	Barolo 2005	2.55 (.100)	2.36 (.136)	.27	.33
13	Bordeaux 2005	2.78 (.079)	2.71 (.099)	.59	.48
14	Bordeaux 2004	2.60 (.092)	2.39 (.121)	.16	.22

\* t-test for equality of means

† Rank-sum test for same underlying distribution

Table 4: Estimated effect of education on wine ratings (robust s.e.)

$j$	Wine	$\hat{\rho}_j$	$p$ -value	$j$	Wine	$\hat{\rho}_j$	$p$ -value
1	Prosecco 2008	.142 .095	.14	8	Brunello 2004	-.088 .193	.65
2	Prosecco 2008	-.07 .149	.64	9	Chanti 2004	-.22 .265	.41
3	Chardonnay 2006	-.114 .217	.60	10	Chanti 1996	.015 .238	.95
4	Chardonnay 2008	.043 .158	.79	11	Barbaresco 2005	-.045 -.150	.76
5	Lison 2008	.013 .185	.94	12	Barolo 2005	-.228 .167	.17
6	Lison 2008	-.083 .270	.76	13	Bordeaux 2005	-.049 .125	.69
7	Brunello 2003	.075 .190	.69	14	Bordeaux 2004	-.215 .153	.16
$p$ -value: $\rho_j = 0$ , all $j$ 's				.89			
$R^2$				.12			
$N$				1,234			

where  $u$  is the sum of the  $\epsilon$ 's, each multiplied by the corresponding  $d$ . We estimate this equation by regressing the observed  $Y$ 's on the wine dummies  $d$  and their interactions with  $W$  and with  $X$ . All covariates were demeaned so that the coefficients on  $d$ 's are estimates of the corresponding  $\mu_0$ 's. In our most preferred version of the model,  $X$  includes only a dummy for sex.

The estimated effect of wine education on the ratings of the 14 wines are displayed in table 2. At any conventional level of significance, the effect of education does not appear to differ from zero for any wine. Furthermore, we cannot even reject the hypothesis that all the  $\rho$ 's are zero. On the other hand, for most wines we find significant differences (not displayed) in the of ratings by males and females.

Having found no evidence that the average scores differ systematically between the two groups of subjects, we examine whether educated tasters as a group display any more agreement than ordinary tasters in rating the wines. For each subject we compute

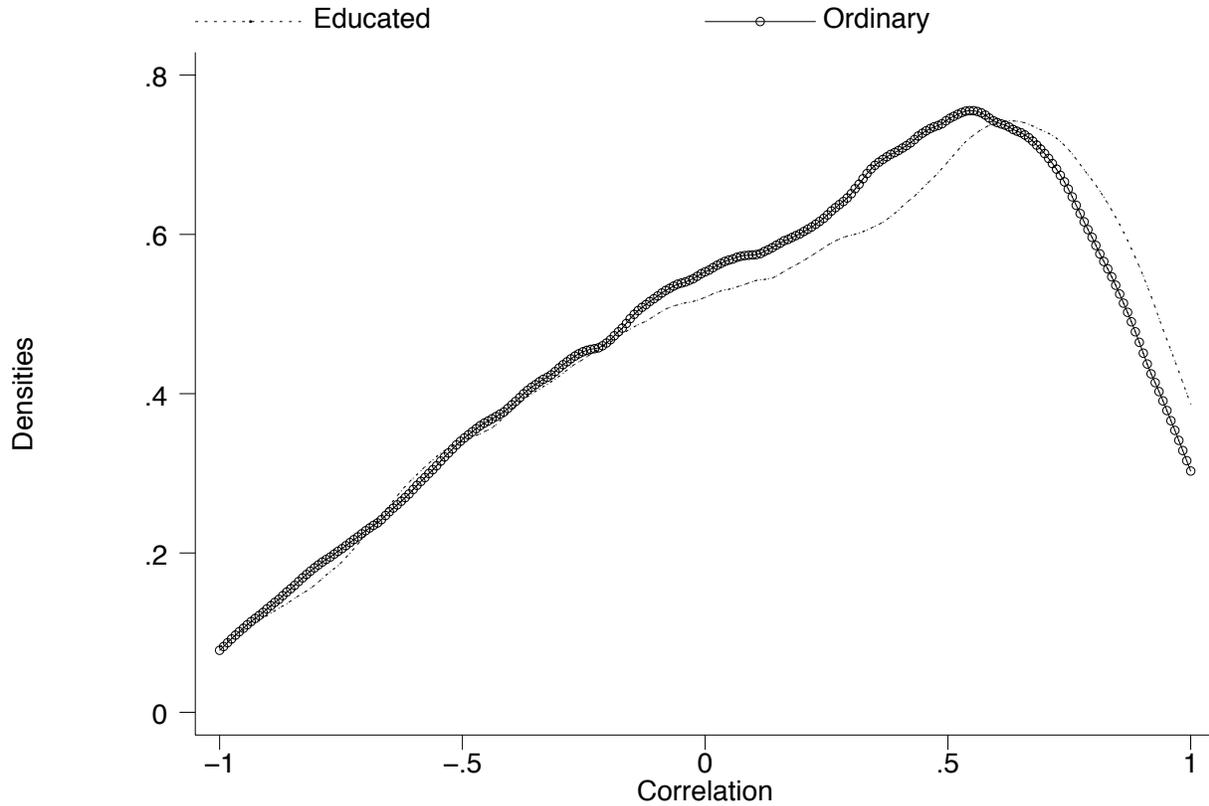


Figure 1: Correlation with mean ratings in the relevant group (Epanechnikov kernel function; bandwidth=.18)

the correlation between the scores that she gave to the wines she tasted and the mean ratings those wines received from the remaining members of her group (educated or ordinary). If ratings among educated tasters tend to agree more than among ordinary tasters, the first group should display comparatively higher values of this correlation than the latter. The distribution of this quantity in the two groups is represented in Figure 1. In this case as well, there are no remarkable differences between the groups.

Finally, we inspect the relationship between taster appreciation and prices in our small sample of wines. We refit equation (2) with the restriction that all  $\rho$ 's be zero imposed, and plot the estimated wine effects against the prices (figure 2). A similar exercise is performed for Wine Spectator scores (figure 3). In either case there is no apparent relationship with taster appreciation.

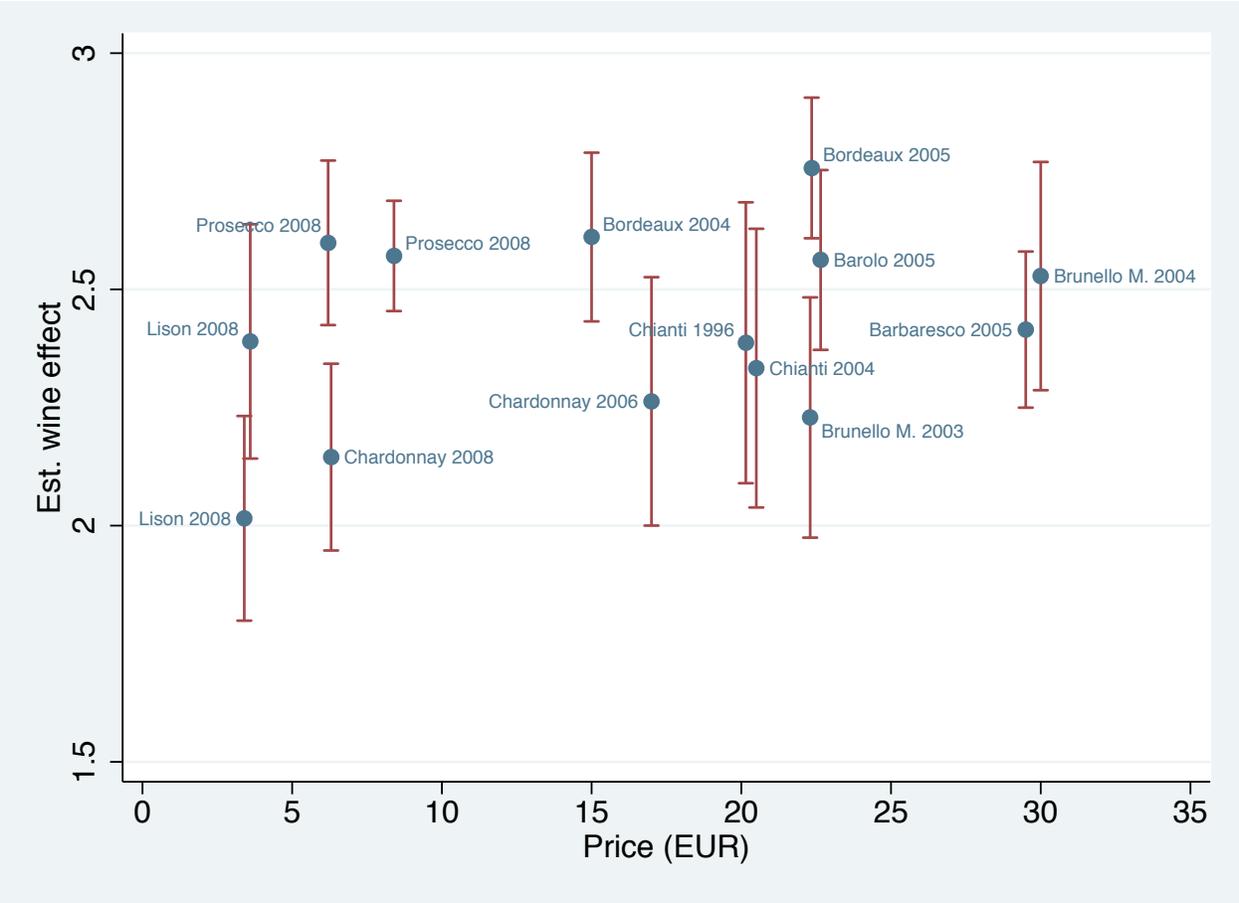


Figure 2: Estimated wine effects vs. prices

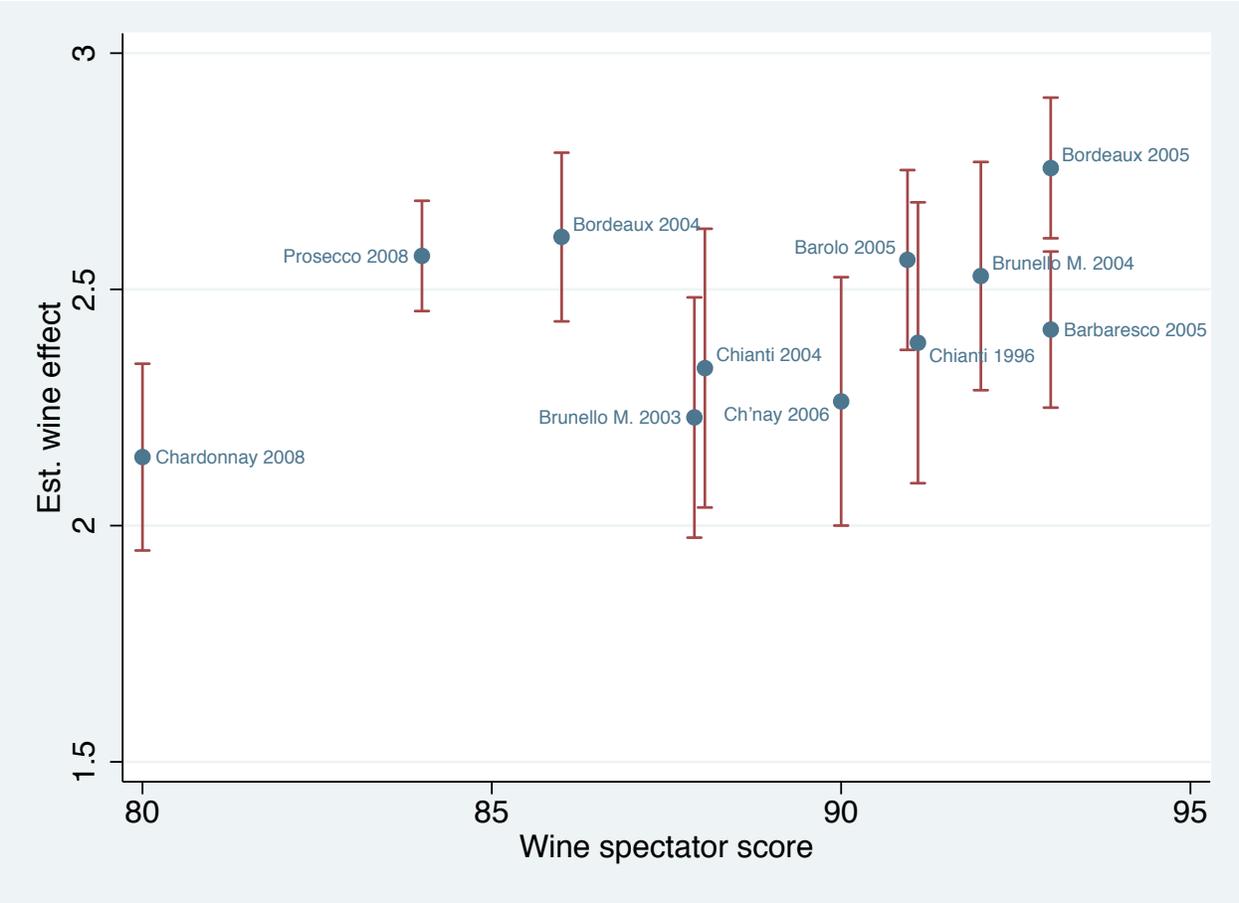


Figure 3: Estimated wine effects vs. Wine spectator scores

### 3 Summary and conclusions

The opinions of experts, which play a very important role in the market for wine, may not be particularly useful to ordinary consumers if those experts, as is plausible, have their own different tastes.

The blind tasting experiment described in this paper attempted to assess to what extent the appreciation of wine changes with specific education and experience. We compared the scores assigned to 14 wines by 84 oenology majors and 163 regular students at the University of Padova and found no evidence of an effect of education on wine ratings. For all wines, the mean rating appears not to differ between the two groups of subjects. Furthermore, if there is any feature of a wine that only people with a specific training can perceive and like or dislike, then those in the educated group should agree more than ordinary tasters on their ratings. Yet, we do not find evidence of any such difference. In fact, we are not able to reject the hypothesis that the ratings from the two groups are drawn from the same population.

Even though the analysis presented in this paper focused on the overall rating of wines, tasters were also asked to provide separate ratings of individual characteristics (color, intensity of aroma, quality of aroma, quality of taste, intensity of taste, and persistence of taste). Repeating the analysis on those ratings essentially confirms the findings above.

One potential problem with our experiment is that the group of educated tasters may not be expert enough. Indeed, a significant share of the oenology students involved in the tastings were still in the early stages of their education. Even if only partially trained, however, the tasters in the educated group have self-reported levels of wine consumption – i.e. of experience – significantly higher than ordinary tasters. Alternatively, the four-point scale adopted for the ratings may have been too narrow to capture the differences in appreciation by the educated group. It is also possible that the wine rating form itself encouraged learning by non-educated tasters: by requiring separate ratings for single characteristics of a wine, it focused their attention on aspects they might usually ignore.

Our results support the notion that, when all external cues (price, brand, terroir, and so forth) are removed, the appreciation of a given wine has more to do with random variation in tastes than with a specific understanding of wine and wine making. Yet, in most real world situations, wine experts are exposed to such information when making their evaluations.

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