

**Are Consumers Indeed Misled?
Congruency in Consumers' Attitudes towards Wine Labeling Information
versus Revealed Preferences from a Choice Experiment**

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Abstract

Agricultural economists are increasingly being asked by policy makers and food industry to evaluate the efficacy of labeling programs or to assess if consumers are misled by existing labeling programs. International food agencies, however, often rely only on stated preference methods in the form of attitude and perception measurement to directly assess consumers' understanding and evaluation of label information and its importance to their purchase decisions. Attitude measures are increasingly criticized for potentially providing biased estimates of true preferences, as they tend to overstate the importance of product characteristics when evaluated separately. Choice experiments, on the other hand, provide a methodological tool for a holistic product evaluation and force respondents to trade-off several attributes against another. In this study, we assess how closely consumers' attitudinal measures with respect to food product labeling alternatives (pre- and post-information) correlate with estimates of relative value and importance from a discrete choice experiment (DCE). Data from a recent study commissioned by the Australian wine industry is used to examine whether consumers are being misled by current food labeling policy which allows a product, only partially derived from wine and of lower technical quality, to be labeled as "Wine Product". In combination with origin labeling consumers are potentially being misled by the combined label "Wine Product of Australia". Thus, the overall objective of this research is to compare the results of attitudinal versus choice based methods to examine the efficacy of each method when assessing the impact of labeling information and policy on consumer behavior.

Keywords: discrete choice experiment vs. attitude measurement, food labeling
Track: Food Policy

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Introduction

Food labeling must not be misleading, in the sense that it should not induce consumers to make errors in their purchase decision and it should accurately reflect the production methods and true content of the products. Misleading labeling creates a market failure in the form of asymmetric information (Golan et al., 2001). Agricultural economists are increasingly being asked by policy makers and food industry to evaluate the efficacy of labeling programs. This information is often used for economic cost-benefit analysis and provides information for policy makers when deciding whether labeling policies should be initiated/ mandated, or if existing labeling usage is misleading. International food agencies, however, often rely only on stated preference methods in the form of attitude and perception measurement to directly assess consumers' understanding and evaluation of label information and its importance to their purchase decision. Attitude measures are increasingly criticized for potentially providing biased estimates of true preferences, as they tend to overstate the importance of product characteristics when evaluated separately (Kolodinsky, 2008).

Choice experiments (CEs), on the other hand, provide a methodological tool for a holistic product evaluation and force respondents to trade-off several attributes against another. Respondents participating in CEs are typically not aware of which attributes researchers are interested in, therefore reducing social response bias encountered in attitude measurement studies. Choice based methods have been found to have a high external validity and to provide valid willingness to pay estimates for attribute levels (e.g. Chang et al., 2009). While attitudes reflect consumers' desire for information, CEs capture how much consumers actually value labeling information in their purchase decisions relative to other product attributes.

Objectives

The overall objective of this research is to compare the results of attitudinal versus choice based methods to examine the efficacy of each method when assessing the impact of labeling information and policy on consumer behavior. We assess how closely consumers' attitudinal measures with respect to food product labeling alternatives (pre- and post-information) correlate with estimates of monetary value and relative importance from a discrete choice experiment (DCE).

To compare both research methods this study addresses five specific research questions, to:

- 1) estimate consumers' marginal willingness to pay for product labeling alternatives using values obtained from a DCE;
- 2) determine the importance of this product labeling information in consumers' product choices relative to other product attributes/information that are typically included on wine packaging;
- 3) evaluate how strongly consumers' attitude towards existing versus proposed product labeling alternatives differ;
- 4) determine whether consumers' perceptions of allowed ingredients differ under the three product labeling alternatives to assess the degree which consumers are potentially misled under each; and
- 5) determine whether attitude and DCE estimates are congruent at the aggregated and disaggregated level.

Data and Methodology

Consumer sample

Data was gathered through an online survey conducted in October 2008. Our total sample of 1,228 consumers was recruited randomly by a reputable panel provider and is representative of the Australian wine consumer. Table 1 provides a detailed characterization of the consumer

sample and compares it to the total Australian wine consumer population as identified by single source data (Roy Morgan, 2007). To qualify, respondents were not allowed to work in marketing or the wine industry and were required to drink white wine and to have purchased cask wine in the last three months as we wanted respondents to have recent purchase experience.

Insert Table 1 about here

Overview of experimental survey design

Before describing the methods applied in the survey in more detail, this section specifies the experimental survey design and provides an overview of the question order and at which step additional product information was provided.

Once respondents had successfully passed the screening portion of the survey, they completed a visual shelf simulation discrete choice experiment (DCE) to assess consumer preferences for a number of wine attributes and labeling alternatives without providing any additional information. After breaking up the survey with general wine behavior questions, respondents were then asked to state their attitudes towards three labeling alternatives (two existing and one under consideration) and to indicate their beliefs of allowed production processes and additives for each alternative – again without providing any additional information. Therefore, in the first part of the survey, the DCE and the first set of evaluation scenarios, consumers' choices, attitudes and beliefs for each of the three labeling alternatives were assessed in a situation representative of a realistic and common market situation where no additional labeling information or definitions is provided.

In the next step respondents were provided with a definition of the three product types according the Food Standards of Australia and New Zealand code (FSANZ, 2006 and 2008). A screen shot of the information provided to respondents can be found in Figure 1.

Insert Figure 1 about here

A change in consumer attitudes due to the information of product definitions provided can be assumed to measure the degree of information asymmetry and functions as an indicator of potential consumer misleading. Accordingly, consumer attitudes towards wine and wine product / wine-based beverage were elicited again after respondents received the product definitions. Finally, respondents were asked a set of direct questions regarding the potential of consumer misleading before concluding the survey with sociodemographic questions. The following sections provide complete details of the DCE as well as the attitude and belief measurement.

Discrete choice experiment

Discrete choice experiments (DCEs) simulate realistic consumer behavior by asking respondents to choose one option from a set of alternatives that vary in their characteristics and to indicate if they realistically would purchase this option. Respondents thereby are forced to consider the holistic product with multiple attributes and to trade-off attributes against each other (Louviere et al., 2000), such as accepting a higher price for a reputed brand or preferable labeling alternative or accepting a less preferred labeling alternative for a lower product price. Conversely, attitudinal questions only relate to one specific attribute, neglecting its relative role or relation to other product characteristics. In the DCE respondents are also not aware of the specific attribute the researcher wants to analyze, thereby preventing social demand effects.

The DCE simulated consumer market behavior without any additional information and tested if consumers differentiated in their choices between the product labeling alternatives when the existing and proposed wine product types were all simultaneously present in the market. If consumers discriminate ‘wine product’ and ‘wine-based beverage’ this would reflect in significant different part worth utilities for both labeling alternatives.

Six wine attributes price, brand, product labeling, origin, alcohol level and sweetness level were included in the DCE and varied with two to four levels (see Table 2). Prior research indicated that price, brand, sweetness level and country of origin are the most important choice drivers for Australian wine consumers (Lockshin, et al., 2006; Lockshin et al., 2009). To reliably assess the relative importance and marginal willingness to pay for labeling alternatives it is essential to include all relevant attributes into the discrete choice experiment; otherwise the relative effect of the labeling attribute under scrutiny would likely be overestimated (Islam, Louviere and Burke, 2007).

Insert Table 2 about here

For the product labeling attributes, we used the two options currently available in the market: 'Wine' and 'Wine Product', and the option currently being considered: 'Wine Based Beverage'. 'Wine Based Beverage' is the option proposed to replace 'Wine Product' as some industry leaders believe it better reflects the true nature of an alcoholic drink which is only partially made of wine. The assignment of attribute levels for the labeling attribute took the relative market share of the products to be analyzed into account to ensure that wine occurred more often than wine products and wine based beverages. For the four levels wine was chosen twice and wine product and wine based beverage once.

The prices covered by the four equi-spaced price levels were chosen to reflect the range of market prices for 4 Litre cask wine at the time of the study in November 2008. The four brands chosen represent different degrees of brand reputation; two are well known brands that offer cask and bottled wine, while the other two brands also offer cask wine products. While the majority of wine sold in Australia is produced domestically, low priced bulk wine from South America and Spain is imported in years with below average harvest volumes. The choice of the country of origin levels reflects this situation. A low and a high alcohol level were included in the DCE to cover differing degrees of alcohol between cask

wine alternatives. While the majority of bottled wine in Australia has a low sweetness level (dry wine), about half of the cask wine volume sold is of higher sweetness. The two wine types reflect these different sweetness levels.

Visual product attributes such as brand and brand specific packaging were found to impact consumers subliminally by direct activation (Barg, 2002; Breitmeyer et al., 2004; Dijksterhuis et al., 2005). The relative effect of visual attributes on consumer choice can only be reliably measured with visual shelf simulations (Mueller, Lockshin and Louviere, 2010), verbal presentation is very likely to underestimate their impact. Accordingly we used a visual shelf simulation for the DCE (see Figure 2). Product alternatives were presented using a photo-realistic shelf simulation of wine products with labeling information printed on the package in realistic font relative to other attribute information, thus, preventing a potential bias from over-emphasizing product information.

Insert Figure 2 about here

Attributes and levels were combined into product concepts (attribute combinations) according a $4^4 \times 2^2$ orthogonal main effects plan (OMEF) with 64 alternatives in 16 choice sets of 4 options. The design was statistically efficient at the level of 100% (Street and Burgees, 2007). Respondents were asked to repeatedly (16 times) choose their most preferred product from four alternatives to have for an everyday consumption occasion and to indicate if they would realistically purchase the chosen option.

Multinomial Logit Model

The standard multinomial logit model, which is the most widely used discrete choice model (Train 2003, p. 38), was applied to analyze respondents' choices. It is based on Random Utility Theory

$$(1) \quad U_i = \beta X_i + \varepsilon_i$$

where the utility from choosing an alternative i from the available choice options S is a linear combination of attribute part worth β and an error term. The Vector X_i consists of the choice-specific product attributes. Under the usual assumptions that the errors ε_{ni} are iid and follow a Type I distribution the probability that alternative i is chosen from all alternatives j equals:

$$(2) \quad \pi(i) = e^{\lambda(\beta X_i)} / \sum_{j \in S} e^{\lambda(\beta X_j)}$$

The willingness to pay for each attribute was calculated by standardising the attribute part worth estimate by the price coefficient (Louviere et al. 2000).

Consumer beliefs about allowed production processes and additives

Following the DCE, respondents completed a series of questions allowing us to assess which production processes and additives consumers perceived or believed were allowed for all three product labeling alternatives. The items (see Table 5) were chosen to cover the product definition of ‘wine’ and ‘wine product’ as specified by the Food Standard of Australia and New Zealand (FSANZ, 2006 and 2008) code.

Attitude measurement

An attitude scale with four items was used to measure consumers’ evaluation of all three product labeling alternatives with and without information explaining the definition, production processes and allowed additives of the three product labeling alternatives. Scale items were selected partially following Heslop (2006) and covered several product evaluation dimensions such as quality, taste, naturalness and purchase intent. Attitudes were compared between the labeling alternatives at each information condition assessing the degree of perceived difference. Comparing attitudes for the same labeling alternatives between the information conditions allowed us to determine the effect of consumer information on their product evaluations. Attitude scales were tested for reliability and the degree of difference between the product labeling alternatives was assessed on the individual and aggregated level.

Congruency between attitudes and DCE estimates

To assess congruency between attitude and DCE estimates, part worth utility differences from the DCE and attitude differences between the labeling alternatives were compared a) for the total sample and b) for pre-specified segments differing in attitudes after evaluation of the three labeling alternatives.

Results and Implications

Discrete choice experiment

The estimated part worth values from the multinomial logit model for all three labeling attribute levels are detailed in Table 2. Overall labeling had a significant influence on consumers' choices (Wald Statistic = 66.8, $p < 0.01$). It can therefore be concluded that consumers consider product labeling as a product cue when making cask wine choices.

Insert Table 2 about here

Products labeled as 'wine' had a positive part worth value, while 'wine-based beverages' resulted in a significant and negative utility estimate. The utility of 'wine products' is almost exactly in the middle between the two other labeling alternatives, and is not significantly different from zero. From this it can be concluded that consumers significantly discriminate between the currently used label 'wine product' and the alternatively suggested 'wine-based beverage', with the later being less preferred.

Marginal willingness to pay

Marginal willingness to pay values were calculated by standardizing the attribute level part worth utilities by the price vector (-0.12) and are given with their confidence interval in the three rightmost columns of Table 3. Accordingly, the marginal monetary value between both labeling alternatives 'wine product' and 'wine-based beverage' equals A\$ 0.74 per 4 Litres of cask wine. This willingness to pay value can be used for welfare calculations and needs to be compared to potential costs for producers changing product labeling. These cost estimates are not available to the authors.

Insert Table 3 about here

Relative importance of product labeling information

An important insight generated from the DCE is the importance an attribute has on consumers' purchase decision relative to other product characteristics. Jointly, with the marginal willingness to pay, this relative importance can provide legislators with a relative perspective on how important product labeling is for consumers – this measure cannot be achieved with attribute measures which only focus on one product attribute.

While we find significant differences in consumer utility between the labeling alternatives, consumers' choices reveal that product labeling only has a small overall impact on their product choice. The relative importance of the attributes included in the DCE was estimated by calculating the partial contribution of each attribute to the overall explained variance (Louviere and Islam, 2008). Not surprisingly country of origin, price and brand are the three most important product cues for Australian wine consumers when purchasing cask wine and jointly explain more than 90% of choice variance. Labeling is only the second least important product attribute, explaining only 1.4% of observed choice variance (see Table 4). Only alcohol level is less important than product labeling.

Insert Table 4 about here

Perceptions of allowed production processes and additives

Eliciting consumers' perception of allowed production processes and ingredients resulted in distinctive differences between all three labeling alternatives (see Table 5). Consumers are potentially misled if they perceive differences in the allowed production methods between 'wine product' and 'wine-based beverage'.

Insert Table 5 about here

It is interesting to note that although almost 80% of consumers thought 'wine' was a product of fermented grapes, only 50.4% of consumers thought that 'wine products' were

made using fermented grapes. Furthermore, only 40.1% to 54.2% of consumers indicated they believed components (other than fermented grapes) such as sugar, water, fruit juices or alcohol could be added. Considering these results, it appears that roughly one-half of consumers currently do not know what can be included in a ‘wine product’.

When the term ‘wine-based beverage’ is used, the percent of consumers believing a specific component can be added increases significantly, with 10.4% to 32.4% more consumers believing the component can be added to products labeled as ‘wine based beverages’ compared to ‘wine products’. Therefore, the use of the term ‘wine-based beverage’ appears to better indicate to consumers that components other than fermented grapes may be included in the beverage. These differences between ‘wine product’ and ‘wine-based beverage’ in Table 5 indicate that consumers are potentially misled by ‘wine product’.

Attitudes towards product labeling alternatives

Before testing for differences in attitudes between the labeling alternatives, the four-item attitude scale was tested for reliability. Cronbach Alpha clearly exceeded the benchmark of 0.7 for all product alternatives and information conditions (rightmost column in Table 6). Accordingly, the sum of all four item scores can be used to assess overall product attitudes.

Insert Table 6 about here

Paired samples t-tests (paired means t-tests) were conducted using SPSS 17. The mean level of agreement for each scale item for ‘wine’, ‘wine products’ and ‘wine-based beverages’ both before and after “information” are shown in Table 6. Means which carry the same superscript are not statistically different. The overall attitudes regarding the labeling alternatives agrees with the findings from the DCE. ‘Wine product’ is positioned between ‘wine’ and ‘wine-based beverage’ and is evaluated significantly higher than ‘wine-based beverages’. This finding confirms the suggestion that ‘wine product’ and ‘wine-based

beverage' are perceived differently when no extra information is provided and using 'wine product' labeling might potentially mislead consumers.

While consumer choices and their attitudes concur regarding the evaluation of the labeling alternatives, attitudinal measures do not provide any estimate of the importance of wine product labeling relative to other product characteristics, nor do they provide estimates of consumers' marginal willingness to pay.

Consumers' attitudes without extra information can be compared to their attitudes towards the labeling alternatives after they received a description of the product labeling definition (see Figure 1) that also indicated that 'wine products' and 'wine-based beverages' are actually identical. The second last rows in Table 6 contain item values and overall attitudes after information that have to be compared to the relevant values before information in the upper rows. After receiving information about the actual product definition, consumers' overall attitudes towards wine-based beverages / wine products decreased slightly but significantly from 15.89 to 15.50. This decrease can be attributed to the significant deterioration in the evaluation regarding naturalness and purchase intent, while the evaluation of quality and taste did not change significantly. While providing information has a small negative effect for 'wine-based beverage' we can observe a contrasting effect for the evaluation of 'wine', which increased slightly from 20.58 to 21.15 and is significant at $p < 0.05$.

We conclude that providing respondents with information about the product definition of 'wine' and 'wine-based beverage' only had a small effect on their attitudes towards products. This agrees with consumer perceptions regarding allowed production processes and additives in Table 5, where more than two-thirds of consumers associated 'wine based-beverage' with those additives legally allowed. Accordingly, 'wine based beverage' seems to

be an appropriate product labeling alternative that conveys the majority of consumers with a truthful product description.

Direct questions of misleading

Considering previous research insights (Kolodinsky, 2008), it is not surprising that consumers are more concerned when asked directly about potential misleading by product labeling, which conveys incomplete information. About 50% to 60% of consumers stated that they felt misled or they would not purchase a wine product if they knew that other food components may be added (see first two rows in Table 7). This share is higher and overstates real consumer concerns compared to the results from the choice experiment discussed previously, which were obtained using more reliable, indirect methods. There labeling only accounted for 1.7% of attribute importance relative to other attributes such as price, brand and country of origin.

Insert Table 7 about here

The last question asked if consumers would purchase a wine product if other food components may be added, even if he/she liked the taste of it and if the quality was good. Interestingly, about 40% of consumers indicated they would feel misled and that they would have a different perception of the product even if it tasted good (last row in Table 7). Thus, even if wine products /wine based beverages are perceived to taste good and to be of good quality, consumers still feel misled if other food components are added.

Congruency between attitude measurement and discrete choice

As previously discussed, the relative part worth utilities from consumers' choices and differences in their attitudes toward product labeling agreed on the aggregated level that 'wine products' are significantly higher valued than 'wine-based beverages'. Whereas both methods come to similar relative conclusions, only the DCE can provide absolute monetary evaluations and relative product attribute importances.

The analysis so far considered only the aggregated sample and assumed consumers to be homogeneous. Responses indicate that preference heterogeneity exists for consumers' choices (Mueller and Umberger, 2009) and their attitudes towards the labeling alternatives (standard deviation in Table 6). To assess if both methods also agree on the disaggregated level we analyze consumers' choices separately on pre-specified segments, which differ in their attitude differences between the labeling alternatives.

Four a-priori segments were derived based on difference of attitudes between labeling alternatives. Two product labeling alternatives were assumed to be indifferent if their overall evaluation (sum of scale items in Table 6) did not differ more than 10%. The first segment comprises about 45% of the sample, who do not discriminate in their attitudes towards the product labeling alternatives (see Table 8). About one-quarter of respondents perceive 'wine product' to be similar to 'wine' but evaluate 'wine-based beverages' as inferior. Around 18% of respondents in the third segment perceive 'wine products' and 'wine-based beverages' as similar but evaluate wine as superior. The remaining 12% in segment four distinguish between all three labeling alternatives.

Insert Table 8 about here

Separate multinomial logit models were estimated for all four segments to test if the attitudinal differences reflect congruent choice differences between the product labeling alternatives. The Wald statistic (Wald=25.79, $p < 0.001$) indicates significant differences in the part worth values between the four segments, reflecting differences in their choice behavior. Resulting part worth estimates were translated in marginal willingness to pay values and stars indicate their statistical significance from zero (Table 9).

Insert Table 9 about here

For all four segments we find significant differences in choice revealed marginal willingness to pay between 'wine; and 'wine-based beverages'. While the marginal WTP for

‘wine product’ and ‘wine based beverage’ are only marginally significantly different from each other for the first segment of ‘the indifferent’, from their attitudes we would not expect a significant difference between ‘wine’ and ‘wine-based beverages’. Although, their attitude differences suggest indifference, consumers’ choices reveal significant differences between the labeling alternatives for this segment. Nevertheless, the absolute difference in the marginal WTP is smallest for this segment (\$0.60), also indicating a low importance of the labeling attribute to this segment.

The absolute monetary difference between ‘wine’ and ‘wine-based beverage’ product is almost identical for segments 2 and 3 (\$1.79 and \$1.80) but the relative positioning of the ‘wine product’ partially agrees with the attitudinal differences. For segment 2, the WTP for ‘wine product’ is positioned much closer to ‘wine’ than to ‘wine-based beverages’, while for segment 3 the opposite is true. Attitudes and choices appear to be somewhat related for both segments. For segment 4, which discriminates all product labeling alternatives in their attitudes, marginal WTP derived from their choices also shows significant deviations that are strongest of all four segments (total span of \$3.31). Accordingly, labeling is relatively more important to this segment which is also reflected by their attitudes and choices.

Overall, we find some congruency between attitude and choice differentiation on the disaggregated level. While the choice experiment finds significant discrimination between ‘wine’ and ‘wine-based beverages’ for all consumer segments, attitudes show less strong differentiation. We therefore conclude that very similar or identical attitudes towards different labeling alternatives are not a sufficient indication that these product labeling alternatives do not elicit differences in consumer choice. As food policy makers are concerned about consumers’ final purchase behavior, choice experiments appear to be the more appropriate method for the evaluation of consumer reactions to food labeling alternatives.

Summary

Results from attitude and DCE methods are congruent for the overall sample – both methods find that ‘wine product’ is significantly preferred/ evaluated higher than ‘wine-based beverage’, implying that consumers are indeed misled by the current wine product labeling policy. The different product labeling alternatives were found to have a significant impact on consumers’ choices in the DCE shelf simulation, but they only explained 1.4% of consumers’ overall choice variance, indicating a low importance of wine product labeling relative to other cask wine attributes such as price, brand and country-of-origin. In economic terms, consumers’ lower preference for ‘wine based beverage’ relative to ‘wine product’ is equivalent to a lower marginal WTP of A\$ 0.74 per 4 Liter product. While consumer relative attitudes towards the labeling alternatives and their discrimination in the DCE are similar, only the choice experiment is able to provide relative attribute importance and monetary measures and estimates of the perceived differences – these are important measures and can be the basis for welfare analysis.

We find four unique segments which differ in how they discriminate product labeling alternatives. Analyzing the choices of these four segments, we find that some of those who state to be indifferent in their attitudes actually indeed discriminate the different labeling alternatives when making choices in the DCE. Thus, choice based measures appear to be both a more valid measure of relative importance and a more sensitive method of determining market failures related to food labeling issues.

Conclusions

Our results are interesting in light of the debate on the validity, strengths and weaknesses of alternative research methods in food labeling policy. While choice and attitude measures come to congruent findings on an aggregated level, the DCE has a number of advantages over direct attitude elicitation. We suggest that choice based methods not only provide more “economically” insightful results in form of marginal WTP estimates that facilitate cost-

benefit analysis of labeling policies, but also are able to capture significant behavioral differences across consumer segments that cannot be detected with attitude measures.

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Table 1 Sample characterization and comparison to Australian wine consumer population (Roy Morgan Single Source, 2007).

		Roy Morgan (wine consumer population)	Sample (n=1,228)
State	NSW	34.3%	36.3%
	Victoria	25.7%	25.4%
	Queensland	18.4%	17.9%
	South Australia	7.7%	7.9%
	Western Australia	10.8%	9.5%
	Tasmania	2.3%	2.4%
	Northern Territories	0.6%	0.4%
Area	Capital Cities	65.3%	65.3%
	Country Area	34.7%	34.7%
Gender	Female	52.2%	52.4%
	Male	47.8%	47.6%
Age	18-24	8.2%	7.7%
	25-34	16.1%	14.8%
	35-49	31.4%	31.2%
	>50	44.3%	46.2%
Marital status	single	30.7%	28.1%
	married/ de facto	69.3%	71.9%
Children in household	yes	31.8%	35.0%
	no	68.2%	65.0%
Number of children	1	13.3%	13.6%
	2	12.7%	14.0%
	3+	5.7%	7.4%
People living in household	1-2 People in HH	45.9%	50.4%
	3-4 People in HH	41.4%	37.8%
	5+ People in HH	12.8%	11.8%
Personal income (AUD)	Under \$20,000	18.1%	20.4%
	\$20,000 to \$29,999	12.0%	11.6%
	\$30,000 to \$49,999	25.5%	23.2%
	\$50,000 to \$69,999	19.8%	19.2%
	\$70,000 or More	24.7%	25.5%
Education	Some Secondary/Tech.	14.6%	16.7%
	Finished Tech./HSC/Year 12	34.1%	20.9%
	Have Diploma or Degree	51.3%	62.4%
Employment	full time work	47.7%	43.9%
	part time work	20.3%	19.2%
	not employed	32.0%	36.9%

Table 2 Attribute and levels of the discrete choice experiment

Attribute	Levels	1	2	3	4
Price per 4 Liter carton	4	A\$7.99	A\$9.99	A\$11.99	A\$13.99
Brand (with typical label)	4	Brand 1	Brand 2	Brand 3	Brand 4
Labeling	4	Wine	Wine	Wine Product	Wine Based Beverage
Country of Origin	4	Australia	Argentina	Chile	Spain
Alcohol level	2	9.5%	12.5%		
Wine type (sweetness)	2	Dry White	Soft White		

Table 3 Estimates for Multinomial Logit model (with price as a continuous variable)

Attribute	Attribute Level	Coefficient	t-statistic	Wald-Stat.	p-value	marg. WTP	confidence interval marg. WTP	
no choice const.		-1.64	-37.16	1381.0	0.00			
Country of origin	Australia	0.61	50.21	2528.2	0.00	\$5.08	\$4.83	\$5.35
	Argentina	-0.21	-13.66			-\$1.72	-\$1.91	-\$1.55
	Chile	-0.23	-15.01			-\$1.92	-\$2.11	-\$1.74
	Spain	-0.17	-11.40			-\$1.44	-\$1.62	-\$1.28
Brand	Brand 1	-0.23	-15.15	993.3	0.00	-\$1.92	-\$2.11	-\$1.74
	Brand 2	-0.30	-18.93			-\$2.46	-\$2.67	-\$2.26
	Brand 3	0.24	17.59			\$1.96	\$1.80	\$2.14
	Brand 4	0.29	22.35			\$2.42	\$2.24	\$2.61
Sweetness	Dry White	-0.11	-12.94	167.4	0.00	-\$0.88	-\$0.98	-\$0.79
	Sweet White	0.11	12.94			\$0.88	\$0.79	\$0.98
Labeling	Wine	0.08	7.42	66.8	0.00	\$0.68	\$0.57	\$0.79
	Wine Product	0.00	0.30			\$0.03	-\$0.08	\$0.14
	Wine-based beverage	-0.09	-6.42			-\$0.71	-\$0.85	-\$0.58
Alcohol	9.5%	-0.04	-4.84	23.5	0.00	-\$0.32	-\$0.40	-\$0.25
	12.5%	0.04	4.84			\$0.32	\$0.25	\$0.40
Price		-0.12	-32.37	1047.7	0.00			

(n=1,228, LL²=42,132, df=1,216, Pseudo R²=0.0742)

Table 4 Relative attribute importance (estimated by partial attribute contribution to explained variance)

Attribute	Relative importance
Country of Origin	52.4%
Price	21.7%
Brand	20.6%
Wine type (sweetness)	3.5%
Labeling	1.4%
Alcohol level	0.5%

Table 5 Consumer believes about allowed production processes and additives for three labeling alternatives (tick any that apply approach)

Statements of allowance	Wine	Wine Product	Wine-based Beverage
Is a product of fermented grapes	79.6%	50.4%	32.2%
Mainly made from wine but other food components can be added	12.5%	52.4%	62.8%
Sugar can be added	21.5%	54.2%	67.7%
Water can be added	17.9%	52.8%	69.2%
Fruits juices other than wine can be added	12.0%	40.1%	72.5%
Aroma can be added	16.3%	49.4%	65.3%
Alcohol (eg. brandy or other spirits) can be added	15.1%	45.2%	64.7%
None of the above apply	15.0%	13.3%	13.5%

Table 6 Attitude measurement: Consumers' mean level of agreement with statements regarding Wine, Wine Products (WP) and Wine-Based Beverages (WBB), before and after product information, 7-point scales.

	Is of high quality		Tastes Good		Is a Natural Product		Is something I would consider purchasing		Overall Evaluation (sum of scale items)		Cronbach Alpha
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Before Information											
Wine	5.17	1.15	5.15	1.12	4.75	1.13	5.50	1.12	20.58	3.87	0.881
Wine Product	4.71	1.31	4.77	1.23	4.41	1.23	4.81	1.35	18.70	4.61	0.920
Wine-Based Beverage	3.97 ^a	1.46	4.14 ^b	1.35	3.82	1.40	3.95	1.54	15.89	5.34	0.946
After Information											
Wine	5.28	1.18	5.22	1.16	5.21	1.19	5.44	1.19	21.15	4.19	0.915
WP /WBB	3.98 ^a	1.38	4.12 ^b	1.28	3.61	1.42	3.79	1.49	15.50	4.95	0.916

^{a,b} Means with the same superscript are not statistically different ($\alpha = 0.05$)

Table 7 Responses to direct question of potential misleading (7 point scales)

Statement	Disagree (1-3)	Neither (4)	Agree (5-7)	Mean	Std. Dev.
When I purchase a “Wine Product of Australia” I feel misled if this product is not completely made of grapes but can contain other food	17.1%	29.0%	53.9%	4.78	1.60
I would not purchase a “Wine Product of Australia” if I knew that other food components, such as water or sugar, can be added up to 30%.nts.	15.6%	25.9%	58.5%	4.95	1.58
It does not matter to me if a “Wine Product of Australia” is not exclusively made of grapes as long as I like the taste of it and the quality is good.	38.2%	29.8%	32.1%	3.71	1.70

Table 8 Segments based on difference in attitudes between product labeling alternatives

Segment	Characterization		Size
1	Indifferent	W ~ WP ~ WBB	44.9%
2	Wine product is like wine	W ~ WP > WBB	26.0%
3	Wine product is like wine-based beverage	W > WP ~ WBB	17.6%
4	Three distinct label categories	W > WP > WBB	11.5%

Abbreviations: W wine, WP wine product, WBB wine-based beverage

Table 9 Marginal willingness to pay for labeling alternatives for four pre-specified segments

	Segment 1		Segment 2		Segment 3		Segment 4	
Attitude difference	W ~ WP ~ WBB		W ~ WP > WBB		W > WP ~ WBB		W > WP > WBB	
Wine	\$0.33	**	\$0.77	**	\$0.96	**	\$1.56	**
Wine Product	-\$0.05		\$0.26	*	-\$0.12		\$0.18	
Wine-based beverage	-\$0.27	*	-\$1.02	**	-\$0.84	**	-\$1.75	**

Sign. different from zero at: **p<0.01; *p<0.10

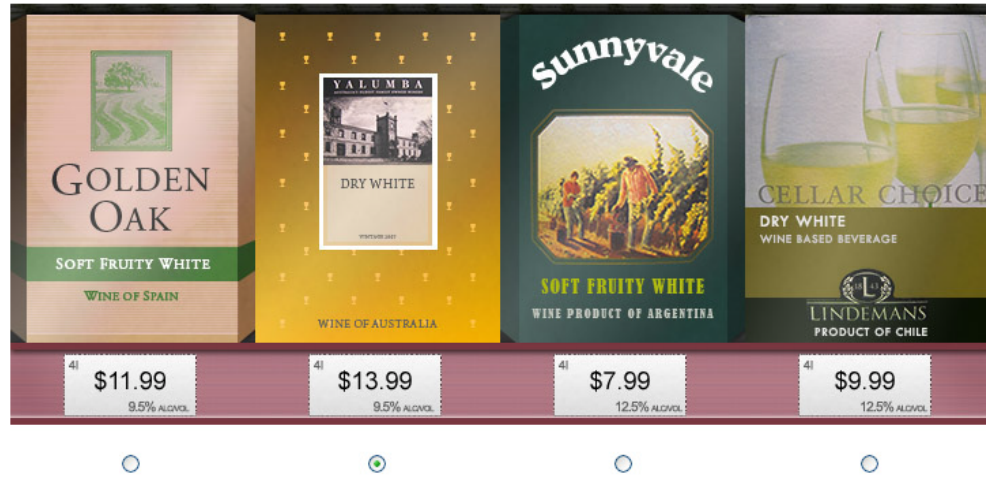
Please read the following product definitions as stated in the Australian Food Standards Code. This will be important for later questions.

Wine	The product of the complete or partial fermentation of fresh grapes, or a mixture of that product and products derived solely from grapes
Wine Product and Wine Based Beverage	Same definition: A food containing no less than 700 mL/L of wine (as described above), which has been formulated, processed, modified or mixed with other foods such that it is not wine.

Figure 1 Respondent information of wine, wine product and wine based beverage

Showing image 9 of 16.

Imagine you are shopping for an alcoholic beverage (bag in box) to have for your daily consumption, e.g. for dinner during the week.



From these four alternatives, which one would you be most likely to choose?

Would you realistically buy your most preferred option?

- Yes
- No

Figure 2 Example of visual shelf simulation choice task