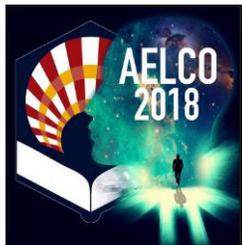




Using opposites to describe the wine tasting experience: The naïve versus the expert dimensions.

(Symposium: The Language of senses)

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The importance of “perceived quality”

Italian wine is one of the **best known products** on the **international food market**, not only in terms of its reputation for quality, but also in terms of the number of bottles sold (Brentari et al., 2011).



Change in the concept of wine: from *nutritional food* to *hedonistic beverage* (Saéñz-Navajas et al., 2016; Corduas et al., 2013)



Change in the reasons for wine consumption: from *nutritional purposes* to the *pleasure of drinking* (Saéñz-Navajas et al., 2016; Corduas et al., 2013)



IMPORTANCE OF WINE PERCEIVED QUALITY

Factors related to perceived quality

PERCEIVED QUALITY

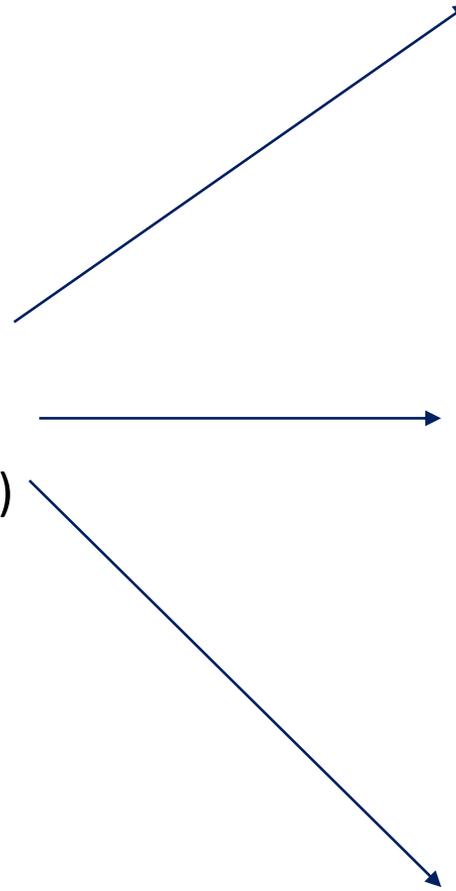
(depending on the judgment of the consumer;

e.g. Oude et al., 1995; Rust, et al. , 1999; Charters & Pettigrew, 2007)

Product = relating in part to the product category

Person = consumer's anagraphical and cultural variables

Place = consumption situation



The perceived quality related to the Product

PERCEIVED QUALITY

(e.g. Charters & Pettigrew, 2007; Hopfer & Heyman, 2014; Saénz-Navajas et al., 2016)

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graph TD; A[PERCEIVED QUALITY] --> B[Extrinsic Factors]; A --> C[Intrinsic Factors];
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Extrinsic Factors: external dimensions concerning the issues beyond physical and organoleptic properties of wine (i.e. type of grapes, winemaking process, packing, etc.)

Intrinsic Factors: dimensions relating to product's organoleptic and sensorial properties emerging during the tasting process (i.e. visual appearance of wine, its taste, its body, etc.)

Description of experts' sensory experience

- **Intrinsic properties** are described and evaluated by **experts** in **wine reviews** and **tasting notes** (Hopfer & Heyman, 2014).
- **Wine's descriptions** capture the **three canonical steps** in any **wine tasting procedure** (Caballero, 2017; Paradis, 2015; Paradis & Eeg-Olfsson, 2013; Suarez-Toste, 2017): i) wine's visual appearance (i.e. the clarity and the color of wine); ii) wine's olfactory characteristics; iii) wine's palate (i.e. smell, taste and touch).



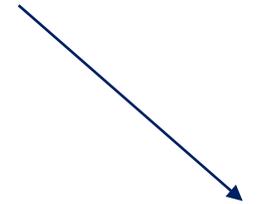
Paucity of sensory vocabularies (i.e. in the olfactory domain).



Use of *property expressions* (i.e. soft, sharp, sweet) and of *object descriptors* (i.e. blueberry, honey, apricot).



Use of *figurative language* (i.e. metonymy, metaphor, personification, similie)



Presence of *synesthesia* (i.e. cross modal mapping between senses).

Expert evaluation scales

- The **intrinsic characteristics** referring to the **sensorial properties** of wine are the focus of the **evaluation scales** used by **experts**.
- All **sensorial properties**, excluding the terms relating to other objects, are organized in terms of **oppositional scales** (Paradis, 2015).

Wine and Spirit Education Trust (WSET)	
APPEARANCE	
clarity	bright – clear – dull – hazy – cloudy
intensity	
white	water-white – pale – medium – deep
rosè	pale – medium – deep
red	pale- medium – deep – opaque
color	
white	green – lemon – straw – gold – amber – brown
rosè	pink – salmon – orange – onion skin
red	purple – ruby- garnet – mahogany –tawny
other observations	legs, bubbles, rim, color vs. core, deposits etc.
NOSE	
condition	clean – unclean
intensity	weak – medium – pronounced
development	youthful – grape aromas – aged bouquet (tired – oxidized)
fruit character	fruity, floral, vegetal, spicy, woods, smoky, animal fermentation, aromas, ripeness, faults
PALATE	
sweetness	dry – off-dry – medium dry – medium sweet – sweet – luscious
acidity	flabby – low – balanced – sharp
tannin	astringent – hard – balanced – sharp
body	thin – light – medium – full – heavy
fruit intensity	weak – medium – pronounced
alcohol	light – medium – high
length	short – medium - long

Table 1. Terminology for wine tasting developed by the WSET (Wine & Spirit Education Trust).

Opposites in cognitive abilities

- **Perception:** *opposites* are central to the *direct organization of perceptual experiences* in various *perceptual and spatial domains* (e.g., Bianchi et al., 2013; Bianchi & Savardi, 2008; Bianchi, et al., 2011).



Opposites in cognitive abilities

- **Language:** *opposites are fundamental to lexical semantics with reference to the organization of conceptual spaces* (e.g., Burro, et al., 2018; Croft & Cruse, 2004; Paradis et al., 2013).

e.g.: up-down; big-small; good-bad; young-old

- **Reasoning:** *opposites play a central role in inductive reasoning* (e.g., Gale & Ball, 2012), *deductive reasoning* (e.g., Augustinova, 2008), *insight problem solving* (e.g., Branchini et al., 2016) and *humor understanding* (e.g., Canestrari et al., 2018).

The study

- Influence of “wine gurus” on wine market (Sáenz-Navajas et al., 2016; Suarez-Toste, 2017).
- **Expertise make a difference in wine tasting:** the experts’ performance was superior than non-experts’ performance (Ballester et al., 2014; Sáenz-Navajas et al., 2016; Torri et al., 2013; Urdapilleta et al., 2011).



WINE EXPERTS:

- wider domain-specific knowledge and experience;
- faster in picking up information, in processing and storage them in memory;
- shared representations, especially for people belonging on the same wine culture.



NON-EXPERT CONSUMERS:

- representations of sensory profiles of wine based on a poor set of exemplars;
- influence of consumption context.



Are the expert and non-expert judgements based on the same underlying dimensions?

The study

Aim: to identify a set of **basic non-expert dimensions**, frequently referred to in order to **describe** the **sensorial properties of wine**. The set used as a reference was the **results of a preliminary corpus study**.

CORPUS BASED STUDY

Aim: to identify the **terms** used most frequently in the **corpora** of vocabulary used by **experts in Italy** to **describe** and **evaluate** the **quality of wine** as perceived by them.

Method

Materials: a selection of the **sensorial characteristics** specified in the text of **Product Specifications** and the tasting reviews in seven widely distributed **wine guidebooks** concerning **12 of Italian wines** designated as originating from the Veneto Region: Amarone della Valpolicella DOCG, Recioto della Valpolicella DOCG, Valpolicella DOC, Valpolicella Ripasso DOC, Recioto di Soave DOCG, Lugana DOC, Custoza DOC, Bardolino DOC, Soave DOC, Prosecco DOC, Verona IGT, Delle Venezie IGT.

Procedure:

- two independent raters identified all sensory expressions used in the corpora;
- the descriptors were classified according to the sense modality they referred to (i.e. visual, olfactory or gustatory);
- fourth category referred to non-sense specific characteristics (e.g. «strong»);
- very good inter-rater agreement (Cohen's $K = 0.94$).

Data analysis: frequency count method (in R software for statistical computing, version 3.5 .1) to identify the most frequent properties descriptors.

Results

- **1742 descriptors;**
- **elimination** of the **object descriptors** (e.g. citrus), **color descriptors** (e.g. ruby red) and **descriptors expressing the degree of a particular property** (e.g. *very* intense);
- **278 descriptors** were **ranked** according to the **frequency of use** (frequency ranging from 36 to 5);
- Selection of **30 properties most frequently used;**
- **Addition of 34 terms** commonly used in the **official tasting scale** of the **Italian Sommelier Association**

Results

64 Italian Expert sensorial properties

VELATO (hazy)	SALATO (salty)	LIMPIDO (clear)	MAGRO (thin)	CONSISTENTE (robust consistency)	PESANTE (heavy)
BRILLANTE (bright)	DI CORPO (full bodied)	FLUIDO (fluid)	ROBUSTO (robust)	INTENSO (intense)	PERSISTENTE (persistent)
VISCOSO (viscous)	EQUILIBRATO (well balanced)	CARENTE (lacking)	CORTO (short)	COMUNE (common)	PRONTO (ready)
COMPLESSO (complex)	IMMATURO (immature)	AMPIO (ample)	GIOVANE (young)	SECCO (dry)	ARMONICO (harmonious)
ASTRINGENTE (astringent)	FRANCO (frank)	SCIPITO (tasteless)	CRISTALLINO (crystal clear)	DEBOLE (weak)	
FINE (fine)	MATURO (mature)	ECCELLENTE (excellent)	VECCHIO (old)	DOLCE (sweet)	PIENO (full bodied)
AMABILE (medium sweet)	PENETRANTE (penetrating)	ABBOCCATO (slightly sweet)	ELEGANTE (elegant)	CALDO (warm)	BUONO (good)

Results

64 Italian Expert sensorial properties

AMABILE (medium sweet)	PENETRANTE (penetrating)	ABBOCCATO (slightly sweet)	ELEGANTE (elegant)	CALDO (warm)	BUONO (good)
STUCCHEVOLE (luscious)	AVVOLGENTE (embracing)	LEGGERO (light)	BEVIBILE (drinkable)	MORBIDO (soft)	CARICO (strong)
ALCOLICO (alcoholic)	ENTUSIASMANTE (exciting)	SPIGOLOSO (sharp)	OTTIMO (very good)	FRESCO (fresh)	CARATTERISTICO (characteristic)
PASTOSO (thick)	GRADEVOLE (pleasant)	PIATTO (flat)	DELICATO (delicate)	TANNICO (tannic)	VELLUTATO (velvety)
ACIDULO (acidulous)	SECCO (dry)	MOLLE (flabby)	VIVACE (lively)	SAPIDO (sapid)	
ASTRINGENTE (astringent)	FRANCO (frank)	SCIPITO (tasteless)	CRISTALLINO (crystal clear)	DEBOLE (weak)	

The experimental study

Aim: to identify the **basic perceived dimensions** pertaining to **quality** which **non-experts** refer to with regard to the experience of **wine tasting**.

Method

Participants: five hundred and fifty eight Italian adult participants (321 females, 237 males), ranging in from age 18 to 60 took part in the study individually. They were randomly assigned either to the red or white wine condition.

Procedure: two Italian questionnaires (one for red wine and one for white wine) were accessed and compiled by the participants in the study via smartphone or computer. The average time needed to fill in the questionnaire was around 30 minutes.

Materials: Two questionnaires to be administered online (LimeSurvey CE, stable version: 3.4.2, <http://www.limesurvey.org>):

- *Information about participants' sex, age, and wine experience;*
- *"IF YOU THINK OF WHITE WINE (or RED WINE) what property is opposite to..."* and then the target property was shown, in capital letters, followed by an empty box where participants could type in their response.

The order of presentation of the 64 target properties was randomised between participants.

Results

Variation of a property along an identifiable dimension

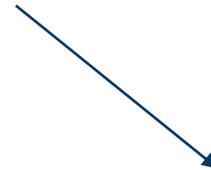
Number of sensory properties that are understood as a constituting a dimension:

- **Most** of the **properties** have a **dimensional structure** in non-experts' mind: participants were able to find the opposite in more than 82% cases.
- In around **16-18% of cases** of **indeterminacy of dimension** (5421 total number of cases): participants were not able to find the opposite pole.



«I don't know» responses:

- 13% for red wine;
- 12% for white wine.



«Negation» responses:

- 2.54% for red wine;
- 5.42% for white wine

Results

Variation of a property along an identifiable dimension: I don't know responses

- Frequent both for red and white wines with properties such as **Avvolgente** (*Embracing*), **Astringente** (*Astringent*), **Abboccato** (*Slightly sweet*), **Tannico** (*Tannic*), **Franco** (*Frank*).
- Infrequent for red wine with properties such as **Vecchio** (*Old*), **Immature** (*Immature*), **Dolce** (*Sweet*), **Giovane** (*Young*), **Caldo** (*Warm*); for white wines with properties such as **Maturo** (*Mature*), **Morbido** (*Soft*), **Comune** (*Common*), **Secco** (*Dry*), **Dolce** (*Sweet*).

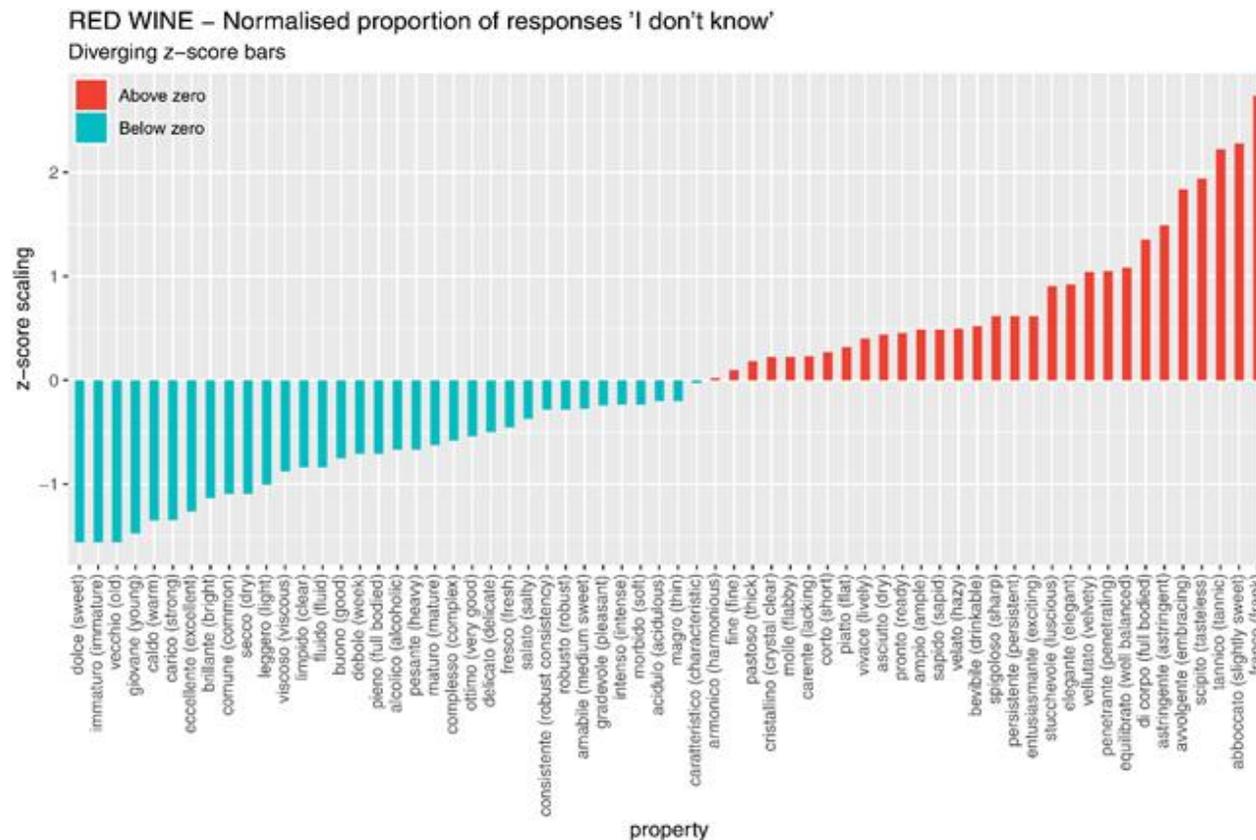


Figure 1. Scaling (based on z values) of the 64 target properties in terms of the proportion of "I don't know" responses given by participants for each property. The graph refers to red wine.

Results

Variation of a property along an identifiable dimension: I don't know responses

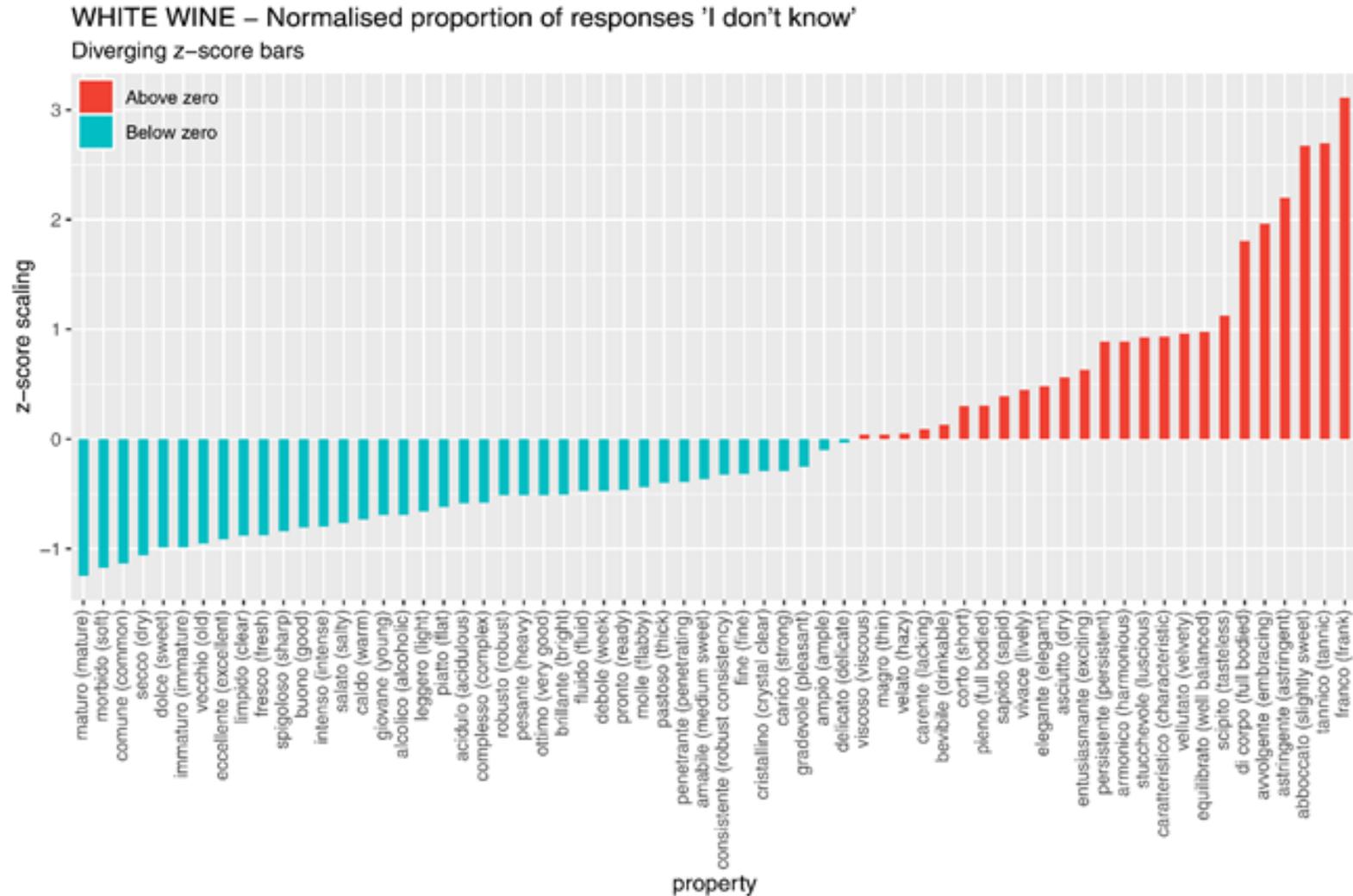


Figure 2. Scaling (based on z values) of the 64 target properties in terms of the proportion of "I don't know" responses given by participants for each property. The graph refers to white wine.

Results

Variation of a property along an identifiable dimension: Negation responses

- Frequent both for red and white wines with properties such as **Avvolgente** (*Embracing*), **Astringente** (*Astringent*), **Abboccato** (*Slightly sweet*), **Tannico** (*Tannic*), **Franco** (*Frank*).
- Infrequent for red wine with properties such as **Vecchio** (*Old*), **Immatturo** (*Immature*), **Dolce** (*Sweet*), **Giovane** (*Young*), **Caldo** (*Warm*); for white wines with properties such as **Matturo** (*Mature*), **Morbido** (*Soft*), **Comune** (*Common*), **Secco** (*Dry*), **Dolce** (*Sweet*).

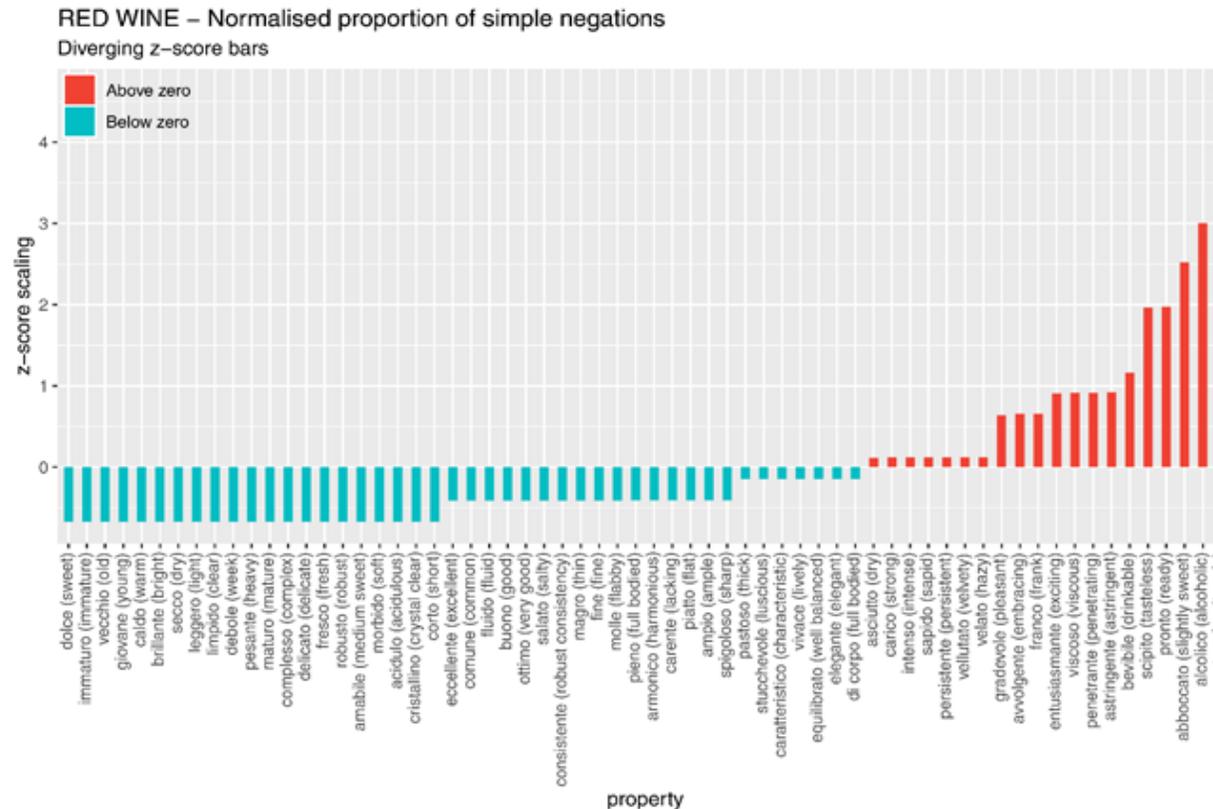


Figure 3. Scaling (based on z values) of the 64 target properties in terms of the proportion of responses consisting of a simple negation of the target property. The graph refers to red wine

Results

Variation of a property along an identifiable dimension: Negation responses

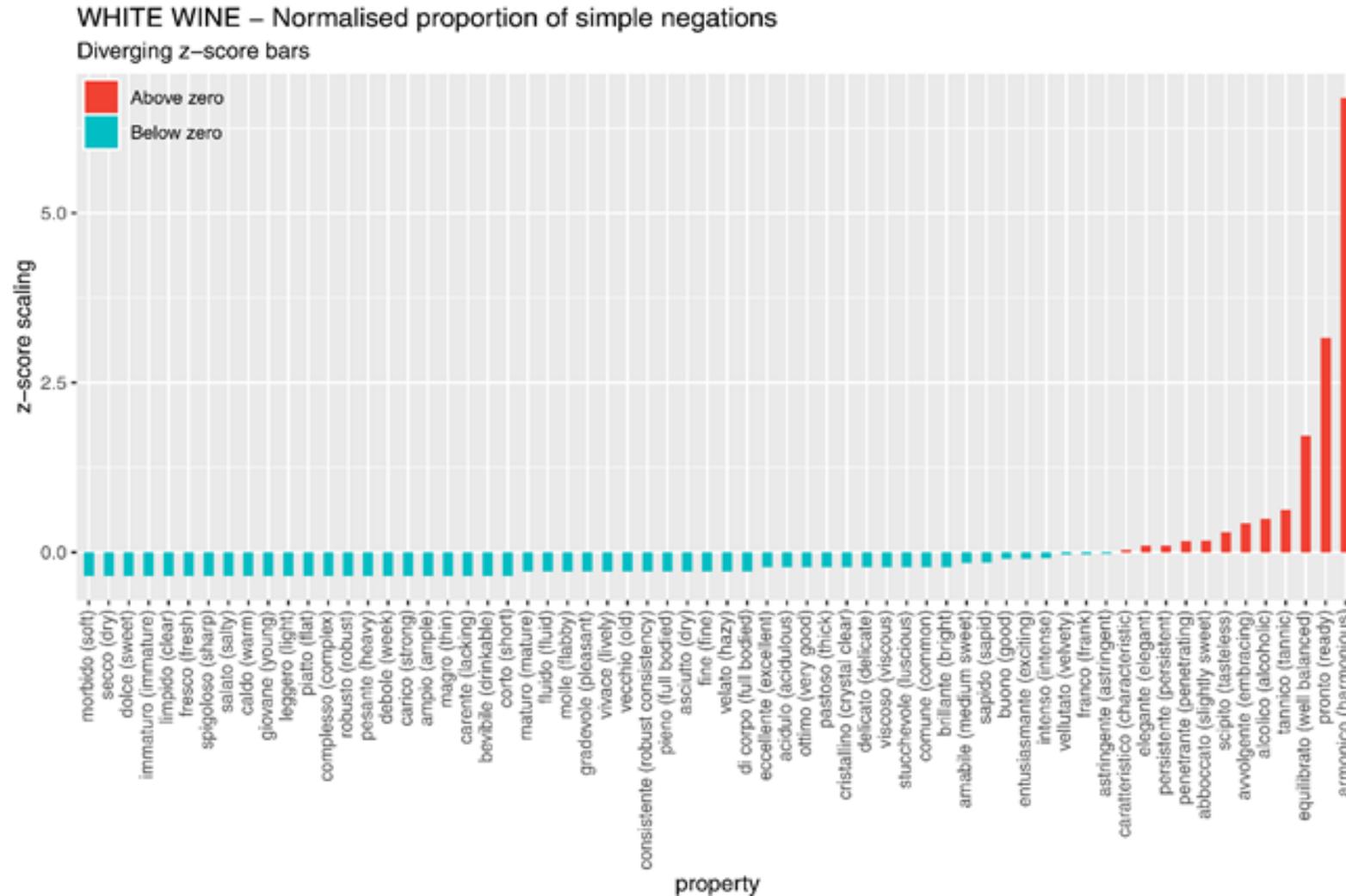


Figure 4. Scaling (based on z values) of the 64 target properties in terms of the proportion of responses consisting of a simple negation of the target property. The graph refers to white wine

Results

Univocity/Multivocity of the properties

- **Univocity:** cases where participants were consistent in identifying the underlying dimension (e.g., for red wine «Vecchio» (Old); for white wine «Giovane» (Young));
- **Multivocity:** cases where a property elicits a variety of different opposites (e.g., both for red and white wine «Franco» (Frank) and «Avvolgente» (Embracing))

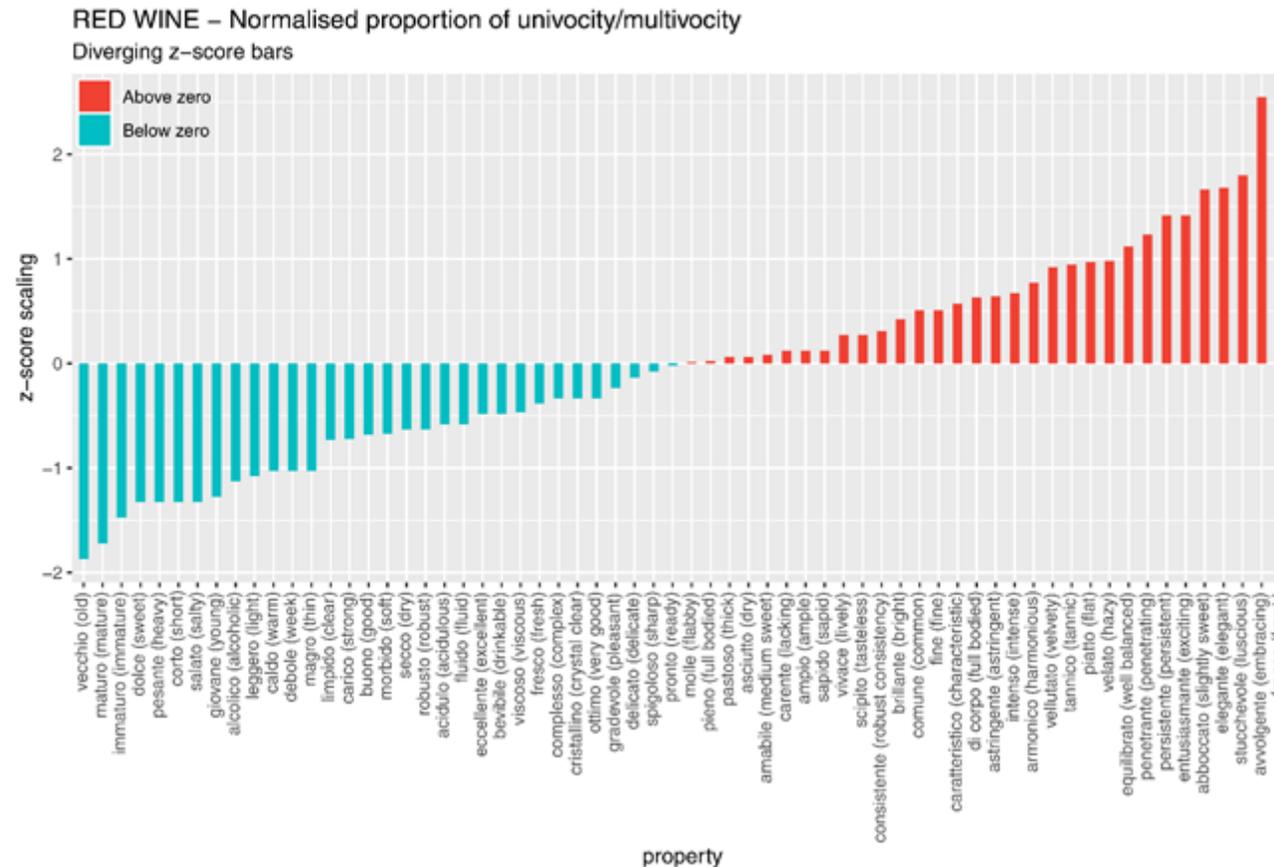


Figure 5. Scaling (based on z values) of the 64 target properties in terms of the number of different opposites given. The graph refers to red wine.

Results

Univocity/Multivocity of the properties

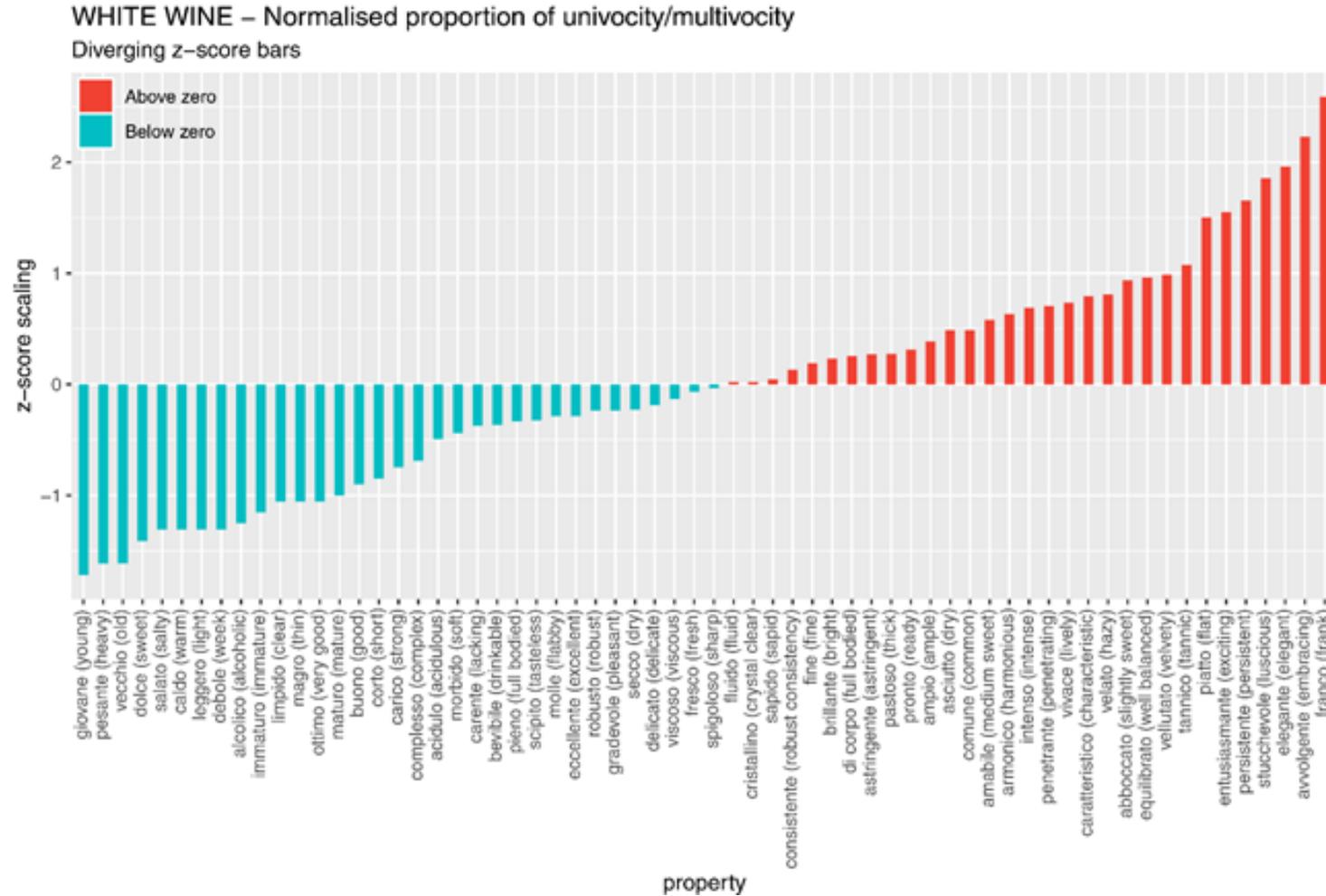


Figure 6. Scaling (based on z values) of the 64 target properties in terms of the number of different opposites given. The graph refers to white wine.

Results

Univocity/Multivocity of the properties

- Strength of dimension: the proportion of participants (out of the total) who converged on the most frequent opposite associated with each target property.

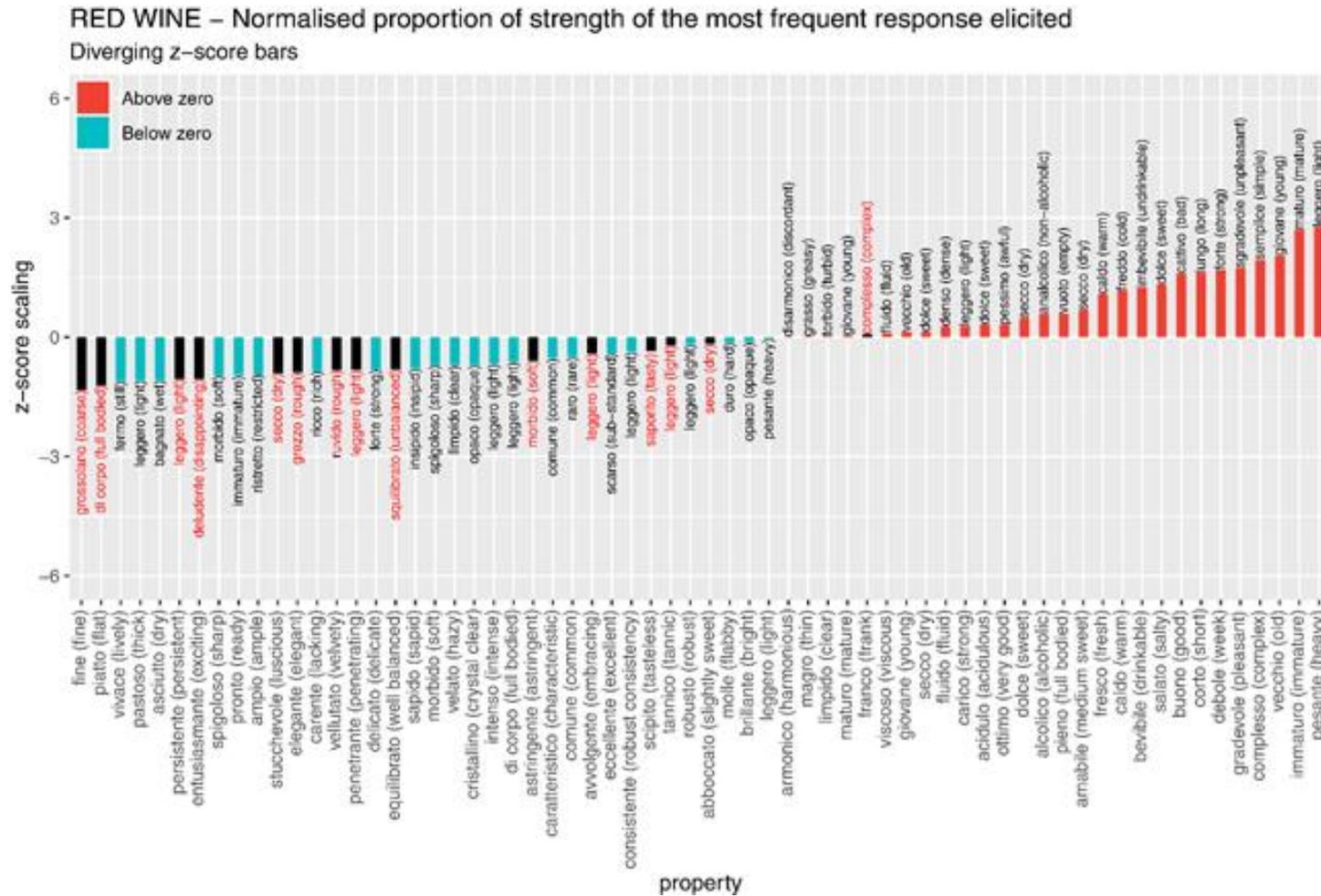


Figure 7. Scaling (based on z values) of the 64 target properties in terms of the strength of the underlying dimension based on the opposites which were elicited the most frequently (in proportion to the total number of participants). The graph refers to red wine

Results

Univocity/Multivocity of the properties

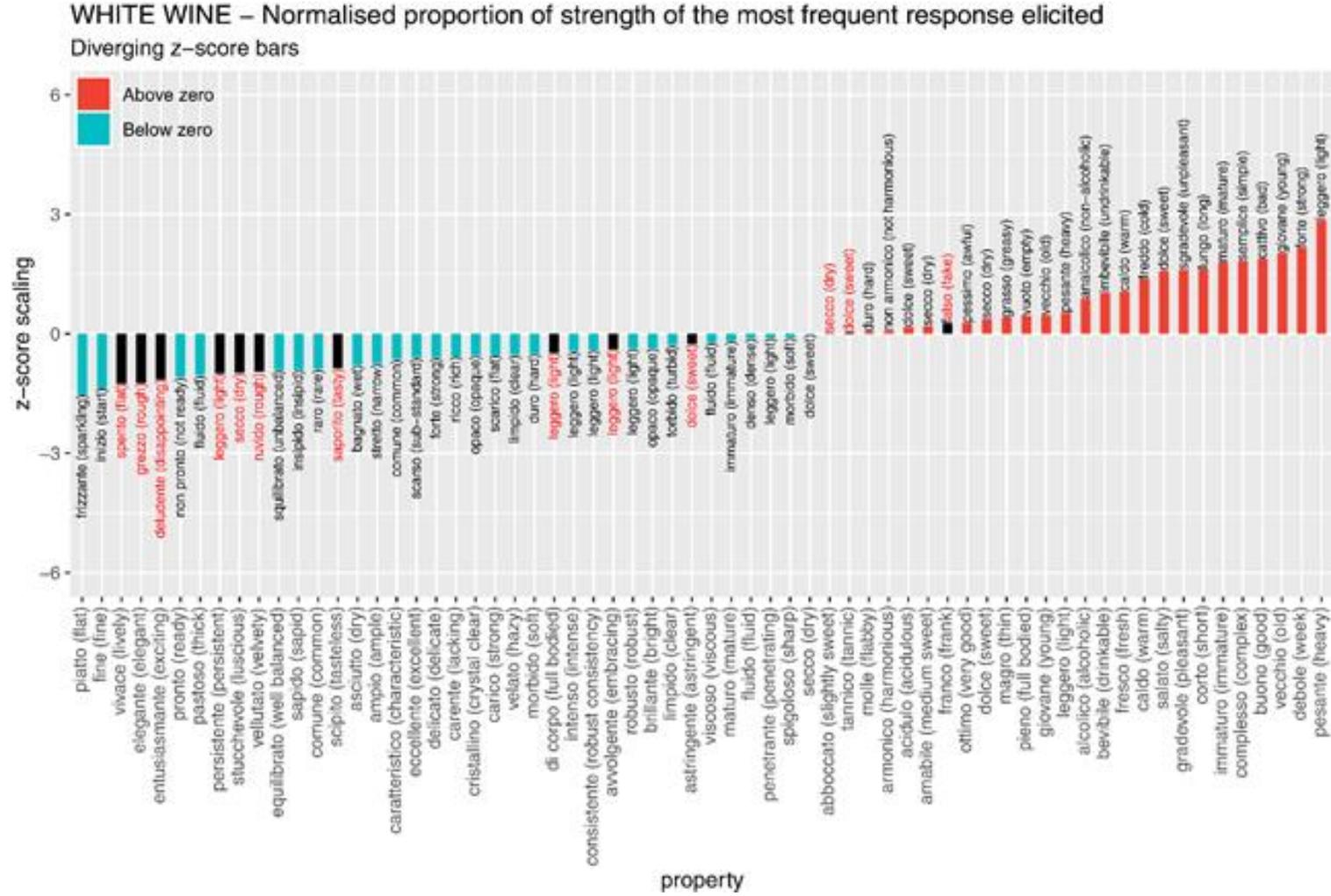


Figure 8. Scaling (based on z values) of the 64 target properties in terms of the strength of the underlying dimension based on the opposites which were elicited the most frequently (in proportion to the total number of participants). The graph refers to white wine.

Results

Differences between red and white wines

GLMM analyses (binomial family, Logit-link functions), with colour as fixed effect and the 64 properties as random effect revealed that:

- **red wines** were associated with «I don't know» responses ($\chi^2_{(1, N=64)} = 7.830, p = .005, \text{Cohen's } d = 0.35$);
- **white wines** were associated with **Negation responses** ($\chi^2_{(1, N=64)} = 48.294, p < .001, \text{Cohen's } d = 0.87$);
- **a trend for red wines** to be associated with **a greater number of different opposites** ($\chi^2_{(1, N=64)} = 3.338, p = .068, \text{Cohen's } d = 0.23$).

Results

Impact of anagraphic variables

Gender differences:

Males:

- a) greater number of different opposites, both for red wine ($\chi^2_{(1, N = 64)} = 10.702, p = .001$) and white wine ($\chi^2_{(1, N = 64)} = 22.828, p < .001$);**
- b) more “I don’t know” responses, for both red wine ($\chi^2_{(1, N = 64)} = 5.630, p = .017$) and white wine ($\chi^2_{(1, N = 64)} = 4.005, p = .045$).**

Females: negation more frequently, only in the case of red wine ($\chi^2_{(1, N = 64)} = 19.282, p < .001$).

Age differences:

Younger adults (20-40):

- a) greater number of different opposites for both red wine ($\chi^2_{(1, N = 64)} = 6.334, p < .011$) and white wine ($\chi^2_{(1, N = 64)} = 15.908, p < .001$);**
- b) negation more frequently, both for red wine ($\chi^2_{(1, N = 64)} = 36.809, p < .001$) and for white wine ($\chi^2_{(1, N = 64)} = 18.844, p < .001$).**

Older adults (40-60): more frequently with “I don’t know” both for red wine ($\chi^2_{(1, N = 64)} = 35.474, p < .001$) and white wine ($\chi^2_{(1, N = 64)} = 33.882, p < .001$).

Conclusions

- a) **Non-experts** are generally able to **think** of the property suggested in **terms of an oppositional dimension**;
- b) The **risk of ambiguity** associated with these terms is **very high**, due to the fact that non-experts often interpret the terms in relation to different dimensions, and to differences between the males and females and between the age groups;
- c) The **target properties** generally **evoke similar dimensions** when applied to either red or white wines, but some **thought provoking discrepancies** emerged, e.g.:
 - Target property *PIATTO* (*FLAT*): the difference found between the various opposites chosen may be due to the distinction (only in the case of white wine) between still and sparkling wines;
 - Target property *FRANCO* (*FRANK*): while for white wine, this property was taken to refer to the “frankness” or sincerity of the wine, for red wine it appeared to be more linked to simplicity since the most frequent opposite was *COMPLESSO* (*COMPLEX*) followed by “I don’t know”.



THANK YOU FOR YOUR ATTENTION

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