Bursting the Bubble: Understanding Australian Consumer Preferences for Sparkling Wine Styles

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Table of Contents

Thesis Summary

This research investigated Australian consumers' preferences for Australian sparkling wine styles. Firstly, focus group thematic analysis examines consumer opinions concerning different sparkling wine styles, in addition to discussion about the importance of country of origin, occasion, price, and sensory attributes as purchase drivers (Chapter 2). Findings suggest producers could benefit from marketing a range of sparkling wines to cater to different tastes, occasions and gift purchases. Results also confirm the importance of marketers pursuing opportunities to obtain and promote favourable expert reviews for their sparkling wines, and of identifying and promoting regional distinctiveness.

Chapters 3 and 4 investigate the influence of wine involvement and knowledge, on consumer preferences for Australian sparkling white (made via carbonation, Charmat, transfer and Méthode Traditionelle), sparkling rosé, sparkling red, Moscato and Prosecco compared to French Champagne. Consumers were segmented into three distinct clusters ('No Frills', 'Aspirants' and 'Enthusiasts') using the Fine Wine Instrument (FWI). Chapter 3 found that the majority of No Frills consumers were female and typically consumed sparkling wine once per month. Almost 55% of Aspirants were male with a household income of more than AU$75,000. Enthusiast consumers were also predominantly male and well educated, and 64% were under the age of 35 years. Sparkling white wine and Champagne were generally the preferred styles for each consumer group, followed by Moscato and sparkling rosé wine. Interestingly, Moscato scored favourably with both No Frills and Enthusiast segments. Almost 25% of respondents indicated they were not familiar with Prosecco, while sparkling red wine was perceived similarly by male and female consumers.

Furthermore, Chapter 4 provides a detailed examination of the results from descriptive analysis of representative wine samples using a trained panel; an online survey where participants were segmented into FWI clusters; and blind wine tasting preference testing. Consumer perceptions, preferences and liking were measured using 9-point hedonic scales and compared via statistical analysis. Consumers anticipated liking Champagne and sparkling white wine the most, and Moscato and Prosecco the least, but on tasting, could only readily identify the Moscato and sparkling red wines, i.e. the most contrasting wine styles. As such, liking scores for the Champagne and sparkling white wine were significantly lower based on tasting scores (median scores were 6.0, compared with 9.0 and 8.0 for survey responses, respectively). These results

suggest consumers' pre-conceived expectations of different sparkling wine styles clearly influence their purchasing and consumption behaviour. Aspirants and Enthusiasts were more likely to pay a higher price per bottle for Champagne and sparkling white wine than other sparkling wine styles, and consumption of these sparkling wines was most frequently associated with celebratory occasions such as anniversaries, birthdays, Christmas, New Year and weddings.

This insight will be used to identify and evaluate sparkling wine styles and/or marketing strategies which might influence consumers' purchasing decisions in favour of Australian sparkling wine. This will in turn, enable the Australian wine industry to capture a greater proportion of sparkling wine sales within existing and emerging markets internationally, thereby delivering economic benefits to sparkling wine producers.

Thesis Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree. I acknowledge that copyright of published works contained within this thesis resides with the copyright holder(s) of those works.

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Date *02/03/2021*

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Chapter 1 Literature Review and Research Objectives

1.1 Literature Review

The scope of this literature review comprises academic scholarship examining Champagne and sparkling wine history, production, regulation, composition, as well as consumer markets, behaviour and preferences. While considerable research has been undertaken on the composition of sparkling wines, the impact of style on consumer choices has yet to be explored in detail. Instead, a substantial amount of consumer research concerns the influence of age, gender, label design, the country of origin effect, price, taste, and occasion on preferences for still (or table) wines.

1.1.1 Australia and Sparkling Wine

The strength of the Australian sparkling wine industry when compared to the Champagne houses is of major importance to the national wine sector. Australia is amongst the top ten producers of sparkling wine (by volume) in the world, producing ~7 million cases/annum, and almost half of Australia's adult population (i.e., ~9 million consumers) regularly enjoy this fine wine style (Wine Australia 2019). Sparkling white wine accounts for the 'lion's share' of Australian sparkling wine production, but sparkling rosé, sparkling red, and increasingly Prosecco and Moscato are also produced in Australia. In fact, even in light of the Coronavirus pandemic of 2020, sparkling wine economic figures indicate positive growth during the March and September quarters (albeit at a slower rate than imported sparkling wine) (Wine Australia 2020b). Over recent years, domestic sparkling wine sales have remained relatively constant in Australia, whereas the volume and value of sparkling wine being imported (predominantly Champagne) has grown, and exports have declined (Wine Australia 2019). Nevertheless, the IRI MarketEdge report of 2018–19 (pre-pandemic), stated that the volume of sparkling wine sales increased by 0.8% in domestic off-trade markets (Wine Australia 2019). Additionally, Australian product sales accounted for 81% of the sparkling wine market and sales grew by 0.6%. This is in contrast to sales of imported sparkling wine which increased by 1.6% over the same time period (Wine Australia 2019).

Even though Australian winemakers produce sparkling wines which now rival those from Champagne houses (Culbert et al. 2015), it is possible that businesses have not capitalised on

consumer demand. The tradition, heritage and prestige associated with the Champagne brand infer superior product quality and reliability, whereas premium Australian sparkling wine brands are comparatively unknown and may therefore represent a purchase risk (Culbert et al. 2016).

1.1.2 History of Sparkling Wine

The wine industry in the French region of Champagne began in the third and fifth centuries as an extension of the vines planted during the Roman occupation of southern France (Sharp & Smith 1993b). Following this, the Catholic Church expanded vineyards in Champagne with the intention of producing communion wines for their congregations and table wines for the community (Faith 1988). Nevertheless, it was not until the mid-seventeenth century that sparkling wines were produced. Most famously, Dom Perignon and members of other religious orders in abbeys and vineyards played a major role in developing processes for the deliberate production of sparkling wines (Faith 1988).

The first Champagne houses were founded in 1729 and technical developments continued until the 19th century; many of these improvements are still being practiced throughout the world today, including in Australia (Sharp & Smith 1993b). In fact, documentation shows that numerous Champagne house styles have dramatically changed over the 19th and 20th centuries (from sweeter to drier wines), to meet changing consumer demands (Harding 2021). Australian sparkling wine production has been, and still is, heavily influenced by French winemaking expertise, as a point of reference for industry and consumers alike (Sexton 2011). Indeed, this segment of the Australian industry owes both its development and existence to French practices, particularly in the renowned Great Western region (Sexton 2011). In 1863, Jean Pierre Trouette and Emile Blampied produced the first Australian *Méthode Champenoise* wine at St Peter's winery in Victoria (*Australian Wine - Uncorked! A history of wine on film* 2001). Subsequently, in 1881 the first of the now iconic sparkling red wines was pioneered by French winemaker August D'Argent for the Victorian Champagne Company (Dunstan 1994). Although sparkling red wines are often regarded as distinctively Australian, Cohen, Lockshin and Sharp (2012) indicated that sparkling white wines have a higher likelihood of success and frequent purchase (classified as excess loyalty). Nonetheless, 'change of pace' tendencies were observed with regard to sparkling red wine (Cohen, Lockshin & Sharp 2012).

1.1.3 Production Methods of Sparkling Wine

Sparkling wine production begins with primary fermentation to produce a base white, rosé or red wine of desired characteristics, which then undergoes blending and cold-stabilisation (Ribéreau-Gayon 2000). Usually, the base wines are pale in colour, impart neutral or fruity aromas, have low residual sugar concentrations and moderate alcohol levels (Torresi, Frangipane & Anelli 2011). These wines then undergo secondary fermentation during which carbon dioxide (*perlage*) and some additional alcohol are produced in a sealed vessel. Following secondary fermentation, the solids, e.g. dead yeast cells, are removed prior to the adjustment of final parameters such as sugar, alcohol and sulphur dioxide levels (Howell 2008).

There are four main production practices followed in Australia: the traditional method (*Méthode Traditionelle*); the transfer method; the bulk method (*Méthode Charmat*); and carbonation; each requiring different levels of winemaking intervention, and imparting a diverse range of sensory characteristics, which determine the final price point in the marketplace (Howell 2008). *Méthode Traditionelle*, otherwise known as *Méthode Champenoise* if undertaken in the French wine region of Champagne, involves secondary fermentation in the bottle (Ribéreau-Gayon 2000). Once the *liqueur de tirage* (the solution added at bottling to induce the second fermentation, composed of wine, yeast and sugar) have been added to the *cuvée* (the wine blend, but in Champagne it also means the first 2,050 litres of juice from a 4,000 kg press), the wine is fermented. It then undergoes: *remuage* (the turning and tilting of bottles in an upright rack, to collect the sediment at the neck of the bottle); *disgorgement* (the removal of the yeast sediments after fermentation and ageing in bottle); *dosage* (the addition of sugar to Champagne after disgorgement); and corking, all in the same bottle in which it is eventually purchased by the consumer (Jackson 2008). At the various production stages of bottle-fermented sparkling wine, oenological factors that affect aroma, flavour, and foam characteristics have been investigated (Kemp et al. 2015).

The transfer method offers the advantages of secondary fermentation in bottle, but involves filtration from a pressurised vat before re-bottling for market (Ribéreau-Gayon 2000). In contrast, wines produced via the bulk method undergo secondary fermentation in pressurised vats, after which they are filtered and the dosage is added. The final blend is then bottled under pressure before sale (Ribéreau-Gayon 2000). Finally, carbonated wines are produced by directly injecting food grade carbon dioxide into the base wine prior to bottling. This method is the least expensive and produces wines that are generally considered to be of lesser quality

(Dunbar 1982). Post-production, research has shown that bottle storage conditions significantly impact the quality of sparkling alcoholic beverages (Benucci 2020; Pearce et al. 2016).

1.1.4 Regulation and Sparkling Wine

The governments of Old World wine producing countries have implemented regulations to protect regional names (appellations), winemaking practices and registered trademarks, including semi-generic wine names such as Champagne (Campbell & Guibert 2006). The region of Champagne is an *Appellation d'Origine Contrôlée* regulated by the *Institut National de l'Origine et de la Qualité*. The term Champagne encompasses the chalky soil and cool climate of the region and berries with naturally high acid levels; a characteristic suited to sparkling wine (Garrison et al. 2008). The regulations specify that only seven grape varieties are permitted for use in Champagne production including Arbanne, Chardonnay, Petit Meslier, Pinot Blanc, Pinot Gris, Pinot Meunier, and Pinot Noir (Institut National de l'Origine et de la Qualité 2010). However, Champagnes are typically made with Chardonnay (white), Pinot Noir and Pinot Meunier (red) grapes which are fermented without skin contact. Wines designated as *blanc de blanc* are produced solely from Chardonnay grapes, whereas *blanc de noir* wines are made from Pinot Noir, Pinot Meunier or a combination of both varieties (Institut National de l'Origine et de la Qualité 2010).

In Australia, the Food Standards Code, predominantly Standard 4.5.1.(1), defines sparkling wine as ‘a product consisting of wine that by complete or partial fermentation of contained sugars, has become surcharged with carbon dioxide’. The wine must contain no less than 45 mL/L of ethanol and no less than 5 g/L of carbon dioxide at 20°C. The product may also contain grape spirit, brandy and sugars, but their addition must not increase the ethanol content by more than 25 mL/L at 20°C (Australian New Zealand Food Safety Authority 2004). Domestic regulations do not specify which grape varieties comprise Australian sparkling wines, however, Chardonnay, Pinot Noir and Pinot Meunier are most common. Other grapes include Semillon, Chenin Blanc, Riesling, Crouchen, Trebbiano and Muscat Gordo Blanco for sparkling white wine production, and Shiraz and Merlot are commonly used for medium to full-bodied sparkling red wines (Wine Australia 2020a).

1.1.5 Composition of Sparkling Wine

The physical, microbial, chemical and biochemical aspects of sparkling wine production have been studied to improve winemaking technology, reduce production costs and enhance wine quality (Torresi, Frangipane & Anelli 2011). Despite the volume of sparkling wine produced being considerably lower than for still wine, improvements to technologies and methodologies have high economic significance because of the inherent value of the style (Torresi, Frangipane & Anelli 2011). To date, a substantial proportion of academic research has focussed on the chemical and biochemical composition of sparkling wines during and after secondary fermentation, as well as yeast strain selection, foaming qualities and the effects of ageing on lees.

Enzymatic preparations are often used during sparkling wine production to increase juice yield, enhance must clarity and solubilise yeast compounds (Alexandre & Guilloux-Benatier 2006; González-Lázaro et al. 2020; Klis et al. 2002; Leroy et al. 1990; Martínez-Rodríguez & Pueyo 2009; Nunez et al. 2005; Torresi et al. 2014). Yeast strain selection has significant consequences on wine quality (Alexandre 2019; Di Gianvito et al. 2019; Garofalo et al. 2016; Ma et al. 2018; Onguta 2017; Velázquez et al. 2016), with S*accharomyces cerevisae* and other yeast species imparting different sensory characteristics (Coloretti, Zambonelli & Tini 2006; Ivit & Kemp 2018; Martínez-Rodríguez, Polo & Carrascosa 2001; Nicolini et al. 2013, 2015; Schmitt et al. 2019). In particular, native species (Vigentini et al. 2017), as well as commercial yeast varieties (Borrull, Poblet & Rozes 2015; Pérez-Magariño et al. 2015; Rodriguez-Nogales, Fernández-Fernández & Vila-Crespo 2012; Torrens et al. 2008) have been investigated. In conjunction with these microbiology focussed studies, research has also examined correlations with wine composition, including the influence of grape variety, base wine treatments, yeast strain selection and the occurrence of *Botrytis cinerea* infection (Abdallah et al. 2010; Cilindre et al. 2007, 2010; Coelho et al. 2011; Gallart et al. 2004; García et al. 2009; Marchal. et al. 2001, 2002; Martínez-Lapuente et al. 2013; Moreno-Arribas et al. 2000; Scollary 2013; Senée, Robillard & Vignes-Adler 1999, 2001; Senée et al. 1998; Vanrell et al. 2007; Vincenzi, Crapisi & Curioni 2014).

Méthode Traditionelle wines are of particular interest in the academic literature, especially where bottle fermentations using micro-encapsulated yeast have resulted in sensory properties similar to using free yeasts (Benucci et al. 2019; Benucci & Esti 2020). Generally, the yeast used for secondary fermentation must also have a high flocculation capacity to enable the lees to be readily eliminated from the bottle, thus numerous studies have examined this attribute

during disgorgement (Bayly et al. 2005; Bester, Pretorius & Bauer 2006; Perpetuini et al. 2016; Suzzi, Romano & Zambonelli 1984; Tofalo et al. 2016). Furthermore, the use of immobilised yeasts has simplified the disgorgement process (Borislav et al. 2017; Diviès et al. 1994; Efremenko et al. 2006; Kourkoutas et al. 2005; Martynenko et al. 2004; Tataridis et al. 2005; Yokotsuka, Yajima & Matsudo 1997).

Research indicates that nitrogen-containing compounds released during ageing on lees can be precursors for photolytic activity (Fornairon-Bonnefond et al. 2001; Martínez-Rodríguez & Pueyo 2009). Autolysis modifies the proteaceous composition of a wine by releasing peptides and amino acids (Pozo-Bayón et al. 2009) which can contribute to the body of a wine, thereby improving foam stability and binding volatile compounds (García et al. 2009; Pérez-Magariño et al. 2014; Pozo-Bayón et al. 2009). The influence of autolysis on the sensory characteristics of finished wine have been extensively studied by Adolfo Martínez-Rodríguez and colleagues (Martínez-Rodríguez et al. 2001; Martínez-Rodríguez, Carrascosa & Polo 2001; Martínez-Rodríguez, Polo & Carrascosa 2001), while other research has explored how to improve and accelerate the process (Cebollero, Carrascosa & Gonzalez 2005; Cebollero & Gonzalez 2006, 2007; Giovani & Rosi 2007; Gonzalez, Martínez-Rodríguez & Carrascosa 2003; Tabera, Muñoz & Gonzalez 2006; Todd, Fleet & Henschke 2000). However, variation in autolysis conditions, in particular the use of fresh yeast or active dry yeast, temperature, pH and the use of a model wine system or real wine, have afforded inconsistent and even contradictory results (Alexandre & Guilloux-Benatier 2006).

Sugars derived from either grapes or yeast can also affect the composition of sparkling wine; however mannose is considered to be the main sugar broken down during ageing and autolysis (Martínez-Rodríguez & Polo 2000). It is clear that the concentrations of simple sugars and mannoproteins are dependent upon press fractionation, yeast strain, cell preparation, temperature and the duration of ageing (Caridi 2006; Guilloux-Benatier & Chassagne 2003; Jégou et al. 2017), but studies are not in agreement regarding the changes in concentration of volatile compounds, including ethyl esters and acetates during ageing (Loyaux, Roger & Adda 1981; Pozo-Bayón et al. 2003; Ubeda et al. 2019). Nevertheless, it has been concluded that ageing on lees significantly alters the aroma profile of sparkling wines (Pozo-Bayón et al. 2009). Phenolic compounds also contribute to the mouthfeel of wine; the concentration of hydroxybenzoic acids, hydroxycinnamic acids, flavonoids, phenolic alcohols, and phenolic aldehydes present in Chardonnay and Pinot Noir base wines were found to vary depending upon the vintage (Chamkha et al. 2003). Moreover, analysis of Chardonnay, Pinot Noir and

Pinot Meunier berries identified proanthocyanidins as the major phenolic compounds present, accounting for 60-93% of total phenolics, irrespective of variety, with the highest concentration found in Pinot Meunier and the lowest in Chardonnay (Mané et al. 2007).

Champagne and sparkling wine foam is a developing area of research of international interest (Martínez-Lapuente et al. 2015; Medina-Trujillo et al. 2017; Scollary 2020). In particular, production method, yeast strain, sucrose additions, fermentation temperature, fining additions, protein and amino acid content, as well as phenolic composition play significant roles in foam quality (Condé et al. 2017a; Condé et al. 2017c; Crumpton et al. 2018; Culbert et al. 2017a; Esteruelas et al. 2015; González-Lázaro et al. 2019; Martínez-Rodríguez et al. 2001; Pegg et al. 2021). Consequently, emerging technologies (including robotics) for measuring sparkling wine foam characteristics have been developed (Condé et al. 2019; Condé et al. 2017b; Lima et al. 2016) and employed alongside studies investigating consumer perceptions of carbonated drinks (Gonzalez Viejo et al. 2019).

The physio-chemical aspects of effervescence have also been studied using instantaneous high-speed photography (Liger-Belair 2005, 2012). Advancements in assessing carbon dioxide (CO_2) bubbles in sparkling wine are well documented (Liger-Belair 2014, 2017; Liger-Belair, Polidori & Jeandet 2008; Liger-Belair & Séon 2017; Séon & Liger-Belair 2017), and include the study of CO_2 in the glass headspace, CO_2 diffusion, CO_2 flow patterns, and dissolved CO_2 losses (Beaumont, Liger-Belair & Polidori 2020; Liger-Belair et al. 2018; Liger-Belair 2016; Moriaux et al. 2020; Moriaux et al. 2018; Parvitte et al. 2019; Perret et al. 2014; Vallon et al. 2020). Liger-Belair, Polidori and Jeandet (2008) described the processes behind the nucleation, rise and burst of gaseous bubbles, and proposed that foaming acts as a paternoster lift for aroma compounds (Polidori, Jeandet & Liger-Belair 2009).

These publications highlight the wealth of research examining the chemical and physical composition of sparkling wines internationally, and complement consumer preference studies in the field of wine business.

1.1.6 Sparkling Wine Markets

Rokka (2017) discussed the transformation of the Champagne image from a practically insignificant no-brand wine label in the 15th century, to an expression of modernity and icon for the global leisure, class and celebration. Today, attributes of authenticity that resonate with sparkling wine consumers include heritage and pedigree, stylistic consistency, quality

commitments, relationship to place, method of production, and downplaying commercial motives (Beverland 2006). Undeniably, this unique market positioning is dissimilar to other wine segments, because it has been reported that volume does not always meet consumer demand (Garrison et al. 2008). Interestingly, when Champagne producers were interviewed about their market orientation, many responses revealed that they primarily concentrated resources on their land, rendering sales a distinctly secondary activity (Charters & Menival 2009). Nevertheless, it is clear that Australia may learn and benefit from the French experience, particularly when targeting emerging markets.

Champagne brand managers consider authenticity to lie in both the product attributes (appellation, *savoir faire*, a unique style, quality and consistency, as well as honesty and transparency) and the brand image (heritage and myth, including the founder, restraint and brand promotional integrity) (Muraz & Charters 2011). Overall, academic commentary suggests that the Champenoise have marketed their product via clear positioning of a high quality, premium product. They are committed to excellence through strict production control (which is supported by their industry body), have signalled and communicated a clear message of quality and consistency, and have even defended their brand through legal protection (Haeck, Meloni & Swinnen 2019; Jay & Taylor 2013; Salolainen 1993; Sharp & Smith 1993a). As indicated by Charters, Mitchell and Menival (2011), it may be difficult for countries like Australia to develop strong territorial brands outside Europe, because of cultural and legislative constraints. When possible, it has been argued that territorial brands may benefit from maintaining open communication with competitors and creating collective trademarks in order to increase their value (Charters & Spielmann 2014). These brands, such as Champagne, often sustain competitive advantage because there is an institutional organisation that manages the collective process (Kunc, Menival & Charters 2019). Studies have demonstrated that these aesthetic institutional goals shape markets which results in commercial and/or trade implications (Ody-Brasier & Vermeulen 2014; Smith Maguire & Charters 2021).

Champagne houses have successfully projected their image of prestige and exclusivity (Morton et al. 2013), and consumer preferences may be dependent upon these luxury perceptions, in addition to occasion, price, taste, product presentation, brand image and country of origin (Morton, Rivers & Healy 2004). Maguire and Charters (2011) found that large-scale Champagne producers placed greater emphasis on regional-level geographic terroir and brand-level cultural terroir; whereas smaller producers often emphasised highly-localised and personalised land as well as cultural-based notions of terroir. It has also been suggested that

wine businesses managing creative brands, which are often purchased by high-involvement consumers, need to place less emphasis on consistency and focus on overall quality (Charters 2009b).

The feelings of luxury and gracious living associated with Champagne (Coates 2000), are closely linked to perceptions of prestige (Silverstein & Fiske 2003). However, the question of what constitutes a luxury offering depends upon the people involved, as well as the situational context (Reyneke et al. 2011). Compared to medium-involvement consumers, a study by Charters (2009a) found high-involvement consumers, who possess knowledge of production processes and concepts such as terroir, were less likely to assume that Champagne is better. Few consumers base their visual perspective of Champagne on advertising, but low involvement consumers, with less interest in the technicalities of production, seemed to be more at ease with traditional images of the product (Charters 2009a). Generally, advertising is given more consideration when consuming wine at impersonal occasions, whereas less conspicuous indicators (e.g., personal recommendations) are deemed more important for intimate consumption experiences (Dobele, Greenacre & Fry 2018). Although the Champagne market has been studied extensively internationally, the Australian sparkling wine context is yet to be addressed comprehensively in the academic literature.

1.1.7 Behaviour of Sparkling Wine Consumers

When summarising the key findings from wine consumer behaviour research, Lockshin and Corsi (2012) highlighted the importance of researching premium and luxury wine behaviour, successful marketing practices, and consumer behaviour in emerging markets. This included the value of wine tourism and marketing for value, as well as the relationship between grape and wine quality, and consumer behaviour (Lockshin & Corsi 2012). New World wine consumers have a tendency to focus on the general impression of the image, and on the enjoyment and fun associated with drinking Champagne and sparkling wine (Velikova et al. 2016). Indeed, sparkling wine consumers often value a sense of belonging when considering their drinking behaviour (Charters & Pettigrew 2008). Judica and Perkins (1992) suggested that self-esteem, family life and accomplishments were also important factors.

Sparkling wine consumption has been found to be higher among expert respondents (Johnson & Bruwer 2007) and consumers of sparkling wine who have the greatest relative awareness of the shared appellations (Atkin & Newton 2012). Expertise, specifically greater knowledge of

wine, is strongly associated with higher consumption patterns and often predicts a higher liking of sparkling wine (Pickering, Jain & Bezawada 2014). Moreover, consumers' understanding of wine quality is a multi-dimensional construct (Charters & Pettigrew 2007), that is substantially dependent on their level of involvement (Charters & Pettigrew 2006). Research indicates that more highly involved consumers are inclined to conceptualise wine quality more objectively (i.e., using cognitive dimensions), whereas less involved consumers assess quality subjectively (i.e., in sensory dimensions) (Charters & Pettigrew 2006). When considering cooler climate wines, including sparkling styles, the sensory dimensions which influence perceived quality include the natural sugar content at harvest, grape variety, soil and growers' experience (Smith & Bentzen 2011).

A qualitative study suggested that motivations to consume sparkling wine are complex, but include its celebratory symbolic function, as well as perceptions of experiential consumption (Charters 2005). Research by Veale and Quester (2009) found that price and country of origin were both found to be more important contributors to perception of wine quality than taste. Furthermore, consumers' reliance on extrinsic cues remains extremely robust even when a sensory experience was available (Veale & Quester 2008). Interestingly, Croatian consumers consider the intrinsic characteristics of sparkling wine to be most important (i.e., sensory properties and quality), whereas wine appearance, expert reviews and wine awards were deemed to be less significant (Cerjak et al. 2016).

Different methods of production strongly influence sparkling wine sensory profiles, and previous research involving segmentation of consumers based on their hedonic liking of different wines identified distinct consumer clusters (Culbert et al. 2017b). Results showed that consumer acceptance appeared to be unrelated to wine quality or production method, such that an inexpensive Charmat wine received higher scores than considerably more expensive Méthode Traditionelle wines (Culbert et al 2017b). Recent studies in Italy and Canada have investigated how knowledge of production methods (an extrinsic cue) can influence consumer expectations and/or perceptions of sparkling wines (Hayward, Barton & McSweeney 2020; Vecchio et al. 2019). These works provide interesting results regarding liking expectations and unchanged sensory perceptions when a production method is disclosed (Hayward, Barton & McSweeney 2020; Vecchio et al. 2019). The absence of detailed Australian consumer research analysing the influence of involvement, including sparkling wine production method knowledge, is clear. Therefore, addressing this knowledge gap will assist domestic wine producers by informing them of consumer consumption and/or purchase motivations.

1.1.8 Segmentation of Sparkling Wine Consumers

Using market segmentation and a holistic approach to consumer behaviour, a deeper understanding of consumer characteristics, habits, needs and expectations can be gained (Riviezzo, Nisco & Garofano 2011). Generally, consumer categories are often classified by motivations and characteristics; and in a study carried out in Ireland by Keown and Casey (1995), wine consumers were classified as either (i) connoisseurs, (ii) aspirational drinkers, (iii) beverage wine consumers or (iv) new wine drinkers. As highlighted by Morton, Rivers and Healy (2004) and supported by Beverland (2006), the main consumers of sparkling wine are likely to be connoisseurs and aspirational drinkers. Since sparkling wine consumers have not been categorised in peer-reviewed literature, adaptations to wine consumer segmentation models were proposed by Morton, Rivers and Healy (2004).

A subsequent study by Müller (2006) distinguished six sparkling wine consumer groups, namely, the undemanding, the brand conscious, the ambitious, the region of origin conscious, the vine variety conscious and the experts. The study indicated that experts, the vine variety conscious and to a lesser extent the ambitious, perceived the country of origin of the sparkling base wine to be important to their purchase decision making process and their willingness to pay (Müller 2006). Since reputation governs the preference order of all consumers, each purchaser will choose the product with the highest reputation they can afford (Terrien & Steichen 2005). It has been observed that individuals with higher internal values and more complex social identities were less susceptible to normative influence and placed less emphasis on social brand benefits (Orth & Kahle 2008). Moreover, the most expensive and heavily advertised products were not automatically those preferred by regular wine consumers (Vignes & Gergaud 2007).

Wine involvement is also considered to play an important role in determining consumer preferences and behaviour. The Fine Wine Instrument (FWI) is a statistical tool developed to segment consumers based on wine connoisseur, knowledge and provenance variables (Johnson & Bastian 2015). The FWI classifies consumers as ‘No Frills’, ‘Aspirants’ and ‘Enthusiasts’ and is an appropriate model for segmenting sparkling wine consumers, given sparkling wines are often advertised as luxurious products (Beverland 2006). As consumers are exposed to an increasing amount of information, traditional mass-media channels, word-of-mouth and promotion strategies may stress wine consumers (Casini, Cavicchi & Corsi, 2008). However, insights from a survey conducted by Parsons and Thompson (2009) suggest that specialist wine retailer customers value personalised service, staff, and award-based recommendations,

whereas supermarket shoppers value awards and bestseller recommendations. Brunner and Siegrist (2011) outlined five determinants which significantly influence both consumption and spending: knowledge, bargain, recreation, age and intellectual challenge; all of which are trade-offs, except knowledge. It was found that consumers who pay more attention to bargains, typically drink more wine, but pay less for it; consumers who tend to drink to make themselves feel comfortable, also consume more at a lower price per bottle. Older respondents tend to consume more, but spend less on wine; and finally, consumers who drink wine for an intellectual challenge consume less and spend more (Brunner & Siegrist 2011). To further understand the behaviour of sparkling wine consumers, categorisation and analysis of consumer preferences for this fine wine style would assist wine businesses in developing strategies to target specific sections of the Australian domestic market.

1.1.9 Age of Sparkling Wine Consumers

Frequency of wine consumption appears to increase with involvement, with people rating highly in hedonic orientation consuming more than low rating individuals (Neeley, Min & Kennett-Hensel 2010). In contrast to beer and spirits, a pilot study revealed that wine consumption increases linearly over people's lives (Melo et al. 2010). An examination into how Millennials, Generation X, baby boomers, and traditionalists were first introduced to wine, their current consumption preferences, and their attitudes towards wine and its image was undertaken by Olsen, Thach and Nowak (2006). All four cohorts enjoyed red wine, dry white wine and Champagne, drank wine regularly with meals either at home or in restaurants, and associated wine with relaxation (Olsen, Thach & Nowak 2006). Another study by the same authors found that Millennial drinkers had an additional preference for sweet white wines, such as Rieslings and Gewurztraminer (Olsen, Thach & Nowak 2007), which may include Moscato, when considering sparkling wines. Both Generation X and Millennials perceived the image of a sparkling wine to be a sensual and sophisticated drink (Olsen, Thach & Nowak 2006).

Although taste may be considered a primary choice and driving factor in wine consumption behaviour, the results of a study by MacDonald, Saliba and Bruwer (2013) failed to support the empirical literature's predications relating to generational cohorts. An earlier study by Hall (1993) did not confirm the segmentation of drinkers newly introduced to wine as defined by Spawton (1993). Rather, this cohort appeared to be based more around mere enjoyment of wine rather than inexperience (Hall 1993). Extensive research has been published concerning

Generation Y consumers' attitudes towards, and preferences for, Champagne and sparkling wine (Charters et al. 2011; Fountain & Lamb 2011; Chrysochou et al. 2012; Qenani-Petrela, Wolfe & Zuckerman 2007; Thach 2011). Charters et al. (2011) found that this group perceived sparkling wine to be a distinct category from still wine, and placed an emphasis on it as a social drink and one that promoted celebration and sharing. This supports findings from a similar study by Thach (2011) which suggested Generation Y viewed wine as a beverage for formal occasions, such as a special anniversary, wedding, or celebration. They see sparkling wine as a beverage to enhance social occasions, such as a meal with friends/family, or as a drink to socialise without a meal (Thach 2011). Another study by Fountain and Lamb (2011) found that sparkling wine was preferred for everyday drinking by 8.9% of Generation Y respondents, but not the Generation X cohort. However, the results of this study also revealed that 17.3% of Generation X participants selected this style of wine alone, or in combination with others on special occasions, more often than Generation Y (7.2%) (Fountain & Lamb 2011).

Across Anglophone countries, there is similarity amongst Generation Y consumers' wine consumption behaviour, including a perception that sparkling wine is a 'women's drink' and that Generation Y consumers will 'grow into' drinking sparkling wine (Charters et al. 2011). In contrast, older, affluent and well-educated consumers' purchasing decisions are more likely to be influenced by country of origin (Schaefer 1997). According to Qenani-Petrela, Wolfe and Zuckerman (2007), Generation Y purchases mostly red wine, but Chrysochou et al. (2012) found they also have the highest consumption of sparkling wine. When considering young Australasian's wine drinking patterns, sparkling wine is connected with notions of celebration, socialisation and happiness (Fountain & Fish 2010). Interestingly, cheap, sweet sparkling wine has played a role in some segments of New Zealand's binge drinking youth culture (an introduction that was not acknowledged by their Australian counterparts), which may mean that they move away from this style with age (Fountain & Fish 2010). Within the framework of Australian wine consumer segments, it would be interesting to consider the influence of age on consumer involvement and consequent preferences for sparkling wine styles.

1.1.10 Gender of Sparkling Wine Consumers

Gender is also thought to influence the frequency of sparkling wine consumption. Whereas Lerro and colleagues (2019) reported similar rates of sparkling wine consumption by men and women in the US, other studies suggest the volume (Bruwer, Saliba & Miller 2011) and

type/style (Barber, Almanza & Donovan 2006; Forbes 2012) of wine consumed, as well as occasions at which wine is consumed (Thach 2012) are all influenced by gender. Research by Atkin, Nowak and Garcia (2007) suggests that when consumers are unsure about making a wine selection, women are more likely to seek information from store personnel, a server, sommelier, or winery personnel, than men. In addition, wine labels, awards and shelf tags are significantly more important for women, whereas wine region is considered important to both genders (Atkin, Nowak & Garcia 2007). Likewise, gender has been found not to have any impact on the magnitude of country of origin effects (Schaefer 1997).

Female consumers typically drink less wine, spend less on wine overall, but tend to purchase higher priced wine per bottle, particularly white wine (Bruwer, Saliba & Miller 2011). Although it was noted that young women prefer sweeter wine styles, fruit driven styles remain popular throughout their lives (Bruwer, Saliba & Miller 2011). When both male and female consumers were segmented into high, medium and low levels of expertise, low expertise females were found to consume more sparkling wine than other consumer segments, except medium expertise females (i.e. the consumption of low and medium expertise females was not statistically different) (Johnson & Bastian 2007). Another study showed that white, sparkling and dessert wines represented a much higher proportion of female consumers' wine consumption than for males, with women consuming twice as much sparkling wine than men (Bruwer & McCutcheon 2017).

Specific to sparkling wine, it is clear that femininity plays a role in advertising, as women are most often portrayed as consuming wine/sparkling wine when drinking (Atkinson, Kirton & Sumnall 2012). Photographs of celebrities attending events with luxurious drinks such as Champagne/sparkling wine are a common feature in female-targeted publications (Atkinson, Kirton & Sumnall 2012). This supports findings by Ritchie et al. (2011) which indicate that quality sparkling wines/Champagne have a more serious image than still wines, which are rarely gendered. These studies indicate that gender plays a role in the marketing of sparkling wine in general, as well as the preferences of some consumer cohorts. However, it is unknown how gender affects consumers' preferences for different Australian sparkling wine styles and Champagne.

1.1.11 Nationalities of Sparkling Wine Consumers

The relative importance of purchase and consumption drivers can vary amongst wine consumers from different countries. Generally, Australian consumers have been found to enjoy light-bodied whites and sparkling wines or Champagne, which are more suited to the warmer Australian climate (Ristic et al. 2019). Furthermore, consumers from the United Kingdom value traditional advertising that focuses on the product itself, whereas Australian, New Zealand and US consumers tend to focus more on the image, enjoyment and fun associated with sparkling wine consumption (Velikova et al. 2016). Similarly, sparkling wine consumption in Croatia is often influenced by country or region of origin, brand, recommendations, price, occasion and symbolism; and is associated with specific celebrations (Cerjak et al. 2014, 2016). Consumer demand in the Russian sparkling wine market has also been explored (Kiselev et al. 2016), where preferences for styles of sparkling wine appear conservative (Kiselev et al. 2014). Nonetheless, sparkling wine products such as Champagne regularly interact with Russian drinkers' life stages and key emotional events (Kniazeva & Charters 2014).

Previous research from Germany showed that Prosecco was mostly bought by people who preferred white wines or who did not have any preference for red wine (Dal Bianco et al. 2018). An earlier Italian study examining the behaviour of Prosecco drinkers found that Controlled and Guaranteed Denomination of Origin (CGDO) consumers typically expressed a preference for CGDO products, and that they might be more loyal than Controlled Denomination of Origin (CDO) purchasers (Onofri, Boatto & Dal Bianco 2015). Italian consumers buying wine from supermarkets have been surveyed, and substantial differences were observed amongst preferences for brand, certification of origin, and production practices (e.g., sparkling vs. semi-sparkling) (Thiene et al. 2013). Furthermore, a model to derive a reasonable pattern of differences in willingness to pay for Prosecco between CDO and Typical Geographic Indication types has also been developed (Thiene et al. 2013). Generally, Italian Prosecco consumers display high consumer loyalty due to the appeal of the appellation and its upper-tier price point (Rossetto & Gastaldello 2018).

Familiarity with sparkling wine in Brazil has improved over recent years, as demonstrated by a 417% consumption increase between 2005 and 2017, mainly from Muscatel (Araujo, da Silva & Bruch 2019; Araujo et al. 2019). Sweeter wines are also produced in Australia, and individual liking scores have enabled the identification of two consumer clusters with opposing preferences for distinct styles of Moscato (Culbert et al. 2018). One cluster preferred Moscato

wines with prominent fruit, honey and confectionery characters, marked sweetness and viscosity/body, whereas the other liked wines that exhibited greater acidity, varietal aromas and less apparent sweetness (Culbert et al. 2018). Moscato wines, and those produced from innovative varieties (including Moscato Embrapa and Villenave) contain a high concentration of esters with distinct floral aromatic qualities (Caliari et al. 2014). Additional research has also confirmed that the production method of Moscato Giallo wines (traditional, Charmat or Asti) influences the volatile composition of these sparkling products (Caliari et al. 2015). Similar to age and gender, an understanding of the specific preferences of Australian regular sparkling wine consumers would provide guidance and direction for domestic production houses, particularly those who produce multiple styles.

1.1.12 Country of Origin and Sparkling Wines

Scientific advancements have developed a framework to identify relevant chemical components for classifying sparkling wine samples according to their country of origin (Yamashita et al. 2019). However, the country of origin effect also plays a role in how consumers perceive products made in a particular nation (Morton, Rivers & Healy 2004). The effect has been defined as an information cue that influences quality perceptions of a product (Bilkey & Nes 1982). Academic literature has explained this relationship via the 'halo model' and the 'summary construct model' (Morton, Rivers & Healy 2004). When applying the first model, it is hypothesised that consumers use perceptions about a country to make both conscious and subconscious evaluations of products (Nebenzahl, Jaffe & Lampert 1997), as they are unable to determine that quality prior to purchase (Han 1989). The 'summary construct model' suggests that consumers use generalised pre-existing perceptions about products from a particular country to assess the attributes of other commodities from the same country (Nebenzahl, Jaffe & Lampert 1997). National stereotypes and country of origin-based evaluations have been explored (Chattalas, Kramer & Takada 2008), and it is important to note the findings of a study by Leclerc, Schmitt and Dubé (1994) which concluded that the French pronunciation of a brand name may affect the perceived hedonic properties of products, as well as attitudes toward the brand.

It has been well documented that the country of origin has a strong effect on consumers' preferences, price perceptions (Guidry et al. 2009) and quality assessment (Stefani, Romano & Cavicchi 2006). Indeed, analysis has revealed that price and country of origin information were

stronger contributors to perceptions of wine quality than taste, irrespective of objective or subjective knowledge and self-confidence levels (Veale 2008). Younger Millennial consumers from the United States of America and Spain were compared by de Magistris et al. (2011), and while those from the United States of America attributed more weight to "I tasted the wine previously", Spanish millennials ascribed more importance to the "designation of origin".

It has been shown that the addition of regional information on a label increased consumer confidence in the quality of the product (Johnson & Bruwer 2007). However, it was also suggested by Remaud and Lockshin (2009) that wine regions should not think that a geographical name is sufficient to characterise, brand and promote the region. For consumers with greater expertise, label cues relating to the origin of the wine (Atkin & Johnson 2010), grape variety (Corduas, Cinquanta & Ievoli 2013) and the year of production should be very visible because this information can be considered place-based equity (Orth, Wolf & Dodd 2005). Nevertheless, it would be beneficial to understand how the country of origin effect influences the purchase and consumption decisions of Australian sparkling wine consumers, particularly when compared to the international quality benchmark, Champagne.

1.1.13 Packaging of Sparkling Wines

Information at retail outlets has a substantial effect on whether a wine will be selected for purchase (Lockshin, Mueller & Louviere 2010) and choice experiments are a powerful tool for marketing practitioners (Mueller & Lockshin 2008). When purchasing a wine, labels provide complex social, cultural and economic clues (Finkelstein & Quiazon 2007). However, it has also been suggested that many consumers misjudge product quality through erroneous interpretation of both intrinsic and extrinsic cues (Veale & Quester 2007). Grape variety/blend, vintage/year, region information, bottle colour, cellaring information, bottle shape and additional advice were identified as having high importance (Thomas & Pickering 2003). Mueller and Szolnoki (2010) found that label style and brand evaluation were the strongest drivers for informed liking of a wine, followed by liking under blind conditions. Moreover, strong preferences for selected colour-shape combinations in label design were found in a study involving Spanish wine consumers (de Mello & Pires Gonçalves 2008). Younger wine consumers were also heavily influenced by symbols and headlines (Jarvis, Mueller & Chiong 2010).

Complex Champagne packaging has been shown to have a significant impact on brand perception as well as on consumer's buying choices (Favier, Pantin-Sohier & Celhay 2017). A 2006 study found that front label colour, image, picture and logo were of more importance to females than males (Barber, Almanza & Donovan 2006). Female respondents also reported that the back labels were significantly more confusing, difficult to read and contained too much information (Barber, Almanza & Donovan 2006). For wines sold online, labels showing heraldic colours and low visual complexity lead to a stronger effect of authenticity on pleasure in comparison to labels with vivid colours and high visual complexity (Pelet, Durrieu & Lick 2020).

Wine back label information including winery history combined with a quality statement, elaborate taste descriptions and food pairing has generally been found to have a positive effect on consumer choice (Mueller et al. 2010). Elements of origin, endorsements and wine attributes were also found to influence purchasing behaviour (Thomas & Pickering 2003). These results confirmed a previous study by Jennings and Wood (1994) which determined that overall packaging, including bottle shape, plays an important role in wine promotion and consumption. Recently, Favier, Celhay and Pantin-Sohier (2019) found that simple Champagne package design is associated with modernity, reliability, authenticity, success and sobriety, whereas complexity is linked to seniority, joy, imagination, charm, femininity and sophistication. Since the UNESCO World Heritage listing of the Champagne region, the 'Hillsides, Houses and Cellars – World Heritage' designation/appellation is used to protect the wine region, as well as a promotion tool for tourism (Thuriot 2019).

Sparkling wine bottles have a distinctive size and heavyweight strength which evolved in France in order to support the pressures generated during secondary fermentation and the subsequent entrainment of carbon dioxide bubbles (Rutherford, Perkins & Spangenberg 2000). A field study conducted by Piqueras-Fiszman and Spence (2012) at an independent wine retailer, revealed that the weight of wine bottles containing red and white table wines correlated positively and significantly with the price of wines. Furthermore, a consumer trend was observed associating the weight of the bottle, the price of the wine, and its quality (Piqueras-Fiszman & Spence 2012). Similar to this study with Spanish wine consumers, the identification of sparkling wine preferences of different consumer segments will assist Australian producers to implement packaging design strategies that best suit the consumption context of their customer base.

1.1.14 Price of Sparkling Wines

Several studies have identified price as being an important consideration during wine purchasing decisions, and consumers often associate higher prices with superior quality (Chaney 2000; Gluckman 1990; Jover, Montes & Fuentes 2004; Keown & Casey 1995; Rao & Monroe 1989; Schamel & Anderson 2003; Skuras & Vakrou 2002; Spawton 1993). Between 1948 to 2013, the evolution of Champagne prices in New York has shown that that all income groups worked fewer hours for entry-level non-vintage bottles of Champagne, whereas the number of hours required to purchase flagship bottles has generally increased (Merton 2018). Currently, Generation X and baby boomers from the United States of America have been found to consume sparkling wine priced between $US15.00 and $US19.99 most frequently, while Millennials drink bottles ranging from $US10.00 to $US14.99 (Lerro et al. 2019).

Often, when deciding to purchase sparkling wine, consumers highly value intrinsic sensory characteristics in conjunction with the price:quality ratio (Cerjak et al. 2016). Six attributes have been found to be statistically important in explaining deviations from average wine prices, including quality, cellaring potential, grape variety/style, region, vintage and producer size (Oczkowski 1994). Indeed, purchasers cannot always be guided by past experiences, and therefore often rely on reviews which describe a wine's palate structure (Chaney 2000; Morton, Rivers & Healy 2004). In an E-environment, where consumers cannot taste products, evidence suggests that the time dimension of a sale should be included into hedonic price studies whenever the data allows for it (Fedoseeva 2020). Collective reputation, linked to designation of origin has been found to affect the price of sparkling wine most in Poland (Trestini, Stiletto & Stranieri 2020). Trestini, Stiletto and Stranieri (2020) found that the type of retailer also plays an important role, because supermarkets imply a price decrease, whereas specialised stores charge a premium.

In 2002, Lange et al. undertook one of the most prominent studies investigating the price estimation of Champagne. These researchers assessed the effects of sensory characteristics and external information on the overall evaluation of five non-vintage brut Champagnes via a 'Vickrey' auction and a hedonic test. Participants were unable to discriminate between the Champagnes during blind tastings, but significant differences were observed in preferences, which respected the hierarchy of the market when labels were provided (Lange et al. 2002). These findings were supported by another study by Combris, Lange and Issanchou (2006) which showed that participants were unable to assign values to Champagnes after blind tasting, but significant differences in reservation prices became clear when labels were disclosed.

Lecocq and Visser (2006) found that price differences could be explained by characteristics which were directly revealed to the consumer upon inspection of the bottle and its label (ranking, vintage and appellation), rather than sensory variables. Understanding how much regular sparkling wine consumers are willing to pay for different styles of Australian sparkling wine and/or Champagne would provide both small and large producers with valuable information and a competitive edge in the domestic retail space.

1.1.15 Occasions for Sparkling Wines

Consumers are usually willing to spend more on sparkling wine purchased for special occasions (Morton, Rivers & Healy 2004; Velikova et al. 2016), demonstrating the importance of situational context. The consumption of Champagne has been found to be linked to both brand-centric, transformative and intimate regimes, as well as regimes that are situational, banal and rule governed (Cowan & Spielmann 2017). Interestingly, one study revealed that Australian sparkling wine consumers are frequently motivated by kudos from the people they serve or give Champagne to, but sentimentality stems from previous memories of consumption (Morton et al. 2013).

Charters et al. (2011) previously noted that the fact that Champagne and sparkling wine are considered special drinks indicates that they should be marketed separately from other wine styles. This link to celebration may remind people of the product with regard to specific contexts, but may also limit the product's overall versatility (Chang et al. 2014). Specific marketing requires careful consideration, because although wine businesses would like this wine style to be distinct, they would also like people to consume it more than a few times each year (Brunner & Siegrist 2011). In a simulated Champagne wine market, Steichen and Terrien (2009) demonstrated that in a repeated purchasing situation, personal capital and involvement somehow reduce the impact of the main determinants (reputation, price) used by consumers when making a purchase decision.

When wine is purchased for an occasion, for example Christmas, evidence suggests that purchasers are willing to spend more (Kallas, Escobar & Gil 2012). Although not specific to sparkling wines, it was suggested that to assist the consumer in his/her choice, it might be useful to associate a given wine with consumption occasions (Viot 2012). The 'situational purchase context' is a principal driver behind sparkling wine purchasing (Morton, Rivers & Healy 2004) and Champagne has been described as 'the celebration wine' (Coates 2000) which

Australian consumers purchase with the intention of sacralising an event (Pettigrew, Ogilvie & Ryan 2000). A number of variables are affected by this situational context, including the country of origin effect, the price willing to pay and perceptions of prestige and luxury (Morton, Rivers & Healy 2004). As argued by Spawton (1993), the association of sparkling wine with celebration is a key reason why this style is chosen in preference to other alcoholic beverages. This was supported by focus groups undertaken by Olsen (2008) which revealed that participants perceived sparkling wine to be most appropriate for celebrations. Consumers often drink sparkling wine on the weekend (Mueller Loose & Jaeger 2012), a time when social gatherings often occur. As the consumption of sparkling wine and Champagne is more likely to be considered at special events, further research into how preferences and purchase decisions might be affected by occasion would benefit sparkling winemakers and marketers.

1.1.16 Sensory Properties of Sparkling Wines

Previous studies have demonstrated significant diversity in the sensory profiles of Australian sparkling white wine and Moscato (Culbert et al. 2017b; Culbert et al 2018). For sparkling white wines, variation in sensory qualities can be attributed to the method of production; carbonated and Charmat wines are typically fruit-driven styles of sparkling wine, whereas transfer and Méthode Traditionelle wines exhibit varying degrees of complexity (e.g., yeasty, toasty, bready characters) due to a combination of bottle fermentation, aging with lees contact and/or yeast autolysis (Alexandre & Guilloux-Benatier 2006; Culbert et al. 2015; Iland & Gago 1997). In an industry report written by Pini (2011), an expert panel assessing the quality of different sparkling wine styles, gave higher scores to sparkling wines and Champagnes with apple and lemony attributes, clean bright aromas and flavours, as well as a bready/doughy nose through to the palate. Despite wine judge opinion, within the Australian sparkling wine market, evidence shows that there are consumer segments with different preferences for the various styles of sparkling wine (Culbert et al 2016; Culbert et al. 2017b; Culbert et al. 2018).

Wine sensory properties are amongst the most important factors influencing consumer preference (Chaney 2000; Gluckman 1990; Keown & Casey 1995). However, consumers tend to find sparkling wine more difficult to evaluate than table wine, especially less involved (‘novice’) consumers (Charters 1993; Charters & Pettigrew 2007). These consumers perceive that the consumption context often hinders their ability to judge it; whereas highly involved wine consumers are more cognitive of their approach to the product (Charters 1993). As a

general rule, wine consumers are typically looking for softness, creaminess and balance, and the absence of harshness and too much acidity (Pini 2011). Younger and/or less involved consumers tend to prefer sweeter, fruitier styles of wine (Lesschaeve, Bowen & Bruwer 2012), then as consumer involvement increases, preferences transition from sweet to dry, and from lighter to heavier wine styles (Melo et al. 2010). As such, the more complex wines made via traditional bottle-fermentation production methods are not necessarily the preferred sparkling wine style (Culbert et al. 2016; Culbert et al. 2017b). In fact, Charters and Pettigrew (2007) noted complexity, a sensory descriptor frequently associated with high quality sparkling wine, was not a term commonly used by respondents with limited wine involvement.

Production process information can impact consumer expectations of quality and liking, but not informed liking (Vecchio et al. 2019). Consumer trials suggest the varietal composition (Harrar et al. 2013), and levels of carbon dioxide (effervescence) and *dosage* (sweetness) (McMahon, Culver & Ross 2017; McMahon et al. 2017), can also influence tasting thresholds and sparkling wine preferences. However, it should be noted that the timing of consumption (relative to pouring) (White & Heymann 2015) and nucleation sites present in sparkling wine glasses can significantly impact the organoleptic perceptions of carbon dioxide (Polidori, Jeandet & Liger-Belair 2009), i.e. the appearance, taste and texture of bubbles or 'fizz'.

When wine is consumed in conjunction with food, research has indicated that Champagne did the best job of cleansing the palate at a moderate salt level (Harrington & Hammond 2009). The sweetness present in Moscato wines helped mask the perception of bitterness in food, while Champagne gave only a low to moderate match with bitter cuisines (Harrington & Hammond 2009). The effects of sucrose and tartaric acid on the sweetness, sourness and overall taste intensity of Champagne have also been studied (Martin 2002). The suppressive effect of sucrose on the sourness of tartaric acid was stronger than that of tartaric acid on the sweetness of sucrose (Martin 2002). Sweetness contributed the most to the overall taste intensity of Champagne (Martin, Minard & Brun 2002), particularly under 'nose-clip' conditions (Martin 2002). This type of research is used extensively in sensory science and provides a more complete description of the characteristics of food and wine products (Varela & Ares 2012).

On a more scientific level, sensory evaluations of specific compounds found in sparkling wines have been undertaken, including an assessment of Champagnes during maturation (Vannier, Brun & Feinberg 1999). The differences in aromas detected between red and white base wines of different varieties was investigated by de la Presa-Owens et al. (1998). The intensity of floral, citrus and apple notes were rated as high in Chardonnay and Pinot Blanc base wines,

while berry and vanilla/butter characters were more prominent in Pinot Meunier and Pinot Noir (de la Presa-Owens et al. 1998). All flavour and aroma attributes, except berry, were found to increase after secondary fermentation, such that wines could no longer be differentiated by their grape variety (de la Presa-Owens et al. 1998).

Nevertheless, another study which examined the suitability of Spanish grapes for white and rosé sparkling wine production, identified Prieto Picudo, Albarín, and Verdejo as the most promising varieties (Martínez-Lapuente et al. 2013). Torrens et al. (2010) explored the differences in volatile composition of Cava with respect to still base wines, and found sparkling wines demonstrated more complex characteristics such as toasty, lactic, sweet, and yeasty notes. Furthermore, the influence of yeast strain and ageing time on lees on volatile concentrations has been examined (Hidalgo et al. 2004). During the secondary fermentation process and subsequent ageing on lees, acetate and ethyl esters decreased in concentration, whereas norisoprenoids, acetal, diacetyl, and furans appeared and/or increased over time (Torrens et al. 2010). Cava wines made from yeast strains producing low amounts of esters and high concentrations of medium chain fatty acids, higher alcohols and C6 alcohols were found to be less appealing during sensory analysis (Torrens et al. 2008). Despite *Saccharomyces cerevisiae* being widely used in the production of sparkling wine, the aroma compounds produced scored lowly (Mamede, Cardello & Pastore 2005) in comparison to *Pichia membranaefaciens* which has been shown to be more suitable for the production of desirable sparkling wine aromas (Mamede, Cardello & Pastore 2005).

Profiling representative samples of different Australian sparkling wine styles using descriptive analysis methodologies (Gawel & Godden 2008), in conjunction with consumer segmentation with acceptance/preference testing, would provide wine businesses with valuable information when marketing specific product lines.

This literature review confirms that there is an opportunity to further understand Australian consumers' preferences for different sparkling wine styles. The importance of involvement segmentation, occasion (i.e. consumption context) and willingness to pay have been identified as major factors in addressing this research gap. Furthermore, the combined use of survey data with sensory analysis would enable Australian sparkling wine producers to implement more profitable marketing strategies.

1.2 Research Objectives

A number of studies examining the different dimensions of consumer preferences for wine have been previously completed. Yet, consumer preferences for Australian sparkling wine and Champagne have not been fully investigated. Using the current understanding of consumer segmentation in conjunction with the influence of consumer involvement, occasion, price, taste and the country of origin effect, it will be possible to test statistical hypotheses and therefore investigate the factors driving the preferences of Australian sparkling wine consumers.

1.2.1 Study Aims

It is clear that a research gap exists with respect to the classification of Australian sparkling wine consumers, and that categorisation of consumers of this fine wine style would assist business strategies to target specific segments of the Australian domestic market. Therefore, the main objective of this thesis is to gain insight into consumer preferences for Australian sparkling wine styles. The specific aims of this research were to:

- Profile Australian sparkling wine consumers, their knowledge of sparkling wine styles and production methods, and the factors which most influence their purchasing decisions and consumption behaviour;
- Determine consumers' perceptions of and preferences for different styles of Australian sparkling wine and Champagne; and
- Investigate the occasions at which consumers drink their preferred styles of sparkling wine, and how much they are prepared to pay for different styles of sparkling wine.

A statistical model, the Fine Wine Instrument (FWI), was developed to segment consumers based on wine connoisseur, knowledge and provenance variables (Johnson & Bastian 2015). Hierarchical clustering based on responses to specific FWI questions was used to classify participants of studies presented in Chapters 3 and 4 as 'No Frills', 'Aspirants' and 'Enthusiasts'. No Frills consumers typically show little connoisseur-type behaviour and have limited knowledge of wine or interest in wine provenance. They typically purchase their wine from chain retailers, rather than independent or fine wine retailers (Johnson & Bastian 2015). Aspirant consumers share some of the characteristics of Enthusiast consumers segment, but are not as knowledgeable, nor as confident or adventurous in their wine-purchasing abilities. Their purchases are predominantly from chain retailers and they are influenced by the opinions of others (e.g., friends and family, staff at restaurants, wine retailers and wine writers), as well as

advertising, promotions, and awards or medals (Johnson & Bastian 2015). In contrast, Enthusiast consumers are knowledgeable about wine and actively enjoy increasing their wine knowledge. They exhibit connoisseur-like behaviour (i.e., they tend to keep records of their wine purchases, have dedicated wine storage space and ritually check their wines for faults prior to consumption), purchase wine from independent wine retailers, and are adventurous in their wine purchasing (i.e., they like to try different wines). Enthusiasts are confident in their ability to select wines, but will also ask questions and/or seek recommendations (Johnson & Bastian 2015).

1.2.2 Thesis Outline

The following chapter outline summarises how this research addresses the abovementioned research gaps and study objectives.

Chapter 2 forms the foundation of this research by providing insight into factors influencing Australian consumers' purchasing preferences for sparkling wine, including Champagne. Focus groups were conducted and thematic analysis was undertaken to identify factors influencing sparkling wine consumers' purchasing preferences. Personal taste was found to influence choice of a sparkling wine rather than another type of beverage, and selection of a particular style and brand of sparkling wine. Country or region of origin was found to be important, often linked to the product being Champagne. Brand image, reputation and symbolism were found to influence purchase decisions (sometimes linked to consumption occasion), especially for purchases of gifts. Advice, recommendations and expert reviews, and consumption occasion were also found to influence purchase decisions. Price was found to influence the style and brand of sparkling wine purchased. A high price was a barrier for some participants, while other participants avoided sparkling wines that were priced below a particular level. Thematic analysis enabled the development of a preliminary model of purchasing preferences. However, being exploratory in nature, findings cannot be generalised. Further studies are required to confirm the preliminary model and to evaluate the validity and significance of proposed relationships. Findings suggest producers could benefit from marketing a range of sparkling wines to cater to different tastes, occasions and gift purchases. Results also confirm the importance of marketers pursuing opportunities to obtain and promote favourable expert reviews for their sparkling wines, and of identifying and promoting regional distinctiveness. The first comprehensive model of sparkling wine consumers' purchasing

preferences has been developed. Empirical testing would enable refinement and enhance understanding.

Following the focus groups, an online survey was undertaken to further investigate the themes established in Chapter 2. Chapter 3 investigates the perceptions and preferences of Australian wine consumers towards different styles of sparkling wine, including French Champagne and Australian sparkling white, red and rosé wine, Moscato and Prosecco. An online survey of 1027 regular sparkling wine consumers captured demographic information, sparkling wine perceptions and preferences, and typical spending and consumption patterns. Consumers were segmented into three distinct clusters ('No Frills', 'Aspirants' and 'Enthusiasts') using the FWI. The majority of No Frills consumers were female and typically consumed sparkling wine once per month. Almost 55% of Aspirants were male with a household income of more than AU$75,000. Enthusiast consumers were also predominantly male and well educated, and 64% were under the age of 35 years. Sparkling white wine and Champagne were generally the preferred styles for each consumer group, followed by Moscato and sparkling rosé wine. Interestingly, Moscato scored favourably with both No Frills and Enthusiast segments. Almost 25% of respondents indicated they were not familiar with Prosecco, while sparkling red wine was perceived similarly by male and female consumers. The findings from this chapter can be used by sparkling wine producers to better target their products and marketing to the specific needs and expectations of consumers within different segments of the Australian domestic market.

To strengthen the findings of the online survey research, a consumer survey (using the same format employed in Chapter 3) was undertaken in conjunction with blind tasting preference analysis of different sparkling wine styles. Chapter 4 examines consumer preferences for different styles of sparkling wine and the influence of wine style and occasion on sparkling wine purchasing and consumption behaviour. Australian consumers (n = 203) completed an online survey and blind tasting of representative styles of commercial sparkling wines, including Champagne. Wine sensory profiles were determined by descriptive analysis using a trained panel (n = 12) and consumers were again segmented into "No Frills", "Aspirant" and "Enthusiast" clusters using the FWI. Consumer perceptions, preferences and liking were measured using 9-point hedonic scales and compared via statistical analysis. Consumers anticipated liking Champagne and sparkling white wine the most, and Moscato and Prosecco the least, but on tasting, could only readily identify the Moscato and sparkling red wines, i.e. the most contrasting wine styles. As such, liking scores for the Champagne and sparkling white

wine were significantly lower based on tasting scores (median scores were 6.0, compared with 9.0 and 8.0 for survey responses, respectively). These results suggest consumers' pre-conceived expectations of different sparkling wine styles clearly influence their purchasing and consumption behaviour. Aspirants and Enthusiasts were more likely to pay a higher price per bottle for Champagne and sparkling white wine than other sparkling wine styles, and consumption of these sparkling wines was most frequently associated with celebratory occasions such as anniversaries, birthdays, Christmas, New Year and weddings.

Lastly, Chapter 5 outlines the thesis conclusions, limitations of the study and directions for future research, including consideration of the influence of climate change on sparkling wine production, as well as international regulatory issues.

1.2.3 Contribution to Discipline

Approximately 20% of the sparkling wine consumed in Australia is imported, most of which is Champagne. The outcomes of this research are intended to deliver financial benefits to Australian sparkling wine producers through capture of a greater proportion of the existing domestic sparkling wine market. It is hoped that these research findings will inform sparkling wine producers regarding the wine styles, sensory properties and marketing strategies that best meet consumers' needs and expectations, i.e. to further influence purchasing decisions in favour of Australian sparkling wines, thereby delivering economic benefit.

Chapter 2 Focus Group Analysis

2.1 Toward a model of sparkling wine purchasing preferences

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Contribution to the Paper	Designed and conducted focus groups to identify factors influencing sparkling wine consumers' purchasing preferences. Undertook thematic analysis of transcripts; interpreted data; drafted and revised the manuscript.		
Overall Percentage (%)	75%		
Certification	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
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i. the candidate's stated contribution to the publication is accurate (as detailed above);
ii. permission is granted for the candidate in include the publication in the thesis; and
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Toward a model of sparkling wine purchasing preferences

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Abstract

Purpose – This paper aims to provide further insight into factors influencing Australian consumers' purchasing preferences for sparkling wine, including champagne.

Design/methodology/approach – Focus groups were conducted and thematic analysis was undertaken to identify factors influencing sparkling wine consumers' purchasing preferences.

Findings – Personal taste was found to influence choice of a sparkling wine rather than another type of beverage, and selection of a particular style and brand of sparkling wine. Country or region of origin was found to be important, often linked to the product being champagne. Brand image, reputation and symbolism were found to influence purchase decisions (sometimes linked to consumption occasion), especially for purchases of gifts. Advice, recommendations and expert reviews, and consumption occasion also were found to influence purchase decisions. Price was found to influence style and brand of sparkling wine purchased. A high price was found to be a barrier for some participants, while other participants were found to avoid sparkling wines priced below some particular level. Thematic analysis enabled development of a preliminary model of purchasing preferences.

Research limitations/implications – Being exploratory in nature, findings cannot be generalised. Further studies are required to confirm the preliminary model and to evaluate the validity and significance of proposed relationships.

Practical implications – Findings suggest a producer could benefit from marketing a range of sparkling wines to cater to different tastes, occasions and gift purchases. Findings also confirm the importance of marketers pursuing opportunities to obtain and promote favourable expert reviews for their sparkling wines, and of identifying and promoting regional distinctiveness.

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Originality/value – The first comprehensive model of sparkling wine consumers' purchasing preferences has been developed. Empirical testing would enable refinement and enhance understanding.

Keywords Australia, Wines, Psychometric/qualitative, Consumer behaviour, Survey research

Paper type Research paper

Introduction

There is limited published data about Australian sparkling wine production and sales volumes. Champagne and other sparkling wine[1] accounted for about 8 per cent of total sales of wine (table, sparkling, carbonated and fortified) in Australia in 2013-2014 (Australian Bureau of Statistics, 2014). From 2004 to 2012, the number of Australian sparkling wine producers increased from 570 to 948, with annual production reaching 37 million litres in 2011-2012 (Wine Australia, 2012). However, Australia has experienced a recent downturn, with domestic sales of Australian sparkling wine declining from a peak of 39.8 million litres in 2005-2006 to 35.1 million litres in 2013-2014 (Wine Australia, 2014). Simultaneously, due to increased international competition and unfavourable exchange rates, the volume of imported wine of all types was estimated to increase by 20 per cent in 2011-2012 (Gunning-Trant, 2012) and by a further 14 per cent by 2013-2014 (Australian Bureau of Statistics, 2014).

Therefore, sparkling wine constitutes a small but significant proportion of the total Australian wine production, and producers face a highly competitive marketplace. Greater understanding of buyer behaviour seems essential for sparkling wine marketers.

The Australian sparkling wine product range is diverse, comprising white and pink Moscato, and white, rosé and red sparkling wines, as mono-varietals and blends, and covering a wide range of prices. However, the relative importance of each style to Australian consumers remains unclear, since there has been limited published research focusing on sparkling wine consumers (Charters, 2005; Fountain and Fish, 2010). There also have been few studies regarding the wine knowledge, generally, of Australian consumers (Johnson and Bastian, 2007). Consumer- and other marketing-related research typically has focused on table wine rather than sparkling wine (Charters and Pettigrew, 2008; Verdú Jover *et al.*, 2004), although, conversely, some studies have focused specifically on champagne (Charters, 2009a; Morton *et al.*, 2013).

As part of a larger project, this study aims to provide additional knowledge about factors influencing Australian consumers' purchasing preferences for sparkling wine. The study addresses a major gap in knowledge regarding such preferences given that "little [prior research] examines in detail how the consumer perceives the product, or how the wine is evaluated at consumption" (Charters, 2005, p. 54). A specific aim of the study is to develop a conceptual model of purchasing preferences relating to sparkling wine, albeit preliminary in nature and requiring further development. Once fully developed (and tested), such a model should provide additional insight, in turn assisting the development of more appropriate strategies to influence purchasing decisions and increase sales to existing and emerging sparkling wine consumers. These outcomes are important to marketing practitioners given the competitive nature of the market.

Prior studies

Consistent with a grounded theory approach, an initial literature review was undertaken to inform the data collection phase of the study, including development of a set of questions for focus group discussions. Prior studies investigating the preferences of sparkling wine consumers are identified below. However, a detailed discussion of the literature is not provided within this section. Rather, discussions of findings of prior research are

incorporated within the Discussion section. Again, consistent with grounded theory methods, this arrangement enables the development of theory to be supported by analysis of findings from prior studies as well as those from this study (Goulding, 2000).

European and US studies

Based on in-depth individual interviews with a sample of 27 US consumers, Judica and Perkins (1992) identified two types of sparkling wine consumer and several attributes influencing their preferences. In a study of German sparkling wine consumers, Mueller (2006) identified six consumer segments from cluster analysis of data obtained from 1,029 respondents to a combined internet survey and written interview. Based on a tasting experiment in France involving 37 participants and four different champagnes, Vignes and Gergaud (2007) identified several reputation-related and technical factors used by consumers to assess product quality. Using econometric modelling, Lee and Sumner (2013) estimated the relationships between different factors and the price of French- and US-produced champagne and other sparkling wine sold within the USA. Thiene *et al.* (2013) assessed the influence of certification of origin and price on the purchasing preferences for locally produced prosecco sparkling wines in Northern Italy. Cerjak *et al.* (2014) conducted an online survey of 273 Croatian consumers of sparkling wine to identify factors affecting consumption preferences.

Australian and related studies

Within an Australian context, there have been few studies of preferences regarding sparkling wine, although it has been suggested that many young consumers drink sparkling wine because of its sweetness, with some selecting sparkling wine for special occasions such as romantic dinners (Edwards and Spawton, 1990).

As part of a larger study, Charters (2005) assessed the involvement and engagement of Australian consumers with sparkling wine, as well as their key motivations for drinking sparkling wine. This aspect of the study involved focus groups (including tastings of four sparkling wines) and interviews with 60 consumers from across Australia. Fountain and Fish (2010) conducted exploratory research into the experiences and perceptions of young adults relating to sparkling wine. The study involved four focus groups in Christchurch, New Zealand and three in Melbourne, Australia, comprising 50 participants in total. Charters *et al.* (2011) studied the engagement of Generation Y consumers with champagne and other sparkling wine in Australia, New Zealand, South Africa, the UK and the USA. They also investigated how young adults engage with champagne and other sparkling wine in hospitality establishments (Ritchie *et al.*, 2011).

In summary, there have been some studies regarding consumer preferences relating to champagne and other sparkling wine; even fewer identifying and exploring how underlying factors are related. Based on this research, it does seem clear that (1) there are different consumer groups (potentially comprising different market segments) with different perceptions, preferences and consumption levels, and (2) purchase of sparkling wine is influenced by several factors. However, there has been no attempt to develop a conceptual model of purchasing behaviour relating to champagne and other sparkling wine. Such a model would enhance the understanding of sparkling wine buyer behaviour and also provide useful guidance to sparkling wine marketing practitioners.

Methods

The study employed a qualitative methodology, given the aim of developing new theory rather than testing existing theory; in this case, to identify factors influencing consumers' purchasing preferences regarding sparkling wine, and relationships between those factors.

Use of a qualitative approach is supported by arguments such as that by Goulding (2005, p. 295), that "there is increasing acknowledgement […] of the need for the application of qualitative methodologies […] to gain valid insights [and] develop theory".

Methods employed are consistent with some aspects of grounded theory (Goulding, 2000, 2005). In particular, an initial literature review confirmed the lack of a comprehensive model to explain purchasing preferences of sparkling wine consumers, and informed the development of an initial set of questions used in focus groups; while later literature reviews assisted interpretation of themes identified during data analysis, and provided confirmation of the validity of relationships developed from that analysis. Consistent with grounded theory methods, no attempt was made to develop a conceptual model until *after* data collection and initial coding (Corbin and Strauss, 2008), at which point emerging themes were compared and integrated with findings from prior studies "to show relevance and new perspective" (Goulding, 2000).

Focus groups were conducted to investigate wine consumers' preferences relating to champagne and other sparkling wine, consistent with prior consumer-related studies, such as that of Charters *et al.* (2011) regarding champagne and other sparkling wine, and those of Pettigrew and Charters (2008) and Menezes *et al.* (2011) regarding wine, generally.

Tastings were included in the focus group activities to enable discussion of individual preferences regarding champagne and other sparkling wine varieties. This was consistent with the use by Charters (2005, p. 56) of "focus tastings" as an extended form of focus groups, aimed at stimulating and enhancing "participants' exploration of their ideas about wine quality". The sensory analysis featured three Australian sparkling wines, two (French) champagnes and one other French sparkling wine, all presented "blind" to participants.

Participants were recruited using a variety of methods, including social networking sites and local distribution of a flyer. Potential participants were screened against inclusion criteria comprising regular sparkling wine consumption (i.e. consumption on at least 12 occasions per year) and being of legal drinking age (i.e. at least 18 years of age). Exclusion criteria: precluded participation by wine industry professionals, and limited the proportion of participants currently studying or working at a university to 50 per cent, partly to "avoid the tendency to source participants from students" which has the negative consequence of reducing the focus on participants from the target audience (Charters *et al.*, 2011, p. 165).

Participants were assigned to one of four focus groups based on their age and gender: males under 35 years of age ($n = 10$), males aged 35 years or more ($n = 10$), females under 35 years of age ($n = 19$) and females aged 35 years or more ($n = 17$). These criteria were employed due to evidence of differences in wine-related attitudes and consumption based on age and gender (Bruwer *et al.*, 2005), with prior research identifying significant differences in factors influencing buying behaviour among wine consumers above and below 35 years of age (Hall *et al.*, 2004). The high proportion of female participants is typical of wine-related studies due to the predominance of females among wine consumers (Charters *et al.*, 2011). All but two participants had undertaken some post-secondary education, 29 having completed at least an undergraduate degree. Reported family income ranged from below $25 000 p.a. (since several university students participated in the study) to above $150 000 p.a., the mean income falling within the $75,000-$100,000 range.

Two researchers attended each focus group, i.e. a moderator and an assistant. The moderator led each focus group discussion, which comprised a series of prepared questions pertaining to champagne and other sparkling wine production, consumption, preferences, sensory attributes and purchasing behaviour. Group discussions were transcribed by the assistant. The moderator remained neutral and did not attempt to influence participants or

bias their responses in any way. The duration of each focus group was 60-75 min, including tastings and sensory-related discussion.

Use of focus groups offers benefits of participants reacting and building upon the responses of others and generating a broader range of information and insight than individual interviews (Belzile and Öberg, 2012). However, consumers often want to appear knowledgeable about wine due to the image surrounding this product. Therefore, they may be influenced in a group setting by those perceived to have greater wine knowledge or experience (Rasmussen and Lockshin, 1999). Potential bias was minimised in this study by the moderator encouraging *all* participants to engage in discussion at different points of time, and by limiting the discussion time of any (dominant) participants by interrupting at appropriate times with additional questions aimed at other participants.

Questions for the focus groups were developed from a preliminary literature review. These are shown in Table I. Use of semi-structured discussions and open-ended questions is somewhat similar to the "collection of free verbalizations from a sample of respondents" (Boivin, 1986, p. 11) and the "free-form" or "unstructured approach" (Bruwer and Lesschaeve, 2012, p. 613) used in some prior questionnaire-based surveys regarding brand perceptions.

Initial questions	Prompts
Preference questions	
What do you think are the differences and similarities between sparkling wine and champagne?	Country? Quality? Production methods? Price? Sensory?
Do you use the terms "sparkling" and "champagne" to differentiate between the countries of origin?	Australian vs French?
Which do you prefer? Why?	Sensory? Prestige? Support Australia?
Do you buy and/or consume different sparkling wine styles? Why or why not? Thoughts about Moscato and sparkling red?	Moscato? Sparkling white? Sparkling rosé? Sparkling red? Champagne?
When do you buy and/or consume Australian sparkling wine and/or champagne?	Special occasions? Casual drinking?
Have your preferences changed with time?	Will they ever change?
Purchasing behaviour questions	
What is important when you purchase and/or consume Australian sparkling wine and/or champagne?	Country? Occasion? Brand? Variety? Sensory? Price? Label? Quality? Food matching?
Do you usually buy Australian sparkling wine and/or champagne from retail chains or independent stores? Why or why not?	Special offers?
Do you seek advice when buying Australian sparkling wine and/or champagne? Or, do you prefer to browse?	What information? Read wine reviews? Read catalogues?
How many bottles of Australian sparkling wine and/or champagne do you usually purchase?	Chilled vs shelf? Occasion dependent?
How much do you expect to pay when you purchase Australian sparkling wine and/or champagne?	Occasion dependent?
Sensory questions	
How important are the sensory properties of Australian sparkling wine and/or champagne?	Colour? Aroma? Flavour? Effervescence?
What did you like/dislike about the wines tasted today?	
Were you surprised by any of the wines tasted today?	Country? Price? Quality?

Table I.
Initial questions for each focus group

Transcriptions of participants' responses were coded and analysed using QSR International's *NVivo 10* software, to facilitate thematic analysis, "a method for identifying, analysing and reporting patterns (themes) within data" (Braun and Clarke, 2006, p. 79). Use of *NVivo* is consistent with established practice in qualitative research within marketing and other social sciences (Chong, 2014; Crowley *et al.*, 2002; Hutchison *et al.*, 2010), including studies relating to wine consumers (Rocchi and Stefani, 2006) and sparkling wine consumers, specifically (Charters *et al.*, 2011). Two researchers independently coded the qualitative data from the transcripts, consistent with approaches used in prior related research (Beverland, 2006). Coding resulted in a set of 31 nodes with 479 references, which were used in the thematic analysis. Feedback from other research team members enabled refinement of identified themes, factors, relationships between factors and the overall model, reducing subjectivity and increasing credibility and trustworthiness of findings (Charters *et al.*, 2011; Wallendorf and Belk, 1989).

Findings

Participants identified several factors influencing their decisions to purchase champagne or other sparkling wine, the most common being discussed below. While initially discussed separately, most factors have relationships with one or more other factors. The most important of those relationships also are discussed below.

Personal taste. Personal taste was found to influence choice of sparkling wine rather than another type of alcoholic beverage, and selection of a particular style of sparkling wine (such as champagne, some other sparkling white or sparkling red) and brand. Selected participant comments regarding this factor, or illustrating some contrasts in personal taste, are provided below.

> "Everyone's taste is different" (Over-35 female [O35F] participant).

> "Wines are to personal taste" (Under-35 male [U35M] participant).

> "I prefer French", "I don't care [whether French or Australian]" and "I prefer Australian sparkling red" (Three O35F participants with contrasting views).

> "I like moscato because it's sweet" and "[It's] too sweet [for me]" (Two under-35 female [U35F] participants with contrasting views).

Brand image and reputation. Brand image and reputation were found to comprise an important factor influencing purchase decisions across all four focus groups. The factor was found to be influenced by two other factors, "Country or region of origin" and "Advice or recommendations, or expert reviews". In addition, this factor was found to moderate the effect of price on the purchase decision. Selected participant comments relating to this factor are provided below:

> Relationship with quality – the brand or label – perception of quality (O35F participant).

> Brand is important – something you know or something recommended or you've had before or seen advertised elsewhere (U35F participant).

> Reputation makes a difference – expectations – when you make decisions, your expectation gives you something to base decision on, as to taste and quality – number one factor (U35M participant).

> There's prestige (U35M participant).

Country or region of origin. Country or region of origin, particularly with respect to the product being French, was found to be an important factor across all four focus groups,

although occasionally linked to the product being champagne. It also was found that sparkling wine of French origin was perceived in a very positive manner by many participants. Country of origin also was found to influence another factor, "Brand image and reputation", and to moderate the effect of price on the purchase decision. Selected participant comments relating to this factor are provided below:

> I think of French as more yeasty and nutty and earthy (O35F participant).
>
> French is better quality (U35F participant).
>
> Traditional French champagne is more special (U35M participant).
>
> Region of origin does sometimes [influence choice] – comes under what you're expecting – you expect a certain quality […] reputation is linked (U35M participant).
>
> Region is more important [as an influence on purchase] (U35M participant).

Advice or recommendations, or expert reviews. Advice or recommendations, or expert reviews (from a family member, friend, restaurant staff or store salesperson; or from a wine expert or journalist) also were found to comprise an important factor influencing purchase decisions. This factor also was found to influence another factor, "Brand image and reputation". Selected participant comments relating to this factor are provided below:

> I've looked up reviews on the Internet, but not asked in the shop (U35F participant).
>
> Sometimes ask for advice – what recommendations are made (U35F participant).
>
> Sometime in the restaurant asking the waiter/waitress (U35F participant).
>
> Occasionally read wine reviews – and they influence [my] decisions (U35M participant).
>
> Reviews – Halliday's – use that as a general guide (U35M participant).
>
> Recommendations are important to me (U35M participant).

Consumption occasion and company. Consumption occasion and company were found to comprise another important factor influencing purchase decisions across all focus groups. In addition, this factor was found to moderate the effect of price on the purchase decision. Selected participant comments relating to this factor are provided below:

> It's still a celebratory wine – would prefer a still as a general rule (O35F participant).
>
> French champagne is for special occasion – Christening, wedding, birthday, rather than a sparkling wine – it means Formula 1 (O35M participant).
>
> Depends on occasion – French champagne for engagement party or present, or wedding, whereas Australian sparkling for more casual drinking (U35F participant).
>
> Brand [purchased is influenced by] occasion as well – if I'm going to boyfriend's Mum's place, I'll take Chandon or Jansz (U35F participant).
>
> Occasion is important (U35M participant).

Gift purchasing. Gift purchasing was found to influence product type and brand selection. In addition, this factor was found to moderate the effect of price on the purchase decision. Selected participant comments relating to this factor are provided below.

> Brand [purchased] is important if it's a gift (O35F participant).
>
> I'll give a bottle of Moet or Bollinger to someone who I think will be impressed with the brand (O35M participant).

> Have given Australian sparkling as gifts because I was so impressed with quality (O35M participant).

Price. Price was found to influence the style and brand of sparkling wine purchased by participants in all four focus groups. A relatively high price was found to constitute a barrier for some participants, while other participants were found to avoid sparkling wines below some particular price. In addition, the factors, "Country or region of origin", "Brand image and reputation", "Consumption occasion and company" and "Gift purchasing", were found to moderate the effect of price on the purchase decision. Selected participant comments relating to this factor, and the moderation of its effects, are provided below:

> I buy for a price point (O35F participant).
>
> Expect to pay more for French (O35F participant).
>
> For special occasion, maybe [pay] a bit more […] depends on what you're doing and how many people are there. Don't spend big time if there are 30 people coming (O35F participant).
>
> Price goes with occasion […] if it's just for a Friday night for drinks, then that's a different price than for a birthday or a wedding, birthday or new year's eve or my mother's 80th (O35M participant).
>
> French is more expensive (U35F participant).
>
> Depends on occasion – what are you buying for, is it a big occasion, or is it low key […] normally $30-50 for an occasion. For a casual situation maybe […] $20-35 […] less than special occasion. For gifts $40-50 – unless it's really special person – my Dad (U35M participant).
>
> "If it's on special – but not Yellowglen, it has to be at least $15" and "I will not spend over $10 – I'll drink Yellowglen" (Two U35F participants with contrasting views about price).

In summary, thematic analysis of coding from focus group transcripts suggests that the purchase of champagne and other sparkling wine is influenced by personal taste; advice or recommendations from family, friends or wine salespersons and expert reviews; brand image and reputation; country or region of origin of product; price; consumption occasion and nature of company at the occasion; and gift purchasing. Advice, recommendations and expert reviews and country or region of origin influence brand image and reputation. Country or region of origin, brand image and reputation, consumption occasion and company and gift purchasing moderate the influence of price on purchase preferences. In the next section, these findings are compared and integrated with those from prior studies, consistent with a grounded theory approach.

Discussion

Findings that purchase of champagne and other sparkling wine is influenced by personal taste are consistent with "conventional economic theory of consumer behavior" which assumes that "prices, incomes, and personal tastes affect consumption" (Ackerman, 1997, p. 651); sensory evidence that "taste sensitivity varies greatly among individuals" (Lim *et al.*, 2008, p. 493); views that wine is "a sensory product" with a "quasi-aesthetic character", that "can be judged by objective standards but is also a matter of personal taste" (Charters, 2009b, p. 286); and prior findings of Judica and Perkins (1992), Charters (2005), Fountain and Fish (2010) and Cerjak *et al.* (2014) with specific reference to sparkling wine. In summary, based on findings of this and prior studies, personal taste appears to be a major factor in the purchase decision for many sparkling wine consumers, but there are large variations in personal taste – sparkling wine being the preferred alcoholic beverage of some consumers and a beverage to be avoided by others; dry styles being preferred by some and sweet styles by others.

Findings that brand image and reputation influence the purchasing preferences of some consumers are consistent with prior findings of Judica and Perkins (1992), Mueller (2006), Vignes and Gergaud (2007) and Fountain and Fish (2010). Related findings that this factor moderates the influence of price on purchasing preferences are supported by findings of Cerjak *et al.* (2014) and, more generally, of various studies regarding the influence of brand image on the price premium of a brand (Brodie *et al.*, 2002).

Importantly, Judica and Perkins (1992) found symbolism to be related to the sophisticated image of a preferred brand among heavy consumers. Similarly, Charters (2005) suggests that recollections of a memorable event and a high-quality sparkling wine consumed (and appreciated) at that event become intertwined. Finally, in a more general context of alcoholic beverage consumption, Pettigrew and Charters (2010, p. 214) found "the desire to convey an image of sophistication and cosmopolitanism" to be a "symbolic element of alcohol-related decisions" among Hong Kong consumers.

While no participants in this study used terms such as "symbolic" or "symbolism", there is an implication in relevant coding that champagne and some other (expensive) sparkling wines are perceived by some participants to be symbolic of celebration and prestige, and that some perceptions of brand image, country of origin (especially being French) and prestige are consistent with prior findings that "known [champagne] brands act as symbols of status and reassurance" (Morton *et al.*, 2004, p. 3). Therefore, this factor is considered to be better described as brand image, reputation and symbolism.

Findings regarding the importance of country or region of origin to some consumers are consistent with prior findings of Mueller (2006) and Thiene *et al.* (2013). Related findings that this factor influences brand image, reputation and symbolism, and moderates the influence of price on purchasing preferences, also are supported by findings of Mueller (2006), the latter (moderating) influence also being supported by findings of Lee and Sumner (2013). Based on these findings, country or region of origin also appears to be a major factor in the purchase decision for many sparkling wine consumers. For some, the country of origin denotes quality of product, especially in the case of champagne and other French sparkling wine, or if the consumer lacks confidence in her/his knowledge of sparkling wine attributes. For others, sparkling wine from a particular region may be preferred due to particular known characteristics of the region or its products (such as optimal grape-growing conditions). In addition, country or region of origin influences some consumers' perceptions of brand image, reputation and symbolism, and moderates the effect of price on purchasing decisions. For example, some Australian consumers rate French sparkling wine above all other product merely due to its country of origin.

Findings that advice or recommendations, or expert reviews influence purchasing preferences, directly and via the mediator, brand image, reputation and symbolism, are consistent with findings of prior research regarding the influence of word-of-mouth communication on brand image, trust and purchasing behaviour in various product-market settings (Herr *et al.*, 1991; Lin and Lu, 2010; Price and Feick, 1984). The findings also are consistent with those of Friberg and Grönqvist (2012), who found a favourable effect of expert reviews on wine sales in Sweden. Some consumers appear to value advice or recommendations of family, friends or staff within restaurants and retail outlets, while others value the more informed reviews of wine experts.

Findings that consumption occasion and company influence purchasing behaviour are supported by prior findings of Judica and Perkins (1992), Charters (2005), Charters *et al.* (2011) and Cerjak *et al.* (2014). Related findings that this factor moderates the influence of *price* on purchasing behaviour is supported by prior findings of Judica and Perkins (1992). Many consumers appear to purchase different sparkling wine styles and brands for different

occasions, apparently willing to pay significantly higher prices for premium products on special occasions.

Findings that gift purchasing influences preferences are supported by findings of Yang and Paladino (2015) relating to wine, generally. Related findings that this factor moderates the influence of price on purchasing preferences are supported by findings of wine-related studies of Hatak and Stöckl (2008) and Yang and Paladino (2015). Many consumers appear willing to purchase prestigious (and expensive) brands of champagne and other sparkling wine when purchasing gifts for important family members, friends or work associates.

Findings that price is an important factor to some consumers are supported by findings of Charters *et al.* (2011) relating to sparkling wine, and by findings of prior studies regarding the importance of price as an influence on wine purchases (Chrea *et al.*, 2011; Lockshin *et al.*, 2009; MacDonald *et al.*, 2013; Radman *et al.*, 2004). In summary, different consumers have very different views regarding price, some seeking low-priced product with acceptable taste while others avoid brands priced below some particular levels.

In summary, the factors and relationships identified in this study, shown in Figure 1, are consistent with findings of prior wine-related studies, including those specifically focusing on champagne and other sparkling wine. However, reviews of the literature identified the absence of a comprehensive framework relating to sparkling wine buyer behaviour. In addition, prior studies (collectively) have identified all factors identified within this study, but have failed to identify important relationships between some factors. Therefore, findings of this study contribute toward the enhancement of knowledge of sparkling wine buyer behaviour, and have implications for sparkling wine marketing practitioners (discussed below). Importantly, identification of a comprehensive model – albeit of a preliminary nature – provides an opportunity for researchers to test and refine the model, and to evaluate the significance and relative importance of the factors influencing purchasing preferences of sparkling wine consumers.

Further research could identify variations in the model structure or in the strengths of relationships between factors, across different countries, perhaps due to cultural or local wine industry-related circumstances. For example, there could be significant variations with respect to factors such as personal taste and country or region of origin between Australia,

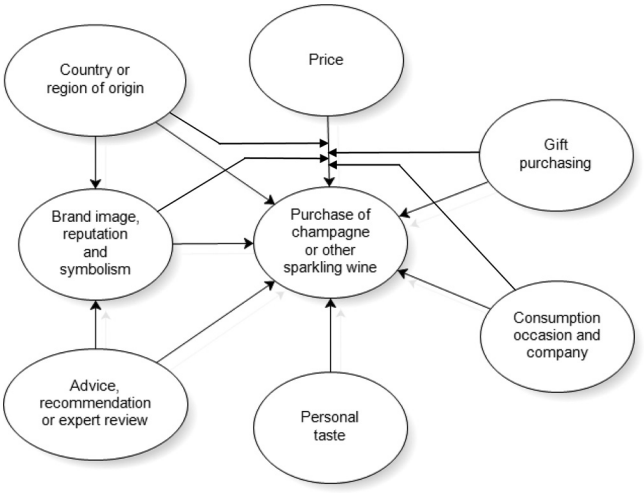

Figure 1.
Factors influencing purchasing preferences for sparkling wine

France, the UK and the USA. Indeed, some factors could be found to be unique to specific countries or regions.

Managerial implications

Recommendations to sparkling wine marketing practitioners based on findings from this study are consistent with those from prior researchers in this field. Findings from this study, being consistent with prior research findings, should provide practitioners with confidence that prior research-based recommendations are valid. In addition, findings from this study identify relationships between some factors, not identified in prior research. Recommended empirical research should provide greater understanding of the relative importance of the factors and relationships between factors identified in this study. In turn, those findings should enable refinement of evidence-based recommendations to practitioners, including special issues in markets within some countries or regions.

Given large differences in personal taste, marketers could benefit from developing a range of sparkling wines to cater to that diversity (perhaps under different labels to avoid tarnishing brand image of premium brands). Marketers also need to take account of the importance of brand image, reputation and symbolism when developing packaging and promotional materials, especially for premium labels.

Given the importance of country or region of origin, marketers could benefit from identifying and promoting relevant regional characteristics and distinctiveness. Similarly, promotional programs in export markets by organisations such as Wine Australia could benefit by focusing on relevant distinctive attributes (including symbolism) of Australian sparkling wine. Given the importance of advice or recommendations, or expert reviews, marketers could benefit from pursuing opportunities to obtain and promote favourable expert reviews, perhaps by entering quality products in events such as the Australian Sparkling Wine Show (http://australiansparklingwineshow.com.au/).

Marketers also need to recognise that consumption occasion and company influence preferences, with champagne and other sparkling wine typically being a drink for special occasions shared with family, friends or other acquaintances. For example, as argued by Charters *et al.* (2011, p. 172), champagne and other sparkling wine "should not be portrayed as a solitary drink" in advertising or promotional material. Findings that many consumers appear to purchase different sparkling wines for different occasions support the view that marketers could benefit from developing a range of sparkling wines to cater for diverse purchasing preferences and situations. Related findings that many consumers are willing to purchase premium brands for special occasions and as gifts suggests that sparkling wine producers could benefit by including premium brands within their product ranges.

Finally, findings that different consumers have very different price sensitivity – some even avoiding brands priced below some particular levels – further support the view that producers could benefit from developing a range of sparkling wine brands across different price points.

Limitations and future research

The main limitation of this study relates to the data collection method, which was determined largely by requirements of the overall funded project. For grounded theory studies, data should be obtained from a wide range of sources (Seaman, 2008). The use of just four focus groups in this study could be considered narrow. However, inter-group diversity was achieved through formation of groups based on age and gender, and use of focus groups does offer benefits of participants reacting and building upon the responses of others, thereby generating a broader range of information and insight than individual interviews (Belzile and Öberg, 2012). The willingness of participants to discuss issues

for 60-75 min, and the generation of 31 nodes with 479 references during the coding process, testify to the breadth and depth of focus group discussions – and to the likelihood of adequate diversity of sources.

The study involves participants from just one city, each focus group comprising a small, convenience-based sample from one of four age- and gender-based populations. Compared to the Australian population, a disproportionate number of participants had completed a university degree (52 per cent of participants compared with 30 per cent of the population above 15 years of age) (Australian Bureau of Statistics, 2011). Participants tend to be within the top two quintiles of income earners (Australian Bureau of Statistics, 2015). However, these issues do not constitute a serious limitation given the exploratory nature of the study.

Further research is required to confirm (or modify) the preliminary model identified within this study, and then to test the validity, and assess the significance, of hypothesised relationships. In effect, the model provides an initial framework or "starting point" for those researchers interested in conducting empirical research relating to sparkling wine buyer behaviour. Initially, the model could be tested conceptually via further focus groups or individual interviews of consumers, preferably in different locations. Alternatively, a Delphi panel (DuBois and Dueker, 2009) comprising established researchers within the sparkling wine field could be conducted to verify the conceptual validity of the model (or to reach consensus on suggested modifications). The confirmed or modified model then could be subjected to empirical testing through a quantitative study across several countries. (Measurement scales would be developed from prior research, including coding from the reported study).

Given the diversity of participant views regarding most factors identified in the current study, and the identification of multiple consumer groups within some prior sparkling wine studies (Judica and Perkins, 1992; Mueller, 2006), multiple respondent groups are likely to be identified within the overall sample in the quantitative study (through techniques such as cluster analysis). Appropriate analysis of these groups would be required to assess the validity of the model for different market segments (represented by the relevant groups). Should the quantitative study be replicated in different countries, analysis within each country should enable the relative importance of factors to be measured for each market segment. Such information would be highly valuable to sparkling wine marketers, whether targeting local or export markets.

The current study makes two major contributions. First, the study identifies a comprehensive set of factors influencing purchasing preferences, including relationships between those factors. Second, it provides a model that can facilitate a quantitative evaluation of those factors in different markets, further extending our knowledge relating to key market segments within sparkling wine markets.

Note

1. The term "sparkling wine" is used here to include champagne but exclude product containing a mixer such as fruit juice; except occasionally when reporting verbatim comments of some research participants and other researchers who use the terms "champagne" and "sparkling wine" in a mutually exclusive manner.

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Chapter 3 Online Survey Analysis

3.1 Understanding Australian Wine Consumers' Preferences for Different Sparkling Wine Styles

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Contribution to the Paper	Designed and conducted an online survey (Survey Monkey) to understand Australian wine consumers' preferences for different sparkling wine styles. Undertook data analysis and interpretation (using XLSTAT & NVivo); drafted and revised the manuscript.		
Overall Percentage (%)	80%		
Certification	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
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Signature		Date	02/03/2021

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Article

Understanding Australian Wine Consumers' Preferences for Different Sparkling Wine Styles

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Abstract: This study investigated the perceptions and preferences of Australian wine consumers towards different styles of sparkling wine, including French Champagne and Australian sparkling white, red and rosé wine, Moscato and Prosecco. An online survey of 1027 regular sparkling wine consumers captured demographic information, sparkling wine perceptions and preferences, and typical spending and consumption patterns. Consumers were segmented into three distinct clusters ('No Frills', 'Aspirants' and 'Enthusiasts') using the Fine Wine Instrument model. The majority of No Frills consumers were female and typically consumed sparkling wine once per month. Almost 55% of Aspirants were male with a household income of more than AU$75,000. Enthusiast consumers were also predominantly male and well educated, and 64% were under the age of 35 years. Sparkling white wine and Champagne were generally the preferred styles for each consumer group, followed by Moscato and sparkling rosé wine. Interestingly, Moscato scored favorably with both No Frills and Enthusiast segments. Almost 25% of respondents indicated that they were not familiar with Prosecco, while sparkling red wine was perceived similarly by male and female consumers. The findings from this study can be used by sparkling wine producers to better target their products and marketing to the specific needs and expectations of consumers within different segments of the Australian domestic market.

Keywords: sparkling wine; Champagne; Prosecco; Moscato; consumer behavior; wine marketing; market segmentation; Fine Wine Instrument

1. Introduction

When summarizing the key findings from wine consumer behavior research published over the past decade, Lockshin and Corsi highlighted the importance of researching premium and luxury wine behavior, successful marketing practices, and consumer behavior in emerging markets [1]. This included the value of wine tourism and marketing for value, as well as the relationship between grape and wine quality, and consumer behavior. Using market segmentation and a holistic approach to consumer behavior, a deeper understanding of consumer characteristics, habits, needs and expectations can be gained [2]. It is clear that a research gap exists with respect to classification of sparkling wine consumers and that categorization of consumers of this fine wine style would assist marketing strategies to target specific segments of the Australian domestic market.

Consumers' understanding of wine quality is a multi-dimensional construct [3] that is substantially dependent on their level of involvement [4]. Research indicates that more highly involved consumers

are inclined to conceptualize wine quality more objectively (i.e., using cognitive dimensions), whereas less involved consumers assess quality subjectively (i.e., in sensory dimensions) [4]. A qualitative study suggested that motivations to consume sparkling wine are complex, but include its celebratory symbolic function, as well as perceptions of experiential consumption [5]. Croatian consumers consider the intrinsic characteristics of sparkling wine to be most important (i.e., sensory properties, price and quality), whereas wine appearance, expert reviews and wine awards were deemed to be less significant [6]. Nevertheless, consumers' reliance on extrinsic cues remains extremely robust even when sensory experiences are available [7]. In fact, it has been suggested that knowledge of how sparkling wine production methods impact wine style might influence consumer expectations [8]. The different methods of sparkling wine production strongly influence sparkling wine sensory profiles, and previous research involving segmentation of consumers based on their hedonic liking of different wines identified distinct consumer clusters [9].

Champagne is associated with feelings of luxury and gracious living [10], which are closely linked to perceptions of prestige [11]. However, the question of what constitutes a luxury offering depends upon the people involved, as well as the situational context [12]. According to Morton and colleagues, anecdotal evidence suggests perceptions of prestige and luxury in Champagne purchases are comprised of brand image, product presentation and taste [13]. Similarly, Italian Prosecco consumers often display high consumer loyalty due to the appeal of the appellation and its upper-tier price point [14]. Charters and colleagues previously noted that the fact that Champagne and sparkling wine is considered to be a special drink indicates that it should be marketed separately from other wine styles [15]. However, this approach requires careful consideration because although marketers would like this wine style to be distinct, they would also like people to consume it more than a few times each year [16]. In a simulated Champagne wine market, Steichen and Terrien demonstrated that in a repeated purchasing situation, personal capital and involvement somehow reduce the impact of the main determinants (reputation, price) used by consumers when making a purchase decision [17]. Territorial brands may benefit from maintaining open communication with competitors and creating collective trademarks in order increase their value [18].

New World wine consumers have a tendency to focus on the general impression of the image, and on the enjoyment and fun associated with drinking Champagne and sparkling wine [19]. Sparkling wine consumers often value a sense of belonging when considering their drinking behavior [20]. Federica and Perkins suggested that self-esteem, family life, and accomplishments were also important factors [21]. Sparkling wine consumption was higher among expert respondents [22] and consumers of sparkling wine have the greatest relative awareness of the shared appellations [23]. Expertise, specifically greater knowledge of wine, is strongly associated with higher consumption patterns and often predicts a higher liking of sparkling wine [24]. Interestingly, highly involved consumers are less likely to assume that Champagne is better than other sparkling wine styles, whereas less involved consumers are more at ease with traditional images of this product [25]. Advertising is given more consideration when consuming wine at impersonal occasions, whereas less conspicuous indicators (e.g., personal recommendations) are deemed more important for intimate consumption experiences [26]. Charters and Pettigrew noted complexity, a sensory descriptor frequently associated with high quality sparkling wine, was not a term commonly used by respondents with limited wine involvement [3]. Female consumers with low levels of expertise were found to consume significantly more sparkling wine than other consumer segments, with the exception of female consumers with medium levels of expertise [27]. Another study showed that white, sparkling and dessert wines represented a much higher proportion of female consumers' wine consumption than for males, with women consuming twice as much sparkling wine than men [28].

Across Anglophone countries, there is similarity amongst generation Y consumers' wine consumption behavior, including a perception that sparkling wine is a 'women's drink' and that generation Y consumers will 'grow into' drinking sparkling wine [15]; whereas older, affluent and well-educated consumers' sparkling wine purchasing decisions are more likely to be influenced by

the country of origin [29]. However, gender was not found to have any impact on the magnitude of country of origin effects [29]. A subsequent study by Müller [30] distinguished six sparkling wine consumer groups, namely, the undemanding, the brand conscious, the ambitious, the region of origin conscious, the vine variety conscious and the experts. The study indicated that experts, the vine variety conscious and to a lesser extent the ambitious perceived the country of origin of the sparkling base wine to be important to their purchase decision making process and their willingness to pay [30]. Since reputation governs the preference order of all consumers, each purchaser will choose the product with the highest reputation he or she can afford [31]. It has been observed that individuals with higher internal values and more complex social identities were less susceptible to normative influence and placed less emphasis on social brand benefits [32]. Moreover, the most expensive and heavily advertised products are not automatically those preferred by regular wine consumers [33].

Rokka discussed how the image of Champagne has transformed from a practically insignificant no-brand wine label in the fifteenth century to an expression of modernity and icon for the global leisure class and celebration [34]. Australian contemporary counterparts made by traditional, Charmat, transfer and carbonation production methods have been shown to have varying chemical and sensory characteristics [35]. Segments of consumers of these sparkling wine styles, including Moscato, have disparate preferences for varietal and complex wines. Moreover, individual liking scores have enabled the identification of two consumer clusters with opposing preferences for distinct styles of Moscato [36]. Grape variety has a strong effect on the manufacture of sparkling wines, and those produced from innovative varieties (including Moscato Embrapa and Villenave) contain a high concentration of esters [37]. Additional research has also confirmed that the production method of Moscato Giallo wines (traditional, Charmat or Asti) influences the volatile composition of the sparkling products [38].

Previous research from Germany showed that Prosecco was mostly bought by people who preferred white wines or who did not have any preference for red wine [39]. An earlier Italian study examining the behavior of Prosecco consumers found that Controlled and Guaranteed Denomination of Origin (CGDO) consumers typically expressed a preference for CGDO products, and that they might be more loyal than Controlled Denomination of Origin (CDO) purchasers [40]. Italian consumers buying wine from supermarkets were surveyed, and substantial differences were observed amongst preferences for brand, certification of origin, and production practices (e.g., sparkling vs. semi-sparkling) [41]. A model to derive a reasonable pattern of differences in willingness to pay for Prosecco between CDO and Typical Geographic Indication types has also been developed [41]. Lastly, sparkling red is considered to be an iconic Australian wine style developed by French winemaker August D'Argent in 1881 for the Victorian Champagne Company [42]. However, Cohen and colleagues indicated that sparkling white wines have a higher likelihood of success and frequent purchase as opposed to sparkling red wines, which might indicate 'change of pace' tendencies [43].

Given the trend towards increased consumption of sparkling wine and Champagne, particularly at special occasions, further research is needed to better inform winemaking and marketing decisions to ensure industry meets the needs and expectations of different segments of the consumer market. This study therefore sought to understand Australian consumer awareness of and preferences for different sparkling wine styles, and the influence of occasion and price on consumption behavior, using the Fine Wine Instrument [44] to segment consumers according to their wine knowledge and purchasing behavior.

2. Materials and Methods

2.1. Consumer Survey

Themes identified from an extensive literature review were used to develop an online survey, which was administered nationally using SurveyMonkey™ (www.surveymonkey.com; San Mateo, CA, USA). Australian consumers (n = 1027) were recruited using a market research company (TKW Research Group, Seaford, Australia; www.surveytalk.com.au), with participants from a broad cross-section of

states; prior to data collection, the survey was trialed by 10 South Australian consumers. Screening was performed using inclusion criteria that required participants to be at least 18 years of age and to have consumed sparkling wine at least 12 times per year on average. The survey took approximately 10–15 min to complete and data were collected over 2 weeks period. Participants were financially compensated for their time.

The questionnaire comprised three sections. The first section contained demographic questions relating to sex, age, education, and household income, as well as questions related to alcohol and wine consumption behavior. The second section measured fine wine behavior using the Fine Wine Instrument (FWI); a statistical model devised to segment consumers on the basis of wine connoisseur, knowledge and provenance variables [44]. Respondents were asked to indicate their level of agreement with a series of 18 statements using a 9 point category scale, where 1 = strongly disagree, 5 = neither agree nor disagree, and 9 = strongly agree. These statements were established in previous work by Johnson and Bastian [44] which investigated fine wine consumer involvement and identified three distinct types of consumers: 'Enthusiast' consumers, who exhibit connoisseur-like behavior, and are knowledgeable about wine and actively enjoy increasing that knowledge; 'Aspirant' consumers, who are less knowledgeable about wine, and less confident and adventurous in their wine-purchasing abilities; and 'No Frills' consumers, who display little connoisseur-type behavior, and who have little wine knowledge or involvement [44]. Section three of the survey examined participants' attitudes towards and preferences for different sparkling wine styles, specifically, Champagne, Australian sparkling white, red and rosé wines, Moscato and Prosecco. Consumers were made aware that sparkling wine should only be called Champagne if it originates from the region of Champagne in France. For the purposes of this study, all other sparkling wine styles (white, red and rosé, Moscato and Prosecco) were assumed to be Australian. Survey questions asked participants to list words that they associated with each of the sparkling wine styles, as well as any known brands. Respondents indicated their preferences for different styles using 9 point Likert scales (where 1 = extremely dislike to 9 = extremely like). Participants were also asked whether they would be likely to consume different sparkling wine styles at a number of pre-determined occasions (e.g., birthdays, Christmas, New Year and others identified in a previous study [45]), again using a 9 point category scale (where 1 = never, 5 = sometimes and 9 = always). Finally, participants were asked how much they would typically spend on a bottle of each style of sparkling wine at a retail outlet; with response options being: never purchase; <AU$15; AU$15–$29; AU$30–$49; AU$50–$79; and >AU$80.

2.2. Data Analysis

Consumer data were analyzed using a combination of descriptive techniques (frequencies, percentages, medians, means and quartiles) as well as agglomerative hierarchical clustering and non-parametric testing. Mood's median test [46] was used to test the equality of medians from two or more populations because the data are ordinal and the consumer segment responses did not follow a normal distribution. An examination of the interquartile ranges (IQR = 3rd quartile − 1st quartile) was also undertaken between the FWI segments for the different sparkling wine styles. The IQR is a measure of variability of FWI segment data (i.e., the spread of values), based on separation of a data set into quartiles. Fisher exact tests were used to test the association between qualitative variables given that some counts within contingency tables were less than 5. Statistical analyses were completed using XLSTAT 2016 (Addinsoft, New York, NY, USA). Qualitative analyses of word frequencies were performed using NVivo software Version 12 (QSR International Pty Ltd., Melbourne, Australia).

3. Results and Discussion

3.1. Influence of Consumer Segmentation on Preferences for Different Sparkling Wine Styles

Agglomerative hierarchical clustering using the questions developed by the FWI provided three distinct groups of wine consumers. As established by Johnson and Bastian [44], No Frills fine wine

consumers demonstrate little connoisseur-type behavior, knowledge about wine or interest in the provenance of their wine purchases. The majority of consumers in this group were female (n = 287, 65.1%) and typically consumed sparkling wine only once per month (n = 256, 58.1%) (Table 1). Aspirants share some similarities with the Enthusiast segment; however, their wine knowledge and wine involvement scores were all significantly lower. These respondents were not as confident in their wine-purchasing abilities and valued the opinions of others, including friends and family, staff at restaurants, wine retailers and wine writers [44]. Almost 55% of this segment were male (n = 266, 54.7%) with a household income of more than AU$75,000 ($n$ = 289, 59.5%). Finally, Enthusiasts exhibit connoisseur-like behavior by keeping records of their wine purchases, having a special wine storage space and ritually checking their wines for faults prior to consumption [44]. These consumers were also mostly male (n = 62, 62%) and well educated (n = 66, 66% holding tertiary qualifications), and 64% (n = 64) were under 35 years of age. This was in agreement with Johnson and Bastian [44], who found a significant proportion of Enthusiasts were male and/or under the age of 35, and therefore highlighted the potential value in tailoring wine marketing strategies towards this demographic. Australian sparkling wine producers might similarly benefit from targeting a younger, male demographic, in order to better engage Enthusiast consumers.

Consumers were asked to record the distribution of their alcoholic beverage consumption using percentage scales for alcohol type, wine type and wine style categories (0%–100%, summing to 100% for each consumer). Generally, regular sparkling wine consumers mostly drink wine (median = 50%), followed by beer (median = 10%), spirits (median = 10%) and cider (median = 1.0%) (Table 2). There were significant differences between the median percentages for wine (p = 0.001), beer ($p < 0.0001$), cider (p = 0.002) and other alcoholic beverages ($p < 0.0001$) consumed between all consumer segments (Table 2). The No Frills and Enthusiast categories, in addition to the Aspirant and Enthusiast groups, also demonstrated significantly different consumption percentages for the same alcohol types; (wine p = 0.001, beer $p < 0.0001$, cider p = 0.001, other $p < 0.0001$ and wine p = 0.000, beer $p < 0.001$, cider $p < 0.001$, other p = 0.013 respectively) (Table 2). Enthusiasts consumed the most varied styles of sparkling wine, specifically the most Champagne (median = 20%, IQR = 20%), Prosecco (median = 20%, IQR = 16.3%) and sparkling rosé (median = 10%, IQR = 20%). The No Frills segment did not consume Champagne (median = 0.0%, IQR = 10%), rather they preferred Australian sparkling white wine (median = 50.0%, IQR = 65.0%). Statistically significant differences between all segments ($p < 0.05$) were observed for each type of wine and style of sparkling wine. Furthermore, the majority of pairwise comparisons between groups (i.e., No Frills vs. Aspirants, No Frills vs. Enthusiasts and Aspirants vs. Enthusiasts) yielded statistically significant results ($p < 0.05$). However, there was no significant difference between the Moscato consumption of No Frills and Aspirant segments (p = 0.103), or the sparkling red consumption of Aspirants and Enthusiasts (p = 0.065) (Table 2).

3.2. Influence of Sparkling Wine Style on Consumer Perceptions and Preferences

Consumers were asked to list words and brands that they associated with each sparkling wine style, i.e., Champagne, sparkling white, red and rosé wines, Moscato and Prosecco. Forced open responses were collected, and participants could list as many or as few words/brands as desired. Similar to previous work undertaken by Verdonk and colleagues [47], word frequency analysis (including synonyms) was undertaken and is shown below, with results including word frequencies (i.e., the number of times each word appeared for each sparkling wine style) and weighted percentages for the top ten terms and brands (Table 3).

Table 1. Demographics of Fine Wine Instrument consumer segments (data are frequencies and percentages).

		Frequency | Percentage (%)							
		All Consumers (*n* = 1027)		**No Frills (*n* = 441)**		**Aspirants (*n* = 486)**		**Enthusiasts (*n* = 100)**	
Gender	Male	482	46.9	154	34.9	266	54.7	62	62.0
	Female	545	53.1	287	65.1	220	45.3	38	38.0
Age	18–24	53	5.2	18	4.1	25	5.1	10	10.0
	25–34	307	29.9	122	27.7	131	27.0	54	54.0
	35–44	208	20.3	88	20.0	105	21.6	15	15.0
	45–54	181	17.6	77	17.5	91	18.7	13	13.0
	55–64	170	16.6	90	20.4	75	15.4	5	5.0
	65+	108	10.5	46	10.4	59	12.1	3	3.0
Household income (AUD)	<50,000	256	24.9	126	28.6	107	22.0	23	23.0
	50,000–100,000	417	40.6	176	39.9	199	40.9	42	42.0
	100,001–150,000	232	22.6	92	20.9	115	23.7	25	25.0
	>150,000	122	11.9	47	10.7	65	13.4	10	10.0
Education	High school	236	23.0	132	29.9	88	18.1	16	16.0
	Trade	298	29.0	141	32.0	139	28.6	18	18.0
	Undergraduate	271	26.4	109	24.7	132	27.2	30	30.0
	Postgraduate	222	21.6	59	13.4	127	26.1	36	36.0
Sparkling wine consumption	Once per month	471	45.9	256	58.1	197	40.5	18	18.0
	Once every 2 weeks	259	25.2	96	21.8	143	29.4	20	20.0
	Once per week	204	19.9	62	14.1	107	22.0	35	35.0
	More than twice per week	93	9.1	27	6.1	39	8.0	27	27.0

		Chi-Square Test	**Marascuilo Procedure**		
		All Segments	**No Frills vs. Aspirants**	**No Frills vs. Enthusiasts**	**Aspirants vs. Enthusiast**
Sparkling wine consumption	Once per month	<0.0001 *	Significant	Significant	Significant
	Once every 2 weeks	0.012 *	Significant	Not Significant	Not Significant
	Once per week	<0.0001 *	Significant	Significant	Significant
	More than twice per week	<0.0001 *	Not Significant	Significant	Significant

* *p* values at significance level of 0.05.

Table 2. Average alcohol, wine and sparkling wine consumption of Fine Wine Instrument consumer segments.

		Minimum | Mean | Median | Maximum															
		All Segments (n = 1027)				**No Frills (n = 441)**				**Aspirants (n = 486)**				**Enthusiasts (n = 100)**			
Alcohol type	Wine	0	52.3	50.0	100	0	52.2	50.0	100	2	54.3	50.0	100	7	43.1	40.0	100
	Beer	0	18.9	10.0	100	0	17.6	5.0	100	0	19.0	10.0	90	0	24.4	22.5	80
	Spirits	0	16.1	10.0	95	0	16.4	10.0	95	0	16.0	10.0	95	0	15.0	10.0	60
	Cider	0	8.9	1.0	90	0	10.1	0.0	90	0	7.2	0.0	70	0	11.6	10.0	50
	Other	0	3.9	0.0	100	0	3.7	0.0	100	0	3.5	0.0	70	0	6.0	0.0	45
Wine type	Sparkling wine	0	31.8	25.0	100	0	36.5	30.0	100	0	27.9	20.0	100	0	30.2	25.0	100
	White	0	27.7	20.0	100	0	30.6	25.0	100	0	26.5	20.0	90	0	21.0	20.0	90
	Rosé	0	7.2	2.0	100	0	6.7	0.0	100	0	6.9	5.0	60	0	11.3	10.0	60
	Red	0	25.5	20.0	100	0	19.5	10.0	100	0	31.3	30.0	100	0	23.7	20.0	100
	Dessert	0	4.1	0.0	90	0	3.8	0.0	90	0	3.9	0.0	70	0	6.0	5.0	20
	Fortified	0	3.6	0.0	90	0	2.8	0.0	90	0	3.5	0.0	50	0	7.9	5.0	70
Wine style	Champagne	0	13.9	5.0	100	0	8.1	0.0	100	0	16.6	10.0	100	0	27.2	20.0	100
	Sparkling white	0	45.5	40.0	100	0	51.1	50.0	100	0	44.3	40.0	100	0	26.4	20.0	100
	Sparkling red	0	10.7	0.0	100	0	8.4	0.0	100	0	12.4	5.0	100	0	12.0	10.0	100
	Sparkling rosé	0	8.4	2.0	100	0	8.0	0.0	100	0	8.4	5.0	100	0	10.4	10.0	40
	Moscato	0	17.3	5.0	100	0	21.5	5.0	100	0	13.8	5.0	100	0	15.7	10.0	100
	Prosecco	0	4.2	0.0	100	0	3.0	0.0	100	0	4.6	0.0	90	0	8.3	10.0	40

		Mood Test Multiple Pairwise Comparison p value			
		All Segments	**No Frills vs. Aspirants**	**No Frills vs. Enthusiasts**	**Aspirants vs. Enthusiasts**
Alcohol type	Wine	0.001 *	0.361	0.001 *	0.000 *
	Beer	<0.0001 *	0.005 *	<0.0001 *	0.000 *
	Spirits	0.239	0.260	0.120	0.375
	Cider	0.002 *	0.748	0.001 *	0.000 *
	Other	0.000 *	0.014 *	<0.0001 *	0.013 *
Wine type	Sparkling wine	0.002 *	0.000 *	0.134	0.256
	White	<0.0001 *	0.071	<0.0001 *	0.000 *
	Rosé	<0.0001 *	0.000 *	<0.0001 *	<0.0001 *
	Red	<0.0001 *	<0.0001 *	0.000 *	0.002 *
	Dessert	<0.0001 *	<0.0001 *	<0.0001 *	0.003 *
	Fortified	<0.0001 *	<0.0001 *	<0.0001 *	0.05 *
Wine style	Champagne	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
	Sparkling white	<0.0001 *	0.002 *	<0.0001 *	<0.0001 *
	Sparkling red	<0.0001 *	<0.0001 *	<0.0001 *	0.065
	Sparkling rosé	0.000 *	0.004 *	0.001 *	0.025 *
	Moscato	<0.0001 *	0.103	0.001 *	<0.0001 *
	Prosecco	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *

Data are the means and medians of a percentage scale (0–100%). * p values at significance level of 0.05.

Table 3. Frequencies (and weighted percentages) of the top ten words and brands that consumers associated with different sparkling wine styles.

Word or Brand | Frequency | Weighted Percentage (%)																
Champagne						**Sparkling White**						**Sparkling Red**				
expensive	224	11.7	Moet	421	19.6	bubbly	237	11.9	Yellow	143	6.3	red	109	6.7	none *	80	6.9
bubbly	137	7.1	Chandon	182	8.5	refreshing	209	9.0	Jacobs	123	5.5	bubbly	79	4.5	Brown	69	5.9
celebration	88	4.6	Dom	117	5.4	light	122	4.3	Creek	121	5.4	rich	78	4.3	Brothers	58	5.0
quality	60	3.1	Mumm	105	4.9	fresh	162	4.2	Brown	110	4.9	none*	69	4.2	Creek	30	2.6
French	51	2.7	Bollinger	102	4.7	fun	62	3.3	Yellowglen	109	4.8	sweet	58	3.0	Jacobs	27	2.3
luxury	51	2.4	Veuve	102	4.7	celebration	47	2.4	Brothers	94	4.2	sparkling	56	2.7	Seppelt	27	2.3
classy	50	2.6	Perignon	98	4.6	good	46	2.3	Chandon	86	3.8	strong	42	2.5	Penfolds	26	2.2
special	49	2.5	Cliquot	56	2.6	crisp	46	2.3	Glen	49	2.2	dark	39	2.3	Yellowglen	22	1.9
sparkling	43	1.9	Verve	52	2.4	fruity	39	2.1	Wolf	42	1.9	wine	32	2.0	n *	20	1.7
dry	38	2.0	Krug	39	1.8	nice	39	2.1	Blass	40	1.8	heavy	34	1.9	nil *	20	1.7
Sparkling Rosé						**Moscato**						**Prosecco**				
pink	161	9.4	Jacobs	88	7.5	sweet	485	27.1	Brown	271	17.8	none*	130	9.0	none *	110	15.0
sweet	153	7.6	Creek	85	7.2	none *	62	3.6	Brothers	239	15.7	(don't) know *	116	7.9	Brown	64	8.7
light	128	6.0	none*	79	6.7	light	74	3.3	none *	70	4.6	Italian	93	6.4	Brothers	54	7.4
bubbly	85	4.7	Brown	61	5.2	fruity	43	2.5	Gossips	64	4.2	dry	79	5.5	(don't) know	37	5.1
refreshing	82	3.7	Brothers	53	4.5	refreshing	57	2.3	Jacobs	55	3.6	sweet	69	4.5	nil *	25	3.4
none*	53	3.1	Yellowglen	37	3.1	wine	36	2.1	Creek	52	3.4	nothing *	56	3.9	n *	23	3.1
red	50	2.9	Mateus	26	2.2	(don't) know *	35	1.8	Banrock	48	3.2	(not) sure *	42	2.9	(can't) recall	17	2.3
nice	37	2.1	(can't) recall	22	1.9	bubbly	31	1.7	Station	43	2.8	wine	38	2.6	(not) sure *	17	2.3
wine	31	1.8	Yellow	22	1.9	delicious	31	1.7	Bros	29	1.9	never* (tried)	36	2.5	na *	15	2.1
(don't) know *	34	1.6	nil	21	1.8	nice	28	1.6	Moscato	25	1.6	sparkling	42	2.4	(no) idea	12	1.6

* Descriptors which indicated that respondents were unfamiliar with the sparkling wine style. In these circumstances, 'none', 'nil', 'na' and 'n' were taken to indicate that no words or brand could be associated with the wine style; 'know', 'never' and 'sure' were associated with 'don't know', 'never tried' and 'not sure', respectively. Consumers were asked to the list words and brands that they associated with each sparkling wine style (as many or as few words/brands as desired, but at least one response).

The words used to describe Champagne include 'expensive', 'celebration', 'quality', 'France' and 'luxury' (Table 3), supporting research indicating that Champagne houses have successfully projected an image of prestige, luxury and exclusivity [48]. Brands such as 'Moët' (19.6%) and 'Chandon' (8.5%), 'Dom (5.4%) Perignon' (4.6%), 'Mumm' (4.9%), 'Bollinger' (4.7%), 'Veuve (4.7%) Cliquot' (2.6%) and 'Krug' (1.8%) were most well-known. In contrast, Australian sparkling white wine was described as 'bubbly', 'refreshing', 'light', and 'fruity'. There was little reference to quality or complexity; however, it should be noted that these wines were also associated with 'celebration' and special occasions. Furthermore, 'Yellow' (6.3%), 'Jacob's (5.5%) Creek' (5.4%), 'Yellowglen' (4.8%), 'Brown (4.9%) Brothers' (4.2%), 'Chandon' (3.8%) and 'Wolf (1.7%) Blass' (1.8%) were mentioned. Respondents deemed sparkling red wine to be 'red', 'bubbly', 'rich', 'dark' and 'heavy' with 'Brown (5.9%) Brothers' (5.0%), 'Jacobs (2.3%) Creek' (2.6%), 'Seppelt' (2.3%), 'Penfolds' (2.2%) and 'Yellowglen' (1.9%) being named. Sparkling rosé was considered a 'pink', 'sweet' and 'light' wine, and 'Jacobs (7.5%) Creek' (7.2%), 'Brown (5.2%) Brothers' (4.5%), 'Yellowglen' (3.1%), 'Mateus' (2.2%) and 'Yellow' (1.9%) were the most well-known brands. The overwhelming impression of Moscato was that it is 'sweet'. Nevertheless, positive language was used, including reference to the 'refreshing', and 'delicious' characteristics of the wine style, which is made by 'Brown (17.8%) Brothers' (15.7%), 'Gossips' (4.2%), 'Jacobs (3.6%) Creek' (3.4%) and 'Banrock (3.2%) Station' (2.8%). Consumer knowledge of Prosecco was limited, demonstrated by the high ranking of the words 'none' and 'don't know'. Some consumers were aware of the style's country of origin (Italian, 6.4%), but used both 'dry' and 'sweet' to describe the sensory attributes. The most popular Prosecco brand was 'Brown (8.7%) Brothers' (7.4%), whereas other responses within the list indicated unfamiliarity (e.g., 'none', 'don't know', 'nil', 'can't recall', 'not sure' and 'no idea').

Of the consumers that had an opinion on the sparkling wine styles, statistically significant differences were observed amongst sparkling wine styles and consumer segments ($p < 0.05$) (Table 4). Enthusiasts consistently preferred all sparkling wine styles more than the Aspirant and No Frills segments. Pairwise comparisons of the sparkling white wine preferences found that only the No Frills vs. Aspirant scores demonstrated a significant difference ($p = 0.010$). All other pairwise comparisons for sparkling white wines were statistically insignificant. Overall, Champagne and sparkling white wine were most preferred (medians = 7.0 for both, IQRs = 4.0, 2.0 respectively), followed by sparkling rosé and Moscato (medians = 6.0 for both, IQRs = 2.0, 3.0 respectively). Surprisingly, Moscato received the highest median scores from the Enthusiast and No Frills segments (medians = 7.0 for both, IQRs = 4.0). Sparkling red wine had a median score of 6.0 (IQR = 3.0) and all segment comparisons for this style yielded statistically significant results ($p < 0.05$). Prosecco was preferred the least by No Frills and Aspirant segments (medians = 5.0 for both, IQRs = 2.0), with statistically significant differences observed between all groups ($p < 0.05$). This result is not surprising when the low level of familiarity with Prosecco is considered. Additional advertising and/or consumer exposure to Prosecco may improve sales of this wine style, given it has been suggested that wines that have been tasted previously seem to be preferred over recommended or prestigious wines [49].

Of the 1027 regular Australian sparkling wine consumers surveyed, only 6.2% ($n = 64$) indicated that they were not familiar with Champagne. In contrast, only 10 respondents were unable to state their preferences for sparkling white wine (Table 5). Overall, 253 (24.63%) consumers were not familiar with Prosecco, 6.6% ($n = 68$) did not have an opinion about Moscato, and only 3.5% ($n = 36$) and 3.7% ($n = 38$) did not indicate a preference score for sparkling rosé and red wines, respectively. In vast contrast to the Enthusiast segment, the No Frills consumers demonstrated the least familiarity with Prosecco ($n = 157$), Champagne ($n = 44$), Moscato ($n = 38$), sparkling rosé ($n = 26$) and sparkling red wines ($n = 25$). Aspirant frequencies for all wine styles, except sparkling white wine ($n = 5$), sat between the No Frills and Enthusiast segments. In summary, the observed trend was that respondents were most familiar with sparkling white wine ($n = 10$) and least familiar with Prosecco ($n = 253$) (Table 5).

Women consistently liked sparkling wine more than men, with the exception being for sparkling red wine (Table 6). Female respondents preferred sparkling white wine the most (median = 8.0,

IQR = 2.0), followed by Champagne, sparkling rosé, Moscato (medians = 7.0 for all, IQRs = 4.0, 3.0, 4.0 respectively), sparkling red (median = 6.0, IQR = 4.0) and Prosecco (median = 5.0, IQR = 2.0). Additionally, the median scores provided by women for sparkling white, Moscato and sparkling rosé were all significantly higher than those of men ($p < 0.05$). These findings are consistent with previous research suggesting gender-based interest and/or preference in sparkling wine [45,50].

The younger consumers who participated in this study (i.e., those under 35 years of age), preferred Moscato and sparkling rosé (medians = 7.0 for both, IQRs = 4.0, 2.0 respectively) more than consumers from other age groups. Respondents over 55 years of age (median = 8.0, IQR = 2.0) preferred sparkling white wine the most. Pairwise comparisons between all age categories for sparkling white wine and Moscato identified significant differences ($p < 0.05$). Nonetheless, statistically significant differences were not observed between any of the age groups regarding sparkling red wine. Furthermore, consumers with postgraduate qualifications provided the highest scores for Prosecco (median = 6.0, IQR = 2.0). Whereas Moscato was most popular with respondents whose highest level of education was high school and trade qualifications (medians = 7.0 for both, IQRs = 3.0, 5.0). When comparing the median scores of all education segments collectively, Champagne ($p < 0.0001$), Prosecco ($p = 0.001$) and Moscato ($p = 0.013$) showed significantly different results. In addition, Champagne was the only sparkling wine style that provided significant differences between all income levels ($p < 0.0001$). A significant result ($p < 0.001$) was observed when comparing the lower Prosecco preferences of consumers who earn less than AU$50,000 to the higher scores of those who earn more than AU$150,000. Consumers with household incomes above AU$150,000 preferred Champagne the most (median = 8.0, IQR = 3.0), followed by sparkling white wine (median = 7.0, IQR = 2.0).

The No Frills segment showed females preferred sparkling white wine ($p = 0.002$), Moscato ($p = 0.002$) and sparkling rosé ($p = 0.033$), significantly more than their male counterparts. Male and female Aspirant responses for all styles (except sparkling red wine) were significantly different; with females preferring sparkling white ($p = 0.001$), sparkling rosé ($p < 0.0001$) and Moscato ($p = 0.002$). The preference scores of male and female consumers in the Enthusiast segment were not significantly different for any of the sparkling wine styles (Table S1 (Supplementary Materials)). When comparing the preference scores of individual age groups (i.e., <35 years, 35–55 years, >55 years) within the No Frills segment, significant differences were observed between all the age groups for sparkling white ($p = 0.004$).

Moscato ($p = 0.019$) and sparkling red ($p = 0.020$) wines. Aspirants of different ages also had significantly different preference scores for Champagne ($p = 0.050$), sparkling white ($p = 0.008$), Prosecco ($p = 0.004$), Moscato ($p = 0.001$) and sparkling rosé ($p = 0.007$). Younger consumers (<35 years) preferred Moscato more than older consumers ($p < 0.0001$), and statistically significant results were observed when all Aspirant age groups were compared; younger respondents rated Moscato higher. Only the preference scores for Moscato ($p = 0.007$) and sparkling rosé ($p = 0.014$) were significantly different across all age groups within the Enthusiast segment, where liking reduced as age increased (Table S2 (Supplementary Materials)).

Significant differences were found when comparing the No Frills and Aspirant consumers' preferences for Champagne, according to those who had completed High School with those who had undergraduate ($p = 0.025$, $p = 0.048$ respectively) and postgraduate ($p = 0.016$, $p = 0.001$ respectively) qualifications. Aspirant respondents who had completed postgraduate study also provided significantly higher preference scores for Champagne than participants who had completed a trade qualification ($p = 0.014$). Preferences for Prosecco were higher from those who had finished postgraduate study compared to a trade qualification, for both the No Frills and Aspirant segments ($p = 0.041$, $p = 0.019$ respectively). Enthusiasts who had completed undergraduate education gave lower preference scores for Moscato when compared to High School and Trade School graduates ($p = 0.001$ for both) and Postgraduates ($p = 0.011$). A significant difference between Enthusiast preferences for Prosecco was also perceived amongst those who had been educated at undergraduate and postgraduate levels, where postgraduates preferred the style more ($p = 0.041$) (Table S3 (Supplementary Materials)).

Table 4. Liking scores of Fine Wine Instrument consumer segments for different sparkling wine styles.

	1st Percentage Quartile | Mean | Median | 3rd Percentage Quartile															
	All Segments (n = 1027)				No Frills (n = 441)				Aspirants (n = 486)				Enthusiasts (n = 100)			
Champagne	5.0	6.8	7.0	9.0	5.0	6.3	7.0	8.0	6.0	7.0	7.0	9.0	7.0	7.7	8.0	9.0
Sparkling white	7.0	7.3	7.0	9.0	7.0	7.3	8.0	9.0	7.0	7.3	7.0	9.0	7.0	7.5	7.0	9.0
Sparkling red	4.0	5.7	6.0	7.0	3.0	5.1	5.0	7.0	5.0	5.9	6.0	7.0	6.0	6.9	7.0	8.0
Sparkling rosé	5.0	6.0	6.0	7.0	5.0	6.0	6.0	7.0	5.0	5.8	6.0	7.0	6.0	6.9	7.0	8.0
Moscato	5.0	6.0	6.0	8.0	5.0	6.1	7.0	9.0	4.0	5.7	6.0	7.0	5.0	6.8	7.0	9.0
Prosecco	5.0	5.3	5.0	7.0	4.0	5.0	5.0	6.0	5.0	5.3	5.0	7.0	5.0	6.5	7.0	8.0

	Mood Test Multiple Pairwise Comparison p value			
	All Segments	No Frills vs. Aspirants	No Frills vs. Enthusiasts	Aspirants vs. Enthusiasts
Champagne	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Sparkling white	0.035 *	0.010 *	0.645	0.657
Sparkling red	<0.0001 *	0.002 *	<0.0001 *	<0.0001 *
Sparkling rosé	<0.0001 *	0.049 *	<0.0001 *	<0.0001 *
Moscato	<0.0001 *	0.002 *	0.050 *	<0.0001 *
Prosecco	<0.0001 *	0.015 *	<0.0001 *	<0.0001 *

Data are the means, medians and quartiles of 9 point Likert scale scores (where 1 = extremely dislike, 5 = neither dislike nor like, 9 = extremely like, and 0 = never consumed). * p values at significance level of 0.05.

Table 5. Frequency of Fine Wine Instrument consumer segments' unfamiliarity with different sparkling wine styles.

Wine Type	Frequency			
	All Segments (n = 1027)	No Frills (n = 441)	Aspirants (n = 486)	Enthusiasts (n = 100)
Champagne	64	44	19	1
Sparkling white	10	3	5	2
Sparkling red	38	25	10	3
Sparkling rosé	36	26	8	2
Moscato	68	38	25	5
Prosecco	253	157	88	8

Table 6. Quartile and median liking scores and comparisons of gender, age, education and household income (AUD) segments for different sparkling wine styles.

	1st Quartile Percentage | Median | 3rd Quartile Percentage																	
	Champagne			**Sparkling White**			**Sparkling Red**			**Sparkling Rosé**			**Moscato**			**Prosecco**		
All segments	5.0	7.0	8.0	7.0	7.0	9.0	4.0	6.0	7.0	5.0	6.0	7.0	4.0	6.0	8.0	5.0	5.0	6.0
Male	5.0	7.0	8.0	6.0	7.0	8.0	5.0	6.0	7.0	5.0	6.0	7.0	4.0	6.0	7.0	4.0	5.0	7.0
Female	5.0	7.0	9.0	7.0	8.0	9.0	3.0	6.0	8.0	5.0	7.0	8.0	5.0	7.0	9.0	5.0	5.0	7.0
<35 years	5.0	7.0	8.0	6.0	7.0	9.0	4.0	6.0	7.0	5.0	7.0	9.0	5.0	7.0	9.0	5.0	5.0	7.0
35–55 years	5.0	7.0	9.0	7.0	7.0	9.0	5.0	6.0	7.0	5.0	6.0	7.0	5.0	6.0	8.0	5.0	5.0	6.5
>55 years	5.0	7.0	9.0	7.0	8.0	9.0	3.0	6.0	7.0	5.0	5.0	7.0	3.0	5.0	7.0	3.0	5.0	6.0
High school	5.0	7.0	8.0	6.0	7.5	9.0	4.0	6.0	7.0	5.0	6.0	7.0	5.0	7.0	8.0	5.0	5.0	6.0
Trade	5.0	7.0	8.0	7.0	7.0	9.0	4.0	6.0	7.0	5.0	6.0	7.0	4.0	7.0	9.0	4.0	5.0	6.0
Undergraduate	6.0	7.0	9.0	7.0	7.0	9.0	5.0	6.0	7.0	5.0	6.0	7.0	5.0	6.0	7.0	5.0	5.0	7.0
Postgraduate	6.0	8.0	9.0	7.0	7.0	9.0	5.0	6.0	8.0	5.0	6.0	7.0	5.0	6.0	8.0	5.0	6.0	7.0
<50,000	5.0	7.0	7.0	7.0	8.0	9.0	4.0	6.0	7.0	5.0	6.0	7.0	5.0	6.0	8.0	4.0	5.0	6.0
50,000–100,000	5.0	7.0	7.0	7.0	7.0	8.0	5.0	6.0	7.0	5.0	6.0	7.0	5.0	6.0	8.0	5.0	5.0	7.0
100,001–150,000	6.0	7.0	7.0	7.0	8.0	9.0	4.0	6.0	7.0	5.0	6.0	7.0	4.0	6.0	8.0	5.0	5.0	6.5
>150,000	6.0	8.0	8.0	7.0	7.0	9.0	4.0	6.0	7.0	5.0	6.0	7.0	4.0	6.0	8.0	5.0	5.0	7.0

	Mood Test Multiple Pairwise Comparison *p* value					
	Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
Both genders	0.129	<0.0001 *	0.053	<0.0001 *	0.000 *	0.193
All age groups	0.024 *	<0.0001 *	0.397	0.003 *	<0.0001 *	0.000 *
<35 years vs. 35–55 years	0.048 *	0.038 *	0.252	0.206	<0.0001 *	0.006 *
<35 years vs. >55 years	0.467	<0.0001 *	0.232	0.001 *	<0.0001 *	<0.0001 *
35–55 years vs. >55 years	0.011 *	0.003 *	0.88	0.021 *	0.045 *	0.113
All education levels	<0.0001*	0.676	0.258	0.492	0.013 *	0.001 *
High school vs. Trade	0.118	0.969	0.692	0.76	0.786	0.747
High school vs. Undergraduate	0.003 *	0.677	0.618	0.337	0.005 *	0.298
High school vs. Postgraduate	<0.0001 *	0.283	0.207	0.698	0.379	0.001 *
Trade vs. Undergraduate	0.142	0.687	0.906	0.183	0.004 *	0.147
Trade vs. Postgraduate	0.000 *	0.274	0.084	0.915	0.419	0.000 *
Undergraduate vs. Postgraduate	0.018 *	0.485	0.072	0.179	0.058	0.019 *
All income levels	<0.0001 *	0.611	0.303	0.911	0.845	0.097
50,000 vs. 50,000–100,000	0.053	0.273	0.067	0.931	0.759	0.124
50,000 vs. 100,001–150,000	0.000 *	0.633	0.228	0.839	0.831	0.553
50,000 vs. >150,000	<0.0001 *	0.653	0.643	0.554	0.558	0.018 *
50,000–100,000 vs. 100,001–150,000	0.040 *	0.259	0.661	0.755	0.949	0.381
50,000–100,000 vs. >150,000	0.001 *	0.718	0.355	0.482	0.382	0.19
100,001–150,000 vs. >150,000	0.137	0.626	0.599	0.677	0.448	0.064

Data are the medians and quartiles of 9 point Likert scale (1 = extremely dislike, 5 = neither dislike nor like, and 9 = extremely like). * *p* values at significance level of 0.05.

Preferences of No Frills consumers of different income levels showed significant differences for sparkling white wine ($p = 0.012$) and Prosecco ($p = 0.019$). Those with incomes less than AU$50,000 were significantly different to those earning AU$50,000–$100,000 and greater than AU$150,000 ($p = 0.019$, $p = 0.017$ respectively for sparkling wine and $p = 0.007$ and $p = 0.005$ for Prosecco). In addition, significant differences were observed between the No Frills sparkling white wine preference scores of people who earned AU$100,001–$150,000 and AU$50,000–$100,000 ($p = 0.031$) and more than AU$150,000 ($p = 0.021$) (Table S4 (Supplementary Materials)).

When comparing preferences for Champagne across all segments of varying incomes, statistically significant results were observed ($p < 0.001$). In addition, within the Aspirant segment there were significantly different results across all income brackets ($p < 0.0001$). Mood's test showed that the median Champagne scores were different when comparing Aspirants with incomes less than AU$50,000 to AU$50,000–$100,000 ($p = 0.004$), AU$100,001–$150,000 ($p < 0.001$) and greater than AU$150,000 ($p < 0.0001$). When considering Champagne, a significant difference was also observed for Aspirants earning AU$50,000–$100,000 and those with a household income over AU$150,000 ($p = 0.004$). Aspirants with a household income of less than AU$50,000 had significantly different preference scores for sparkling red wine to those earning AU$50,000–$100,000 ($p = 0.006$). Finally, the Champagne preference scores of Enthusiasts who earn AU$50,000–$100,000 were significantly lower than those who earn more than AU$150,000 ($p = 0.039$). Enthusiasts with an average household income less than AU$50,000 provided significantly higher scores for sparkling rosé wine, than those who earn AU$100,001–$150,000 ($p = 0.021$) (Table S4 (Supplementary Materials)).

3.3. Influence of Occasion on the Consumption of Different Sparkling Wine Styles

The 'situational purchase context' is a principal driver behind sparkling wine purchasing [13] and Champagne has been described as 'the celebration wine' [10] which Australian consumers typically purchase with the intention of sacralizing events [51]. Anchor and Lacinova found that the second biggest motivation for drinking wine, especially sec or demi sec sparkling wine, was 'to celebrate something' [52]. It has been argued that a number of variables are affected by this situational context, including the country of origin effect, the price consumers are willing to pay and perceptions of prestige and luxury [13]. In the current study, when survey participants were asked whether they would consume different sparkling wine styles at a number of pre-determined occasions (identified during focus groups previously conducted by Verdonk and colleagues [45]), the results showed highly significant differences between the ranked medians of the FWI segments for all occasions ($p < 0.05$). Each of the occasions specified showed an increase in the likelihood of consumption as consumer involvement increased (No Frills median ≤ Aspirant median ≤ Enthusiast median). As argued by Spawton [53], the association of sparkling wine with celebration is a key reason why this style is chosen in preference to other alcoholic beverages. This was supported in focus groups held by Olsen, which revealed that participants perceived sparkling wine to be most appropriate for celebrations [54], and a 2016 study found that Croatian sparkling wine consumers generally associated consumption with specific celebrations [6].

In this study, the Enthusiast segment was most likely to consume every style of sparkling wine at each of the listed occasions (median ≥ 2, i.e., anniversary, at home with food, at home without food, birthday, breakfast, by yourself, Christmas, during the week, funeral, girl's/boy's night out, hot weather, Melbourne Cup, New Year, on the weekend, pub/club, restaurant/café, wedding, work drinks). In fact, the median numbers were above 4 for all wine styles, except Prosecco. These consumers were most likely to drink Champagne, sparkling white, red and rosé wines, and Moscato (median ≥ 5) at an anniversary, at home with food, birthday, Christmas, during the week, Melbourne Cup, New Year, on the weekend, pub/club, restaurant/café, wedding and work drinks (Table 7).

Table 7. Median consumption scores at occasions and comparisons of Fine Wine Instrument consumer segments for different sparkling wine styles.

	No Frills Median | Aspirants Median | Enthusiasts Median																	
	Champagne			**Sparkling White**			**Sparkling Red**			**Sparkling Rosé**			**Moscato**			**Prosecco**		
Anniversary	4.0	5.0	7.0	5.0	5.0	6.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	5.0	1.0	1.0	3.0
At home with food	1.0	3.0	5.0	3.0	4.0	6.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	5.0	1.0	1.0	3.0
At home without food	1.0	3.0	5.0	2.0	4.0	5.0	1.0	1.0	5.0	1.0	1.0	4.0	1.0	1.0	5.0	1.0	1.0	3.0
Birthday	4.0	5.0	7.0	5.0	5.0	6.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	3.0
Breakfast	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	4.0	1.0	1.0	4.0	1.0	1.0	4.0	1.0	1.0	2.0
By yourself	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	5.0	1.0	1.0	4.0	1.0	1.0	5.0	1.0	1.0	2.0
Christmas	5.0	6.0	7.0	5.0	5.0	6.0	1.0	3.0	5.0	2.0	3.0	5.0	2.0	2.0	5.0	1.0	1.0	3.0
During the week	1.0	3.0	5.0	2.0	3.0	5.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	3.0
Funeral	1.0	1.0	5.0	1.0	2.0	5.0	1.0	1.0	4.0	1.0	1.0	4.0	1.0	1.0	4.5	1.0	1.0	3.0
Girl's/boy's night out	1.0	2.0	6.0	3.0	3.0	5.5	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	4.5	1.0	1.0	3.0
Hot weather	1.0	3.0	5.0	3.0	5.0	5.5	1.0	1.0	5.0	1.0	2.0	4.0	1.0	1.0	5.0	1.0	1.0	3.0
Melbourne Cup	2.0	4.0	6.5	3.0	4.0	6.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	3.0
New Year	5.0	6.0	7.0	5.0	5.0	6.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	4.0
On the weekend	2.0	5.0	6.0	4.0	5.0	6.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	3.0
Pub/club	1.0	2.0	5.0	2.0	3.0	5.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	2.0
Restaurant/café	2.0	3.0	5.0	3.0	5.0	6.0	1.0	2.0	5.0	1.0	3.0	5.0	1.0	2.0	5.0	1.0	1.0	3.0
Wedding	5.0	6.0	7.0	5.0	5.0	6.5	1.0	2.0	5.0	1.0	2.0	5.0	1.0	1.0	5.0	1.0	1.0	3.0
Work drinks	1.0	3.0	5.5	2.0	3.0	5.5	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	5.0	1.0	1.0	3.0

	Mood Test *P* value					
	Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
Anniversary	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
At home with food	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
At home without food	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Birthday	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Breakfast	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
By yourself	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Christmas	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
During the week	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Funeral	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Girl's/boy's night out	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Hot weather	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Melbourne Cup	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
New Year	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
On the weekend	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Pub/club	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Restaurant/café	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Wedding	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *
Work drinks	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *

Data are the medians and quartiles of 9 point Likert scale (1 = never, 5 = sometimes, and 9 = always). * *p* values at significance level of 0.05.

The No Frills segment did not report consuming sparkling red, rosé, Moscato or Prosecco (median = 1) at an anniversary, at home with food, at home without food, birthday, breakfast, by yourself, during the week, funeral, girl's/boy's night out, hot weather, Melbourne Cup, New Year, on the weekend, pub/club, restaurant/café, wedding and work drinks. However, the Aspirant group was more likely to consume sparkling red and sparkling rosé (median ≥ 2) at an anniversary, at home with food, birthday, Christmas, New Year, on the weekend, restaurant/café and wedding. Of all the sparkling wine styles, Champagne and sparkling white wine were consumed the most at all occasions, with Enthusiasts consistently providing the highest scores. The highest median values for all segments consuming Champagne and sparkling white wine (i.e., No Frills median > 4.0, Aspirant median > 5.0, Enthusiast median > 6.0) were found on anniversaries, birthdays, Christmas, Melbourne Cup, New Year and weddings ($p < 0.001$ for all). Sparkling white wine was also regularly consumed on weekends (No Frills median = 4.0, Aspirant median = 5.0, Enthusiast median = 6.0) ($p < 0.001$) (Table 7).

Pairwise comparisons between the consumer segments showed that the majority (96.5% of combinations tested) of relationships were significantly different. However, statistically significant differences were not observed between the No Frills and Aspirant segments when comparing likelihood of consumption for sparkling white wine at Christmas ($p = 0.064$) and New Year ($p = 0.066$). The Mood test also found non-significant differences between the No Frills and Aspirant groups for Moscato at the following occasions: anniversaries ($p = 0.062$), at home with food ($p = 0.395$), at home without food ($p = 0.092$), birthdays ($p = 0.121$), by yourself ($p = 0.067$), Christmas ($p = 0.643$), during the week ($p = 0.074$), on a girls/boys night out ($p = 0.560$), Melbourne Cup ($p = 0.056$), New Year ($p = 0.206$), on the weekend ($p = 0.097$), at the pub/club ($p = 0.089$) and at a restaurant/café ($p = 0.333$). Detailed comparisons of each FWI segment at each listed occasion can be found in the appendices (Table S5 (Supplementary Materials)).

3.4. Influence of Price on Consumer Purchasing Behavior

Several studies have identified price as being an important consideration during wine purchasing decisions [53,55–61], with high prices being associated with superior quality [53,59]. Six attributes were found to be statistically important in explaining deviations from average wine prices: quality, cellar potential, grape variety/style, region, vintage and producer size [62]. Lecocq and Visser found that price differences could be explained by characteristics which were directly revealed to the consumer upon inspection of the bottle and its label (ranking, vintage and appellation), rather than sensory variables [63].

The most common sparkling wine purchased by consumers in this study was sparkling white wine priced between AU$15 and $29 per bottle ($n = 538$, 52%), followed by Champagne at the same price point ($n = 358$, 35%) (Figure 1). Participants typically purchased bottles of sparkling white at a price less than AU$30 ($n = 887$, 86%), and fewer than 2.1% ($n = 21$) spend more than AU$50 per bottle. More people were willing to spend upwards of AU$30 for Champagne (43%, $n = 441$ typically spending more than AU$30 per bottle), but only 5.5% ($n = 56$) usually spend more than AU$80. Approximately 60% of consumers ($n = 631$) never purchase Prosecco, 39% ($n = 401$) do not buy sparkling red wine, 38% ($n = 389$) never buy Moscato, and 34% ($n = 345$) do not purchase sparkling rosé wine (Table 8).

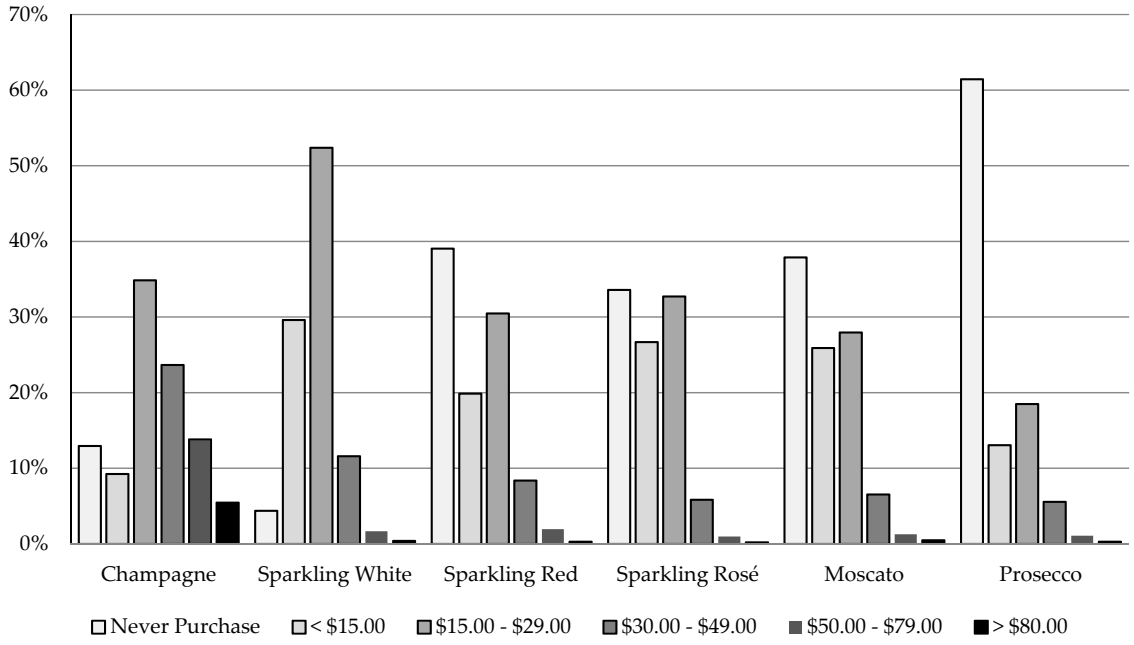

Figure 1. Consumer spending per bottle (AUD) on different sparkling wine styles.

For all considered wine styles, there was a significant association between the consumer segments and the price they were willing to pay ($p < 0.0001$ for all) (Table 8). The No Frills consumers rarely pay more than AU$30 per bottle of Australian sparkling wine. When considering Prosecco, Moscato, sparkling rosé and sparkling red wine, at least 40% of the collective cohort do not purchase these styles. The majority of purchases made by Aspirants and Enthusiasts were under AU$50 and approximately 60% of each of these groups do not purchase Prosecco. The data show that No Frills consumers are most likely to purchase sparkling white wine at AU$15–$29 (n = 222, 50.3%) and never purchase sparkling red wine (n = 237, 54%) or Prosecco (n = 282, 64%). Only ~20% of the No Frills segment was willing to spend AU$15–$29 on sparkling red (n = 102, 23%), sparkling rosé (n = 119, 27%) and Moscato (n = 109, 25%).

Aspirants typically purchase sparkling white wine priced between AU$15 and $29 ($n$ = 271, 56%) and most never purchase Prosecco (n = 290, 60%). At least 30% of the Aspirants purchase Champagne (n = 159, 33%), sparkling red (n = 180, 37%), sparkling rosé (n = 180, 37%) and Moscato (n = 153, 31.5%) at retail prices between AU$15 and $29. Proportionally, the Enthusiast group's spread of data for the AU$15–$29 and AU$30–$49 was the most similar. The results ranged from 19% to 40% for the AU$15–$29 price bracket (n = 35, 35% for Champagne, n = 45, 45% for sparkling white wine, n = 31, 31% for sparkling red wine, n = 37, 37% for sparkling rosé wine, n = 25, 25% for Moscato, n = 19, 19% for Prosecco) and between 8% and 32% across all styles in the AU$30–$49 category (n = 28, 28% for Champagne, n = 32, 32% for sparkling white wine, n = 22, 22% for sparkling red wine, n = 22, 22% for sparkling rosé wine, n = 26, 26% for Moscato, and n = 8, 8% for Prosecco). Interestingly, only 1% (n = 1) of Enthusiasts did not purchase Champagne.

All consumer segments were willing to pay more for Champagne than any other style of sparkling wine. This likely reflects the influence of country of origin and price on consumer perceptions of wine quality [64,65]. Evidence also suggests purchasers are willing to spend more per bottle when wine is purchased for special occasions [49]. Although not specific to sparkling wine, it has been suggested that associating a given wine with an occasion might assist consumers with their purchasing decisions [66].

Table 8. Typical spending (AUD per bottle) of Fine Wine Instrument consumer segments on different sparkling wine styles.

		Frequency | Percentage (%)											
		Champagne		**Sparkling White**		**Sparkling Red**		**Sparkling Rosé**		**Moscato**		**Prosecco**	
All Segments	Never purchase	133	13.0	45	4.2	401	39.0	345	33.6	389	37.9	631	61.4
	<$15	95	9.3	304	28.4	204	19.9	274	26.7	266	25.9	134	13.0
	$15–$29	358	34.9	538	50.2	313	30.5	336	32.7	287	27.9	190	18.5
	$30–$49	243	23.7	119	11.1	86	8.4	60	5.8	67	6.5	57	5.6
	$50–$79	142	13.8	17	1.6	20	1.9	10	1.0	13	1.3	11	1.1
	>$80	56	5.5	4	0.4	3	0.3	2	0.2	5	0.5	3	0.3
No Frills	Never purchase	98	22.2	31	7.0	237	53.7	177	40.1	181	41.0	282	64.0
	<$15	52	11.8	162	36.7	90	20.4	132	29.9	137	31.1	58	13.2
	$15–$29	164	37.2	222	50.3	102	23.1	119	27.0	109	24.7	72	16.3
	$30–$49	76	17.2	24	5.4	11	2.5	12	2.7	13	3.0	23	5.2
	$50–$79	35	7.9	2	0.5	1	0.2	0	0.0	1	0.2	6	1.4
	>$80	16	3.6	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0
Aspirants	Never purchase	34	7.0	14	2.9	147	30.3	154	31.7	190	39.1	290	59.7
	<$15	36	7.4	128	26.3	98	20.2	124	25.5	110	22.6	64	13.2
	$15–$29	159	32.7	271	55.8	180	37.0	180	37.0	153	31.5	99	20.4
	$30–$49	139	28.6	63	13.0	53	10.9	26	5.4	28	5.8	26	5.4
	$50–$79	89	18.3	9	1.9	8	1.7	2	0.4	3	0.6	3	0.6
	>$80	29	6.0	1	0.2	0	0.0	0	0.0	2	0.4	3	0.6
Enthusiasts	Never purchase	1	1.0	0	0.0	17	17.0	14	14.0	18	18.0	59	59.0
	<$15	7	7.0	14	14.0	16	16.0	18	18.0	19	19.0	12	12.0
	$15–$29	35	35.0	45	45.0	31	31.0	37	37.0	25	25.0	19	19.0
	$30–$49	28	28.0	32	32.0	22	22.0	22	22.0	26	26.0	8	8.0
	$50–$79	18	18.0	6	6.0	11	11.0	8	8.0	9	9.0	2	2.0
	>$80	11	11.0	3	3.0	3	3.0	1	1.0	3	3.0	0	0.0
		Fisher Exact *p*-Value											
		Champagne		**Sparkling White**		**Sparkling Red**		**Sparkling Rosé**		**Moscato**		**Prosecco**	
Price vs. Segment Association		<0.0001 *		<0.0001 *		<0.0001 *		<0.0001 *		<0.0001 *		<0.0001 *	

* *p* values at significance level of 0.05.

4. Conclusions

Different styles of sparkling wine (both fruit driven and complex styles) appeal to different segments of the domestic sparkling wine market. In the current study, sparkling white wine and Champagne were the preferred wine styles, followed by Moscato and sparkling rosé wine. However, preference scores for sparkling white and rosé wines were significantly higher for women, than for men, and younger consumers (i.e., those <35 years of age) preferred Moscato and sparkling rosé more than consumers from other age groups. Men and women liked sparkling red wine equally and Moscato appealed to both No Frills and Enthusiast consumers. Whereas Italian sparkling wines have enjoyed considerable (international) growth in recent years, most of the Australian consumers surveyed did not consume it regularly. In fact, almost 25% of consumers were unfamiliar with the style, suggesting Australian wine producers might benefit from further marketing this style. Perhaps not surprisingly, Enthusiasts consumed all sparkling wine styles, more often, and at different occasions, and were willing to spend more on Champagne, albeit, on average, the majority of respondents do not pay more than AU$50 per bottle for Australian sparkling wine.

The outcomes of this study can be used by sparkling wine producers to better tailor their products and marketing strategies to the specific needs and expectations of consumers within different segments of the Australian market. This research aimed to address a knowledge gap regarding the categorization of sparkling wine consumers to assist marketers in targeting specific segments of the Australian domestic market. There are several limitations to this study, due to possible sample and self-selection biases of survey respondents. Despite a recruited convenience sample of approximately 1000 Australian regular sparkling wine consumers, it should be acknowledged that the participants may not be entirely representative of the broader Australian sparkling wine consuming population. In addition, the survey required participants to self-report data, which could also lead to accuracy issues. Opportunities for future research include consumer tastings to determine sparkling wine preferences, as well as an exploration of consumers' knowledge of sparkling wine production. Finally, this study could be replicated in other countries, to determine how cultural influences affect consumer behavior.

Supplementary Materials: The following are available online at https://www.mdpi.com/2306-5710/6/1/14/s1. Table S1: Influence of FWI segmentation and gender on preferences for different sparkling wine styles.; Table S2: Influence of FWI segmentation and age on preferences for different sparkling wine styles; Table S3: Influence of FWI segmentation and education on preferences for different sparkling wine styles; Table S4: Influence of FWI segmentation and household income (AUD) on preferences for different sparkling wine styles; Table S5: Influence of FWI segmentation on consumption occasions of different sparkling wine styles.

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3.1.1 Online Survey Supplementary Data

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Supplementary Materials

Understanding Australian wine consumers' preferences for different sparkling wine styles

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Table S1. Influence of Fine Wine Instrument segmentation and gender on preferences for different sparkling wine styles.

		Median					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
All Segments	Male	7.0	7.0	6.0	6.0	6.0	5.0
	Female	7.0	8.0	6.0	7.0	7.0	5.0
No Frills	Male	6.0	8.0	5.0	6.0	6.0	5.0
	Female	7.0	7.0	5.0	7.0	7.0	5.0
Aspirants	Male	7.0	7.0	6.0	5.0	5.0	5.0
	Female	7.0	8.0	6.0	7.0	6.0	5.0
Enthusiasts	Male	8.0	7.0	7.0	7.0	7.0	7.0
	Female	8.0	7.0	7.0	7.0	8.0	7.0
		Mood Test Multiple Pairwise Comparison *P* value					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
All Segments	Male vs Female	0.129	< 0.0001*	0.053	< 0.0001*	0.000*	0.193
No Frills	Male vs Female	0.075	0.002*	0.276	0.033*	0.002*	0.881
Aspirants	Male vs Female	0.023*	0.001*	0.312	< 0.0001*	0.002*	0.002*
Enthusiasts	Male vs Female	0.785	0.728	0.542	0.640	0.297	0.937

Data are medians and quartiles of 9 point Likert scale (1 = extremely dislike, 5 = neither dislike nor like, 9 = extremely like).
* *p* values at significance level of 0.05.

Table S2. Influence of Fine Wine Instrument segmentation and age on preferences for different sparkling wine styles.

		Median					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
All Segments	<35 years	7.0	7.0	6.0	7.0	7.0	5.0
	35–55 years	7.0	7.0	6.0	6.0	6.0	5.0
	>55 years	7.0	8.0	6.0	5.0	5.0	5.0
No Frills	<35 years	6.5	7.0	5.0	6.0	7.0	5.0
	35–55 years	6.0	8.0	6.0	6.0	6.0	5.0
	>55 years	6.0	8.0	5.0	6.0	5.0	5.0
Aspirants	<35 years	7.0	7.0	6.0	6.0	7.0	5.0
	35–55 years	7.5	7.0	6.0	6.0	5.0	5.0
	>55 years	7.0	8.0	6.5	5.0	5.0	5.0
Enthusiasts	<35 years	8.0	7.5	7.0	7.5	8.0	7.0
	35–55 years	8.0	7.0	8.0	7.0	7.0	7.0
	>55 years	7.5	8.0	6.5	5.5	5.5	6.0
		Mood Test Multiple Pairwise Comparison P-value					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
All Segments	All age groups	0.024*	<0.0001*	0.397	0.003*	<0.0001*	0.000*
	<35 years vs 35–55 years	0.048*	0.038*	0.252	0.206	<0.0001*	0.006*
	<35 years vs >55 years	0.467	<0.0001*	0.232	0.001*	<0.0001*	<0.0001*
	35–55 years vs >55 years	0.011*	0.003*	0.880	0.021*	0.045*	0.113
No Frills	All age groups	0.263	0.004*	0.020*	0.761	0.019*	0.992
	<35 years vs 35–55 years	0.111	0.119	0.006*	0.479	0.040*	0.989
	<35 years vs >55 years	0.844	0.002*	0.058	0.846	0.008*	0.723
	35–55 years vs >55 years	0.322	0.013*	0.437	0.613	0.161	0.723
Aspirants	All age groups	0.050*	0.008*	0.362	0.007*	0.001*	0.004*
	<35 years vs 35–55 years	0.019*	0.023*	0.426	0.434	0.003*	0.017*
	<35 years vs >55 years	0.557	0.003*	0.155	0.002*	0.001*	0.002*
	35–55 years vs >55 years	0.108	0.341	0.463	0.013*	0.021*	0.251
Enthusiasts	All age groups	0.879	0.297	0.227	0.014*	0.007*	0.887
	<35 years vs 35–55 years	0.633	0.208	0.184	0.114	0.299	0.918
	<35 years vs >55 years	0.932	0.982	0.402	0.007*	0.058	0.650
	35–55 years vs >55 years	0.727	0.175	0.129	0.064	0.274	0.629

Data are medians and quartiles of a 9 point Likert scale
(1 = extremely dislike, 5 = neither dislike nor like, 9 = extremely like).
* *p* values at significance level of 0.05.

Table S3. Influence of Fine Wine Instrument segmentation and education on preferences for different sparkling wine styles.

		Median					
		Champagne	Sparkling White	Sparkling Red	Sparkling Rosé	Moscato	Prosecco
All Segments	High School	7.0	7.5	5.0	6.0	7.0	5.0
	Trade	7.0	7.0	5.0	6.0	7.0	5.0
	Undergraduate	7.0	7.0	5.0	6.0	6.0	5.0
	Postgraduate	8.0	7.0	5.0	6.0	6.0	5.0
No Frills	High School	5.0	8.0	5.0	6.0	7.0	5.0
	Trade	6.0	8.0	5.0	6.0	7.0	5.0
	Undergraduate	7.0	8.0	5.0	6.0	6.0	5.0
	Postgraduate	7.0	7.0	5.0	7.0	6.0	5.0
Aspirants	High School	7.0	7.0	5.0	6.0	6.0	5.0
	Trade	7.0	7.0	5.0	6.0	6.0	5.0
	Undergraduate	7.0	7.0	5.0	6.0	5.0	5.0
	Postgraduate	8.0	7.0	5.0	6.0	6.0	5.0
Enthusiasts	High School	8.0	8.0	7.0	7.5	8.0	7.0
	Trade	8.0	7.0	7.0	7.0	8.0	7.0
	Undergraduate	8.0	7.0	5.0	7.0	6.0	5.0
	Postgraduate	9.0	8.0	7.5	7.0	7.5	7.5
		Mood Test Multiple Pairwise Comparison P-value					
		Champagne	Sparkling White	Sparkling Red	Sparkling Rosé	Moscato	Prosecco
All Segments	All education levels	<0.0001*	0.676	0.258	0.492	0.013*	0.001*
	High school vs Trade	0.118	0.969	0.692	0.760	0.786	0.747
	High school vs Undergraduate	0.003*	0.677	0.618	0.337	0.005*	0.298
	High school vs Postgraduate	<0.0001*	0.283	0.207	0.698	0.379	0.001*
	Trade vs Undergraduate	0.142	0.687	0.906	0.183	0.004*	0.147
	Trade vs Postgraduate	0.000*	0.274	0.084	0.915	0.419	0.000*
	Undergraduate vs Postgraduate	0.018*	0.485	0.072	0.179	0.058	0.019*
No Frills	All education levels	0.148	0.803	0.351	0.561	0.620	0.177
	High school vs Trade	0.244	0.640	0.814	0.970	0.964	0.824
	High school vs Undergraduate	0.025*	0.461	0.635	0.920	0.399	0.456
	High school vs Postgraduate	0.016*	0.376	0.170	0.189	0.657	0.061
	Trade vs Undergraduate	0.394	0.761	0.794	0.948	0.330	0.340
	Trade vs Postgraduate	0.776	0.532	0.115	0.195	0.388	0.041*
	Undergraduate vs Postgraduate	0.682	0.782	0.088	0.235	0.814	0.223

Aspirants	All education levels	0.007*	0.426	0.858	0.331	0.322	0.074
	High school vs Trade	0.272	0.139	0.856	0.474	0.844	0.760
	High school vs Undergraduate	0.048*	0.423	0.875	0.365	0.606	0.237
	High school vs Postgraduate	0.001*	0.764	0.449	0.791	0.563	0.081
	Trade vs Undergraduate	0.309	0.449	0.979	0.068	0.608	0.090
	Trade vs Postgraduate	0.014*	0.190	0.513	0.273	0.661	0.019*
	Undergraduate vs Postgraduate	0.145	0.579	0.499	0.478	0.482	0.536
Enthusiasts	All education levels	0.197	0.435	0.487	0.352	0.002*	0.165
	High school vs Trade	0.545	0.311	0.681	0.611	0.934	0.530
	High school vs Undergraduate	0.777	0.236	0.840	0.133	0.001*	0.052
	High school vs Postgraduate	0.266	0.654	0.308	0.853	0.427	0.475
	Trade vs Undergraduate	0.688	0.948	0.495	0.343	0.001*	0.103
	Trade vs Postgraduate	0.066	0.288	0.560	0.680	0.356	0.120
	Undergraduate vs Postgraduate	0.090	0.192	0.142	0.106	0.011*	0.041*

Data are medians of a 9 point Likert scale (1 = extremely dislike, 5 = neither dislike nor like, 9 = extremely like).

* p values at significance level of 0.05.

Table S4. Influence of Fine Wine Instrument segmentation and household income (AUD) on preferences for different sparkling wine styles.

		Median					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
All Segments	<50,000	7.0	8.0	5.0	6.0	6.0	5.0
	50,000-100,000	7.0	7.0	5.0	6.0	6.0	5.0
	100,001-150,000	7.0	8.0	5.0	6.0	6.0	5.0
	>150,000	8.0	7.0	5.0	6.0	6.0	5.0
No Frills	<50,000	6.0	8.0	5.0	6.0	6.0	5.0
	50,000-100,000	6.0	8.0	5.0	6.0	7.0	5.0
	100,001-150,000	7.0	8.0	5.0	6.0	6.0	5.0
	>150,000	7.0	7.0	5.0	6.5	7.0	5.0
Aspirants	<50,000	7.0	7.0	5.0	6.0	5.0	5.0
	50,000-100,000	7.0	7.0	5.0	6.0	6.0	5.0
	100,001-150,000	8.0	7.0	5.0	6.0	6.0	5.0
	>150,000	8.0	8.0	5.0	6.0	5.0	5.0
Enthusiasts	<50,000	8.0	7.5	7.5	8.0	8.0	7.5
	50,000-100,000	8.0	7.0	7.0	7.0	8.0	7.0
	100,001-150,000	8.0	8.0	5.0	7.0	7.0	5.0
	>150,000	9.0	7.0	7.0	7.0	7.0	7.0
		Mood Test Multiple Pairwise Comparison *P* value					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
All Segments	All income levels	<0.0001*	0.611	0.303	0.911	0.845	0.097
	<50,000 vs 50,000–100,000	0.053	0.273	0.067	0.931	0.759	0.124
	<50,000 vs 100,001–150,000	0.000*	0.633	0.228	0.839	0.831	0.553
	<50,000 vs >150,000	<0.0001*	0.653	0.643	0.554	0.558	0.018*
	50,000–100,000 vs 100,001–150,000	0.040*	0.259	0.661	0.755	0.949	0.381
	50,000–100,000 vs >150,000	0.001*	0.718	0.355	0.482	0.382	0.190
	100,001–150,000 vs >150,000	0.137	0.626	0.599	0.677	0.448	0.064
No Frills	All income levels	0.236	0.012*	0.356	0.783	0.973	0.019*
	<50,000 vs 50,000–100,000	0.702	0.019*	0.769	0.377	0.695	0.007*
	<50,000 vs 100,001–150,000	0.138	0.993	0.959	0.531	0.624	0.110
	<50,000 vs >150,000	0.293	0.017*	0.096	0.394	0.554	0.005*
	50,000–100,000 vs 100,001–150,000	0.066	0.031*	0.750	0.896	0.944	0.371
	50,000–100,000 vs >150,000	0.247	0.312	0.126	0.803	0.840	0.402
	100,001–150,000 vs >150,000	0.796	0.021*	0.106	0.748	0.854	0.161

Aspirants	All income levels	<0.0001*	0.434	0.039*	0.759	0.552	0.473
	<50,000 vs 50,000–100,000	0.004*	0.959	0.006*	0.595	0.630	0.777
	<50,000 vs 100,001–150,000	0.000*	0.533	0.411	0.698	0.627	0.548
	<50,000 vs >150,000	<0.0001*	0.156	0.504	0.818	0.502	0.147
	50,000–100,000 vs 100,001–150,000	0.143	0.505	0.102	0.319	0.286	0.686
	50,000–100,000 vs >150,000	0.004*	0.128	0.124	0.480	0.305	0.165
	100,001–150,000 vs >150,000	0.185	0.365	0.857	0.918	0.187	0.343
Enthusiasts	All income levels	0.229	0.877	0.328	0.149	0.424	0.438
	<50,000 vs 50,000–100,000	0.690	0.643	0.596	0.283	0.179	0.137
	<50,000 vs 100,001–150,000	0.951	0.730	0.119	0.021*	0.246	0.220
	<50,000 vs >150,000	0.103	0.599	0.197	0.466	0.157	0.779
	50,000–100,000 vs 100,001–150,000	0.632	0.523	0.217	0.129	0.378	0.932
	50,000–100,000 vs >150,000	0.039*	0.823	0.319	0.886	0.229	0.433
	100,001–150,000 vs >150,000	0.109	0.521	0.908	0.344	0.580	0.193

Data are medians and quartiles of a 9 point Likert scale

(1 = extremely dislike, 5 = neither dislike nor like, 9 = extremely like).

* p values at significance level of 0.05.

Table S5. Influence of Fine Wine Instrument segmentation on consumption occasions of different sparkling wine styles.

		Mood Test Multiple Pairwise Comparison *P* value					
		Champagne	**Sparkling White**	**Sparkling Red**	**Sparkling Rosé**	**Moscato**	**Prosecco**
Anniversary	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.041*	<0.0001*	0.000*	0.062	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
At home with food	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.001*	<0.0001*	<0.0001*	0.395	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
At home without food	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	0.000*	<0.0001*	<0.0001*	<0.0001*	0.092	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	0.001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Birthday	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.012*	<0.0001*	<0.0001*	0.121	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	0.000*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Breakfast	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	<0.0001*	<0.0001*	<0.0001*	0.000*	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
By yourself	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	<0.0001*	<0.0001*	0.000*	0.067	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Christmas	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.064	<0.0001*	0.000*	0.643	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	0.027*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
During the week	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	<0.0001*	<0.0001*	<0.0001*	0.074	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	0.002*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Funeral	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	<0.0001*	<0.0001*	<0.0001*	0.006*	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*

Girl's/boy's night out	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.001*	<0.0001*	0.000*	0.560	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Hot weather	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	<0.0001*	<0.0001*	<0.0001*	0.039*	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	0.001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Melbourne Cup	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.001*	<0.0001*	0.000*	0.056*	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
New Year	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.066	<0.0001*	<0.0001*	0.206	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	0.001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
On the weekend	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.033*	<0.0001*	0.000*	0.097	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Pub/club	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.012*	<0.0001*	<0.0001*	0.089	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Restaurant/café	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.003*	<0.0001*	0.001*	0.333	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Wedding	All Segments	0.000*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	0.004*	0.028*	<0.0001*	<0.0001*	0.034*	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	0.030*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
Work drinks	All Segments	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	No Frills vs Aspirants	<0.0001*	0.001*	<0.0001*	<0.0001*	0.013*	<0.0001*
	No Frills vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*
	Aspirants vs Enthusiasts	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*	<0.0001*

* p values at significance level of 0.05.

Chapter 4 Online Survey and Consumer Tasting Analysis

4.1 Investigating Australian Consumers' Preferences for Different Styles of Sparkling Wine Using the Fine Wine Instrument

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Principal Author

Name of Principal Author (Candidate)	Naomi Verdonk		
Contribution to the Paper	Designed and conducted an online survey (Survey Monkey), descriptive wine analysis (Fizz), chemical analysis (pH. TA, residual sugar, alcohol, phenolic concentrations), and blind consumer wine tastings (Survey Monkey) to investigate Australian consumers' perceptions of and preferences for different styles of sparkling wine using the Fine Wine Instrument. Undertook data analysis and interpretation (using XLSTAT & NVivo); drafted and revised the manuscript.		
Overall Percentage (%)	80%		
Certification	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	02/03/2021

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

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Investigating Australian Consumers' Perceptions of and Preferences for Different Styles of Sparkling Wine Using the Fine Wine Instrument

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Abstract: This study investigated consumer preferences for different styles of sparkling wine and the influence of wine style and occasion on sparkling wine purchasing and consumption behavior. Australian consumers (n = 203) completed an online survey and blind tasting of representative styles of commercial sparkling wines, including Champagne. Wine sensory profiles were determined by descriptive analysis using a trained panel (n = 12) and consumers were segmented into 'No Frills', 'Aspirant' and 'Enthusiast' clusters using the Fine Wine Instrument. Consumer perceptions, preferences and liking were measured using 9-point hedonic scales and compared via statistical analysis. Consumers anticipated liking Champagne and sparkling white wine the most, and Moscato and Prosecco the least, but on tasting, could only readily identify the Moscato and sparkling red wines, as the most contrasting wine styles. As such, liking scores for the Champagne and sparkling white wine were significantly lower based on tasting (median scores were 6.0, compared with 9.0 and 8.0 for survey responses, respectively). Consumers' preconceived expectations of different sparkling wine styles clearly influenced purchasing and consumption behavior. Aspirants and Enthusiasts were more likely to spend more per bottle for Champagne and sparkling white wine, and consumption of these sparkling wines was most frequently associated with celebratory occasions, such as anniversaries, birthdays, Christmas, New Year and weddings.

Keywords: Champagne; descriptive analysis; hedonic liking; Moscato; Prosecco; segmentation

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1. Introduction

Australia is among the top ten producers of sparkling wine (by volume) in the world, producing ~7 million cases/annum [1], and almost half of Australia's adult population (i.e., ~9 million consumers) regularly enjoy this fine wine style [1]. Sparkling white wine accounts for the 'lion's share' of Australian sparkling wine production, but sparkling rosé, sparkling red, and increasingly, Prosecco and Moscato, are also produced in Australia [2]. Domestic sparkling wine sales have remained relatively constant in Australia, whereas the volume and value of sparkling wine being imported (predominantly Champagne) is growing, while exports are declining [1].

Previous studies have demonstrated significant diversity in the sensory profiles of Australian sparkling white and Moscato wines [3,4]. For sparkling white wines, variation in sensory qualities can be attributed to the method of production; carbonated and Charmat wines are typically fruit-driven styles of sparkling wine, whereas transfer and Méthode Traditionelle wines exhibit complexity (e.g., yeasty, toasty, bready characters) due to a combination of bottle fermentation, aging with lees contact and/or yeast autolysis [5,6]. Within the domestic (Australian) sparkling wine market, there are consumer segments

with different preferences for these different styles of sparkling wine [3,4,7]. Wine sensory properties are amongst the most important factors influencing consumer preference [8–10]. However, consumers tend to find sparkling wine more difficult to evaluate than table wine, especially less involved ('novice') consumers [11,12]. Younger and/or less involved consumers tend to prefer sweeter, fruitier styles of wine [13], then as consumer involvement increases, preferences transition from sweet to dry, and lighter to heavier wine styles [14]. As such, the more complex wines made via traditional production methods are not necessarily the preferred sparkling wine style [3,7]. Production process information can impact consumer expectations of quality and liking, but does not always affect informed liking [15]. Consumer trials suggest the varietal composition [16], and levels of carbon dioxide (effervescence) and dosage (sweetness) [17,18], can also influence tasting thresholds and sparkling wine preferences. However, it should be noted that the timing of consumption (relative to pouring) [19] and nucleation sites present in sparkling wine glasses [20] can significantly impact the organoleptic perceptions of carbon dioxide, i.e. the appearance, taste and texture of bubbles or 'fizz'.

Extrinsic cues, including the country or region of origin, brand, recommendations, price, occasion and symbolism, are also important drivers of the perceived quality of sparkling wine [7,21–23], and thus, influence sparkling wine purchasing decisions [23]. However, the relative importance of these drivers can vary amongst wine consumers from different countries. For example, consumers from the United Kingdom value traditional advertising that focuses on the product itself, whereas Australian, New Zealand and US consumers tend to focus more on the image, and the enjoyment and fun associated with sparkling wine consumption [24]. Similarly, sparkling wine consumption in Croatia is often associated with specific celebrations [25]. Consumers are usually willing to spend more on sparkling wine purchased for special occasions [26,27], demonstrating the importance of situational context. Country of origin and price have been shown to influence consumer perception of prestige and luxury [26], albeit in a more recent study, Australian sparkling wine consumers denied kudos (i.e., prestige/status) motivated their Champagne purchases [28]. Price continues to be a strong driver of wine purchasing decisions [8–10,29–33], and consumers often associate higher prices with superior quality [29,30].

Segmentation is often performed to study the preferences of specific groups of wine consumers. For example, extensive research has been published concerning generation Y consumers' attitudes towards, and preferences for, Champagne and sparkling wine [34–39]. Gender is also thought to influence the frequency of sparkling wine consumption. Whereas Lerro and colleagues reported similar rates of sparkling wine consumption by men and women in the US [40], other studies suggest the volume [41] and type/style [42,43] of wine consumed, as well as occasions at which wine is consumed [44], are all influenced by gender. Wine involvement is also considered to play an important role in determining consumer preferences and behavior [3,27]. The Fine Wine Instrument (FWI) is a statistical tool developed to segment consumers based on wine connoisseur, knowledge and provenance variables [45]. The FWI classifies consumers as 'No Frills', 'Aspirants' and 'Enthusiasts' and is an appropriate model for segmenting sparkling wine consumers, given sparkling wines are often categorized as luxurious products [46].

This study examined the influence of fine wine knowledge and behavior (determined using the FWI) on consumer perceptions of and preferences for different styles of sparkling wine. Consumers' familiarity with and ability to identify different sparkling wine styles were also explored, as well as knowledge of sparkling white wine production methods. In this way, the study aimed to provide insight into consumers' expectations of sparkling wine and the importance of the consumption context. The results from this work will enable industry to tailor their marketing strategies for different sparkling wine styles to specific segments of the domestic market. Research in the field of wine science is also advanced through a novel application of the FWI.

2. Materials and Methods

2.1. Sparkling Wines

Nine commercial wines, a French Champagne and eight Australian sparkling wines (Table 1), were chosen in consultation with an industry reference group comprising four prominent Australian sparkling winemakers. The Australian sparkling wines included four sparkling white wines made via carbonation, Charmat, transfer and Méthode Traditionelle production methods (hereafter CA, CH, TR and MT, respectively), a sparkling red wine, a sparkling rosé wine, a Moscato and a Prosecco. A French Champagne was included, to reflect the international benchmark for sparkling wine. Wines were chosen to be representative of each wine style (i.e., to reflect sensory profiles typical of each style, as well as prominent brands in the domestic market); in the case of the sparkling white wines and Moscato, quality ratings and wine sensory profiles available from two previous studies [3,4] were used to inform wine selection. Wines were then sourced from retail outlets and cellared at 15 °C until required.

Table 1. Vintage, varietal composition, geographical origin and price of the French Champagne and Australian sparkling wines studied.

Wine Style	Vintage	Varieties	Region	Price (AUD)
Champagne	NV	PN, Ch, PM	Champagne	55
Sparkling white (CA)	NV	Ch, PN	SA	25
Sparkling white (CH)	NV	Ch, PN	SE Australia	10
Sparkling white (TR)	NV	PN, Ch, PM	SA, NSW, Vic.	30
Sparkling white (MT)	2008	PN, Ch	Vic.	40
Sparkling red	2012	Shiraz	Vic.	20
Sparkling rosé	NV	PN, Ch	Tas.	25
Moscato	2012	Muscat	Vic.	15
Prosecco	NV	Glera	Vic.	15

AUD = Australian dollars; CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle; NV = non-vintage; Ch = Chardonnay; PM = Pinot Meunier; PN = Pinot Noir; NSW = New South Wales; SA = South Australia; SE = South Eastern; Tas. = Tasmania; Vic. = Victoria.

2.2. Chemical Analysis of Wines

Aliquots of sparkling wine (~50 mL, taken from three separate bottles of each wine) were degassed using an ultrasonic bath (Sonorex Digitec DT 1028F, Bandelin Electronic, Berlin, Germany) as described previously [47]. The basic composition of degassed wines were then determined using published analytical methods [48]. pH and titratable acidity (TA, expressed as g/L of tartaric acid) were measured with an autotitrator (Compact Titrator, Crison Instruments, Allela, Spain). Ethanol (as percentage alcohol by volume, abv) was measured with an alcolyzer (Anton Paar, Graz, Austria). Residual sugar was measured enzymatically with a D-glucose/D-fructose enzymatic test kit (Boehringer-Mannheim, R-BioPharm, Darmstadt, Germany), using a liquid handling robot (CAS-3800, Corbett Robotics, Eight Mile Plain, Qld., Australia) and a spectrophotometric plate reader (Infinite M200 Pro, Tecan, Grödig, Austria). Wine color was determined via spectral (CIELAB) measurements performed with a Cintra 4040 spectrometer (GBC Scientific Equipment, Melbourne, Vic., Australia), operating between 380 and 780 nm (at 2 nm intervals). Total phenolics were measured as the absorbance of wine at 280 nm using the Cintra 4040 spectrophotometer.

2.3. Descriptive Analysis of Wines

The sensory profiles of sparkling wines were determined by descriptive analysis (DA) [49] with a trained panel of 12 judges (10 females and 2 males, aged between 18 and 50 years) comprising University of Adelaide staff and students. Panelists were recruited on the basis of their availability and previous wine sensory experience (including DA of sparkling white wines [3] and/or Moscato [4]). The panel completed eight hours of training (4 × 2 h sessions over four weeks) during which they identified descriptive

terms and gained familiarity in recognizing and scoring the intensity of each attribute [50]. DA training also included practice evaluation sessions, conducted in isolated sensory booths under the conditions used during formal assessment (i.e., controlled ventilation, red lighting and a temperature of 22–23 °C). This also enabled evaluation of panel performance (reproducibility and repeatability). The panel generated 38 attributes, including: apple/pear, bruised apple, citrus, confectionary, dark fruit, floral/musk, honey, mixed spice, oaky, savory/smoky, stone fruit, toasty/nutty, tropical fruit, vanilla/caramel and yeasty aromas and flavors; overall aroma and flavor intensity; and sweetness, bitterness, acidity, astringency, complexity and effervescence. Reference standards were developed (Table S1) and provided at subsequent training sessions and during final evaluations, and panelists could refer to these at any time during evaluations.

Throughout DA sessions (both training and formal evaluation), a standardized protocol was employed to minimize variability in pouring and serving wines, and changes in wine carbonation and temperature [3,19]. Wines were poured immediately prior to evaluation, with glasses held at a 45° angle and wine (~30 mL) poured down the inside of the glass. Wines were served chilled (i.e., at 5 °C), in air-dried, three digit-coded black XL5 (ISO standard) 215 mL stemmed wine glasses (covered with lids). Panelists received wines from the same bottles, which were sealed with sparkling wine stoppers and refrigerated between pours.

Three formal evaluation sessions were held, with 9 wines presented in each session, such that all wines were assessed in triplicate. Wines were presented in a randomized order (across panelists), in brackets of three to minimize warming and loss of carbon dioxide. The time lapse between pouring and serving wines was less than 30 sec, with panelists completing evaluation of brackets in five to eight min. Breaks (3 min) were enforced between each bracket to avoid sensory fatigue. Distilled water and plain crackers were provided as palate cleansers. Panelists rated the intensity of each sensory attribute using 15 cm unstructured line scales, with anchor points of 'low' and 'high' placed at 10, and 90% on the scale, respectively. Data were acquired with FIZZ software (Version 2.47b, Biosystèms, Couternon, France).

2.4. Consumer Trials

Consumer trials were completed within 1 month of DA. Regular sparkling wine consumers (n = 203) were recruited using various methods, including flyers, e-newsletters, social media and an internal wine consumer database. Inclusion criteria required participants to be at least 18 years of age and regular consumers of sparkling wine (i.e., $\geq$12 times per year). Consumers attended a single tasting session, during which they rated their acceptance of a subset of the sparkling wines, but in the fortnight prior to the consumer tasting, they first completed an online survey.

2.4.1. Online Survey

The online survey, administered via SurveyMonkey™ (San Mateo, CA, USA), was adapted from a previous study [27] and took participants 10–15 min to complete. The first section of the survey comprised demographic questions related to sex, age, education, household income and alcohol consumption. The second section then explored participants' knowledge of, and preferences for, different styles of sparkling wine. Participants were made aware that sparkling wine should only be called Champagne if it comes from the region of Champagne in France, but that for the purposes of this study, all other sparkling wine styles should be assumed to be Australian in origin. Participants were asked to: (i) list words they associated with each style of sparkling wine; (ii) indicate their liking of each style of sparkling wine (using 9-point category scales, where 1 = extremely dislike, 5 = neither like nor dislike and 9 = extremely like); and (iii) indicate how frequently they consume each style of sparkling wine at a number of pre-determined occasions (using 9-point category scales, where 1 = never, 5 = sometimes and 9 = always). Participants were also asked to rate their familiarity with different sparkling wine production methods

(carbonation, Charmat, transfer and Méthode Traditionelle; again using 9-point category scales) and the price they would typically spend (in Australian dollars) for a 750 mL bottle of each style of sparkling wine at a retail outlet (response options were: never purchase; <$15; $15–$29; $30–$49; $50–$79; and >$80).

2.4.2. Acceptance Testing

Consumer acceptance testing was undertaken over a four week period, in sensory laboratories at either the University of Adelaide's Waite Campus or the University of South Australia's City East Campus, under the same conditions used during DA (i.e. controlled ventilation, red lighting and a temperature of 22–23 °C). Prior to wine evaluation, participants completed the Fine Wine Instrument (FWI) survey, a statistical model developed to segment consumers (as 'No Frills', 'Aspirants' and 'Enthusiasts') according to their fine wine behavior and knowledge [45]. Participants were then instructed on how to assess wines using a hedonic scale, before being presented with wines. However, for ethical reasons, each consumer evaluated a subset of six sparkling wines (chosen randomly according to an incomplete block design). The standardized protocol described above for DA was again employed. Wines were presented in a randomized order, in brackets of three to minimize warming and loss of carbon dioxide. The time lapse between pouring and serving wines was less than 30 sec, with participants completing evaluation of brackets in five min. Participants rated their liking of each wine using 9-point hedonic scales (where 1 = extremely dislike, 5 = neither dislike nor like and 9 = extremely like). Consumers were also asked to identify how much they would expect to pay for a 750 mL bottle of each wine and the style of each sparkling wine. Data were acquired with Survey Monkey™. On completion of wine evaluation, participants received a $20 gift voucher as compensation for their time.

2.5. Data Analysis

Statistical analyses were performed with XLSTAT 2012.1.01 (Addinsoft, New York, NY, USA). Chemical and DA data were analyzed by analysis of variance (ANOVA), with principal component analysis (PCA) of DA data also performed. Consumer data were analyzed using a combination of descriptive techniques (frequencies, percentages, medians and quartiles), agglomerative hierarchical clustering and non-parametric testing. Mood's median test was used to test the equality of medians from two or more populations because the data was ordinal and did not follow normal distribution. Additionally, sample distribution shapes were different and variability was not constant across datasets. To compare proportions of consumers within each segment, a chi-square test and Marascuilo procedure was used. Fisher exact tests were also used to test the association between qualitative variables, given that some counts within contingency tables were less than 5, while a Wilcoxon signed-rank test compared median expected liking scores vs. median actual liking scores. Qualitative analysis of word frequencies was carried out with NVivo qualitative data analysis software (Version 10, QSR International Pty Ltd., Melbourne, Victoria, Australia).

2.6. Ethical Statement

DA panelists and consumers gave informed consent before participating in the study, which was approved by the Human Research Ethics Committees of the University of Adelaide (Project No. H-212-2014) and the University of South Australia (00000338180).

3. Results and Discussion

3.1. Chemical and Sensory Profiles of Sparkling Wines

Chemical and sensory analyses were performed prior to consumer trials to establish the compositional and sensory variation amongst the different sparkling wines (Table 2, Figure 1, Table S1). The wines were generally characterized by low pH (typically 3.00–3.12, albeit the pH of the sparkling rosé was 3.35), high TA (8.0–10.4 g/L), low residual sugar

(<13 g/L), moderate alcohol (10.8–13.4% abv) and low phenolics (1.2–3.6 au), as would be expected of sparkling wine. The exceptions to this were: Moscato, for which the residual sugar was 56.5 g/L and alcohol content was 6.2% abv, which were consistent with previously reported compositional data for this sweeter, lighter-bodied style of sparkling wine [4]; and the sparkling red wine, which had considerably higher phenolics (51.2 au) as a consequence of alcoholic fermentation on skins and 23.0 g/L of residual sugar.

Table 2. Basic chemistry of the French Champagne and Australia sparkling wines studied.

Sparkling Wine	pH	TA (g/L)	Residual Sugar (g/L)	Alcohol (% abv)	Phenolics (au)
Champagne	3.00 ^{e}	8.89 ^{c}	8.6 ^{cd}	12.7 ^{c}	1.3 ^{d}
Sparkling white (CA)	3.04 ^{d}	10.43 ^{a}	8.9 ^{cd}	10.8 ^{h}	2.7 ^{c}
Sparkling white (CH)	3.12 ^{b}	8.79 ^{cd}	12.8 ^{c}	11.1 ^{g}	3.6 ^{b}
Sparkling white (TR)	3.00 ^{e}	8.77 ^{d}	9.6 ^{cd}	11.5 ^{f}	1.2 ^{d}
Sparkling white (MT)	3.11 ^{bc}	8.27 ^{f}	7.0 ^{d}	13.5 ^{a}	1.2 ^{d}
Sparkling red	3.35 ^{a}	9.23 ^{b}	23.0 ^{b}	12.8 ^{b}	51.2 ^{a}
Sparkling rosé	3.04 ^{d}	8.60 ^{e}	9.0 ^{cd}	12.0 ^{d}	2.3 ^{c}
Moscato	3.10 ^{c}	7.99 ^{g}	56.5 ^{a}	6.2 ^{i}	2.5 ^{c}
Prosecco	3.09 ^{c}	8.28 ^{f}	11.5 ^{cd}	11.7 ^{e}	2.0 ^{c}
ANOVA *p*-Value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Values are means of three replicates (n = 3). Different letters (within columns) indicate statistical significance ($p \leq 0.05$, one-way ANOVA). Titratable acidity (TA) measured as g/L of tartaric acid. CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle.

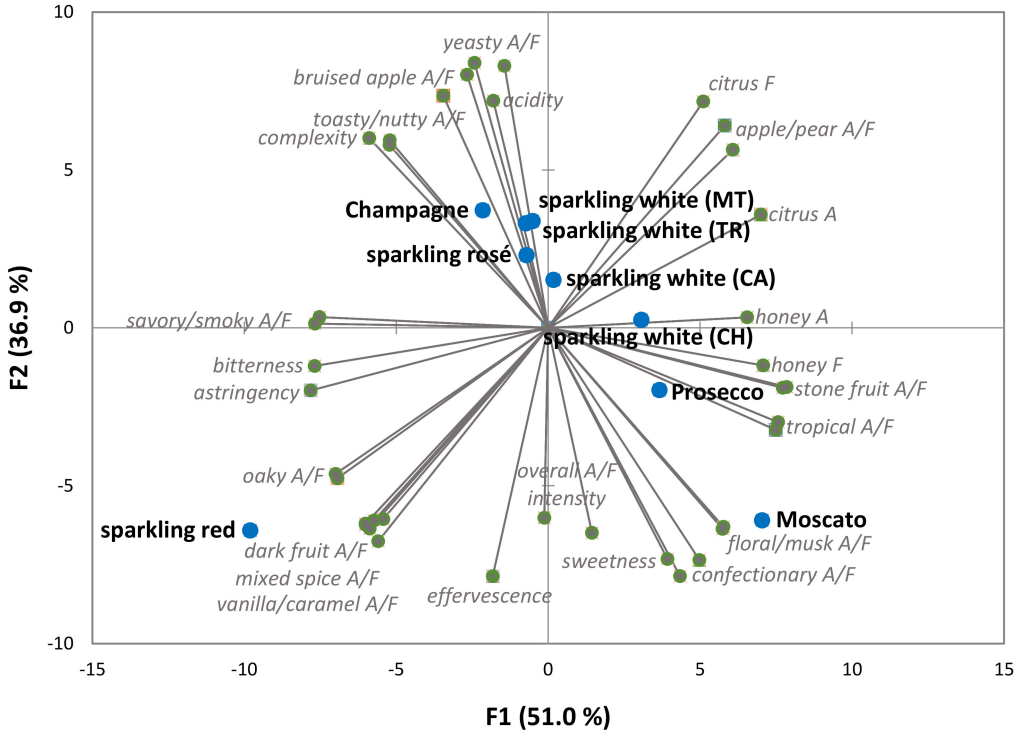

Figure 1. Principal component analysis biplot of sensory attribute ratings of the French Champagne and Australian sparkling wines studied. CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle; A = aroma; F = flavor.

The sensory profiles of the various sparkling wines were determined by DA and significant differences were observed amongst the intensity ratings of all sensory attributes (Table S2), reflecting the stylistic diversity of the nine wines. PCA of sensory data gave the biplot shown in Figure 1 and the first and second principal components explained

51 and 37% of variation, respectively. The Champagne, sparkling white wines made via carbonation, transfer and Méthode Traditionelle production methods and sparkling rosé, were clustered around the middle of the two upper quadrants, based on the prominence of yeasty, toasty/nutty and bruised apple aromas and flavors, complexity and acidity. In contrast, the more fruit driven styles of sparkling wine, i.e., the Charmat, Prosecco and Moscato wines, were positioned in the quadrants on the right; with the Moscato strongly associated with floral/musk and confectionary attributes and sweetness, typical of this style. The sparkling red wine was situated in the lower quadrant on the left, reflecting the intensity of dark fruit, mixed spice, vanilla/caramel and oaky aromas and flavors. These results suggest sensory differences between the sparkling white (CH), sparkling red, Prosecco and Moscato wines should be more apparent than amongst the Champagne, sparkling white (especially the CA, TR and MT wines) and sparkling rosé wines.

3.2. Consumer Perceptions of and Preferences for Different Sparkling Wine Styles

Two hundred and three consumers were recruited to participate in consumer trials (Table 3). A higher proportion of female consumers participated (61.5%), which might reflect gender-based preferences for sparkling wine [23,40], but this was consistent with demographics reported in other recently published sparkling wine studies [3,4,7,23,27]. Although all age categories were represented, 47.3% of participants were aged ≥55 years, and thus, older consumers were over-represented relative to younger consumers (only 16.7% of participants were aged <35 years). Whereas all participants consumed sparkling wine at least once per month (regular consumption of sparkling wine was one of the inclusion criteria for participation in the consumer trial), 25.1% of participants consumed sparkling wine one or more times per week, and a further 33.0% of participants consumed sparkling wine fortnightly (Table 3).

Table 3. Demographics and sparkling wine consumption of consumers and of Fine Wine Instrument consumer segments. Data represent response number (frequency) and proportion (percentage).

		All Consumers (*n* = 203)		**No Frills (*n* = 31)**		**Aspirants (*n* = 104)**		**Enthusiasts (*n* = 68)**	
Gender	Female	125	61.5	26	83.9	61	58.7	38	55.9
	Male	78	38.5	5	16.1	43	41.3	30	44.1
Age (years)	18–24	8	3.9	4	5.9	3	2.9	1	3.2
	25–34	26	12.8	7	10.3	14	13.5	5	16.2
	35–44	34	16.8	8	11.7	22	21.2	4	12.9
	45–54	39	19.2	11	16.2	21	20.2	7	22.6
	55–64	67	33.0	25	36.8	30	28.9	12	38.7
	>65	29	14.3	13	19.1	14	13.5	2	6.5
Household income (AUD)	<50,000	44	21.6	16	23.5	21	20.2	7	22.6
	50,000–100,000	84	41.4	29	42.6	45	43.3	10	32.3
	100,001–150,000	46	22.7	14	20.6	23	22.1	9	29.0
	>150,000	29	14.3	9	13.2	15	14.4	5	16.1
Education	High school	38	18.7	15	22.1	16	15.4	7	22.6
	Trade	43	21.2	11	16.2	25	24.0	7	22.6
	Undergraduate	55	27.1	20	29.4	25	24.0	10	32.3
	Postgraduate	67	33.0	22	32.4	38	36.5	7	22.6
Sparkling wine consumption	Once per month	85	41.9	10	32.3	47	45.2	28	41.2
	Once per fortnight	67	33.0	10	32.3	38	36.5	19	27.9
	Once per week	41	20.2	7	22.6	18	17.3	16	23.5
	>Once per week	10	4.9	4	12.9	1	1.0	5	7.4

Gender was the only demographic for which responses were significant ($p \leq 0.05$, Fisher's Exact Test).

Hierarchical clustering based on responses to questions from the Fine Wine Instrument [45] was used to classify participants as 'No Frills' (n = 31), 'Aspirant' (n = 104) or 'Enthusiast' (n = 68) wine consumers (Table 3). No Frills consumers typically show little connoisseur-type behavior and have limited knowledge of wine or interest in wine provenance. They typically purchase their wine from chain retailers, rather than independent or fine wine retailers [45]. Aspirant consumers share some of the characteristics of Enthusiast consumers segment, but are not as knowledgeable, nor as confident or adventurous in their wine-purchasing abilities. Their purchases are predominantly from chain retailers and they are influenced by the others' opinions (e.g., friends and family, staff at restaurants, wine retailers and wine writers), as well as advertising, promotions, and awards or medals [45]. In contrast, enthusiast consumers are knowledgeable about wine and actively enjoy increasing their knowledge. They exhibit connoisseur-like behavior (i.e., they tend to keep records of their wine purchases, have dedicated wine storage space and ritually check their wines for faults prior to consumption), purchase wine from independent wine retailers, and are adventurous in their wine purchasing (i.e., they like to try different wines). Enthusiasts are confident in their ability to select wines, but will also ask questions and/or seek recommendations [45]. In the current study, a significant proportion of No Frills consumers were female (i.e., 83.9%), whereas female consumers represented 58.7% and 55.9% of the Aspirant, and Enthusiast segments, respectively. The age, household income and level of education of the FWI segments were similar, but interestingly, the No Frills segment tended to consume sparkling wine more frequently (35.5% consumed sparkling wine at least once or more per week) and the Aspirant segment less frequently (81.7% consumed sparkling wine only fortnightly or monthly).

On average, participants' alcohol consumption predominantly comprised wine (at 68.2% of total alcohol consumption), with similar rates of wine consumption for each FWI segment (Table S3). This largely comprised red wine (42.4%), white wine (28.6%) and sparkling wine (23.2%) consumption, of which No Frills consumers consumed significantly more sparkling wine than Aspirant (p = 0.006) and Enthusiast (p < 0.001) consumers, while Enthusiasts consumed significantly more fortified wine than Aspirants (p = 0.030). When consumers' sparkling wine consumption was considered, sparkling white wine (53.8%), sparkling red wine (22.4%) and Champagne (14.5%) accounted for >90% of total consumption (Table S3). This likely reflects the predominance of sparkling white wine in the domestic market [2]. Statistical analysis confirmed significantly higher consumption of sparkling white wine by No Frills consumers compared with Enthusiasts (p = 0.039), and higher consumption of sparkling red wine, but lower consumption of Prosecco by Aspirants compared with Enthusiasts (p = 0.012 and p = 0.017, respectively). Other potential differences in red and sparkling red wine consumption by No Frills consumers (relative to Aspirants and Enthusiasts) were not validated by statistical analysis, which was attributed to the comparatively small number of No Frills consumers (n = 31).

Frequency analysis of the words consumers associated with different styles of sparkling wine provided insight into their perceptions of each wine style (Table 4). All styles were described as 'bubbly' (or 'bubbles' in the case of sparkling red wine), and Champagne, sparkling white wine and sparkling rosé wine were associated with celebration. The reputation of Champagne was evident from its association with 'expensive', 'special', 'luxury', 'refined' and 'fine', and it's origin with reference to the word 'French'. Sparkling white, rosé and Moscato wines were described as 'light' 'refreshing' and 'fun', whereas sparkling red was considered to be 'rich, 'dark' and 'heavy'. The most frequently used word, 'sweet', was offered by 184 participants to describe Moscato, demonstrating consumers' familiarity with the characteristic sweetness of this style of sparkling wine; albeit, the use of the word 'sickly' would suggest the style does not appeal to all consumers. In contrast, consumers were clearly less familiar with Prosecco. Almost 20% of participants described Prosecco as 'sweet', whereas typically it is a dry style of sparkling wine, while 'don't know', 'none' and 'sounds familiar' were all amongst the more frequently used descriptors. Nevertheless, the reference to 'Italy' and 'Italian' indicates consumer awareness of the geographical origin of

Prosecco. These findings were consistent with results from an online survey of Australian sparkling wine consumers [27].

Table 4. Frequencies and weighted percentages of the top ten words (and their synonyms) that consumers associated with different sparkling wine styles.

Word	Frequency	Weighted Percentage						
Champagne			**Sparkling White**			**Sparkling Red**		
expensive	61	10.1	bubbly	67	11.0	rich	52	6.8
celebration	44	7.3	celebration	41	6.9	red	39	6.6
bubbly	36	6.0	refreshing	51	6.8	bubbles	35	6.0
special	21	3.4	light	40	4.5	dark	16	2.6
luxury	21	3.1	fun	26	4.3	heavy	17	2.6
refined	14	2.5	summer	15	2.5	delicious	15	2.6
fine	13	2.5	fresh	30	2.4	Christmas	13	2.2
dry	12	2.0	crisp	15	2.2	sweet	14	2.1
French	12	2.0	happy	13	2.2	bodied	12	2.0
sparkling	14	1.9	drink	12	1.9	wine	12	2.0
Sparkling Rosé			**Moscato**			**Prosecco**		
pink	39	8.7	sweet	184	40.2	sweet	39	9.2
sweet	42	8.6	light	24	4.2	Italian	30	7.5
light	46	8.2	sickly	17	3.8	don't know *	21	5.2
bubbly	28	6.2	bubbly	17	3.5	sparkling	21	4.2
refreshing	18	3.4	fruity	11	2.5	wine	16	4.0
fun	12	2.7	refreshing	13	2.3	none *	14	3.5
red	11	2.4	drink	9	2.0	dry	12	3.0
nice	10	2.2	wine	9	2.0	Italy	12	3.0
wine	9	2.0	fun	8	1.8	bubbly	12	2.7
celebration	8	1.8	low alcohol	6	1.4	sounds familiar *	10	2.5

Descriptors which indicated consumers were not familiar with the sparkling wine style are marked with an asterisk; with 'none' interpreted as no words could be associated with the wine style. Consumers were asked to the list words that they associated with each sparkling wine style (as many or as few words as desired, but at least one response).

During blind tastings, consumers rated their liking of a randomly chosen subset of six of the nine sparkling wines (Table 5). Mean liking scores ranged from 4.8 for Moscato to 6.0 for the carbonated sparkling white wine; these wines also received the lowest (5.0) and highest (7.0), median liking scores, respectively. This was consistent with two previous studies which found on average, Australian consumers liked fruit-driven Charmat sparkling white wines more than more complex transfer and Méthode Traditionelle sparkling wines [3,7], and in one of these studies, Champagne [7].

The interquartile ranges (IQR = 3rd quartile–1st quartile) for the liking scores of each sparkling wine ranged from 2 to 6 for No Frills and Enthusiast consumers, and by 2 to 5 for Aspirants, indicating that there was considerable variation amongst consumer liking scores, even within FWI segments. Nevertheless, statistically significant differences in liking were observed. No Frills consumers tended to like the CH and MT sparkling white wines and Champagne more, and the sparkling rosé wine and Moscato less, whereas Aspirants liked the sparkling rosé wine and the CH and TR sparkling white wines. Enthusiasts liked the sparkling red wine the most, followed by the Champagne, the CA sparkling white and sparkling rosé wines, and they liked the Moscato the least. Statistical analysis revealed the No Frills consumers' liking scores for the CH and MT sparkling white wines were significantly higher than the corresponding scores of Aspirants, but Aspirant consumers liking scores for sparkling rosé wine were significantly higher than for No Frills consumers. Aspirants' liking of Moscato was neutral (5.3), but it was significantly higher than for Enthusiasts (4.4). Despite consumers' limited familiarity with Prosecco (Table 4), mean liking scores for Prosecco were neutral to favorable (i.e., 5.2–5.9), irrespective of FWI

segment. Whereas the Champagne, sparkling white (TR and MT especially) and sparkling rosé wines exhibited varying levels of complexity, together with underlying apple/pear, citrus and stone fruit aromas and flavors, and crisp acidity, the Prosecco displayed intense fruity (apple/pear, citrus, tropical, stone fruit), floral and confectionary characters, and less acidity (Figure 1, Table S2), which some consumers might have found more amenable. The apparent sweetness of the Moscato (Figure 1) clearly doesn't appeal to all consumers, while the red fruit and oak notes (Figure 1) and fuller body (Table 2) exhibited by the sparkling red tended to appeal to Aspirants and Enthusiasts, who typically drink more red wine (Table S3).

Table 5. Liking scores of consumers and Fine Wine Instrument consumer segments for the different sparkling wines.

1st Percentage Quartile | Mean | Median | 3rd Percentage Quartile																
	All Consumers				**No Frills**				**Aspirants**				**Enthusiast**			
Champagne	4.0	5.9	6.0	7.0	4.0	6.3	7.0	8.0	4.0	5.7	6.0	7.0	5.0	6.1	7.0	7.5
Sparkling white (CA)	5.0	6.0	7.0	7.0	5.0	5.9	6.0	7.0	5.0	6.0	7.0	7.0	5.0	6.1	7.0	8.0
Sparkling white (CH)	5.0	5.9	6.0	7.0	5.0	6.5	7.0	8.0	5.0	6.0	7.0	7.0	3.3	5.4	6.0	7.0
Sparkling white (TR)	4.0	5.6	6.0	7.0	3.5	5.5	5.0	7.5	4.0	5.5	6.0	7.0	5.0	5.9	6.0	7.0
Sparkling white (MT)	3.0	5.3	6.0	7.0	6.0	6.4	7.0	8.0	3.0	4.9	5.0	7.0	3.0	5.3	6.0	7.0
Sparkling rosé	5.0	5.9	6.0	7.0	3.0	4.4	5.0	5.5	5.0	6.1	7.0	7.0	5.0	6.1	6.0	7.0
Sparkling red	4.0	5.8	6.0	8.0	3.0	5.3	5.0	7.0	3.0	5.6	6.0	8.0	5.0	6.4	7.0	8.0
Moscato	3.0	4.8	5.0	7.0	2.0	4.1	3.0	6.0	3.0	5.3	6.0	7.0	2.0	4.4	3.5	7.0
Prosecco	4.0	5.7	6.0	7.0	2.8	5.2	5.0	7.3	4.0	5.6	6.0	7.0	5.0	5.9	6.0	7.3

Mood Medium Test Multiple Pairwise Comparison p Values				
	All Consumers	**No Frills vs Aspirants**	**No Frills vs Enthusiasts**	**Aspirants vs Enthusiasts**
Champagne	0.256	0.125	0.762	0.326
Sparkling white (CA)	0.108	0.719	0.117	0.065
Sparkling white (CH)	0.294	0.004 *	0.185	0.190
Sparkling white (TR)	0.637	0.936	0.490	0.374
Sparkling white (MT)	0.073	0.025 *	0.233	0.239
Sparkling rosé	0.032 *	0.009 *	0.058	0.548
Sparkling red	0.201	0.622	0.429	0.538
Moscato	0.037 *	0.080	0.866	0.022 *
Prosecco	0.978	0.979	0.867	0.853

Data represent mean, median and quartiles of 9-point hedonic scale scores (where 1 = extremely dislike, 5 – neither dislike or like, and 9 = extremely like). * denotes P values at ≤ 0.05. CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle.

Previous research involving segmentation of consumers based on their liking of different sparkling white wines found younger consumers tended to prefer more fruit-driven sparkling wine styles (i.e., CA and CH sparkling wines), while older consumers appreciated the more complex TR and MT sparkling wines [3]. The authors hypothesized this might in part reflect the demographics of consumer segments; i.e., older consumers, particularly those with higher household incomes, can afford to consume higher priced sparkling wines more frequently than younger, less affluent consumers. In the current study, the Enthusiast segment did comprise a higher proportion of more affluent consumers (than other FWI segments), but Enthusiasts tended to like a broad range of wines, including the CA sparkling white wine.

3.3. Consumer Knowledge of Sparkling Wine Production Methods

Disclosure of country of origin and method of production provide extrinsic cues which can influence consumers' perception of sparkling wine quality and/or hedonic liking [3,7,15,25]. Consumers were therefore asked to rate their knowledge of Champagne and sparkling white wine production methods, from 1 = extremely unfamiliar to 9 = extremely familiar (Table 6). Mean responses ranged from 1.9 for Charmat production to 3.6 for Méthode Champenoise, indicating consumers had limited appreciation of

sparkling winemaking. Irrespective of the FWI segment, higher responses were given for Méthode Champenoise, carbonation and Méthode Traditionelle (than the Charmat and Transfer methods), with responses given by the more knowledgeable Aspirant and Enthusiast consumers being significantly higher than responses from No Frills consumers. The IQRs for responses from No Frills, Aspirant and Enthusiast consumers were 0–1, 1–5 and 2–6, respectively, which suggests some Aspirants and Enthusiasts were familiar with some production methods. Enthusiasts knowledge of the traditional Méthode Champenoise and Méthode Traditionelle was significantly higher than that of Aspirants ($p = 0.025$, and $p = 0.001$, respectively). However, since consumers were not specifically asked to explain their understanding of the different production methods, it is not clear to what extent consumer responses reflect awareness that there are different methods versus a true appreciation of what each method involves and how this influences wine sensory properties and quality. Given that most consumers had limited knowledge of sparkling winemaking, there were low expectations of consumers' ability to identify the different styles of sparkling wine presented during the blind tasting, with the exception of the sparkling red and Moscato wines, which both exhibited distinctive sensory profiles; dark fruit and oak aromas and flavors in the case of the sparkling red wine, and varietal fruit, floral, musk and confectionary characters and apparent sweetness in the case of the Moscato (Figure 1).

Table 6. Consumers' and Fine Wine Instrument consumer segments' knowledge of different sparkling wine production methods.

1st Percentage Quartile | Mean | Median | 3rd Percentage Quartile																
	All Consumers (n = 203)				**No Frills (n = 31)**				**Aspirants (n = 104)**				**Enthusiast (n = 68)**			
Champagne	1.0	3.6	3.0	6.5	1.0	1.4	1.0	1.0	1.0	3.5	2.0	6.0	2.0	4.6	5.0	7.0
Sparkling white (CA)	1.0	3.2	2.0	5.0	1.0	1.5	1.0	2.0	1.0	3.1	2.0	5.0	1.0	4.1	3.0	7.0
Sparkling white (CH)	1.0	1.9	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.8	1.0	2.0	1.0	2.4	1.0	3.0
Sparkling white (TR)	1.0	2.0	1.0	2.0	1.0	1.1	1.0	1.0	1.0	2.0	1.0	2.0	1.0	2.3	1.0	3.0
Sparkling white (MT)	1.0	3.1	2.0	5.0	1.0	1.3	1.0	1.0	1.0	2.9	2.0	5.0	2.0	4.2	3.5	7.0

Mood Medium Test Multiple Pairwise Comparison p Values				
	All Consumers	**No Frills vs Aspirants**	**No Frills vs Enthusiasts**	**Aspirants vs Enthusiasts**
Champagne	<0.0001 *	0.001 *	<0.0001 *	0.025 *
Sparkling white (CA)	<0.0001 *	0.020 *	<0.0001 *	0.058
Sparkling white (CH)	0.001 *	0.001 *	<0.0001 *	0.341
Sparkling white (TR)	0.001 *	0.001 *	<0.001 *	0.629
Sparkling white (MT)	<0.0001 *	<0.0001 *	<0.0001 *	0.001 *

Data represent mean, median and quartiles of 9-point Likert scale scores (where 1 = extremely unfamiliar, 5 = neither unfamiliar nor familiar, and 9 = extremely familiar). * denotes p values at ≤ 0.05. CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle.

3.4. Consumer Recognition of Different Sparkling Wine Styles

As expected, of the nine different sparkling wines evaluated in the current study, only the Moscato and sparkling red wines were identifiable by a majority of consumers, i.e. by 79.6% and 59.2% of consumers, respectively (Table 7). Presumably the characteristic confectionary and floral/musk notes, and sweetness of Moscato, and the dark fruit and oak aromas and flavors exhibited by the sparkling red wine (Figure 1, Table S1), contributed to the relative ease of their identification.

Table 7. Ability of consumers and Fine Wine Instrument consumer segments to correctly identify different sparkling wine styles (during blind tastings).

	Proportion [a] | Percentage							
	All Consumers		No Frills		Aspirants		Enthusiast	
Champagne	26/137	19.0	4/17	23.5	14/77	18.2	8/43	18.6
Sparkling white (CA)	12/135	8.9	3/21	14.3	4/68	5.9	5/46	10.9
Sparkling white (CH)	5/136	3.7	1/21	4.8	2/65	3.1	2/50	4.0
Sparkling white (TR)	3/134	2.2	0/19	0.0	2/74	2.7	1/41	2.4
Sparkling white (MT)	12/132	9.1	2/21	9.5	5/67	7.5	5/44	11.4
Sparkling rosé	5/139	3.6	0/19	0.0	2/77	2.6	3/43	7.0
Sparkling red	77/130	59.2	12/21	57.1	34/61	55.7	31/48	64.6
Moscato	109/137	79.6	19/23	82.6	58/70	82.9	32/44	72.7
Prosecco	8/138	5.8	1/25	4.0	2/65	3.1	5/48	10.4

Champagne was the only sparkling wine style for which responses were statistically significant (at $p \leq 0.003$ for all segments, k Proportions Test, and at $p \leq 0.05$ for No Frills vs. Enthusiasts, Marascuilo Procedure). CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle. [a] Consumers who correctly identified a sparkling wine, relative to consumers who tasted that sparkling wine.

Surprisingly, a substantial proportion of consumers (~17–27%), including Enthusiasts, were unable to identify the Moscato. The use of black wine tasting glasses (which concealed color) confounded identification of the sparkling red wine for ~40% of consumers, despite its distinct sensory profile (Figure 1). This highlights the difficulty consumers, even knowledgeable consumers, have evaluating wine, especially without visual or extrinsic cues (such as brand, region, variety and/or price).Only 19% of consumers correctly identified the Champagne, with a small, but significantly higher proportion of No Frills consumers identifying the Champagne than Enthusiasts ($p < 0.003$). However, given the limited number of No Frills consumers ($n = 31$), this result might not be representative. Fewer than 10% of consumers were able to identify the sparkling white, rosé and Prosecco wines, which likely reflects both the similarity amongst the sensory profiles of these wines (Figure 1) and consumers' limited knowledge of sparkling winemaking methods. Despite the bottled fermented sparkling white wines (i.e., TR and MT sparkling white wines) exhibiting toasty, yeasty notes that were not evident in the CA and CH sparkling white wines or the Prosecco, the majority of consumers were not able to distinguish the different sparkling white wine styles. Indeed, 131/203 consumers gave responses of 'Unsure' for one or more of the Australian sparkling white wines (data not shown). The low identification rate observed for Prosecco (5.8%), again suggests consumers are not familiar with this wine style.

3.5. Comparison of Consumer Expected vs. Actual Liking of Different Sparkling Wine Styles

In the online survey (i.e., prior to the blind tasting), consumers were asked to rate their expected liking of the different styles of sparkling wine (Table 8). Responses indicated consumers expected they would like Champagne the most (9.0), followed by sparkling white wine (8.0), sparkling red wine (7.0) and sparkling rosé wine (6.0); neutral scores (i.e., 5.0) were given to Moscato and Prosecco.

After the blind tasting, a Wilcoxon signed-rank test compared median expected liking scores with median actual liking scores, and found consumers' expected liking of Champagne and sparkling white red wines was significantly higher than the actual liking scores awarded to these wines during the tasting ($p < 0.0001$). It is possible that the clinical nature of the sensory laboratory (i.e., the individual white booths, red lighting, and opaque wine glasses), as compared with the contextual settings typically experienced during wine consumption, resulted in the (untrained) consumers being hyper-analytical of the wines they evaluated. However, the differences in liking scores might also be explained by consumers being unable to differentiate wine styles and/or wine quality, in the absence of extrinsic cues. Thus, during the tasting, more conservative (neutral) liking scores were given. A third explanation might be that the nine sparkling wines studied, didn't match consumers' expectations of the different sparkling wine styles.

Table 8. Comparison of expected and actual liking scores of consumers and Fine Wine Instrument consumer segments for different sparkling wine styles.

	Survey (Expected) Median Liking | Tasting (Actual) Median Liking							
	All Consumers		**No Frills**		**Aspirants**		**Enthusiast**	
Champagne	9.0	6.0	7.5	7.0	8.0	6.0	9.0	7.0
Sparkling white (MT)	8.0	6.0	9.0	7.0	8.0	5.0	8.0	6.0
Sparkling rosé	6.0	6.0	6.0	5.0	7.0	7.0	5.0	6.0
Sparkling red	7.0	6.0	7.0	5.0	7.0	6.0	8.0	7.0
Moscato	5.0	5.0	5.5	3.0	5.5	6.0	4.0	3.5
Prosecco	5.0	6.0	5.0	5.0	5.5	6.0	5.5	6.0
	Wilcoxon Signed-Rank Test *p*-Value							
Champagne	<0.0001 *		0.201		<0.0001 *		<0.0001 *	
Sparkling white (MT)	<0.0001 *		0.004 *		<0.0001 *		<0.0001 *	
Sparkling rosé	0.919		0.087		0.932		0.126	
Sparkling red	<0.0001 *		0.252		0.003 *		0.015 *	
Moscato	0.189		0.028 *		0.636		0.895	
Prosecco	0.447		0.479		0.625		0.850	

Data represent medians of 9-point hedonic scale scores (where 1 = extremely dislike, 5 = neither dislike or like, and 9 = extremely like). * denotes *p* values at $\leq$0.05.

Aspirants and Enthusiasts significantly over-estimated their liking of Champagne and sparkling white and red wines. In the case of Champagne, the tradition, heritage and prestige associated with French Champagne likely influenced consumers' perceptions of quality, and therefore, expected liking, as reported in previous studies [7,21]. No Frills consumers predicted their moderate liking of Champagne, but over-estimated their liking of sparkling white wine, and Moscato in particular. Interestingly, Enthusiasts anticipated liking Moscato the least, and this was reflected in the liking scores given to the Moscato during the tasting, which, despite wines being presented blind, the majority of Enthusiasts (i.e., 72.7%, Table 8) correctly identified. The expected and actual liking scores for Prosecco were equal to, or higher than for Moscato, suggesting Prosecco might fare well in the Australian domestic market, once consumers gain greater familiarity of this style of sparkling wine. This represents an opportunity for Australian producers of Prosecco to consider how they market this style of wine to their consumers, especially Aspirants and Enthusiasts.

3.6. Sparkling Wine Consumers' Purchasing Behavior

The bottle price and quality:price ratio were found to be amongst the most important sparkling wine characteristics driving the purchasing decisions of Croatian sparkling wine consumers [25], and may similarly play a role in Australian sparkling wine consumers' purchasing decisions. In the current study, consumers rarely spend more than $50 (AUD) per bottle for Australian sparkling wine and only 47 consumers (comprising 36% of Aspirants and 37% of Enthusiasts) typically spend $50 or more on Champagne (Table 9). A substantial proportion of consumers (from all FWI segments) indicated they never purchase sparkling rosé (51/139, 36.7%), sparkling red (31/130, 23.8%), Moscato (66/137, 48.2%) or Prosecco (93, 67.4%) wines. These results suggest consumers either do not like or do not expect to like these sparkling wine styles, in agreement with consumers' expected liking scores (Table 8). In contrast, only two consumers indicated they never purchase sparkling white wine, consistent with consumers' self-reported sparkling wine consumption (Table 4).

Table 9. Typical spend by consumers and Fine Wine Instrument consumer segments for different sparkling wine styles (as Australian dollars per 750 mL bottle).

		Survey Frequency | Tasting Frequency												Fisher Exact *p* Value		
		Never Purchase		<$15		$15–29		$30–49		$50–79		>$80		Survey | Tasting Segment × Price		Survey & Tasting × Price
Champagne (*n* = 137)	All Consumers	17	26	7	31	25	48	41	22	41	7	6	3	0.005 *	0.617	1.000
	No Frills	5	3	4	6	4	5	1	3	2	0	1	0			0.799
	Aspirants	9	17	1	16	15	23	24	15	24	4	4	2			1.000
	Enthusiasts	3	6	2	9	6	20	16	4	15	3	1	1			1.000
Sparkling white (MT) (*n* = 132)	All Consumers	2	44	29	33	80	34	18	17	3	3	0	1	1.000	1.000	1.000
	No Frills	1	3	7	7	12	8	1	3	0	0	0	0			1.000
	Aspirants	1	26	16	13	41	18	8	9	1	1	0	0			1.000
	Enthusiasts	0	15	6	13	27	8	9	5	2	2	0	1			1.000
Sparkling rosé (*n* = 139)	All Consumers	51	28	25	38	60	57	3	13	0	3	0	0	0.343	0.048 *	1.000
	No Frills	10	10	4	5	5	4	0	0	0	0	0	0			0.880
	Aspirants	27	14	16	19	33	34	1	8	0	2	0	0			0.980
	Enthusiasts	14	4	5	14	22	19	2	5	0	1	0	0			1.000
Sparkling red (*n* = 130)	All Consumers	31	35	22	27	50	48	21	18	6	2	0	0	0.059	0.106	1.000
	No Frills	10	11	4	4	6	4	1	2	0	0	0	0			0.959
	Aspirants	15	16	11	14	24	24	10	7	1	0	0	0			0.120
	Enthusiasts	6	8	7	9	20	20	10	9	5	2	0	0			0.390
Moscato (*n* = 137)	All Consumers	66	63	36	38	30	33	5	3	0	0	0	0	0.307	0.295	0.156
	No Frills	15	14	4	5	3	4	1	0	0	0	0	0			0.440
	Aspirants	28	27	20	24	18	16	4	3	0	0	0	0			0.014 *
	Enthusiasts	23	22	12	9	9	13	0	0	0	0	0	0			0.017 *
Prosecco (*n* = 138)	All Consumers	93	35	17	33	25	53	3	14	0	3	0	0	<0.0001 *	0.140	1.000
	No Frills	24	11	1	5	0	9	0	0	0	0	0	0			1.000
	Aspirants	43	15	12	13	7	29	3	7	0	1	0	0			1.000
	Enthusiasts	26	9	4	15	18	15	0	7	0	2	0	0			1.000

* denotes *p* values at ≤ 0.05.

Of those consumers who purchase the various styles of Australian sparkling wine, the majority (~73–97%) spend less than $30 per bottle (Table 9); only 16% and 27% of consumers indicated they spend more than $30 per bottle for sparkling white and red wines, respectively. As expected, a higher proportion of the consumers who tend to spend more on the different styles of sparkling wine were Aspirants and Enthusiast, albeit the typical spend by FWI segment was only statistically significant for Champagne ($p = 0.005$) and Prosecco ($p < 0.0001$). To some extent, these results reflect the bottle prices for the different sparkling wine styles; certainly the Moscato and Prosecco sourced for the current study had lower retail prices than the sparkling rosé and red wines, which were in turn lower in price than the Méthode Traditionelle wine and the Champagne (Table 1). Of course, as with all wine styles, there can be considerable price variation even amongst sparkling wines of the same style.

The blind tasting results again demonstrated the difficulty consumers had identifying sparkling wine styles and their preconceptions of the sensory profiles of different styles of sparkling wine. Whereas 67% of consumers (93/138) indicated they never purchase Prosecco in their survey responses, only a quarter gave this response in the tasting (Table 7), which reflects the consumers' inability to recognize this sparkling wine style. In the case of Moscato, the most readily identifiable sparkling wine, 46% of consumers (63/137) indicated they never purchase Moscato based on their tasting (compared with 48% in the survey). Consumers seemingly misidentified the Prosecco, which might explain why the expected liking scores and typical spend for Prosecco were low (Tables 8 and 9), yet 12% of consumers who tasted the Prosecco (i.e., 17/138) indicated they would spend more than $30 per bottle for this wine (Table 7). Previous research has shown that in Italy, consumers use price as an indicator of Prosecco quality [51] and that higher prices can instill high consumer loyalty [52]. In Australia, this may be true of some sparkling white wines, but would not be expected to be the case for Prosecco until consumer familiarity with this sparkling wine style improves.

The results from the tasting indicated the typical spend by FWI segment was only statistically significant for sparkling rosé wines ($p = 0.048$), with a higher proportion of Aspirants and Enthusiasts again indicating they would spend more per bottle than No Frills consumers (Table 9). The association between survey and tasting scores was also compared by FWI segment using Fisher Exact tests. Significant differences were only observed between responses from Aspirants ($p = 0.014$) and Enthusiasts ($p = 0.017$) for Moscato (Table 9), suggesting these consumers might spend more per bottle for Moscato based on their tasting experience, compared to their preconceived perceptions of this sparkling wine style. This finding was consistent with a recent study that found broad appeal for Australian Moscato wines [4].

3.7. Sparkling Wine Consumers' Consumption Behavior

Numerous studies have shown that consumers associate sparkling wine with celebration and that they therefore tend to consume sparkling wine at special occasions [25–27,30,53–55]. In the current study, consumers similarly indicated they consumed Champagne and sparkling white wine at anniversaries, birthdays, Christmas, New Year and weddings, with sparkling white wine also consumed at the Melbourne Cup and at restaurants and cafes (Table S4). Aspirants and Enthusiasts also consumed sparkling red wine at Christmas, whereas median responses of 1.0–1.5 indicated Moscato and Prosecco were not styles of sparkling wine that were consumed very often at any of the suggested occasions or contexts. Significant differences were observed amongst some FWI segments' survey responses (Table S5), but in most instances median responses were $\leq$2.0, so differences were not considered meaningful. Some meaningful differences were observed amongst FWI segments' responses during the blind tasting (Tables S4 and S5). No Frills consumers were more likely to consume the Champagne at a girls' or boys' night out than Aspirants or Enthusiasts, and the MT sparkling white wine to celebrate a New Year, wedding, or at a restaurant or café, on weekends or at work drinks than Enthusiasts. However, they were less likely to consume

the sparkling rosé than Aspirants and/or Enthusiasts to celebrate an anniversary, birthday, New Year or wedding.

Whereas survey responses indicated Champagne and sparkling white wine were the most frequently consumed sparkling wine at key celebratory occasions (i.e., anniversaries, birthdays, Christmas, New Year and weddings), with the exception of the Champagne at birthdays, these sparkling wine were given significantly lower ratings during the blind tasting (Table S4 and Table 10).

Table 10. Comparison of Fine Wine Instrument consumer segment preferences for different sparkling wine styles by occasion.

		Wilcoxon-Signed Rank Test *p* Values								
		Anniversary	**At Home with Food**	**At Home without Food**	**Birthday**	**Breakfast**	**By Yourself**	**Christmas**	**Funeral**	**Girls' or Boys' Night**
Champagne	No Frills	0.442	0.386	0.285	0.899	0.724	0.730	0.688	0.041 *	0.720
	Aspirants	0.005 *	0.148	0.908	0.109	0.990	0.140	0.022 *	0.648	0.765
	Enthusiasts	0.005 *	0.947	0.540	0.137	0.734	0.545	0.023 *	0.104	0.820
Sparkling white	No Frills	0.053	0.836	0.268	0.030 *	0.072	0.435	0.004 *	0.832	0.412
	Aspirants	<0.0001 *	0.020 *	0.028 *	<0.0001 *	0.571	0.835	<0.0001 *	0.039 *	0.001 *
	Enthusiasts	<0.0001 *	0.001 *	0.004 *	<0.0001 *	0.003 *	0.939	<0.0001 *	0.534	0.104
Sparkling rosé	No Frills	0.482	0.083	0.272	0.779	0.050 *	0.410	0.636	0.105	0.858
	Aspirants	<0.0001 *	0.010 *	0.000 *	<0.0001 *	<0.0001 *	0.000 *	<0.0001 *	0.000 *	0.000 *
	Enthusiasts	<0.0001 *	0.014 *	0.001 *	<0.0001 *	0.001 *	0.008 *	<0.0001 *	0.006 *	0.000 *
Sparkling red	No Frills	0.384	0.725	0.622	0.906	1.000	0.440	0.751	0.174	0.677
	Aspirants	0.814	0.325	0.264	0.358	0.074	0.107	0.426	0.014 *	0.386
	Enthusiasts	0.066	0.006 *	0.190	0.001 *	0.149	0.030 *	0.360	0.001 *	0.260
Moscato	No Frills	0.393	0.019 *	0.136	0.548	0.766	1.000	0.003 *	1.000	0.066
	Aspirants	0.004 *	0.022 *	0.013 *	0.006 *	0.000 *	0.076	0.000 *	0.018 *	0.025 *
	Enthusiasts	0.008 *	0.004 *	0.039 *	0.090	0.041 *	0.008 *	0.036 *	0.013 *	0.032 *
Prosecco	No Frills	0.000 *	0.002 *	0.002 *	0.000 *	0.002 *	0.005 *	0.000 *	0.005 *	0.001 *
	Aspirants	<0.0001 *	0.001 *	0.001 *	<0.0001 *	0.000 *	0.001 *	<0.0001 *	0.000 *	<0.0001 *
	Enthusiasts	<0.0001 *	0.000 *	0.000 *	<0.0001 *	0.001 *	0.001 *	<0.0001 *	0.001 *	<0.0001 *
		Hot Weather	**Melbourne Cup**	**New Year**	**Pub or Club**	**Restaurant or Café**	**Weddings**	**Weekdays**	**Weekends**	**Work Drinks**
Champagne	No Frills	0.621	0.301	0.263	0.148	0.566	0.146	0.648	0.089	0.693
	Aspirants	0.346	0.573	0.010 *	0.220	0.013 *	0.000 *	0.821	0.965	0.010 *
	Enthusiasts	0.472	0.311	0.002 *	0.922	0.172	0.007 *	0.991	0.993	0.114
Sparkling white	No Frills	0.178	0.347	0.032 *	0.190	1.000	0.019 *	0.949	0.343	0.969
	Aspirants	0.000	0.001 *	<0.0001 *	0.010 *	0.003 *	<0.0001 *	0.053	0.001 *	0.097
	Enthusiasts	0.001 *	0.001 *	<0.0001 *	0.043 *	0.001 *	<0.0001 *	0.004 *	<0.0001 *	0.034 *
Sparkling rosé	No Frills	0.888	0.437	0.259	0.796	0.499	0.169	0.102	0.220	0.632
	Aspirants	0.050 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	0.036 *	0.001 *	<0.0001 *
	Enthusiasts	0.000 *	<0.0001 *	<0.0001 *	0.003 *	0.000 *	<0.0001 *	0.009 *	<0.0001 *	<0.0001 *
Sparkling red	No Frills	0.918	0.106	0.526	0.858	0.607	0.861	1.000	0.753	0.108
	Aspirants	0.495	0.580	0.409	0.888	0.453	0.187	0.430	0.716	0.006 *
	Enthusiasts	0.047 *	0.003 *	0.429	0.012 *	0.003 *	<0.0001 *	0.037 *	0.020 *	0.025 *
Moscato	No Frills	0.181	0.022 *	0.010 *	0.203	0.106	0.046 *	0.219	0.548	0.041 *
	Aspirants	0.080 *	0.001 *	0.000 *	0.018 *	0.001 *	<0.0001 *	0.066	0.012 *	0.000 *
	Enthusiasts	0.039 *	0.000 *	0.001 *	0.043 *	0.027 *	0.003 *	0.007 *	0.010 *	0.119
Prosecco	No Frills	0.002 *	0.000 *	0.001 *	0.001 *	<0.0001 *	0.000 *	0.001 *	0.000 *	0.001 *
	Aspirants	0.000 *	<0.0001 *	<0.0001 *	<0.0001 *	0.002 *	<0.0001 *	0.000 *	<0.0001 *	<0.0001 *
	Enthusiasts	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	<0.0001 *	0.002 *	0.000 *	0.000 *

* denotes p values at ≤ 0.05.

In the case of the sparkling rosé, Aspirant and Enthusiast scores were significantly higher (than survey responses) for all occasions and contexts, suggesting these FWI segments liked this wine (Table 8) and could envisage consuming it, particularly at celebratory occasions. Enthusiasts also gave significantly more favorable responses for consumption of the sparkling red wine at birthdays, New Year, weddings, restaurants and cafes, and on

weekends. Interestingly, Moscato ratings increased for all occasions and contexts, often irrespective of FWI segment, but not to the same levels as the other sparkling wine styles. Lastly, all three FWI segments indicated they would be more likely to consume the Prosecco, regardless of occasion or context, than previously suggested by their survey responses. Once again, this was consistent with the observed increased in expected vs. actual liking scores for (Table 8), as well as the higher spend price per bottle (Table 9), for this wine. However, given that consumers were not familiar with this sparkling wine style (Table 6) and could not differentiate it from other sparkling wines (Table 7), this might again be attributed to consumers believing the Prosecco to be a different wine, e.g., the Champagne or MT sparkling white wine.

4. Conclusions

Consumers tended to associate sparkling wine with celebration, but it was clear that the various sparkling wine styles were perceived differently. Champagne was recognized as an expensive, but refined, luxury product, while sparkling white and rosé wines were described as light and refreshing. However, consumers could not readily differentiate sparkling white wine styles, likely due to their limited knowledge of sparkling wine production methods. In contrast, ~80% of consumers correctly identified the Moscato based on its prominent fruit character and sweetness, and 60% of consumers identified the sparkling red wine, which exhibited dark fruit and oak aromas and flavors. Consumers were far less familiar with Prosecco; indeed two thirds of consumers indicated they never purchase Prosecco.

Consumers anticipated liking Champagne and sparkling white wine the most, and Moscato and Prosecco the least, however upon tasting, significantly lower liking scores were given to the Champagne, and sparkling white and red wines. Liking scores for the fruit driven Moscato and Prosecco wines were comparable with their expected liking scores, but surprisingly, No Frills consumers liked these two sparkling wine styles the least. This might, however, reflect the limited size of this FWI segment (n = 31), which is attributed to self-selection biases and acknowledged as a limitation of the current study. Nevertheless, despite two thirds of consumers indicating they never purchased Prosecco, this sparkling wine style was rated favorably, and consumers from all FWI segments could envisage consumption of Prosecco at a range of occasions. Similarly, while sparkling rosé only accounted for ~10% of participants' total sparkling wine consumption, consumers (especially Aspirants) liked this wine style, and on tasting, Aspirants and Enthusiasts indicated they would likely consume sparkling rosé at similar occasions as for the Champagne. This research suggests there may be opportunities for wine marketers to better position these wine styles in the domestic market and to actively promote Prosecco to sparkling wine consumers, many of whom might currently avoid the style because it is not familiar, and thus, represents a purchasing risk.

Consumers' preconceived expectations of different sparkling wine styles clearly influences both their purchasing and consumption behavior, i.e., the price they are willing to pay per bottle, their expected liking and the occasions at which they would consume different styles of sparkling wine. Significantly higher expectations were held for Champagne and sparkling white wine, especially by Aspirants and Enthusiasts, who were more likely to spend more per bottle for these styles of sparkling wine. Consumption of these sparkling wines was strongly associated with celebratory events such as anniversaries, birthdays, Christmas, New Year and weddings; sparkling red wine consumption was most frequently associated with Christmas. However, without extrinsic cues, consumer perceptions of Champagne and sparkling white and red wines seemingly decreased, whereas, perceptions of sparkling rosé and Prosecco were similar, or improved.

This study advances our understanding of the factors that influence sparkling wine consumers' purchasing and consumption behavior, i.e., not just age and gender, but the wine connoisseur, knowledge and provenance variables that underpin the FWI. Collectively, the results provide sparkling wine producers important insight into consumers'

perceptions, expectations and perceptions of different styles of sparkling wine, i.e., information which can be used to tailor marketing strategies for specific sparkling wine styles and/or towards specific consumer segments. For example, strategies that introduce consumers to lesser known styles, such as Prosecco, to build familiarity, or that showcase style variation to breakdown negative pre-conceptions/expectations or enhance the quality:price ratio of bottle-fermented sparkling white wines. The current study focused on Australian consumers and Australian sparkling wines, with Champagne included as the international benchmark for sparkling wine, nevertheless research findings are likely to be relevant to other New World sparkling wine markets. Furthermore, the study could be replicated elsewhere, to enable cross-cultural comparisons of sparkling wine purchasing and consumption behavior.

Finally, one additional limitation to the current study should be acknowledged: whilst the sparkling wines presented to consumers during acceptance testing were chosen to be representative of their respective wine styles, different results may have been obtained with a different selection of sparkling wines, due to style variation.

Supplementary Materials: The following are available online at https://www.mdpi.com/2304-8158/10/3/488/s1, Table S1: Attributes and standards used in descriptive analysis of sparkling wines, Table S2: Mean intensity ratings for sensory attributes of the French Champagne and Australian sparkling wines studied, Table S3: Alcohol, wine and sparkling wine consumption of consumers and of Fine Wine Instrument consumer segments. Data represent minimum, mean, median and maximum responses (on a percentage scale, i.e., 0–100%), Table S4: Influence of occasion on consumers' and Fine Wine Instrument consumer segments' consumption of different sparkling wine styles, Table S5: Statistical analysis for influence of occasion on consumers' and Fine Wine Instrument consumer segments' consumption of different sparkling wine styles.

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4.1.1 Online Survey and Consumer Tasting Supplementary Data

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Supplementary Materials

Article

Investigating Australian Consumers' Perceptions of and Preferences for Different Styles of Sparkling Wine Using the Fine Wine Instrument

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Table S1. Attributes and standards used in descriptive analysis of sparkling wines.

Attributes	Reference standards
apple/pear	⅛ green pear, ⅛ green apple
bruised apple	50 mL dry sherry, ⅛ green apple
citrus	⅛ yellow grapefruit, ⅛ orange, ⅛ lemon, ⅛ lime
confectionary	3 red frog sweets, 1 strawberry and cream sweet
dark fruit	5 tsp Ribena cordial, 5 tsp four berry jam, 1 tsp mulberry extract
floral/musk	2 red rose petals, ½ tsp rose water, 1 musk stick
honey	2 tsp honey
mixed spice	½ cinnamon stick, ½ tsp mixed spice
oaky	10 oak chips
toasty/nutty	2 mini toasts, 3 water crackers, 1 tbs mixed nuts
savory/smoky	½ bacon rasher, 2 tsp smoked almonds
stone fruit	2 dried apricots, 1 dried peach, ½ canned peach, 1 canned apricot
tropical fruit	⅛ rock melon, ½ lychee, ⅛ passionfruit, ⅛ pineapple, ⅛ mango
vanilla/caramel	2 tsp desiccated coconut, ½ tsp vanilla essence
yeasty	1 tbs wine yeast

Standards were prepared in 25 mL of Chardonnay wine, except dark fruit which was prepared in 25 mL of Shiraz wine.

Table S2. Mean intensity ratings for sensory attributes of the French Champagne and Australian sparkling wines studied.

Attribute	Champagne	Sparkling white (CA)	Sparkling white (CH)	Sparkling white (TR)	Sparkling white (MT)	Sparkling red	Sparkling rosé	Moscato	Prosecco
overall intensity A	9.38 bcd	7.84 d	8.86 bcd	9.51 bc	9.54 bc	10.32 ab	8.44 cd	11.95 a	9.45 bcd
apple/pear A	5.1 a	5.6 a	6.3 a	5.3 a	5.6 a	2.4 b	5.3 a	5.0 a	5.7 a
bruised apple A	4.8 b	3.0 bc	1.9 c	7.9 a	7.6 a	1.9 c	4.1 b	1.3 c	1.5 c
citrus A	5.9 a	5.7 a	7.0 a	5.0 a	5.7 a	1.7 b	5.1 a	6.2 a	6.5 a
confectionary A	1.9 e	3.2 cde	5.3 bc	2.7 de	3.2 cde	4.4 bcd	3.5 cde	9.5 a	6.7 b
dark fruit A	0.6 b	0.9 b	1.1 b	0.7 b	0.6 b	10.9 a	0.7 b	1.4 b	1.3 b
floral/musk A	2.2 c	2.7 c	6.2 b	3.5 c	2.9 c	3.5 c	2.7 c	12.2 a	7.5 b
honey A	3.3 bc	3.2 bc	4.1 abc	4.7 ab	4.5 abc	2.5 c	4.0 abc	5.4 a	4.4 abc
mixed spice A	1.6 b	1.2 b	1.0 b	1.1 b	1.4 b	6.7 a	1.3 b	1.9 b	1.2 b
oaky A	2.0 b	1.6 bc	1.0 bc	1.3 bc	1.3 bc	9.3 a	1.5 bc	0.6 c	0.7 bc
savoury/smoky A	4.0 ab	2.7 bc	1.4 cd	2.2 cd	2.1 cd	4.8 a	2.8 bc	0.9 d	1.3 cd
stone fruit A	4.1 cd	4.2 bcd	6.5 ab	4.5 bc	4.9 bc	2.0 d	4.9 bc	8.4 a	7.2 a
toasty/nutty A	6.2 a	3.0 cde	2.2 de	5.3 ab	5.5 ab	4.3 abc	3.8 bcd	1.2 e	1.5 e
tropical fruit A	3.1 de	4.4 cd	6.1 bc	4.3 cd	3.6 de	1.5 e	3.8 de	9.1 a	7.6 ab
vanilla/caramel A	2.3 b	2.5 b	2.4 b	2.4 b	3.0 b	5.0 a	2.9 b	2.7 b	2.7 b
yeasty A	5.6 a	2.6 cd	1.9 cd	5.1 ab	5.0 ab	2.5 cd	3.3 bc	0.9 d	1.4 d
overall intensity F	9.60 bcd	9.18 cd	8.76 d	9.44 cd	10.33 bc	10.76 ab	9.72 bcd	11.73 a	9.32 cd
apple/pear F	6.2 a	6.4 a	6.8 a	6.1 a	6.6 a	2.1 b	6.0 a	5.7 a	6.1 a
bruised apple F	5.5 ab	3.5 bc	3.0 c	7.2 a	7.4 a	1.7 c	5.4 ab	1.2 c	2.1 c
citrus F	8.4 a	8.4 a	8.6 a	8.4 a	7.8 a	1.9 b	8.2 a	6.6 a	7.8 a
confectionary F	2.0 d	3.3 cd	4.9 bc	2.0 d	2.5 d	4.7 bc	2.9 cd	10.1 a	5.7 b
dark fruit F	0.7 b	0.7 b	0.9 b	0.7 b	0.4 b	11.4 a	0.6 b	1.4 b	0.8 b
floral/musk F	2.4 d	3.0 d	4.8 c	2.7 d	2.3 d	2.9 d	2.7 d	12.0 a	7.0 b

honey F	3.1 bc	2.8 bc	4.0 ab	3.7 abc	3.9 abc	2.0 c	3.3 bc	5.5 a	3.7 abc
mixed spice F	1.4 b	1.1 b	1.2 b	0.9 b	0.9 b	7.4 a	1.2 b	2.1 b	1.4 b
oaky F	2.0 b	1.6 bc	0.9 bc	1.0 bc	1.5 bc	10.0 a	1.8 bc	0.6 c	1.0 bc
savoury/smoky F	2.8 ab	2.0 bc	1.4 bc	1.6 bc	2.0 bc	3.6 a	2.3 abc	0.9 c	1.2 c
stone fruit F	4.3 c	4.9 bc	6.5 abc	4.3 c	4.6 bc	1.8 d	4.6 bc	8.7 a	6.6 ab
toasty/nutty F	5.5 a	2.5 bc	2.2 bc	4.6 a	4.7 a	3.9 ab	4.8 a	1.1 c	1.5 c
tropical F	3.9 de	4.7 cd	6.2 bc	4.2 cd	3.7 de	1.6 e	4.4 cd	9.4 a	7.6 ab
vanilla/caramel F	2.0 b	1.6 b	2.2 b	2.1 b	2.6 b	4.6 a	2.4 b	2.4 b	2.5 b
yeasty F	5.1 a	2.3 cd	2.7 bcd	4.4 ab	5.1 a	2.3 cd	4.1 abc	1.0 d	2.3 cd
effervescence	3.38 b	4.63 ab	4.84 ab	4.32 ab	3.53 b	6.42 a	4.09 ab	4.85 ab	5.52 ab
acidity	10.21 a	10.56 a	9.90 a	10.19 a	10.08 a	6.79 b	10.81 a	3.04 c	7.23 b
bitterness	4.87 b	3.79 b	3.32 bc	4.39 b	4.44 b	9.10 a	4.71 b	1.11 c	4.27 b
sweetness	1.84 c	2.36 c	2.83 c	1.90 c	2.05 c	4.53 b	2.06 c	13.19 a	4.55 b
astringency	5.09 b	4.55 b	3.48 bc	4.91 b	4.63 b	10.69 a	4.75 b	1.65 c	3.64 b
complexity	8.54 a	5.91 bcd	5.46 cd	8.29 a	8.52 a	7.57 ab	6.93 abc	2.37 e	4.29 de

A = aroma attributes; F = flavor attribute; MT = Méthode Traditionelle; TR = Transfer; CH = Charmat; CA = carbonated. Values are means from three wine replicates, presented to 12 judges during three formal sensory evaluation sessions. Means followed by different letters (within rows) are significantly different at $P < 0.001$ ($P \leq 0.05$, one-way ANOVA, Tukey's LSD post hoc).

Table S3. Alcohol, wine and sparkling wine consumption of consumers and of Fine Wine Instrument consumer segments. Data represent minimum, mean, median and maximum responses (on a percentage scale, i.e., 0–100%).

	All Consumers (*n* = 203)				**No Frills (*n* = 31)**				**Aspirants (*n* = 104)**				**Enthusiast (*n* = 68)**			
Wine	10.0	68.2	75.0	100.0	10.0	67.8	80.0	90.0	15.0	66.9	75.0	100.0	20.0	70.5	75.0	100.0
Beer	0.0	18.9	10.0	80.0	0.0	14.8	10.0	80.0	0.0	19.9	10.0	75.0	0.0	18.9	15.0	60.0
Spirits	0.0	12.3	10.0	70.0	0.0	17.6	10.0	70.0	0.0	12.4	10.0	60.0	0.0	9.9	10.0	40.0
Cider	0.0	7.4	5.0	90.0	0.0	13.3	5.0	90.0	0.0	6.6	4.5	40.0	0.0	6.7	5.0	30.0
Other	0.0	3.3	0.0	40.0	0.0	4.2	0.0	25.0	0.0	3.3	0.0	40.0	0.0	3.0	0.0	15.0
Sparkling wine	2.0	23.2	20.0	94.0	5.0	37.1	25.0	89.0	2.0	21.7	20.0	75.0	5.0	19.1	18.5	55.0
White	0.0	28.6	25.0	90.0	0.0	32.9	25.0	85.0	0.0	27.4	25.0	90.0	0.0	28.5	25.0	80.0
Rose	0.0	9.4	5.0	50.0	0.0	11.3	10.0	25.0	0.0	9.8	5.0	50.0	0.0	8.1	5.0	40.0
Red	0.0	42.4	40.0	90.0	0.0	32.5	22.5	80.0	0.0	43.0	40.0	90.0	5.0	44.9	42.5	90.0
Dessert	0.0	3.8	2.0	30.0	0.0	5.4	3.5	25.0	0.0	3.1	1.0	20.0	0.0	4.6	5.0	30.0
Fortified	0.0	4.1	4.5	20.0	0.0	3.8	5.0	10.0	0.0	3.7	2.0	20.0	0.0	4.8	5.0	15.0
Champagne	0.0	14.5	10.0	100.0	0.0	10.5	5.0	100.0	0.0	12.0	10.0	60.0	0.0	14.9	10.0	70.0
Sparkling white	0.0	53.8	55.0	100.0	0.0	58.5	72.5	100.0	0.0	50.7	50.0	100.0	0.0	52.6	50.0	100.0
Sparkling red	0.0	22.4	15.0	100.0	0.0	13.5	9.0	90.0	0.0	20.3	20.0	100.0	0.0	16.9	10.0	70.0
Sparkling rose	0.0	8.9	5.0	65.0	0.0	5.8	5.0	65.0	0.0	5.8	5.0	40.0	0.0	5.1	5.0	50.0
Moscato	0.0	11.5	5.0	100.0	0.0	9.8	5.0	100.0	0.0	7.0	5.0	60.0	0.0	4.4	5.0	60.0
Prosecco	0.0	8.0	3.0	65.0	0.0	1.9	0.0	30.0	0.0	4.2	0.0	60.0	0.0	6.1	5.0	65.0

Mood's Medium Test Multiple Pairwise Comparison P values				
	All Consumers	**No Frills vs Aspirants**	**No Frills vs Enthusiasts**	**Aspirants vs Enthusiasts**
Wine	0.866	0.593	0.674	0.907
Beer	0.346	0.228	0.148	0.621
Spirits	0.847	0.650	0.566	0.838
Cider	0.965	0.864	0.991	0.809
Other	0.761	0.897	0.708	0.461
Sparkling wine	<0.001*	0.006*	<0.001*	0.063
White	0.938	0.997	0.807	0.733
Rose	0.281	0.269	0.112	0.425
Red	0.760	0.576	0.460	0.751
Dessert	0.177	0.145	0.760	0.065
Fortified	0.131	0.340	0.825	0.030*
Champagne	0.526	0.636	0.595	0.471
Sparkling white	0.237	0.080	0.039*	0.921
Sparkling red	0.026*	0.186	0.286	0.012*
Sparkling rose	0.880	0.849	0.875	0.616
Moscato	0.290	0.811	0.216	0.147
Prosecco	0.052	0.868	0.373	0.017*

* denotes P values at ≤ 0.05.

Table S4. Influence of occasion on consumers' and Fine Wine Instrument consumer segments' consumption of different sparkling wine styles.

		Survey Median | Tasting Median																	
		Anniversary		**At home with food**		**At home without food**		**Birthday**		**Breakfast**		**By yourself**		**Christmas**		**Funeral**		**Girls' or boys' night**	
Champagne (*n* = 137)	All Consumers	5.0	4.0	3.0	3.0	3.0	2.0	5.0	5.0	2.0	2.0	1.0	1.0	6.0	5.0	1.0	1.0	2.0	2.0
	No Frills	3.0	5.0	2.0	3.0	2.0	3.0	5.0	5.0	2.0	1.0	1.0	1.0	5.0	5.0	1.0	1.0	4.0	4.0
	Aspirants	5.0	4.0	2.0	3.0	2.0	2.0	5.0	5.0	1.0	2.0	1.0	1.0	7.0	5.0	1.0	1.0	1.0	2.0
	Enthusiasts	6.0	5.0	3.0	3.0	3.0	3.0	5.0	5.0	2.0	2.0	1.0	1.0	6.0	5.0	1.0	1.0	3.0	2.0
Sparkling white (MT) (*n* = 132)	All Consumers	6.0	3.0	3.0	2.0	3.0	2.0	6.5	3.0	3.0	1.5	1.0	1.0	7.0	3.0	1.0	1.0	3.0	2.0
	No Frills	7.0	5.0	2.0	2.0	3.0	2.0	5.0	5.0	3.0	2.0	1.0	1.0	7.0	5.0	1.0	2.0	3.0	3.0
	Aspirants	5.0	3.0	3.0	2.0	3.0	2.0	6.0	3.0	2.0	2.0	2.0	1.0	7.0	3.0	1.0	1.0	5.0	2.0
	Enthusiasts	7.0	2.0	3.5	2.5	3.5	2.0	7.0	3.0	3.0	1.0	1.0	1.0	7.0	3.0	1.0	1.0	2.5	2.0
Sparkling rosé (*n* = 139)	All Consumers	2.0	4.0	1.0	2.0	1.0	2.0	3.0	5.0	1.0	2.0	1.0	1.0	3.0	5.0	1.0	1.0	1.0	2.0
	No Frills	1.0	3.0	1.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0	1.0	1.0	2.0	3.0	1.0	1.0	1.0	2.0
	Aspirants	2.0	4.0	2.0	2.0	1.0	2.0	3.0	5.0	1.0	2.0	1.0	1.0	3.0	5.0	1.0	1.0	1.0	2.0
	Enthusiasts	1.0	5.0	1.0	2.0	1.0	2.0	3.0	5.0	1.0	2.0	1.0	1.0	3.0	5.0	1.0	1.0	1.0	3.0
Sparkling red (*n* = 130)	All Consumers	3.0	3.0	1.0	2.0	1.0	2.0	2.0	5.0	1.0	2.0	1.0	1.0	4.0	5.0	1.0	1.0	1.0	2.0
	No Frills	1.0	1.0	1.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0
	Aspirants	3.0	3.0	2.0	2.0	1.0	2.0	3.0	5.0	1.0	2.0	1.0	2.0	5.0	4.0	1.0	1.0	1.0	2.0
	Enthusiasts	3.0	4.0	1.0	2.0	1.0	2.0	3.0	5.0	1.0	2.0	1.0	1.0	4.0	5.0	1.0	1.0	1.0	2.5
Moscato (*n* = 137)	All Consumers	1.0	2.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	3.0	1.0	1.0	1.0	1.0
	No Frills	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0
	Aspirants	1.0	2.0	1.0	1.0	1.0	1.0	1.0	3.0	1.0	1.0	1.0	1.0	1.5	3.0	1.0	1.0	1.0	1.0
	Enthusiasts	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0
Prosecco (*n* = 138)	All Consumers	1.0	3.0	1.0	2.0	1.0	2.0	1.0	4.0	1.0	2.0	1.0	1.0	1.0	4.0	1.0	1.0	1.0	2.0
	No Frills	1.0	3.0	1.0	1.5	1.0	1.5	1.0	3.0	1.0	1.5	1.0	1.0	1.0	3.0	1.0	1.0	1.0	2.5
	Aspirants	1.0	4.0	1.0	2.0	1.0	1.0	1.0	4.0	1.0	1.0	1.0	1.0	1.0	4.0	1.0	1.0	1.0	2.0
	Enthusiasts	1.0	3.5	1.0	3.0	1.0	2.0	1.0	4.0	1.0	2.0	1.0	1.0	1.0	5.0	1.0	1.0	1.0	2.0

		Hot weather		Melbourne Cup		New Year		Pub or club		Restaurant or café		Weddings		Weekdays		Weekends		Work drinks	
Champagne (n = 137)	All Consumers	3.0	3.0	3.0	3.0	7.0	5.0	1.0	2.0	3.0	4.0	7.0	5.0	2.0	2.0	4.0	4.0	2.0	3.0
	No Frills	2.0	3.0	1.0	5.0	7.0	6.0	2.0	3.0	5.0	5.0	6.0	5.0	2.0	3.0	4.0	5.0	3.0	4.0
	Aspirants	3.0	3.0	2.0	3.0	7.0	5.0	1.0	2.0	3.0	4.0	7.0	5.0	2.0	2.0	3.0	5.0	1.0	3.0
	Enthusiasts	3.0	5.0	5.0	4.0	7.0	5.0	2.0	2.0	3.0	5.0	7.0	5.0	2.0	2.0	5.0	3.0	2.0	3.0
Sparkling white (MT) (n = 132)	All Consumers	5.0	2.0	5.0	3.0	7.0	3.0	3.0	2.0	5.0	3.0	7.0	3.0	3.0	2.0	5.0	3.0	3.0	2.0
	No Frills	3.0	3.0	5.0	3.0	7.0	5.0	3.0	2.0	5.0	5.0	7.0	5.0	3.0	3.0	5.0	5.0	3.0	5.0
	Aspirants	5.0	2.0	3.0	2.0	7.0	3.0	3.0	2.0	5.0	3.0	7.0	3.0	2.0	2.0	5.0	3.0	3.0	2.0
	Enthusiasts	5.0	3.0	5.0	2.0	8.0	3.0	2.0	2.0	5.0	3.0	7.0	3.0	3.0	1.5	6.0	3.0	3.0	2.0
Sparkling rosé (n = 139)	All Consumers	2.0	3.0	1.0	3.0	2.0	5.0	1.0	2.0	2.0	3.0	2.0	5.0	1.0	2.0	2.0	3.0	1.0	3.0
	No Frills	1.0	1.0	1.0	2.0	1.0	3.0	1.0	2.0	3.0	3.0	1.0	3.0	1.0	2.0	1.0	3.0	1.0	2.0
	Aspirants	3.0	3.0	1.0	3.0	2.0	5.0	1.0	2.0	2.0	4.0	2.0	5.0	1.0	2.0	2.0	3.0	1.0	3.0
	Enthusiasts	2.0	3.0	1.0	4.0	2.0	5.0	1.0	2.0	3.0	5.0	2.0	5.0	1.0	2.0	1.0	5.0	1.0	3.0
Sparkling red (n = 130)	All Consumers	2.0	3.0	1.0	2.0	2.0	5.0	1.0	2.0	3.0	4.0	2.0	5.0	1.0	2.0	2.0	3.0	1.0	2.0
	No Frills	1.0	1.0	1.0	1.0	1.0	3.0	1.0	1.0	2.0	3.0	1.0	3.0	1.0	2.0	1.0	3.0	1.0	2.0
	Aspirants	3.0	3.0	1.0	2.0	2.0	5.0	2.0	2.0	3.0	3.0	2.0	5.0	1.0	2.0	2.0	3.0	1.0	3.0
	Enthusiasts	2.0	4.0	1.0	2.5	2.0	5.0	1.0	2.0	3.0	5.0	2.0	5.0	1.0	2.0	1.0	5.0	1.0	2.0
Moscato (n = 137)	All Consumers	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	3.0	1.0	1.0	1.0	2.0	1.0	1.0
	No Frills	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
	Aspirants	1.0	2.0	1.0	1.0	1.0	3.0	1.0	1.0	1.0	2.0	1.0	3.0	1.0	1.0	1.0	2.0	1.0	2.0
	Enthusiasts	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
Prosecco (n = 138)	All Consumers	1.0	3.0	1.0	3.0	1.0	4.0	1.0	2.0	1.0	3.0	1.0	4.0	1.0	2.0	1.0	3.0	1.0	3.0
	No Frills	1.0	1.5	1.0	3.0	1.0	3.0	1.0	2.5	1.0	3.0	1.0	4.5	1.0	2.5	1.0	3.0	1.0	3.0
	Aspirants	1.0	2.0	1.0	3.0	1.0	4.0	1.0	2.0	1.0	3.0	1.0	4.0	1.0	2.0	1.0	3.0	1.0	2.0
	Enthusiasts	1.0	3.0	1.0	3.0	1.0	4.0	1.0	1.5	1.0	5.0	1.0	4.0	1.0	2.0	1.0	4.0	1.0	3.0

Data represent medians of 9-point Likert scale scores (where 1 = never consume, 5 = sometimes consume, and 9 = always consume).

Foods **2021**, *10*, 488

Table S5. Statistical analysis for influence of occasion on consumers' and Fine Wine Instrument consumer segments' consumption of different sparkling wine styles.

		Survey Mood's Median Test Multiple Pairwise P-value | Tasting Mood's Median Test Multiple Pairwise P-value																	
		Anniversary		**At home with food**		**At home without food**		**Birthday**		**Breakfast**		**By yourself**		**Christmas**		**Funeral**		**Girls' or boys' night**	
Champagne (n = 137)	All Segments	0.277	0.505	0.682	0.820	0.593	0.909	0.931	0.488	0.312	0.788	0.152	0.784	0.779	0.519	0.773	0.655	0.188	0.116
	No Frills vs Aspirants	0.135	0.318	0.982	0.635	0.676	0.715	0.748	0.355	0.789	0.741	0.210	0.899	0.479	0.904	0.674	0.493	0.083	0.038*
	Aspirants vs Enthusiasts	0.849	0.398	0.383	0.781	0.599	0.744	0.911	0.324	0.140	0.501	0.073	0.528	0.849	0.258	0.648	0.436	0.311	0.528
	No Frills vs Enthusiasts	0.127	0.649	0.685	0.528	0.311	0.382	0.708	0.840	0.342	0.890	0.961	0.592	0.390	0.529	0.492	0.907	0.540	0.198
Sparkling white (MT) (n = 132)	All Segments	0.481	0.949	0.585	0.379	0.817	0.789	0.501	0.324	0.195	0.926	0.362	0.949	0.407	0.213	0.570	0.292	0.200	0.594
	No Frills vs Aspirants	0.712	0.835	0.764	0.400	0.877	0.638	0.803	0.542	0.394	0.835	0.258	0.062	0.657	0.211	0.764	0.139	0.803	0.322
	Aspirants vs Enthusiasts	0.278	0.763	0.395	0.186	0.590	0.741	0.762	0.262	0.085	0.756	0.242	0.763	0.180	0.427	0.289	0.986	0.073	0.944
	No Frills vs Enthusiasts	0.035*	0.980	0.368	0.857	0.590	0.492	0.656	0.159	0.829	0.726	0.829	0.013*	0.575	0.078	0.617	0.160	0.386	0.378
Sparkling rosé (n = 139)	All Segments	0.380	0.040*	0.448	0.905	0.631	0.848	0.778	0.076	0.226	0.479	0.795	0.223	0.357	0.223	0.683	0.702	0.714	0.709
	No Frills vs Aspirants	0.774	0.057	0.281	0.721	0.426	0.571	0.505	0.023*	0.256	0.232	0.546	0.087	0.444	0.035*	0.668	0.564	0.452	0.571
	Aspirants vs Enthusiasts	0.218	0.473	0.355	0.871	0.473	0.957	0.518	0.762	0.329	0.605	0.882	0.871	0.176	0.871	0.534	0.459	0.961	0.561
	No Frills vs Enthusiasts	0.915	0.013*	0.710	0.657	0.800	0.624	0.511	0.047*	0.092	0.444	0.506	0.135	0.822	0.127	0.425	0.978	0.438	0.409
Sparkling red (n = 130)	All Segments	0.204	0.088	0.513	0.103	0.485	0.322	0.127	0.015*	0.068	0.107	0.818	0.039*	0.258	0.319	0.259	0.154	0.530	0.815
	No Frills vs Aspirants	0.077	0.206	0.316	0.166	0.258	0.312	0.043*	0.247	0.820	0.091	0.616	0.011*	0.101	0.166	0.107	0.053	0.381	0.532
	Aspirants vs Enthusiasts	0.508	0.158	0.834	0.302	0.722	0.469	0.434	0.032*	0.039*	0.496	0.601	0.342	0.669	0.608	0.487	0.588	0.704	0.944
	No Frills vs Enthusiasts	0.111	0.034*	0.261	0.035*	0.235	0.134	0.156	0.008*	0.103	0.035*	0.916	0.069	0.111	0.130	0.241	0.130	0.261	0.284
Moscato (n = 137)	All Segments	0.143	0.166	0.109	0.880	0.220	0.526	0.206	0.038*	0.946	0.198	0.049*	0.394	0.178	0.046*	0.377	0.551	0.563	0.845
	No Frills vs Aspirants	0.395	0.129	0.084	0.852	0.085	0.229	0.358	0.035*	0.756	0.079	0.677	0.193	0.204	0.581	0.985	0.769	0.288	0.572
	Aspirants vs Enthusiasts	0.673	0.128	0.118	0.615	0.520	0.526	0.086	0.044*	0.978	0.405	0.014*	0.461	0.096	0.013*	0.173	0.301	0.677	0.767
	No Frills vs Enthusiasts	0.759	0.173	0.590	0.840	0.217	0.502	0.661	0.612	0.755	0.278	0.080	0.478	0.955	0.717	0.227	0.136	0.478	0.757
Prosecco (n = 138)	All Segments	0.033*	0.916	0.050	0.461	0.653	0.203	0.025*	0.798	0.096	0.490	0.115	0.986	0.018*	0.305	0.010*	0.345	0.132	0.316
	No Frills vs Aspirants	0.009*	0.679	0.029*	0.613	0.131	0.949	0.006*	0.716	0.031*	0.949	0.055	0.905	0.005*	0.373	0.041*	0.804	0.052	0.164
	Aspirants vs Enthusiasts	0.501	0.609	0.588	0.641	0.069	0.093	0.549	0.500	0.971	0.994	0.678	0.943	0.442	0.354	0.018*	0.150	0.347	0.284
	No Frills vs Enthusiasts	0.030*	0.739	0.014*	0.137	0.024*	0.867	0.021*	0.867	0.034*	0.289	0.034*	0.866	0.021*	0.289	0.476	0.381	0.185	0.616

		Hot weather		Melbourne Cup		New Year		Pub or club		Restaurant or café		Weddings		Weekdays		Weekends		Work drinks	
Champagne (*n* = 137)	All Segments	0.312	0.300	0.161	0.496	0.999	0.434	0.040*	0.149	0.434	0.765	0.892	0.651	0.445	0.393	0.203	0.412	0.803	0.889
	No Frills vs Aspirants	0.986	0.538	0.904	0.392	0.977	0.205	0.290	0.053	0.205	0.576	0.787	0.355	0.986	0.205	0.576	0.232	0.510	0.644
	Aspirants vs Enthusiasts	0.140	0.124	0.069	0.311	0.974	0.553	0.012*	0.756	0.927	0.548	0.651	0.841	0.218	0.400	0.075	0.381	0.804	0.908
	No Frills vs Enthusiasts	0.342	0.267	0.204	0.504	0.961	0.437	0.382	0.111	0.265	0.484	0.961	0.483	0.429	0.540	0.110	0.839	0.653	0.653
Sparkling white (MT) (*n* = 132)	All Segments	0.994	0.189	0.778	0.548	0.551	0.044*	0.671	0.254	0.713	0.046*	0.375	0.009*	0.229	0.080	0.150	0.026*	0.642	0.028*
	No Frills vs Aspirants	0.453	0.107	0.803	0.399	0.638	0.218	0.395	0.400	0.878	0.061	0.835	0.009*	0.211	0.033*	0.561	0.024*	0.727	0.062
	Aspirants vs Enthusiasts	0.973	0.188	0.826	0.812	0.278	0.427	0.615	0.272	0.415	0.333	0.211	0.379	0.158	0.958	0.051	0.468	0.468	0.039*
	No Frills vs Enthusiasts	0.936	0.811	0.617	0.278	0.829	0.013*	0.656	0.105	0.656	0.013*	0.273	0.003*	0.143	0.051	0.465	0.008*	0.386	0.013*
Sparkling rosé (*n* = 139)	All Segments	0.592	0.086	0.179	0.013*	0.531	0.065	0.522	0.921	0.766	0.232	0.756	0.129	0.719	0.640	0.712	0.055	0.763	0.121
	No Frills vs Aspirants	0.505	0.080	0.332	0.014*	0.319	0.105	0.365	0.865	0.574	0.091	0.200	0.045*	0.486	0.574	0.498	0.187	0.636	0.098
	Aspirants vs Enthusiasts	0.355	0.381	0.201	0.341	0.804	0.218	0.354	0.756	0.548	0.744	0.600	0.651	0.561	0.561	0.530	0.108	0.501	0.441
	No Frills vs Enthusiasts	0.986	0.027*	0.082	0.003*	0.272	0.021*	0.849	0.710	0.203	0.153	0.227	0.046*	0.800	0.352	0.915	0.021*	0.978	0.040*
Sparkling red (*n* = 130)	All Segments	0.600	0.138	0.096	0.255	0.029*	0.063	0.258	0.149	0.552	0.351	0.201	0.255	0.816	0.485	0.204	0.323	0.750	0.675
	No Frills vs Aspirants	0.529	0.315	0.053	0.821	0.008*	0.206	0.101	0.053	0.454	0.710	0.077	0.206	0.529	0.312	0.023*	0.454	0.622	0.448
	Aspirants vs Enthusiasts	0.443	0.109	0.737	0.144	0.463	0.348	0.044*	0.749	0.323	0.231	0.763	0.551	0.763	0.772	0.508	0.326	0.704	0.492
	No Frills vs Enthusiasts	0.362	0.061	0.035*	0.200	0.061	0.023*	0.261	0.080	1.000	0.219	0.134	0.098	0.698	0.235	0.206	0.151	0.405	0.819
Moscato (*n* = 137)	All Segments	0.367	0.720	0.982	0.769	0.125	0.280	0.673	0.643	0.360	0.403	0.268	0.378	0.194	0.720	0.491	0.890	0.887	0.518
	No Frills vs Aspirants	0.348	0.423	0.978	0.503	0.367	0.038*	0.377	0.348	0.941	0.431	0.348	0.880	0.125	0.423	0.423	0.753	0.803	0.508
	Aspirants vs Enthusiasts	0.200	0.723	0.863	0.951	0.785	0.494	0.901	0.767	0.166	0.201	0.125	0.994	0.189	0.723	0.280	0.656	0.635	0.273
	No Frills vs Enthusiasts	0.940	0.625	0.876	0.502	0.348	0.160	0.453	0.506	0.320	0.824	0.785	0.112	0.610	0.625	0.955	0.969	0.902	0.840
Prosecco (*n* = 138)	All Segments	0.050*	0.124	0.164	0.389	0.024	0.615	0.069	0.533	0.017*	0.128	0.008*	0.946	0.027*	0.067	0.010*	0.219	0.187	0.221
	No Frills vs Aspirants	0.029*	0.526	0.090	0.854	0.006*	0.324	0.039*	0.265	0.005*	0.934	0.002*	0.747	0.010*	0.068	0.003*	0.406	0.069	0.504
	Aspirants vs Enthusiasts	0.588	0.063	0.237	0.180	0.721	0.721	0.153	0.609	0.771	0.061	0.237	0.853	0.813	0.042*	0.994	0.243	0.868	0.082
	No Frills vs Enthusiasts	0.014*	0.128	0.366	0.402	0.014*	0.317	0.261	0.502	0.009*	0.134	0.016*	0.868	0.007*	0.868	0.003*	0.095	0.092	0.494

* denotes P values at ≤ 0.05.

Chapter 5 Concluding Remarks, Future Directions and Closing Statement

5.1 Concluding Remarks

This research aimed to understand Australian wine consumer preferences for different sparkling wine styles (specifically Champagne, Australian sparkling white wines made from the classic grape varieties using carbonation, Charmat, transfer and Méthode Traditionelle production methods, sparkling rosé wine, sparkling red wine, Prosecco and Moscato). The study involved: (i) focus groups that explored the factors that influence Australian consumers' purchasing preferences; (ii) online surveys that ascertained consumers' perceptions of and preferences for different styles of sparkling wine; and (iii) blind tastings to determine consumers' ability to recognise and discriminate different sparkling wine styles, and to compare expected vs. actual liking of different sparkling wines and the influence of sparkling wine style and occasion on consumer purchasing and consumption behaviour. The collective work examined the influence of Australian consumer involvement (determined using the Fine Wine Instrument (FWI)) on sparkling wine preferences, as well as the importance of wine sensory attributes, occasion and price.

Initial findings were consistent with prior research, however, these studies also identified relationships between factors which have not been characterised previously. The key findings provide valuable insight into Australian sparkling wine consumers' purchasing and consumption behaviour, and most notably reveal unexpected results with regards to Prosecco and Moscato. The conclusions not only provide wine industry practitioners confidence in the validity of previous research, but offer additional evidence-based recommendations for effectively promoting specific sparkling wine styles to different segments of the Australian domestic market.

Results from the focus group study feature in Chapter 2. The findings demonstrate the large variation in consumers' personal taste, leading to the conclusion that producers might benefit from developing a range of sparkling wine styles that cater for this diversity. In addition to the sensory properties of sparkling wine styles, this study highlighted the importance of country of origin, occasion, price, expert recommendations, brand image, reputation and symbolism, in determining consumers' purchasing decisions. It was clear that further investigation of these drivers (consumption occasion and price sensitivities, in particular) was required. These factors were therefore explored, using the FWI as a novel approach to segmentation (Johnson &

Bastian 2015), in studies described in Chapters 3 and 4. This sophisticated tool provided multidimensional analysis of fine wine consumers' questionnaire responses, incorporating connoisseur, knowledge, provenance and occasion elements. The FWI introduced a different segmentation base for the Australian domestic wine market and offers insights into three distinct consumer clusters: 'No Frills', 'Aspirant' and 'Enthusiast' consumers. Since many sparkling wines, Champagne in particular, are considered to be 'fine' wines, segmentation of consumers based on the FWI seemed reasonable and as expected, clear differences were observed between the perceptions, preferences, and purchasing and consumption behaviour of the FWI segments. The insights gained about each FWI segment will enable Australian sparkling wine producers to market specific styles of sparkling wine to consumers within each group. They will potentially be able to develop a broader range of sparkling wine styles and/or brands to better meet the needs and expectations of different consumer demographics, spanning different price points and quality dimensions, and target more specific occasions at which sparkling wine might be consumed.

Key findings demonstrated that different styles of sparkling wine (both fruit driven and complex styles) appeal to different segments of the domestic sparkling wine market. An online survey of approximately 1,000 regular sparkling wine consumers (discussed in Chapter 3) revealed that sparkling white wine and Champagne were the most preferred wine styles, followed by Moscato and sparkling rosé wine. Preference scores for sparkling white and rosé wines were significantly higher for women than for men, while younger consumers (i.e., those < 35 years of age) preferred Moscato and sparkling rosé more than consumers from older age groups.

The studies reported in Chapters 3 and 4 identified clusters with distinct pre-conceived expectations and perceptions of, and preferences for, different sparkling wine styles, using the FWI. From a sensory perspective, the Champagne, sparkling white wines made via carbonation, transfer and Méthode Traditionelle production methods and sparkling rosé exhibited varying degrees of yeasty, toasty/nutty and bruised apple aromas and flavours, complexity and acidity. In contrast, the sparkling white wine made via the Charmat production method, the Prosecco and Moscato wines were more fruit driven styles of sparkling wine; with the Moscato characterised by varietal floral/musk and confectionary attributes, and apparent sweetness. The sparkling red wine displayed dark fruit, mixed spice, vanilla/caramel, and oaky aromas and flavours. When nine different sparkling wine styles were tasted under blind conditions (as described in Chapter 4), significant differences existed between consumers'

expected liking scores (obtained via an online survey) and their actual liking scores for Champagne, sparkling white and sparkling red wine. Participants tended to provide lower liking scores during the blind tasting, which might indicate a degree of hyper-scrutiny in the sensory laboratory.

In the study described in Chapter 4, the Enthusiast segment self-identified as the consumers most informed about Champagne production. Notwithstanding this, the overall responses indicate consumers were not particularly familiar with any of the sparkling wine production methods, and consequently, this information (which is often found on wine bottle labels, providing an extrinsic cue) may not play a primary role in quality perception. On the other hand, focus group data (presented in Chapter 2) indicates that carbonation is perceived as a method of producing lower quality wines, that retail at lower price points. Australian sparkling white wines range in price, quality and style, in part due to different production methods, and they are consumed at a variety of consumption occasions. Sparkling white wine in particular, was associated with celebration, happiness, fun and summer. While sparkling rosé was also associated with celebration, albeit to a lesser extent than sparkling white wine, consumers' expected liking scores for this sparkling wine style were only moderately favourable.

The results reported in Chapters 3 and 4 indicate that consumers typically expected they would like sparkling white wine, perhaps because this is a familiar style, that they consume most regularly. In contrast, Champagne was considered to be expensive and luxurious, and suited to extra special celebratory occasions. Consumers therefore expected to like it, due to its prestige. However, in the blind tasting study described in Chapter 4, none of the FWI segments could reliably identify Champagne alongside the other sparkling white wines (including the Australian Méthode Traditionelle wine). Considering consumers are generally willing to pay more for Champagne because it is often thought to be of higher quality, it is likely that extrinsic cues (including country of origin and brand) play a significant role in influencing purchasing behaviour and anticipated liking for Champagne.

Given that most consumers, irrespective of their FWI classification, had limited knowledge of sparkling winemaking production methods, it is not surprising that participants could not readily identify the different styles of sparkling wine presented during the blind tasting. Even the sparkling red and Moscato wines, which exhibited the most distinctive sensory profiles, were only correctly identified ~60 and 80% of the time; the Moscato was presumably easier to identify based on its prominent fruit character and sweetness. In the case of the sparkling red wine, which exhibited dark fruit and oak aromas and flavours, consumers expect to like this

style, just not as much as they expected to like the sparkling white wine and Champagne. The more complex wines, i.e. the Champagne and sparkling red wine, were preferred most by Enthusiasts, and perhaps unsurprisingly, this segment consumed a broader range of sparkling wine styles, more regularly and at more varied occasions. Enthusiasts were also willing to spend more per bottle for Champagne, especially to celebrate a wedding, anniversary or the New Year; although, on average, the majority of respondents would not pay more than AU$50 per bottle for any Australian sparkling wine. For all FWI segments, the most popular occasions at which Australian sparkling white wine was consumed were anniversaries, Christmas, weddings, New Year and birthdays, and consumers tended to spend more per bottle for sparkling white wine for consumption at these special occasions. Interestingly, the findings presented in Chapter 4 suggest that consumption of sparkling rosé, Prosecco and Moscato are not as strongly linked to specific events. Typically, these sparkling wine styles are less expensive than Champagne and Méthode Traditionelle wines, so they could potentially be marketed as options for regular sparkling wine consumption or at less formal occasions.

It was clear that consumers lacked familiarity with Prosecco. As such, their expected liking and probable spend per bottle for Prosecco was lower than for other sparkling wine styles. Indeed, the majority of participants in both the online survey (described in Chapter 3) and the consumer tasting (described in Chapter 4) indicated they never purchase Prosecco, despite the style being received favorably during the blind tasting. Notwithstanding consumers' limited familiarity with Prosecco, the blind tasting results revealed that participants could envisage drinking this style of sparkling wine at a wide range of occasions. Prosecco is not likely to be perceived as equivalent to Champagne or premium Australian sparkling white wines, but instead, Prosecco could be promoted as an approachable sparkling wine style, suitable for consumption at casual occasions. As a whole, this research suggests there are opportunities for wine marketers to better position Prosecco in the Australian sparkling wine landscape, and to actively promote Prosecco to regular sparkling wine consumers, many of whom avoid the style because it is not familiar and therefore represents a purchasing risk.

When comparing the expected vs. actual liking scores of each of the sparkling wine styles studied, with the exception of Prosecco, all of the wine styles evaluated during the blind tastings received scores that were either similar to or lower than the expected liking scores. Surprisingly, the fruit driven styles, with the least complexity (i.e. Moscato and Prosecco), were preferred least by the No Frills segment; albeit a notable limitation of this study was the relatively small number of No Frills consumers (i.e. n = 31, from a total of 203 participants).

Moscato was the most recognisable wine style under blind tasting conditions and scored favorably with Aspirants, demonstrating that sweeter styles of sparkling wine should not only be targeted towards low-involvement, novice consumers. Moreover, favorable scores were given to the sparkling rosé and Moscato wines by Aspirants and Enthusiasts, highlighting opportunities to promote these styles for consumption at occasions including anniversaries and birthdays (for sparkling rosé), and birthdays and Christmas (for Moscato).

The industry reference group (comprising prominent Australian sparkling winemakers) acknowledged the importance of Moscato within their production portfolios, prior to the commencement of this research. As this style continues to be refined and production methods evolve, it is evident that sparkling Moscato will maintain its place in the Australian domestic market. However, market research suggests consumers are becoming more health conscious and aware of their sugar and alcohol intake, so this may influence Moscato consumption in the future. The current research suggests the less complex, lighter sparkling wine styles (i.e. sparkling rosé, Prosecco and Moscato) still appeal to both Aspirant and Enthusiast consumers. These results provide consumer insights that can be used by sparkling wine producers to tailor their production and marketing strategies to better meet the specific needs and expectations of their target market, as a key outcome of this study. Although not specifically investigated in this research, this insight might also be valuable to sparkling wine producers targeting export markets.

5.1.1 Limitations

This research aimed to address a knowledge gap regarding the categorisation of sparkling wine consumers, and their purchasing and consumption behaviour, to assist industry (both producers and marketers) to better meet the specific needs and expectations of different segments of the Australian domestic market. As with any such research, there are limitations associated with each study that should be acknowledged. The scope of the original research question focussed on the perceptions and preferences of consumers from Australia only, and predominantly reflect responses for Australian sparkling wines. Therefore, the studies could also be duplicated in other countries to determine if cultural influences impact consumer behaviour. Of particular note is the potential for sample and/or self-selection biases associated with the use of convenience sampling to recruit focus group, online survey and consumer tasting participants. Although convenience sampling is common practice in consumer research, self-selection

biases may not give representative and reproducible results. In the current studies, this was in part mitigated through inclusion criteria that required all participants to be regular sparkling wine consumers. Best endeavours were used to recruit diverse focus group, questionnaire and tasting participants by gender and age to ensure representative samples, including a substantial online survey cohort of just over 1000 respondents. Nevertheless, the relatively low number of younger participants and participants classified as No Frills consumers is acknowledged as a limitation of the study described in Chapter 4. A study that specifically focuses on younger and/or No Frills consumers might therefore need to be undertaken.

There is an increasing body of research demonstrating the influence of context on wine consumers' perceptions and preferences for different types and styles of wine. Extrinsic cues, such as price, style, brand and country of origin, have also been shown to influence consumer preferences, acceptability and liking. Therefore, future studies concerning consumer preferences for sparkling wine could take context (e.g. situation, location and occasion) and/or extrinsic cues into account. During the consumer tastings, differences in environmental conditions were minimised by ensuring both sensory laboratories maintained constant temperature, light and ventilation conditions, that wine samples were presented 'blind' (unidentifiable) using a randomised presentation order across panellists, poured according to a standard protocol, to a set volume and using ISO glassware, as is expected in sensory analysis research. However, this environment does not reflect the context in which sparkling wines would typically be consumed. As such, consumer liking and the wine tasting experience might reasonably be expected to be influenced by the contextual setting. The aforementioned limitations highlight opportunities for future research into consumers' understanding of sparkling wine production methods and label terminology, the impact of this knowledge on preferences, and, given the close association of sparkling wine consumption with celebratory occasions, a study exploring the emotions that are evoked when consuming different styles of sparkling wine (in different contexts).

5.2 Future Directions

Australian sparkling wine producers not only face challenges associated with a constantly evolving consumer base, but climate change and intellectual property rights also present threats to financial viability. The research described in this thesis contributes knowledge and insight that can be used by industry to tailor both winemaking and wine marketing strategies, to better meet consumer needs and expectations. However, further research is needed to address issues associated with climate change and the regulation of Geographical Indications, as outlined below.

5.2.1 Sparkling Wine and Climate Change

The quality of fruit, including fruit destined for sparkling wine production, is determined by the geographical site of a vineyard, due to the strong influence of climate (as well as viticultural management) on grape development and composition. Therefore, future research examining the viability of such locations will require careful analysis to ensure economic confidence within the sector. In Australia, it is clear that the influences of climate and viticultural management on fruit quality are paramount, and that global warming will greatly affect the future of this wine style. The impact of climate change on vine phenology and berry chemistry has flow-on effects for winemaking practices and ultimately, the sensory properties of wines. Traditionally, grapes for sparkling wine production are grown in cooler regions which facilitates wines with higher natural titratable acidity, and the array of grape-derived volatile compounds that contribute the desired aroma and flavour profile expected of sparkling wines. However, regions that were once considered optimal for sparkling wine production are increasingly facing warmer growing seasons, which affects the chemical and sensory profiles of finished wine, and therefore challenges sparkling winemakers' ability to meet consumer expectations of different sparkling wine styles. Most famously, the Champagne region has been forecast to experience temperature increases of more than 5°C by the end of the 21st century (Adelsheim et al. 2016).

It is possible that the climatic conditions of some existing sparkling wine appellations may not support the fruit requirements for sparkling wine production in the future, such that producers will need to source their fruit from, and/or establish vineyards in, other (cooler) regions. It is also conceivable that they will be forced to abandon some of the wine styles they have previously made. In the case of Champagne producers, this might mean abandoning traditions

practised for centuries. Moving forward, macroclimate and topography, vine density, pruning methods, cultivars and clones will all require careful consideration to ensure yields and fruit quality are maintained. As wine growing regions in Australia continue to warm, it is important that viticultural practices, including canopy management, pruning techniques and irrigation, not only optimise yield in a cost-effective manner, but mitigate the impact of warmer growing conditions. To facilitate this, accessible technologies are being developed, from digital sensors that rapidly monitor vine physiology, growth, nutrition and water-use, to mechanisation of vineyard management practices.

Generally, sparkling wine styles require harvest to occur when berries have the desired aroma and flavour profiles, in conjunction with high natural acidity and low fermentable sugars. The timing of harvest is therefore critical and ensures sparkling wine grapes are picked at optimal sugar concentrations (to avoid undesirable yeast metabolic by-products and/or high alcohol levels) and aroma/flavour ripeness. In the future, tartaric acid additions might play an important role in ensuring juice chemistry is optimal for sparkling wine styles. Future research could therefore explore the use of alternative varieties or clones of the classic varieties, to determine whether or not they are better suited to sparkling wine production from fruit grown in warmer climates. In particular, Australia could follow Italy's lead, where scientists are actively pursuing the development of new varieties specifically adapted for warmer climates, including high acidity varieties for sparkling wines (Hayes 2019). Studies that determine consumer acceptance of these new sparkling wine styles would provide domestic and international wine industries with valuable marketing insight.

As the climate continues to change, many Australian wine regions are expected to experience increased growing season temperatures and aridity, as well as more frequent extreme weather events, including heatwaves, frost and bushfires. Research into the feasibility of Tasmania as the premier Australian sparkling wine production region is already underway, and merits attention. Compared to mainland Australia, the topographic variation of Tasmania may provide cooler site selection (with the exclusion of areas affected by high rainfall or frost), that are more viable in the longer term (Smart 2014). Climate-related research, such as that reported in Australia's Wine Future - A Climate Atlas (Remenyi et al. 2020) will be fundamental to the strategic decision making that will underpin the profitability of the wine sector. Such research insights will identify risks and opportunities for winemakers, including sparkling wine producers, not just in Australia, but globally.

As a consumer driven industry, it is important to consider how the impacts of climate change will affect sparkling wine consumers. Unlike the European Union (EU), where strict wine regulations govern much of the industry, Australia has the potential to produce sparkling wines using alternate varieties, addition of water to juice, fermentation arrest processes and/or de-alcoholising technologies (such as reverse osmosis-evaporative perstraction). If the climate continues to warm and excessively high berry sugar levels at harvest are unavoidable, these unconventional strategies could be implemented for the development of unique sparkling wines that meet a range of industry and consumer needs. For example, many corporate wineries are undertaking work using beverage technology experts to pioneer wines that meet commercial expectations. Nevertheless, any consumer concerns regarding sugar consumption may need to be considered by product developers, given the current health messaging around sugar intake. Therefore, consumer acceptance of sweeter sparkling wine styles could be investigated in future research.

5.2.2 Australian Prosecco, Intellectual Property and Trade

Australian production of Prosecco is currently under intense international scrutiny and in the future, the legal status and export potential of Prosecco may require careful examination. Implementation of protected designations of origin, may have consequences for a number of Australian agricultural products (e.g. cheese and olive oil) where intellectual property laws, including geographical indications (GIs), play significant roles in regional branding. In recent years, sales of Italian Prosecco have steadily increased in the United Kingdom and United States of America. Recognising market potential, Australian producers planted Prosecco grapevines and sold wines labelled using the variety name. However, legal issues have arisen because Prosecco is now a protected designation of origin for sparkling wine produced in a specific wine region in Italy, and is no longer the recognised name of the grape variety; this has been changed to Glera. The transition of Prosecco from grape variety to GI has been examined in detail by Australian legal scholars, including Hill (2019), who argued that there is no justifiable explanation for the change. Nevertheless, Italy has successfully protected the name in Japan and has made similar applications in China, India, Malaysia and New Zealand (Dunn 2019).

Australia's position currently acknowledges Prosecco as a grape variety and not a GI. Therefore, it is likely that the prohibition on using the term Prosecco on labelling of exported

Australian products would contravene Article 20 of the Trade-Related Aspects of Intellectual Property Rights (the TRIPS Agreement) and Article 2.1 of the Technical Barriers to Trade (TBT) Agreement. Recent research funded by Wine Australia raised uncertainty around whether prohibition of the use of the word Prosecco on products in Australia would be inconsistent with the Australian Constitution. Davison and colleagues (2019a) argued that fundamentally, Australia should question to what extent the Italian legal system can use Intellectual Property claims to leverage international protections. In addition, it has also been argued that the EU governments' proposed prohibition on imports of Australian Prosecco may contravene their World Trade Organisation obligations. This situation will likely require further legal analysis to resolve ongoing use of the name Prosecco by Australian wine producers in both domestic and export markets.

Intellectual property and trade concerns will need to be scrutinised carefully to appreciate the full implications for the Australian wine industry. The consequences of accepting the EU's assertions in relation to Prosecco could potentially open Pandora's Box with regards to claims affecting other Australian agricultural products (Davison et al. 2019b). Future research should consider to what extent food and beverage industries and their consumers are concerned by potential changes to Australian GI regulations, as this would provide valuable insight to marketers. It would also be beneficial for the wine industry to understand how adaptable consumers are to any required changes to labelling and the subsequent impact on sales. Should naming variations arise, it is clear that re-education regarding branding is imperative. Interestingly, informal discussions with focus group participants suggest the term 'Champagne' (a designation legally used in Australia prior to September 2011) is still regularly used by consumers to describe Australian sparkling wine in casual settings. The lack of familiarity of Australian sparkling wine consumers with Prosecco (as established in Chapters 3 and 4) indicates that a change in wine style name may not influence liking scores when tasting a beverage, such that now may be an appropriate time to find an alternative name, unique to Australia, for marketing wines currently sold as Prosecco. By and large, consumers of all FWI segments were not overly familiar with Prosecco (despite the increasing promotion, popularity and production of this sparkling wine style in Australia), as evidenced by neutral expected liking scores. Notwithstanding this, results from the study described in Chapter 4 suggest consumers generally liked Australian Prosecco more than they expected to, and could envisage consuming Prosecco at a range of occasions. It would therefore be interesting to consider

whether changing Australian product names would have any effect on consumer confidence and/or any impact on sales in the domestic market.

5.3 Closing Statement

This research profiled Australian sparkling wine consumers by analysing results from focus groups, online survey questionnaires and blind tastings. Segmentation using the FWI was used to investigate wine involvement, and incorporated the evaluation of knowledge of sparkling wine styles and production methods. Consumers' perceptions of and preferences for different sparkling wine styles were explored, specifically relating to Champagne, Australian sparkling white wines made from the classic grape varieties using carbonation, Charmat, transfer and Méthode Traditionelle production methods, sparkling rosé wine, sparkling red wine, Prosecco and Moscato. Furthermore, focus group, survey and tasting questions were designed to establish which factors most influence consumer purchasing decisions and consumption behaviour. In particular, the importance of occasion and price were determined to be major influencing factors, and should therefore be considered as an integral part of Australian sparkling wine marketing strategies.

Overall, research presented in this thesis lays the foundation for ongoing studies concerning the influence of wine involvement on preferences for both new and existing styles of Australian sparkling wine in different contextual settings. The influence of climate change on sparkling wine production and the impact of intellectual property law claims on wine marketing provide interesting new research directions. As technical winemaking advancements continue to be developed, the Australian sparkling wine sector will benefit from understanding the preferences of different consumer segments (i.e. No Frills, Aspirants and Enthusiasts), and the extent to which price, occasion, production method and geographical origin influence consumer acceptance, and purchasing and consumption behaviour. These insights will be advantageous to the Australian wine industry as it reconciles changing production conditions (both climatic and regulatory), with evolving consumer preferences. It is anticipated that production houses throughout the country will be able to consider and extrapolate from this work when marketing existing products and developing new Australian sparkling wine styles.

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Appendices

A.1 Focus Group Materials

A.1.1 Focus Group Participant Information Sheet

Project title: FAB study - Understanding Consumers Perceptions of **F**rench and **A**ustralian **B**ubble drinks

Background Information
Sparkling wine has accounted for almost 10% of Australian domestic wine sales since the late 1980s. Between 2004 and 2012, the number of Australian sparkling wine producers increased from 570 to 948, and annual production reached 37 ML. However, an additional 9.6 ML sparkling wine, predominantly Champagne, was imported; i.e. 20% of sparkling wine consumed in Australia. While Champagne is undoubtedly the benchmark for sparkling wine, even sparkling wine connoisseurs can struggle to differentiate Australian sparkling wines from Champagne.

Why is this study being conducted?
The Australian wine industry seeks to capture a greater proportion of the domestic sparkling wine market, for financial gain. To achieve this, winemakers and wine marketers need to better understand Australian wine consumers' preferences for French Champagne vs. sparkling wine and the importance of country of origin, price, occasion, brand and packaging, as purchasing drivers. We aim to achieve this through observing wine consumers' in store purchasing behaviour and decisions, to gain a better understanding of sparkling wine purchase drivers.

What is involved if I become involved in the research study?
You will be asked to respond to 3 questions regarding how often you purchase Champagne and sparkling wine, if your purchase depends on occasion, and the importance of different purchase drivers (e.g. price, sensory characteristics, brand, region, occasion, wine writers or critics, previous consumption, family members or friends or bundling and promotion). We anticipate this will take no longer than 3-5 minutes. Your responses will be recorded, transcribed and then stored electronically. All paper-based information will be stored in a locked cabinet in P-1-26 at the University of South Australia, City East campus to ensure confidentiality. Electronic data will be stored on the Playford server at City East campus. All data will be retained for 5 years from the date of publication. The identity of participants will not be recorded.

How will this study benefit me and/or the community?
It is envisaged the project will deliver economic benefits to the wine industry, however these benefits are by no means assured. Improvements to the financial viability and sustainability of the Australian wine industry could also result in social benefits to wine industry personnel, in terms of employment security and increased employment through distribution and retail networks.
The study will not benefit you directly.

Are there any risks from my involvement in this study?
There are no anticipated risks to involvement in the study.

Do I have to be involved in this study?
No. Your involvement is entirely voluntary. You may decline to be involved or withdraw your consent at any time without prejudice.

Who do I contact if I have further questions about the study?
For questions concerning the research study you may contact
Melissa Lane (lanmj009@mymail.unisa.edu.au),
Naomi Verdonk (Adelaide University; 8313 0284, naomi.verdonk@adelaide.edu.au)
Dr Karma Pearce (UniSA; 83021133, karma.pearce@unisa.edu.au)
Dr. Kerry Wilkinson (Adelaide University; 8313 7360, kerry.wilkinson@adelaide.edu.au)
Dr. Renata Ristic (Adelaide University; 8313 0096, renata.ristic@adelaide.edu.au)

Who do I contact if I have further questions about the approval process or any concerns and complaints regarding this study?
If you have any ethical concerns about the project or questions about your rights as a participant please contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028.

A.1.2 Focus Group Consent Form

Project Title: FAB study - Understanding Consumers Perceptions of **F**rench and **A**ustralian **B**ubble drinks (Champagne vs Sparkling wine).

Principle Researchers:
Melissa Lane (lanmj009@mymail.unisa.edu.au),
Naomi Verdonk (Adelaide University; 8313 0284, naomi.verdonk@adelaide.edu.au)
Dr Karma Pearce (UniSA; 83021133, karma.pearce@unisa.edu.au)
Dr. Kerry Wilkinson (Adelaide University; 8313 7360, kerry.wilkinson@adelaide.edu.au)
Dr. Renata Ristic (Adelaide University; 8313 0096, renata.ristic@adelaide.edu.au)

- I have read the Participant Information Sheet and the nature and purpose of the research project has been explained to me.
- I understand the purpose of the research and my involvement in it, I have also been given the opportunity to have a member of my family or a friend present while the project was explained to me. I understand and agree to take part.
- Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.
- I understand that I may withdraw from the research project at any stage and that this will not affect my status now or in the future.
- I understand that electronic data will be kept on the University of South Australia City East Campus, Playford server for 5 years after publication. Paper based questionnaires will be stored in a locked filing cabinet in p1-26.
- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential.
- I am aware that I should keep a copy of this Consent Form, when completed, and the attached Information Sheet.
- I am over 18 years of age.
- Should I agree to take part in the focus group, I agree to maintain confidentiality of other group members and agree to the interview being recorded.
  - ☐ Yes
  - ☐ No
- I would like to be considered and contacted for ant future wine related studies.
  - ☐ Yes
  - ☐ No

Name of participant	
Signature	
Date	

I have provided information about the research to the research participant and believe that he/she understands what is involved.

Research Assistant signature	
Date	

This project has been approved by the University of Adelaide's Human Research Ethics Committee. If you have any ethical concerns about the project or questions about your rights as a participant please contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028 or by email to hrec@adelaide.edu.au

A.1.3 Focus Group Questionnaire

Demographic Information

What is your gender?

- ☐ Male
- ☐ Female

To which age group do you belong?

- ☐ 18-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65+

What is your highest level of education?

- ☐ Some high school
- ☐ High school, Year 12
- ☐ TAFE, diploma or trade
- ☐ Some university
- ☐ Undergraduate degree
- ☐ Postgraduate degree

What is your household income?

- ☐ <$25,000
- ☐ $25,001-$50,000
- ☐ $50,001-$75,000
- ☐ $75,001-$100,000
- ☐ $100,001-$150,000
- ☐ $150,001-$200,000
- ☐ >$200,000

How often do you currently consume sparkling wine/Champagne?

- ☐ 4+ times/week
- ☐ 2-3 times/week
- ☐ once/week
- ☐ once/fortnight
- ☐ once/month

Please indicate the proportion (percentage by volume) of each of the following styles of sparkling wine/Champagne you consume. Please note this must equate to a total of 100%.

Moscato	%
Sparkling white	%
Sparkling rosé	%
Sparkling red	%
Champagne	%
Total	100%

Please indicate the proportion (percentage by volume) of each of the following alcoholic beverages you consume. Please note this must equate to a total of 100%.

Sparkling wine/Champagne	%
Table wine	%
Beer	%
Spirits	%
Other, please specify:	%

Total	100%

Sparkling Wine Knowledge

List the words/phrases that you associate with the term “sparkling wine”:

List the words/phrases that you associate with the term “Champagne”:

List as many Australian sparkling wine brands as possible:

List as many French Champagne brands as possible:

List the grape varieties used in sparkling wine/Champagne production:

Please indicate which of the following brands you associate with sparkling wine:

- ☐ Andrew Garrett
- ☐ Bay of Fires
- ☐ Bird in Hand
- ☐ Chandon
- ☐ Clover Hill
- ☐ Croser
- ☐ House of Arras
- ☐ Jacobs Creek
- ☐ Jansz
- ☐ Minchinbury
- ☐ Redbank
- ☐ Seppelt
- ☐ Stefano Lubiana
- ☐ Yarra Burn
- ☐ Yellowglen

Please indicate which of the following brands you associate with Champagne:

- ☐ Pol Roger
- ☐ Moët & Chandon
- ☐ Bollinger
- ☐ Les Mesnil
- ☐ Laurent-Perrier
- ☐ Mumm
- ☐ Veuve Clicquot
- ☐ Taittinger
- ☐ Ruinart
- ☐ Billecart-Salmon
- ☐ Louis Bouillot
- ☐ Nicolas Feuillatte
- ☐ Piper-Heidsieck
- ☐ Louis Perdrier
- ☐ Louis Roederer

Briefly describe the meaning of the following terminology related to sparkling wine/Champagne production. If you do not know please indicate by placing a tick in the "unsure" column.

Term	Unsure	Brief Description
Vintage	☐	
Non-vintage	☐	
Méthode Champenoise	☐	
Brut	☐	
Lees Ageing	☐	
Methode Traditionnelle	☐	
Moscato	☐	
Blanc de blancs	☐	
Blanc de noirs	☐	
Cuvée	☐	
Remuage	☐	
Crémant	☐	
Charmat	☐	
Tirage	☐	
Sec	☐	
Demi-sec	☐	
Muselet	☐	

Consumption – Australian Sparkling Wine

How often would you consume Australian sparkling wine on the following occasions/situations?

Occasion or location	Never		Occasionally		Sometimes		Usually		Always
Restaurant/cafe	1	2	3	4	5	6	7	8	9
Christmas	1	2	3	4	5	6	7	8	9
Work drinks	1	2	3	4	5	6	7	8	9
By yourself	1	2	3	4	5	6	7	8	9
Anniversaries	1	2	3	4	5	6	7	8	9
Pub/club	1	2	3	4	5	6	7	8	9
Funerals	1	2	3	4	5	6	7	8	9
Melbourne Cup	1	2	3	4	5	6	7	8	9
"Girls or boys night"	1	2	3	4	5	6	7	8	9
Breakfasts	1	2	3	4	5	6	7	8	9
Weddings	1	2	3	4	5	6	7	8	9
At home with food	1	2	3	4	5	6	7	8	9
At home without food	1	2	3	4	5	6	7	8	9
New Year	1	2	3	4	5	6	7	8	9
Hot weather	1	2	3	4	5	6	7	8	9
Birthdays	1	2	3	4	5	6	7	8	9
During the week	1	2	3	4	5	6	7	8	9
On the weekend	1	2	3	4	5	6	7	8	9

How often would you mix Australian sparkling wine with the following?

Mixer	Never		Occasionally		Sometimes		Usually		Always
Orange juice	1	2	3	4	5	6	7	8	9
Spirits	1	2	3	4	5	6	7	8	9
Soft drink	1	2	3	4	5	6	7	8	9
Other wine	1	2	3	4	5	6	7	8	9
Other	1	2	3	4	5	6	7	8	9
Please specify:									

Consumption – French Champagne

How often would you consume French Champagne on the following occasions/situations?

Occasion or location	Never		Occasionally		Sometimes		Usually		Always
Restaurant/cafe	1	2	3	4	5	6	7	8	9
Christmas	1	2	3	4	5	6	7	8	9
Work drinks	1	2	3	4	5	6	7	8	9
By yourself	1	2	3	4	5	6	7	8	9
Anniversaries	1	2	3	4	5	6	7	8	9
Pub/club	1	2	3	4	5	6	7	8	9
Funerals	1	2	3	4	5	6	7	8	9
Melbourne Cup	1	2	3	4	5	6	7	8	9
"Girls or boys night"	1	2	3	4	5	6	7	8	9
Breakfasts	1	2	3	4	5	6	7	8	9
Weddings	1	2	3	4	5	6	7	8	9
At home with food	1	2	3	4	5	6	7	8	9
At home without food	1	2	3	4	5	6	7	8	9
New Year	1	2	3	4	5	6	7	8	9
Hot weather	1	2	3	4	5	6	7	8	9
Birthdays	1	2	3	4	5	6	7	8	9
During the week	1	2	3	4	5	6	7	8	9
On the weekend	1	2	3	4	5	6	7	8	9

How often would you mix French Champagne with the following?

Mixer	Never		Occasionally		Sometimes		Usually		Always
Orange juice	1	2	3	4	5	6	7	8	9
Spirits	1	2	3	4	5	6	7	8	9
Soft drink	1	2	3	4	5	6	7	8	9
Other wine	1	2	3	4	5	6	7	8	9
Other	1	2	3	4	5	6	7	8	9
Please specify:									

Purchasing – Australian Sparkling Wine

How often would you purchase *a bottle* of Australian sparkling wine from the following outlets?

Outlet	Never		Occasionally		Sometimes		Usually		Always
Cellar door	1	2	3	4	5	6	7	8	9
Independent bottle shop	1	2	3	4	5	6	7	8	9
Chain bottle shop	1	2	3	4	5	6	7	8	9
Online	1	2	3	4	5	6	7	8	9
Wine subscription (wine club or wineries)	1	2	3	4	5	6	7	8	9
Telemarketing	1	2	3	4	5	6	7	8	9
Other	1	2	3	4	5	6	7	8	9
Please specify									

When purchasing *a bottle* of Australian sparkling wine, how likely are the following factors to influence your selection?

Factor	Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
Price	1	2	3	4	5	6	7	8	9
Grape variety	1	2	3	4	5	6	7	8	9
Style (e.g. sweet vs dry; white vs red)	1	2	3	4	5	6	7	8	9
Commercial brand	1	2	3	4	5	6	7	8	9
Recommendations	1	2	3	4	5	6	7	8	9
Wine Region	1	2	3	4	5	6	7	8	9
Previous consumption	1	2	3	4	5	6	7	8	9
Promotions or specials	1	2	3	4	5	6	7	8	9
Packaging (e.g. bottle shape, label design)	1	2	3	4	5	6	7	8	9
Prestige	1	2	3	4	5	6	7	8	9
Occasion	1	2	3	4	5	6	7	8	9

How much would you typically spend on *a bottle* of table wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100
- ☐ Never purchase

How much would you typically spend on *a bottle* of Australian sparkling wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100
- ☐ Never purchase

What is the most you have ever spent on *a bottle* of Australian sparkling wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100
- ☐ Never purchase

What was the occasion for purchasing this bottle of Australian sparkling wine?

What is your favourite Australian sparkling wine?

If your local bottle shop didn't stock your favourite Australian sparkling wine how often would you:

Scenario	Never		Occasionally		Sometimes		Usually		Always
Travel to an alternative bottle shop to purchase that specific wine	1	2	3	4	5	6	7	8	9
How far would you travel?									km
Choose an alternative brand that you are familiar with	1	2	3	4	5	6	7	8	9
Ask advice to obtain an alternative	1	2	3	4	5	6	7	8	9
Purchase online as an alternative	1	2	3	4	5	6	7	8	9

Purchasing – French Champagne

How often would you purchase *a bottle* of French Champagne from the following outlets?

Outlet	Never		Occasionally		Sometimes		Usually		Always
Cellar door	1	2	3	4	5	6	7	8	9
Independent bottle shop	1	2	3	4	5	6	7	8	9
Chain bottle shop	1	2	3	4	5	6	7	8	9
Online	1	2	3	4	5	6	7	8	9
Wine subscription (wine club or wineries)	1	2	3	4	5	6	7	8	9
Telemarketing	1	2	3	4	5	6	7	8	9
Other	1	2	3	4	5	6	7	8	9
Please specify									

When purchasing *a bottle* of French Champagne, how likely are the following factors to influence your selection?

Factor	Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
Price	1	2	3	4	5	6	7	8	9
Grape variety	1	2	3	4	5	6	7	8	9
Style (e.g. sweet vs dry; white vs red)	1	2	3	4	5	6	7	8	9
Commercial brand	1	2	3	4	5	6	7	8	9
Recommendations	1	2	3	4	5	6	7	8	9
Wine Region	1	2	3	4	5	6	7	8	9
Previous consumption	1	2	3	4	5	6	7	8	9
Promotions or specials	1	2	3	4	5	6	7	8	9
Packaging (e.g. bottle shape, label design)	1	2	3	4	5	6	7	8	9
Prestige	1	2	3	4	5	6	7	8	9
Occasion	1	2	3	4	5	6	7	8	9

How much would you typically spend on *a bottle* of French Champagne?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100
- ☐ Never purchase

What is the most you have ever spent on *a bottle* of French Champagne?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100
- ☐ Never purchase

What was the occasion for purchasing this bottle of French Champagne?

What is your favourite French Champagne?

If your local bottle shop didn't stock your favourite French Champagne wine how often would you:

Scenario	Never		Occasionally		Sometimes		Usually		Always
Travel to an alternative bottle shop to purchase that specific wine	1	2	3	4	5	6	7	8	9
How far would you travel?									km
Choose an alternative brand that you are familiar with	1	2	3	4	5	6	7	8	9
Ask advice to obtain an alternative	1	2	3	4	5	6	7	8	9
Purchase online as an alternative	1	2	3	4	5	6	7	8	9

A.1.4 Focus Group Tasting Evaluation

Sparkling wine code (3 digits) _____

Evaluate the product in front of you:
Considering all characteristics (appearance, aroma, flavour, mouthfeel) indicate your overall like or dislike.

Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
1	2	3	4	5	6	7	8	9

How much would you expect to pay for this wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100

Would you expect this wine to be:

- ☐ An Australian sparkling wine
- ☐ A French Champagne
- ☐ Unsure

Sparkling wine code (3 digits) _____

Evaluate the product in front of you:
Considering all characteristics (appearance, aroma, flavour, mouthfeel) indicate your overall like or dislike.

Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
1	2	3	4	5	6	7	8	9

How much would you expect to pay for this wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100

Would you expect this wine to be:

- ☐ An Australian sparkling wine
- ☐ A French Champagne
- ☐ Unsure

Sparkling wine code (3 digits) _____

Evaluate the product in front of you:
Considering all characteristics (appearance, aroma, flavour, mouthfeel) indicate your overall like or dislike.

Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
1	2	3	4	5	6	7	8	9

How much would you expect to pay for this wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100

Would you expect this wine to be:

- ☐ An Australian sparkling wine
- ☐ A French Champagne
- ☐ Unsure

Sparkling wine code (3 digits) _____

Evaluate the product in front of you:
Considering all characteristics (appearance, aroma, flavour, mouthfeel) indicate your overall like or dislike.

Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
1	2	3	4	5	6	7	8	9

How much would you expect to pay for this wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100

Would you expect this wine to be:

- ☐ An Australian sparkling wine
- ☐ A French Champagne
- ☐ Unsure

Sparkling wine code (3 digits) _____

Evaluate the product in front of you:
Considering all characteristics (appearance, aroma, flavour, mouthfeel) indicate your overall like or dislike.

Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
1	2	3	4	5	6	7	8	9

How much would you expect to pay for this wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100

Would you expect this wine to be:

- ☐ An Australian sparkling wine
- ☐ A French Champagne
- ☐ Unsure

Sparkling wine code (3 digits) _____

Evaluate the product in front of you:
Considering all characteristics (appearance, aroma, flavour, mouthfeel) indicate your overall like or dislike.

Extremely dislike		Moderately dislike		Neither like or dislike		Moderately like		Extremely like
1	2	3	4	5	6	7	8	9

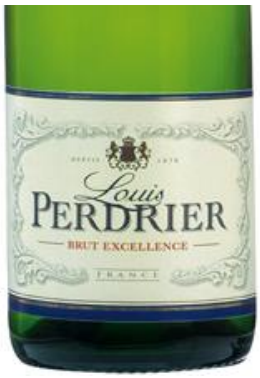
How much would you expect to pay for this wine?

- ☐ <$10
- ☐ $11-20
- ☐ $21-30
- ☐ $31-40
- ☐ $41-50
- ☐ $51-60
- ☐ $61-70
- ☐ $71-80
- ☐ $81-90
- ☐ $91-100
- ☐ >$100

Would you expect this wine to be:

- ☐ An Australian sparkling wine
- ☐ A French Champagne
- ☐ Unsure

A.1.5 Focus Group Label Challenge

How much would you expect to pay for a bottle of Veuve Clicquot?		How much would you expect to pay for a bottle of Louis Perdrier?	
	☐ <$10 ☐ $11-20 ☐ $21-30 ☐ $31-40 ☐ $41-50 ☐ $51-60 ☐ $61-70 ☐ $71-80 ☐ $81-90 ☐ $91-100 ☐ >$100		☐ <$10 ☐ $11-20 ☐ $21-30 ☐ $31-40 ☐ $41-50 ☐ $51-60 ☐ $61-70 ☐ $71-80 ☐ $81-90 ☐ $91-100 ☐ >$100
How much would you expect to pay for a bottle of Nicolas Feuillatte?		How much would you expect to pay for a bottle of Jacob's Creek?	
	☐ <$10 ☐ $11-20 ☐ $21-30 ☐ $31-40 ☐ $41-50 ☐ $51-60 ☐ $61-70 ☐ $71-80 ☐ $81-90 ☐ $91-100 ☐ >$100		☐ <$10 ☐ $11-20 ☐ $21-30 ☐ $31-40 ☐ $41-50 ☐ $51-60 ☐ $61-70 ☐ $71-80 ☐ $81-90 ☐ $91-100 ☐ >$100
How much would you expect to pay for a bottle of Clover Hill?		How much would you expect to pay for a bottle of Arras?	
	☐ <$10 ☐ $11-20 ☐ $21-30 ☐ $31-40 ☐ $41-50 ☐ $51-60 ☐ $61-70 ☐ $71-80 ☐ $81-90 ☐ $91-100 ☐ >$100		☐ <$10 ☐ $11-20 ☐ $21-30 ☐ $31-40 ☐ $41-50 ☐ $51-60 ☐ $61-70 ☐ $71-80 ☐ $81-90 ☐ $91-100 ☐ >$100

A.1.6 Focus Group Questions

Preference	**Prompts**
What do you think are the differences and similarities between sparkling wine and Champagne?	Country? Quality? Production methods? Price? Sensory?
Do you use the terms ‘sparkling’ and ‘Champagne ’ to differentiate between the countries of origin?	Australia vs French?
Which do you prefer? • Why?	Sensory? Prestige? Support Australia?
Do you buy and/or consume different sparkling wine styles? • Why or why not? o Thoughts about Moscato & sparkling red?	Moscato? Sparkling white? Sparkling rosé? Sparkling red? Champagne?
When do you buy and /or consume Australian sparkling wine and/or Champagne?	Special occasions? Casual drinking?
Have your preferences changed with time?	Will they ever change?
Purchasing behaviour	**Prompts**
What is important when you purchase and/or consume Australian sparkling wine and/or Champagne?	Country? Occasion? Brand? Variety? Sensory? Price? Label? Quality? Food matching?
Do you usually buy Australian sparkling wine and/or Champagne from retail chains or independent stores? • Why or why not?	Special offers?
Do you seek advice when buying Australian sparkling wine and/or Champagne? • Or, do you prefer to browse?	What information? Read wine reviews? Read catalogues?
How many bottles of Australian sparkling wine and/or Champagne do you usually purchase?	Chilled vs shelf? Occasion dependent?
How much do you expect to pay when you purchase Australian sparkling wine and/or Champagne?	Occasion dependant?
Sensory	**Prompts**
How important are the sensory properties of Australian sparkling wine and/or Champagne?	Colour? Aroma? Flavour? Effervescence?
Return Sheets	
Reflections	**Prompts**
What did you like/dislike about the wines tasted today?	
Were you surprised by any of the wines tasted today?	Country? Price? Quality?

A.2 Descriptive Analysis Materials

A.2.1 Descriptive Analysis Representative Wines

Name, Vintage, varietal composition, geographical origin and price of the French Champagne and Australian sparkling wines studied.

Wine Name	Wine Style	Vintage	Varieties	Region	Price (AUD)
Moët & Chandon Brut Impérial	Champagne	NV	PN, Ch, PM	Champagne	55
Tomich Hill "M" Chardonnay Pinot	Sparkling white (CA)	NV	Ch, PN	SA	25
Yellowglen Yellow	Sparkling white (CH)	NV	Ch, PN	SE Australia	10
Seppelt Salinger Select Cuvée	Sparkling white (TR)	NV	PN, Ch, PM	SA, NSW, Vic.	30
Brown Brothers Patricia Pinot Noir Chardonnay Brut	Sparkling white (MT)	2008	PN, Ch	Vic.	40
Seppelt Original Sparkling Shiraz Vintage	Sparkling red	2012	Shiraz	Vic.	20
Jansz Brut Rosé	Sparkling rosé	NV	PN, Ch	Tas.	25
Brown Brothers Sparkling Moscato	Moscato	2012	Muscat	Vic.	15
Brown Brothers Prosecco	Prosecco	NV	Glera	Vic.	15

AUD = Australian dollars; CA = carbonated; CH = Charmat; TR = Transfer; MT = Méthode Traditionelle; NV = non-vintage; Ch = Chardonnay; PM = Pinot Meunier; PN = Pinot Noir; NSW = New South Wales; SA = South Australia; SE = South Eastern; Tas. = Tasmania; Vic. = Victoria

A.2.2 Descriptive Analysis Information Sheet

Dear Participant,

You are invited to participate in the research project described below.

What is the project about?
This project investigates and characterises the sensory attributes (appearance, aroma, flavour, taste and mouthfeel) of different commercially available sparkling wine styles.

Who is undertaking the project?
This project is being conducted by Naomi Verdonk.
This research will form the basis for the degree of Doctor of Philosophy at the University of Adelaide under the supervision of Dr Kerry Wilkinson, Dr Julie Culbert, Dr Renata Ristic and Dr Karma Pearce.
The research is funded by Wine Australia.

Why am I being invited to participate?
Participants are invited to take part based on their previous experience with formal sensory evaluation and/or descriptive analysis.

What will I be asked to do?
Participants will assess the sensory properties of the sparkling wines. The project will involve training in standard descriptive analysis procedures including vocabulary generation, use of scales and gaining general panel consensus in understanding the attributes. The testing will be held at the University of Adelaide Waite Campus in the Wine Innovation Central Building.

How much time will the project take?
The descriptive analysis will take less than 2 months to complete. Participants will be required to attend sessions which will run for a maximum of 2 hours.

Are there any risks associated with participating in this project?
The project has no foreseeable risks. All samples will be hygienically prepared with a high standard of food/beverage handing.

What are the benefits of the research project?
There will be no immediate benefits to participants for taking part. Participants will receive a gift voucher for their time.

Can I withdraw from the project?
Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time.

What will happen to my information?
Information and data from the study will be aggregated and remain confidential in a secure database. The information provided by participants will only be read by the researchers of this project. The data will be published in a relevant journal, but no individual will be identified by name in any publication or presentation. No unwanted communication will be received from any third party as a result of your participation.

Who do I contact if I have questions about the project?
If you have any further questions concerning the project please contact:
Dr Kerry Wilkinson, kerry.wilkinson@adelaide.edu.au, (08) 8313 7360

What if I have a complaint or any concerns?
The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2014-212). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. Contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028 or by email to hrec@adelaide.edu.au if you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?
If you are able to participate in this study, please sign the consent form.

Yours sincerely,

Naomi Verdonk
PhD Candidate

A.2.3 Descriptive Analysis Consent Form

1. I have read the attached Information Sheet and agree to take part in the following research project:

   Title: Understanding Australian consumer preferences for sparkling wine styles

   Ethics Approval Number: H-2014-212

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

3. I have been given the opportunity to have a member of my family or a friend present while the project was explained to me.

4. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.

5. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged

6. I understand that I am free to withdraw from the project at any time.

7. I agree to the interview being audio/video recorded.
   - ☐ Yes
   - ☐ No
   - ☐ N/A

8. I am aware that I should keep a copy of this Consent Form, when completed, and the attached Information Sheet.

Participant to complete:

Name	
Signature	
Date	

Researcher/witness to complete:

I have described the nature of the research to

	Print name of participant

and in my opinion she/he understood the explanation.

Signature	
Position	
Date	

A.3 Online Survey and Consumer Tasting Materials

A.3.1 Online Survey Participant Information Sheet

Dear Participant,

You are invited to participate in the research project described below:

What is the project about?
This research will investigate Australian consumers' knowledge of sparkling wine (e.g. production methods), recognition of Australian and French brands and preference for different sparkling wine styles. The influence of age, gender, wine involvement and knowledge as well as the importance of label design, packaging, branding, country of origin, occasion, price, emotions and sensory attributes as purchase drivers will also be examined. This insight will be used to identify and evaluate sparkling wine styles and/or marketing strategies which might influence consumers' purchasing decisions in favour of Australian sparkling wine. This will in turn, enable the Australian wine industry to capture a greater proportion of sparkling wine sales within existing and emerging markets, thereby delivering economic benefits to sparkling wine producers. Indeed, a tangible performance indicator might be an upward trend in Australian sparkling wine sales.

Who is undertaking the project?
This project is being conducted by Naomi Verdonk.
This research will form the basis for the degree of Doctor of Philosophy at the University of Adelaide under the supervision of Dr Kerry Wilkinson, Dr Julie Culbert, Dr Renata Ristic and Dr Karma Pearce.
The research is funded by Wine Australia.

Why am I being invited to participate?
Participants must be over 18 years of age and have consumed sparkling wine at least 12 times during the previous year.

What will I be asked to do?
This study will take place in two stages:

1. Online questionnaire
2. Consumer preference trial

If you chose to participate in the *online questionnaire*, you will be approached by an Australian market research company to voluntarily complete an online survey by clicking on an email link. The questionnaire is anonymous and therefore data cannot be withdrawn. All information will be stored securely electronically.
If you chose to participate in the *consumer preference trial*, you will be given 6 x 30mL serves of sparkling wine to taste and will be asked to expectorate the wine. You will also be asked to complete a paper questionnaire about your preferences before, during and after the tasting. These sessions will be held at the University of Adelaide Waite Campus and the Uni SA City East Campus.

How much time will the project take?
It is anticipated that the *online questionnaire* will take no more than 20 minutes.
Participants of the *consumer preference trial* need only attend one session which should take no longer than 20 minutes.
Each *consumer preference trial* participant will receive a gift voucher for their time.

Are there any risks associated with participating in this project?
There are no foreseeable risks associated with answering the questions of this study. After the wine has been tasted, an alcohol breath test will be available for you to use.

What are the benefits of the research project?
The outcomes of this research are intended to deliver financial benefits to Australian sparkling wine producers through the capture of a greater proportion of the existing domestic sparkling wine market. It is hoped that research findings will inform sparkling wine producers regarding the wine styles, sensory properties and marketing strategies that best meet consumers' needs and expectations.
Participation in the online questionnaire and consumer preference trial will not benefit you directly. Participants will receive a gift voucher for their time.

Can I withdraw from the project?
Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time. You will have the opportunity to ask questions of the researcher either via email, over the phone or in person.

What will happen to my information?
Data from the *online questionnaire* is anonymous and therefore cannot be withdrawn.
Data from the *consumer preference trial* will be de-identified after completion.
Only aggregated data will be published and all participants can request a final copy of the report prior to publication.
The online data will be stored electronically in password protected files on the server at the University of Adelaide Waite Campus. The paper-based information will be stored in a locked cabinet at the University of Adelaide, Waite campus. Only aggregated data will be published and a summary of the results will be made available to you. After 5 years, paper based data will be shredded and electronic data will be deleted from the server.

Who do I contact if I have questions about the project?
If you have any questions about the project, please contact Naomi Verdonk, PhD Candidate, at the University of Adelaide at naomi.verdonk@adelaide.edu.au or on (08) 8313 0284.

What if I have a complaint or any concerns?
The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2014-212). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. Contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028 or by email to hrec@adelaide.edu.au if you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?
If you wish to participate in any stage of this research, please email naomi.verdonk@adelaide.edu.au for the online questionnaire link as well as the consumer preference trial session times.

Yours sincerely,

Dr Kerry Wilkinson
kerry.wilkinson@adelaide.edu.au or (08) 8313 7360
Naomi Verdonk
naomi.verdonk@adelaide.edu.au or (08) 8313 0284
Dr Renata Ristic
renata.ristic@adelaide.edu.au or (08) 8313 0284
Dr Julie Culbert
julie.culbert@adelaide.edu.au or (08) 8313 0284
Dr Karma Pearce
karma.pearce@unisa.edu.au or (08) 8302 1133

A.3.2 Online Survey Introduction

Dear Sparkling Wine Consumer,

Thank you for clicking on the link to receive further information about my research project.

The following study has been reviewed and approved by the University of Adelaide Human Research Ethics Committee:

PROJECT TITLE: Understanding Australian consumer preferences for sparkling wine styles
APPROVAL NUMBER: H2014212

The Human Research Ethics Committee monitors all the research projects which it has approved. The committee considers it important that people participating in approved projects have an independent and confidential reporting mechanism which they can use if they have any worries or complaints about that research.

This research project will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research (see http://www.nhmrc.gov.au/publications/synopses/e72syn.htm).

By completing the online consent form and submitting your responses; consent to participate in the study will be assumed. If you wish to withdraw from the study, you may do so at any time without prejudice. All confidential information collected will be de-identified, then undergo statistical and thematic analysis in password protected computer files. In accordance with University of Adelaide policies, the electronic records will be stored for 5 years.

If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the principal investigator:
Name: Dr Kerry Wilkinson
Email: kerry.wilkinson@adelaide.edu.au

If you wish to discuss with an independent person matters related to:

- making a complaint, or
- raising concerns on the conduct of the project, or
- the University policy on research involving human participants, or
  your rights as a participant, contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028 or by email to hrec@adelaide.edu.au.

A.3.3 Online Survey Consent Form

Please read the following and consent to participation by clicking on the appropriate button below:

1. I have read the Information Sheet and agree to take part in the following research project:
   PROJECT TITLE: Understanding Australian consumer preferences for sparkling wine styles
   APPROVAL NUMBER: H2014212

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

3. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.

4. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

5. I understand that I am free to withdraw from the project at any time.

6. I am aware that I should keep / print a copy of this consent form and the Participant Information Sheet attached to your email.

☐ I consent to participating in this study.

A.3.4 Online Survey Questions (Chapters 3 and 4)

Are you over 18 years old?
- ☐ Yes
- ☐ No

Do you consume sparkling wine at least 12 times per year?
- ☐ Yes
- ☐ No

Please enter your consumer code:

Ensure the number is correct

On average, how often do you consume sparkling wine?
- ☐ More than twice per week
- ☐ Once per week
- ☐ Once every 2 weeks
- ☐ Once per month

What is your gender?
- ☐ Male
- ☐ Female

Which age group do you belong to?
- ☐ 18-24
- ☐ 25-29
- ☐ 30-34
- ☐ 35-39
- ☐ 40-44
- ☐ 45-49
- ☐ 50-54
- ☐ 55-59
- ☐ 60-64
- ☐ 65+

What is your highest level of education?
- ☐ School leaving certificate
- ☐ Year 12 certificate
- ☐ TAFE certificate/Diploma/Trade
- ☐ Bachelor's degree
- ☐ Graduate/Postgraduate diploma/certificate
- ☐ Master's degree
- ☐ Doctorate

In which State/Territory do you live?
- ☐ Australian Capital Territory
- ☐ New South Wales
- ☐ Northern Territory
- ☐ Queensland
- ☐ South Australia
- ☐ Tasmania
- ☐ Victoria
- ☐ Western Australia

What is your household income?

- ☐ <$25,000
- ☐ $25,000 - $50,000
- ☐ $50,001 - $75,000
- ☐ $75,001 - $100,000
- ☐ $100,001 - $150,000
- ☐ $150,001 -$200,000
- ☐ >$200,001

How do you feel about the following wine related statements?

1	2	3	4	5	6	7	8	9
Strongly disagree		Disagree		Neither agree or disagree		Agree		Strongly agree

- I am choosy when it comes to selecting wines from particular vintages.
- When drinking wine, it is important for me to know in which country the wine was made.
- I can generally recall the memorable wines that I drink.
- In my wine collection, it is important to have wines from countries other than Australia.
- For me, the grape variety from which the wine is made is an important consideration.
- I would like to learn more about wine styles and their countries of origin.
- I often look for rare or scarce wines.
- I regularly read wine magazines and wine reviews in newspapers .
- I prefer shopping for and buying wine from specialty outlets.
- I regularly attend special wine tastings or wine club meetings.
- I keep a record of the wines that I buy.
- I always check my wine for cork or other taints.
- I prefer to drink older wines than younger wines.
- I have a special wine storage space (either at home or elsewhere) that allows me to age my wines and maintain a wine collection.
- I take more notice of wine related articles in the press and TV than I did two years ago.
- I prefer wines from certain geographical regions.
- Being knowledgeable about wine gives me a great deal of satisfaction.
- I usually buy at least a half dozen bottles (mixed or same) each time I buy wine.

Please tell us a bit about your personality. Indicate how you feel about each statement by choosing one of the following options:

1	2	3	4	5	6	7	8	9
Strongly disagree		Disagree		Neither agree or disagree		Agree		Strongly agree

- I usually drink the same kind of wines on a regular basis.
- I rarely buy brands about which I am uncertain how they will perform.
- I do not like to talk to my friends about my purchases.
- I like to go window shopping and find out about the latest styles.
- Even though certain wines are available in a number of different flavours, I tend to buy the same flavour.
- Reading mail advertising to find out what's new is a waste of time.
- I like to shop around and look at displays.
- I usually throw away mail advertisements without reading them.
- I often read advertisements just out of curiosity.
- I get very bored listening to others about their purchases.
- I would rather stick with a brand I usually buy than try something I am not very sure of.
- When I go to a restaurant, I feel safer to order wines I am familiar with.
- If I like a brand, I rarely switch from it just to try something different.
- I think of myself as a brand-loyal consumer.
- I do not like to shop around just out of curiosity.
- I generally read even my junk mail just to know what it is about.
- I am very cautious in trying new or different products.
- I enjoy taking chances in buying unfamiliar brands just to get some variety in my purchases.
- When I see a new brand on the shelf, I am not afraid of giving it a try.
- I like to browse through mail order catalogues even when I don't plan to buy anything.

Please indicate the proportion (percentage by volume) of each of the following alcoholic beverages you consume. Please note, this must equate to a total of 100%.

Wine	%
Beer	%
Spirits	%
Cider	
Other alcoholic beverages	%

Please indicate the proportion (percentage by volume) of each of the following styles of wine you consume. Please note, this must equate to a total of 100%.

Sparkling wine	%
White wine	%
Rosé wine	%
Red wine	%
Dessert wine	%
Fortified wine	%

This survey asks you to answer questions about your preferences for the following sparkling wine styles:

- Champagne (from France);
- Sparkling white wine;
- Sparkling rosé wine;
- Sparkling red wine;
- Prosecco; and
- Moscato.

You may be aware that sparkling wine should only be called Champagne if it comes from the region of Champagne in France. For the purposes of this study, all other sparkling wine styles (sparkling white wine, prosecco, moscato, sparkling rosé wine and sparkling red wine) are assumed to be Australian.

Please indicate the proportion (percentage by volume) of each of the following styles of sparkling wine you consume. Please note, this must equate to a total of 100%.

Champagne (from France)	%
Sparkling white wine	%
Sparkling rosé wine	%
Sparkling red wine	%
Moscato	%
Prosecco	%

How much do you like the following styles of sparkling wine?

1	2	3	4	5	6	7	8	9	
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like	Unfamiliar with this wine style

- Champagne (from France)
- Sparkling white wine
- Sparkling rosé wine
- Sparkling red wine
- Prosecco
- Moscato

What words do you associate with Champagne (i.e. sparkling wine from the Champagne region in France)?

Can you recall any Champagne brands? If yes, please list them below:

How would you describe the look, smell and taste of Champagne?

When do you drink Champagne?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Typically, how much do you pay for a bottle of Champagne at a liquor store?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Never purchase

What words do you associate with sparkling white wine?

Can you recall any sparkling white wine brands? If yes, please list them below:

How would you describe the look, smell and taste of sparkling white wine?

When do you drink sparkling white wine?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Typically, how much do you pay for a bottle of sparkling white wine at a liquor store?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Never purchase

What words do you associate with sparkling rosé wine?

Can you recall any sparkling rosé wine brands? If yes, please list them below:

How would you describe the look, smell and taste of sparkling rosé wine?

When do you drink sparkling rosé wine?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Typically, how much do you pay for a bottle of sparkling rosé wine at a liquor store?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Never purchase

What words do you associate with sparkling red wine?

Can you recall any sparkling red wine brands? If yes, please list them below:

How would you describe the look, smell and taste of sparkling red wine?

When do you drink sparkling red wine?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Typically, how much do you pay for a bottle of sparkling red wine at a liquor store?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Never purchase

What words do you associate with Moscato?

Can you recall any Moscato brands? If yes, please list them below:

How would you describe the look, smell and taste of Moscato?

When do you drink Moscato?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Typically, how much do you pay for a bottle of Moscato at a liquor store?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Never purchase

What words do you associate with Prosecco?

Can you recall any Prosecco brands? If yes, please list them below:

How would you describe the look, smell and taste of Prosecco?

When do you drink Prosecco?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Typically, how much do you pay for a bottle of Prosecco at a liquor store?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Never purchase

How does sparkling wine make you feel? Please rank the following emotions:

1	2	3	4	5	6	7	8	9
Strongly disagree		Disagree		Neither agree or disagree		Agree		Strongly agree

- Adventurous
- Calm
- Contented
- Embarrassed
- Enthusiastic
- Envious
- Happy
- Irritated
- Lonely
- Nostalgic
- Optimistic
- Panicky
- Passionate
- Relaxed
- Sad
- Surprised
- Tense
- Unfulfilled
- Warm hearted

A.3.5 Online Consumer Tasting Questions (Chapter 4)

How familiar are you with sparkling wine production methods?

1	2	3	4	5	6	7	8	9
Extremely unfamiliar		Unfamiliar		Neither familiar or unfamiliar		Familiar		Extremely familiar

- Generally
- Méthode Champenoise
- Méthode Traditionelle
- Transfer method
- Charmat method
- Carbonation method

Please describe how you feel right now by rating the following moods:

1	2	3	4	5	6	7	8	9
Strongly disagree		Disagree		Neither agree or disagree		Agree		Strongly agree

- Happy
- Loving
- Calm
- Energetic
- Fearful/anxious
- Angry
- Sad
- Tired

Please select the code of your first wine (front, left):

Ensure the number is correct

How much do you like this wine?

1	2	3	4	5	6	7	8	9
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like

Would you drink this wine at the following occasions?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Can you identify this sparkling wine style?

- ☐ Champagne (from France)
- ☐ Sparkling white wine (Carbonation method)
- ☐ Sparkling white wine (Charmat method)
- ☐ Sparkling white wine (Transfer method)
- ☐ Sparkling white wine (Méthode Traditionelle)
- ☐ Sparkling rosé wine
- ☐ Sparkling red wine
- ☐ Moscato
- ☐ Prosecco

How much would you pay for a bottle of this wine at a retail outlet?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Would not purchase

Please select the code of your second wine:

Ensure the number is correct

How much do you like this wine?

1	2	3	4	5	6	7	8	9
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like

Would you drink this wine at the following occasions?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Can you identify this sparkling wine style?

- ☐ Champagne (from France)
- ☐ Sparkling white wine (Carbonation method)
- ☐ Sparkling white wine (Charmat method)
- ☐ Sparkling white wine (Transfer method)
- ☐ Sparkling white wine (Méthode Traditionelle)
- ☐ Sparkling rosé wine
- ☐ Sparkling red wine
- ☐ Moscato
- ☐ Prosecco

How much would you pay for a bottle of this wine at a retail outlet?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Would not purchase

Please select the code of your third wine:

Ensure the number is correct

How much do you like this wine?

1	2	3	4	5	6	7	8	9
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like

Would you drink this wine at the following occasions?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Can you identify this sparkling wine style?

- ☐ Champagne (from France)
- ☐ Sparkling white wine (Carbonation method)
- ☐ Sparkling white wine (Charmat method)
- ☐ Sparkling white wine (Transfer method)
- ☐ Sparkling white wine (Méthode Traditionelle)
- ☐ Sparkling rosé wine
- ☐ Sparkling red wine
- ☐ Moscato
- ☐ Prosecco

How much would you pay for a bottle of this wine at a retail outlet?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Would not purchase

Please select the code of your fourth wine:

Ensure the number is correct

How much do you like this wine?

1	2	3	4	5	6	7	8	9
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like

Would you drink this wine at the following occasions?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Can you identify this sparkling wine style?

- ☐ Champagne (from France)
- ☐ Sparkling white wine (Carbonation method)
- ☐ Sparkling white wine (Charmat method)
- ☐ Sparkling white wine (Transfer method)
- ☐ Sparkling white wine (Méthode Traditionelle)
- ☐ Sparkling rosé wine
- ☐ Sparkling red wine
- ☐ Moscato
- ☐ Prosecco

How much would you pay for a bottle of this wine at a retail outlet?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Would not purchase

Please select the code of your fifth wine:

Ensure the number is correct

How much do you like this wine?

1	2	3	4	5	6	7	8	9
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like

Would you drink this wine at the following occasions?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Can you identify this sparkling wine style?

- ☐ Champagne (from France)
- ☐ Sparkling white wine (Carbonation method)
- ☐ Sparkling white wine (Charmat method)
- ☐ Sparkling white wine (Transfer method)
- ☐ Sparkling white wine (Méthode Traditionelle)
- ☐ Sparkling rosé wine
- ☐ Sparkling red wine
- ☐ Moscato
- ☐ Prosecco

How much would you pay for a bottle of this wine at a retail outlet?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Would not purchase

Please select the code of your sixth wine:

Ensure the number is correct

How much do you like this wine?

1	2	3	4	5	6	7	8	9
Strongly dislike		Dislike		Neither like or dislike		Like		Strongly Like

Would you drink this wine at the following occasions?

1	2	3	4	5	6	7	8	9
Never		Occasionally		Sometimes		Mostly		Always

- Anniversaries
- At home with food
- At home without food
- Birthdays
- Breakfast
- By yourself
- Christmas
- Funerals
- Girls or boys night
- Hot weather
- Melbourne Cup
- New Year
- Pub/club
- Restaurant/café
- Weddings
- Weekdays
- Weekends
- Work drinks

Can you identify this sparkling wine style?

- ☐ Champagne (from France)
- ☐ Sparkling white wine (Carbonation method)
- ☐ Sparkling white wine (Charmat method)
- ☐ Sparkling white wine (Transfer method)
- ☐ Sparkling white wine (Méthode Traditionelle)
- ☐ Sparkling rosé wine
- ☐ Sparkling red wine
- ☐ Moscato
- ☐ Prosecco

How much would you pay for a bottle of this wine at a retail outlet?

- ☐ <$15.00
- ☐ $15.00 - $29.00
- ☐ $30.00 - $49.00
- ☐ $50.00 - $79.00
- ☐ >$80.00
- ☐ Would not purchase

How does sparkling wine make you feel? Please rank the following emotions:

1	2	3	4	5	6	7	8	9
Strongly disagree		Disagree		Neither agree or disagree		Agree		Strongly agree

- Adventurous
- Calm
- Contented
- Embarrassed
- Enthusiastic
- Envious
- Happy
- Irritated
- Lonely
- Nostalgic
- Optimistic
- Panicky
- Passionate
- Relaxed
- Sad
- Surprised
- Tense
- Unfulfilled
- Warm hearted

A.4 Co-Authored Publications during Candidature

A.4.1 Citations

Culbert, J., Verdonk, N., Ristic, R., Olarte Mantilla, S., Lane, M., Pearce, K., Cozzolino, D. and Wilkinson, K., 2016. Understanding consumer preferences for Australian sparkling wine vs. French Champagne. *Beverages*, *2*(3), 19.

Verdonk, N., Culbert, J. and Wilkinson, K., 2015. Sparkling wine: All that sparkles: Consumer perceptions of sparkling wine. *Wine and Viticulture Journal*, *30*(1), pp.71-73.

Verdonk, N., Wilkinson, J., Culbert, J., Ristic, R., Lane, M., Pearce, K. and Wilkinson, K., 2016. Australian consumers' perceptions of Champagne and other sparkling wine: An exploratory study. In *9th Academy of Wine Business Research Conference*. Academy of Wine Business Research, Adelaide, Australia, 17-18 February, pp. 184-193.