



Consumer knowledge affects valuation of product attributes: Experimental results for wine



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ABSTRACT

While a substantial literature on the effect of professional expertise in markets exists, consumers' "home-grown" knowledge has received little attention in economics. We combine data from a novel valuation experiment, in which participants received information about and bid on wines sequentially, with data on participants' wine knowledge to examine knowledge and bid updating. High knowledge participants did not value wines differently, but did update bids more with objective information, such as appellation and expert rating, than did low knowledge participants. Both low and high knowledge participants updated their bids significantly after taste-testing the wines. Our findings provide evidence that knowledge and preference are separable, and that knowledge captures a factor giving consumers the ability to process information to form expectations of product quality. Though both low and high knowledge consumers use sensory information, we find differences in preference for wines based on sensory information between low and high knowledge consumers. Our results suggest that knowledge is an important variable to consider in markets for complex, multi-attribute products.

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1. Introduction

Between 1992 and 2009, U.S. consumer-packaged product introductions, defined as new food, beverage, and non-durable goods, increased from 15,718 to 46,036 per year (ERS, 2012). Choice proliferation complicates the relationship between consumers and products (see, e.g., Schwartz, 2004), as well as for academics, policy-makers, and others interested in how choices underpin consumer demand. Proliferation also complicates regulation, labeling and informational systems (Verbeke, 2005). More options has been found to decrease the probability that any decision is made (Iyengar and Lepper, 2000), and has been shown to shift choices towards simpler or more easily justified options (Sela et al., 2009; Iyengar and Kamenica, 2010). These effects have been found in consumer markets (Iyengar and Lepper, 2000), retirement savings decisions (Iyengar et al., 2004; Iyengar and Kamenica, 2010), and health care choices (Hanoch et al., 2009). For many choices, an individual needs more than simple access to information about a product to make an informed decision; she must also possess knowledge to be able to interpret the information. As more options become available, the information an individual must interpret in-

creases, and as individuals gain more knowledge about and experience with these options, the attributes relevant to their decisions, and even their preferences for attribute combinations, may evolve.

Recent decades have seen the development of an extensive literature examining the implications of boundedly rational consumers, limited cognitive capacity, and costly and/or strategically hidden information (see, for instance, the survey article by DellaVigna, 2009). A related area of study involves learning in a few specific settings: strategic games (e.g. Roth and Erev, 1995), learning from market interactions (e.g. List, 2003), and social learning (e.g. Conley and Udry, 2010). Though researchers have pointed out the importance of knowledge in food markets, in which credence attributes related to production method have become important (Verbeke, 2005), little research exists studying the effects of knowledge on consumer behavior in markets, the use of product information, or the relationship between knowledge and valuation.

In an experimental auction, we examine the relationship between consumer wine knowledge and wine valuation, as well as the effect of knowledge on bid updating when consumers receive new information. With so many products in the wine market and year-to-year variation in the sensory attributes of wines, reputations—for wineries and appellations—are important (Costanigro et al., 2010). Wine labeling policy, set for the American wine market by the Alcohol and Tobacco Tax and Trade Bureau

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(TTB), plays an important role in consumer choice and the formation of reputation by stipulating the conditions under which different label components can be used.

We define and measure wine knowledge using a wine knowledge quiz included in appendix B, which was developed by Frøst and Noble (2002) to classify individuals according to wine expertise. We also collect and evaluate wine experience, information-seeking, and habit-related variables to control for factors that may be correlated with knowledge. We analyze willingness to pay (WTP) for California Cabernet Sauvignon wines with data generated in an experimental auction designed to detect the marginal impact of attributes and information on WTP. Using measures of participants' wine knowledge, we employ these WTP data to study how knowledge, other wine experience variables, and demographic characteristics relate to valuation. We also assess how knowledge affects bid updating when new information is provided.

We find that wine knowledge shapes how experiment participants update their WTP for wine attributes, though it is not correlated with baseline bids for wine with minimal information. Other wine-related variables, such as the participant's claims about the average price they usually pay for wine, are correlated with valuation of wine at baseline, and significantly explain wine attribute valuation. The data indicate significant and systematic differences in WTP updating by participants of different knowledge levels after they receive information about wine attributes. We show that high knowledge consumers use objective information—especially appellation and winery name—more than low knowledge consumers to update their bids. Participants of all knowledge levels respond to sensory information and expert rating. We posit that knowledge gives consumers the ability to more accurately use information, leading to more refined expectations of the utility the wines will provide, though this is modulated by the nature of the information (Hsee and Zhang, 2010).

2. Information, Knowledge, and valuation

Economists have studied the effect of professional experts on markets for experience or credence goods, including wine (Ali et al., 2008; Hilger et al., 2011; Friberg and Grönqvist, 2012), movies (Reinstein and Snyder, 2005), and food safety (Jin and Leslie, 2003). Scant attention has been paid to the effect of consumers' own knowledge on choice or valuation. The most closely related literature has examined the effect of buyers' market experience on market outcomes, both in auctions for consumer goods and in investment decisions. Primarily a laboratory-based literature, authors have found that increased experience in the lab is correlated with better outcomes—namely a lower purchasing price (Kagel and Levin, 1986; Kagel, 1995; Rutström, 1998; Güth et al., 2003). A few field studies have been published as well, with mixed results on the relationship between experience and bidder success. Bajari and Hortacsu (2003) and Dewan and Hsu (2004), studying auction outcomes for heterogeneous goods, found an insignificant to negative relationship between bidder experience and outcomes in online auctions. However, Kostandini et al. (2011), analyzing auctions for a homogeneous good, estimated a positive relationship between experience and outcome.

A significant literature on retirement savings has examined biases and decision rules—Benartzi and Thaler (2007) summarize the literature—and the effect of the number of plans offered on plan choice (Iyengar and Kamenica, 2010). However, few have studied the moderating effect of knowledge or experience. Research on investment decisions has found that experience appears to reduce behavioral biases (Feng and Seasholes, 2005). In a hypothetical choice scenario, Agnew and Szykman (2005) measured participants' financial knowledge and found that those with higher levels of knowledge were more likely to actively make portfolio choices

(opting out of the default) and were less likely to report feeling overwhelmed by the choice than were low knowledge participants.

Recently, a literature has developed examining the role of knowledge in nutrition label interpretation and use, and investigating determinants of nutrition knowledge. Grunert et al. (2010) studied consumer knowledge, interest in healthy eating, and nutritional label use among shoppers at UK food retailers, finding that interest in healthy eating primarily explained use of nutrition labels, but knowledge was importantly related to comprehension of nutrition labels. Miller and Cassady (2012) found that individuals' knowledge interacted with motivations to switch to a healthier diet to produce more accurate choices in a task comparing the healthiness of two products' nutrition labels. Cooke and Papadaki (2014) found that nutrition knowledge and interest in healthy eating predicted both nutrition label use and dietary quality among UK university students. Nutrition knowledge appears to play an important role in nutrition label use, and to be correlated with interest in healthy eating (Grunert et al., 2012). However, there are important differences in decision-making about food relative to other goods (Rangel, 2013), so the relationship among knowledge, motivation, and food choice may not apply in other settings.

Fields of study that consider cognitive or sensory processes have a history of studying perception and knowledge. The wine market is rich in information. In fact, journalists, wine writers, and academics regularly discuss consumer confusion in interpreting and using label information to make choices (Drummond and Rule, 2005). California wine-grape growers alone harvested approximately 120 varieties of wine grapes in 2014 (California Department of Food and Agriculture, 2015). The TTB recognizes more than 300 appellations, or growing areas, in the U.S., including American Viticultural Areas (AVAs), counties, and states, and has issued licenses to over 8000 wineries or wine blenders (TTB, 2015a; TTB, 2015b). Myriad sources generate wine reviews, including magazines (e.g. Robert Parker's Wine Advocate, the Wine Spectator), newspapers (the New York Times, the Wall Street Journal, etc.), blogs (e.g. Dr. Vino, Vinography), and crowd-sourced opinion (www.cellartracker.com). In addition, some wine attributes provide multiple dimensions of information. Appellations, for instance, provide information about different climatic and soil conditions, which may affect the sensory qualities of the wines (Ashenfelter, 2008; Ashenfelter and Storchmann, 2010); they also accrue reputations, which influence consumers' wine valuation (Cross et al., 2011).

Wine has been used as the setting for many studies in psychology and sensory sciences (see, for instance, Lawless, 1984; Solomon, 1990; Melcher and Schooler, 1996; Bende and Nordin, 1997; Ballester et al., 2008). These authors have typically separated subjects into binary expert and non-expert categories, studying differences in the way subjects process wine-related ideas and discriminate among wine samples. Solomon (1990) found that wine experts performed better on tests of both cognitive and sensory abilities than non-experts. Solomon (1997) studied wine description and categorization by expert, intermediate, and novice wine consumers, finding that specificity of tasting terms increased with expertise. Experts grouped wines differently and more consistently than non-experts, leading Solomon to conclude that expertise created structure in the way people thought about wines. Other research suggests that expertise is related to somewhat better sensory discrimination skills (Lawless, 1984; Bende and Nordin, 1997), but that much of the difference in performance is attributable to knowledge rather than greater sensory acuity (Melcher and Schooler, 1996; Hughson and Boakes, 2002; Ballester et al., 2008).

In addition, there is a sizeable experimental economic literature on wine and food valuation. Experimental economic studies on wine, largely conducted in the lab, have examined WTP under different information conditions, such as blind tasting of wines,

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