Food Quality and Preference 43 (2015) 97–105

Contents lists available at ScienceDirect

Food Quality and Preference

journal homepage: www.elsevier.com/locate/foodqual

What are domestic apples worth? Hedonic responses and sensory information as drivers of willingness to pay

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ARTICLE INFO

Article history:
Received 6 December 2013
Received in revised form 23 January 2015
Accepted 22 February 2015
Available online 7 March 2015

Keywords:
Hedonic ratings
Willingness to pay
BDM auction
Apple
Information

ABSTRACT

The effects of written information of key sensory characteristics of apple cultivars on hedonic ratings and willingness to pay (WTP) were measured in an experimental auction. Participants (n = 118, 95F, 23M, mean age 37 y.) rated, in three subsequent rounds, pleasantness and WTP based on (1) appearance only (n = 25), (2) appearance, written information and tasting (n = 44), or (3) appearance, tasting and written information (n = 49). Four domestic cultivars were described as medium sour and crispy ('Amorosa'), sour and medium crispy ('Konsta'), medium sweet and medium crispy ('Lobo') and sweet and medium crispy ('Tobias'). The differences between the cultivars in pleasantness and WTP were minimal when the evaluation was based on appearance only. The effect of tasting after visual inspection was positive in three cultivars and negative in one ('Konsta'). Written information after tasting did not affect pleasantness or WTP. For one cultivar ('Tobias'), information given before tasting created expectations that were not fulfilled, thus tasting decreased hedonic ratings and WTP. Mean WTP was 2.36 euro/kg. When pleasantness increased by one point, WTP increased by 0.31–0.45 euro/kg. Regression models showed that pleasantness explained 38–55% of WTP. Respondents who reported consuming domestic apples more often than once a week had 0.52–0.74 euro/kg higher WTP than those who consumed them less frequently, suggesting that familiarity with the product increases WTP. Results indicate that both written information and tasting contribute to the ratings of pleasantness and WTP.

1. Introduction

Producers, industry and retail sector strive to create added value for their products within a category and capture attention from new customer segments. In this setting, locally produced foods have gained attention. Grebitus, Lusk, and Nayga (2013) showed that respondents considered local apples to be fresher, tastier and safer than non-local apples. According to Jaeger et al. (2011), horticultural markets are highly competitive and characterised by numerous poorly differentiated and low-priced products. This is the case also in Finland. Domestic apples are seasonal products and poorly differentiated or branded in retail stores, and imported apples of good quality are often sold at a low price (1–2 euro/kg). Apples are regarded domestic when they are grown and harvested in Finland although the cultivar strain itself may be of non-domestic origin. The market share of local production (4.8 million kg) is 4–6% of the total consumption of apples in Finland (Finnish Customs, 2013; Tike, 2013).

Consumers' willingness to spend money on a commodity can be studied with a range of hypothetical (e.g. contingent valuation, hypothetical choice experiment) and non-hypothetical value elicitation methods (VEMs). Non-hypothetical VEMs, such as experimental auctions, have gained rising popularity in the last two decades as a tool for the valuation of private and public goods mainly because of their ability to mimic real market situations by using real products and allowing for exchange of real money. This is probably why non-hypothetical VEM tends to provide more accurate willingness to pay (WTP) values than their hypothetical counterparts (Lusk & Shogren, 2007). Various combinations and designs have been used, the common feature being that real products need to be present, which may be accompanied with tasting of some or all of the samples by some or all respondents (e.g. Combris, Bazoche, Giraud-Héraud, & Issanchou, 2009; Lange, Martin, Chabanet, Combris, & Issanchou, 2002; McCluskey, Mittelhammer, Marin, & Wright, 2007; Yue & Tong, 2011).

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http://dx.doi.org/10.1016/j.foodqual.2015.02.013
0950-3293/

In experimental auctions, a set of rules are used to determine, based on participants' bids, who the winner of the auctioned good is and what price is to be paid. Different auction mechanisms have been used in empirical studies such as Vickrey 2nd (Grebitus et al., 2013; Lange et al., 2002; Noussair, Robin, & Ruffieux, 2004) and n^{th} price auction (Stefani, Romano, & Cavicchi, 2006; Zhang & Vickers, 2014) and Becker-Degroot-Marschack (BDM) auction (Becker, Degroot, & Marschack, 1964; Combris et al., 2009; Ginon, Combris, Lohéac, Enderli, & Issanchou, 2014; Lusk, Fox, Schroeder, Mintert, & Koohmaraie, 2001; Lusk & Shogren, 2007; Noussair et al., 2004).

Experimental auctions have been applied in specialty products such as Champagne (Lange et al., 2002), region-of-origin labelled spelt (Stefani et al., 2006), GM-foods (Jaeger et al., 2004), and everyday commodities like apples (Costanigro, Kroll, Thilmany, & Bunning, 2014; Lund, Jaeger, Amos, Brookfield, & Harker, 2006; Zhang & Vickers, 2014), steaks (Lusk et al., 2001), orange drink, cookies and chocolate (Noussair et al., 2004), and wine (Combris et al., 2009; Grebitus et al., 2013). Lusk et al. (2001) examined the effect of sensory information for steak tenderness on consumer WTP in a grocery store setting. When relying on tasting alone, an average premium was less than in condition in which samples were tasted and written information about tenderness was provided.

Hedonic ratings have been combined with WTP, either in within- or between-subjects settings. For example, Lange et al. (2002) had two respondent groups, one of which reported hedonic ratings of the samples, while the other rated WTP. In their study, Yue and Tong (2011) considered 14 apple cultivars, and respondents stated their WTP and liking of attributes (such as juiciness) for 6–7 samples, but not their overall liking. Lund et al. (2006) measuring liking after tasting, found that tasting had small effect on the mean WTP, but the distribution of the bids was different before and after tasting the samples. Ginon et al. (2014) observed a slightly better discrimination between cheese and bread samples with WTP mechanism than with ratings of liking.

Previous studies have mainly concentrated in studying discrimination ability of WTP compared to hedonic ratings. Apart from Lange et al. (2002) and the very recent articles by Zhang and Vickers (2014) and Ginon et al. (2014), who studied the relationship of WTP and liking with correlations, studies with direct comparison of WTP and hedonic responses are, to our knowledge, rare. Lange et al. (2002), studying WTP for Champagne, found that higher product discrimination was reached with bid prices than with hedonic ratings. Zhang and Vickers (2014) studied apples using two information conditions (taste first or information first). They measured both WTP and liking, but focused their discussion mainly on the effect of information condition, cultivar and growing conditions on bid price.

Liking a food product has been shown to be a major driver of choice (e.g. Arvola, Lähteenmäki, & Tuorila, 1999; Huotilainen, Seppälä, Pirttilä-Backman, & Tuorila, 2006; Seppä, Railio, Vehkalahti, Tahvonen, & Tuorila, 2013), and thus pleasantness, measured through hedonic rating, may be a predominant driver of WTP. Consequently, hedonic rating may be highly correlated with WTP. When designing this experiment we were interested in finding out how perceived pleasantness is shown in WTP.

The shoppers are typically able to examine only the extrinsic properties of the product i.e. visual information, such as colour and size, while repeated purchases ultimately depend on whether the inner sensory properties (flavour, texture) of the fruit were well-liked (Harker, Gunson, & Jaeger, 2003; Jaeger & MacFie, 2001; Jaeger et al., 2011; McCluskey et al., 2007). The timing of information may markedly affect expectations and actual perceptions of a product (Kähkönen, Tuorila, & Rita, 1996; Lange, Issanchou, & Combris, 2000; Zhang & Vickers, 2014). Kähkönen et al. (1996) showed that nutritional information offered before exposures increased pleasantness ratings. However, use of sensory descriptions as a type of information is rare. To our knowledge, only Lusk et al. (2001) has used this kind of information in WTP research. In addition, previous consumption practices and involvement in the product play a role in pleasantness, purchase intention and WTP (Hollebeek, Jaeger, Brodie, & Balemi, 2007; Kähkönen & Tuorila, 1999; Lange et al., 2002). Lange et al. (2002) observed that brand information increased WTP in respondents who consumed Champagne unfrequently, while frequent consumers of Champagne relied more on their individual hedonic expectations.

Based on the above papers, we have identified the following gaps: first, there is very little information on the effects of sensory descriptions on the hedonic ratings or WTP. Secondly, previous research has not explicitly analysed functional relationship between hedonic ratings and WTP. Furthermore, previous consumption has not been paid attention to except by Lange et al. (2002), while their samples were not an everyday commodity.

Therefore, the present study compares the effect of information provided at different phases (appearance of the product, written descriptive sensory information, tasting) on hedonic ratings and WTP, using a familiar local product frequently used as a snack (i.e. apple) with distinct sensory properties. The research questions were formulated as follows: (1) do the information of the product attributes and the timing of the information affect hedonic ratings and WTP, (2) what is the functional relationship between pleasantness and WTP, i.e. $F(\text{plea}) = a + b^{*}\text{plea}$, and (3) how does previous domestic and general apple consumption affect hedonic ratings and WTP.

2. Materials and methods

2.1. Samples

Four domestic apple cultivars ('Amorosa', 'Konsta', 'Lobo', 'Tobias') were selected for the study based on their distinct sensory characteristics representing major sensory variations of cultivars in production and their availability during the study. 'Lobo' is the most widely cultivated domestic cultivar and 'Amorosa' is rapidly gaining popularity. 'Konsta' and 'Tobias' are novel cultivars. Each cultivar was harvested from one orchard in South-Western Finland. The apples were kept in the cold storage (+3 °C, relative humidity 80–92%) of the research orchard of MTT (Agrifood Research Finland) until evaluations. Just before the first session, the apples were transferred to the cold storage (+4 °C) at the University of Helsinki, where the evaluations were carried out.

The sensory profiles of the four samples (Fig. 1) were determined by a trained panel (n = 13, 11F, 2M, 24–57 years) using

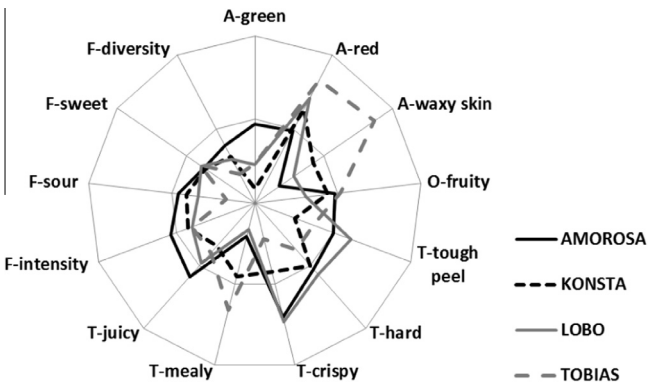

Fig. 1. The profiles of the four cultivars, based on descriptive analysis (n = 13). The profile is based on 2 × 2 × 13 ratings of each attribute. A = appearance, O = odour, T = texture and F = flavour attributes.