The role and interplay of intrinsic and extrinsic cues in Australian consumers' evaluations of fish

ABSTRACT

This study investigates the role and interplay of intrinsic and extrinsic cues when evaluating fish quality and in shaping consumers' attitudes toward fish and fish consumption. A sensory analysis of nine different fish including five variants of Barramundi was conducted to determine how consumers evaluated the fish on intrinsic cues. Focus groups were then conducted to explore the impact of extrinsic cues on attitudes and purchase intentions. While quantitative sensory analysis revealed distinct differences between barramundi variants on intrinsic cues, the qualitative focus groups revealed that, as a brand, barramundi is perceived much more favourably and consistently, with consumers using extrinsic cues, particularly country of origin as surrogate indicators of quality. Key implications include the need for aquaculture producers to ensure intrinsic product quality and consistency, as while Australian consumers use the extrinsic cue of "Australian grown" as a surrogate indicator of quality, as their familiarity and confidence with seafood grows, this overreliance on extrinsic cues may diminish.

Keywords:
extrinsic cues
aquaculture
fish consumption
intrinsic cues
seafood
sensory analysis
country of origin

1. Introduction

Consumers use a range of intrinsic and extrinsic cues when evaluating the quality of a food product (Hansen, 2005; Richardson et al., 1994; Steenkamp, 1990; Szbillo and Jacoby, 1974). Intrinsic cues are the product's inherent attributes which can be objectively evaluated before and after consumption and include appearance, taste, texture, odour and colour. Extrinsic cues are lower level cues and include price, branding, outlets, and information provided at the point of sale and on packaging which seeks to influence and to reinforce consumer choice (Veale and Quester, 2009). The relative importance of internal versus external cues varies across product categories (Liefeld et al., 1996; Zeithaml, 1988), and at different stages of the purchase process (Bredahl 2004; Liefeld et al., 1996). Understanding which intrinsic and extrinsic cues consumers use to arrive at objective and subjective evaluations of seafood quality, as well as the relative importance of different cues is critical for influencing the levels of seafood consumption.

Understanding seafood consumption is important for three main reasons. First, given current levels of demand, seafood and fish in particular will play an increasing role in feeding the world's growing population (FAO, 2008). In markets where seafood is currently a very small part of consumers' diets and consumers tend to have low levels of knowledge of seafood, an understanding of intrinsic and extrinsic cues is fundamental to increasing seafood consumption. Second, with the rapid depletion of wild capture fisheries, aquaculture (farmed seafood) will play an increasingly important role in meeting the rising global demand for seafood (Wagner and Young, 2009). Knowledge of intrinsic and extrinsic cues and their relative importance will allow seafood farmers and marketers to more effectively develop their product intrinsically in line with consumer preferences, as well as to employ effective extrinsic cues to favourably impact consumption levels. Third, given the well recognised health benefits of seafood, a deeper understanding of product-related consumption barriers from a consumer perspective is essential for "[...] health educators who want to make their campaigns more effective" (Trondsen et al., p. 302). While there has been a substantial amount of research concerning consumers' evaluations of fish quality in European countries where per capita fish consumption is traditionally higher (Brunsø et al., 2009; Pieniak et al., 2008), there is a lack of research about fish consumption in Australia and other western and non-European countries.

While annual per capita seafood consumption in Australia is increasing, at approximately 25 kg per year (unprocessed seafood), consumption remains not only well below recommended levels of two serves per week but also well below the average consumption for other countries such as Korea (54 kg), Netherlands (52 kg), Spain (41 kg) and France (35 kg) (FAO, 2007). The potential for positive intervention is particularly pertinent for aquaculture in Australia. For example, whilst the past five years have seen annual farmed barramundi production increase from 2,700 tonnes to 6,000 tonnes, average farm gate prices have fallen (ABFA, 2010). In addition, wild capture fisheries in Australia are almost fully exploited with the total future production of wild caught fish likely to plateau or even decline (DAFF, 2010). As demand for seafood in Australia is expected to grow in order to meet the demands of an

aging population, the gap between supply and demand is likely to be satisfied by increased seafood imports unless domestic aquaculture can approach the market with a product that sufficiently satisfies the intrinsic and extrinsic characteristics required for success.

Hence, the purpose of this paper is to investigate the role and interplay of intrinsic and extrinsic cues and their relative importance in influencing consumers' fish consumption, in the context of Australian farmed barramundi. The study will contribute theoretically to our understanding of intrinsic and extrinsic cues as drivers for seafood consumption, and in practice, serve as a basis for strategy development for the seafood industry in general and for Australian aquaculture producers in particular. More specifically, our results will allow Australian barramundi farmers to fine-tune their product development to deliver a product that is more appealing to consumers and more effectively use relevant extrinsic variables (price, branding, country of origin labelling, packaging, etc) to influence consumer preferences (Rødbotten et al.,2009).

The remainder of this paper is structured as follows: an overview of the current literature regarding intrinsic and extrinsic cues as applied to food in general and seafood in particular is presented. Next, the method and procedures are detailed and finally, results are presented and discussed.

2. Literature Review

Perceptions of seafood quality are based on intrinsic attributes (sensory cues) including appearance, smell, texture, tenderness and taste (Grunert, 1997; Myrland et al., 2000; Olsen, 2004; Trondsen et al., 2003). Consumers' perceptions of seafood quality are also influenced by extrinsic cues such as price, outlets, country of origin, packaging, labelling, branding, and nutritional information (Brunsø et al., 2009; Nielsen et al., 2002; Trondsen et al., 2003). Aqueveque (2006, p. 238) explains that "extrinsic cues are lower level cues that can be changed without changing the product, ...while intrinsic cues are higher level cues directly related to the product." Intrinsic cues are product specific, for example, specific to a particular species of seafood such as barramundi, whereas extrinsic cues are often generalisable across product categories; that is, consumers can use the same cue of price or country of origin to evaluate all seafood (Zeithaml, 1988).

Many consumers perceive difficulty in evaluating and selecting fish (Leek et al., 2000; Myrland et al., 2000; Olsen, 2004; Scholderer and Grunert, 2001; Sveinsdóttir et al., 2009) due to lack of experience, familiarity and confidence (Sørensen et al., 1996; Verbeke et al., 2007b) and an absence of external cues such as branding and labelling (Sogn-Grundvåg and Østli, 2009). Unfortunately, many consumers have limited skills in evaluating the quality of seafood at the point-of-purchase and simply lack the ability to "use attributes of fresh fish to evaluate the overall expected quality" (Verbeke et al., 2007b, p. 652). Hence, their pre-consumption expectations (expected quality) may not match their experience (experienced quality) leading to post-consumption dissatisfaction and low repurchase loyalty (Bredahl et al., 1998; Olsen, 2002; Sogn-Grundvåg and Østli, 2009).

For consumers lacking in experience and familiarity with seafood, a lack of intrinsic cues and confusion surrounding the extrinsic cues available to them at the point-of-purchase makes purchasing fresh seafood a difficult and sometimes risky task. The difficulty faced by many Australian consumers in evaluating seafood arises, in part, from the way in which fresh seafood is marketed in most Australian supermarkets and seafood stores. Seafood is typically housed behind glass and minimal information, other than species, price and, in some cases, country of origin is provided. Useful information for evaluating quality, such as nutritional information, country of origin information, method of production (e.g. wild caught versus farmed), and how to store, prepare and serve the fish is rarely provided. In contrast to many European seafood outlets, Australian consumers rarely have the opportunity to touch or smell the seafood prior to purchase, and thus usually rely entirely on observed sensory qualities such as appearance (e.g., colour, portion size) and limited extrinsic cues, mainly price, in making their selection. Interestingly, while Australian consumers would like to have the opportunity to touch and smell seafood during the selection process to determine if it was firm and fresh, they also respond negatively to the possibility that other consumers have touched and contaminated the seafood (Sogn-Grundvåg and Østli, 2009).

Further insight into the role played by the intrinsic and extrinsic cues used by consumers to evaluate product quality can be gained by considering an alternative approach to classifying cues based on the economics of information (Darby and Karni 1973; Nelson, 1970, 1974), where the quality of food products can be determined based on search, experience and credence characteristics (Grunert, 1997). Search characteristics can be evaluated prior to purchase and include both intrinsic attributes such as appearance and extrinsic attributes including price, portion size and country of origin information. Experience characteristics are evaluated during preparation and consumption and include intrinsic attributes such as touch and smell while cooking, appearance once cooked, taste and texture ("mouth-feel"). Finally, credence characteristics cannot be evaluated even after consumption and include attributes such as whether the seafood was caught or farmed in a sustainable or humane manner or the long-term health benefits of consuming seafood (Darby and Karni, 1973). Credence is "a matter of trust, and today, credence attributes are becoming more and more important for consumers due to increased market and product complexity" (Hansen, 2005, p. 78).

2.1 Intrinsic cues

Taste, texture and perceived freshness (quality) have been found to be key determinants of seafood consumption (Bredahl and Grunert, 1997; Brunsø et al., 2009; Leek et al., 2000; Olsen, 2004; Rødbotten et al., 2009; Verbeke and Vackier, 2005). Conversely, unpleasant physical attributes, such as odour (including smell while cooking) and the presence of bones have been reported as major barriers to seafood consumption (Bredahl and Grunert, 1997; Brunsø et al., 2009; Leek et al., 2000; Myrland et al., 2000; Olsen, 2001; Olsen, 2004; Verbeke and Vackier, 2005). An important sensory cue used in evaluating seafood is appearance such as the colour of the seafood (Nielsen et al., 2002) or attributes such as the brightness of the eyes of a fish or the presence of defects or damage in a whole fish.

Above all other sensory qualities, taste/distaste has been found to be both a key driver and barrier to fish consumption. Sveinsdóttir et al. (2009, p. 121) argued that "sensory liking is the strongest determinant of fish consumption intention." In a comparative qualitative study of Spanish and Belgian consumers, Brunsø et al. (2009) found that taste was a key attitudinal motive for fish consumption. Likewise, in a study of Belgian consumers (n=429), Verbeke and Vackier (2005) found that taste was the most important driver of fish consumption. Similarly, Trondsen et al. (2003) conducted a study of perceived barriers to fish consumption among Norwegian women aged 45-69 years (n=9407) and found that perceptions of inconsistent quality and not liking the taste of fish were key barriers to fish consumption.

The taste of food is critical to attitude formation because "food is a matter of pleasure, and very few people eat things they do not like the taste of", despite purported health benefits (Brunsø et al., 2009, p. 699). The issue of taste is of particular concern in the case of farmed seafood such as barramundi, where different methods of production (sea-cage, earth-pond, lined-pond, etc.) yield fish of a different flavour, and where inconsistent quality control may result in a tainted or unpleasant "muddy" taste. One unpleasant taste experience with a particular species of seafood may be enough to prevent repurchase even if the species is farmed in a different manner. The issue of taste may be of particular import in a country such as Australia, where regular seafood consumption is not traditional.

Hence we propose that: Among intrinsic cues, taste will have the most significant influence on Australian consumers' evaluation of fish.

2.2 Extrinsic cues

Despite the importance of intrinsic cues in shaping attitudes toward seafood consumption, the impact of extrinsic cues should not be overlooked (Oude Ophuis and Van Trijp, 1995). Iop et al. (2006, p. 894) point out that "although the importance of intrinsic variables such as colour, aroma, flavour and texture in food acceptance and choice are very well recognized, several studies have shown that other variables also play an important role in food acceptance, preference, choice and intention to purchase." Extrinsic variables such as price, branding, context and appropriateness (purchase/consumption occasion), method of production, certification of quality, country and region of production, expert opinion and nutritional information have also been found to influence quality evaluations and seafood consumption, as well as consumers' willingness to pay (Gao et al., 2010).

Price is one of the most researched extrinsic cues (Zeithaml, 1988) and has been found to be used as a cue to quality (Monroe, 1982), particularly when a consumer is less familiar with a product or when there is limited "other specific and reliable information available for consumers to consider" (Veale and Quester, 2009, p. 203). In particular, price cues are frequently used when evaluating unbranded products (Bredahl, 2004).

Country of origin information and brand names have frequently been investigated as influential extrinsic cues (Josiassen, 2010; Siu and Wong, 2002; Srinivasan et al., 2004; Zeithaml, 1988). After price, brand is among the most researched extrinsic cues (Bredahl, 2004), with country or region of origin often closely linked with brand equity (Agrawal and Kamakura, 1999). van der Lans et al. (2001) compared the marketing of food products with region of origin to the application of a branding strategy. Country of origin is often used by consumers as a summary construct to simplify decision making (Agrawal and Kamakura, 1999). Brunsø et al. (2009) found that heavy users of fish considered that fish from their country of origin was of a higher quality than imported fish. Specifically in relation to food, country of origin is perceived to be linked to freshness, as home country products have often travelled less distance to get to market (Péneau et al., 2009). In Australia, this close association between perceptions of freshness and distance from source to consumption could reinforce consumers' country of origin effects beyond a sense of moral obligation to local industry or ethnocentrism.

A final extrinsic cue of relevance to our study is the method of production, with farmed fish such as barramundi being produced via a variety of methods with each method producing a product with potentially different intrinsic qualities. Barramundi can be wild caught or farmed. Farmed barramundi is produced in a range of environments including sea cages, ponds with water ranging from salt, to brackish to fresh and in indoor tanks with fresh water. Numerous studies have revealed a preference for wild caught over farmed fish with a perception that wild fish is of a better quality (Brunsø, et al. 2009; Kole, 2003; Verbeke et al., 2007). However, some studies of cod have failed to reveal sensory differences between wild and farmed cod (Kole et al., 2009; Morkore, 2001). Indeed, under sensory analysis, Luten et al. (2002) found that Dutch consumers actually preferred farmed cod to wild cod in terms of appearance, taste and fibrousness, but not juiciness.

Hence we propose that: Among extrinsic cues, country of origin will have the most significant influence on Australian consumers' evaluation of fish.

2.3 The roles and relative importance of internal verses external cues

The ability to use cues to make evaluations is known as "cue utilisation" (Oude Ophuis and Van Trijp, 1995). Consumers differ on this characteristic due to different cognitive competencies, perceptual abilities, experiences, and preferences (Grunert, 2005; Hansen, 2005; Verbeke *et al.*, 2007a). Veale and Quester (2009) state that reasons for poor cue utilisation include "lack of understanding, lack of self-confidence, misinterpretation or inaccessibility to information." People who hold stronger beliefs in their ability to evaluate and select fish report higher intentions to purchase fish (Verbeke and Vackier, 2005). Verbeke et al., (2007b, p. 652) argue that consumers with "lower experience and lower confidence are likely to associate also with the perceived risk of buying low quality or making the wrong choice when buying fish, as well as with fish benefit perception".

While consumers often use intrinsic and extrinsic cues simultaneously (Srinivasan et al., 2004), the relative roles and impacts of intrinsic and extrinsic cues can vary (Liefield et al., 1996), depending on a range of factors including the level of perceived risk (Liefield et al., 1996; Zeithaml, 1988), and the presence or absence of branding (Bredahl, 2004; Richardson et al., 1994). Liefield et al. (1996) found that with lower levels of perceived risk, there was lower use of external cues, while Richardson et al. (1994) found that consumers had a propensity to rely more on external cues when assessing the product quality of food. Extrinsic cues are also used more when consumers are either unwilling or unable to spend time and effort in the search process (Siu and Wong, 2002; Zeithaml, 1988).

Cues are often surrogate indicators of quality with the relative importance of cues depending on their predictive value and confidence value (Richardson et al., 1994). Predictive value is the degree to which the cue "predicts" quality, whereas confidence value refers to the degree to which consumers have confidence in their ability to use and judge the cue accurately (Richardson et al., 1994). Intrinsic cues generally have higher predictive value than extrinsic cues, but often intrinsic cues cannot be judged until the point of consumption (Zeithaml, 1988), increasing the consumer's reliance on extrinsic cues at point of purchase. Past experience and familiarity with a product category influences the extent to which people search for, recall and use intrinsic and extrinsic information when evaluating product quality and making purchasing decisions (Howard and Sheth, 1969), with the use of intrinsic cues becoming relatively stronger as product familiarity increases (Rao and Monroe, 1988) The more familiar a consumer is with a product category, the more confident they are in making decisions with respect to that product category (Verbeke et al., 2007b).

In the case of Australian seafood consumers, where less experienced consumers may have less confidence in their ability to judge quality intrinsically**,** extrinsic cues such as country of origin and branding could take on much greater importance as they are easier for consumers to interpret and use. If Australian consumers gain greater confidence in their ability to judge the quality of seafood, it would be expected that this overreliance on extrinsic cues would decrease.

Hence we propose that: Australian consumers of fish are more likely to use extrinsic rather than intrinsic cues in product evaluation.

3. Method

To explore the role and interplay of intrinsic and extrinsic cues in evaluating farmed fish we used a multi-method approach; a quantitative sensory evaluation of nine cooked fish species to investigate intrinsic cues; followed by qualitative focus group discussions to investigate the accompanying extrinsic cues and their relationship with intrinsic cues. Barramundi was chosen as the most suitable finfish for this study for two main reasons, high levels of consumer awareness (Turvey, Hamblin and DeVincentis, 2010) and market share (Danenburg, 2011) and second, its importance to Australian aquaculture.

3.1 Stage 1 Sensory Evaluation

Sensory protocols are designed to measure the hedonic liking of products, the attributes that drive liking and the impact of these variables on purchase and consumption behaviour. In this instance, the key measures used to determine consumer acceptability were overall liking and preference. Specific intrinsic attributes measured included appearance, aroma, flavour, texture, and aftertaste. By profiling products on key sensory attributes, we were able to provide understanding around key drivers of liking (what appeals to the consumer), and the sensory and perceptual attributes that characterise and differentiate these products. A total of nine fish products were evaluated, including five barramundi variants (wild caught and imported plus three different types of Australian farmed barramundi namely, sea-cage, earth pond, tank) and four species considered to be key competitors (gold band snapper, cobia, nile perch and yellow tail king fish).

Upon arrival, respondents were greeted, audited for compliance to recruitment specifications (main or joint grocery buyers, aged 18-59 years of age, whom purchased chilled or fresh fish from a supermarket or fishmonger for consumption in-home at least once a month, and consumed barramundi in or out of home at least 3 times a year) and then briefed. Respondents then moved to individual sensory booths, with touch screen technology for data collection. Fish products were evaluated in a sequential monadic design, one by one, one after the other and in a pre-prescribed randomised order to minimise any bias. A double-blind design was employed throughout to ensure that neither the serving staff nor the participants were aware of the fish species in each evaluation. Due to considerations around fatigue and satiety, respondents only evaluated four of the nine fish variants over the duration of one hour. With the total number of respondents (n = 145), this incomplete design meant that each fish variant was evaluated by approximately 60 consumers. A qualified chef cooked the products to ensure consistency. The fish was lightly pan fried with minimal oil and no seasoning.

The product questionnaire comprised hedonic ratings of liking as well as actual ratings of various sensorial intensities ranging from a low of "dislike extremely" to a high of "like extremely". Respondents were also asked to provide an "ideal" rating on each attribute tested. Once a set of four products had been evaluated, respondents were also asked to indicate their preferred sample overall.

3.2 Stage 2 Focus groups

The main objective of the focus group discussions was to evaluate extrinsic cues and explore the interplay of intrinsic and extrinsic cues in the evaluation of fish quality. Twenty-six consumers took part in four focus groups. For efficiency of time and cost, as well as for the benefit of being able to refer back to the tasting session prior, these respondents had also taken part in the preceding sensory evaluation session.

The first 20 minutes of the discussion focused more qualitatively on the prior product experience in the sensory evaluation, and probed further into intrinsic product attributes and reasons for acceptance/rejection that would otherwise not be elicited from a quantitative questionnaire. So that memory did not have to be relied on alone and given the multiple samples tested, product was also prepared in the same manner for consumption and discussion during these groups. Five species were evaluated in this component: sea-cage barramundi, earth pond barramundi, imported barramundi, tank barramundi and cobia.

The remainder of the focus group comprised a more traditional approach, where respondents took part in a more free-flowing group discussion. The exploratory approach was designed to penetrate the surface of observable and reported behaviour and delve deeper into the more underlying motivations of behaviour and attitudes. Specifically, this sub-component was designed to explore what extrinsic variables were important in consumers' quality evaluations, and how these extrinsic cues combined with intrinsic cues to arrive at over-all quality evaluations.

4. Results

4.1 Stage 1 Sensory evaluation

4.1.1 Profile of respondents

The sample comprised 145 consumers recruited from a commercial panel, with 66 percent females and 34 percent males. The mean stated fish consumption frequency was 5.2 times a month. The sample was skewed towards barramundi consumption to ensure that those tasting the product were amenable to it, had the potential to recognise it, and had existing perceptions about the species.

4.1.2 Product evaluation

Overall liking results revealed that goldband snapper was the best liked fish product (Figure 1) with a mean liking score of 7.1 on a ten point scale. Sea-cage barramundi (6.5), earth pond barramundi (6.1) and imported barramundi (6.0), as well as cobia (6.1), were also well liked. Less well liked were wild barramundi, nile perch, yellowtail kingfish and tank barramundi. Distributions of liking were generally positively distributed with the exception of nile perch, yellowtail kingfish and tank barramundi which attracted flatter distributions, and wild barramundi which was somewhat polarised. Given these overall evaluations we now turn to the evaluation of specific intrinsic cues.

Insert Figure 1 here.

The specific intrinsic attributes measured included: overall appearance measured by a single item with the dimension of colour also a single item; aroma (single item); taste was measured with one item (overall flavour) and the dimensions of, sweetness, saltiness, bitterness and oiliness were measured with single item measures; texture (single item); and aftertaste (single item). As expected, all of these attributes were significantly correlated (at $p<0.05$) with overall liking, with variations in the strength of the relationships. Liking of taste (0.83) was the most highly correlated with overall liking. Of the flavour attributes, sweetness (0.70) had the highest correlation with overall liking followed by, oiliness (0.61), saltiness (0.58) and bitterness (0.58). Closely associated with flavour, aftertaste was also highly correlated with overall liking (0.82). Texture (0.75) and aroma (0.50) followed. Hence our proposition that taste would be the most significant of the intrinsic cues is supported.

With respect to the barramundi variants, sea-cage barramundi was liked best and predominantly for its mild flavour and its moistness. It had no detectable acidity or bitterness, and it was close to ideal in terms of texture, but a slightly firmer and more salty product was considered ideal. Earth-pond barramundi was liked second best for its fresh/natural flavour, less for its colour (too dark), and intensity of aroma and flavour (too strong, oily). Imported barramundi was well liked for its appearance, specifically its colour, but consumers generally wanted something sweeter, saltier, firmer and less bitter. Despite

Australian consumers overwhelmingly expressing a preference for wild-caught over farmed fish, the wild barramundi suffered from polarisation, with some consumers enjoying the mild flavour and others disliking its blandness, suggesting higher acceptance with increased sweetness and saltiness. Tank barramundi was least liked overall and participants reported a noticeable "off" flavour and aftertaste, with focus group members describing the taste as "not quite right" and tasting like "something from the bottom of a creek [river]".

In summary, considerable variation was evident in the sensory profiles of the species tested with large differences observed in the range of flavour strength, oiliness and texture. As well as differences between barramundi and other species, significant differences were observed across the barramundi variants tested.

4.2 Stage 2 Focus groups

The focus groups began with another tasting of four barramundi variants and one additional species, cobia to refresh and explore respondents' awareness of intrinsic cues before discussing extrinsic cues. Comments generally followed the key findings noted from the larger sensory evaluation, that is, there was considerable variation in sensory profiles and some barramundi variants were not at all liked (Table 1).

Table 1
Evaluations of barramundi variants from the sensory component of focus groups.

Barramundi variant	Evaluation
Sea-cage Barramundi	Generated the greatest appeal. Visually appealing, soft texture, slightly oily, mild flavour, slightly sweet, fresh taste. Easily recognisable as barramundi.
Earth Pond Barramundi	Despite its visual appeal and soft texture, the flavour was considered quite strong, oily and slightly salty.
Imported Barramundi	Flavourless, mushy texture, bitter/acidic, strong metallic aftertaste.
Tank Barramundi	Visually appealing and flesh looked firm; however it was gelatinous and gritty, with a strong aroma, and an earthy, muddy, salty flavour and a strong aftertaste.

*wild-caught barramundi was not re-tasted in the focus groups

A consistent finding across all three groups was that most consumers still lacked knowledge and confidence when buying, preparing and cooking fish at home. Many looked for the safety of a mild-flavoured, moist fish that could be cooked simply and easily in a variety of ways that the whole family would like. In support of the literature, taste was the dominant intrinsic cue when selecting fish (Brunsø et al., 2009). Barramundi was seen to meet these taste and versatility criteria. In contrast to the objective evaluations made during the sensory analysis, respondents reported that they had never experienced noticeable differences in the

taste of barramundi they had purchased. An overriding observation based on subjective evaluations was the perception that barramundi offered a consistent product quality and as a result was a low risk purchase.

The extrinsic cue that appeared to be most important to the majority of respondents when purchasing seafood in general and barramundi specifically was country of origin. "Australian" was seen to be a proxy or surrogate measure for freshness, superior quality and safety, but "Australian" also meant more expensive. Barramundi was perceived to be an iconic Australian fish with many participants being unaware that barramundi was also grown and imported from other countries. Imported seafood was perceived to be cheaper but riskier in terms of possible contamination and hygiene and less fresh. However, a small number of more budget-conscious respondents who purchased imported barramundi, rationalised that the imported product must still be safe if the supermarket sold it. In terms of branding, respondents only wanted to know if the product was Australian. Any additional provenance and/or identification was seen as potentially confusing, with respondents preferring a "keep it simple" approach to a category they already found confusing. Hence our proposition that among extrinsic cues, country of origin would have the most significant influence on Australian consumers' evaluation of fish is supported.

In terms of other extrinsic cues, barramundi was perceived as healthy. Similarly to the lack of awareness around Australian versus imported barramundi, there was little knowledge of farmed versus wild, what these terms meant or what the respective consequence might be with regard to product quality and availability within the Australian market. Consumers had very limited knowledge and awareness of methods of farmed seafood production, and consequently, method of production was not a relevant extrinsic cue. The credence attribute of sustainable production was probed, but did not stimulate substantial interest or discussion. Key concerns were much more clearly aligned to issues of freshness, quality, versatility and consistency.

5. Discussion

The purpose of this paper was to investigate the role and interplay of intrinsic and extrinsic cues and their relative importance, in influencing consumers' fish consumption, in the context of Australian farmed barramundi. While our respondents were specifically recruited for regular purchase of chilled or fresh fish from a supermarket or fishmonger at least once a month, and consumed Barramundi in or out of home at least 3 times a year, our focus group results revealed low levels of knowledge and expertise regarding fish in general and barramundi in particular, with the majority of respondents being unable to correctly identify barramundi during a taste test. This finding supports previous research suggesting many consumers have difficulty in evaluating fish (Olsen, 2004; Scholderer and Grunert, 2001; Sveinsdóttir et al., 2009).

In terms of intrinsic cues the key drivers of experience-based acceptability for barramundi are flavour and texture, supporting previous research highlighting the importance of taste and

texture (Bredahl and Grunert, 1997; Brunsø et al., 2009; Leek et al., 2000; Olsen, 2004; Rødbotten et al., 2009; Verbeke and Vackier, 2005). Ideally, the flavour of fish must be free of "off notes", metallic flavours, bitterness or acidity in order to be perceived as fresh. Texture is also important, with a firm, yet moist and tender texture correlating to higher overall liking. Appearance is less important; however, a lighter uniform colour of fresh fillet, void of dryness is considered ideal. This correlates with other secondary drivers such as mildness of aroma, flavour and aftertaste. These ideal sensory qualities are in contrast to the actual sensory evaluations of the variants of barramundi evaluated in this study which varied considerably from close to ideal (sea-cage barramundi) to significantly different to ideal (tank barramundi). However, the ideal qualities are aligned to the current perception and experience of barramundi in Australia where barramundi is subjectively perceived as a consistent, good quality fish.

Extrinsic factors influencing quality evaluations begin at the point of purchase. Specifically, we explored price, country of origin and method of production. Of these, the key driver of quality evaluations was country of origin with respondents using country of origin as a proxy or surrogate cue for quality. Closely associated with country of origin was price, with consumers acknowledging imported product was less expensive, but of lower quality than domestically produced product. Given barramundi is typically sold unbranded, country of origin and price were critical extrinsic cues, as supported by Bredahl (2004), who found that price cues were more often used with unbranded products. The final extrinsic cue of method of production was not relevant to the majority of respondents as the levels of awareness of wild versus farmed and different types of farmed seafood was virtually nonexistent. When prompted in the focus groups, consumers indicated a preference for wild caught fish, however in terms of the sensory evaluation, wild caught barramundi ranked fourth of the five barramundi variants in terms of overall liking.

Turning to the relative importance and roles of intrinsic and extrinsic cues, in the case of Australian barramundi, it appears that unfavourable objective evaluations based on intrinsic cues are being overridden by positive subjective evaluations based on extrinsic cues, particularly country of origin as a surrogate cue for quality and freshness. Despite being regular fish consumers, our respondents had low levels of knowledge, and thus relied more heavily on extrinsic cues which were much quicker and easier for them to interpret and use. Hence our third proposition that Australian consumers of fish are more likely to use extrinsic rather than intrinsic cues when evaluating fish is supported.

6. Conclusions

The current research shows the desire and intent of the Australian consumer to consume more seafood. Current consumer needs for seafood, as well as what drives them, both extrinsically and intrinsically have been revealed. Through the use of both quantitative and qualitative research techniques, the current investigation identified the key intrinsic and extrinsic drivers in Australian seafood purchase and consumption. Overall our findings have revealed that

consumers prefer product that is perceived to be fresh, sourced nationally and priced appropriately for the level of quality.

With regard to experience characteristics, acceptance is driven most strongly by taste and texture. These attributes correlate with other sensory drivers such as mildness of aroma, flavour and aftertaste. To stimulate consumption, fish farmers need to ensure that the integrity of their product is maintained from production right up to preparation in the home. If these characteristics can be ensured by rigorous quality processes, the added advantage is the fact that barramundi as a species is already subjectively evaluated by Australian consumers to embody these qualities.

Extrinsically, there are numerous marketing methods that can be used in conjunction with a high quality product in order to increase overall volume and margin. Australian branding is the most important cue for consumers' desire for quality, safety and freshness, as well as providing a point of difference from imported products. However, we emphasise that as Australian consumers become more knowledgeable about seafood this reliance on extrinsic cues will diminish.

Some limitations need to be noted; the study was limited to 145 participants from one capital city in Australia. The research focused on experience qualities rather than search qualities. In order to maintain experimental control, each fish type was pan-fried, which may have affected the overall acceptability of some of the fish species upon tasting as this cooking method is not "ideal" for all species. However to investigate differences between the same species, grown in different locations and processed in different ways, this controlled methodology was imperative. Finally, the participants in the focus groups were also participants in the sensory evaluation study and so may have been sensitised to the research questions.

Note: This work formed part of a project of the Australian Seafood Cooperative Research Centre, and received funds from the Australian Government's CRCs Programme, the Fisheries R&D Corporation and other CRC Participants.

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