Buying Seafood: Understanding Barriers to Purchase Across Consumption Segments

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Abstract

Most consumers consider fish to be an important part of a healthy and balanced diet. When purchasing fish, consumers weigh up considerations of risk which may act as a barrier to consumption. In this paper, the findings of an online survey of Australian consumers (n=899) which explored factors influencing fish consumption are discussed. This paper focuses on a number of barriers for consumers, classed as regular, light and very light fish consumers that arise from the perceived risk of fish consumption. Perceived risk associated with fish consumption included functional, physical, psychological, social and financial risk and, with the exception of financial risk, varied across consumption segments. Based on the findings, strategies for reducing perceived risks as a means of stimulating fish consumption are proposed.

Keywords: fish, consumption, barriers, perceived risk

1. Introduction

Despite an abundance of fish being available to Australian consumers, annual fish consumption in Australian is well below recommended levels of two

serves per week and average consumption for other industrialised nations. While there has been a substantial amount of research on barriers to fish consumption in European countries where per capita fish consumption is customarily higher, there is limited research about fish consumption in Australia and other western countries. The purpose of this paper is to focus on the perceived risk of fish consumption resulting in barriers and then to discuss strategies that may be used to minimise these risks and thus stimulate fish consumption.

2. The role of perceived risk in influencing fish consumption

Perceived risk from a consumer behaviour perspective relates to the degree of uncertainty and the potential for important negative consequences for the consumer arising from a poor purchasing decision (Bauer, 1960; Cho & Lee, 2006; Dowling & Staelin, 1994; Tuu & Olsen, 2009). Perceptions of risk from making poor purchasing decisions are a strong predictor of consumption behaviour (Mitchell, 1999; Tuu & Olsen, 2009). Subjective risk can be distinguished from objective risk, in particular for a product such as fish where perceived risk is much higher than actual risk. Where, the relative importance or significance of potential negative consequences is high, perceived risk is greater (Taylor, 1974). For example, despite fish being, in actuality, a relatively safe product to consume, people can die as a result of eating fish (Bean & Griffen, 1990). While risk has a known probability, uncertainty emerges when the consumer does not know the precise probability of the risk occurring (Knight, 1948). However, from a marketing perspective, Cunningham (1967) suggested that it makes no difference to the consumer whether the precise probability is known or unknown, and it is perceived uncertainty rather than actual risk that influences purchasing behaviour (Mitchell, 1999). The term risk as used in this paper includes this uncertainty.

Perceived risk is important to marketers as it colours pre-purchase attitudes, evaluations and intentions, as well as, post-purchase evaluations, satisfaction and loyalty (Campbell & Goldstein, 2001; Chen & Li, 2007; Grewal, Gopalkrisnan, Gotlieb, & Levy, 2007; Gurhan-Canli & Batra, 2004; Park, Lennon, & Stoel, 2005; Tuu & Olsen, 2009; Yuksel & Yuksel, 2006). Perceived risk is closely linked to the level of involvement in the buying decision making process due to the complexity of considerations involved (Laurent & Kapferer, 1985). The degree of involvement concerns the relative importance of the product to the consumer and the extent to which making the right product choice is important (Zaichowsky, 1985). Where involvement is high, consumers will take more time and devote more effort to arrive at the right purchasing decision. As a rule, food is a product where involvement is low

and thus decision making tends to be associated with limited, habitual or routine response behaviour (Blackwell, Miniard, & Engel, 2001; Mahon, Cowan, & McCarthy, 2006). However, the perceived risks associated with making the wrong decision when purchasing fish makes fish into a product where the involvement is higher than with many other food items (Foxall, Leek, & Maddock, 1998; Juhl & Poulsen, 2000; Pieniak, Verbeke, Vermeir, Brunsø, & Olsen, 2008).

The greater the perceived risk, the more involved the consumer becomes in the decision making process, and the more extensive is the search for both personal and non-personal information during evaluation of alternatives (Bansal & Voyer, 2000; Cho & Lee, 2006; Dowling & Staelin, 1994; Gurhan-Canli & Batra, 2004). Mitchell (1999) argued *"perceived risk is more powerful at explaining consumers' behaviour since consumers are more often motivated to avoid mistakes than maximise utility in purchasing"* (p. 163). Bettman (1973) distinguished between inherent risk (product-category risk) and handled risk (product-specific risk). The inherent risk in a product category, such as fish, can be mitigated to some extent by purchasing a well-known and trusted brand or from a reputable supplier, and thus reduce handled risk or product-specific risk; that is, the level of conflict the class of product arouses when the consumer selects *"a brand from a product class in his/her usual buying situation"* (Mitchell, 1999, p. 166). Careful purchasing choices reduce cognitive dissonance.

2.1 Types of perceived risk associated with fish consumption

Numerous studies have focussed on the perceived risk of purchasing food products (Mitchell, 1999). Various types of perceived risks faced by consumers in the buying decision have been identified and can be applied to fish consumption including functional, psychological, social, financial and physical risks (McCathy & Henson, 2005; Stone & Gronhaug, 1993; Tsiros & Heilman, 2005).

2.1.1 Functional risk associated with fish consumption

Functional risk arises when a product may not perform up to expectations. Functional risk is associated with the consumers' degree of familiarity, knowledge and confidence with a product category which, in turn, influences the degree of involvement in the decision making processes of information search, evaluation of alternatives and purchase decisions (Howard & Sheth, 1969; Myrland, Trondsen, Johnston, & Lund, 2000; Verbeke et al., 2008). The more familiar and knowledgeable the consumer is with the product category, the greater the confidence or degree of self-efficacy they perceive to make the right purchasing decision, and thus reduce functional risk (Sogn-Grundvag & Ostli, 2009). Knowledge about fish is closely related to the consumers' past experiences with fish and their degree of familiarity with fish leading to a level of expertise (Fischer & Frewer, 2009; Pieniak et al., 2008; Tuu &

Olsen, 2009). Olsen (2004) explains that knowledge about fish increases the consumer's ability to manage the entire fish consumption process from selection to serving. Consumer knowledge is also brought to bear in making risk assessments, with customers with lower levels of knowledge or expertise experiencing higher levels of perceived risk due to uncertainty (Frewer, Shepherd, & Sparks, 1994; Klerch & Sweeney, 2007; Laroche, Nepomuceno, & Richard, 2010). Self-efficacy refers to how competent a person feels to do what is required to manage a situation, and thus reduce uncertainty (Bandura, 1997). In the case of fish, self-efficacy relates to the consumers' confidence to make a good choice when selecting, storing, and preparing fish.

Previous studies of fish consumption have revealed the unsurprising fact that many consumers, and in particular less regular, less experienced and less knowledgeable fish consumers, experience difficulty in evaluating, selecting, and preparing fish (Brunso et al., 2009; Juhl & Poulsen, 2000; Scholderer & Grunert, 2001; Sogn-Grundvag & Ostli, 2009; Sveinsdóttir et al., 2009). Fish is a food category that requires acquisition of sensory skills and a lack of sensory ability by consumers to evaluate the quality of fish or determine whether fish is fresh has been found to be a major barrier to fish consumption and to vary across consumption segments (Olsen, 2004; Verbeke & Vackier, 2005, Verbeke, Sioen, Pieniak, Van Camp, & De Henauw, 2005).

2.1.2 Psychological risk associated with fish consumption

Unpleasant sensory qualities such as unpleasant smells, not liking the taste or texture of fish, not liking to touch fish, and the presence of bones gives rise to psychological risk and have been found to be a major barrier to fish consumption (Bredahl & Grunert, 1997; Brunso et al., 2009; Leek, Maddock, & Foxall, 2000; Olsen, 2001; Olsen, 2004; Verbeke & Vackier, 2005). Fish consumption studies have found that some consumers, and in particular less experienced fish consumers perceive more barriers to fish consumption including the presence of unpleasant sensory qualities, such as not liking to touch fish and not liking the smell of fish when preparing it (Baird, Bennett, & Hamilton, 1988; Brunso et al., 2009; Myrland et al., 2000; Nielsen, Hyldig, & Larsen, 2002; Trondsen, Scholderer, Lund, & Eggen, 2003).

2.1.3 Social risk associated with fish consumption

Social risk arises from social norms due to potential lack of acceptance from significant others. Social norms or pressure from household members who do not like to eat fish have been found to negatively influence fish consumption (Olsen, 2001; Olsen, 2004; Scholderer & Grunert, 2001; Trondsen et al., 2003 Verbeke & Vackier, 2005). In particular, the presence of children and teenagers within the household has been found to decrease fish consumption (Honkanen, Olsen, & Myrland, 2004; Myrland et al., 2000; Olsen & Ruiz, 2008). Indeed, family expectations, both positive

and negative, have been found to be as influential as attitudinal factors such as taste and preferences in explaining fish consumption (Bredahl & Grunert, 1997; Olsen, 2001, Verbeke & Vackier, 2005).

2.1.4 Financial risk associated with fish consumption

Financial risk associated with fish consumption may arise with fish being perceived to be a relatively expensive meal option (Brunso et al., 2009; Myrland et al., 2000; Olsen, 2004; Trondsen et al., 2003; Verbeke & Vackier, 2005). The potential for financial loss is exacerbated due to the possibility of spoiling the fish during storage or preparation resulting from a lack of consumer knowledge or confidence, and hence more likely to be associated with less experienced fish consumers (Sogn-Grundvag & Ostli, 2009). Previous research has revealed that fish experts and fish connoisseurs are less price sensitive than less skilled fish consumers (Arvanitoyannis & Krystallis, 2005; Brunso et al., 2009; Hanson, Rauniyar, & Herrmann, 1994; Verbeke, Vermeir, & Brunso, 2007).

2.1.5 Physical risk associated with fish consumption

Perceived risk associated with fish consumption also pertains to issues of safety, with some consumers being concerned about possible contaminants, treatment with hormones or antibiotics, mercury levels and whether the fish has been handled in a hygienic manner (Domingo & Bocio, 2007; Fischer & Frewer, 2009; Lobb, Mazzocchi, & Traill, 2007; Sidhu, 2003; Sioen et al., 2008; Smith & Sahyoun, 2005; Verbeke & Vackier, 2005). Safety and minimising risk or hazardous outcomes has been found to be an important aspect of food consumption (Bredbenner, Mauer, Wheatly, Cottone, & Clancy, 2007; Fischer & Frewer, 2009; Saba & Messina, 2002; Tuu & Olsen, 2009; Yeung & Yee, 2002). Fish consumers, and in particular those in high risk groups such as young children and pregnant women, may perceive physical risk or risk to their well-being or health, such as choking on a fish bone or unacceptable levels of mercury (Jardine & Bunn, 2010). However, the significant perceived health benefits of fish consumption have been found to outweigh risks (Sioen et al., 2008; Vanhonacker, Pieniak, & Verbeke, 2010). Low fish consumption has been associated with perceptions of physical risk associated with food poisoning from eating fish (Pieniak et al., 2008; Vanhonacker et al., 2010).

2.2 Aims and hypotheses

The aims of this paper are twofold: first, to investigate factors leading to perceived risk associated with fish consumption and second, to identify and discuss strategies that can be used to reduce the perceived risk associated with fish consumption and thus stimulate fish consumption. Based on the extant literature the following five hypotheses were developed and tested:

Regular fish consumers are less likely than lighter fish consumers to perceive:

Hypothesis 1: functional risk associated with fish consumption.

Hypothesis 2: psychological risk associated with fish consumption.

Hypothesis 3: social risk associated with fish consumption.

Hypothesis 4: financial risk associated with fish consumption.

Hypothesis 5: physical risk associated with fish consumption.

3. Methodology

To investigate the research questions, a survey of Australian consumers (n=899) was conducted by commercial research company via an online consumer panel in June 2010. Participants were screened for industry affiliation, participation in recent seafood research, age (18 years and older), whether they were either the main or joint grocery shopper in the household, and for having consumed fish in the past three months. The main purpose of the survey was to measure Australian fish consumers' attitudes toward fish consumption. The survey included regular (n=296), light (n = 303) and very light (n=300) fish consumers. Regular fish consumers were classified as those who purchase and eat fish 2 - 3 times per week to at least once a week. Light fish consumers purchase and eat fish about once per fortnight, while very light fish consumers purchase and eat fish once per month. Analysis of variance and chi-square analysis were conducted to identify significant differences across consumption segments (regular, light and very light fish consumers). Post-hoc tests (Tukey HSD) were used to determine the pattern of differences between the groups. Levene's test was used to check for homogeneity of variances, and where violated, Kruskal Wallis tests were conducted to test for differences.

Questions for the consumer survey were drawn from an extensive review of the literature on fish consumption, and recent qualitative and quantitative research studies of fish consumption in Australia conducted on behalf of the Australian Seafood Cooperative Research Centre. Scales and items for measuring constructs were based on pre-validated items from a number of previous studies of fish consumption (e.g., Pieniak, Verbeke, Vermeir, Brunsø, & Olsen, 2007a; Sørensen, Grunert, & Nielsen, 1996; Vanhonacker et al., 2010; Verbeke & Vackier, 2005). Items were measured on either a 6 point agreement or a 6 point importance scale.

4. Findings and discussion

4.1 Profile of respondents

Females represented 65.9 percent of the sample (n=592) and males represented 34.1 percent (n=307). The majority of the respondents were in the 55 years and older age bracket (34%), with the next largest age bracket being 45 - 54 years (29.7%), with respondents under 25 years of age being the smallest age group in this survey (2.7%). The sample was highly educated with the majority of respondents being tertiary educated (47.6%), with the next largest group being technically trained (27.3%), followed by people educated to secondary school level (24.1%). This may mean that perceived barriers to fish consumptions are less evident in this survey as Trondsen et al. (2003) found a negative relationship between educational level and perceptions of barriers to fish consumption. The respondents were represented across a broad and representative range of annual household income categories (Table 1). Differences across demographic groups by consumption rate were not evident with the exception that older consumers (55 years plus) were more likely to be regular consumers of fish than younger consumers (18-24 years). The screening revealed that 73 percent of respondents were the main shopper and 27 percent identified as being the joint grocery shopper in their household.

Table 1
Respondent profile.

Variable	Level	%	Variable	Level	%
Gender	Female	65.9	Education	Tertiary /university	47.6
	Male	34.1		Technical training/TAFE	27.3
Age	55 years and older	34.0		Secondary school	24.1
	45-54	29.7		Primary school	1.0
	35-44	20.1	Annual household income (AUD)	100,000 or above	26.7
	25-34	13.5		60,000 - 100,000	27.1
	18-24	2.7		20,000 - 60,000	24.2
				Less than 20,000	15.9

Approximately half (48.3%) of the respondents did not have children living at home, while more than half of the respondents (53.5%) resided in households with more than two people. The majority of respondents resided in the major capital cities of Melbourne (31.3%) and Sydney (25%). Respondents from other Australian capital cities and regional areas of Australia were under-represented in the sample.

4.2 Findings related to the functional risk of fish consumption

Lack of familiarity with fish and lack of knowledge and confidence in selecting, storing and preparing fish are major reasons for perceptions of functional risk (Fischer & Frewer, 2009; Juhl & Poulsen, 2000; Sogn-Grundvag & Ostli, 2009; Sveinsdóttir et al., 2009). To assess the extent to which respondents were familiar with and informed about fish, we drew from the work of Verbeke and Vackier (2005). To determine the extent to which Australian consumers perceived functional risk associated with fish consumption related to a lack of knowledge or confidence to select, store or prepare fish, we developed a bank of items drawn from the work of a number of researchers (e.g., Pieniak et al., 2007a; Sørensen, et al., 1996; Vanhonacker et al., 2010; Verbeke & Vackier, 2005, Verbeke et al., 2008, etc), as presented in Table 2.

Table 2
Perceptions of factors associated with the functional risk of fish consumption by usage segment.

Item	Total Mean (SD)	Regular Mean (SD)	Light Mean (SD)	Very Light Mean (SD)
Items related to familiarity with fish				
I am familiar with preparing fish	4.11(1.04)	4.42(1.01)	4.01(1.02)	3.92(1.04)
I am well informed about fish	3.99(1.06)	4.20(1.09)	3.87(1.01)	3.89(1.04)
Items related to selecting fish				
Making the right decision when choosing fish is important	4.51(0.82)	4.58(0.86)	4.50(0.81)	4.43(0.80)
I would buy more fish, if I was more confident in my ability to select good quality fish	3.44(1.15)	3.22(1.21)	3.57(1.09)	3.53(1.13)
Fish is more difficult to assess for freshness and quality as compared to other meats	3.37(1.21)	3.20(1.31)	3.44(1.18)	3.47(1.17)
I cannot recognise when fish is fresh	3.21(3.21)	2.99(1.18)	3.32(1.11)	3.32(1.16)
I do NOT feel confident to select the right type/variety of fish	2.84(1.16)	2.58(1.16)	2.93(1.13)	2.99(1.14)
I do NOT know how to select fish	2.83(1.18)	2.59(1.19)	2.89(1.13)	3.01(1.16)
Items related to storing fish				
I know how to store fish safely	4.28(1.05)	4.39(1.09)	4.19(1.05)	4.26(0.98)
I do NOT know how long I can keep fish before it needs to be cooked	2.72(1.19)	2.54(1.21)	2.81(1.19)	2.81(1.18)
Items related to preparing fish				
If I knew of more ways to prepare and serve fish, I would eat more of it	3.56(1.23)	3.42(1.31)	3.57(1.22)	3.67(1.14)
I do NOT know much about how to prepare and serve fish	2.92(1.28)	2.68 (1.27)	2.97(1.20)	3.12(1.32)
I am NOT confident to prepare and serve fish	2.88(1.25)	2.68(1.26)	2.86(1.21)	3.11(1.25)

(6 point scale: 6 = strongly agree to 1 = strongly disagree)

4.2.1 Familiarity with fish

About three-quarters of the respondents (74.9%) in this study agreed that they are familiar with preparing fish (Verbeke & Vackier, 2005). Regular fish consumers more “strongly agreed” or “agreed” that they are familiar with preparing fish (49%) than either light (30.3%) or very light (26.3%) fish consumers ($F(2,896) = 20.33$, $p<0.00$). However, in contrast to previous studies of fish consumption where

respondents did not agree with the statement 'I am well informed about fish" (Verbeke & Vackier, 2005), more than two-thirds of the respondents in this study (68.9%) agreed they are well informed about fish. Regular fish consumers more "strongly agreed" or "agreed" they are well informed about fish (38.9%) than either light (26.4%) or very light (26.7%) fish consumers ($F(2,896) = 9.51$, $p<0.00$).

4.2.2 Selecting fish

As expected, the vast majority of respondents (93.1%) agreed that making the right decision when choosing fish is important (Verbeke et al., 2007). Almost half of the respondents (48.9%) agreed they would buy more fish, if they were more confident in their ability to select good quality fish. Regular fish consumers more "strongly disagreed" or "disagreed" that they would buy more fish if they were more confident in their ability to select a good quality fish (26.3%) than either light (14.8%) or very light (16.6%) fish consumers ($F(2,896) = 8.23$, $p<0.00$). Almost one-third of respondents (29.3%) agreed they do not know how to select fish. Moreover, 28.9 percent of respondents agreed that they do not feel confident to select the right type or variety of fish. Regular fish consumers more "strongly disagreed" or "disagreed" that they do NOT know how to select fish (48.7%) than either light (38.3%) or very light (33.0%) fish consumers ($F(2,896) = 10.46$, $p<0.00$), and that they do NOT feel confident to select the right type/variety of fish (49.4%) than either light (36.6%) or very light (32.4%) fish consumers ($F(2,896) = 11.20$, $p<0.00$). Nearly half of the respondents (49%) agreed that fish is NOT more difficult to assess for freshness and quality as compared to other meats, while 40.6 percent agreed that they cannot recognise if fish is fresh. Regular fish consumers more "strongly disagreed" or "disagreed" that fish is more difficult to assess for freshness and quality as compared to other meats (32%) than either light (19.2%) or very light (20%) fish consumers ($F(2,896) = 4.71$, $p<0.01$). Regular fish consumers also more "strongly disagreed" or "disagreed" that they cannot recognise if a fish is fresh (31%) than either light (21.1%) or very light (22.4%) fish consumers ($F(2,896) = 8.20$, $p<0.00$).

4.2.3 Storing fish

The majority of respondents (82.3%) agreed that they know how to store fish safely, and less than one-quarter of the respondents (23.1%) agreed that they do NOT know how long they can keep fish before it needs to be cooked. Regular fish consumers more "strongly disagreed" or "disagreed" that they know how long they can keep fish before it is cooked (50%) than either light (39.3%) or very light (42.6%) fish consumers ($F(2,896) = 5.30$, $p<0.05$). Regular fish consumers more "strongly agreed" or "agreed" that they know how to store fish safely (47.3%) than either light (37.3%) or very light (34.6%) fish consumers ($F(2,896) = 2.59$, $p<0.10$).

4.2.4 Preparing fish

Over one-third of respondents (33.9%) acknowledged that they do NOT know much about how to prepare and serve fish, and 29 percent of respondents agreed they are NOT confident to prepare and serve fish. Very light fish consumers more "strongly agreed" or "agreed" that they do not know much about how to prepare or serve fish (38.3%) than either regular (7.7%) or light (9.3%) fish consumers ($F(2,896) = 9.56$, $p<0.00$), and that they are NOT confident to prepare and serve fish (13.3%) than either regular (7.8%) or light (8.9%) fish consumers ($F(2,896) = 9.24$, $p<0.00$). Just over half of the respondents (52.4%) agreed that if they knew of more ways to prepare and serve fish, they would eat more of it. Regular fish consumers more "strongly disagreed" or "disagreed" that if they knew of more ways to prepare and serve fish, they would eat more of it (25.3%) than either light (17.8%) or very light (13%) fish consumers ($\chi 2 = 6.16$, d.f. = 2, $p<0.05$).

In line with the literature, a lack of familiarity with preparing fish and being less informed about fish appear to add to functional risk, thus creating a significant barrier to fish consumption in Australia, in particular for lighter fish consumers (Fischer & Frewer, 2009). Moreover, a lack of knowledge and confidence to select, store or prepare fish appear to add to functional risk, thus creating a significant barrier to fish consumption in Australia, in particular for lighter fish consumers (Juhl & Poulsen, 2000; Sogn-Grundvag & Ostli, 2009; Verbeke & Vackier, 2005). Hence, Hypotheses 1 is supported.

4.3 Findings related to the psychological risk of fish consumption

To assess the perceived psychological risk of fish consumption, we drew from the work of various researchers (e.g., Leek et al., 2000; Verbeke & Vackier, 2005; Olsen, 2001) and asked respondents their level of agreement to a number of statements, as presented in Table 3.

Table 3
Perceptions of factors associated with the psychological risks of fish consumption by usage segment.

Item	Total Mean (SD)	Regular Mean (SD)	Light Mean (SD)	Very Light Mean (SD)
I have had good experiences in eating fish in the past	4.66(0.93)	4.80(0.92)	4.63(0.94)	4.54(0.90)
The bones in fish are unpleasant	4.54(1.31)	4.52(1.30)	4.56(1.35)	4.54(1.29)
I do NOT like the smell of fish when preparing it	3.10(1.29)	2.97(1.38)	3.11(1.27)	3.21(1.22)
I do NOT like the smell of fish	3.09(1.44)	2.97(1.50)	3.17(1.41)	3.14(1.40)
I do not like to touch fish	2.72(1.40)	2.52(1.35)	2.70(1.40)	2.94(1.44)
Eating fish is usually an unpleasant experience	1.95(1.13)	1.87(1.21)	1.97(1.15)	2.02(1.04)
Fish usually tastes bad	1.89(0.96)	1.74(0.94)	1.93(0.99)	1.98(0.98)

(6 point scale: 6 = strongly agree to 1 = strongly disagree)

The majority of respondents (92.7%) agreed that they have had good experiences in eating fish in the past. Regular fish consumers more “strongly agreed” or “agreed” that they have had good experiences in eating fish in the past (67.9%) than either light (57.1%) or very light (48.7%) fish consumers ($F(2,896) = 6.34$, $p<0.02$). Less than half of the respondents (37.6%) agreed that they do NOT like the smell of fish when preparing it. Despite perceptions that the smell of fish is off-putting to most consumers, less than half of the respondents (42.7%) agreed with the statement, “I do not like the smell of fish”. The majority of respondents (83.7%) also agreed that “the bones in fish are unpleasant”. Only 27.3 percent of respondents agreed with the statement, “I do not like the touch of fish”. Very light fish consumers more “strongly agreed” or “agreed” that they do not like to touch fish (14.6%) than either regular (9.5%) or light (10.9%) fish consumers ($F(2,896) = 6.92$, $p<0.01$). Only 5.3 percent of respondents agreed with the statement “fish usually tastes bad”. Regular fish consumers more “strongly disagreed” or “disagreed” that fish usually tastes bad (83.8%) than either light (73%) or very light (71%) fish consumers ($F(2,896) = 5.03$, $p<0.01$). Hence, consistent with previous studies of fish consumption, negative perceptions of sensory qualities of fish appear to add to psychological risk and negatively impact on fish consumption in Australia, and in particular for lighter fish consumers, and thus, Hypotheses 2 is supported.

4.4 Findings related to the social risk of fish consumption

Previous studies on fish consumption have indicated that social norms, that is, acceptability to family and friends negatively influence fish consumption (Olsen, 2001; Olsen, 2004; Scholderer & Grunert, 2001; Trondsen et al., 2003 Verbeke & Vackier, 2005). To determine the extent to which fish consumption in Australia is influenced by social norms, we asked respondents their level of agreement with a number of statements, based on the work of Olsen (2001), about the influence of others in their household on their household’s fish consumption (Table 4).

Table 4
Perceptions of factors associated with the social risk of fish consumption by usage segment.

Item	Total Mean (SD)	Regular Mean (SD)	Light Mean (SD)	Very Light Mean (SD)
Resistance by other members of my household make it hard for me to serve fish as often as I want	2.49(1.73)	2.32(1.64)	2.55(1.74)	2.61(1.80)
Other adults in my household do not like fish	2.35(1.56)	2.17(1.43)	2.44(1.64)	2.45(1.59)
One or more children in my household do not like fish	2.07(1.77)	1.93(1.66)	2.03(1.82)	2.24(1.86)

(6 point scale: 6 = strongly agree to 1 = strongly disagree; respondents were also given a not applicable option)

In line with Verbeke and Vackier (2005) who found that 23.6 percent of family members in their study of Belgian consumers did not want to eat fish, only 27.7 percent of the respondents in this study agreed that resistance by other members of their household makes it hard for them to serve fish as often as they want (Olsen, 2001). Only 21.1 percent of respondents agreed that other adults in their household do not like fish, while pleasingly, less only 22.7 percent agreed that one or more children in their household do not like fish. However, regular fish consumers less "strongly agreed" or "agreed" that other adults in their household do not like fish (10.2%) than either light (15.6%) or very light (15.7%) fish consumers (χ^2 = 6.11, d.f. = 2, $p<0.05$). Hence, social risks arising from the negative influence of household members act to decrease fish consumption in Australia, in particular for lighter fish consumers. Hence, Hypothesis 3 is supported.

4.5 Findings related to the financial risk of fish consumption

To uncover consumers' perceptions regarding the financial risks associated with fish consumption we asked respondents for their level of agreement on a range of statements, as presented in Table 5.

Table 5
Perceptions of factors associated with the financial risk of fish consumption by usage segment.

Item	Total Mean (SD)	Regular Mean (SD)	Light Mean (SD)	Very Light Mean (SD)
I compare prices of products to ensure I receive the best value for money	4.57(0.94)	4.63(0.96)	4.58(0.96)	4.48(0.97)
I would be influenced to purchase fish if there was a special price promotion on fish at the store	3.76(1.32)	3.78(1.32)	3.73(1.40)	3.76(1.25)
Fish is an inexpensive meal option	3.44(1.24)	3.42(1.29)	3.49(1.22)	3.42(1.21)

(6 point scale: 6 = strongly agree to 1 = strongly disagree)

In line with European studies, the majority of respondents consider fish to be a relatively expensive meal option, with less than half of the respondents (47.5%) agreeing with the statement "fish is an inexpensive meal option" (Brunso et al., 2009). The vast majority of respondents (90.9%) appear to be price sensitive with most agreeing that they compare prices of products to ensure they receive the best value for money. Moreover, approximately two-thirds of respondents (63.4%) agreed that if there was a special price promotion on fish at the store, it would influence them to serve fish. While fish is perceived to be an expensive meal option and this may influence overall consumption in Australia, no differences were found across usage segments with respect to financial risk associated with fish consumption, and hence, Hypothesis 4 is not supported.

4.6 Findings related to the physical risk of fish consumption

Another potential barrier to fish consumption relates to consumers' perceptions about the safety of fish, including concerns about spoilage, contaminants, additives and hygienic handling. To explore these perceptions we drew from the work of various researchers (e.g., Fischer & Frewer, 2009; Olsen, 2003; Vanhonacker et al., 2010; Verbeke & Vackier, 2005) and asked respondents to indicate their level of agreement about the perceived safety of consuming fish (Table 7).

Table 7
Perceptions of factors associated with the physical risk of fish consumption by usage segment.

Item	Total Mean (SD)	Regular Mean (SD)	Light Mean (SD)	Very Light Mean (SD)
Eating fish is safe	4.42(0.82)	4.53(0.80)	4.36(0.80)	4.36(0.86)
I am concerned about high mercury levels in fish	4.02(1.18)	4.07(1.31)	4.09(1.11)	3.91(1.12)
I am concerned about possible contaminants in fish	3.90(1.10)	3.93(1.21)	3.95(1.02)	3.83(1.05)
I am concerned that fish may not have been handled in a hygienic way	3.67(1.08)	3.70(1.14)	3.66(1.07)	3.66(1.03)
I am concerned that the fish may have been treated with hormones and/or antibiotics	3.67(1.17)	3.68(1.27)	3.72(1.09)	3.61(1.14)
Eating fish is risky	2.95(0.95)	2.85(0.94)	3.00(0.98)	2.99(0.92)
It is unwise to eat fish	1.76(1.02)	1.64(0.10)	1.77(1.02)	1.87(1.04)
Someone in my household is allergic to fish	1.59(1.33)	1.48(1.25)	1.51(1.31)	1.76(1.40)

(6 point scale: 6 = strongly agree to 1 = strongly disagree)
*sig at <0.05

The majority of respondents (90.3%) agreed that eating fish is safe. Regular fish consumers more "strongly agreed" or "agreed" that eating fish is safe (51.3%) than either light (39.9%) or very light (41.0%) fish consumers ($F(2,896) = 4.31$, $p<0.01$). Only 23.5 percent of respondents agreed that eating fish is risky, with only six percent agreeing that is it unwise to eat fish. Regular fish consumers more "strongly disagreed" or "disagreed" that is unwise to eat fish (83.1%) than either light (78.2%) or very light (73.0%) fish consumers $F(2,896) = 3.89$, $p<0.02$). Only 9.3 percent of respondents agreed that someone in their household is allergic to fish. Very light fish consumers less "strongly disagreed" or "disagreed" that someone in their household is allergic to fish (62.9%) than either regular (71.3%) or light (70.8%) fish consumers ($\chi^2 = 9.12$, d.f. = 2, $p<0.01$). With respect to contaminants and additives, 70.1 percent of respondents agreed they are concerned about high mercury levels in fish. More than two-thirds of respondents (68%) agreed that they are concerned about possible contaminants in fish. Over half of the respondents (59.4%) agreed that they are

concerned that fish may not have been handled in a hygienic way. Just over half of the respondents (55.2%) agreed that they are concerned that the fish may have been treated with hormones and/or antibiotics. Hence, regular fish consumers in Australia are less likely than lighter fish consumers to perceive physical risk associated with fish consumption, and thus Hypothesis 5 is supported.

5. Implications, limitations and future research

The findings reveal that perceptions of functional, psychological, social, financial and physical risk create barriers to fish consumption in Australia, and with the exception of financial risk, perceptions of risk vary across usage segments. Fish consumers may use three key strategies (risk relievers) to reduce the perceived risks associated with fish consumption (Angulo & Gil, 2007). First, they may purchase a familiar, trusted and well-known product or brand (Campbell & Goldstein, 2001; Lobb et al., 2007). Second, they may seek out trustworthy and useful information on less familiar product offerings (Pieniak, Verbeke, Vermeir, Brunsø, & Olsen, 2007b; Taylor, 1974). Third, they may be prepared to for pay for assurances of quality and country of origin (Angulo & Gil, 2007; Dimara & Skuras, 2003).

When faced with high perceived risk or product incongruity, consumers tend to demonstrate a preference for the norm; that is, favour familiar products over less familiar products (Campbell & Goldstein, 2001). Indeed, previous fish consumption studies have argued that Australian consumers hold strong preferences for Australian fish and for a particular species of fish, and prefer to purchase and serve fish with which they are familiar (Fisheries Research & Development Corporation, 2006). Moreover, the lack of ability to rely upon search characteristics and sensory qualities such as smell and touch when selecting fish in modern retail settings has meant that consumers now have to rely more heavily on extrinsic cues and credence characteristics in which they are required to place their trust in producers and retailers to provide accurate information and handle the fish in ways that minimise potential hazards (Cho & Lee, 2006; Lobb et al., 2007; Pieniak et al., 2007b). Consumers use extrinsic cues such as price, outlets, origin, packaging, labelling, branding, and nutritional information to assist them to evaluate perceptions of fish quality and reduce perceived risk (Brunso et al., 2009; Nielsen et al., 2002; Trondsen et al., 2003). Dimara and Skuras (2003) argue that issues related to certification, region of production and traceability are important quality cues with consumers being interested in purchasing both products assured to be of high quality and authenticity. The challenge for the Australian fishing industry is to build consumer trust and reduce the perceived level of risk associated with fish purchasing and consumption. Strategies for reducing the perceived risks of fish consumption include improving

knowledge and confidence through consumer education, providing trustworthy and sufficient information, and providing safety, quality and country of origin assurances (Fischer & Frewer, 2009).

This study focussed primarily on investigating drivers and barriers to fish consumption in Australia, with the focus of this paper being on perceived risks of fish consumption. Future research could investigate more fully strategies that consumers use to reduce perceived risks associated with fish consumption to provide clearer insights into how fish consumption could be stimulated. Moreover, future studies could involve comparative studies including other western countries.

6. Conclusion

Australian consumers perceive a number of risks associated with fish consumption including functional, psychological, social, financial and physical risks. These risks arise from a lack of familiarity, knowledge and confidence in selecting, storing and preparing fish as well as the negative influence of household members over fish consumption, unpleasant sensory qualities associated with fish, and concerns regarding the safety of fish. These risks vary across usage segments with regular fish consumers perceiving fewer barriers to fish consumption than lighter fish consumers. In an attempt to reduce the level of perceived risk, consumers may prefer familiar over unfamiliar fish products, seek out trustworthy and accurate information, or be willing to pay for assurances of quality and origin. The challenge for the Australian fishing industry is to seek to reduce the perceived risk of fish consumption by educating consumers on how to select, store and prepare fish and providing Australian consumers with sufficient, trustworthy and valuable information and assurances at the point of sale and on fish packaging.

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