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Theory of planned behavior applied to fish consumption in modern Metropolitan Lima

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Abstract

Despite being an important source of protein, fish consumption in Peru is low compared with other coastal countries. Thus, the objective of this study is to identify the core determinants of such consumption. We based our analysis on the framework provided by the Theory of Planned Behavior (TPB) proposed by where attitudes, subjective norms, past experience and health involvement determine the intention and frequency of fish consumption. Primary data were gathered through 159 consumers of fish in modern Metropolitan Lima between August and October 2015. From a set of likert scale indicators a structural model was specified to evaluate the relationships given by the theoretical framework of the TPB. The results showed that the intention to eat fish is determined by personal attitudes, norms and past experience, and as expected, intention itself causes the frequency of fish consumption. Nonetheless, although consumers' interest in healthy eating was shown to positively influence fish consumption behavior by theory, Metropolitan Lima fish consumers seem to be not concerned by positive health attributes related to fish consumption. These results may have important implications on production decisions, sales and marketing for the promotion of fish in Lima as a means of economic development.

Keywords: Theory of Planned Behavior (TPB); fish consumption; Lima; Peru.

Practical Application: Decision support for policy makers regarding fish consumption preferences in Modern Metropolitan Lima based on the TPB.

1 Introduction

For many cultures, fish consumption is an integral part of daily life as a source of protein (Burger et al., 2003) and other nutrients (Can et al., 2015; McManus et al., 2014). Fish is also considered an alternative source of protein to more traditional sources (Aberoumand, 2014). Because of the country's coastal connectivity, the Peruvian domestic fish market is largely dominated by fresh fish, which covers approximately 30% of the national market (Del Carpio & Vila, 2010) and is the fresh sector representative of more than 50% of total fish consumption compared to processed fish (Fréon et al., 2014). The Peruvian fisheries sector provides more revenue and jobs than the indirect human consumption industry. Currently, fisheries provide a conservative estimate of 232,000 jobs, 35% of which are in restaurants (Christensen et al., 2014). The number of restaurants in Lima increased by 5.7% from 2009 to 2010, while approximately 7% of the new restaurants were *cevicherias* (Proexpansión, 2011).

Even though Lima is a coastal city, its fish consumption remains low, a counterintuitive phenomenon that has been observed in other coastal regions of the world (Can et al., 2015). Actual Peruvian fish consumption generally does not even come close to the recommendation to eat fish twice per week (Birch et al., 2012; Verbeke et al., 2007), as do 75% of Spanish consumers (Pieniak et al., 2011; Can et al., 2015). Annual per capita edible fish consumption in Peru was estimated to be 11.2 kg (up to 22.5 kg in whole fish equivalents) in 2011 (Instituto Nacional de Estadística e Informática, 2012; Avadí & Fréon, 2015), which is just above the average per capita European whole fish consumption of 20.5 kg (Verbeke & Vackier, 2005). The low frequency of fish consumption in Peru could be due to different barriers, including supply-related obstacles such as the lack of a cold chain (Halwart et al., 2007), logistical operations, and sub-optimal sanitary conditions (Fréon et al., 2014). Additionally, individuals may be averse to consuming fish because of a perceived difficulty in buying, preparing and cooking fish (Mitterer-Daltoé et al., 2013), the belief that it is expensive (Verbeke & Vackier, 2005), the unpleasant physical properties of some varieties of fish such as the bones and the smell (Olsen, 2004), or even a simple lack of habit (McManus et al., 2014; Mitterer-Daltoé et al., 2013; Leek et al., 2000).

Different factors beyond sensorial characteristics influence consumer food choices, and the elucidation of these factors would contribute to a better understanding of dietary behavior (Carrillo et al., 2011). Among them, just to acknowledge a few, we may mention past experiences and health concerns related to fish consumption. It is possible that those who currently eat fish perceived related past experiences more positively than those who do not (Mitterer-Daltoé et al., 2013), causing a higher fish-eating intention and, thus, consumption frequency. Likewise, consumers characterized by a healthy lifestyle will be prone to healthy diets (Brouwer & Mosack, 2015) composed of fish.

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Among other factors, we should mention the work by Lennernäs et al. (1997) which highlights the roles of quality/freshness, price, taste, healthy choices and family preferences, while Drewnowski & Darmon (2005) consider the effects of taste, convenience and economic constraints on food choices (O'Neill et al., 2014). In this regard, the identification of the principal factors considered by fish consumers would allow for establishing relationships between the frequency of fish-eating purchase behavior and attitudes in terms of explaining the intention and frequency of eating fish. Many different models, which take different and often interrelated factors into account, have been proposed to explain consumer behavior towards fish (Mitterer-Daltoé et al., 2013; Verbeke & Vackier, 2005). The Theory of Planned Behavior (TPB) is one of the most commonly used to explain the variance in behavior (Verbeke & Vackier, 2005; Scholderer & Grunert, 2001; Ajzen, 1991). Given that fish represent an important source of protein and other nutrients (Can et al., 2015; McManus et al., 2014), it is critical to understand the principal factors driving coastal Peruvian fish consumer behaviors such as intention and consumption frequency. Thus, the primary objective of this research is to investigate consumer behavior in Lima, Peru, using the TPB as a conceptual framework.

2 Materials and methods

Metropolitan Lima, the fifth most populated city in Latin America, was chosen as the study site of this research. Modern Lima presents predominately the socio-economic levels A and B (Ipsos Apoyo, 2011). A choice-based sampling was used because this approach precludes making more general inferences about a larger population (Thompson & Kidwell, 1998), especially with unknown fish consumer population weights. Primary data were gathered between August and October 2015 at the study site. Fish consumers were interviewed randomly at the supermarkets and fresh markets in Modern Metropolitan Lima. The structured questionnaire involved 159 consumers who eat fish. The minimum sample size for this study was calculated according to the following assumptions: Expected fish consumption rate of 31% obtained from the Perú (2016); Modern Metropolitan Lima population extracted from Instituto Nacional de Estadística e Informática (2014); sampling error of 5%; and 95% confidence interval (Can et al., 2015). Questions are addressed to fish consumers only, therefore our empirical model implicitly assumes that non-fish consumers are missing at random (MAR) i.e. that heterogeneity in fish consumption frequency is explained by the set of included covariates.

Topics in the survey's questionnaire were based on the main factors that compel fish consumers to determine their intentions and frequency of fish consumption based on the TPB. Research on the TPB has made considerable progress since the theory was introduced more than two decades ago (Ajzen, 2011). Despite the fact that the TPB became one of the most frequently cited and influential models for the prediction of human social behavior, the TPB has also been the target of much criticism and debate. Some researchers reject it outright as an inadequate explanation of human social behavior (Ajzen, 2011). Most critics, however, accept the theory's basic reasoned action assumptions but question its sufficiency or inquire into its limiting conditions (Fishbein & Ajzen, 2011).

From Ajzen's (2008, p. 537) perspective, it may be deducted that "the intention to adopt a certain course of action logically precedes actual performance of the behavior". Thus, it seems that intentions could be seen as a mediator between attitudes and actions. Specifically, according to Ajzen (1991), the intention to perform behavior together with perceptions of behavioral control accounts for a major part of the variance in behavior. The TPB assumes that these behavioral intentions capture the motivational influences on behavior. Intention is thus seen as the most proximal predictor of behavior. Behavioral intention, in turn, is seen as a function of attitudes, subjective norms and perceived behavioral control related to that specific behavior (Ajzen, 1991). The perceived behavioral control, attitudes and subjective norms will predict intentions (Brouwer & Mosack, 2015). However, some question the degree to which the primary components of the TPB (i.e., attitudes, subjective norms, perceived behavioral control) sufficiently explain intention and behavior because the level of prediction for intention varies quite dramatically (Rise et al., 2010). Ajzen (2011) said that intentions may be determined not only by attitudes, norms and perceived control but also by one or more added variables, and these added variables were captured, at least in part, by measures of past behavior (Mitterer-Daltoé et al., 2013) and health (Tudoran et al., 2009).

In our study, a structural equation model is specified to operationalize and test the causal links posited by the proposed theoretical model, the TBP. From this framework, three main constructs were retained: attitudes, subjective norms and past experience (Mitterer-Daltoé et al., 2013). Attitude towards the behavior entails a consideration of the outcomes of performing the behavior, while subjective or social norms refer to the perceived social pressure to perform or not such behavior (Ajzen, 1991). Finally, behavioral control is assumed to reflect past experiences as well as anticipated difficulties or facilitating conditions (Vermeir & Verbeke, 2008). Our model also included a health construct as it could explain a substantial amount of variance in the fish purchasing intention, according to Tudoran et al. (2009). Furthermore, it could explain a large part of the variance in respondent behaviors (Conner & Armitage, 1998; Verbeke & Vackier, 2005) as in Uruguay and Brazil. In Uruguay, Ares & Gámbaro (2008) scored the health-related factors of "feeling good and safe", "health" and "nutrient content" as the most important motives underlying consumer food choices. In Brazil, Mitterer-Daltoé et al. (2013) explored the perception of healthiness as a contributor to understanding the main factors underlying fish consumption. The questions of our study related to the TPB and fish consumption behavior were based on Verbeke & Vackier (2005), Mitterer-Daltoé et al. (2013) and Carrillo et al. (2011) (Table 1). Table 1 shows the dimensions and measures used for the operationalization of the studied structural model.

All of the measurements in the TPB questionnaire were recorded in the same direction so that a high score meant a positive attitude, subjective norm or past experience (Mitterer-Daltoé et al., 2013). The study uses a Likert scale questionnaire ranging from 1 (Strongly disagree) to 5 (Strongly agree) to measure the perceptions

of fish, except for the behavior variable "how frequently do you eat fish?", which was measured on the binary scale "monthly or more" or "weekly" basis. The scales (questions) were obtained from the relevant literature in English language and were then translated to Spanish. Two bilingual professionals, one in the linguistic field and the other an expert on fish issues, cooperated on the back translation of this study. TPB construct reliability was tested by Cronbach's alpha. The analysis was performed using Mplus software (Muthén & Muthén, 2007).

Table 2 summarizes household demographic characteristics (such as age, number of children, family members, among others) by consumption frequency (weekly and monthly or more).

This model is specified with a dichotomous dependent variable representing the fish consumer's final choice in terms of consumption frequency. The consumption frequency dependent variable takes values of 1 and 0 indicating 'weekly' consumption or 'monthly or less frequently', respectively. Thus, consumption frequency is first explained by a set of demographic factors or

Table 1. Constructs and items used in the model and Cronbach's alpha coefficient (α).

Dimension	Items	Definition	Origin of the scales
Subjective Norms (α = 0.70)	My mate/close friend thinks that I should eat/buy fish I buy fish to prepare healthy food for my family I buy fish to prepare nutritious food for my family I buy fish to prepare a wide range of food for my family	Refers to the social pressure perceived by an individual to show a specific behavior (Verbeke & Vackier, 2005).	Verbeke & Vackier (2005).
Attitude (α = 0.68)	Eating fish is healthy Eating fish is safe Eating fish is nutritious Fish has good taste I'm very satisfy with a menu that includes fish I really enjoy eating fish I prefer a dish that includes fish, rather than a one that does not	Refers to the degree in which a person has a favorable or unfavorable evaluation of the behavior (Verbeke & Vackier, 2005).	Verbeke & Vackier (2005).
Past Experience (α = 0.85)	I'm familiarized with fish consumption I have great knowledge about fish I'm well informed about fish Eating fish is part of my eating habits Eating fish is familiar for me I eat fish since I was a child	Refers to the way of anticipating difficulties or facilitating conditions that influence on the behavior (Verbeke & Vackier, 2005).	Verbeke & Vackier (2005).
Health (α = 0.75)	Fish has several vitamins and minerals I know fish is healthy for me Fish consumption stimulates the brain development Eating fish helps you to live more years Fish contains several proteins Fish is good for my skin/teeth/hair/nails, etc.	Refers to the inherent role of the diet in the well-being of the person. To understand consumer behavior and be capable of providing food that contributes to well-being, studies about the role of health in the diet is necessary (Carrillo et al., 2011, p. 792), Ragaert et al. (2004, p. 265).	Carrillo et al. (2011). Ragaert et al. (2004).
Intention to eat fish (α = 0.80)	There's a high probability that I will eat fish in the following two weeks I'm planning on eating fish in the following two weeks My willingness to eat fish is high (I want to eat fish)	Indicate the willingness of people to perform a behavior. In other words, to what extent they are planning to make an effort with the aim of performing a behavior (Ajzen, 1991).	Verbeke & Vackier (2005). Ajzen (1991).

Table 2. Descriptive statistics of socio-economic variables.

Consumption frequency	Monthly or more		Weekly		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Price *	0.18	0.39	0.24	0.43	0.23	0.42
Age	40.41	15.48	43.63	15.36	42.74	15.41
Number of children	1.36	1.24	1.52	1.27	1.48	1.26
Family members	3.91	1.2	3.73	1.37	3.78	1.32
High level education (1)	0.48	0.51	0.47	0.5	0.47	0.5
District (High level = 1)	0.64	0.49	0.56	0.5	0.58	0.5
Sex (Male = 1)	0.3	0.46	0.2	0.4	0.23	0.42
Education (years)	14.05	425	13.97	4.07	13.99	4.11
N	44		115		159	

* Very expensive was scaled to 1 and very cheap was scaled to 5. We converted this variable in a dummy variable to be inserted in the model.

socio-economic factors (Al-Mazrooei et al., 2003) as specified in Table 2.

3 Results and discussion

Lennernäs et al. (1997) found that respondents in different socio-economic categories select different factors as contributing a large portion of influence on their food choices. Therefore, demographic and socio-economic factor characteristics were used as control variables on the Peruvian frequency of fish consumption by means of a probit model where the dependent variable is fish consumption frequency either low or high (Al-Mazrooei et al., 2003). The estimated probit model is presented below (Table 3).

It was expected, for instance, that education or income level (proxied by a district dummy on the assumption that household incomes will be reasonably homogeneous within small enough residential areas (Hanley & Morgan, 2008)) would have a positive effect on fish consumption (Can et al., 2015). Nonetheless, socio-economic variables did not fit well in the probit model. R-squared was 3.6% and none of the variables were significant in the frequency of fish consumption at a 10% significance level (Table 3).

Given that socio-economic characteristics did not have a significant relation to consumption frequency- which does not mean we are neglecting the fact that there is certain effect on the fish consumption-, a more general and conceptual framework was required to explain such fish consumption behavior. Thus, a 'health' construct along with the ones suggested by the TPB as determinants of fish consumption frequency were added to the model. According to the latest studies on food and food-related issues, product healthiness is one of the key factors of consumer perceptions (Niva, 2007).

The TPB appraises behavior as a composite of three constructs: attitude, subjective norms and perceived behavioral control (including statements of facilitating conditions and past experience) (Ajzen, 1991). The TPB was chosen as the theoretical framework by several applied studies (Arvola et al., 2008). For instance, this theory has been extensively and successfully applied to consumer behaviors (Conner & Sparks, 2005), health behaviors (Godin & Kok, 1996), food choices (Arvola et al., 2008) and the variance in fish consumption behavior in countries with a high consumption of fish (Mitterer-Daltoé et al., 2013). A study based on the TPB applied in Brazil, a developing country, validated the theoretical model (Mitterer-Daltoé et al., 2013). Given Brazil's proximity to Peru and the validity of the model in a similar context, the present study seeks to explore the predictive value of each construct in explaining consumer intentions to purchase sustainable food products. The structural relations are represented in the figure below (see Figure 1).

Attitudes are suggested to be one of the main determinants of food consumption behavior, including seafood (Olsen, 2004). Attitudes have been defined as mental states, learned predispositions, psychological tendencies or evaluative

Table 3. Probit model for socio-economic characteristics on the Peruvian frequency of fish consumption.

Variables	Coefficient	Robust Std. Error	Z	Significance
Consumption frequency				
Price (Very expensive = 1)	0.17	0.27	0.65	N.S.
Age	0.01	0.01	0.56	N.S.
Number of children	0.03	0.12	0.29	N.S.
Family members	–0.07	0.85	–0.79	N.S.
High level education (1)	–0.04	0.22	–0.17	N.S.
District (High level = 1)	–0.18	0.22	–0.81	N.S.
Sex (Male = 1)	0.14	0.34	0.41	N.S.
Education (years)	0.54	0.59	0.90	N.S.

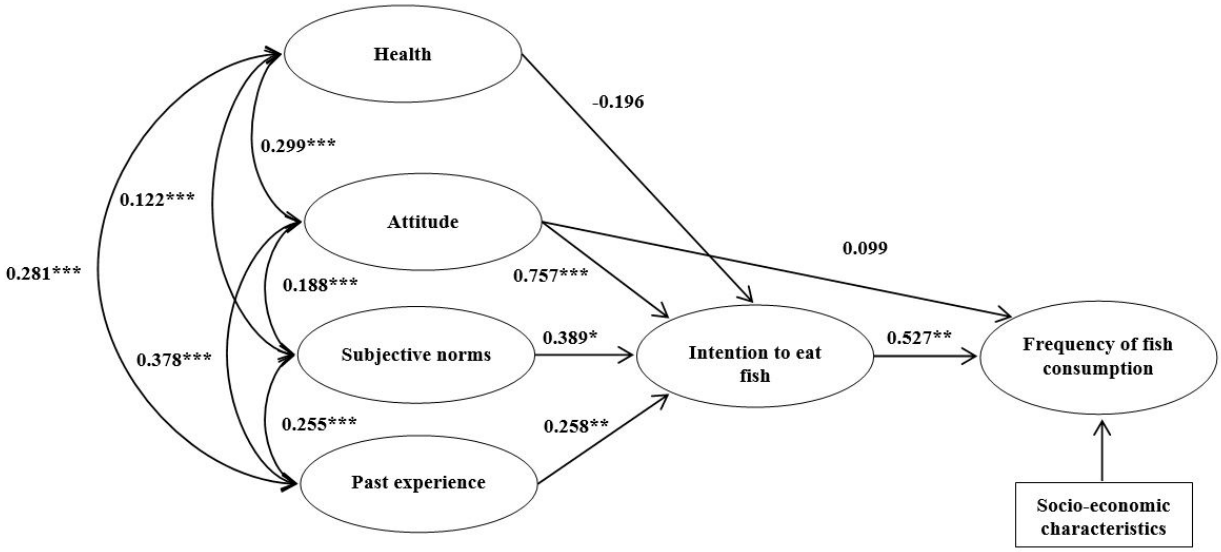

Figure 1. TPB applied to fish consumption in modern Metropolitan Lima (Mitterer-Daltoé et al., 2013). *** p < 0.01; ** p < 0.05; *p < 0.10; Chi-Square test of model fit p-value = 0.00. Frequency of fish consumption (equation) R-squared = 29.5%. Elaborated by the authors.

judgements about objects, which guide behavior towards those objects (Tudoran et al., 2009). Social norms are often defined and measured as perceived social pressure or expectations from people in general (subjective norms) of form-specific groups or individuals (Olsen, 2004). Mitterer-Daltoé et al. (2013) determined that habit as a variable measure of past experience was an important discriminating variable and a good explanatory construct to explain fish consumption. Thus, past experience may be included as a substantive predictor of subsequent behavior because its power relies on the belief that past behavior was a reasoned action (Vermeir & Verbeke, 2008).

Our TPB-based model (Figure 1) can be best described as a Structural Equation Model which is estimated by Generalized Least Squares under the assumption of (conditional) multivariate normality of the ordinal indicators (see Muthén & Satorra, 1995 and Muthén, 2004 for further details). The main equation of interest that relates fish consumption to its TPB and socio-economic determinants exhibits an R-squared of 29.5% which shows the share of explained variance for qualitative dependent variable models (Amemiya, 1981), while the single probit model (Table 3) only achieved 3.6%. The proposed SEM, which includes the traditional constructs defined by the TPB, pretends to be enhanced by the inclusion of 'Health involvement'. According to the latest studies on food related issues, product healthiness is one of the key factors in consumer perceptions (Olsen, 2003; Niva, 2007; Pieniak et al., 2008). Further, consumers' interest in healthy eating was shown to positively influence fish consumption behavior, which confirms previous studies (Olsen, 2003; Verbeke & Vackier, 2005). For instance, Pieniak et al. (2010) found that the association between the belief that eating fish is healthy and fish consumption frequency was weaker than might expected among European consumers. Hall & Amberg (2013) argued that the hypothesis of the relationship between the belief that seafood is healthy would correspond to higher levels of seafood consumption was largely unsupported. Our outcome showed that the belief that fish is healthy was not significant as a predictor of the intention to eat fish ($\beta = -0.196$) which suggests that Modern Metropolitan Lima fish consumers are not concerned by fish healthy attributes. The lack of a statistically significant relation between health involvement and fish consumption frequency was also verified by Mitterer-Daltoé et al. (2013). Olsen (2003) stated that because of the fact that almost all consumers agree that fish is healthy, the perceived health-value associated with fish products does not seem to explain the variation in fish consumption. This lack of 'variability' would explain why the health factor did not influence the intention to eat fish in our model. Moreover, Foxall et al. (1998) proved that involvement in healthy eating is not always a main reason for purchasing fish when compared with taste or distaste. Additionally, some people who are motivated to healthy eating choose chicken and other nutritional food as alternatives to seafood (Olsen, 2004).

Attitude, subjective norm and past experience presented statistically significant conditional correlations with intention to eat fish (Mitterer-Daltoé et al., 2013), suggesting that they may be explained by common unobserved characteristics. The-estimation showed that personal attitudes ($p < 0.01$), subjective norms ($p < 0.10$) and past experience variables ($p < 0.05$) were statistically significant explanatory factors of the intention to eat fish (Figure 1). Nonetheless, attitude was not statistically significant to explain fish consumption frequency ($p > 0.10$).

As expected, intention to eat fish is a significant explanatory factor of a higher frequency of fish consumption. Thus, our results verify that the immediate antecedent of the fish consumption behavior is the intention to perform such behavior (Tudoran et al., 2009; Fishbein & Ajzen, 1975). Intention represents a willful state of choice where one makes a self-implicated statement as to a future course of action. Intention is the most immediate determinant of behavior and, implicitly, the most direct predictor of engaging in that behavior (Tudoran et al., 2009). As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance (Vermeir & Verbeke, 2008). The latter is verified by the the positive relation between consumption intention ($p < 0.05$) and the frequency of fish consumption.

To stimulate the habit of consuming fish, a strategic solution is to make good quality fish products available that are convenient and better suited to modern consumer demands (Mitterer-Daltoé et al., 2013). Currently, the Peruvian gastronomy boom allows new products to be incorporated into a social marketing campaign that could be broadcasted by famous chefs to lead attempts to persuade consumers to include more fish in their diets. These actions help arouse the intention of eating fish in modern Metropolitan Lima fish consumers.

4 Conclusions

Although Lima is a coastal city with easy access to high-quality seafood products, its fish consumption is very low. Thus, this paper investigates fish consumers behavior in Peru, more specifically in modern Metropolitan Lima from the TBP conceptual framework. Our findings suggest that personal attitudes, norms and past experience positively influence the intention to eat fish, where the latter determines the frequency of fish consumption. On the contrary, even though consumers' interest in healthy eating was shown to positively influence fish consumption behavior theoretically, Metropolitan Lima fish consumers seem to be not concerned by positive health attributes related to fish consumption. Finally, it is shown that socio-economic factors have little explanatory power when predicting fish consumption frequency, making the TPB a most reliable approach for explaining fish consumption frequency. The high relevance of the TPB also suggests a high potential of marketing campaigns that aim to influence consumer behavior. For instance, taking advantage of the current Peruvian cuisine boom, new high-quality products that are convenient and better suited to modern Metropolitan Lima consumer demands can be incorporated into a social marketing campaign to persuade consumers to include more fish in their diets.

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