Title

Hybrid surveys; a method for the effective use of open-ended questions in quantitative surveys

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Unstructured Abstract

Surveys could become more valid by systematically combining predetermined questions (PDQ) with open-ended questions (OEQ). This study was based on a survey of Japanese consumers, focusing on seafood quality (n=200). The real-life relevance of PDQ items was challenged based on the frequencies of OEQ. The colour, overall freshness and price issues are the most important factors consumers consider when evaluating the quality of packed mackerel fillets in real-life. The use of hybrid surveys led to increased validity of this study by allowing the rejection of PDQ items that would otherwise dilute the accuracy of the results.

Structured Abstract

Background: Traditional surveys are based on predetermined questions (PDQ) and are mainly used in hypothesis testing. In order to validate such a battery of items, an open-ended question (OEQ), probing for additional factors is sometimes added at the end of the survey. Due to participant fatigue and the openness of the question, answers might be less reliable or skipped by the respondents. This approach could become more efficient and dynamic by systematically combining, comparing and analysing PDQ with OEQs in hybrid surveys.

Scope and approach: This study was based on a survey of Japanese consumers, focusing on seafood quality (n=200). The survey started with three OEQs, asking participants to list the most important factors when evaluating packed mackerel fillets, before 26 PDQ asking participants to assess the importance of different quality dimensions for the same products. The OEQ were grouped based on the PDQ and the answers were counted. The PDQ were rated on 7-point importance scales

Key findings and conclusions: The real-life relevance of PDQ items was challenged based on the frequencies of OEQ. The result revealed that, in fact, the colour, overall freshness and price issues are the most important factors consumers consider in real-life. This study proposed a new approach to designing surveys, examining the use and analysis of hybrid surveys. The use of hybrid surveys led to increased validity of this study by revealing how

consumers think in their daily life and allowed the rejection of PDQ items that would otherwise dilute the accuracy of the results.

Keywords

Title

Hybrid surveys; a method for using open-ended questions in a quantitative survey

Introduction

People's opinions are often more complex than their answers to surveys may reflect (Zaller & Feldman, 1992). Surveys are designed to reduce this complexity and to enable hypothesis testing by using a range of scaled predetermined questions (PDQs). This approach may overlook the possibility that survey participants are primed by PDQs and as such, the survey may introduce ideas that are new to the consumers (Geer 1991). For example, in surveys participants are often requested to imagine certain situations, e.g., that they are just about to evaluate the quality of a specific seafood product in a supermarket. This will usually elicit some factors in a consumer's mind that he or she would normally use to evaluate the product in question. After this instruction, the survey may provide a long list of all conceivable factors that may influence quality in the form of PDQs (see e.g. Bravo, Cordts, Schulze & Spiller, 2013). A number of these factors may be new and unexpected to the consumers, they are nonetheless requested to rate the importance of the factors. This is problematic because there might be a substantial discrepancy between the factors that consumers use in reality and the new factors they are introduced to by the survey instrument. This study explores a more realistic approach by using open-ended questions (OEQs) in combination with PDQs.

Open-Ended questions

Based on scientific articles, reports and qualitative pre-studies one can increase the coverage of most relevant factors of, in this case, fish quality in PDQs. However, when a new product is studied in a new target population, the need for unstructured measurements becomes increasingly apparent in order to obtain valuable consumer insights related to real-life behaviour (Echtner & Ritchie, 1991; Echtner & Ritchie, 1993). This may be even more apparent when conducting research across cultures. Peoples' cultural background has a profound impact on the way people perceive, think, and behave and influences how different constructs are defined and thus also influence product evaluation (Kluckhohn & Kroeberg, 1952; Clark, 1990; van de Vijver & Leung, 1997). Using PDQs in foreign cultural settings can easily lead to missing factors that are important for product evaluation. Nonetheless, few studies use OEQs as a means to ensure the validity of data collected and to explain participants' reactions to situations that are either unknown or impossible for researchers to pre-test (e.g. satisfaction with caesarean section: Porter, Van Teijlingen, Chi Ying Yip & Bhattacharya, 2007). This disinclination for using OEQs may be due to challenges related to participant fatigue, unreliable answers, data handling, time consuming analysis and need for trained personnel to reach objective results (Lawless & Heymann, 2010; Jackson & Trochim, 2002; Li & Yamanishi, 2001). Some argue that studies cannot rely on OEQs because forcing participants to answer to PDQs guarantees the creation of data and therefore results (Gao, Li, Bai & Fu, 2016). Such an approach only guarantees the collection of data that fulfil

predetermined objectives and publication of the results in papers. It does not focus on solving real problems using academic competence. Optimising the use of OEQs is one of the most promising expansions in the field of consumer research and large companies have already started using OEQs in product improvement and development (MacFee, 2016; Deck & Vlaemmick, 2016). Thus, the need for an efficient method for acquiring quantitative results with real-life validity is apparent. This paper contributes in this direction by developing a systematic method for combining, comparing and analysing PDQs with OEQs in hybrid surveys.

Quality in focus

Food quality is a research area that remains relevant due to its established links to consumers' satisfaction and safety (Grunert, 2005; Grunert, Bredahl & Brunsø, 2004). Consumers perceive food quality in an abstract manner and communication of quality often resorts to product characteristics that either represent (extrinsic) or compile (intrinsic) expectations and experiences of food quality (Banović, Grunert, Barreira & Fontes, 2009; Gellynck, Verbeke & Viaene, 2003; Olson & Jacoby, 1972). Because of the perishability of fresh or chilled fish products, quality is of particular importance and may influence consumption and purchase behaviour (Luten, Oehlenschläger & Olafsdottir, 2003; Altintzoglou & Heide, 2016; Verbeke, Vermeir & Brunsø, 2007). Quality becomes increasingly important when fish is transported over long distances in international value chains, for example between Norway and Japan (Engelseth, 2016). The success of this type of food trade largely relies on optimal value chains and in-depth understanding of the target population (Engelseth, Takeno & Alm, 2009; Sone & Nortvedt, 2009; Altintzoglou, Heide, Wien & Honkanen, 2016).

Japanese consumers

Japanese seafood consumption is among the highest in the world and involves a strong focus on quality. It includes traditional and habitual consumption of various species, such as salmon and mackerel from Norway (Nakamoto, 2000; Price & Gislason, 2001; Chern, Kimiko, Kiyoshi & Yuki, 2002; Asche, Guttormsen, Sebulonsen & Sissener, 2005; Seafood Council, 2016). Research has shown high complexity in consumer behaviour related to the choice of fish products in Japan. Despite the commonly accepted intuitive link between price and quality, a study from 1984 showed that price was a very weak indicator of quality for Japanese consumers (Yamada & Ackerman, 1984). On the contrary, price and naturalness were found to be the most important food choice motives in Japan, with strong preferences for familiar and domestic products (Prescott, 1998; Prescott, Young, O'Neill, Yau & Stevens, 2002). These contradictory results indicated a need for particular focus on the function of price as a quality indicator for Japanese consumers.

Food products often carry more information than the country of origin, such as labels about the environmental impact of the production method. Japanese consumers are willing to pay more for seafood products with ecolabels and information about the country of origin compared to unlabelled products (Uchida, Onozaka, Morita & Managi, 2014). Despite interest and willingness to pay for ecolabels, however, Japanese consumers may not use unjustified and fashionable labels that are promoted through the use of sensationalized information. Marine Stewardship Council (MSC) labelling led to no significant premium in Japan, and a positive effect from ecolabels was only present when balanced (not sensationalized) information was used (Loureiro & McCluskey, 2000; Uchida, Roheim, Wakamatsu & Anderson, 2014).

While the impact of the nuclear accident in Fukushima in 2011 has not dramatically increased the direct risk of fatal cancer cases yet (Fisher et al., 2013), it is a major event that is by no means ignored by Japanese society. Therefore, when studying Japanese consumers, one should also take into account their risk perception related to food choice. Consumers use extrinsic cues to minimize the risk and for Japanese consumers, country of origin is a commonly used cue (Kim, 2008). However, a current report indicates that local, non-imported food is still preferred by Japanese consumers (Saito & Saito, 2013). With substantial complexity related to the choice of fish products among Japanese consumers, the need for combining OEQs with PDQs is apparent. Such a hybrid approach was used in this study to reveal the real-life importance of factors consumers use in their evaluation of the quality of packed mackerel fillets.

Methods

This study was based on a sample of Japanese consumers (n=200) recruited by a marketing agency. All participants were responsible for at least 50% of the food purchases in their household.

The participants completed an online survey which started with three OEQs where they were asked to list factors they consider important when evaluating the quality of packed mackerel fillets in a shop or supermarket. This was followed by 26 randomised PDQs which have been predetermined based on a desk study of relevant literature as well as industry reports and interviews with relevant industrial actors in the specific value chain (see results in Figure 1 for a list of these factors) (Altintzoglou & Heide, 2016; Andersen, 2014). The PDQs were rated on 7-point importance scales, from 1 = Not at all important to 7 = Extremely important.

The analysis of the PDQ items was performed using non-parametric tests. Wilcoxon and Kruskal-Wallis tests were used to determine significant rank differences. The analysis of OEQs was done by grouping the input from the participants based on the PDQs. The grouped answers were counted and compared to the matching PDQs. The importance and validity of the PDQs was evaluated based on the respective rank and the count obtained in OEQs.

Sample

The participants had an average age of 44 years old and were balanced among age groups (Table 1) and between the genders. Most participants were married, while about a third of them were single. The average number of children in the household was 0.5 with an average age of seven and a half years. The sample was balanced among metropolitan, medium urban and rural areas, while it was overrepresented by the seaside locations to reflect the distribution of the population in Japan.

Table 1. Social and demographic characteristics.

	n	200
	Mean age	44
Age categories (%)		
	20-29	18
	30-39	22
	40-49	26
	50-59	22

	60-64	12
Gender (%)		
	Male	50
	Female	50
Marital status (%)		
	Married	54
	Cohabiting with a partner	3
	Single	34,5
	Divorced	6.5
	Widowed	0.5
	Prefer not to answer	1.5
	Number* of Children below 18 living in household	0.5
	Age* of youngest child	7.4
Origin type (%)		
	Metropolitan area	36
	Medium urban area	32
	Rural area	32
	Seaside	89
	Inland	11

* mean; % indicates percentages within characteristic.

Most participants were educated at university level, while most of the remaining participants had completed two years of college or high school education (Table 2). Half of the participants were employed in a full time work, while a quarter was occupied with housekeeping. The most common employment type was clerical work and income was balanced within the sample.

Table 2. Education and employment characteristics.

Highest completed education (%)		
	Elementary/junior high school	3
	High school	26.5
	2 y college/vocational school	24
	4 y university	40
	Graduate school or higher	5.5
	Prefer not to answer	1
Employment status (%)		
	Full time work	49.5
	Part time work	16.5
	Homemaker	24
	Student	0.5
	Retired	1.5
	Not working	6
	Prefer not to answer	2
Employment type (%)		

Executive/Senior manager	6.1
Professional	7.6
Middle manager	8.3
Clerical worker	34.8
Engineer	10.6
Salesperson	10.6
Manual worker/Physical labour	18.9
Prefer not to answer	3
Income (%)	
<2 million yen	11.5
2 - 2.99 million yen	12.5
3 - 3.99 million yen	13.5
4 - 4.99 million yen	14.5
5 - 6.99 million yen	18.5
7 - 9.99 million yen	10
>10 million yen	8
Prefer not to answer	11.5

% indicates percentages within characteristic.

Results

The standard ranking analysis (Figure 1) of all the PDQ items revealed the highest importance for the factor freshness ($z=4.74$; $p<0.001$). A large number of factors followed on second rank of importance, with the non-significant order: good quality, no fillet gaping, colour of the fillet, expected taste, shininess of the fillet, no leakage (in the package), shininess of the skin, skin colour, low price, good value for money, not from a polluted area, it doesn't smell, country of origin, easy to prepare, clean fish belly, positive health effects, no blood in the fillet, that it is from Japan, and skin pattern. The next three stages in ranking included salt content ($z=2.57$; $p=0.010$), sustainably sourced ($z=2.53$; 0.011) high price and that it is from Norway ($z=3.33$; $p=0.001$) and in the last rank that the fillet has the fin on and attractive packaging ($z=2.01$; $p=0.045$).

The content analysis of the OEQs showed frequencies that largely differed from the ranking analysis of the PDQs (also in Figure 1). The colour of the filet was the factor the participants reported most frequently as a cue to evaluate the quality of packed mackerel fillets in a shop. Colour was followed by freshness, low price and good value for money. Factors such as no fillet gaping, no leakage, country of origin, shininess of the fillet and skin colour were mentioned less frequently. The rest of the factors were rarely reported by the participants.
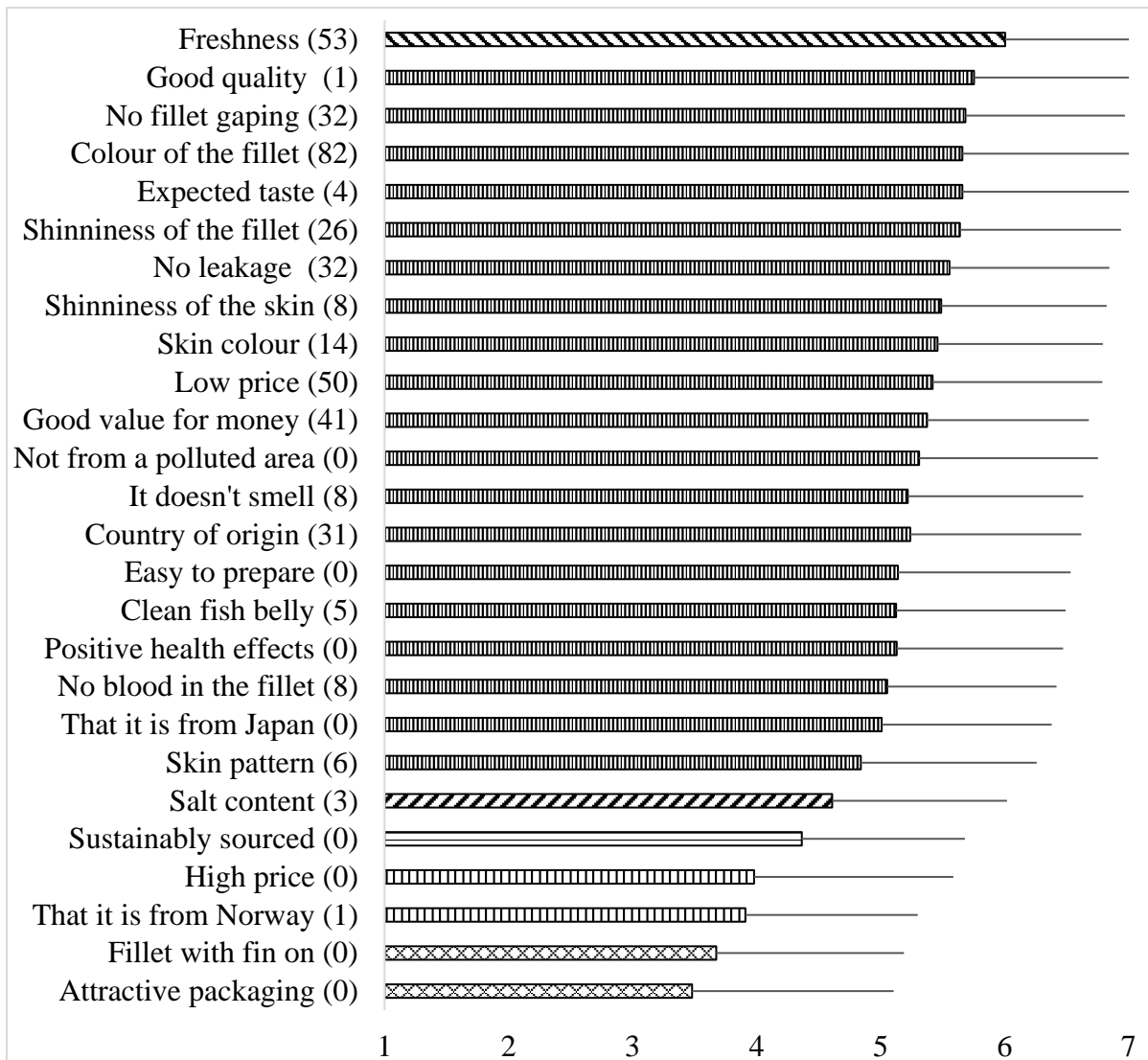
Figure 1. Mean rank of importance of PDQ factors and OEQ frequency scores (in brackets) used for evaluating the quality of packed mackerel fillets by consumers in Japan with. 7-point importance scale from 1=Not at all important to 7=Extremely important. Change in bar colour pattern indicates the significant changes in the rank order.

Discussion

The results based on the PDQs and QEOs combined show that Japanese consumers consider the colour of the fillet, the overall freshness and the price when they evaluate the quality of packed mackerel fillets. This conclusion would not have been reached, if the analysis of the data and the interpretation of the results had been based on the PDQs or OEQs alone. This study challenged the relevance of the PDQ items based on the frequencies obtained in the OEQs. The result revealed that, in fact, few of the factors included in the PDQs were important and valid for Japanese consumers when they evaluated the quality of packed mackerel fillets in their daily life. This increased validity was particularly important due to the cultural context of studying a different country.

Good quality was one of the highest rated PDQ factors. It was included in PDQs to ensure coverage of vague general factors for consumers who express themselves in that manner. However, the usefulness of this information regarding the evaluation of the quality of food products is limited. The OEQ counts revealed that good quality was a factor that was rarely considered by the participants. On the contrary, freshness, an equally undefinable descriptor of quality, was ranked highest as PDQs and found among the most frequently reported factors in OEQs. This result indicated high relevance and usability of this factor for communication towards consumers. However, the factor freshness is vague and cannot be objectively defined to satisfy all consumers. Is it based on the production date? Is it based on asking at the counter? General appearance as a sum of various quality characteristics? Or is it the opposite of frozen and thawed? A way to define freshness aiming at a universal consensus is an ambitious aim that could be the focus of future research.

Price was included in PDQs because it can be used by the consumers as an indication of quality when they do not have access to evaluate the product or have little knowledge with which to evaluate quality otherwise (Grunert, 2005). The results revealed a high relevance for price as a quality cue in PDQs and more so in the OEQs part of the study. It was low price and value for money that were considered important, but not high price. This may be an indication of low price symbolising low quality, or good value for money in combination with other quality cues. This result also indicates that Japanese consumers would not look for high price as an indication of quality when they are evaluating the quality of packed mackerel fillets. However, the complex relationship between price and quality could be further explored, as it appears to be generally relevant, but may depend on product categories and markets.

Methodological considerations

Open questions can lead to conclusions that reflect factors participants find most important to report (Schuman & Scott, 1987). However, OEQs may result in irrelevant responses, if the questions lack a clear frame of relevance. Thus, to ensure high relevance and usability of the responses to OEQ, this study was focused on factors important for the evaluation of the quality of packed mackerel fillets.

Surveys sometimes include OEQs at the end of a list of PDQs. This was avoided in this study because the PDQs may prime consumers when responding to the OEQs. In this way, we aimed to capture the participants' initial thoughts, which was only possible by placing the OEQs at the beginning of the survey instrument. Three OEQs seems to be an appropriate number before the PDQs, because it was observed that even though everyone reported two factors in OEQ, some avoided the third.

Japanese consumers may be reluctant to express extreme opinions and tend to use a narrow range on scales, particularly on labelled psychometric scales (Yao et al., 2003). Therefore, it was considered relevant to improve the method for collecting their responses about important factors they use when they evaluate the quality of packed mackerel fillets, using OEQs and PDQs in the hybrid survey in this study.

Practical implications

Using a hybrid approach with PDQs following OEQs, the study revealed that the colour of the fillet, freshness and price issues are the factors that come to consumers' minds when they

evaluate the quality of packed mackerel fillets. Relying on PDQs alone would have revealed a number of factors that Japanese consumers would not necessarily apply in a real-life situation. In addition, our results show that the truly important factors such as colour and price would be ranked too low. Focusing on either too many factors with relatively low importance, or focusing on factors that in fact do not correspond to those consumers consider when they are at the shop is likely to reduce the chances of success in the market. While real-life observation of consumers' behaviour remains the most realistic approach, hybrid surveys present an efficient way to obtain scientific results reflecting more closely consumer behaviour in real-life.

Conclusion

The liberalization of world trade, leading to increased competition among all business actors, makes targeted marketing important to succeed in many markets (Beck, Chapman & Palmatier, 2015). Collecting valuable data, like product evaluation and preferences in foreign cultures is helpful for adjusting marketing and promotion activities to different cultural contexts. For this data collection to be valid the inclusion of qualitative elements may be important (Voldnes, Grønhaug & Sogn-Grundvåg, 2014). Still, there is a limited use of qualitative research in international business research (Doz, 2011). This study demonstrated that hybrid surveys, including a qualitative element into the use of PDQs in a quantitative questionnaire, increased the validity and usability of the results without dramatically increasing the effort in data collection and analysis. Using this new approach, few variables of highest importance can be targeted to obtain consumer insights related to the evaluation of quality for fish products at the point of purchase. Thus, the probability to influence real choices in real-life settings can be increased.

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