



“It gives me peace of mind”. A new perspective on the identification of quality cues on salmon fillet products in Japan and the USA

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ABSTRACT

The way in which perceived quality affects consumer food choice is complex due to variations in intrinsic and extrinsic product attributes that interface with personal factors and the socio-cultural context. Taking the example of salmon fillets sold in the USA and Japan, this study uses a think-aloud protocol (TAP) as a data collection method and a corpus (text data)-driven approach as an analytical tool for uncovering how consumers infer quality cues on salmon fillets. The study aims to help in designing representative studies and may help in explaining survey results. The findings indicate that consumers infer quality under the influence of multiple factors, including individual knowledge of food production, processing and cooking, personal preferences based on culinary heritage and the socio-cultural environment. This study also shows how a TAP can be used in combination with text mining to provide richer insights into consumer choice.

1. Introduction

‘Quality’ is a word that is often discussed and studied in relation to the food supply chain, from production to table, yet the basic concept of quality remains ambiguous and its definition is circumscribed by the type of study conducted (Ghylin et al., 2008; Giusti et al., 2008; Kahl et al., 2012). In a pioneering work on product quality, Garvin (1984) identified five approaches to the study of quality on which other scholars have built their work: (i) the transcendent philosophical approach, based on the excellence or superiority of the product (Rubini, 2013); (ii) the product-based (characteristics of product features) approach used in economics (Leffler, 1982); (iii) the user-based approach, pertaining to the extent to which the product satisfies the needs of the consumer, used in marketing, operations management and computer software studies (Peskin and Hart, 1996); (iv) the manufacturing-based approach (Liu et al., 2013; Nayak and Ray, 2012; O’Connor, 2016); and (v) the value-based approach, which pertains to the degree of product excellence at an acceptable price (Cakir, 2000; Sebastianelli and Tamimi, 2002). Scholars have also studied product quality based on the service perspective (Bougoure and Neu, 2010; Fripp, 2020; Hansen, 2014). Diener (1984) studied subjective well-being related to quality of life, summarised as the three general components of life satisfaction, positive affect and negative affect. Other studies have also studied subjective

well-being and quality of life in relation to a flourishing environment, human motivation and basic human needs (Angner, 2010; Kapteyn et al., 2015).

The definition of quality cues on an abstract level is rather clear in the literature, e.g.: “Quality cues are related to product performance that provides a clear idea about the products and/or services that satisfy the consumers’ requirements. These quality cues can be further divided into product intrinsic (product/service related) and extrinsic (non-product/service related) cues” (Olson and Jacoby, 1972, in Hossain et al., 2015). The varied use and the meaning of quality reflected in the literature indicates a need to formulate identifiable quality cues that consumers may use when evaluating food products at the point of purchase. In this study, the focus point is Norwegian salmon fillet products in Japan and the USA, the objective being to investigate how consumers describe what they consider to be relevant quality cues when purchasing salmon fillet products.

This paper aims to provide novel insights into how consumers infer product quality based on the visible product cues on salmon presented to them and how they convey their thoughts around product quality. These insights will help to support our understanding of quality differentiation for salmon and identify opportunities for further research regarding potential implementation in sustainable aquaculture in the future. Food products have intrinsic and extrinsic qualities (Galati et al., 2018;

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Pramudya and Seo, 2019). The intrinsic elements include the type and amount of unsaturated fats (DHA/EPA) found in the salmon, the colour of the salmon flesh, its form and its appearance. The extrinsic quality dimensions, such as ecolabels, branding and packaging, may, together with the intrinsic elements, lead to profitable differentiation of Norwegian salmon from wild-caught salmon or salmon produced in other countries, in particular the USA and Japan.

Identifying the key cues for quality dimensions supports both theoretical food science research and industry practice. The latter could lend key insights into how visual cues on packages could trigger consumers' own mental and emotive processes, often in the split second prior to the product purchase. As such, this paper seeks to answer the following research questions:

RQ1. What quality cues can be identified in the TAP data about salmon products?

RQ2. What variations of consumer-reported quality cues can be observed between the USA and Japan?

After setting the main frame regarding quality cues and the challenge with defining food quality in the introduction, this paper presents the need for an exploration into what consumers place in focus when considering the quality of fish fillet products. The paper continues with a literature review that starts by identifying the various parts of a product that play a role in defining quality. We then focus in three powerful concepts that influence consumers when they identify the quality of the product, within their own range of knowledge and preferences and socio-cultural context. The final part of the literature review will focus on quality labels, including ASC, which was used in our study.

2. Literature review: consumer food choice and quality

Consumer food choice is a multiple-level decision-making behaviour (see the overview by Mojet, 2001 in Köster, 2009). Consumers' decision to purchase a food product can be said to be broadly influenced by (i) the perceived product attributes, (ii) their individual knowledge and preferences and the (iii) socio-cultural context of purchase and use (Kamphuis et al., 2015; Morano et al., 2018; Mottaleb et al., 2017; Yin et al., 2010). In choosing fish products, perceived quality has been identified as a factor of central importance (Verbeke et al., 2007b). The perceptions of salmon quality are influenced by the product's intrinsic and extrinsic attributes as well as the individual's personal preferences and experiences and the socio-cultural context that surrounds the decision.

2.1. Product attributes

The existing literature has identified a variety of attributes that are thought to be important, such as product safety, the nutritional content, freshness, the quality of the prepared meal and the physical attributes of the fish product (Bisogni et al., 1987; Botta, 1995; Bremner, 2000; Holm and Kildevang, 1996; Oehlenschläger and Sörensen, 1998). When consumers are in stores, making decisions about what they will buy, they rely on visual cues as well as their memory to identify the appearance of the food with the quality that they prefer (Wesson et al., 1979). Factors like the perceived image of the end-product, consumer trust (Grunert, 2002) and perceived healthiness (Petrescu et al., 2020) are also important. Not only the product's appearance itself but also the total presentation of the food product, including its packaging, is important in representing quality and influencing consumer choices. Personality and dynamic cultural factors, as well as involvement in food and knowledge about the quality evaluation of fish, are also influential (Bech et al., 2001; Brunso et al., 2009; Østli et al., 2013; Sogn-Grundvåg and Østli, 2009; Verbeke et al., 2007b).

2.2. Individual knowledge and personal preferences

The level of consumer knowledge can also influence meal preparation, which in turn can affect the quality of the meal that is consumed (Goffon, 1995). However, knowledge in itself is a complex variable that involves familiarity with the product and expertise in using it (Alba and Hutchinson, 1987). When consumers lack the skills to evaluate fish quality, the decision to buy and eat fish is particularly influenced by quality cues such as the brand name and price (Dodds et al., 1991; Verbeke et al., 2007b). However, the latter has been used in differentiation strategies to such an extent that it has limited efficacy, and a deeper understanding of quality is needed (Parga-Dans and González, 2017). Depending on the style of the packaging, fish products are not always visible, and consumers often resort to using the information on the packaging to inform their decisions (Jaffry et al., 2004; Verbeke and Roosen, 2009). Some of the factors that influence these decisions include perceived health risks and benefits (Verbeke et al., 2005), the sustainability of the production method (Verbeke et al., 2007a), the origin of the product (Verbeke and Roosen, 2009), the convenience when planning and interacting with the products (Olsen et al., 2007; Rortveit and Olsen, 2007), the price and value (Kole et al., 2009) and a combination of cues like organic labelling and the country of origin (Thøgersen et al., 2019).

2.3. Socio-cultural context

Consumers' response to food, how they perceive food quality and what influences them to purchase food are further affected by the socio-cultural context. Scholars have contended that consumers' food choice and consumption of food can only be fully understood in a social context, in which food can be coupled with historical and current culinary narratives to become meaningful social events that shape food preferences (Birch et al., 1980; Mossberg and Eide, 2017; Phyne et al., 2016; Rozin, 1996; Wang and Clarke, 2019). Consumers can be highly involved in food activities in everyday life, such as eating out, experimental cooking and having a general interest in cooking. These activities help to shape consumers' identity around food (Andersson and Mossberg, 2017; Mossberg and Eide, 2017). Various consumer segments may be influenced by the social context when they choose products and evaluate the quality, leading to different choices for everyday dinners when compared with entertaining friends or business partners (Heide and Olsen, 2018). Regional innovation in food practices, such as the food trend towards increased vegetable-based diets, and increased awareness of sustainable consumption also help to shape consumers' food choices (Bergflødt et al., 2012; Leer, 2016; Micheelsen et al., 2014).

2.4. Quality certification

Quality certification is one way of differentiating on quality. This certification must not be confused with quality labels, which are used subjectively by processors, retailers and so on. Certificates like 'Protected Designation of Origin' (PDO) or 'Protected Geographical Indication' (PGI) are used to different degrees in EU countries, and Italy is one of the countries with the most of these certificates (Mascarello et al., 2015). Traditional Speciality Guaranteed (TSG) is a third scheme in the EU (Grunert and Achmann, 2016). TSG highlights a traditional character, either in the composition or in the means of production. It seems that these labels play a minor role in consumers' choice of food (Mascarello et al., 2015). However, no research has been performed on these labels and seafood. They were originally meant for agricultural products, with the current exception of Scottish salmon with a PGI label. Another kind of certification consists of the eco-labels that are becoming important in seafood. Traditional eco-labels, like MSC and lately ASC, are also considered by consumers as signalling higher quality (Sörqvist et al., 2015), except for wine, for which the case is the opposite (Delmas and Lessem, 2017). It is important to explore whether these kinds of

certificates are important quality cues in consumer choices of salmon and whether they can be used as differentiation attributes. Finally, there is evidence that consumers associate processing characteristics, such as their effect on organic food, with quality characteristics, for example better taste (Grunert et al., 2004). However, this cannot necessarily be verified objectively. It can, however, be negative; for instance, if consumers have high expectations regarding the quality of organic salmon, tasting it may disconfirm their expectations, and therefore they will not try it again.

3. Method and data

This section contains several sub-sections that describe think-aloud protocols (TAPs), our method of data collection, the respondent profiles, the design of the interview guide used and the framework for the analysis of the collected data.

3.1. Think-aloud protocol method

A think-aloud protocol (TAP) is a qualitative data-eliciting method that was developed in the 1980s in the field of computer science to address the usability acceptance of new products, such as computer software (Ericsson and Simon, 1984, 1998; Lewis and Rieman, 1993). Closely connected to language and cognitive science, TAPs (also known as talk-aloud protocols and cognitive walkthrough) were developed to help producers understand user perspectives and experiences, enabling them to make improvements in product design. Due to their contextual flexibility, TAPs have been used in a variety of disciplines for qualitative research, such as in nursing to capture clinical reasoning during patient simulation (Burbach et al., 2015), in engineering to study how student engineers understand complex phenomena in problem solving (Koro-Ljungberg et al., 2013), in sports to understand cognitive changes during long-distance cycling as well as event cognitive processes in golf (Whitehead et al., 2015, 2017) and in the field of pedagogy (Hu and Gao, 2017; Vandeveldel et al., 2015). In this study, a TAP is applied as part of a multi-tool mixed-method research framework for managing and analysing data on salmon products. In particular, the TAP was used to uncover new perspectives on how consumers infer quality.

3.2. Respondents

A total of 20 TAP interviews were conducted with respondents from Rhode Island, USA, and Kashiwa, Japan. These countries were chosen because they rank high as targeted markets for Norwegian salmon exports (Wijnen, 2019) and they represent quite different cultures. The respondents were recruited via existing contacts through a partial snowball approach, with each person contacting 5 more potential respondents in the same country and area.

To facilitate the TAP process of elucidating direct consumer reactions to a familiar product category, individuals who consumed salmon were prioritised as respondents to this study. This also allowed for the creation of a small but specific topic-related text corpus based on the collected respondent interviews. The respondents should also be involved in at least 30% of the food purchases and food preparation in their household, have no seafood allergies, not work in the field of product differentiation and ideally have no affiliation to the seafood industry. Table 1 shows the characteristics of the respondents who were

prioritised as being of primary and secondary importance to this study. The respondents were fully informed about the nature and purpose of the TAP interview. The respondents' names are anonymised. The respondent numbers appear in the text examples as '\$' for speaker and 'R' for respondent, followed by 'USA' or 'JPN' (Japan) for the country of reference and a number. The respondents were compensated in the form of a gift card of ca. 550 NOK for an e-commerce platform.

3.2.1. Respondent profile for the USA

A total of 10 individuals from Rhode Island, USA, with profiles aligned with the characteristics in Table 1, agreed to participate in this study. They live primarily along the coastal southern border to the Atlantic Ocean. The respondents' range in age between 25 and 60 years. There is a fair spread between those who have families and those who are single households. They are mostly college educated, and some work as researchers and teachers. Most respondents can be said to have a personal interest in cooking (one was working professionally as a chef, whilst others cooked for themselves and their families). Some respondents also have farming experience, including rearing and slaughtering animals as well as growing their own vegetables. The various profiles of the respondents are interesting regarding the extent of their cultural and environmental heritage of living near the ocean.

3.2.2. Respondent profile for Japan

A total of 10 individuals from Kashiwa, Japan, with profiles aligned with the characteristics in Table 1, agreed to participate in this study. Some respondents have work experience in the food and beverage industry. The respondents' age range is from the late 20s to 70 years. Most of the Japanese respondents have a university education. Notable among the Japanese respondents is their strong familial connections, with all the respondents living either with a partner or with an extended family with grandparents and grandchildren in the same household. There also seems to be strong gender role awareness, reflected in constant references to who does the shopping and general cooking in the household. Children who are still at school (needing lunchboxes) are a common demographic feature of the Japanese respondents.

3.3. Think-aloud protocol (TAP)

Prior to the interview session, the respondents were introduced the aim of the study and the way in which the TAP works. A bar of chocolate was used as a sample pre-run of the TAP session. The interviewer's main role was to encourage the respondents to speak freely and openly and to think aloud while looking at the product, with as little interference from the interviewer as possible. At the end of the pre-run, the respondents were given a scenario in which they saw themselves in a supermarket context, shopping for food and/or their daily meals framed as: "Could you please choose any way you prefer to 'Think Aloud' about the way you evaluate the products while they would choose them in real life". Using a TAP approach driven by pictures as done previously by Risius et al. (2017), participants were presented with six salmon products that were familiar to them from real supermarkets. All the salmon products carried the information required by the national authorities in the USA and Japan and, accordingly, provided information about the country of origin and whether the fish was wild captured or farmed. All the products were shown as fillets in standard tray packaging. Table 2 shows the product parameters for the USA, and Table 3 shows the product

Table 1
Respondent recruitment variation goal.

Factors	Gender (if feasible)	Age	Household situation	Income	Location of origin (if feasible)	Food preferences
Levels	Female	18–30	Single	Low	Rural	Gourmet
	Male	30–50	Couple	Medium	Urban	Casual
		50–70	Young children at home	High	Inland	Natural
		70+	Teenagers at home		Seaside	

Table 2
Experimental products for the USA.

Type	Ingredients	Labels	Quality	Freezing	Production
Control	No info	No info	No info	Defrosted	Chilean farmed
Product 1	No info	ASC	Premium	Fresh	Norwegian farmed
Product 2	Marinated	Organic	No info	Defrosted	Norwegian farmed
Product 3	Marinated	MSC	Premium	No info	Alaskan wild
Product 4	No info	Omega-3	Sashimi	Defrosted	Norwegian farmed
Product 5	No info	ASC + organic	No info	Defrosted	Norwegian farmed
Product 6	Marinated	Omega-3 + organic	Premium	Fresh	Norwegian farmed

Table 3
Experimental products for Japan in English.

Type	Ingredients	Labels	Quality	Freezing	Production
Control	Salted	No info	No info	Defrosted	Chilean farmed
Product 1	No info	ASC	Premium	Fresh	Norwegian farmed
Product 2	Salted	Organic	No info	Defrosted	Norwegian farmed
Product 3	Marinated	MSC	Premium	No info	Japanese wild
Product 4	No info	EPA/DHA	Sashimi	Defrosted	Norwegian farmed
Product 5	Salted	ASC + organic	No info	Defrosted	Norwegian farmed
Product 6	Marinated	EPA/DHA + organic	Premium	Fresh	Norwegian farmed

parameters for Japan, written in English. The specification differs by country, reflecting the market conditions in each country (e.g. a salted cut fillet is regularly eaten in Japan but not in the USA).

Pictures of the products were presented to the respondents, who were encouraged to voice their ideas about the visuals in any manner they chose (Fig. 1). To identify and distinguish cultural norms, apprehension and appreciation were encouraged. As such, the respondents were asked to ‘think aloud’ about the way in which they evaluate those products that they would choose, simulating an intention to purchase and their purchase decision in real life. Each TAP session lasted between one and one-and-a-half hours.

3.4. Creating text corpus data from think-aloud protocol transcripts

The 20 TAP sessions were recorded and transcribed in accordance

with the Göteborg Transcription Standard Version 6.4 (Nivre et al., 2004), which allows standardisation of transcripts for machine readability.

3.5. Framework of data analysis

To conduct a systematic, corpus-driven analysis of the TAP transcripts, the transcripts were uploaded to word concordance software called AntConc (Anthony, 2019). This software has several text analysis toolkit features that support both quantitative and qualitative text analysis and theory building, allowing for a more precise analysis of language in use (Anthony, 2005). Some primary functions of AntConc include generating word list of high frequency that occurs in the corpus. High frequency occurring words quantitatively indicate topic saliency in the text. A qualitative text analysis supported by AntConc is a keyword-in-context (KWIC) analysis that enables the retrieval of targeted key words such as “quality” for example, so that we can understand the context in which respondents talk about salmon quality in the process of choosing to buy the product. AntConc also helps generate word concordances and collocations that shows what other words the respondents associate with when they talk about the ‘quality’ of salmon. The AntConc word frequency ranking will help uncover the most salient in-vivo topics in the corpus data (what was most spoken about by the respondents. The AntConc KWIC analyses as illustrated in the text examples given in this article, will help uncover in detail, the way the keywords and concepts were used by the respondents in context. This shows how the respondents reflect around buying salmon.

4. Findings and discussion

The following sub-sections begin by addressing RQ2, providing an overview of the comparative findings for both groups of respondents in the TAP sessions in relation to the products presented to them. These are followed by sub-sections on the KWIC analysis. The KWIC findings and discussion address RQ1 and reveal how the individual groups of respondents reflected on the quality of the salmon products. The KWIC findings are based on identified salient themes that are broadly categorised according to (i) product-level attributes, (ii) personal-level preferences and (iii) socio-cultural-level attributes for respondents from the USA and Japan, respectively. All three dimensions are important and combine with each other towards consumer decision making, even though the analysis presented below provides a separate taxonomy for the findings.

4.1. Comparative findings: USA and Japan

Table 4 presents the combined comparative TAP results for consumer inclinations in purchasing salmon fillets for the respondents from the USA and Japan. The product attributes from Tables 2 and 3 were ranked



Fig. 1. Examples of product pictures that were shown to the participants.

Table 4

USA and Japanese respondents' TAP results for consumer inclinations according to product attributes, individual knowledge, preferences and the socio-cultural context. Scores are based on the AntConc concordance plot frequency count: high salience: 3, median salience: 2, low salience: 1, not applicable: 0.

	Product attributes: USA							Product attributes: Japan						
	Marinated	Labels	Quality (premium/sashimi)	Freezing	Chilean farm raised	Norwegian farm raised	Alaskan wild	Marinated	Labels	Quality (premium/sashimi)	Freezing	Chilean farm raised	Norwegian farm raised	Japanese wild
Individual knowledge														
High cooking knowledge and skill	1	2	3	1	1	2	3	1	2	3	1	1	2	3
High food production knowledge	1	2	2	1	1	2	3	1	2	3	1	1	2	3
Individual preferences														
Healthy food	1	2	2	1	1	2	3	1	3	3	1	1	2	3
Favourite food type	1	2	2	3	1	2	3	1	2	3	1	1	2	3
Type of meal	3	2	2	3	1	2	3	1	2	3	1	1	1	3
Disposable income	2	3	3	3	1	2	3	1	3	3	1	1	2	3
Socio-cultural context														
Sustainable consumption (wild salmon)	0	2	3	1	0	0	3	0	3	3	1	0	0	3
Shopping at local markets	0	2	3	0	0	0	3	1	3	3	0	0	0	3
Relationship building with farmers	0	2	3	0	0	0	3	0	1	2	1	0	0	1
Lifestyle convenience	3	2	2	0	1	1	2	1	2	3	1	0	0	2
Sum inclination	12	21	25	13	7	13	29	8	23	29	9	6	11	27
Difference inclination	4			4	1	2	2		2	4				

in accordance with the individual knowledge and preferences of the consumers as well as the socio-cultural context of purchase and use. The results were compiled from the generated AntConc concordance plot, which showed the saliency ranking of each TAP transcript indicating how often the respondents talked about the product attributes and expressed their opinions about the product. The properties (left-hand column of Table 4) of individual knowledge, preferences and socio-cultural context were derived from the most salient themes in the corpus data, indicated by the most frequently occurring words used by the respondents. The respondents' inclinations are scored on a continuum scale, with 3 indicating a high inclination, 2 indicating a median inclination and 1 indicating a low inclination; 0 is indicated when the attribute is not applicable to the context.

At the bottom of Table 4 is the sum inclination and the difference inclination. The former indicates the overall consumer inclination, or favourability towards a certain salmon product over another, when presented during the TAP sessions. The latter indicates the differences in consumer inclination between the two groups of respondents, with higher preferences for 'product attributes' indicated in each corresponding group. There are slight differences in inclination towards different types of salmon products between the two groups of respondents. According to the TAP texts, the respondents from Japan have a slightly greater preference for products with appropriate labelling and 'premium' or 'sushi'-grade products. The respondents from Japan also indicate greater openness to adjust their willingness to pay more for products that are labelled as sustainably caught, healthy or 'premium'. The respondents from the USA are more inclined to purchase frozen and/or marinated products than the respondents from Japan. The decision to buy marinated products is influenced by 'lifestyle convenience', the 'type of meal' being prepared, whether it is lunch, dinner, for the family or only for the children and so on and the respondents' 'disposable income', weighing the convenience of a marinated product, which saves time, against the price of the product. The inclination to purchase frozen salmon fillets for respondents in the USA is influenced by 'favourite food', 'type of meal' and 'disposable income'. One type of 'favourite food' reflected in the TAP for respondents in the USA is sushi, ready-made sushi often coming in chilled form, while, in Japan, there is a greater variety of meals made with fresh fish, such that frozen fish ranks low on the preference list for the respondents from Japan.

Although the respondents have different national socio-cultural contexts, there seems to be a consensus and a shared concern about sustainable consumption and buying locally. Both groups of respondents are inclined to buy local wild-caught fish, indicating that their least favourite option was the farm-raised salmon from Chile. Norwegian farm-raised salmon has a relatively positive connotation and branding for the respondents in general, but, given a choice, they would still buy local fish.

While Table 4 provides a brief numeric overview of the comparative data between the two groups of respondents, the following sub-sections identify the salient themes reflected in the TAP sessions and investigate how the respondents reflect on their inclination to purchase one product over another.

4.2. TAP salient themes: respondents from the USA

The 10 interview transcripts provided a total of 3344 unique words with 77,964 total word tokens to form the AntConc corpus database. The generated frequency word list allows for the identification of prominent keywords that can be indicative of salient themes that occur throughout the corpus database. Indicated in the 10% frequency of word use range in the corpus data, 8 salient subjects and themes were reflected by the respondents in the TAP. These salient themes include *wild salmon* (562 occurrences), *organic* (190 occurrences), *farmed* (172 occurrences), *fresh* (168 occurrences), *frozen* (115 occurrences), *market* (109 occurrences), *time* (87 occurrences) and *price* (78 occurrences). Some of these salient themes will be discussed simultaneously due to co-occurrences in the

context of use. The data findings indicate that the salient themes corresponded positively to respondents' attention to and awareness of the packaged experimental products presented (shown in Table 2).

4.2.1. Product attributes

4.2.1.1. *Wild salmon*. The word 'salmon' has 562 occurrences in the corpus data, of which 48 occurrences relate to the words 'wild salmon'. The product's origin was of particular interest to several respondents, referring to 'the Alaskan wild salmon' as the preferred product. Text Example 1 shows how the product quality of salmon is reflected on by respondent \$RUSA1 in the TAP:

Text Example 1. USA respondent \$RUSA1.

\$RUSA1: depending on what time of year it is / the Alaskan wild salmon would probably be // [be]cause I know / [at] certain times of the year / you can get the wild salmon // I do prefer wild / a little less fat // the defrosted ones / if it's the time of year where wild caught isn't readily available / previously frozen is okay / I don't know a lot about salmon from chile / I would think Norway might be a good choice / only because I think clean // I'm not sure about farm raised / some reports say that farm raised is okay // it does tend to have more fat / I like the flavour of number three / wild caught / if I were to go into the store / my first choice would be the Alaska wild / number three / the sustainably wild / after all that / that's what I want / my Alaska salmon.

The country of origin and the use of the specific particle, 'the' in the phrase 'the Alaskan wild salmon' indicates that the respondent has connected salmon's quality and its flavour profile to a specific place of harvest and production, associating wild salmon with being 'a little less fat' and 'sustainably wild'. The word 'my' in the sentence 'my Alaska salmon' indicates a sense of possession, if not responsibility, for the respondent when thinking about consuming salmon. A brief comparison is made by \$RUSA1 between salmon from Chile and salmon from Norway, salmon from Norway being associated with being 'clean', even if 'it does tend to have more fat'. That salmon is produced responsibly is of concern to \$RUSA1, indicated by the respondent reflecting on salmon being a seasonal product that is available at 'certain times of the year' and the reference to eating 'sustainably wild'.

4.2.1.2. *Organic and farmed*. The words 'organic' and 'farmed' have 190 and 172 occurrences, respectively, and the respondents seemed to reflect on the aspects of organic and farmed salmon in similar contexts. The aspect of organic salmon is closely related to making 'healthy food' choices, reflected in Table 4. Text Examples 2 and 3 are the TAP reflections from \$RUSA8 and \$RUSA5 on the subjects 'organic' and 'farmed'.

Text Example 2. USA respondents \$RUSA8 and \$RUSA5

\$RUSA8: I think some of the labelling on them makes me feel like / the rich in omega three is almost just like a marketing thing / I'm already aware that salmon's rich in omega three / organic / I don't really know how, for number five / I don't really know how farm raised salmon can be organic / I guess it would be in the feed / but I'm not a huge organic consumer.

\$RUSA5: marinated organic salmon / so organic tells me that it was farmed a little bit better // It was fed a little bit better from Norway / which is a great place that salmon comes from / farm raised / I have various thoughts about farm raised versus wild / I like the wild salmon a little bit better / not that farm raised is bad / but if I had a choice between farm raised in the wild / I would choose the wild // I'm not a huge organic fan / I know it's a catch word in the industry right now / consumers do like it / I personally don't see a lot of

difference between organic and inorganic / I personally don't see how everything can be organic / we have rain that picks up other things and drops it where they're saying these organic crops are or fished / I know that salmon is farmed in the ocean / and you can feed it in organic feed / but it's not necessarily just going to eat that / there might be something else that's really through their farm that they eat / and it's not organic at that point.

In general, the respondents indicate an awareness of what constitutes organic foods and feed for farmed salmon. The product labels seemed to help with identifying the properties of the packaged salmon, which were judged against individual knowledge: 'I don't really know how raised salmon can be organic' (\$RUSA8) and 'I know that salmon is farmed in the ocean, and you can feed it *organic feed*, but it's not necessarily just going to eat that' (\$RUSA5). Farmed salmon is also compared with wild salmon. As indicated in the theme of 'wild salmon', the respondents from the USA seemed to have a preference for wild salmon. This is also indicated in the TAP for \$RUSA5, 'if I had a choice between farm raised in the wild / I would choose the wild'. Product-level attributes such as farmed or wild in the example of \$RUSA5 are directly associated with personal preferences and a highly positive behaviour modality towards one option, that is, if I had a choice and I would choose.

4.2.1.3. Fresh and frozen. The word 'fresh' has 169 occurrences in the corpus data, mostly occurring in the context of respondents looking at the salmon packaging and deciding whether the product is fresh or defrosted. Text Example 3 shows respondent \$RUSA5 reflecting on a preference for fresh or frozen products:

Text Example 3. USA respondent \$RUSA5.

\$RUSA5: and I see defrosted / so that tells me that it was previously frozen / I would prefer to eat a fresh piece of fish / I do know that chile produces good salmon / and that's where the verlasso salmon comes from / it does look moist / it does not really appear that it was frozen / but still that defrosted kind of throws me off a little // moving over to number one / I can see that it's fresh salmon / it's from Norway / which has great quality salmon / I like the words premium and quality / and then / it was farmed responsibly / and that was a certified certification / those words there really tell me a lot about the product.

The visual cues were helpful for the respondents when looking at the product details and packaging. The respondents used the products' visual cues, aligned with their personal knowledge of the product, to make decisions: 'I see defrosted', 'it does look moist', and 'I do know that Chile produces good salmon', 'it's from Norway, which has great quality salmon'.

4.2.2. Individual knowledge and preferences

Individual knowledge about the product and how the product is evaluated for quality interface with personal-level preferences, most of which are reflected through individual knowledge of the product, as seen in the text examples presented above. The salient themes that further reflect personal-level preferences include 'market', with 109 text occurrences, 'time', with 87 text occurrences, and 'price', with 78 text occurrences.

4.2.2.1. Shopping at local markets. The common word co-occurrences with 'market' are 'fish market' (24 co-occurrences) and 'local market' (15 co-occurrences). Text Example 4 gives three excerpts from transcripts in which the respondents speak about visiting the market.

Text Example 4. USA respondents \$RUSA2, \$RUSA5 and \$RUSA3.

\$RUSA2: I just go to the one that's near my house // it's only like a 10 min drive / the fish market / [be]cause I don't buy my fish at the grocery store / so it's like a separate trip / I buy fish at the farmer's

market sometimes too / and there's a farmer's market vendor that sells local fish.

\$RUSA5: personally / I go to the fresh market / I feel that they have a little more vested interest in the fish than the stock boy that's putting it in the case / and I feel they're going to maintain the quality a little more than a supermarket would / because that's all they do / they're in fish / maintain the quality / maintain[ing] the temperature control is more important to me than just having it convenient.

\$RUSA3: I would go to a fish market / so then you'll see the whole fish / you'll see enough of the fillets to know / and they know what boat the fish came from / so now you're really supporting the local [fishermen] // it was much cheaper / it was nice / it was fresh / and you can just pick the fish that you want.

Words such as 'just' in the sentence 'I just go to the one that's near my house' and 'only' in 'it's only like a 10 minute drive' (\$RUSA2) indicate that convenience is an important factor influencing the respondents' purchase behaviour. However, other TAP transcripts reveal that supporting the local community and access to quality food are also important when choosing where to buy their fish. For \$RUSA5, local markets and fish markets are also preferable because there is an associated sense of quality control of the produce compared with larger supermarkets. There is a sense of personalised service and relationship building with the fishing community, the members of which have expert knowledge and skills in fishing 'because that's all they do' (\$RUSA5) 'and they know what boat the fish came from' (\$RUSA3).

4.2.2.2. Price. The word 'price' has 78 occurrences in the corpus data and is closely correlated with 'disposable income', as shown in Table 4. Text Example 5 is a compilation of excerpts from respondents who reflected on 'price' and how price influences their consumption pattern.

Text Example 5. USA respondents \$RUSA10, \$RUSA7 and \$RUSA8.

\$RUSA10: yeah / again there's a price point / if money wasn't a thing / would I prefer Sashimi Ahi / or Ahi Sashimi / but / if that's \$50 or whatever for a lunch versus \$15 or \$20 or whatever of salmon / then "d be more prone to go with salmon // I'm not made of money.

\$RUSA7: I'm on a very strict budget / so price is / unfortunately / a big factor of what I buy / I get thrilled when the fish is on sale and beef is on sale / I like my red meat too / and when lobster goes on sale / but I usually get it off the boats which is the best.

\$RUSA8: I have mixed feelings / I think / I'm definitely not a person who has a lot of disposable income / so if an organic item is around the same price as a non-organic item / if it's close / I might buy it / because I do think that there are benefits to the environment / not so much nutritionally / but I think that it's more of a price issue for me / that's where my perception of organic comes in / it's almost a luxury item.

Price is often a practical socio-economic consideration when purchasing food. It is often coupled with feelings and emotion – 'I get thrilled when the fish is on sale' (\$RUSA7) and 'I have mixed feelings' (\$RUSA8) – and with the use of declarative statements – 'I'm not made of money' (\$RUSA10) and 'I'm definitely not a person who has a lot of disposable income' (\$RUSA8). There were some contextual reflections on the link between a product's price and whether it was organically produced. For \$RUSA8, organic produce is 'almost a luxury item' due to the respondent's socio-economic context.

4.2.3. Socio-cultural context

The influence of the socio-cultural context can be seen in several text examples pertaining to product-level attributes as well as individual

preferences. For example, choosing a lower-priced product is usually coupled with disposable income. Choosing a local farmer's market or fish market over large grocery chain stores indicates a socio-cultural value system to support and build more resilient food communities. A preference for wild salmon and 'sustainably wild' shows social awareness of individual- and community-level responsibility towards environmental considerations and eating sustainably. However, if there is an omnipresent theme raised by the respondents that permeates the socio-cultural fabric, it would be the subject of 'time'.

The word 'time' has 87 occurrences in the corpus data. There are various nuances of meaning from the corpus data when the respondents speak about 'time', which is associated with the broader socio-cultural context of consumer choice. The socio-cultural context refers to the encompassing aspects of family, work and living conditions of the respondents. The most frequent topic raised by the respondents is having time to cook, in relation to buying the marinated salmon, Products 2, 3 and 6, presented to the USA respondents. Text Example 6 contains a selection of respondent TAPs around the concept of 'time' and meal preparation.

Text Example 6. USA respondents \$RUSA3, \$RUSA10 and \$RUSA8.
\$RUSA3: we don't have the opportunities / when you're working full time, you don't have the opportunity to really spend a lot of time cooking and learning this stuff.

\$RUSA10: if I don't have time and I know / like I like teriyaki I salmon / if it was already taken care of / and I could just throw it on the grill / then yeah sure / it doesn't take a lot of time to prepare and cook food / so I don't mind doing that / I don't have a negative opinion of it / but I'd probably not get it because I'd rather take care of something myself.

\$RUSA8: I try to buy healthful foods / I try not to buy junk food / [but] it's hard because they're teenage kids / and they wanna eat a lot of junk / but for the most part / we mostly focus on dinner time / [it] is like the most important meal for us.

Consumers need to strike a balance between food quality and having time to prepare food for themselves and their family in a time-efficient manner. For \$RUSA3, the lack of opportunity to learn how to cook when you have work commitments becomes a push factor towards buying ready-made meals or marinated products. For \$RUSA10, the situation is more nuanced, with the use of a low-obligation modality, 'probably', in the sentence 'but I'd *probably not get it* because I'd rather take care of something myself' to indicate that the respondent would still prefer salmon that is not marinated in its package. The conflicting interests of family food preferences are highlighted when \$RUSA8 refers to, 'I *try not* to buy junk food, [but] it's *hard* because they are *teenage kids*', stating that the family has a routine of having dinner as their one daily important meal and a family get-together time.

4.3. TAP salient themes: Japanese respondents

The 10 interview transcripts resulted in a total of 2539 unique terms with 64,855 total word tokens to form the AntConc corpus database. The generated frequency word list allows for the identification of prominent keywords that can be indicative of salient themes that occur throughout the corpus database. Indicated as appearing in the 10% frequency of word use range in the corpus data, the respondents reflected on 6 salient subjects and themes in the TAP. These salient themes are *organic, farmed, domestic, price, frozen and premium*. Some of these salient themes will be discussed simultaneously due to co-occurrences in the context of use. The data findings indicate that the salient themes correspond positively to respondents' attention towards and awareness of the packaged experimental products presented.

4.3.1. Product attributes

4.3.1.1. *Organic, farmed, price and premium*. The subjects 'organic', 'farmed', 'price' and 'premium' are often interrelated when reflected on by the respondents in the TAP sessions, particularly when they are considering one factor against another prior to making a purchase. Text Example 7 shows how \$RJPN1 reflected on these topics whilst looking at the products presented.

Text Example 7. Japanese respondents \$RJPN1 and \$RJPN3.

\$RJPN1: this is organic / it feels like it is making a strong point of being organic / but I feel like I don't really understand what makes a fish organic / is it the feed / is it the fishery / if it was based on the fishery / then I think it would be better to have the location written on it / produced in Norway or in Hokkaido / but without it / I just don't really understand what it means / if it's organic / it seems to be good for your body / but the actual circumstances / I don't know the circumstances that make the fish organic / also / if this would have a much higher price / I think it would not be something that we would have on a regular basis.

\$RJPN3: when you compare it / first off / it says that it is 'premium' / I guess it looks a bit expensive / and it also says that it's from Norway // when something like ASC certification is added / you get the impression that it has properly been inspected / you know / the word 'premium' / in japan means something like 'special' / it is used with such a meaning / so you get an impression as if it was grown in a special way.

Product labelling and certified organic or sustainably produced fish are important aspects for the respondents in Japan because they provide a visual cue for the product quality and build consumers' trust in the product. There is a sense of frustration for \$RJPN1 when the indicated 'organic' is not coupled with a label showing the product origin and when the label 'organic' does not indicate what an organic salmon product entails. Without appropriate product labelling, the respondents might feel disinclined to pay a higher price.

4.3.1.2. *Frozen*. The word 'frozen' has 80 occurrences in the corpus data. Text Example 8 contains 2 TAP excerpts that indicate how the respondents contemplated the subject of frozen foods.

Text Example 8. Japanese respondents \$RJPN2 and \$RJPN8

\$RJPN2: basically when it comes to fish / I don't know / I generally prefer that it be never frozen / shrimp and the like are always frozen / so I will buy those / with fish / I buy pretty much everything never frozen / thawed fish / and this applies to other meat too / is often-times imported / like there is chicken from brazil and so on that is sold thawed / but for the most part I won't buy it // I think it probably has something to do with the technique by which it was frozen / when meat has been frozen once then thawed / it really does lower its fullness when heated up / that's the reason I generally don't buy frozen meat / never frozen.

\$RJPN8: I choose never frozen / the reason for this / is that if it is frozen and then defrosted / when it defrosts at home / it is probably not tasty // so, I want to buy it never frozen / but if I think that I will not use it today / I think I will buy it frozen to store it / in any case / if it is just one piece / then I will buy it never frozen like that / if it were my parents / they would always go for never frozen.

The respondents from Japan, in general, have a preference for fresh over frozen products, with several respondents expressing the thought

'never frozen'. This preference has several influencing factors, which include when they plan to eat it – 'but if I think I *will not use it today*' (\$RJPN8) – and how it is packaged – 'if it is just *one* piece, then I will buy it never frozen'. There is a socio-cultural aspect to this preference for fresh over frozen as \$RJPN8 says that there is a preference among the older generation in Japan to purchase fresh rather than frozen: 'if it were *my parents*, they would *always go for never frozen*'. The latter result could be explained for the potential of freezing products at home, which is preferably done to "never frozen" products.

4.3.2. Individual knowledge and preferences

Individual knowledge and preferences were contemplated in relation to the product attributes, such as 'organic' and 'premium', for many of the respondents from Japan. As indicated in Table 4, the respondents had a preference for products with appropriate labelling. Text Example 9 consists of two TAP excerpts that show how the respondents contemplated their preferences regarding the subject of product labels, perceived quality and the individual expectation of a product.

Text Example 9. Japanese respondents \$RJPN1 and \$RJPN4.

\$RJPN1: seeing ASC certified written on the package is like when I am buying wine / I look for the DOCG mark on the bottle / I learned this from a friend / that it means that its quality is guaranteed / that it is good wine / I will not be disappointed // same goes for other such words, such as 'organic' or 'premium' / so if these are on the packaging / I think they must be richer in nutrients.

\$RJPN4: the Atlantic salmon / it's farmed in Norway and it's been thawed / and is meant for use in sashimi / it is rich in DHA and DPA / or so it says here / I guess that makes it sound like it's good for health // I may not eat it as sashimi / but that's what the label says it's for / so I get the impression that maybe what they're getting at is / that it's especially fresh so that it can also be made into sashimi // based on my experience / when I hear the salmon is from Norway / I feel like it must be good / my general image is that Norwegian salmon tastes good.

The idea of the expectation of a product carries weight for some respondents from Japan. \$RJPN1, in Text Example 7, expresses frustration when talking about 'organic' labelling. In a further example, \$RJPN1 elaborates that appropriate labels on products build expectations of product quality, so 'I will not be disappointed'. This knowledge also has a shared social aspect, as \$RJPN1 'learned this from a friend', which indicates that product preferences can be socially swayed. In Text Example 7, \$RJPN1 expresses a need to know the country of origin of the product. This is reflected in Text Example 8, with \$RJPN4 saying that Norwegian salmon may be a preferred product for making sashimi. The connotation that comes with the product label is that Norwegian salmon is of a sufficiently high quality to be used in making sashimi.

4.3.3. Socio-cultural context

Similar to the respondents from the USA, there is a general community awareness of and preference for sustainable consumption among the respondents from Japan. Their concern about sustainable consumption is closely related to the salient theme of 'domestic', which has 104 occurrences in the corpus data. 'Domestic' is spoken about in the context of local wild-caught fish in Japan. The respondents' preference for a product that is wild caught in Japan is reflected in Table 4. There is, however, a greater socio-cultural context of concern for the environment, as Text Example 10 indicates.

Text Example 10. Japanese respondents \$RJPN8 and \$RJPN6.

\$RJPN8: recently it has been coming up on tv really a lot / for instance / the dawn of Gaia / or tv shows like those kinds of documentaries / also on abnormal weather / or that they can't catch any more fish / I hear talk like that / so the impression I have of fish

farming / regarding fish farming as well / has become a good one / I used to think in the past that wild caught was very good / and the impression that I had was that farm raised fish was of a lower product quality / but that now there are / for instance / products that can only be produced on farms / and conversely / that farm raised is safer / the impression that I have has improved / but in the end / I am very much attracted products that are domestic wild caught // when it is wild caught / i'm not sure if the product quality is higher / but the impression that I have is that is likely fresher / and especially if it is used for sashimi / the impression I have is that if it says 'wild caught' / that I think that it might be fresher than if it says 'farm raised' though.

\$RJPN6: but you know / this kind of display / this one is also different / eco-label of the sea // marine product harvested through sustainable fishery / MSC certified // it somehow gives you a reassuring feeling / how to say it / I think it gives me peace of mind.

Socio-cultural influences are felt by the respondents in Japan through friends, family and documentaries or news that they view on TV as well as product labels. With a strong preference for wild-caught fish in Japan, \$RJPN8, for example, shares how watching documentaries and news on the increasing 'abnormal weather, or that they can't catch more fish' has helped to change the respondent's impression of farmed fish. Food safety and eating healthily are a concern for the respondents, whereby farmed products are seen as having lower quality than wild-caught products. For \$RJPN6, appropriate labels indicating certified sustainably produced food are reassuring and give 'peace of mind'.

The concept of having 'peace of mind' has 28 occurrences in the Japan respondents' corpus data, and it is uniquely referred to by the respondents in relation to product safety when the individual does not have much background knowledge on food production (TAP transcripts \$RJPN6, \$RJPN9 and \$RJPN10). As \$RJPN9 comments about certification and 'domestic', "It's a feeling of *peace of mind*. For some reason, 'wild caught' and 'domestic' give somewhat of a better impression."

4.4. Findings and discussion in relation to the research questions

This two-country comparative study applied a TAP method as a means of revealing how consumers inferred the quality of packaged salmon in the USA and in Japan. To address RQ1, a TAP in combination with a systematic text analysis can be a powerful qualitative analysis tool when uncovering the mental and visual processes of consumers in product quality evaluation. Product attributes were reflected on for their intrinsic and extrinsic properties in accordance with individual knowledge and preferences. The breadth of the properties the participants brought up in this TAP study were in accordance with what has been previously demonstrated in the literature (Carlucci et al., 2015). Consumers are also embedded into their socio-cultural environment, which influences their quality perceptions. Consumers will choose, for example, marinated products out of convenience and the type of meals planned, despite them being rather negatively perceived. However, there remains a stronger preference for unmarinated products and freshly caught fish. A previous study on incorporating consumer input in the development of new fish products presented a practical alternative that on one hand increases convenience by providing marinades to assist product preparation success, while the marinade is proposed to be in a separate container, so that the purity of the fish fillet will remain intact. (Banović et al., 2016). Such a solution could provide different results than those presented in this study. In relation to RQ2, the findings indicated that both groups of respondents preferred locally sourced fish and shorter food supply chains. However, while the respondents from the USA distinctly discussed their preference for wild-caught salmon as a form of quality dimension for health reasons and as an activity that they grew up with, the respondents from Japan spoke about wild-caught salmon as a measure of 'peace of mind' equated with quality living

and dining, associated with a type of exclusive product to consume. The socio-cultural environment and social values also evolve over time. There is currently greater awareness of sustainable consumption in both groups of respondents. These concerns are interrelated with individual and family health when consuming fish. As such, the respondents seemed to prefer Norwegian farmed salmon to Chilean farmed salmon in general, citing a cleaner environment in Norway and higher production standards than in Chile. A segmentation study has also shown that country reputation plays an important role on how consumers infer quality, using the country of origin as a quality cue (Risius et al., 2019). In the same study, there is also an indication that domestically produced fish leads to even higher preference, for most of the segments.

The way in which salmon is packaged and sold and the indicators of certification that are visible on packages influenced the respondents' purchase behaviour. Sashimi was a relatively less well-known concept in the USA than in Japan, where sashimi was seen as the 'ultimate lazy food' and was purchased for the specific purpose of having sashimi, while, in the USA, sushi-quality salmon could be processed further (cooked). There is a general consensus that 'sushi-grade salmon', whether in the USA or in Japan, is acknowledged to be of premium quality. These results are comparable to previous findings that showed differences between social norms and perceived innovativeness of sushi and sashimi between a western country, in this case Norway, and Japan. (Altintzoglou et al., 2016).

5. Conclusion and implications

The main objective of this study was to provide novel insights into how consumers infer product quality based on the product cues visible on salmon presented to them and how they express their thoughts around product quality. TAP was used as a means of understanding how consumers reflect on quality salmon. It was used to uncover their thought processes and understand how consumers make a choice of one product over another. The TAP transcripts were used to create a small corpus of data for the respondents from the USA and Japan, and a text analysis was conducted on the data to ascertain how the respondents reflected on quality cues. These insights are intended to support industry stakeholders, particularly in the Norwegian seafood sector, in differentiating salmon based on quality. By applying a combined method of a TAP and AntConc text analysis, the means of identifying the key cues for quality dimensions in this study has been described to support both theoretical food science research and industry practice.

Although this study provides comparative insights into the thoughts of respondents from the USA and Japan, the limitations to this study include the fact that qualitative methods, even if software supported such as the use of AntConc, are indeed less generalisable and more context specific than large scale statistical surveys. However, the advantage of a study such as this is the ability to provide a complementary bolster to the larger statistical survey-styled studies in the field, in which TAP and various forms of discourse analysis frameworks can determine how consumers make decisions at a much deeper level.

The main industrial implications based on this study are linked to how quality could be communicated on salmon fillet products. One clear example, which stands on both countries studied here, is that sushi-grade salmon is a symbol of high quality. That provides an opening for product concepts that apply this perspective and build congruency related to the aesthetics and pricing of sushi-grade salmon fillets in the market. One potential in that direction could be to incorporate a recipe, or suggestion for additional products for the preparation of a sushi dish, using this product as a driving force of inspiration. An alternative expectation regarding this symbolism could be that consumers perceive sushi-grade salmon as of high quality, which does not necessarily mean that it will be used in preparing sushi. However, the quality cue may still stand its own ground in differentiating from other salmon products with which consumers may compare to at the shop. An additional implication that falls near the latter is related to sashimi. Sashimi, despite being

conceptually so near sushi, is not as known in the US, while in Japan it symbolises high convenience. Taking that into account, using the term sashimi in the US would yield little market differentiation. In Japan, such differentiation would shift the focus from quality to a combination of quality and convenience, which would in turn match different segments, setting and potentially packaging aesthetics. Quality label ("premium") seem also to be highly appreciated by the respondents, particularly in Japan. This is interesting, as the term "premium" does not convey any tangible or verifiable information about quality, but seems to give Japanese consumers a sense of high quality product. Another implication with industrial relevance is that of high consumer preference for non-marinated fillets. While companies may use significant resources to reach an ideal marinated product, consumers show little interest to the product concept as a whole. The consumers seem to think that the marinade is used to conceal that the product is not so fresh anymore, and therefore an indication of lower quality. This result could benefit the use of resources and company reputation of seafood product producers. A final industrial implication from the results described in this paper is linked to the origin of the fish fillets. While short value chains and locally sourced products would be the first priority, there is also differentiation to be made by which country is the imported product from. Quality differentiation is therefore at least two dimensional when it comes to origin and can be applied by a dual focus on local and domestic, or sourced by countries with a good reputation when it comes to quality and sustainability, such as Norway.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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