Examining barriers to seafood consumption among young adults in Norway and Russia

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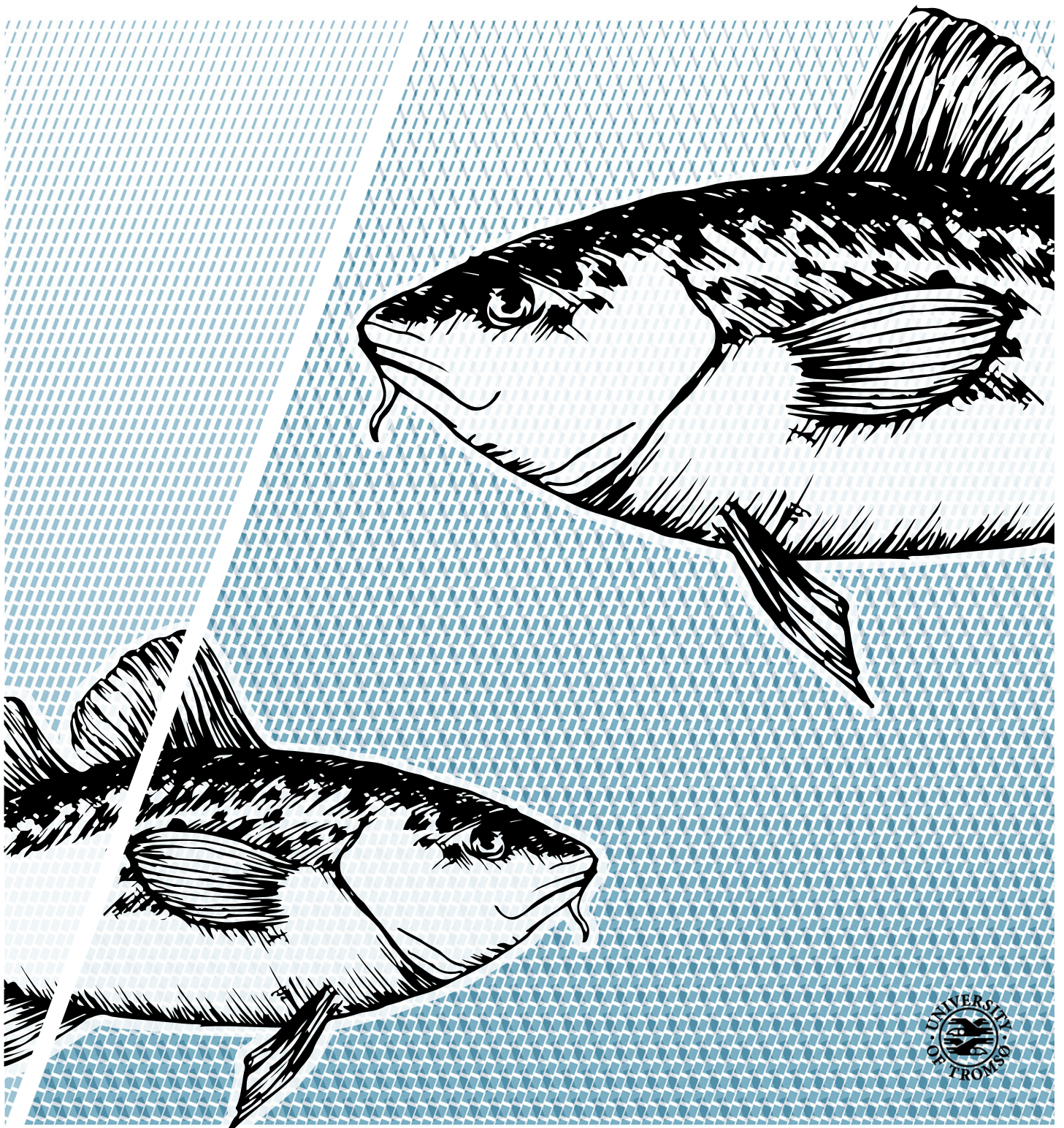
Abstract

Although the majority of people consider fish and seafood an important part of a healthy and balanced diet, the consumption of this food category in Norway and Russia is still below the recommended level, especially in younger age groups. This thesis discusses results of an online survey of young fish consumers in Norway and Russia, which focused on existing barriers to consumption of fish and seafood. Differences in perceived barriers in Norway and Russia could be to a large extent explained by differences in fish and seafood availability and quality of available products between the countries. Among Norwegian consumers, such barriers as a lack of satiety after consuming seafood, unpleasant smell and high price of fresh products explain variance in seafood consumption frequency. For Russian consumers, the main barriers are a difficulty to evaluate product quality, not liking the taste of fish in childhood, unpleasant sensory feelings and unsatisfactory variety of available fish products.

Acknowledgements

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Introduction

Supported by a number of studies, the idea that fish and seafood are an integral part of a healthy and balanced diet seems to be widely accepted these days. Researchers concur that regular consumption of fish provides health benefits, reducing the risk of depression (Tanskanen et al., 2001), cardiovascular diseases, type 2 diabetes, and fatal coronary artery disease (Thorsdottir et al., 2012). Presence of marine food in a diet also stimulates fat loss (Thorsdottir et al., 2007). In addition to being a source of well-known omega 3 fatty acids and high-quality protein, fish and seafood contain other components beneficial to health, namely Vitamin D, Vitamin B12, selenium, iodine, choline and taurine (Lund, 2013).

Yet, despite all the health benefits, in the majority of countries fish and seafood consumption is below the level recommended by public health institutions, which usually amounts to at least two portions per week, and accounts only for a small part of total animal protein intake (FAO, n.d.). Even in countries with generally high fish consumption, like Norway, around half of the population eat less than the recommended amount (Sjømatnorge.no, 2010). In Russia, where the nutrient intake is biased towards fats and carbohydrates (Honkanen, 2010), seafood consumption is also far below the desired level.

Although fish consumption is lower than desired among all age groups, it is argued that low intake of fish and seafood products is especially prominent among children and young adults (Thorsdottir et al., 2012). On the one hand, lack of fish and seafood products in the diet of today's young adults undoubtedly poses a health concern, both regarding their current health status and health issues that may develop in the future as a result of the maintained diet. On the other hand, provided that habits are steady constructs (Scholderer and Trondsen, 2008), it raises concerns that young adults can keep the habit of low fish consumption into later stages of life, with health issues becoming more prominent as people get older.

Another aspect of low fish consumption among young adults that can have consequences in the future deals with the fisheries industry as a whole. If people who are currently in their twenties do not increase their fish consumption intake as they age, this may lead to unfavorable consequences for the industry that employs a great number of people at all stages of seafood production and sales, and is of great economic importance for many countries.

1.1 Aim of the study

The purpose of this study is to identify the barriers that affect fish consumption behavior among young adults in Norway and Russia, and measure their relative importance. Given the cultural differences between the countries, as well as differences in dietary habits and seafood availability, we expect the factors to vary.

Knowledge on what exactly hinders young people from making a meal choice in favor of fish and seafood is essential for promoting fish as an important part of a diet, which subsequently leads to better public health as well as economic benefits related to the fishing industry.

Factors negatively affecting fish consumption will be examined with the help of the following research questions:

1. What are the main barriers for fish consumption among young adults in Norway and Russia?

2. How and to what extent do those barriers differ between the countries?

1.2   Defining fish and seafood

In a large part of previous studies on fish and seafood consumption, *fish and seafood* were considered a single undifferentiated food category (Carlucci et al., 2015). Following this tradition and provided that this study does not aim at exploring barriers to consumption of specific fish products, we will further use the terms *fish*, *seafood*, and *fish and seafood* interchangeably to encompass a large variety of marine- and freshwater-originated food products, including sushi and seaweed products.

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Consumption of fish and seafood

2.1   Chronological age and fish consumption

Although fish is perceived as a healthy food option among all age groups of adults (Brunsø et al., 2009), its actual consumption varies greatly. A number of studies have confirmed that frequency of fish and seafood consumption usually increases with age (Birch and Lawley, 2014; Olsen, 2003; Myrland et al., 2000), which is one of the examples of how food behavior and nutrient intake change over time.

Yet, chronological age is not the only factor that affects how much fish a person eats. Instead, the positive relationship between age and consumption can be mediated by a number of other factors, or even affected by factors not related to age at all. According to the conceptual model developed by Olsen (2003), changes in attitudes and motives that take place during the life course consequently lead to changes in eating habits. (Figure 1). Pieniak et al. (2010) suggest a more complex model (Figure 2), also including education, as well as subjective and objective knowledge about fish and seafood.
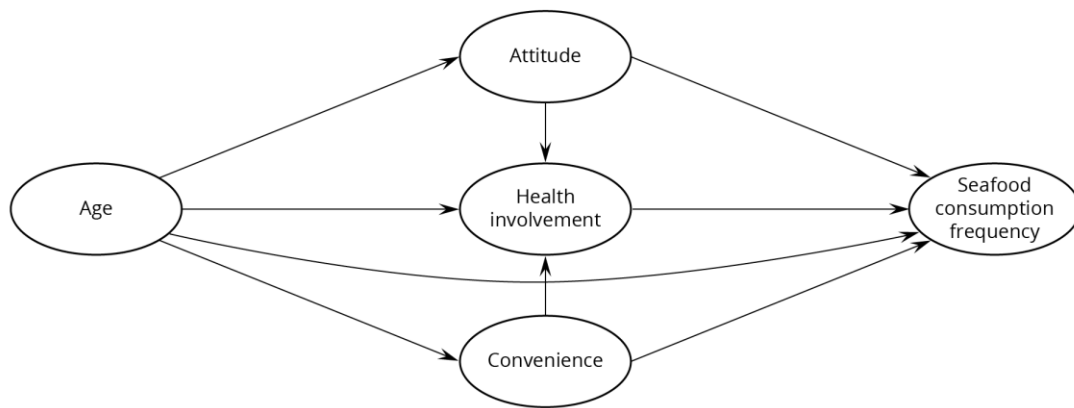
Figure 1. Relationship between age and fish consumption frequency (adapted from Olsen, 2003).
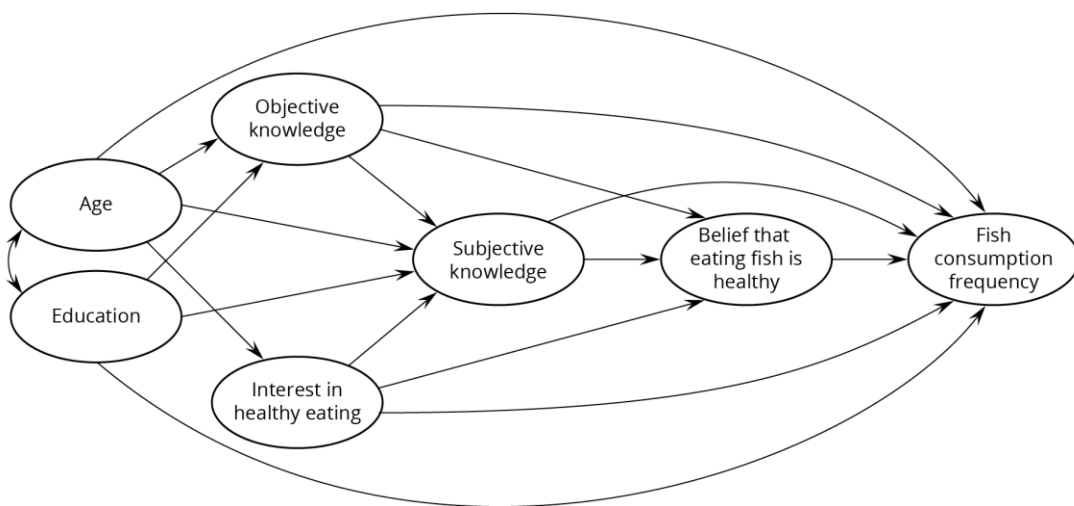
Figure 2. Relationships between predictor factors (including age) and fish consumption frequency (adapted from Pieniak et al., 2010).
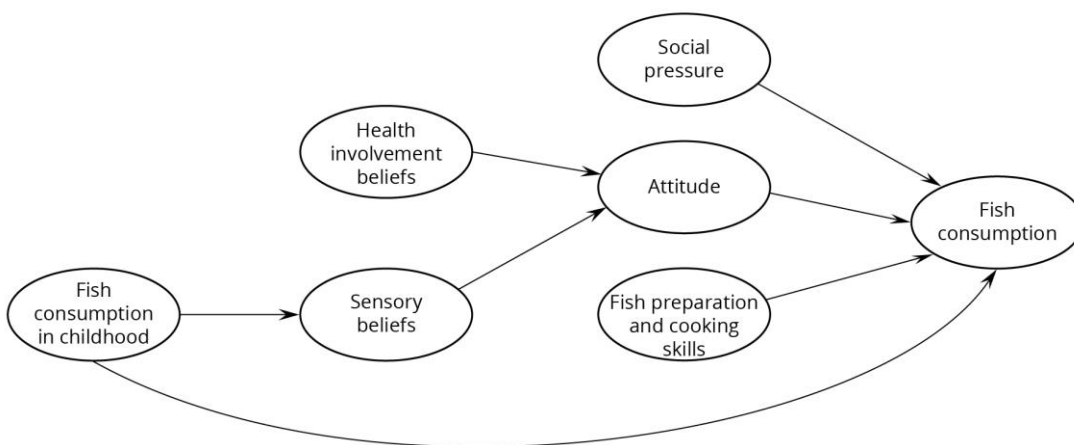
Figure 3. Relationship between fish consumption and predictor variables (adapted from Thorsdottir et al., 2012).

The model suggested by Thorsdottir et al. (2012) does not include age as a predictor valuable *per se* (Figure 3), yet the sample of this study was people between 17 and 26 years of age, which constitutes a relatively narrow age group where direct effect of age within the group might be not that visible and hence was not included.

With age being seen as a major input variable in the existing models, it should be noted that seafood consumption does not automatically increase as the chronological age increases (Pieniak, 2009). Other factors, although connected to and affected by age, also to a great extent reflect both the personal qualities and perceptions of a person, as well as the external circumstances.

The existing models imply that young adults as an age group have second lowest fish and seafood consumption level. Provided that consumption frequency would not increase significantly only with a positive change of age as an input factor alone, other factors need to be studied in order to assess their relative importance.

2.2   Importance of fish consumption for young adults

In accordance with the aforementioned models, young adults consume much less fish and seafood than older age groups, which was also mentioned in several studies (Altintzoglou et al., 2010; Thorsdottir et al., 2012). The diet of this age group, that includes for the most part people who move out from their parental homes and start independent lives, cannot be describes as healthy. No longer influenced by parents, young adults tend to shift their food intake towards consuming less fruit and vegetables, while eating more food that contains a lot of fat and a lot of calories (Deshpande et al., 2009).

Although health and chronic diseases are not as great of an issue in young adults, compared to, for example, elderly people, addressing health-related dietary biases, including low fish consumption, is still necessary. Since increasing intake of fish among today's young adults can lower the risk of such diseases as depression, cardiovascular diseases, and diabetes (Tanskanen et al., 2001;

Thorsdottir et al., 2012), it might be possible to prevent the occurrence of these diseases in the future.

Even though today's low fish consumption among young adults may increase with age, as the aforementioned models suggest, it is important to take into account that fish consumption is also greatly dependent on habit. Hence, there is a high chance that low fish intake may be kept further into adulthood. A similar idea is suggested in Olsen (2013) who argues that age might be not the only explanation of fish consumption level, but a cohort to which a person belongs, affects it too. Even though the "cohort" explanation is less likely than the "age" explanation, the experiences, attitudes, and preferences, that the cohort of today's young adults have will undoubtedly be kept into the future and affect the consumption patterns to a certain extent.

Last, but not least, young adults are future parents. Taking into account that parents affect food preferences of their children (Thorsdottir et al., 2012), ensuring healthy eating patterns among young adults will have positive effect on the future generations as well.

2.3   Defining the target group

When it comes to defining the age range of young adults, examples found in different studies demonstrate a high level of ambiguity. Some studies targeting young adults include respondents of a relatively wide age range, for example those who are 20–44 years (Fluge et al., 1998) or 19–43 years with a median age of 23 (Hutter et al., 2005). In other cases, the lower threshold of the group is somewhat higher, and the targeted respondents are 26–36 years old (Smith et al., 2014, presented age at the time of the first survey). Studies where students are used as respondents assume that young adults are 17–24 years old (Bartholomew and Horowitz, 1991) or have a mean age of 20.9 (Adolphus and Baic, 2011).

Under this study, the term *young adults* refers to individuals of 18–30 years of age. The lower limit marks the age of majority in both Norway and Russia, while the upper limit of 30 years allows the research to cover individuals in different stages of life that young adults go through, without the range being too broad.

2.4   Norway

Inhabited by more than five million people, Norway is stretched along the western side of the Scandinavian Peninsula. Most of its territory is mountains or high terrains, and the long coastline is deeply indented by fjords.

Figure 4. Map of Norway (adapted from Free Vector Maps.com, 2014).

To a great extent, the Norwegian economy today is owed to large reserves of oil and natural gas that were discovered several decades ago. Export revenues from the petroleum industry today account for a large share of the national GDP that contributes to the Norwegians high purchasing power. The country also ranks high in such lists as GDP per capita and Human Development Index (HDI).

For many centuries, the lifestyle and diet of Norwegians have been greatly influenced by the extensive coastline. Fisheries have been and still remain a major industry with its today's production far exceeding the domestic demand. The main fishing grounds are located in the North, Norwegian and Barents Seas. The area around the Lofoten archipelago is well known for its large seasonal fishery

on *skrei*, large spawning cod. In addition to capture fisheries, the coastal zone of Norway is a perfect place for fish farming, and today the Norwegian aquaculture industry ranks among the world's leading.

Seafood's availability has made seafood an integral part of the diet in Norway. According to FAO, fish and seafood consumption in Norway is one of the highest in Europe, and fish accounts for a large portion of total animal protein intake compared to other countries (FAO, 2011). Nevertheless, diet of Norwegians still can be improved, since on average they eat less vegetables, fruit, berries, and fish than recommended, while intake of fat, salt, and sugar is too high (Meltzer et al., 2014).

Despite public health in Norway is good in comparison to many other counties, the country keeps facing challenges in this sphere. As the amount of people over 70 years of age is constantly growing, the problem of prevention of chronic diseases is of great importance. Increase of fish consumption can be one of the measures aimed at improving public health in the future (Zahl, 2014).

Since fish has traditionally been part of the Norwegian diet, and the country has a good supply of fresh fish and seafood, it might be expected that seafood consumption level in young adults is higher than in other countries, especially in proximity of fishing grounds where availability is highest (Trondsen et al., 2003).

2.5   Russia

In comparison to Norway, Russia spans over a much larger territory, occupying one-eighth of the Earth's land area, and is home to almost 144 million people, as of 2014 (Federal State Statistics Service, n.d.). The country consists of over eighty federal subjects of different types that have different degree of autonomy. Although in some of federal subjects ethnical groups other than Russian prevail, on the country's level Russians make up 81 of the total population (Federal State Statistics Service, n.d.).

Figure 5. Map of Russia (adapted from Free Vector Maps.com, 2014).

The country has access to twelve seas of three oceans and the landlocked Caspian Sea, not to mention a great number of rivers and lakes. The total fish and seafood production make the country rank in the top ten of the top ten of the world's leading producers. Despite this, per capita supply of fish and seafood is relatively low, and fish proteins account only for a small portion of total protein intake (FAO, 2011).

Table 1. Key figures of fish and seafood production, supply, and consumption in Norway and Russia (FAO, 2011).

Country	Norway	Russia
Production (tons, live weight)	3 683 302	4 383 302
Imports (tons, live weight)	211 342	1 169 102
Exports (tons, live weight)	2 992 012	1 942 151
Per capita supply (kilograms, live weight)	53.4	22.3
Fish proteins (grams per capita per day)	15.1	7.5
Fish proteins in total protein intake (%)	13.8	7.4

Although the modern Russian diet is in many ways formed by the circumstances that the country has experienced in the last three decades, it has traditionally been different from what we today consider healthy. Back in the Soviet times, unstable food supply as well as shortages of food made people value energy-rich and fatty foods. The breakup of the Soviet Union had a strong effect on all aspects of people's lives, with the diet not being an exception. Several economic crises and a quick transition to a new economic system made many struggle economically, with having to spend more money on food. At the same time, public health became a significant issue, as life expectancy dropped significantly and certain chronic diseases have risen (Honkanen and Frewer, 2009).

However, as the county was recovering and the GDP was showing a steady growth, situation with unhealthy and biased diet was not improving. For example, by the late 2000s the Russians ate almost 50% less fish and up to 40% less meat than in 1990. This reduction was compensated by increased consumption of carbohydrates, namely bread and potatoes that even strengthened the existing bias (Honkanen, 2010).

Moreover, the country follows the modern trend also visible in many western countries that is characterized by increased consumption of, among others, alcohol, sweets, FAFH[1], and fast-food (Staudigel and Schröck, 2014). Given that fish has proven to be beneficial for health, increasing fish and seafood consumption, especially among younger age groups, may be one of effective measures that can be used to increase public health.

However, finding barriers to higher seafood consumption among Russians, as well as their food-related preferences in general, may be challenging for a number of reasons. First of all, research on food preferences of Russian consumers is generally limited. To our knowledge, there are no published studies on fish consumption among young adults in Russia. Secondly, Russia is characterized by great diversity both in terms of geography and ethnical composition of the population. Although the country has access to fishing grounds in several seas, a number of areas (including major cities) are far from them. These areas may

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[1] Food away from home

have worse supply of fish and seafood due to logistics, and fish in those areas is most likely not the dish that has been eaten traditionally. To add up on that, a number of minor ethnical groups live in Russia, with some of them having a different religion, language, as well as food preferences from the Russians that constitute the majority of the population and their culture and preferences are generally reflected in the studies, unless otherwise stated. Moreover, Russia demonstrates big differences in terms of life rural and urban population as Petrenya et al. (2011) demonstrated. If studies conducted in cities (Honkanen and Frewer, 2009; Honkanen et al., 2011) show that Russians do not eat enough fish and seafood, then the situation in rural areas, which are in many aspects different from the largest cities (Andersen et al., 2009), is likely to be even more striking.

Provided that fish consumption dropped in the 1990s when a large portion of today's young adults were children, we might expect that they were unable to establish a strong habit of eating fish back then, and their attitude towards fish expressed in sensory perceptions is not positive enough.

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Barriers to fish and seafood consumption

Existing barriers to fish consumption were investigated and described as part of a systematic review conducted by Carlucci et al. (2015). Based upon 49 pieces of literature, the study was aimed to synthesize main findings of recent research on purchasing behavior towards seafood from a number of international studies.

The model of consumer purchasing behavior proposed in the paper (Figure 6) connects the influencing factors with quantity, frequency, and characteristics of consumed fish via two parallel pathways. On the one hand, consumption is defined by choice relative to quality and frequency of consumed fish and seafood. This choice, in turn, is mediated by drivers (positive influence) and barriers (negative influence) to seafood consumption. The model presented in the study groups all factors into seven categories, with each of them represented by both drivers and barriers. On the other hand, fish consumption is mediated by choice relative to characteristics of actual fish products. Even though the proposed model suggests that there are interactions between factors that serve as drivers and barriers, the quality, degree and direction of them remains unclear.

Since we believe that this paper presents the best outline of known drivers and barriers to fish consumption available to date, we will use this grouping for the purpose of this study in order to assess the relative importance of factors and how they explain the variance in fish consumption frequency in Norway and Russia.

Although drivers and barriers in this model may be seen as opposing each other, they do not exclude each other. A complementary relationship between them is also present, similar to barriers and drivers related to health perception. Even if we assume that fish and seafood a number of health benefits, it does not automatically imply absence of health risks. Still, with risks being present, we often see situations where benefits outweigh them in the final choice (Birch and Lawley, 2012).
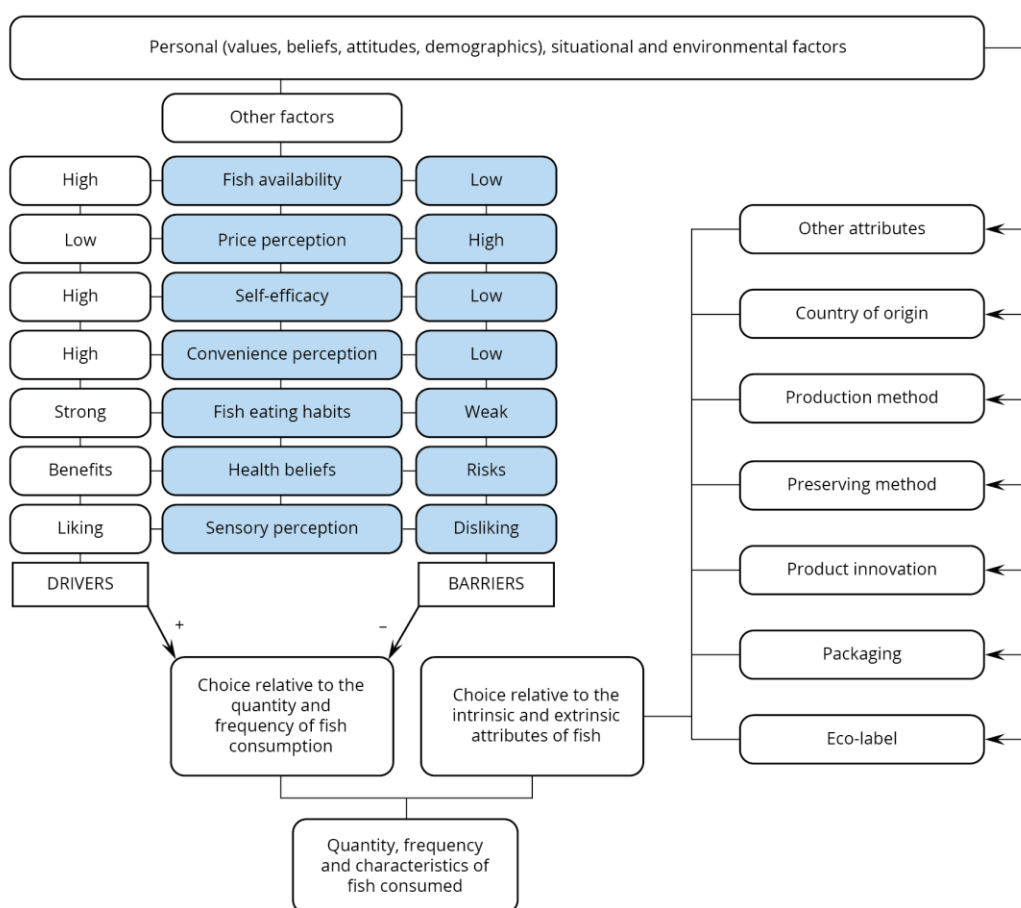
Figure 6. Drivers and barriers of fish consumption, and attributes of fish products most relevant for consumers. Blue areas indicate barriers examined in the current study (adapted from Carlucci et al., 2015)

3.1   Fish availability

As it is the case with any other food product, consumption of fish and seafood depends on whether the products are available and what assortment consumers can choose from. Thanks to modern preservation methods, production technologies, and logistics, people today can enjoy a wide assortment of fish and seafood that was impossible even several decades ago. Fish and seafood is no longer a local food option that is available only to those who live close to fishing areas. Fish trade has become a profitable global industry, thanks to which, for example, Norwegian farmed salmon is today sold fresh in many parts of the world.

Yet, the aforesaid does not imply that the fish and seafood market is saturated and one can choose from an infinite range of available products in any place. Although fresh fish, for instance, is no longer a product exclusive to coastal areas, its variety and quality in cities far from the fishing grounds is undoubtedly lower than on the coast.

It should also be mentioned, that availability is to a large extent a subjective factor. As it has been demonstrated in a study conducted in Norway, people who grew up in coastal areas where fresh fish and seafood were widely available, but later moved inland, perceive the assortment there as limited (Trondsen et al., 2003). This observation is somewhat similar to the observed effect of assortment or, in other words, consideration set on fish consumption. The more product alternatives are available, the more likely consumers are to choose fish and seafood as a meal option. Consequently, consumers perceive a lack of product variety as a barrier (Carlucci et al., 2015; Myrland et al., 2000).

In many ways, the increased availability of fish and seafood products today, in comparison to the past, is marked with a higher range of different product categories, rather than alternatives within a certain product category. Moreover, from a consumer point of view, all fish and seafood are divided into several categories or segments depending on when they are eaten. Some fish products are seen as suitable for everyday consumption, while other (usually high value or exotic) are considered an option for a restaurant or weekend meal (Altintzoglou

et al., 2010). Since the actual range of products in different places can vary significantly and make any kind of comparison hard or even impossible, the current study will refer to fish and seafood as a whole category (including sushi and processed fish and seafood) or make a distinction between fresh, frozen, and canned fish and seafood (similar to Grieger, et al. 2012; Birch et al., 2012)

3.2   Price perception

Different products that belong to the category of fish and seafood constitute a wide range in terms of both type and market price. On the latter scale, fish and seafood span from inexpensive frozen tilapia fillets to premium products like black caviar or lobsters. However, from a consumer point of view, all fish and seafood appear to be a more pricey food alternative than other sources of protein, including meat. Together with a higher perceived price, fish and seafood are also seen as less filling (McManus, et al., 2012; Carlucci et al., 2015).

Several studies that focus on barriers to fish and seafood consumption list price or price perception as a major or even the main barrier that prevents people to consume more fish (Birch et al., 2012; Vanhonacker, 2013, Staudigel and Schröck, 2013). As it could be anticipated, this factor varies for products of different price categories. For example, a study conducted in Australia by Birch et al. (2012) showed that price has a different effect as a barrier for fresh (chilled) and frozen fish. The participants of the study reported price to be the most important barrier for fresh fish and seafood that have shorter shelf life and are more expensive. For frozen seafood, price was on the fourth place with a much lower score. Price also functions as an important indicator of fish quality and freshness (Brunsø et al., 2009), which may indicate that consumers are willing to pay more for high-quality fresh fish products, and the price barrier in this case might be lower.

Although price is most often a limiting factor for fish consumption, in case of price promotion, it positively affects impulse seafood purchasing (Birch et al, 2012).

3.3   Self-efficacy

The factor of self-efficacy directly refers to a person's level competence in preparing fish. It is mostly related to fresh fish, a product category that is believed to require a higher competence in of consumers, but also is relevant to all other types of products at all stages where a consumer interacts with them, from assessing the quality of a product upon purchase to preparing a meal from it. As a factor, self-efficacy builds upon a consumer's knowledge, experience, expertise, and self-confidence. It is considered that lower self-efficacy in preparing fish and seafood dishes functions as a barrier and leads to lower consumption (Birch and Lawley, 2012; Carlucci et al., 2015).

As it is argued by Carlucci et al. (2015), self-efficacy is positively related with age and involvement with food in general. Hence, we can expect that self-efficacy among the targeted group of young adults is lower than it would be among older consumers, since young adults have not had enough time yet to acquire necessary knowledge and skills to become confident consumers of fish and seafood.

3.4   Convenience perception

Convenience can be defined as the ability of a consumer to save time and effort while preparing food. Although fish is generally seen as an inconvenient meal option (Olsen et al., 2007) that requires a log of time and effort in preparation, some fish products, namely processed fish, is perceived as an easy and quick food option (Carlucci et al., 2015).

As perceived inconvenience of fish is directly related to a person's convenience orientation, and perceived inconvenience of fish affects fish consumption negatively (Carlucci et al., 2015), it has been proven that those consumers that see fish and seafood as difficult to prepare, eat little products of this category (Birch and Lawley, 2012).

Convenience is also a factor that is connected to age. Younger consumers who tend to have less cooking skills compared to older age groups might perceive

the range of available convenient products as much narrower, and hence perceive a wider range of fish and seafood products as inconvenient (Scholderer and Trondsen, 2008).

3.5   Fish eating habits.

Proved to be a strong predictor of fish consumption, the habit component is to a great extent linked to past experiences associated with eating fish. Although Carlucci et al. (2015) argue that there are not enough studies on formation of fish consumption, the studies listed and discussed there (namely Altintzoglou et al., 2010; Thorsdottir et al., 2012; and Trondsen et al., 2003) suggest that regular fish consumption in childhood lead to establishing consistent fish eating habits in adulthood. According to Birch and Lawley (2014), regular fish consumption in childhood also results in a more favorable attitude towards fish and seafood in adults. Yet, it does not mean that an adult person would automatically consume the same amount of fish as in his or her childhood. Other factors that the person comes across as he or she starts an adult life may weaken the existing habit (Carlucci et al., 2015).

3.6   Health beliefs

Fish is generally perceived as a healthy food option, and its consumption is proved to have a number of health and nutritious benefits (Tanskanen et al., 2001; Thorsdottir et al., 2012; and others). The fact that fish is associated with health contributes positively to a more frequent consumption of fish (Pieniak, 2009). Although the majority of people today are aware that eating fish is beneficial for health and have a positive image of fish and seafood, the knowledge about what exactly makes this product category good for health is quite limited (Pieniak et al., 2010). Perception of fish as a healthy food increases with age and level of fish consumption. As it was demonstrated in a study of Belgian consumers, many people believe that fish contains dietary fiber, which is not true to the fact (Verbeke et al., 2005).

Although virtually everyone is aware that fish is healthy, health information is more effective in increasing sales than low prices. Thorsdottir et al. (2012) argue that a decrease in price would be less efficient than additional promotion of health benefits.

As Carlucci et al. (2015) show on the example of several studies, fish consumption is positively related to a person's involvement in sticking to a healthy diet. Knowing that fish is healthy appears to be common knowledge today and it does not increase actual consumption, while personal beliefs that diet is crucial for health does.

Together with health benefits, fish consumption might impose certain health risks that may lead to a decrease in fish consumption. Environmental contaminants such as pesticides, PCBs, and heavy metals may be present in wild-caught fish, while colorants and antibiotics are a major concern for farmed fish and seafood (Verbeke et al., 2005). According to existing studies, no significant negative effect of health risks on the level of fish and seafood consumption has been found (Carlucci et al., 2015).

3.7   Sensory perception

As it is the case with other food products, sensory characteristics of fish and seafood, such as taste, texture, and smell, are important determiners of fish consumption. Consumers use these characteristics to evaluate the freshness and, consequently, the quality of fish and seafood products (Carlucci et al., 2015)

In a number of studies, attitude was used as a proxy means of sensory perception. Sensory aspects and taste are among the major criteria that define a person's attitude towards a food product as positive or negative. Yet, their affect is to a certain degree situational and largely depends on the species or type of product (Olsen, 2003). As it has been concluded in several studies, younger consumers express less positive attitude towards fish and seafood compared to elderly people (Birch and Lawley, 2012; Olsen, 2003).

3.8   Other measures

According to the conceptual model in Carlucci et al., (2015), quantity, frequency, and characteristics of fish consumed are determined by both factors defining quantity and frequency of fish consumption and attributes related to fish and seafood products themselves. The most relevant characteristics include country of origin, preserving methods, eco-labeling, and others. With those characteristics referring to actual products, rather than fish and seafood as a category, we believe that they can also perform the function of drivers and barriers to a certain extent, but applicable to the products they represent. Observing general trends, however, may be useful to accompany and expand the knowledge related to existing barriers to fish consumption.

Based on the theoretical findings, this paper will explore the research questions by the following more specific supplemented questions:

— How can those barriers be explained by the country's culture, dietary habits and seafood availability?

— How different are perceptions of attributes related to the intrinsic and extrinsic attributes of fish?

— To what extent does the lack of availability of fresh fish and seafood affect consuming behavior?

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Methodology

4.1. Participants and data collection

In order to explore the research questions, an online survey was conducted in March–April 2016. To recruit participants, a convenience sampling method was used. Although it is considered non-representative of entire population and has limitations, it is the least expensive and time consuming of all strategies used for sampling. Given that the available resources were not sufficient to employ techniques used by professional marketing companies, this method appeared to be optimal for the purpose of the master's thesis. Since the respondents recruited through this method do not represent the entire populations, the results of this study should be interpreted with caution and cannot be extrapolated on all young adults in Norway in Russia (Malhotra and Birks, 2007).

The questionnaire was originally designed in English and its questions were tested in pilot interviews prior to the main study with individuals from the target group selected at convenience (10 interviews were conducted in each country). During the interviews conducted either face-to-face or via Skype, the respondents were asked to fill out the questionnaire while providing comments

concerning the questions themselves as well as why they choose a certain option or answer. The comments provided during the pilot interviews were recorded and the relevant ones will be later used to illustrate the results of the study.

After the interviews the phrasing of some questions was modified to make sure that respondents understand them in the way they were intended. For example, it was discovered that many people, both in Norway and Russia, do not see sushi as a seafood product and hence do not think of it when asked about frequency of seafood consumption.

> *No, I do not think about sushi then. In my mind, seafood is fish, crabs, and shrimp. […] Sushi is sushi, and fish is fish.*

Due to this, the text of some survey questions was modified to avoid misunderstanding and a reminder that sushi is a seafood product was included in the description of the questionnaire. The questions were then translated into Russian and Norwegian, and the translations were compared to each other to avoid inconsistency and various readings, and hence keep influence of language factors on the outcome of the study to a minimum. Using the online-based survey tool SurveyGizmo[2], two versions of the questionnaire were created for participants from Norway and Russia respectively.

Invitations to fill out a questionnaire were posted by the author of the study to his personal accounts on social networks. The invitation in Russian was posted on VK[3], the most popular Russian social network, and Facebook[4]. The invitation in Norwegian was posted on Facebook only. The posts contained brief information about the study, a link to the online questionnaire, a picture to draw more attention in the newsfeed, as well as an invitation to participate in study and share the post with friends.

Since the survey was published online and did not have any limits related to what country it could be filled out from, the self-reported values of location are intended to sort the responses. Only responses from people currently residing

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[2] http://www.surveygizmo.com; SurveyGizmo, Boulder, CO, USA
[3] http://vk.com
[4] http://facebook.com

in Russia and Norway were considered as valid for the Russian and Norwegian versions of the survey respectively. Using the self-reported value of age, only questionnaires filled out by people of 18–30 years of age were considered valid.

One of the major drawbacks of surveys conducted online is that they are only available to people who use the Internet (Malhotra and Birks, 2007) and, in case of this study, social networks. However, given that young adults belong to the most active group of Internet and social network users, we assume that the amount of people who could not access the survey due to that is not statistically significant. Provided that users actively shared the post with the questionnaire link, the reached audience greatly exceeded the personal connections of the author and, thus, increased the validity of results.

After the survey had been performed, the collected data was extracted from SurveyGizmo as a CSV spreadsheet and processed using Microsoft Excel[5] and SPSS[6].

4.2. Measures

The demographic section of the survey included questions on age, gender, education, household composition, employment status, income level, as well cities of residence and origin. Each respondent was asked to provide his or her chronological age as a number, which gives more flexibility in processing the data results compared to using small age ranges. A widely used question about the number of people in the household does not reflect all possible variants of household composition, hence the following options were used: "I live alone", "I live with my parents", etc.

In order to be able to compare the effect of income on seafood consumption in the two countries with a significant difference in GDP per capita, income, and costs of living, the standard scale of income ranges was abandoned in favor of a scale where a respondent chooses what he or she can afford. The options range from "Can afford anything including major purchases" to "Can afford most of

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[5] Microsoft Office 2013, Microsoft Corp, Redmond, WA
[6] IBM SPSS Statistics version 23

durable goods" and down to "Can hardly afford food". Given that income is measured in relative but not in absolute values, it allows for an easier comparison of Norway and Russia, as well as a comparison of "expensive" cities with higher income (for example Moscow or St. Petersburg) to smaller cities in Russia. Relative measures might also be more convenient in this case because questions related to income and wealth are generally considered sensitive or even inappropriate. By not asking for exact absolute values, we hope to reduce item nonresponse.

For fish and seafood consumption frequency, a self-reported measure was used. The respondents were asked to assess how often they eat fish and seafood on average. For further analysis the values were converted into times per week, where "I do not eat fish and seafood" = 0, "less than once a month" = 0.1, "1–3 times per month" = 0.5, "once a week" = 1, and up to "five times a week or more often" = 5. Those who answered that they do not eat fish and seafood were asked to provide the reasons for that ("I am vegetarian", "Someone in my household does not eat fish and seafood", and others. The respondents who answered that they eat fish and seafood were presented with statements assessing barriers to seafood consumption and perception of extrinsic and intrinsic characteristics of fish and seafood. Respondents were asked to range those statements using a 7-point Likert scale ranging from "Strongly disagree" (1) to "Strongly agree" (7).

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Results

5.1   Profile of respondents

Out of all respondents from Russia and Norway who filled out the online-questionnaires, 560 and 217 respectively met the criteria of age and place of residence. Since some people do not eat fish at all, and thus did not provide any information on factors influencing their fish consumption, while some others dropped out after filling out one or several pages of the questionnaire, the total number of full questionnaires equals to 463 in Russia and 190 in Norway. Data from partially filled responses were used in the analysis due to the fact that they could provide at least some information valuable for the study. Answers provided in open fields were proofread to ensure uniform spelling.

Table 2. Profile of respondents from Norway and Russia.

Demographic variable	Norway		Russia	
Number of questionnaires (n (%))				
Filled out	217	(100)	560	(100)
Eat fish and seafood	208	(95.9)	525	(93.8)
Full questionnaires	190	(87.6)	463	(82.7)
Age (years)				
Mean (SD)	24.6	(3.1)	24.7	(3.1)
Gender (%)				
Males/females	37.8/62.2		25.9/74.1	
Education (n (%))				
Less than high school	1	(0.5)	2	(0.4)
High school	48	(22.2)	28	(5.0)
Technical school or equivalent	6	(2.8)	33	(5.9)
Some university, no degree	31	(14.4)	86	(15.4)
University degree	129	(59.7)	406	(72.5)
PhD or higher	1	(0.5)	4	(0.7)
Other	0	(0.0)	1	(0.2)
Household (n (%))				
Alone	54	(24.9)	81	(14.5)
Shared residence	71	(32.7)	69	(12.3)
With parents	16	(7.4)	124	(22.1)
With partner/spouse	60	(27.6)	200	(35.7)
With partner/spouse and child/children	12	(5.5)	80	(14.3)
With child/children	2	(0.9)	3	(0.5)
Other	2	(0.9)	3	(0.5)
Occupation (n (%))				
Unemployed	5	(2.3)	14	(2.5)
Student	130	(59.9)	108	(19.3)
Homemaker	0	(0.0)	13	(2.3)
Employed	74	(34.1)	370	(66.1)
Self-employed	5	(2.3)	42	(7.5)
Other	3	(1.4)	13	(2.3)
Income (n (%))				
Can hardly afford food	2	(0.9)	6	(1.1)
Can afford food	60	(26.7)	90	(16.1)
Can afford food and clothes	93	(42.9)	297	(53.0)
Can afford most of durable goods	26	(12.0)	79	(14.1)
Can afford practically anything	21	(9.7)	83	(14.8)
Can afford anything	15	(6.9)	5	(0.9)

Demographic variable	Norway		Russia	
Fish consumption frequency (n (%))				
I do not eat fish and seafood	9	(4.1)	35	(6.3)
Less than once a month	11	(5.1)	61	(10.9)
1–3 times a month	37	(17.1)	183	(32.7)
Once a week	42	(19.4)	135	(24.1)
Twice a week	64	(29.5)	83	(14.8)
3 times a week	38	(17.5)	42	(7.5)
4 times a week	10	(4.6)	16	(2.9)
5 times a week or more	6	(2.8)	5	(0.9)

Respondents were not equally distributed across all possible ages within the given range. However, since the distribution has a similar bias and there is no significant difference in mean age for both studied countries, we find the results acceptable for comparison. Similarly, the majority of survey participants in both Norway and Russia has higher education or are currently getting it. Hence, the results that will be discussed below will be most relevant to this social group.

Despite that, differences between household situation and primary occupation in two countries can be clearly seen. In Norway more people live on their own (including residences shared with roommates), while in Russia more people live with parents or partners, which can be explained by the economic situation as well as cultural differences between the countries. Average age of first marriage in Russia is lower than in Norway, and many people get married soon after they have graduated from university. Similarly, Russians get children earlier, which is reflected in a higher percentage of respondents having children in the household. Since Russia does not have a system of supporting students similar to the Norwegian Lånekassen, Russian students tend to live with their parents if they study at the university at the city they are from. This reason also makes people usually start working after graduating and if they want to continue education, they do it part-time alongside with having a full-time job. Moreover, the education system in Russia is less flexible and it makes extension of the study period less.

5.2   Reported frequency of fish consumption

As many as 54.4% (n = 118) of respondents in Norway reported that they eat at least the recommended amount of fish and seafood of two portions per week on average. Among respondents living in Russia only 26.1% (n = 146) eat the recommended amount or more. With conversion indexes used in this study, the mean amount of fish and seafood consumed in Norway and Russia equals to 1.72 and 1.10 portions per week respectively (1.80 and 1.17 if we exclude those who do not eat fish at all).

Although 4.1% and 6.2% of the respondents in Norway and Russia reported that they do not currently consume fish or seafood at all, their motives were not explored under this study. As Jahns et al. (2014) hypothesize, factors that limit fish intake among people who eat less fish and seafood than recommended and people who did not eat fish and seafood at all would be different. Moreover, the sample size of this study does not allow drawing any valid conclusion for the group of fish non-consumers.

Table 3. Reported reasons for not eating fish among young adults from Norway and Russia.

Reason (n (%*))	Norway	Russia
I am allergic to fish and seafood	0 (0)	3 (8.57)
I do not like fish and seafood	2 (22.2)	19 (54.2)
I am vegetarian/vegan	7 (77.8)	18 (51.4)
I am concerned about contaminants in fish and seafood	4 (44.4)	3 (8.57)
Someone in my household does not eat fish and seafood	1 (11.1)	0 (0)
I cannot afford fish and seafood	0 (0)	0 (0)
Fish and seafood is too difficult to prepare	1 (11.1)	0 (0)
It is difficult to find fish and seafood of good quality	1 (11.1)	1 (2.8)
Selection of fish and seafood in the stores is too bad	0 (0)	0 (0)
Other	0 (0)	0 (0)

* Percentage of the total amount of reported fish non-consumers in the country.

In Norway, most of the respondents lived in Tromsø (37.8%), Oslo (16.6%), Trondheim (6.9%), Bodø (6.0%), and Bergen (5.5%). The majority of respondents from Russia lived in Arkhangelsk (28.0%), St. Petersburg (20.7%), and

Moscow (15.9%)[7]. Other cities and areas in both countries are underrepresented.

The collected data show that there is a statistically significant relationship between age and seafood consumption within the studied age group in both countries. The correlation coefficients, however, are relatively low (0.092 and 0.046 in Norway and Russia respectively) with low R-squares (0.057 and 0.018). This goes in line with numerous studies that proved a more distinct positive relationship between age and fish consumption, yet, samples in those studies included a much wider age range, where such a trend can be clearly seen (e.g. Myrland et al., 2000; Honkanen, 2010). In case of young adults, that are the target group of this study, not only the age range is much narrower, but also factors like changes in household situation (moving out from parents' house, moving in with a partner, etc.) may have a greater effect on food choice than an increase in chronological age.
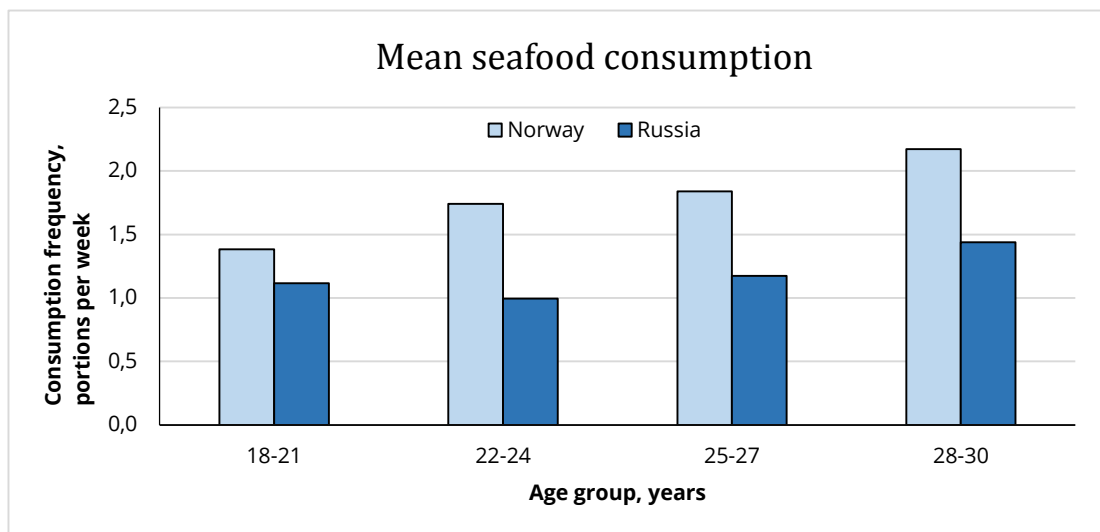
Figure 7. Mean seafood consumption across age groups in Norway and Russia.

For both Norway and Russia, mean seafood consumption slightly increases with the level of education and income, which also increase with age, and people who live with kids eat fish and seafood more often than those who live alone. Yet, groups with different income, education, and household situation are not equally represented in the studied population, and the mean age in those groups is

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[7] Here and below, in percent from all respondents who reported that they consume fish and seafood, unless otherwise stated.

different. Hence, the current study cannot provide any valid and clear conclusion on the distinct influence of those factors.

The collected data show a significant gender bias in the studied samples where women prevail (62.2% of all respondents in Norway and 74.1% in Russia). At the same time, this cannot be seen as a drawback, since people of both genders show no difference in fish and seafood consumption levels and it is argued that in general women are more likely to take food choice decisions and thus define the diet of other people in the household (Myrland, et al., 2000). No statistically significant difference in mean fish consumption between women and men in the studied group of young adults has been found either.

5.3   Geographic variance in fish consumption frequency

Since in both Norway and Russia a large part of the survey participants lived in some few cities, comparison of these cities was done when possible to illustrate differences existing within the countries. For that, Tromsø and Oslo were chosen in Norway, and Arkhangelsk, St. Petersburg, and Moscow were chosen in Russia. What is more, one of the cities in each country is located on the coast, and one city is the capital and the largest city of the country, which allows comparing seafood consumption and other parameters in case of different availability of fresh seafood.
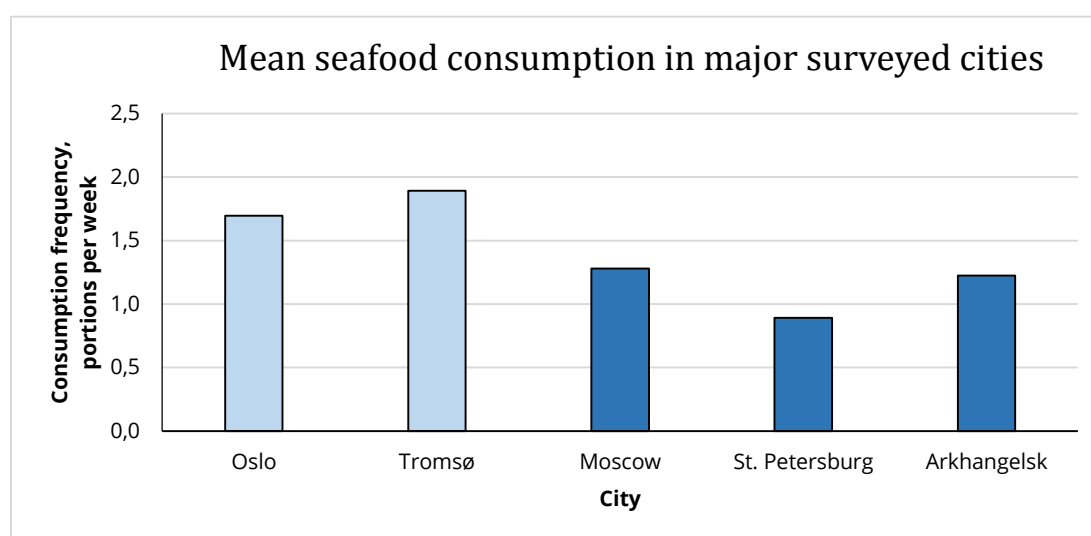
Figure 8. Mean fish and seafood consumption among young adults 18-30 years in major surveyed cities in Norway and Russia.

5.3.1 Norway

Mean seafood consumption in the two examined cities in Norway does not
show any statistically significant difference. People in Tromsø, a coastal city in
the north of the country, eat 1.916 portions of fish per week on average
(n = 81), while people in Oslo, the capital city in the south-east, eat 1.909 por-
tions per week (n = 32). Yet, given that mean age of respondents from Oslo is
higher, a lower level of fish consumption may be expected there in case of the
same given age.

5.3.2 Russia

In contrast with Norway, respondents from the different Russians cities have a
different level of fish and seafood consumption. Moscow[8] has the highest sea-
food consumption of 1.335 portions per week on average (n = 84), followed by
Arkhangelsk with 1.283 portions per week (n = 150). Both of the cities are
above the country's average. In St. Petersburg, mean fish and seafood consump-
tion is significantly lower and amounts 0.958 portions per week (n = 107),
which is less than a half of the recommended amount. Although not enough data
was collected to estimate average consumption in smaller cities, we can expect
the numbers there to be significantly smaller, similar to what was shown in the
study comparing Arkhangelsk with a rural settlement of Nelmin-Nos (Petrenya
et al., 2011).

5.4. Influence of barriers on fish consumption frequency

A regression analysis was performed in order to find out which of the barriers
exert a negative impact on fish and seafood consumption frequency, and to
what extent this is different in Norway and Russia. Two statements ("I consider
my diet healthy" and "There are health benefits associated with eating fish and
seafood") were not included as independent variables since they do not repre-
sent actual barriers for fish consumption, but were used to assess the attitude of
respondents towards fish consumption in relation to health. Similarly, two

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[8] Mean age of respondents from Moscow is higher than from the two other cities, while the
number of respondents is lower.

more items were excluded ("Fish and seafood are not an integral part of my diet" and "I am not familiar with preparing fish and seafood at home") as they do not represent the barriers but reflect the actual consumption level instead, and thus cannot be used as independent variables. Statements grouped under *Other measures* reflect intrinsic and extrinsic qualities of certain fish and seafood products and are not barriers to fish consumption in general (For full list of barriers see Appendix B).

Table 4. Barriers explaining variance in seafood consumption level among young adults in Norway.

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.075	.237		12.956	.000
I do not consider fish and seafood filling	-.228	.059	-.265	-3.887	.000
Fish and seafood have an unpleasant smell	-.123	.047	-.182	-2.596	.010
I consider fresh fish and seafood an expensive meal option	-.120	.047	-.175	-2.540	.012

Table 5 Barriers explaining variance in seafood consumption level among young adults in Russia

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	2.159	.193		11.177	.000
I am not good at determining the quality of fish and seafood	-.127	.029	-.211	-4.456	.000
I did not like the taste of fish and seafood when I was a kid	-.052	.022	-.111	-2.413	.016
Touching fish and seafood is unpleasant	-.056	.026	-.099	-2.108	.036
Most of my friends do not eat fish and seafood regularly	-.066	.030	-.098	-2.195	.029
I am not satisfied with the variety of available fish and seafood where I live	.047	.023	.088	1.993	.047

5.5. Perception of barriers to fish consumption

5.5.1 Fish availability

People's perception of fish availability in both Norway and Russia varied significantly between different product categories. Respondents from Russia see the available range of fresh fish and seafood as not wide enough, while Norwegian respondents are satisfied with it. On the contrary, consumers from Russia reported a higher availability of canned fish and seafood. As the majority of fish sales in big Russian cities take place through supermarkets and hypermarkets (Norwegian Seafood Council, 2015), the perceived lack of high-quality available fish there appears to be a significant barrier. A respondent living in Moscow commented:

> *I have no idea where I could buy [fish]: I don't have enough time to go to fish markets, and what I see in chain supermarkets is not fish, but just rotting carcasses which, what's more, cost a lot of money.*

As for available variety of seafood in Norway, respondents were quite neutral in general, with people in Tromsø being slightly more satisfied than the country's average, and people in Oslo being less satisfied. What is notable, even relatively high availability of fish and seafood can sometimes be seen as insufficient. For example, during a preliminary interview a respondent, who grew up in Arkhangelsk but now lives in Tromsø, noted that the range of seafood there was not wide enough.

> *I actually used to eat quite a lot of fish when I was a kid. And I am used to being able to choose from different fishes. Whenever I go to a supermarket here, I only see salmon, cod and maybe something else, but when I travel back home I can also eat navaga, toothfish, salted herring (not the pickled one that they sell in Tromsø), capelin, smeltfish, sterlet, and so on. I also spent a lot of time trying to find squid here, but I couldn't.*

In Russia, respondents saw the available variety of fish as not wide enough, with large cities like Moscow and St. Petersburg scoring slightly higher than the country's average. For both countries, the older the respondents were, the less satisfied they were with fish availability at the place of their residence.

Table 6. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to fish availability among participants from Norway and Russia.

	Norway	Russia
There is not a wide range of fresh fish and seafood available where I live	2.95 (1.74)	3.46 (1.96)
There is not a wide range of frozen fish and seafood available where I live	2.47 (1.44)	2.73 (1.72)
There is not a wide range of canned fish and seafood available where I live	3.25 (1.45)	2.38 (1.49)
I am not satisfied with the variety of available fish and seafood where I live	2.96 (1.66)	3.92 (1.93)
There are not many restaurants with fish and seafood dishes (including sushi) where I live	2.74 (1.79)	2.80 (1.91)
There is a lack of sushi offerings where I live	2.85 (1.91)	2.04 (1.57)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.2 Price perception

Perception of fish and seafood as an expensive meal option, appears to be similar for both Norway and Russia with fresh seafood being the most expensive category, and canned seafood the least expensive one. However, perception of fish as having being good value for money is different. The majority of respondents from Russia expressed agreement with the statement that fish is not good value for money, while respondents in Norway disagreed with it. Perception of fish as good value for money increased with age.

Although other studies found that fish and seafood is seen as not filling enough in comparison to other sources of protein, like meat (Brunsøet al., 2009), the respondents tend to disagree with it

> *I cannot agree with that. Some sushi is really filling. You don't need to eat a lot to get really full. As for other fish, it depends: I think fat fish, such as salmon, is filling, but not, for example, cod.*

Table 7. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to price perception among participants from Norway and Russia.

	Norway	Russia
I consider fresh fish and seafood an expensive meal option	4.04 (1.71)	4.02 (1.77)
I consider frozen fish and seafood an expensive meal option	2.98 (1.57)	3.36 (1.64)
I consider canned fish and seafood an expensive meal option	2.66 (1.39)	2.65 (1.54)
I do not think that fish and seafood is good value for money	2.49 (1.44)	3.95 (1.64)
I do not consider fish and seafood filling	1.79 (1.35)	1.96 (1.45)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.3 Self-efficacy

When it comes to self-efficacy, consumers from Russia reported lower competence in determining quality of fish and seafood, and they also appear less familiar with preparing fish and seafood at home. As a person's competence in choosing and preparing seafood, self-efficacy is higher in more frequent consumers (Birch and Lawley, 2012), and the mean scores are consistent with the reported seafood consumption frequency in Norway and Russia. A respondent from Stavanger noted that he perceives his ability to determine quality of seafood and prepare as very product specific:

> *I am not really good at cooking fish, so I prefer to buy something that does not require a lot of manipulations and that is easy to see if it is fresh or not.*

Table 8. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to self-efficacy among participants from Norway and Russia.

	Norway	Russia
I am not good at determining the quality of fish and seafood	3.52 (1.84)	4.24 (1.71)
I am not familiar with preparing fish and seafood at home	2.43 (1.72)	3.36 (2.11)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.4 Convenience perception

Respondents from Norway and Russia did not show significant differences in convenience perception related to cooking food in general. The majority of respondents tend to agree that they are limited in time when it comes to preparing food at home. Young adults in Russia generally found fish and seafood as difficult to prepare, while Norwegians mostly disagreed with this statement. Although Olsen (2003) did not find connection between convenience and actual consumption, the obtained results are more in line with conclusions drawn by Birch and Lawley (2012), who argue that difficulty to prepare a certain food lowers its consumption.

Table 9. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to convenience perception among participants from Norway and Russia.

	Norway	Russia
I do not have enough time to cook my meals	3.50 (1.74)	3.54 (1.86)
I do not like cooking	2.87 (1.97)	2.80 (1.82)
I do not find it easy to cook fish and seafood	2.49 (1.53)	3.43 (1.88)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.5 Fish eating habits

Perception of fish as part of the diet among respondents from Norway and Russia was different and may be linked to average consumption frequencies in the countries. Russian young adults reported to have eaten less fish in the childhood, that corresponds to the late 1990s and that period was characterized by low consumption levels among all age groups in Russia (Honkanen, 2010).

A respondent from Oslo noted that she sees fish as a necessary component of the Norwegian diet:

> *I somehow think that we Norwegians are supposed to eat fish because we have a lot of it. […] It is like a habit in a way.*

Table 10. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to fish eating habits among participants from Norway and Russia.

	Norway	Russia
Fish and seafood are not an integral part of my diet	2.41 (1.62)	3.73 (2.06)
I did not like the taste of fish and seafood when I was a kid	3.05 (2.14)	3.45 (2.19)
It was not typical in my family to eat fish and seafood when I was a kid	1.87 (1.39)	2.53 (1.73)
Most of my friends do not eat fish and seafood regularly	3.48 (1.58)	4.36 (1.53)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.6 Health beliefs

In line with other studies (Birch et al., 2012), among young adults in Norway and Russia fish and seafood was seen as having health benefits as well, with no substantial differences in answers observed. Although consumption of fish may impose some risks (Verbeke et al., 2005), and respondents mentioned them

during preliminary interviews, they tended to disagree with this statement. A respondent from Kaliningrad said:

> *Some exotic fishes can be dangerous, but that's definitely not for everyone. […] There might be various fish parasites, especially in sushi. Plus, I think that the quality of fish in sushi bars is really terrible here in Russia. Ah, and I heard something about mercury in tuna not so long ago.*

Table 11. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to health beliefs among participants from Norway and Russia.

	Norway	Russia
I do not know what makes fish and seafood healthy	1.97 (1.22)	1.81 (1.26)
There are health risks associated with eating fish and seafood	2.79 (1.58)	2.11 (1.34)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.7 Sensory perception

Respondents from both Norway and Russia had a similar attitude toward the sensory characteristics of fish and seafood. They generally agreed that bones and smell of fish were unpleasant, and generally disagreed that fish is unpleasant to touch. With fish and seafood, representing a wide range of products, we can expect that attitude towards different types of them would be different. As a respondent from Tromsø said:

> *Yes, some fish and seafood smell terrible, but it depends on what you choose. I would never buy a whole fish, but fillets, for example, are easy to cook, they do not smell that bad, and I hardly need to touch anything.*

As it could have been expected, those respondents who consume at least the recommended amount of fish and seafood showed better attitude to presence of bones, smell, and touching fish.

Table 12. Means (standard deviations) of evaluations for perceived barriers to fish consumption related to sensory perception among participants from Norway and Russia.

	Norway	Russia
Bones in fish are unpleasant	5.04 (1.89)	5.16 (1.85)
Fish and seafood have an unpleasant smell	3.06 (1.74)	3.13 (1.78)
Touching fish and seafood is unpleasant	2.41 (1.65)	2.98 (1.83)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

5.5.8 Other attributes

Although according to Carlucci et al. (2015) several studies mention significant and positive influence of eco-labels on fish product choice, respondents from both Norway and Russia reported that they do not pay attention to eco-labels when buying fish and seafood. Similarly, they did not consider important the brand under which fish and seafood is sold. At the same time, young adults tend to pay attention to the preservation method of fish and seafood products and its origin. This may be explained by the fact that a lot of seafood comes unpackaged and many consumers show a preference for buying unpackaged fish, which is less likely to have eco-label or brand marks on it. Preservation method origin may be perceived as mediators of fish quality and freshness as well as product safety (Carlucci et al., 2015).

Another attribute, where a large difference between Norwegian and Russian respondents was observed deals with preference for Norwegian and Russian products respectively. Norwegian fish and seafood has established a reputation of high-quality product both domestically and internationally, and consumers' preference for the local fish could be anticipated. On the other hand, Russian consumers did not report that they prefer domestically produced fish. Due to immense distances and challenging logistics, not all of the fish and seafood produced in Russia can be available in every corner of the country, and imported options are often offered instead. Moreover, Russia does not pursue a special brand promotion policy comparable to the one in Norway, due to which many consumers are unaware of what fish products are actually from Russia (TASS, 2016)

A difficulty to find fish of good quality was reported by the majority of Russian respondents, while Norwegians mostly disagreed with that statement. This difference is coherent with reported perception of availability and price in both countries that was discussed earlier. When comparing Russian cities, respondents from Moscow and St. Petersburg, where fish consumption frequency was low compared to the country's average, also reported more difficulty to find fish and seafood of good quality.

Table 13. Means (standard deviations) of evaluations for attributes of fish products and other measures among participants from Norway and Russia.

	Norway		Russia	
I consider my diet healthy **	4.85	(1.47)	4.45	(1.50)
There are health benefits associated with eating fish and seafood **	6.52	(0.81)	6.45	(1.04)
I pay attention to eco-labels when I buy fish and seafood	3.87	(1.75)	3.25	(1.84)
The preserving method of fish and seafood I buy is important to me	5.13	(1.52)	5.14	(1.52)
Brand under which fish and seafood is sold is important to me	3.76	(1.67)	3.44	(1.77)
I pay attention to origin, quality, and nutritional value of food I buy	5.05	(1.55)	5.45	(1.44)
It is difficult to find fish and seafood of good quality	3.11	(1.61)	4.55	(1.69)
I prefer fish and seafood products produced in Russia/Norway over imported ones	5.69	(1.51)	4.30	(1.60)

* Based on 7-point Likert scales from one (1) = strongly disagree to seven (7) = strongly agree.

** Although these statements represent health beliefs, they are not barriers *per se.*

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Discussion and conclusion

The present study examined differences in fish consumption levels among young adults residing in Norway and Russia in relation to perceived barriers. Both perception of barriers and their influences on variance of fish consumption within the target groups were explored. In line with previous studies that concluded that fish consumption in Russia and Norway is on average lower than recommended by health authorities (Honkanen, 2012) and that fish consumption is especially low among young consumers (Thorsdottir et al., 2012), it was shown that mean seafood consumption among the target age group in both countries is lower than the recommended level and the estimated amounts are similar with the statistical data available from FAO (2011).

Respondents belonging to different groups in terms of education, income, and household situation demonstrated minor changes in terms of fish consumption levels. Given that fish consumption slightly increased with education level, income level and presence of other people in the household, as well as age, it is likely that those factors were mutually influential.

Far more explicit differences in fish consumption levels could be observed by influence of perceived barriers which, in turn, encompass personal, situational,

and environmental factors. Provided that a significant bias towards the barrier side in any of the examined factors can eliminate positive their influence of other factors, we can argue that the factors have a multiplication effect on each other. Low availability of fish and seafood of sufficient quality in certain Russian cities has shown its effect on consumption frequency that was low even in case of respondents with a highly positive attitude towards seafood. This can also suggest the general-to-specific direction of work on eliminating the barriers, since drivers related to personal factors are not able to substitute more general barriers related to the situation or environment.

When it comes to perception of different barriers, the obtained results showed smaller differences in mean scores of perceived barriers between the countries than it had been expected. The differences suggest that Norway enjoys a much better availability of fish and seafood, the factor that may consequently explain familiarity with high-quality products, habits of eating fish and seafood, and, last but not least, prices and their perception. Coupled with a relatively low purchasing ability of Russians (Honkanen, 2010), lack of available seafood in Russia and low quality of that seafood that is available undoubtedly strengthen the belief that fish is not good value for money. With sushi offerings being highly available in large cities, where average consumption of fish is lower, we can hypothesize that sushi makes up a significant portion of total consumption, which otherwise would be substituted by other products. As a respondent from Oslo noted,

> *I cannot think of any other seafood product as easy as sushi. If there had been no sushi, I would have eaten more, like, pizza or maybe burgers. Other fish is just too difficult to cook.*

Lack of other notable differences in barriers in this study and the fact that most of the respondents live in cities and represent a social layer with higher education may give us reasons that these social groups in Norway and Russia are to a certain extent similar. Provided that in general people with a higher education have a tendency towards maintaining a healthier diet (Myrland et al., 2003) and thus having higher fish consumption, we can hypothesize that including cohorts

with lower education level and/or other places of living may make the barriers more explicit.

However, in Norway and Russia different barriers directly determine variance in frequency of fish consumption. Limited ability to determine the quality of seafood at purchase that ranked first for Russian consumers is likely to be connected to the aforementioned lack of assortment of high-quality seafood. In this case purchase of seafood imposes additional risks and requires a higher qualification to diminish the arising barrier (Birch and Lawley, 2012). Quite notably, a social factor expressed in the statement "Most of my friends do not eat fish and seafood regularly" is of importance in predicting fish consumption frequency among Russian fish consumers. Provided that it has a negative influence on fish and seafood consumption, we may suggest that people eat a similar amount of fish to those with whom they interact socially.

One of the perceived barriers, namely dissatisfaction with the variety of available fish and seafood turned out to have positive connection with fish consumption frequency. The reason for this is likely that frequent and more experienced seafood consumers tend to see the same assortment of fish products as narrower in comparison to those who eat fish less often (similar to experienced consumers having higher awareness of problems with fish supply, as described in Scholderer and Trondsen (2008)). This implies a reverse influence that may be present in this case.

In case of Norway, perception of fish and seafood as not filling turned out to be the barrier that explained most of fish consumption variance. In addition, price of fresh fish and seafood is also significant in predicting the variant, with both of the barriers classified as factors related to price perception. The third significant barrier here was an unpleasant smell, which makes the main barriers to among Norwegians similar to those that Brunsø et al. discovered in Spanish and Belgian consumers (2009).

The main finding of the study is that different factors serve as barriers to seafood consumption among the examined groups of young adults in Norway and Russia. While barriers in Norway are linked to price perception, smell, and that

fish does not provide enough satiety, Russian consumers are constrained by lack of available fish, inability to assess quality, sensory perception, and unpleasant experience with seafood as a kid.

6.1 Fish consumption and fisheries management

Although a number of fisheries today show signs of overexploitation and mismanagement, resulting in lower landings, health authorities keep doing their best to ensure higher fish protein intake. In this situation, a number of concerns have risen that a higher protein intake might lead to increasing the load on the fish stocks (Thurstan and Callum, 2014).

Although this is undoubtedly the case, it is necessary to keep in mind that an increase in fish demand will also have consequences for the whole fishing industry that encompasses from fish harvesting and aquaculture to fish marketing and sales. This industry is of great economic importance in many parts of the world, with parts of Norway and Russia not being exceptions, and development of the industry will have economic incentives.

Although aquaculture may be called the best solution, since it has been showing growth recently while capture fisheries are in decline (Thurstan and Callum, 2014), increased demand on fish can also lead to better utilization and management of existing resources. In case with the Barents Sea, it has been practically proven that fisheries management can be an effective instrument of maintaining fish stocks while ensuring stable catches (Eide et al., 2013), and this gives grounds to think that it is possible to find a balance between better high demand for fish and good condition of the stocks.

Last but not least, promotion of fish and seafood as a necessary part of diet can also give advantages in terms of forming a positive attitude towards and awareness of the marine environment (Jacobs et al., 2015). This, in turn, makes initiatives aimed at better sustainability more effective (Mitchell, 2011).

6.2   Limitations

The sample of this study was not representative of whole populations of Norway and Russia due to the chosen sampling technique. The sample was positively skewed with respect to education, and respondents at the ends of the targeted age range are underrepresented.

The survey treated fish and seafood as a single undifferentiated category, which may have biased the result, since available as well as preferred seafood products vary greatly.

Many cities and areas in both countries are underrepresented in the samples.

6.3   Future research opportunities

Future research should seek to include a more representative sample that may provide better insight of consumer groups who are lagging behind in consumption level. This will provide valuable information needed for targeted campaigns and interventions.

Since research on changes in food preferences over time is limited (Carlucci et al., 2015), future works could fill this gap with longitudinal studies similar to the one conducted by Scholderer and Trondsen (2008).

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/A

Questionnaire example

Hello,

I'm conducting research on fish and seafood consumption among young adults as part of my master's thesis project at the University of Tromsø, Norway. I'm trying to find out what people of 18–30 years old think about fish and seafood, how often they eat it, and what motivates them to choose fish and seafood as their meal.

The survey should only take 8–10 minutes and your responses are completely anonymous. When answering the questions, please remember that fish and seafood products also include sushi and seaweed.

If you have questions about the survey, please contact me at vladimir.ivoninskii@icloud.com Your input is really appreciated!

By clicking *Next* you confirm that you have read and understood the information above and want to participate in the survey.

Let's get started

First off, some general questions that will help me understand consumers of fish and seafood. All your answers are anonymous.

How old are you?*

_____

What is your gender?*

O Male   O Female

What city do you live in?*

_____

What is the highest level of education you have finished?

O Less than high school

O High school

O Technical school or equivalent

O Some university, no degree

O University degree

O PhD

O Other - Write In: _____

What is your primary occupation at the moment?

O Unemployed

O Student

O Homemaker

O Employed

O Self-employed

O Other - Write In: _____

Which statement best describes your level of income?

O Can hardly afford food

O Can afford food, but buying clothes needs to be planned

O Can afford food and clothes, but buying durable goods (home appliances, consumer electronics, furniture, etc.) needs to be planned

O Can afford most of durable goods (home appliances, consumer electronics, furniture, etc.)

O Can afford practically anything, except for major purchases (car, house/apartment)

O Can afford anything (including major purchases (car, house/apartment), lots of traveling, etc.)

Which statement best describes your household situation?

O I live alone

O I live in a shared residence

O I live with my parents

O I live with my partner/spouse

O I live with my partner/spouse and child/children

O I live with my child/children

○ Other - Write In: _____

How often do you eat fish and seafood on average? (Including eating out)*

○ I do not eat fish and seafood

○ Less than once a month

○ 1–3 times a month

○ Once a week

○ Twice a week

○ 3 times a week

○ 4 times a week

○ 5 times a week or more

What prevents you from eating fish and seafood? (You can choose several options)*

☐ I am allergic to fish and seafood

☐ I do not like fish and seafood

☐ I am vegetarian/vegan

☐ I am concerned about contaminants in fish and seafood

☐ Someone in my household does not eat fish and seafood

☐ I cannot afford fish and seafood

☐ Fish and seafood is too difficult to prepare

☐ It is difficult to find fish and seafood of good quality

☐ Selection of fish and seafood in the stores is too bad

☐ Other - Write In: _____

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Now please rate the statements on a scale from "strongly disagree" to "strongly agree". Some questions may seem similar but they are about different types of products. And don't forget that sushi is a seafood product too :)

Please indicate how much you agree with each of the following statements:*

	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
Bones in fish are unpleasant	○	○	○	○	○	○	○
Brand under which fish and seafood is sold is important to me	○	○	○	○	○	○	○
I am not satisfied with the variety of available fish and seafood where I live	○	○	○	○	○	○	○

	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
There is a lack of sushi offerings where I live	◯	◯	◯	◯	◯	◯	◯
I do not consider fish and seafood filling	◯	◯	◯	◯	◯	◯	◯
I am not familiar with preparing fish and seafood at home	◯	◯	◯	◯	◯	◯	◯
I am not good at determining the quality of fish and seafood	◯	◯	◯	◯	◯	◯	◯
I consider fresh fish and seafood an expensive meal option	◯	◯	◯	◯	◯	◯	◯
Fish and seafood are not an integral part of my diet	◯	◯	◯	◯	◯	◯	◯

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Please indicate how much you agree with each of the following statements:*

	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
I do not try new fish and seafood products and dishes	◯	◯	◯	◯	◯	◯	◯
Fish and seafood have an unpleasant smell	◯	◯	◯	◯	◯	◯	◯
I consider frozen fish and seafood an expensive meal option	◯	◯	◯	◯	◯	◯	◯
I do not find it easy to cook fish and seafood	◯	◯	◯	◯	◯	◯	◯
I pay attention to origin, quality, and nutritional value of food I buy	◯	◯	◯	◯	◯	◯	◯
I consider my diet healthy	◯	◯	◯	◯	◯	◯	◯
I do not have enough time to cook my meals	◯	◯	◯	◯	◯	◯	◯

I do not know what makes fish and seafood healthy	◯	◯	◯	◯	◯	◯	◯
There are health benefits associated with eating fish and seafood	◯	◯	◯	◯	◯	◯	◯

Page 4 of 6. We're halfway there!

Please indicate how much you agree with each of the following statements:*

	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
I consider canned fish and seafood an expensive meal option	◯	◯	◯	◯	◯	◯	◯
I do not like cooking	◯	◯	◯	◯	◯	◯	◯
I did not like the taste of fish and seafood when I was a kid	◯	◯	◯	◯	◯	◯	◯
I do not eat out often	◯	◯	◯	◯	◯	◯	◯
I pay attention to eco-labels when I buy fish and seafood	◯	◯	◯	◯	◯	◯	◯
There are not many restaurants with fish and seafood dishes (including sushi) where I live	◯	◯	◯	◯	◯	◯	◯
I do not think that fish and seafood is good value for money	◯	◯	◯	◯	◯	◯	◯
There is not a wide range of fresh fish and seafood available where I live	◯	◯	◯	◯	◯	◯	◯

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Please indicate how much you agree with each of the following statements*

	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
It was not typical in my family to eat fish and seafood when I was a kid	◯	◯	◯	◯	◯	◯	◯
Most of my friends do not eat fish and seafood regularly	◯	◯	◯	◯	◯	◯	◯
The preserving method of fish and seafood I buy is important to me	◯	◯	◯	◯	◯	◯	◯
There are health risks associated with eating fish and seafood	◯	◯	◯	◯	◯	◯	◯
There is not a wide range of canned fish and seafood available where I live	◯	◯	◯	◯	◯	◯	◯
There is not a wide range of frozen fish and seafood available where I live	◯	◯	◯	◯	◯	◯	◯
Touching fish and seafood is unpleasant	◯	◯	◯	◯	◯	◯	◯
I prefer fish and seafood products produced in Norway / Russia over imported ones	◯	◯	◯	◯	◯	◯	◯
It is difficult to find fish and seafood of good quality	◯	◯	◯	◯	◯	◯	◯

Thanks a bunch!

Thank you for taking the survey. Your response has made me one step closer to finishing my master's degree and I appreciate your help a lot!

Should you have any comments or questions concerning this questionnaire, please drop me a line at vladimir.ivoninskii@icloud.com.

If you know someone who is 18–30 years old, lives in (country) and could spend a few minutes on this survey, please send them this link: <link>
Have a nice day!

/B

List of barriers to fish consumption grouped by category

Fish availability

1. There is not a wide range of fresh fish and seafood available where I live
2. There is not a wide range of frozen fish and seafood available where I live
3. There is not a wide range of canned fish and seafood available where I live
4. I am not satisfied with the variety of available fish and seafood where I live
5. There are not many restaurants with fish and seafood dishes (including sushi) where I live
6. There is a lack of sushi offerings where I live

Price perception

7. I consider fresh fish and seafood an expensive meal option
8. I consider frozen fish and seafood an expensive meal option

9. I consider canned fish and seafood an expensive meal option

10. I do not think that fish and seafood is good value for money

11. I do not consider fish and seafood filling

Self-efficacy

12. I am not good at determining the quality of fish and seafood

Convenience perception

13. I do not have enough time to cook my meals

14. I do not like cooking

15. I do not find it easy to cook fish and seafood

Fish eating habits

16. I did not like the taste of fish and seafood when I was a kid

17. It was not typical in my family to eat fish and seafood when I was a kid

18. Most of my friends do not eat fish and seafood regularly

Health beliefs

19. I do not know what makes fish and seafood healthy

20. There are health risks associated with eating fish and seafood

Sensory perception

21. Bones in fish are unpleasant

22. Fish and seafood have an unpleasant smell

23. Touching fish and seafood is unpleasant