



Millenials' and Xennials' values towards fresh
cow's milk and plant-based milk consumption
in Leusden, The Netherlands.

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Preface and Acknowledgements

My name is Pam Roesink, I am a graduate at Aeres University of Applied Sciences in Dronten and Dalhousie University Faculty of Agriculture in Nova Scotia. I live in the Netherlands and I am concluding my study course International Food business with a final thesis report. My personal passion towards the agricultural sector and internship at Campina inspired me to write my bachelor thesis towards milk consumption in the Netherlands.

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List of Abbrevaitons.

FTE= Fulltime-equivalent
RIVM = Rijksinstituut voor Volksgezondheid en Milieu
GIT = Multifaceted Gastrointestinal Tract
UTH= Ultra-high Temperature

Summary

The cow's milk consumption is declining in the Netherlands, whereas dietary trends showed a growing demand for plant-based milk. Due to the rise of conscious consumerism, plant-based milk products became more attractive towards the millennials. Research was needed to indicate values for fresh cow's milk and plant-based milk in order to indicate if there are any significant relations detected. With positive significant relations between the milk values, marketing companies would be recommended to use this information while developing marketing strategies. The main question for this research was; *"Which characteristics in fresh cow's milk and plant-based milk are most valued by millennials living in Leusden, the Netherlands?"*. With expected outcomes such as the non-existing relation to 'brand' in both milk products. Millennials are proven to be less brand loyal compared other generations. Also, the a significant relationship for the value "environmental concerns" was expected to have a positive relation. This is due to the rise in conscious consumerism dietary trends for millennials.

An online survey was created to reach the limited target group of millennials (born between 1980 and 2000) and xennials (born between 1977 and 1985) living in Leusden. The questionnaire was presented on social media platforms, including questions about the consumers' fresh cow's milk and plant-based milk consumption values. As for the xennials, this generation is not well known and overlapping the millennial generation. Results were addressed towards millennials.

The results were tested with a Chi²- test to see if any significant statistical relationships between the values in fresh cow's milk and plant-based milk were detected by four categorized consumer groups. The four consumer groups were; "fresh cow's milk consumers", "plant-based milk consumers", "both fresh cow's milk and plant-based milk consumers", and "non-milk consumers".

The values in fresh cow's milk are analyzed and in contrary to the expected outcomes, no significant relations were detected, so all 4 groups gave similar responses to how they value the different milk characteristics. Also for plant-based milk, no significant relations were detected between groups and values so all groups responded similarly. A near significant ($P < 0.10$) relationship between groups and values was observed for "price" when the respondents valued plant-based milk. The strict plant-based milk consumers were less concerned about price.

As recommendations towards the milk marketing business, it is important to differentiate themselves in order to gain loyal consumers. Millennials tend to gain their information through online resources, this is an opportunity for brands to raise awareness through social media platforms. With a value in plant-based milk which was almost found to be significant in this research for "price" it is important that with a target group as millennials companies make sure to consider this particular value. The questionnaire was aimed at the inhabitants of the municipality of the village Leusden, and it would be interesting to include respondents from more urban / city areas gain more insight in their perspectives to milk consumption as well.

1. Introduction

The Netherlands has a very strong international market position when it comes to producing and selling dairy. The quality and craftsmanship are highly valued and well known across the world. The Netherlands has a strategic worldwide location what makes it an ideal position for the Dutch to export internationally (Nederlandse Zuivel Organisatie , 2018). The Dutch dairy industry is one of the largest exporting industries of the Netherlands. Export is providing €7,9 billion for the Dutch Economy. In the year 2020, there are 16,250 dairy farms in the Netherlands. On these farms a total of 1,6 million cows are housed, producing around 13,8 billion kilograms of milk that is used in various end-products. About 56% of this production is processed for cheese and around 8 percent is used for fresh milk (Nederlandse Zuivel Organisatie , 2020). Almost 2/3 of the milk which is processed in the Netherlands is exported. The European countries whom are the largest purchasers of Dutch dairy are Germany, Belgium and France. When looking at the bigger picture of the impact dairy has in the world market, the Netherlands provides for about 5 percent of the world dairy trading. Since there is a positive export balance for dairy products, the Dutch dairy sector provides export in dairy, the Dutch dairy sector provides a positive amount of money for the national trade balance. As long the Netherlands keeps exporting its dairy, this number will stay in a positive trend (Nederlandse Zuivel Organisatie, 2020). Not only does the dairy industry benefit the Dutch economy, but it also creates many job opportunities for the citizens living in the Netherlands and market for dairy handling companies.

“Dairy is an important economic sector in the Netherlands. It guarantees billions in turnover and tens of thousands of jobs. With an important share in the trade surplus of the Netherlands, the dairy sector is a pillar of our earned capacity. It will further strengthen the future of the Netherlands of the international competitive position, and dairy is a good example of this. It is innovative entrepreneurs who have to do this, with a government that creates preconditions and gives them space for development” (Sharon Dijksma, 2019).

Having this quote coming from a member of the Secretariat for Economic affairs in the Netherlands clarifies the importance of the current Dutch dairy. Moreover, the dairy industry benefits the sectors operating in animal feed, retail, scientific institutes, machinery building companies and most importantly catering industry is benefited greatly due to milk consumption (Nederlandse Zuivel Organisatie, 2013).

The Dutch dairy industry comprises of 4 main companies, responsible for 90% of the market. One of the biggest dairy companies in the Netherlands is “FrieslandCampina”, claiming around 80% of the market based on contracted dairy farms or 50% based on FTE.(Fulltime- equivalent) In corporation with almost 12.000 dairy farmers and around 24.000 FTE this FrieslandCampina creates a large part of the job opportunities in the Netherlands.

The uniqueness of “FrieslandCampina” is the structure of the company. “FrieslandCampina” differentiates themselves by controlling the whole supply chain,

starting with the connection with dairy farmers (ZuivelNL, 2019). Meeting current customer demands is of high importance to make sure milk sales are realized. For a long time, Dutch citizens used to consume fresh cow's milk as a part of their daily routine. For generations people were told that milk is a positive contribution to their diet. This is not only based on personal observations during my childhood period, but also by generations before me. Supporting this statement is the fact that the Dutch use a certain scale to determine the everyday use of the required nutrition and daily food/beverage intakes. The name of this scale is translated from Dutch to English: "the scale of five components". The scale recommends Dutch citizens to consume certain products, and more importantly dairy. As for milk, the scale recommends people to drink skimmed- and semi skimmed milk. Whole milk is considered aberrant from the scale. Nevertheless, the recommended amount of 150 ml milk a day seems to be changing (Voedingscentrum, 2020).

In recent years Dutch citizens adapted their dairy intake. Observing the statistics of the volume of dairy consumed per capita in the Netherlands from 2010 to 2018, and with the forecast for 2019 to 2021 it can be seen that the actual milk product consumption is decreasing. Dairy in general is still a product which is on average consumed every day for the Dutch, but the exact differences between dairy and actual cow-milk consumption is not given (Nederlandse Zuivel Organisatie, 2018). A declining trend is shown in Figure 1 below research done by Statista (Statista Research Department, 2020).

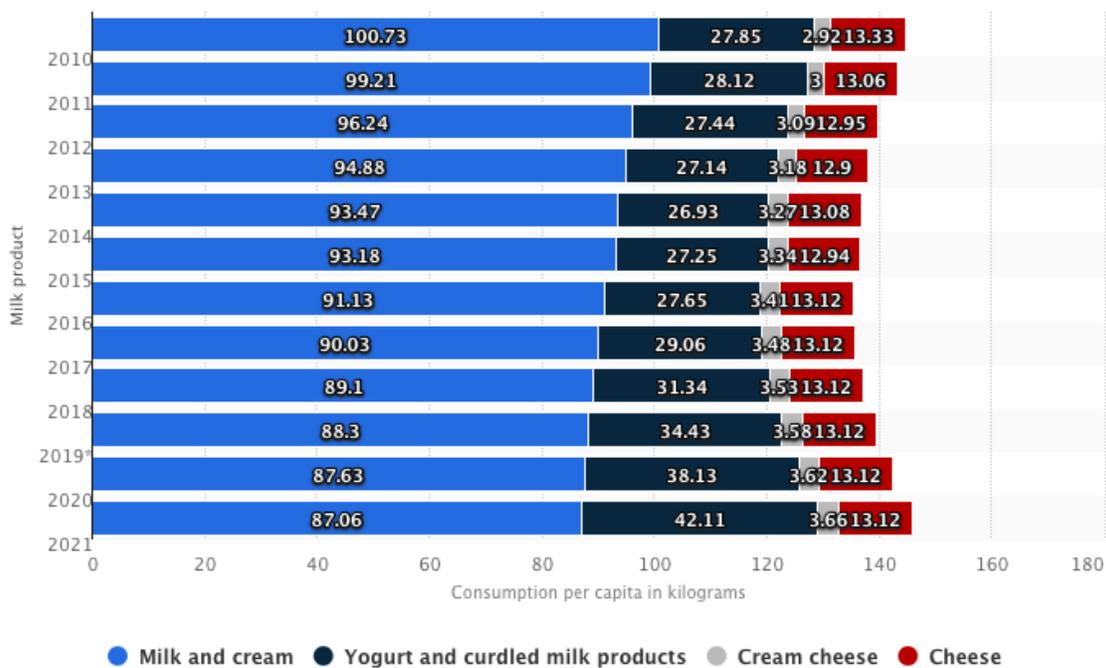


Figure 1. Volume of dairy consumed, in kilograms, per capita in the Netherlands from 2010 to 2018, with a forecast for the year 2019 to 2021 by milk product (Statista Research Department, 2020))

The numbers are declining, and it is shown that dairy milk consumption decreased the last decade. The following prospecting years show an even further decline in the dairy milk consumption (light blue on the graph). However, consumption of yoghurt and curdled milk (dark blue on the graph) products showed a steadily increase. Cheese consumption in the Netherlands remained at a more or less constant level (red in the figure). The graph above shows international prospects that is complimented by a research done that stated that lifestyle choices will affect the milk consumption in the Netherlands, such as the vegan lifestyle (Euromonitor International, 2019). Dutch cow's milk consumers seem to have changed their consumption behaviour towards consuming cow's milk. A declining trend in the current milk consumption of Dutch citizen will have consequences for various parties. These parties being the businesses operating with cow's milk, employees with FTE jobs in the dairy industry and maybe even more importantly the physical health of citizens in the Netherlands. The Dutch governmental organization RIVM states that the declining dairy consumption in the Netherlands is causing concern for the health of citizens of the Netherlands. Daily intake of dairy is needed to keep bone density and health intact (Rijksinstituut voor Volksgezondheid en Milieu, 2016). Also, in a recent peer reviewed study of Dutch food-based dietary guidelines written by the Health Council of the Netherlands resulted that a few portions of dairy, including milk or yoghurt, are recommended on a daily base (Kromhout, D., Spaaij, C., de Goede, J. et al., 2016).

For a long time, Dutch citizens used to consume fresh cow's milk as a part of their daily routine. For generations people were told that milk is a positive contribution to their diet. This is not only based on personal observations during my childhood period, but also by generations before me. Supporting this statement is the fact that the Dutch use a certain scale to determine the everyday use of the required nutrition and daily food/beverage intakes. The name of this scale is translated from Dutch to English: "the scale of five components". The scale recommends Dutch citizens to consume certain products, and more importantly dairy. As for milk, the scale recommends people to drink skimmed- and semi skimmed milk. Whole milk is considered aberrant from the scale. Nevertheless, the recommended amount of 150 ml milk a day seems to be changing (Voedingscentrum, 2020). Looking at the statistics of the volume of dairy consumed per capita in the Netherlands from 2010 to 2018, and with the forecast for 2019 to 2021, it can be seen that the actual milk product consumption is decreasing. Dairy in general is still a product which is on average consumed every day for the Dutch, but the exact differences between dairy and actual cow-milk consumption is not given (Nederlandse Zuivel Organisatie, 2018).

1.1. Milk products

Human milk and milk from other species is a complex physiological liquid of multifaceted gastrointestinal tract (GIT) functionality, where it stimulates the postnatal adaptation of a new-born child by promoting cell growth and digestive adaption of an infant by promoting cell growth and maturation of the digestive tract (Ebringer, Ferenčik, & Krajčovič, 2008). Two milk categories can be distinguished; fresh cow's milk and plant-based milk. In the following paragraphs both categories are further described.

1.1.1. Animal-based milk

Animal-based milk could be retrieved from lactating animals such as cows. Looking at the worldwide milk production, cows produce 81 percent of the total. Lactating and producing milk which can be used for human consumption could be retrieved from goats, sheep, camels, horses and donkeys as well (Food and Agriculture Organization of the United Nations, 2020) .

Continuing to the differences in cow's milk on the market. This research is focused on the fresh cow's milk consumption rather than raw cow's milk consumption. Raw cow's milk is a natural and un-edited food product. The risk of food safety, milk for the consumer market must be heated to more than 70 degrees Celsius to eliminate harmful bacteria (Office for Risk Assessment and Research, 2017). Due to regulations the raw cow's milk is adjusted to different varieties of fresh-cow milk. There are three main adjusted products which are still considered fresh: whole milk, semi-skimmed milk, skimmed milk, ultra-high temperature (UTH) milk and flavoured milk (e.g. chocolate milk) (The Dairy Council, 2016). Whole cow's milk is a complete source of energy, consisting of all significant macronutrients and some micronutrients. Most importantly calcium and nitrogen. Comparatively with other animal sources, whole cow's milk, without including beef, meat and eggs, is the richest source of calcium and vitamin D. Next to that, whole milk is the cheapest source of a food product which contains protein, calcium, nitrogen and vitamin D (Agostoni & Turck, 2011, p. 595). Semi skimmed milk is milk with a fat content between 1.5 and 1.8 grams per 100 grams of the product, whereas skimmed milk fat content does not exceed 0.3 grams per 100 grams of the product. For UTH milk, the main purpose of this milk is its longer shelf life. UTH milk has been heated at such a high temperature that all potentially harmful bacteria are killed) (The Dairy Council, 2016).

Cow's milk and cow's milk products in human diets are well balanced healthy foods. The premium nutritional content of dairy products is strongly associated with the consistency of milk fat and concerns high levels of fat-soluble vitamins and n-3 fatty acids as well as high levels of conjugated linoleic acid. In addition, milk fat is a source of taste and aroma (Markiewicz-Kęszycka, M., Czyżak-Runowska, G., Lipińska, P., & Wójtowski, J., 2013). Drinking cow's milk has benefitted not only infants, but also the adults and the elderly by providing substantial nutritional value. The health benefits of milk products are the consequence of biological active components (enzymes) present in fresh cow-milk. Moreover, the probiotics may also function directly as prevention agents or in the treatment of some infectious, a topical, tumor or other serious diseases (Ferenčík and Ebringer 2003; Gill and Guarner 2004; Santosa et al., 2006).

Occasionally the mass media pose conflicting stories about the benefits of consuming raw dairy products (raw milk). Nonetheless, research did not find any references in the literature containing those claims on that lactose intolerant people are experience maldigestion. Raw milk can contain lactase. This is determined if the enzyme is present in raw milk. Lactase is very labile in heat and its content will be destroyed during the process of pasteurizing milk. (Mullin, G. E., Belkoff, S. M., & Box, R., 2014). Therefore,

raw milk consumption is not something which is beneficial to health. The government and food authorities stick to the daily recommended intake of 150 grams of pasteurized dairy products (Rijksinstituut voor Volksgezondheid en Milieu, 2016). Although drinking fresh cow's milk is a recommended daily nutritional food product to consume, research have also shown otherwise. The decline in cow's milk consumption is not only the case in the Netherlands. A former French researcher Léon Guéguen found that an increasing number of people believe that high-calcium intake cannot be tolerated by the human body, since milk has been available for just a few thousand years and cow's milk is not meant for human consumption. It means that humans are the only animals whom continue drinking milk after the infant period. Nevertheless, such claims crumble when one realizes that much of our modern diet consists of foods which have never been encountered before in the pre-historical times (Fardellone, Séjourné, Blain, Cortet, & Thomas, 2017, p. 276). Numerous of media reports and organizations claim that dairy raises the risk of getting chronic diseases such as obesity, cardiovascular disease, cancer and so on. Which is why, consumers become sceptical and concerned about the health consequences of eating dairy products. It is expressed, by for example an increased consumption of plant-based drinks like soy-, rice-, almond-, and/or oat milk (Thorning, T. K., Raben, A., et al., 2016).

1.1.2. Plant-based milk products

Plant based milk products are fluids resulting from breakdown of plant materials (cereals, pseudo-cereals, legumes, oilseeds, nuts) collected in water and further homogenization of the fluids. Resulting in a consistency which resembles cow's milk. With a lack of stated definition and classification of these plant-based milk alternatives in literature. Therefore, a general classification is given. According to Sethi, S., Tyagi, S. K., & Anurag, R. K., 2016, there are 5 classifications:

- Cereal based: oat milk, rice milk, corn milk, spelt milk.
- Legume based: soymilk, peanut milk, lupin milk, cowpea milk.
- Nut based: almond milk, coconut milk, hazelnut milk, pistachio milk, walnut milk.
- Seed based: sesame milk, flax milk, hemp milk, sunflower milk.
- Pseudo-cereal based: quinoa milk, teff milk, amaranth milk

Consumers could be misled in the labelling of plant- based milk. Since milk is a product extracted from the GIT, it is found that consumers do not feel misled when talking about cow's milk replacing products. Study shows that consumers realize that almonds do not produce milk or lactate and realize that these labels and phrases are designed to have be a functional alternative and/or replacement for animal-based milks (Khan, 2019). Nevertheless, in the Netherlands the Dutch translation of plant-based milk on packaging is not allowed. When the Dutch brand "Alpro" tried to name its product associated with the word; milk, the Higher Council in the Netherland declined the request on the 9th of August 2019 (Council man C.E. du Perron, 2019). Therefore, for in the Netherlands, markets "plant-based milk" as plant-based drinks. In society the word plant- based milk is used frequently. Thus, the term plant-based milk is used in this research.

1.2. Dietary trends towards milk consumption

Conscious consumerism or greening of the actions of food consumers is a phenomenon which has existed longer. The definition here is more of a 'immaterial' movement in the language. This trend is primary about mentality and attitudes, rather than just market figures and consumer demand. Moreover, the trend refers to customer dissatisfaction and questions about excising values and practices. The movement of conscious consumerism or greening of the actions of food consumers is for 'alternative' or innovative eating types under labels such as slow foods, organics, collective consumption and simple living etc... . An important part of conscious consumerism is the focus on social justice, which is generally closely connected to the Sustainable Development Goals (Berkhout, P., Achterbosch, T., Van Berkum, S., et al., 2018). Plant-based milk alternatives pose a significant prospective expansion of the health for food industry and need to be explored extensively though the implementation of advanced manufacturing, technical technologies, fortification techniques to produce a nutritionally full drink with high overall acceptability. Also, plant-based milks can help provide low-cost, nutritious new alternatives to allergic cow's milk population. Additionally, the research field is still unexperienced to see if plant-based milk was as nutritionally equivalent to cow's milk (Sethi, S., Tyagi, S. K., & Anurag, R. K., 2016). While plant-based milk may have different inputs, it can be regarded as a green niche market breakthrough, firstly because it offers a replacement for dairy milk and secondly because the various types of plant-based milk face very similar struggles against the cow's milk regime. Since the plant-based milk market has been expanding in Western Europe since 2017. With the research done "rage against the regime; niche-regime interactions in the societal embedding of plant-based milk" suggested that the consumer decision making shift in their consumption needs to be analysed (Mylan, J., Morris, C., Beech, E., & Geels, F. W., 2019). While taking the research proposal given by Mylan, Morris et al. as a source of inspiration, the question remains whether the millennials value the characteristics of fresh cow's milk and plant-based milk differently. Since cow's milk consumers and plant-based milk consumers may respond differently, 4 different groups need to be compared namely strict cow's milk consumers, strict plant-based milk consumers, consumers who drink both, and consumers who drink no milk products at all.

1.3. Millennials and Xennials

Xennials is the generation born in the year 1977 and 1985 (AbuDamous, H, 2020). Millennials are born in the year 1980 and 2000 (F.M. Moreno, J.G. Lafuente, F. Avila, S.M. Moreno, 2017). Most people do not know about the xennials' generation and that is why the millennials' consumer group is used in society. The same marketing approaches, values and orientation are identical for millennials and xennials (AbuDamous, H, 2020). The millennial generation was born in a changing technological world. They also faced higher unemployment and they are burdened with debts, and due to their population size, they are considered, now and in the future, as a huge and attractive market. Growing up in a modern world of abundant sources of knowledge,

rather than approaching a library, millennials find other main information sources. Therefore, current models of information behaviour can not accurately characterize their approach to filling information needs (Taylor, A., 2012). Figures reflect the self-reported widespread usage of all elements of social media and communication such as social networks, television, mobile phone and internet usage. Millennials are very effective at capturing their attention and will repeatedly visit a website that has competitive pricing and good shipping rates (Smith, 2011). They tend to spend more but show less brand loyalty to earlier generations; the reasons for this lower loyalty may be due to higher price promotion exposures. Millennials are also looking for products and brands which suit their values and personality, lifestyle, social values and culture. Brands are used to create an image in order to reflect personality and communicate their values (Ayaydin & Baltaci, 2013). Millennials are guided by technologic development to the new purchasing trends and make their decision (F.M. Moreno, J.G. Lafuente, F. Avila, S.M. Moreno, 2017).

1.4. Knowledge Gap and Main Objectives

To clarify the declining trend in milk consumption in the Netherlands, it would be interesting to get more insight into how the millennial generation values fresh cow's milk and plant-based milk. Also, different responses may be expected from consumers who drink only cow's milk or plant-based milk, both or none.

Research needs to be carried out to develop recommendations to interested and benefiting organizations such as dairy (marketing) companies and/or companies which produce plant-based alternatives. The research gives an insight whether milk related companies could implement different approaches to increase sales or redirect marketing campaigns. Finally, the discussion chapter will compare and discuss the outcomes of the tested hypothesis to existing research available and evaluate if the results match the expected outcomes.

Hypothesis 1

The value what is most expected to have a significant relation is the comparison between fresh cow's milk consumers and plant-based milk consumers value for environmental concerns. Due to the conscious consumerism or greening of the actions of food consumers, it is expected that environmental concerns are highly valued for plant-based milk consumers in relation to the fresh cow's milk consumers (Berkhout, P., Achterbosch, T., Van Berkum, S., et al., 2018).

Hypothesis 2

For fresh cow's milk consumption, it is expected that nutritional value is highly valued, and a significant relation can be detected. Based on a study of Dutch food-based dietary guidelines written by the Health Council of the Netherlands, it is recommended to include dairy products such as milk or yoghurt in the daily diet. (Kromhout, D., Spaaij, C., de Goede, J. et al., 2016). Also, millennials tend to spend more, but show less brand loyalty to earlier generations; the reasons for this lower loyalty may be due to higher price promotion exposures (Ayaydin & Baltaci, 2013). Thus, the value "brand" in fresh

cow's milk and plant-based milk is expected to have no significant statistical relationship.

To examine both hypothesis, the main research questions to be addressed is "*Which characteristics in fresh cow's milk and plant-based milk are most valued by millennials living in Leusden, the Netherlands?*".

In order to answer the main research question, the supporting sub questions were formulated:

1. What are the most important values in fresh cow's milk given by four categorized milk orientated groups of consumers?
2. What are the most important values in plant-based milk given by four categorized milk orientated groups of consumers?

The research gives an insight whether milk related companies could implement different approaches to increase sales or use certain values in fresh cow's milk and plant-based milk redirect marketing campaigns.

2. Methodology

This chapter describes the material and methods used to perfect a research to indicate values in fresh cow's milk and plant-based milk given by millennials living in Leusden, the Netherlands.

2.1. The questionnaire

A questionnaire is developed in order find answers for the main research question. This questionnaire is distributed among inhabitants of the municipality of Leusden, the Netherlands. Leusden is suburban municipality and research showed that approximately half of the group of millennials live in suburban areas. Exact data of inhabitants living the municipality of Leusden is limited. Therefore, the age group of 25 till 45 years (millennial's and xennials') is targeted and questioned. Since society rarely uses the term xennials', the research uses the term millennials' in order to speak for both generations due to a relatively close overlapping in age requirement.

The questionnaire and test results will be analysed to develop a functioning format to execute a larger scale questionnaire and provide the first preliminary insights of values given by millennials' in fresh cow's milk and plant-based milk for consumption.

A Chi2-test on the results of each value given. The test will determine if there is a significant relation detected. The millennials will be divided into four categorized consumer groups. The categorized consumer groups being; "fresh cow's milk consumers", "plant-based consumers", "both fresh cow's milk and plant-based milk consumers", "non milk consumers". The questionnaire will challenge the millennials' living in Leusden to rate the most important values in fresh cow's milk and plant-based milk. This is done by asking participants to rate 7 different characteristics in both fresh cow's milk and plant-based milk. The characteristics are; "nutritional value", "taste", "structure", "price", "brand", "environmental concerns" and "organic/biological production". Participants are asked to rate the values with a scale from 1 till 4, with 1 being "not important at all" and 4 being "very important".

The questionnaire will be handed out digitally through social media channels such as Facebook and Linked-In. In Facebook, the link to the questionnaire was posted to attract many millennials in the municipality. The full questionnaire can be found in Appendices I. The questionnaire is written in Dutch. However, questions closely related to the research are translated in English. As gratitude for attending the questionnaire, two €25,00 supermarket gift cards were handed out as a reward. The winners were informed through the e-mail addressed they opted to fill in at the end of the questionnaire.

The population size of Leusden is 30,030 residents. Out of the whole population, 6,164 inhabitants are the combination of millennials and xennials (Alle Cijfers, 2020). The margin of error for the sample size will be +/- 9% using a confidence level of 95%. Based on the sample size calculator of Survey Monkey, a sample of 117 respondents

will be sufficient (SurveyMonkey, 2020). The questionnaire was online for 8 business days on several Facebook group pages and Linked- In.

2.2. Analysis of Data

Data is entered in MS Excel and pivot tables were used to give a clear overview to gather the needed data in order to proceed with the Chi² statistical test. A Chi² - statistical test is performed by the statistical program JASP. The critical value for the Chi²-test needs to be calculated in order to evaluate significant relations. Four categorized consumer group are tested by the Chi² test for any significant statistical relationship between the values.

3. Results

In order to answer the research question data needed to be retrieved through online resources. The questionnaire was posted on two Facebook groups. Both groups consisted of members whom live in the municipality of Leusden. It took only a few days to fully retrieve all the required responses. In total 125 responses were given and exceeded the required number of responses. The requirement to fill in the questionnaire was to be a habitant of the municipality Leusden and to be within the age of 25 and 45 years old to be identified as a millennial. All respondents were residents of Leusden and only 1 respondent fell outside of the required age category.

3.1. Descriptive statistics of the categorized consumer groups.

The millennials are divided into four categorized consumer groups, where the exact number of respondents are given and their most consumed milk product.

Group A are participants whom only consume cow's milk. 61 (49,2%) of the 124 respondents form the group of only fresh cow's milk consumers. Group A's most consumed type of fresh cow's milk is by 82% fresh semi-skimmed cow's milk.

Group B are participants whom only consume plant-based milks. 21 (16,6%) of the 124 respondents form the group of only plant- based milk consumers. Group B's most consumed type of plant-based milk is by 66.7% based on cereals.

Group C are participants whom consume fresh cow's milk and consume plant-based milks. 23 (18,6%) of the 124 respondents form the group of both fresh cow's milk and plant-based milk consumers. Group C's most consumed fresh cow's milk product is by 73.9% fresh semi-skimmed cow's milk. As for the most used plant-based milk product, 47.8% based on cereals.

Group D are participants whom do not consume fresh cow's milk nor plant-based milk. 19 (15,3%) of the 124 participants from the group of non- milk consumers.

The following paragraph shows the results of the values of fresh cow's milk given by the four consumer groups. A Chi²-test is done to test significant statistical relationships between the rated characteristics of fresh cow's milk.

3.2. Fresh cow's milk values

To identify the values for fresh cow's milk, seven values ("nutritional value", "taste", "structure", "price", "brand", "environmental concerns" and "organic/biological production") were rated according to the participants' agreement using a motivation of 1 till 4 with 1 being not important at all and 4 being very important.

Table 1 below shows the allocation of the ratings of the answers chosen. Also, the positive or negative relation towards values of fresh cow's milk are calculated based on the Chi²-test. The critical value for this Chi²-test is 16.9, based on 9 degrees of freedom. If the calculated chi²-value is larger than the critical value, based on P <0.05 (marginal significance); with 9 degrees of freedom, a significant relation between the variables can be detected. In that case, different groups (A, B, C or D) respond differently how they value the one of the seven characteristics.

Table 1. Observed values to determine the 7 different fresh cow's milk values for "nutritional value", "taste", "structure", "price", "brand", "environmental concerns" and "organic/biological production". Groups are classified as only cow's milk (A), only plant based (B), both cow's milk and plant-based milk (C) or neither cow's milk nor plant-based milk (D). The Chi² values and P-value indicate if the different groups give similar scores or not.

Fresh cow's milk	Score				Chi ² -Value	P -value
	1	2	3	4		
Nutritional value					10.237	0.115
Group A	6	19	29	7		
Group B						
Group C	3	6	11	3		
Group D	1			2		
Taste					7.569	0.271
Group A	3	5	24	29		
Group B						
Group C	3		10	10		
Group D	1			2		
Structure					3.640	0.725
Group A	5	8	25	23		
Group B						
Group C	2	6	8	7		
Group D			1			
Price					6.544	0.365
Group A	10	15	32	4		

Group B						
Group C	2	8	10	3		
Group D	1	1		1		
Brand					3.779	0.707
Group A	13	37	6	4		
Group B						
Group C	6	12	3	2		
Group D	2	1				
Environmental concerns					5.136	0.526
Group A	7	24	23	7		
Group B						
Group C	4	6	8	5		
Group D	1		1	1		
Way of producing (bio-organic)					6.976	0.323
Group A	9	23	22	7		
Group B						
Group C	4	9	6	4		
Group D	2		1			

Calculated with the Chi²-test, table 1 shows the that for the values in fresh cow's milk no significant relation is found. Since the Chi²-test required to have a P<0.05 in order to have a significant relation detected, it is seen that none of the values fulfil that requirement. Therefore, no differences in responses between groups can be observed at all, with regard to how respondents' value to the seven characteristics.

The following paragraph shows the results of the values of fresh cow's milk given by the four consumer groups. A Chi²-test is done to test significant statistical relationships between the rated characteristics of fresh cow's milk.

3.3. Plant-based milk values

To identify the values for plant-based milk, the same seven values as for fresh cow's milk were rated according to the participants' agreement using a motivation of 1 till 4. With 1 being; not important at all and 4 being; very important.

Table 2 below shows the responses of participants. The positive or negative relation towards values of plant-based milk are calculated based on the Chi²-test. The critical value for this Chi²-test is 16.9, based on 9 degrees of freedom. If the calculated Chi²-value is larger than the critical value, based on P <0.05 (marginal significance); with 9 degrees of freedom, a significant relation between the variables can be detected. In that case, different groups (A, B, C or D) respond differently how they value the one of the seven characteristics.

Table 2. Observed values to determine the 7 different plant-based milk values for “nutritional value”, “taste”, “structure”, “price”, “brand”, “environmental concerns” and “organic/biological production”. Groups are classified as only cow's milk (A), only plant-based (B), both cow's milk and plant-based milk (C) or neither cow's milk nor plant-based milk (D). The Chi² values and P-value indicate if the different groups give similar scores or not.

Plant-based milk	Score				Chi ² -Value	P -value
	1	2	3	4		
Nutritional value					7.127	0.624
Group A		1	2	1		
Group B	4	1	12	4		
Group C	4	3	11	5		
Group D	1					
Taste					12.613	0.181
Group A			1	3		
Group B	1	1	6	13		
Group C	3	1	10	9		
Group D	1					
Structure					9.374	0.403
Group A			3	1		
Group B	2	3	9	6		
Group C	5	5	9	4		
Group D	1					
Price					15.461	0.079
Group A			4			
Group B	3	5	10	3		

Group C	2	11	8	2		
Group D	1					
Brand					3.887	0.919
Group A	1	3				
Group B	6	11	3	1		
Group C	7	10	4	1		
Group D	1					
Environmental concerns					13.740	0.132
Group A		2	1	1		
Group B	1	2	10	8		
Group C	5	3	8	7		
Group D	1					
Way of producing (bio-organic)					13.860	0.217
Group A		2	1	1		
Group B	1	2	11	7		
Group C	5	5	7	6		
Group D	1					

Calculated with the Chi²-test, table 2 shows that for the values in plant-based milk no significant relation is found. Since the Chi²-test is required to have a $p < 0.05$ in order to have a significant relation detected, it is seen that none of the values fulfil that requirement. Nevertheless, the value “price” nearly shows a significant relation, with a marginal significance (P-value) of 0.079 it is considered to be the closest value towards a significant relation or trend ($P < 0.10$) towards price. The value “price” in plant-based milk is therefore less important to group C; consumers whom consume both products, in comparison with group B; whom only consume plant-based milk.

The following chapter will discuss the relationship between the expected results of the research and the actual observed results.

4. Discussion of Results

The main objective of this questionnaire is understand fresh cow's milk and plant-based milk values given by millennials living in Leusden. By performing a Chi²-test on the results of each value given per product (cow's milk or plant-based milk). The millennials were divided into four categorized consumer groups: "fresh cow's milk consumers", "plant-based consumers", "both fresh cow's milk and plant-based milk consumers", "non-milk consumers.

4.1. What are the most important values in fresh cow's milk given by four categorized milk orientated groups of consumers?

There is no significant relationship detected between the values for fresh cow's milk and the four categorized consumer groups. This is not in line with the expected outcomes from start of the research. The expected outcome of the value in fresh cow's milk was a significant relation for "nutritional value". In a recent peer reviewed study of Dutch food-based dietary guidelines written by the Health Council of the Netherlands resulted that a few portions of diary, including milk or yoghurt, are recommended on a daily base (Kromhout, D., Spaaij, C., de Goede, J. et al., 2016). Nevertheless, "nutritional value" does still not show any significant relation for fresh cow's milk by millennials. Furthermore, the value "brand" was expected to have an insignificant relationship towards the millennial consumer group. Millennials are also looking for products and brands which suit their values and personality, lifestyle, social values and culture (Ayaydin & Baltaci, 2013). "Millennials are well known for their lack of brand loyalty" (F.M. Moreno, J.G. Lafuente, F. Avila, S.M. Moreno, 2017). This statement is complimenting the outcome of the value of "brand" in fresh cow's milk consumption.

4.2. What are the most important values in plant- based milk given by four categorized milk orientated groups of consumers?

To measure the significant relationship between the values given in plant-based milk by the four categorized consumer groups, no significant relationship was detected. Environmental concerns for plant-based milk consumers did not show a significant statistical relation in contrary to the expected outcomes of the research. Due to the conscious consumerism or greening of the actions of food consumers, it was expected that environmental concerns were something to take highly into consideration when consuming plant-based milk. These results are contrary knowing that millennials have a high predisposition to engage in environmental promoting consumption behaviour (Nicolau, J. L., Guix, M., Hernandez-Maskivker, G., & Molenkamp, N., 2020). After analyzing the value "brand", no significant relationship is found. No significant relation detected towards "value" in Millennials' all well known for their lack of brand loyalty (F.M. Moreno, J.G. Lafuente, F. Avila, S.M. Moreno, 2017). Thus, the expected outcomes of the research are in line with the actual outcomes. Also, the value which almost showed a significant result was for the value "price". Further research could explore this value even more.

4.3. The research process

At the start of this research, the objectives were gather motivations behind consumers fresh cow's consumption. As the results were not relatable to the motivation behind the research. Soon, this research was focused on the actual values in the milk variation. The questionnaire distribution and collecting data went efficient and fast. The data collected was reliable due to the limited geographical target group. The reward distributed to the participants was part of the great response ratio. No significant statistical relations were detected. Unfortunately, these results did not match the main expected outcome. Nevertheless, by doing this research, a great format and example is created for other graduate students to use for their thesis and potentially use as a reference for other complimenting researches in the same direction.

4.4. Limitations:

The greatest limitation of this research is the constant reorientation of millennials. Furthermore, the present study available develops a characteristic of the millennial that requires studies of different contexts that make it possible to define the profile of the millennium. Millennials appear to be more metropolitan due to the extensive link with technology and the great socio-cultural impact on their background (F.M. Moreno, J.G. Lafuente, F. Avila, S.M. Moreno, 2017). Next to that, the specific target group of millennials' living in the municipality of Leusden may not be representable enough to speak for the total group of millennials in the Netherlands since to the narrow demographical limitations to the research.

5. Conclusions and recommendations

This chapter highlights the most important findings of this research and gives answers to the main research question: “*Which characteristics in fresh cow’s milk and plant-based milk are most valued by millennials living in Leusden, the Netherlands?*”.

5.1. Conclusions

The main objective of the research is understand the most valued characteristics in fresh cow’s milk and plant-based milk by millennials living in Leusden.

The values of fresh cow’s milk are analysed and in contrary to the expected outcomes, no significant relations were detected. Even with the health advises of the Dutch government, it seemed that millennials do not show a specific or even a significant relation towards “nutritional value”. As expected, the value “brand” did not show a significant statistical relation by millennials due to their proven lack of brand loyalty.

As for the values of plant-based milk are analysed and in contrary to the expected outcomes, no significant relations were detected. In specific, a significant relationship for the value “environmental concerns” was expected to be detected. These results are contrary knowing that millennials have a high predisposition to engage in environmental promoting consumption behaviour. Nevertheless, millennials also show inconsistent behaviour towards making choices due to the great ability to educate and inform themselves with an abundance of resources available. As expected, the value “brand” did not show a significant statistical relation by millennials due to their proven lack of brand loyalty.

With answering the main question, the most valued characteristics in the milk products of millennials did not show any significant relationship, which is a result as well. Also, the value which almost showed a significant result was for the value “price”. Further research could explore this value in more depth to examine the potential for “price”.

The results do not show any significant relationships towards fresh cow’s milk and plant-based milk, but that does not mean the results are irrelevant. The results were not in line with the expected results and that shows that research can have a negative outcome. The results contribute for recommendations given in the next paragraph.

5.2. Recommendations

The research leads to a few recommendations for marketers and graduating students:

As recommendation for milk marketing business like for example “FrieslandCampina” or “Alpro”, it is important to differentiate themselves in order to gain loyal consumers. Millennials tend to gain their information through online resources. This is an opportunity for brands to get attention through social media platforms. With a value which was almost found to be significant in this research for “environmental concerns” it is important that having a target group as millennials, companies have to ensure to consider and send out a particular value with their (marketing) message.

With a “close to” significant relationship for “price” in plant-based milk detected, further research could be done in order to evaluate the motivation to this exact value. Also, further research might complement the results of this research by exploring opinions and motivations given by millennials to get insights in the consumers purchase behaviour. Other bachelor’s theses could strengthen the marketers marketing of milk processing and businesses even more.

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I. Appendices

In the appendices chapter, the questionnaire distributed to Dutch participants has been presented on online platforms such as Facebook and Linked in. To continue the questionnaire the requirements; “living in Leusden” and “age” must be answered with “yes”. The questionnaire is written in the Dutch language. The questions most relatable for this research are translated at the end of the questionnaire.

Beste Leusdenaar,

Allereerst wil ik u hartelijk bedanken voor uw deelname aan dit onderzoek bestaande uit 14 vragen. Voor mijn afstuderen doe ik onderzoek naar de verse koemelk & plantaardige melkconsumptie in Nederland. Hierbij gaat het om de voorkeur en keuze die u maakt bij het nuttigen van melk. Graag wil ik onderzoeken hoe de dalende verse koemelk consumptie in Nederland verklaard kan worden en in hoeverre plantaardige melk producten hier invloed op hebben. Bent u tussen de 25 en 45 jaar oud en woonachtig in gemeente Leusden?* Dan nodig ik u graag uit om deze vragenlijst in te vullen. Om u te bedanken verdeel ik onder mijn deelnemers 2x een Albert Heijn cadeaukaart van €25,-. U kan hier kans op maken wanneer u uw e-mailadres achterlaat aan het einde van de enquête.**

Een vriendelijke groet,

Pam Roesink

*Dit onderzoek is plaats- en leeftijdgebonden, mocht u niet aan de demografische eigenschappen voldoen worden uw resultaten niet meegenomen bij het verwerken.

** 1 antwoord per persoon.

***Vereist**

1. Bent u woonachtig in de gemeente Leusden? *

Ja (vereist voor dit onderzoek)

Nee

2. Bent u tussen de 25 en de 45 jaar oud? *

Ja (vereist voor dit onderzoek)

Nee

3. Wat is uw geslacht? *

Man

Vrouw

Anders

Verse koemelk consumptie

Onderstaande vragen gaan over het nuttigen van verse koemelk onder de inwoners van Leusden. Wanneer er over "verse koemelk" gesproken wordt, gaat het om de koemelk verpakkingen die te vinden zijn in het koelvak bij uw supermarkt. Let op dat u niet verward raakt met "rauwe koemelk", dit onderzoek is gericht op "verse koemelk".

4. Nuttigt u verse koemelk? *



Ja

Nee (ga door naar vraag 8)

Nee, maar vroeger wel (ga door naar vraag 8)

Nee, maar ik zou dit wel willen proberen (ga door naar vraag 7)

5. Hoe vaak* drinkt u verse koemelk? *per consumptie moment (in de koffie, per glas, smoothie etc.)

0-10 keer per week

10-20 keer per week

20-30 keer per week

30-40 keer per week

meer dan 40 keer per week

6. Wat voor soort verse koemelk nuttigt u? (Meerdere antwoorden mogelijk)

Verse volle melk

Verse halfvolle melk

Verse magere melk

Anders

7. Beoordeel bij de volgende kenmerken uw motivatie achter het consumeren van "verse koemelk". (Met als 1: heel onbelangrijk en met als 4: heel belangrijk)

1. Heel onbelangrijk. 2. Onbelangrijk 3. Belangrijk 4. Heel

belangrijk

Voedingswaarde

Smaak

Structuur

Prijs

Merk

Milieu overwegingen

Biologische - organische productie

Volgende

Plantaardige melk consumptie

Plantaardige melk is een opkomende trend onder consumenten. Misschien is het u zelf ook wel opgevallen dat het aanbod van plantaardige melk producten groter is geworden en dat deze duidelijker gepositioneerd in de schappen staan. Daarnaast bieden verschillende merken een gevarieerde range in plantaardige melk producten.

8. Nuttigt u plantaardige melk? *



Ja

Nee (ga door naar vraag 12)

Nee, maar vroeger wel (ga door naar vraag 12)

Nee, maar ik zou dit wel willen proberen (ga door naar vraag 11)

9. Hoe vaak* drinkt u plantaardige melk? *per consumptie moment (in de koffie, per glas, smoothie etc.)

0-10 keer per week

10-20 keer per week

20-30 keer per week

30-40 keer per week

meer dan 40 keer per week

10. Wat voor soort plantaardige melk producten nuttigt u? (Meerdere antwoorden zijn mogelijk)

Op basis van granen: Havermelk/ Rijstmelk /Maïsmelk / Speltmelk

Op basis van peulvruchten: Sojamelk / Pindamelk / Lupinemelk / Cowpea-melk

Op basis van noten: Amandelmelk / Kokosmelk / Hazelnootmelk / Pistachemelk / Walnotenmelk

Op basis van zaden: Sesammelk / Vlasmelk /Hennepmelk / Zonnebloemmelk

Op basis van pseudo-granen: Quinoamelk / Teffmelk / Amarantmelk

Anders

11. Beoordeel van de volgende kenmerken uw motivatie achter het nuttigen van "plantaardige melk". (Met als 1: heel onbelangrijk en met als 4: heel belangrijk)

Voedingswaarde /

Smaak / Structuur / Prijs / Merk / Milieu overwegingen / Biologische - organische productie

1. Heel onbelangrijk. 2. Onbelangrijk 3. Belangrijk 4. Heel

belangrijk

Voedingswaarde

Smaak

Structuur

Prijs

Merk

Milieu overwegingen

Biologische - organische productie

Consumenten voorkeuren

12. Beschouwt u de consumptie van plantaardige melk als een alternatief voor verse koemelk? *

Ja

Nee

13. Op welke momenten nuttigt u melk?
Verse koemelk.

Plantaardige melk

Ontbijt

Lunch

Diner

Toetje/Dessert

Warme drank

Bij de koffie

Tijdens koken/bakken

Tussendoortje

Anders

Ontbijt

Lunch

Diner

Toetje/Dessert

Warme drank

Bij de koffie

Tijdens koken/bakken

Tussendoortje

Anders

14. In hoeverre herkent u zichzelf in de volgende statements? (Met als 1: Helemaal oneens en 4 als: Helemaal eens) *

1. Helemaal oneens 2. Oneens 3. Eens 4. Helemaal eens

"Ik heb vertrouwen in mijn kennis van de productie van verse koemelk".

"Ik vind dat mensen moeten overschakelen van het nuttigen van verse koemelk naar plantaardige melk, mochten ze dat nog niet doen"

"Ik vind dat mensen moeten overschakelen van het nuttigen van plantaardige melk naar verse koemelk, mochten ze dat nog niet doen"

"Ik denk dat een combinatie van plantaardige melk en verse koemelk de voorkeur heeft in mijn dieet"

English version:

Do you live in the municipality of Leusden?

- Yes (required for this questionnaire)
- No

Age: between the age of 25 and 45?

- Yes (required for this questionnaire)
- No

Do you consume fresh cow's milk?

- Yes
- No
- No, but I used to
- No, but I would like to try

What type of fresh cow's milk do you consume? * Check all that apply

Whole milk (....) Semi skimmed milk (....) Skimmed milk (....) Other (....)

Do you consume plant-/vegetable-based milk?

- Yes
- No
- No, but I used to
- No, but I would like to try

What type of plant-/vegetable-based milk do you consume? * Check all that apply

- a. Cereal based: oat milk (....) rice milk (....) corn Milk (....) spelt milk (....)
 - b. Legume based: soymilk (....) peanut milk (....) lupin Milk (....) cowpea milk (....)
 - c. Nut Based: almond milk (....) coconut milk (....) hazelnut milk (...) pistachio milk (....) walnut milk (....)
 - d. Seed based: sesame milk (....) flax milk (....) hemp milk (....) sunflower milk (....)
 - e. Pseudo-cereal based: quina milk (....) teff milk (....) amaranth milk (....)
- None of these (....)
Other.....

9. Using a scale of 1= Not at all important to 4= Very important, please rate the following attributes on the motivation behind consuming fresh cow's milk with a cross (x):

Attributes in fresh cow's milk	1	2	3	4
Nutritional value				
Taste				
Structure				
Price				
Brand				
Part of my diet				
Way of production 1. Environmental concerns 2. Organic Biological production				

13. Using a scale of 1= Not at all important to 4= Very important, please rate the following attributes on the motivation behind consuming ~~plant-/vegetable-based~~ milk with a cross (x):

Attributes in plant-/vegetable-based milk	1	2	3	4
Nutritional value				
Taste				
Structure				
Price				
Brand				
Part of my diet				
Way of production 1. Environmental concerns 2. Organic - biological production.				

14. How strongly do you rate the following statements?

a. "I am confident about my knowledge of the production of fresh cow's milk".

Strongly agree (....) Agree (....) Disagree (....) Strongly disagree (....)

b. "I think people need to switch from consuming fresh cow's milk to plant-/vegetable-based milk".

Strongly agree (....) Agree (....) Disagree (....) Strongly disagree (....)

c. "I think people need to switch from consuming plant-/vegetable-based milk to fresh cow's milk".

Strongly agree (....) Agree (....) Disagree (....) Strongly disagree (....)

d. "I think a combination of plant-/vegetable-based milk and fresh cow's milk in my diet is preferable".

Strongly agree (....) Agree (....) Disagree (....) Strongly disagree (....)