

# **Essays on Consumers' Perceptions and Valuations of Health-enhancing Attributes in Food Products**

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## Table of Contents

Abstract.....	iv
Zusammenfassung.....	vi
List of Acronyms and Abbreviations .....	viii
List of Tables .....	ix
List of Figures.....	x
1 INTRODUCTION .....	1
1.1 Problem Statement and Research Objectives.....	1
1.2. Structure and methodology of the Dissertation.....	4
1.3 Synthesis of Results .....	8
References.....	12
2 ESSAYS.....	14
Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products: A Meta-analysis.....	15
I.1. Introduction .....	15
I.2. Literature review.....	17
I.3. Data collection .....	20
I.4. Results .....	24
I.5. Discussion and conclusions .....	27
References.....	31
Appendix I.1. Number of respondents for each WTP value and weighted means for each study ....	36
Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach .....	39
II.1. Introduction .....	39
II.2. Literature Survey on Reference Dependence Approach to Modeling Consumer Behavior.....	41
II.3. Experimental Design and Results.....	43
II.4. Analysis of consumer choice.....	46
II.4.1 Random utility approach .....	46
II.4.2 Reference point effects .....	50
II.5. Conclusions and discussion.....	54
References.....	57
Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia.....	60
III.1. Introduction.....	60
III.2. Major socio-economic factors influencing consumption of foods with health benefits .....	61
III.2.1. Price as a factor in food choice decisions .....	61
III.2.2. Preferences for traditional products in food choice decisions.....	62

III.2.3. Health status as a factor of food choice decisions.....	63
III.3. Methods.....	64
III.3.1. Product of interest .....	64
III.3.2. Focus group interviews .....	65
III.3.3. Survey and experimental auction.....	66
III.4. Discussion of results .....	68
III.4.1. Results from focus group discussions and survey.....	68
III.4.1.1. Price as a factor in food choice decisions .....	69
III.4.1.2. Preferences for traditional products in food choice decisions.....	70
III.4.1.3. Health status as a factor of food choice decisions.....	71
III.4.2. Results from experimental auction.....	73
III.5. Conclusions.....	76
References.....	78
Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-neophobia in a Cross-Cultural Context.....	81
IV.1. Introduction.....	81
IV.2. Literature review.....	85
IV.3. Methodology and Data Collection.....	86
IV.4. Results.....	88
IV.4.1. General results of the discussions in both countries according to discussion topics .....	88
IV.4.1.1. Food purchasing and consumption contexts with respect to diet and health .....	88
IV.4.1.2. Functional food perception .....	89
IV.4.1.3. Novel foods: attitudes, knowledge, factors influencing consumption decision.....	90
IV.4.1. Distrust and food-neophobia in Russian consumers' perceptions of functional foods.....	91
IV.4.2. Distrust and food-neophobia in German consumers' perceptions of functional foods.....	93
IV.5. Discussion of results .....	96
References.....	98
3 CONCLUDING DISCUSSION.....	103
Appendices.....	106
Appendix 1. Discussion Guide for the Focus Group .....	106
Appendix 2. Visual aids used during the discussions .....	109
Appendix 3. Focus group participant's questionnaire.....	110
Appendix 4. Pre-auction questionnaire.....	111
Eidesstattliche Erklärung / <i>Declaration under Oath</i> .....	114
Curriculum Vitae .....	115

*“...food is the most important and frequently encountered material object that translates regulatory regimes and power relationships into lived experience. Thus food has the almost magical property of jumping scale: as it moves, it links the global economy and household economies, political bodies and the bodies of individuals, the world and the self”*

*- E. C. Dunn*

## Abstract

The complexity and controversy of research outcomes in the field of consumer perceptions and valuations of health-enhancing attributes in food products motivated this dissertation. This controversy arises from unclear connection between income levels and the demand for functional foods, disputed values of health-enhancing attributes for consumers, and increasing complexity in consumers' decision-making. Thus, the research presented in this dissertation aimed at developing evidence on consumers' perceptions and valuations of health-enhancing attributes in food products, advancing the methodological approach for studying consumer food choices, and summarizing existing knowledge on the topic. This dissertation is part of a collaborative project analyzing consumer preferences for and valuations of anthocyanin-rich cereal products.

From the state of the art presented in this dissertation, we observed that up to date economics and marketing research fails to provide systemic unbiased evidence on consumer valuations of health-enhancing attributes in food products. Despite the need for assessing potential demand for functional foods, especially in developing countries, current research results in very heterogeneous outcomes. Nonetheless, a meta-analysis of the literature provided evidence on the current state of the art. It had been shown that the carrier product, the health-enhancing attribute, the elicitation methodology, and the place of study significantly influence willingness to pay estimates.

Empirical data from second-price Vickrey auction and a survey performed in Russia were analyzed using traditional random utility and reference point effects approaches. Results from the random utility estimations lacked evidence on negative valuations of food attributes by consumers. The reference point approach indicated the presence of reference points in the experimental auction data and asymmetrical effects of gains and losses on purchase decisions.

Evidence from the emerging economy perspective (Russia) provided an indication that factors influencing consumer behavior cannot be generalized across countries even at a certain level of income. Although post-communist emerging economies share some common trends in consumer behavior, country-specific trends were indicated by Russian respondents. Strong preferences for traditional products and relative unimportance of price were indicated as major trends characterizing consumer perceptions of health-enhancing foods in our sample.

When compared to the data from industrialized economy with developed market of functional food (Germany), our analysis indicated that contextual factors of decision making do differ between Russia and Germany. Different perspectives provided by the discussions in the two countries indicated different levels of trust. Deeper culturally embedded and widespread distrust in formal institutions in Russia pushed consumers towards developing informal networks to ensure food provision and safety. It led to high levels of food-neophobia as consumers perceived traditions as the most important guarantee for health-enhancing food. On the other hand, German participants indicated a number of formal institutions that were trustworthy and through which information concerning novel and health-enhancing attributes in foods could be communicated.

As a result, the originality of this dissertation arises from several aspects: (i) systematic review of the literature employing meta-analysis; (ii) modified methodological approach to the analysis of the empirical data; (iii) specific empirical evidence from an understudied region (Russia); and (iv) comparative analysis of qualitative data in a cross-cultural context.

**Keywords:** willingness to pay, experimental auction, health-enhancing food, functional food, random utility, reference point, meta-analysis, trust

## **Zusammenfassung**

Die Komplexität und Kontroversen über Verbraucherwahrnehmung und Bewertung gesundheitsfördernder Eigenschaften von Lebensmitteln motivierten diese Dissertation. Diese Kontroversen umfassen die nicht eindeutige Verbindung zwischen Einkommensniveau und der Nachfrage nach funktionellen Lebensmitteln, umstrittene Nutzen gesundheitsfördernder Eigenschaften für den Konsumenten und eine steigende Komplexität in Verbraucherentscheidungen. Daher zielt diese Dissertation darauf ab, neue empirische Evidenz in Bezug auf Verbraucherwahrnehmung und Bewertung gesundheitsfördernder Eigenschaften von Lebensmitteln zu liefern, die Methodik zur Untersuchung von Verbraucherentscheidungen für Lebensmittel weiter zu entwickeln und die bestehenden Kenntnisse zu diesem Thema zusammenzufassen. Diese Dissertation ist Teil eines gemeinschaftlichen Projekts, das die Verbraucherakzeptanz von Anthocyan-haltigen Getreideprodukten untersucht.

Basierend auf der vorhandenen Literatur kann geschlussfolgert werden, dass die bisherige Marktforschung keine systematischen und eindeutigen Belege für die Verbrauchereinschätzung von gesundheitsfördernden Eigenschaften in Lebensmitteln liefert. Trotz der Notwendigkeit für die Beurteilung der potenziellen Nachfrage nach funktionellen Lebensmitteln, insbesondere in Entwicklungsländern, resultiert die jetzige Forschung in sehr heterogenen Ergebnissen. Dennoch können anhand der durchgeführten Metaanalyse einige Ergebnisse abgeleitet werden. So hat sich gezeigt, dass das Trägerprodukt, die gesundheitsfördernde Eigenschaft, die Erhebungsmethode und der Studienort maßgeblich die Zahlungsbereitschaft beeinflussen.

Empirische Daten, die im Rahmen von experimentellen Auktionen und einer Umfrage in Russland erhoben wurden, wurden unter Verwendung von traditionellen random utility Modellen sowie reference points effects Modellen analysiert. Die Ergebnisse der random utility Modelle lieferten keine Beweise für eine negative Verbraucherbewertung der gesundheitsfördernder Eigenschaften. Dahingegen lieferte der reference points effects Ansatz Evidenz für die Existenz von so genannten Referenzpunkten in den experimentellen Auktionsdaten und asymmetrische Auswirkungen von Gewinnen und Verlusten auf die Kaufentscheidung.

Die Ergebnisse zeigen zudem, dass Ergebnisse aus Schwellenländern mit einem ähnlichen Einkommensniveau nicht verallgemeinert werden können. Obwohl die ehemaligen kommunistischen Schwellenländer einen gewissen Trend teilen, deuten die Ergebnisse für

Russland auf länderspezifische Trends hin. Eine eindeutige Präferenz für traditionelle Produkte bei einer gleichzeitigen relativen Unwichtigkeit des Preises sind die zentralen Ergebnisse für die russischen Teilnehmer unserer Studie, die wichtig sind für die Verbraucherwahrnehmung von gesundheitsfördernden Lebensmittel.

Im Vergleich zu Daten von Industrieländern mit einem etablierten Markt für funktionelle Lebensmittel (Deutschland), weist diese Analyse darauf hin, dass sich die Determinanten der Entscheidungsfindung in Russland und Deutschland unterscheiden. So ist ein zentrales Ergebnis, dass das Vertrauensniveau in beiden Ländern stark differiert. Ein kulturell bedingtes und weit verbreitetes Misstrauen in offizielle Institutionen in Russland, drängt Verbraucher dazu, inoffizielle Netzwerke zu entwickeln, um die Lebensmittelversorgung zu sichern. Dahingegen weisen deutsche Teilnehmer auf eine Vielzahl von Organisationen hin, die vertrauenswürdig sind und die Information über neue und gesundheitsfördernde Eigenschaften in Lebensmitteln zur Verfügung stellen.

Basierend auf den gewonnen Daten und Erkenntnissen trägt die Dissertation zur bestehenden Literatur in den folgenden Punkte bei: (I) systematischer Review der vorhandenen Literatur mittels Metaanalyse; (II) Weiterentwicklung der methodischen Herangehensweise für die Analyse empirischer Daten; (III) spezifische empirische Belege für eine bisher wenig untersuchte Region (Russland); und (IV) eine vergleichende Analyse qualitativer Daten in einem interkulturellen Kontext

**Schlagwörter:** Zahlungsbereitschaft, experimentelle Auktion, gesundheitsfördernde Lebensmittel, funktionelle Lebensmittel, random utility Modelle, reference points effects Modelle, Metaanalyse, Vertrauen



## **List of Acronyms and Abbreviations**

AIC Akaike Information criterion

BIC Bayesian Information Criterion

BS Bachelor degree

EUR Euro

GI Geographical Indication

GM Genetically Modified

GOST National Standard of Russian Federation (Gosudarstvenniy Standart)

MS Master Degree

NCD Non-communicable Diseases

OLS Ordinary Least Squares

PhD Doctor of Philosophy

USD United States Dollar

WHO World Health Organization

WTP Willingness to Pay

## List of Tables

Table 1. Data sources and the use of data in each section of the dissertation.....	5
Table 2. Classification of dissertation sections based on their contribution to the research objectives.....	6
Table I.1. List of studies (in alphabetical order) selected for meta-analysis.....	21
Table I.2. Definitions and means of explanatory variables.....	23
Table I.3. Mean WTP values for the total sample and excluding outlier.....	25
Table I.4. Results of weighted OLS estimations.....	25
Table I.5. Results of the meta-regression (excluding outlier).....	26
Table in Appendix A. Number of respondents for each WTP value and weighted means for each study.....	36
Table II.1. Characteristics of Participants (N=212).....	43
Table II.2. Descriptive statistics of bids (in Russian Rubles).....	45
Table II.3. Description of explanatory variables.....	47
Table II.4. Coefficients from binary logit estimations (1% significance level).....	48
Table II.5. Contrasts of predictive margins for statistically significant explanatory variables (1% significance level, covariates at observed values).....	49
Table II.7. Results of the logit estimations (1% significance level).....	52
Table II.8. Contrasts of predictive margins for statistically significant explanatory variables (covariates at observed values) .....	53
Table III.1. Russians' self-rated health (%).....	63
Table III.2. Focus Groups Characteristics.....	65
Table III.3. Participants' characteristics (N=212) .....	67
Table III.4. Focus groups participants' opinions about the place of price in food purchase decisions.....	69
Table III.5. Focus groups participants' opinions about the place of traditions in food purchase decisions.....	71
Table III.6. Focus groups participants' opinions about the place of healthiness of food products.....	72
Table III.7. Means and standard deviations of the auction bids.....	73
Table III.8. Description of the explanatory variables.....	74
Table III.9. Estimation results.....	75
Table IV.1. Focus group discussion guidelines.....	87
Table IV.2. Categories related to trust and neophobia.....	88

## List of Figures

Figure 1. Controversy in scientific research regarding functional and novel foods.....	3
Figure I.1. Distribution of WTP values.....	22
Figure I.2. Funnel graph of WTP values.....	23
Figure II.1. Kernel distribution of utility levels for bread.....	50
Figure II.2. Kernel distribution of utility levels for biscuits.....	50
Figure II.3. Kernel distribution of utility levels.....	54
Figure III.1. The importance of price for the choice of bread .....	70
Figure III.2. The importance of price for the choice of biscuits.....	70
Figure III.3. The importance of taste for the choice of bread.....	70
Figure III.4. The importance of taste for the choice of biscuits .....	70
Figure III.5. The importance of being traditional for the choice of bread .....	71
Figure III.6. The importance of being traditional for the choice of biscuits .....	71
Figure III.7. The distribution of answers to the question: "Have you ever heard about anthocyanin before?".....	72
Figure III.8. The distribution of answers to the question: "Are you familiar with the health effects of anthocyanin?" .....	72

# 1 INTRODUCTION

## *1.1 Problem Statement and Research Objectives*

Recent growth at the functional food market can be attributed to several reasons<sup>1</sup>. First, more and more consumers realize that there is a close connection between diet and health which has led to an increase in the demand for health-enhancing foods. Eating a healthy diet has become a way to improve the quality of life, preserve health and increase productivity. Second, issues related to a sustainable food production, preserving biodiversity and meeting consumer demand for more food varieties are contributing to the expanding production of a wide range of products carrying a healthy image. Third, at a government level policies are designed to increase the well-being of the population and decrease health care expenditures (Granato *et al.*, 2010; Siró *et al.*, 2008).

On the other hand, less positive characteristics of functional food developments are also discussed in the literature. First of all, since health-enhancing foods are in most cases priced higher than their traditional counterparts, it was observed that higher prices can negatively influence the consumption of healthier food options (see e.g. French, 2003; Jetter & Cassady, 2006; Cassady, Jetter, & Culp, 2007; Steenhuis, Waterlander, & de Mul, 2011). Thus, there exists economic burden for healthy food consumption which makes it problematic for these food types to reach consumers in middle- or low-income countries or poorer households in a certain country.

At the same time, evidence can be also found that the relationship between the level of economic development of a country or income of a household and nutrition patterns may not be that obvious. Guyomard *et al.* (2011) observe in the data on the evolution of total calories and calories from animal products in different countries that dissimilarities in diets remain between countries at the same stage of economic development and among households in the same country. Consequently, it seems that different non-economic factors can outperform economic determinants in consumers' decision-making process about healthy food choices.

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<sup>1</sup> According to a definition by European Commission Concerted Action on Functional Food Science in Europe (FUFOSE) functional food is “a food that beneficially affects one or more target functions in the body beyond adequate nutritional effects in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease. It is consumed as part of a normal food pattern. It is not a pill, a capsule or any form of dietary supplement” (European Commission, 2010). Consequently, apart from food products designed to provide health effects (enriched, fortified, etc.), there also exist functional foods, health-enhancing properties of which are naturally present (blueberries, carrots, apples, etc.). In the dissertation health-enhancing foods and functional foods are used as synonyms.

At the industry level developments regarding health-enhancing foods are also not completely positive. The health benefit, initially aimed at providing additional stimulus for health-enhancing food purchase, might not be highly valued by consumers (see e.g. Verbeke, 2006). Moreover, consumers in Europe are on average neutral regarding the importance of eating habits for their health status, giving higher priority to stress and weight (Hoefkens *et al.*, 2013). Besides, a lot of health-enhancing foods also belong to the category of novel foods. Novelty in foods can appear from adding functional attributes (Urala & Lähteenmäki, 2004) and thus complicate consumer perceptions, leading to subsequent market failures (Onwezen & Bartels, 2011).

Another controversial issue is related to the perceptions of health claims<sup>2</sup>, specifically the interaction between a health claim and a carrier product. Some studies suggest that a health claim on a product which is already perceived as healthy can positively influence consumer perceptions (Siegrist, Stampfli, & Kastenholz, 2008; Ares, Giménez, & Gámbaro, 2008), while others state that a health claim on a product with an already healthy image results in skeptical consumer perceptions (Verbeke, Scholderer, & Lähteenmäki, 2009). At the same it was discussed in a paper by van Kleef *et al.* (2005) that if the base product is carrying a hedonic image like in the case of a candy bar, a health claim may be even totally ignored by consumers. Consequently, there is no consistent evidence on the relationship between the characteristics of the carrier product and health claims.

At individual consumer level, developments regarding functional foods also raise questions regarding perceptions and decision-making. The complexity of consumers' decision-making in food choices in general is demonstrated by the evidence of existing multiple "gaps" in the process of food consumption. Guyomard *et al.* (2011) refer to the "technological gap" that appears from more and more sophisticated technologies applied in food production; a "space gap" that reflects the distance between the food producer and the consumer; and the "time gap" which appears from increasing time between production and consumption. Naturally, consumers seek the facilitation of the food choice process, and require additional information.

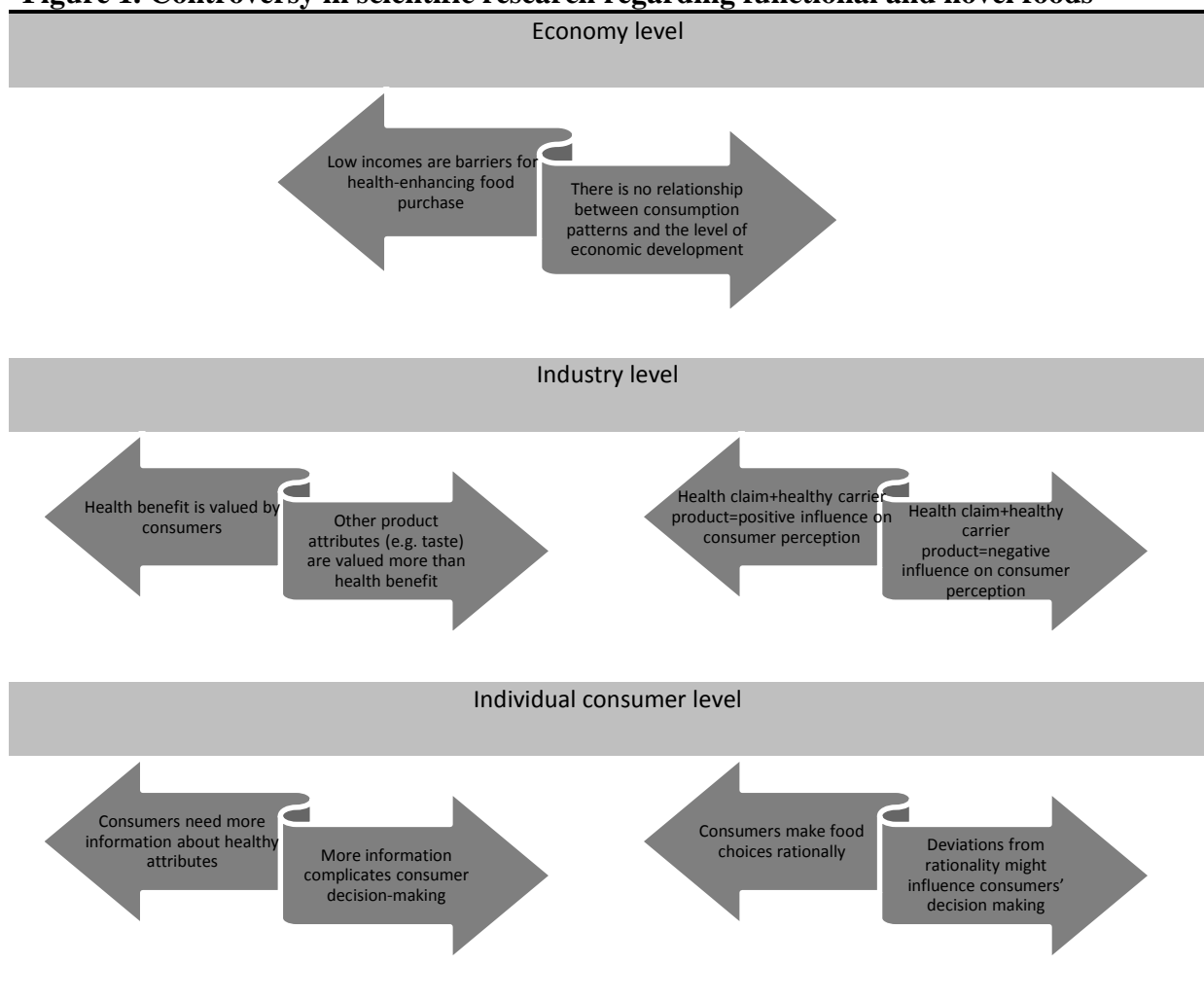
However, providing additional information about different attributes in food products can also negatively influence consumers' perceptions. It has been observed that labels, quality assurance schemes, and traceability actually have a poor effect on consumer's

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<sup>2</sup> According to the European Commission, a health claim is any statement about the relationship between food and health. [http://ec.europa.eu/food/food/labellingnutrition/claims/health\\_claims\\_en.htm](http://ec.europa.eu/food/food/labellingnutrition/claims/health_claims_en.htm) (assessed 03.02.2015).

acceptance by adding complexity to the food choice decisions (Gellynck *et al.*, 2006). In addition, information on food products can differently influence consumer decisions. It has been already discussed in the literature that negative information on the food products influence consumers more than positive information that is reflected in their valuations (Fox, Hayes, & Shogren, 2002), which brings us to the questions related to modelling consumer choices and if, from an economic perspective, consumers can be seen as rational decision-makers.

**Figure 1. Controversy in scientific research regarding functional and novel foods**



*Source: own compilation from the sources mentioned above.*

To sum up, all the controversy in the field (figure 1) requires additional evidence on consumer perceptions of health-enhancing foods especially for comparative studies between emerging and developed economies and closer investigation of consumer decision-making regarding healthy food choices and subsequent modelling of these choices. It is also necessary to get deeper insights into consumers' valuations of health-enhancing foods and potential demand for these products.

## **1.2. Structure and methodology of the Dissertation**

The dissertation consists of four sections. Section 1 entitled “*Consumers’ Willingness-to-pay for Health-enhancing Attributes in Food Products: A Meta-analysis*” presents systematic literature review of the studies reporting willingness-to-pay values for health-enhancing attributes in food products. Section 2 “*Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*” describes modified methodological approach for analyzing the experimental auction data. It specifically investigates if reference point effects approach could provide additional evidence on consumers’ valuations of health-enhancing attributes in foods. Section 3 “*Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia*” provides evidence on recent developments in Russian consumers’ behavior based on the data from qualitative and quantitative analysis. In Section 4 which is entitled “*Consumers’ Perceptions of Functional Foods: Trust and Food-Neophobia in a Cross-Cultural Context*” comparative cross-cultural analysis of qualitative data is performed indicating trust and food-neophobia related perceptions of health-enhancing foods by consumers in Russia and Germany.

This dissertation is part of a collaborative project analyzing consumer preferences for and valuations of anthocyanin-rich cereal products. Anthocyanin-rich cereals are studied for their ability to provide a healthy diet due to the multiple health properties of anthocyanin: antioxidant (Abdel-Aal et al. 2014); anti-inflammatory (Tsuda and others 2002; Min and others 2010), anticancer (Hyun and Chung 2004; Zhao and others 2004; Hui and others 2010), antidiabetic (Tsuda and others 2003; Guo and others 2007), and/or ocular health enhancing properties (Ghosh and Konishi 2007; Kalt and others 2008).

Consumer research was performed in parallel to product development, and this approach mainly shaped the methods applied in research. The appropriateness of methods for consumer research early in the product development process has been discussed in van Kleef, van Trijp, & Luning (2005a). We have already indicated above that market success of functional foods is rather difficult. Lusk & Hudson (2004) indicate that the success rate of new products is about 10%, and since anthocyanin-rich cereal products are of innovative character and future market demand for such products is in question. Thus, the motivation for consumer research being performed in parallel with product development in this project appears from the lack of systematic evidence about consumer perceptions and potential market demand for grain products with health benefits.

The combination of qualitative and quantitative methods was used to obtain the data on consumers’ perceptions and valuations of health-enhancing attributes in food products.

Qualitative investigation in the form of focus group discussions was used to get deeper insights into consumers' perceptions of functional foods and widen the perspective to include previously unaccounted for factors. Quantitative approach that included second-price Vickrey auction provided non-hypothetical valuations of health-enhancing attributes in foods. The need for different kind of evidence is especially pronounced in the case of Russia, where very few studies about consumer preferences have been performed. Data collection methods together with their contribution to the each section of the dissertation are reported in table

**Table 1. Data sources and the use of data in each section of the dissertation**

<i>Price premiums for health-enhancing attributes in foods from relevant literature</i>	<i>Survey and second-price Vickrey auction (with an example of anthocyanin-rich bakery products)</i>	<i>Focus group interviews in Russia on consumers' perceptions of functional foods (with an example of anthocyanin-rich bakery products)</i>	<i>Focus group interviews in Germany on consumers' perceptions of functional foods (with an example of anthocyanin-rich bakery products)</i>
Section I. Consumers' Willingness-to-pay for Health-enhancing Attributes in Food Products: A Meta-analysis	Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach		
	Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia		
		Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-Neophobia in a Cross-Cultural Context	

This dissertation has the following research objectives. First, it aims at summarizing and analyzing the existing knowledge on consumer valuations of health-enhancing attributes in foods. This is achieved through a systematic literature review in the form of meta-analysis. To date, no systematic quantitative review has been performed on the literature about consumers' willingness to pay for health-enhancing attributes in foods. Willingness to pay estimates are elicited from previous research and analyzed through a set of factors that could



influence variations in valuations. Conclusions relevant for the directions of the future research are drawn.

Second, this dissertation aims at contributing to the methodological framework for modelling consumer choices. This is achieved through the application of a reference point effects approach to the analysis of experimental auction data. Traditionally, willingness to pay for different attributes in foods is analyzed within random utility framework. In the present study this approach is modified to include reference points, and gains and losses to better accommodate heterogeneity of consumer preferences.

**Table 2. Classification of dissertation sections based on their contribution to the research objectives**

Systematic summary of the existing knowledge on consumers' valuations of health-enhancing attributes in foods	Developing methodological approaches to modelling of consumer behavior	Advancing qualitative and quantitative evidence on consumer behavior
<p><i>Section I. Consumers' Willingness-to-pay for Health-enhancing Attributes in Food Products: A Meta-analysis</i></p>	<p><i>Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach</i></p>	<p><i>Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia</i></p> <p><i>Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-Neophobia in a Cross-Cultural Context</i></p>

The third research objective is to provide empirical evidence on consumer perceptions and valuations of novel health-enhancing foods in Russia (emerging economy with relatively small market of functional foods) and Germany (industrialized economy with developed functional foods market). The contribution of each section to the research objectives is presented in table 2.

As a result, the originality of this dissertation arises from several aspects: (i) systematic review of the literature employing meta-analysis; (ii) modified methodological

approach to the analysis of the empirical data; (iii) specific empirical evidence from an understudied region (Russia); and (iv) comparative analysis of qualitative data in a cross-cultural context.

### ***1.3 Synthesis of Results***

The next part presents an overview about the results of the research and the contribution of each section to the research objectives and the existing literature.

#### **Section I. Consumers' Willingness-to-pay for Health-enhancing Attributes in Food Products: A Meta-analysis**

Section I consists of a paper that analyzes the existing literature on consumers' valuations of health-enhancing attributes in foods. The analysis is performed via meta-regression that allows determining general factors influencing price premiums for health-enhancing attributes in foods reported in the scientific papers on the topic. It is specifically studied if the variations in willingness to pay estimations can be attributed to the choice of methodology, the place of the research, the product, the health-enhancing attribute specified or the time of study. In total 27 studies reporting WTP estimates were included. The results show that hypothetical methods significantly positively affect the estimates confirming that well-known "hypothetical bias". As a result, mostly positive valuations of health-enhancing attributes reported by consumers can be overestimated as hypothetical valuations are also most often employed method of the research. Despite high level of heterogeneity among the base products used in the studies, the most popular product categories "Dairy" and "Fruits/vegetables" were included in the list of explanatory variables and provided significant negative coefficients. This result suggests the importance of the choice of carrier product for the research on consumer valuations. The most well-known health-enhancing attribute "Lowering cholesterol" significantly positively influences WTP valuations. This result is explained by the fact that consumers are mostly familiar with this health-enhancing attribute.

However, certain limitations to these conclusions should be taken into account as the heterogeneity among studies is extremely high. But even more importantly, the review of the literature indicates that despite the need for the estimation of potential demand for health-enhancing attributes in foods, economics and marketing research so far cannot provide clear unbiased evidence. Moreover, extremely high variation in the estimates and the presence of negative valuations suggest the need for more extensive research and more up-to-date methodology.

## **Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach**

Section II describes modified methodological approach to analyzing data from experimental auction. It is based on the assumption that distortions from assumed rationality in consumer behavior and the acknowledgement of the framing of decision making process can provide additional evidence on consumer food choice decisions.

We draw on data from a survey and second-price Vickrey auction for novel foods with health-enhancing and environmental benefits. Products evaluated during the auction are anthocyanin-rich bakery foodstuffs. In analyzing the data traditional random utility approach is employed first and the factors influencing the purchase decision together with the probabilities of purchase are obtained. Besides, we compare stated and revealed preferences using the data from a survey conducted before the auction. The evidence of overestimated stated preferences is also indicated.

Then, reference point effects approach that originates from Prospect theory is applied to the same data. From the auction data we specify reference points, gains and losses. The reference point approach indicates the presence of reference points in the experimental auction data and asymmetrical effects of gains and losses on purchase decisions. Specifically, perceived losses can significantly decrease the probability of purchase decision, if, for example, consumer negatively perceives any kind of biological transformation in food products.

Models fit is measured by  $PseudoR^2$  and Akaike Information Criterion and Bayesian Information Criterion and indicates that part of consumer-specific heterogeneity is explained in the models that include reference points.

### **Section III. Major Factors Influencing Functional Food Consumption In A Post-Communist Economy: the case of Russia**

Section III presents the results from the qualitative and quantitative inquiries into factors influencing functional food consumption in Russia. Qualitative research in the form of focus groups was performed in December 2012 in two cities (Moscow and Irkutsk) with 30 participants in total. Quantitative research including a survey and an experimental auction was performed in November-December 2013 in the same locations. Resulting data provides unique evidence on consumers' perceptions and valuations of health-enhancing attributes in food products from heavily understudied region. Products used as an example of novel food with health-enhancing benefits are anthocyanin-rich bakery products.

Based on a literature review major socio-economic factors related to the consumption of health-enhancing foods were identified. Then, results from the field research are employed to find the evidence to support or reject the influence of these factors.

First, price is considered to be an important factor in food choice decisions, especially for the consumers in the remote geographical areas. However, the influence of this factor was not supported by the data from the focus groups and the survey. Taste, freshness and naturalness outweigh price as factors of purchase decision. This evidence is true for both Moscow and Irkutsk despite differences in incomes.

Second, Russian consumers demonstrate preferences for traditional products and are cautious about novel and unfamiliar foods. This tendency was indicated in the previous research and is also supported by the extensive use of garden plots and the wild to guarantee food provision and safety, especially in the remote geographical areas.

Third, deteriorating health status of the population influences the consumption of functional foods. Results from focus group discussions indicate that consumers mostly perceive health-enhancing products as traditional and vice versa. Besides, novel health-enhancing substances (like anthocyanin) are mostly unfamiliar to consumers in our sample.

Results of the random effects regression indirectly support the influence of above-mentioned factors. Strong preferences for traditional products and relative unimportance of price are indicated as major trends characterizing consumer perceptions of health-enhancing foods in our sample.

#### **Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-Neophobia in a Cross-Cultural Context**

Consumers' perceptions of functional foods are complicated by perceived risks and complexity that appear from growing and sometimes confusing information flow. Social trust can serve as a mean for the reduction of risk and complexity. Thus, Section IV discusses sources of distrust and food-neophobia as well as coping mechanisms employed by consumers to ensure food provision and safety.

We discuss the results of a qualitative inquiry in the form of focus groups into consumers' perceptions of functional foods in Russia and Germany. Altogether eight focus group interviews were carried out in different parts of Russia and Germany in December-January 2012-2013. A total of 59 people participated in the discussions.

Different perspectives provided by the discussions in the two countries indicate different levels of trust. Deeper culturally embedded and wider-spread distrust in formal institutions in Russia pushes consumers towards developing informal networks to ensure food provision and safety. It leads to high levels of food-neophobia as consumers perceive traditions as the most important guarantee for health-enhancing food. On the other hand, German participants indicate a number of formal institutions that are trustworthy and through which information concerning novel and health-enhancing attributes in foods can be communicated.

We provide exploratory views on the importance of social trust in consumers' perceptions of functional foods and indicate mechanisms that consumers develop to deal with increasing risk and complexity in food choices.

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## **2 ESSAYS**

## **Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products: A Meta-analysis<sup>3</sup>**

### ***1.1. Introduction***

Assessing potential demand for functional or healthy foods<sup>4</sup> is crucial from several perspectives. First, foods with functional attributes require more expensive production process than traditional foods in many cases; for example, when the functional attribute is provided by enhancing or enriching the products with additional substances. Thus, it is necessary to estimate potential demand for functional foods prior to delivering the product to the consumers. However, given that many functional foods are of innovative character, assessing potential demand is often complicated by the non-availability of actual market data (Lusk & Hudson, 2004). Consequently, hypothetical and non-market valuations of novel functional foods by consumers are often employed to obtain the necessary information.

Second, the promotion of healthier food options is related to the fact that an unhealthy diet is among the four main behavioral risk factors of non-communicable diseases (NCD) that are estimated to account for around 36 million deaths in the world each year, mostly in low- and middle-income countries<sup>5</sup>. It has been found that prices can be a barrier for healthy food consumption, especially among low-income groups of the population (see e.g. Jetter & Cassady, 2006; Steenhuis, Waterlander, & de Mul, 2011). From this perspective, it is also helpful for policy makers to assess whether consumers are indeed ready to pay price premiums for foods aimed at improving their health. To set up effective public health interventions, it is particularly important to identify which consumer groups are willing to accept and pay a price premium for a certain health benefit and how information – for example, in terms of labeling – can influence consumers' acceptance and willingness to pay.

Third, the market introduction of functional foods and foods with health benefits does not always prove successful. Despite the importance of a healthy diet in the prevention of some diseases and sustaining well-being in general, economists and marketing researchers observe some uncertainty in consumers' perceptions and acceptance of foods with health benefits. Due to the intermediate status between food and medicine, functional products

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<sup>3</sup> This section is submitted as Dolgoplova I., Teuber R. "Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products: A Meta-analysis" in *Food Policy*.

<sup>4</sup> The ambiguity of the term "functional food" is well-established in the literature. A comprehensive overview of existing definitions across countries is presented in Doyon & Labrecque (2008).

<sup>5</sup> World Health Organization. Fact sheet on non-communicable diseases.  
<http://www.who.int/mediacentre/factsheets/fs355/en/>

extend beyond the two main purposes of traditional foods: satisfying hunger and giving hedonic pleasure. In the case of functional foods, a third perspective – the potential health benefit – is added to the choice decision. Consequently, a specific health benefit provided by a certain food product is assumed to be a significant factor in terms of consumers' acceptance of this food. However, the results of previous research indicate that consumers' acceptance of foods with health benefits also depends upon a variety of other factors besides the health benefit itself (see e.g., Siró, Kápolna, Kápolna, & Lugasi 2008, Verbeke, 2006, and Frewer, Scholderer, & Lambert, 2003). In addition, consumers' unwillingness to pay higher prices, low trustworthiness or knowledge about foods with health benefits and concerns about taste and naturalness have been indicated as reasons for multiple market failures of functional and novel foods (Onwezen & Bartels, 2011). Thus, a more effective and efficient functional foods marketing could also be achieved through a more precise assessment of the potential demand for such products.

One of the most well-known demand-revealing indicators in economics is willingness to pay (WTP). WTP is a welfare measure corresponding to the amount that an individual would be willing to pay to secure the change a product's quality (Hanemann, 1991). WTP estimates for healthy attributes in foods measure the amount that a consumer would be willing to pay to secure the potential benefit for their health obtained by consuming the product.

Previous research demonstrates that WTP for healthy attributes in food products can be influenced by a variety of factors. Among socio-demographic characteristics, age, sex, income and educational level have been found to be connected with WTP estimates (e.g. Bower, Saadat, & Whitten, 2003; Barreiro-Hurlé, Colombo, & Cantos-Villar, 2008; Øvrum, Alfnes, Almli, & Rickertsen, 2012; Teratanavat & Hooker, 2005; Nordström, 2012; Hellyer, Fraser, & Haddock-Fraser, 2012; Hu, Woods, Bastin, Cox, & You, 2011; Markosyan, Wahl, Thomas, & McCluskey, 2007). WTP estimates are typically positively influenced by income and educational level and negatively by age. Besides, female respondents are often willing to pay higher prices. Other important factors influencing consumers' WTP for healthy attributes in foods include knowledge and awareness about the health benefit, liking of and familiarity with the base product, consumption patterns, attitudes and beliefs, health concerns, the presence of children in the household, taste and price. This wide range of possible influential factors makes it difficult to ascertain definite conclusions with respect to the economic determinants of consumers' WTP for health-enhancing foods.

Thus, market or policy decisions about functional foods are complicated by the aforementioned array of factors influencing consumers' choices. Furthermore, WTP estimates are influenced by the chosen type of data collection and analysis. In the case of WTP for attributes in food products, previous meta-analyses have shown that differences in WTP estimates can be attributed to methodological issues, such as the elicitation method, as well as factual differences, such as heterogeneous consumer preferences in different regions of the world (e.g. Dannenberg, 2009; Lusk, Jamal, Kurlander, Roucan, & Taulman, 2005).

This paper investigates the existing body of research concerning consumers' valuations of healthy attributes in food products by means of a meta-analysis. It explores whether variation in WTP estimates for healthy attributes in foods can be attributed to common factors related to the choice of the methodology, the place and time of data collection, the choice of the carrier product and the health benefit specified. Thus, our study contributes to the existing literature on health-enhancing food by: (i) reviewing the existing empirical evidence on consumer valuations of different healthy attributes; (ii) identifying the major underlying drivers of differences in WTP estimates via meta-analysis; and (iii) deriving directions for future research in the field.

The remainder of this paper is organized as follows. The next section discusses previous meta-analyses of WTP for different attributes in foods. Section 3 describes the data collection process. Section 4 reports the results and in section 5 we discuss and conclude.

## ***1.2. Literature review***

Although a meta-analysis of research related to WTP for health benefits in foods has not been performed to date, several studies exist that meta-analyze consumer preferences for other attributes in foods.

A meta-analysis of the valuations of genetically modified (GM) foods was conducted by Lusk et al. (2005), who study the influence of factors such as place of study, sample characteristics, valuation formats and product characteristics on the percentage premium for non-GM foods over GM foods. OLS and weighted OLS are used for the estimations, with and without an extreme outlier. Their results indicate that European consumers' valuations for non-GM foods are higher than those of US consumers and that hypothetical valuations – i.e. without actual purchases involved – are higher than non-hypothetical ones. Moreover, with respect to sample characteristics, the authors find no significant differences between a student and a random sample. However, grocery shoppers exhibit significantly lower WTP values than the general population. With respect to product categories, the results show that

consumers discount GM meat more strongly than other product categories, whereas so-called second-generation GM foods that are GM foods with a potential health benefit are valued positively.

Another meta-analysis of consumer preferences for GM food was performed by Dannenberg (2009). She uses several dependent variables: a) the percentage price premium consumers are willing to pay for the absence of GM ingredients; b) classes of aversion to GM food; c) the fraction of the population that is “pro-GM”; d) the fraction of the population that is “indifferent” to GM foods; and e) the fraction of the population that is “contra-GM”. A weighted least squares technique is used for the estimations, with the results confirming Lusk et al.'s (2005) finding that European consumers are willing to pay higher price premiums for non-GM food than Americans. With respect to the elicitation method, her results indicate that a dichotomous choice technique as well as payment card and open-ended questions provided lower valuations than choice experiments. However, no significant differences were found between WTP values elicited from choice experiments in comparison to experimental auctions. Thus, in contrast to the results of Lusk et al. (2005), her findings do not indicate the presence of a significant hypothetical bias. Besides, her results do not indicate a significant sample effect, unlike those found by Lusk et al. (2005).

Florax and Nijkamp (2005) analyze the WTP for reductions in pesticide risk exposure. Given that the literature on pesticide risk reduction is very diverse, they develop a taxonomy for different types of pesticide risk exposure, including the effects on consumers, farmers and ecosystems. It is noted that most of the studies are performed with US data and address health effects on consumers. A meta-regression framework is employed for the analysis, with the results indicating that geographical location, sampling type and safety enhancing measure type significantly influence WTP estimates.

Lagerkvist and Hess (2011) meta-analyze the literature on consumers' WTP for farm animal welfare. Explanatory variables in this study include: (i) types of farm animal welfare change; (ii) the socio-economic characteristics of consumers; and (iii) each study's categorical and methodological characteristics. According to their results, respondents' socio-economic characteristics influence WTP, with income having a significant positive effect and age having a significant negative effect. Besides, WTP values are influenced by cross-country differences, whereby German and French consumers were found to pay larger price premiums for animal welfare measures than consumers from other countries. With respect to the applied methodologies, their results indicate that methodological differences between

studies only have minor explanatory power. However, the authors find that cheap-talk scripts and double-bounded dichotomous choice reduced stated WTP values.

Deselnicu et al. (2013) provide a meta-analysis of geographical indication (GI) valuation studies. They take into account the type of GI scheme, the data and methodology used to estimate the price premium, as well as different food categories and the degree of processing. Their results highlight that minimally processed foods with short supply chains (e.g. grains, fruits, vegetables) command the highest price premiums. By contrast, premiums are smaller when the products are processed, the supply chain is long and firm brands are known to consumers (e.g. olive oil, wine). Surprisingly, their results indicate that WTP estimates from hedonic analyses are significantly higher than WTP values derived from other methods, although unfortunately the authors do not elaborate on this point. However, it should be noted that in contrast to GM foods, GI foods have already existed on the market for a rather long time and thus a large body of revealed preference evidence is available. Moreover, GI products are often considered premium or even luxury products, such as Champagne or Proscuitto di Parma, which might explain this finding.

More recently, social responsibility as a product attribute has been studied within the framework of meta-analysis by Tully and Winer (2014), who employ a weighted random effects regression for the analysis. In general, their results indicate that consumers' exhibit a higher WTP for products that benefit humans compared to other categories like environment or animals. Concerning methodological implications, incentive compatible methods provided significantly higher WTP because they mostly included real purchase data. This result is in line with the finding by Deselnicu et al. (2013) and the authors argue that higher WTP values obtained from incentive compatible methods are probably due to the fact that socially responsible products are normally priced higher than their traditional counterparts.

To summarize, the existing literature on WTP for certain attributes in foods is vast and heterogeneous. Since there is no standardized procedure to set up the research design or report results, an array of potential WTP determinants have been identified. Existing meta-analyses attempt to shed light on underlying commonalities to derive conclusions that are not only study-specific. Although these meta-analyses themselves are rather heterogeneous in terms of included explanatory variables, some general points can be made. For instance, all meta-analyses include variables that try to capture both factual and methodological effects. The former refer to differences in WTP values due to real market differences such as different consumer preferences across countries, whereas the latter are due to differences in

experimental design and estimation procedures. With respect to methodological effects, the results of previous meta-analyses are not clear-cut. Although most studies conclude that there are significant differences in WTP values due to the elicitation method, the directions are not uniform across studies. With respect to factual effects, the location of the study, food categories and socio-demographics were found to be important determinants of WTP values. Different nations seem to have different preferences and thus are willing to pay different price premiums. Thus, in the following we will investigate the extent to which these results also apply to WTP estimates for healthy attributes in food.

### ***1.3. Data collection***

Our inquiry focuses specifically on papers related to the valuation of healthy attributes in food products. Thus, studies reporting valuations of organic products or GM foods with healthy attributes are not included for the following reasons. First, the organic attribute can be perceived in more dimensions than simply as a health benefit; rather, sensory, ethical and social considerations were also found to influence consumers' decisions to buy and pay a price premium for organic foods (e.g. Hughner et al., 2007; Harper & Makatouni, 2002). Second, studies reporting valuations for genetically modified foods with health benefits (so-called second-generation GM foods) are not included in this research due to the controversy surrounding consumers' perceptions of GM foods. Although some studies report consumer valuations of GM foods with health attributes, it is most likely that the value of the health attribute is biased due to concerns about genetic modification. Third, since we are interested in the valuations of a specific health attribute, we do not consider studies with WTP estimates received from the reduction of potentially harmful content in foods, such as insecticides or pesticides.

Due to a certain ambiguity surrounding the terms "functional food" and "health claim" and different definitions used in different countries, we specify that this study aims to analyze the variations in WTP for health-enhancing attributes in foods, regardless of whether they are named "healthy attributes", "functional attributes" or "health claims".

The databases Google Scholar, ScienceDirect, AgEconSearch, Econis, Greenpilot and IDEAS were searched using the following terms: "willingness-to-pay", "healthy food", "functional food", "health(y) attributes", "functional attributes", "health claim" and their combinations. In case a conference paper and a published article concerning the same study

*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

**Table I.1. List of studies (in alphabetical order) selected for meta-analysis**

N	Authors (year)	Method	Product	Region
1	Asselin, 2005	Choice experiment	Omega-3 eggs	Canada
2	Barreiro-Hurlé et al., 2008	Choice experiment	Resveratrol-enriched wine	Spain
3	Bechtold & Abdulai, 2013	Choice experiment	Yogurt, cream cheese and ice cream enriched with Omega-3 fatty acids	Germany
4	Bower et al., 2003	Choice experiment	Spread Benecol	UK
5	Cash et al., 2007	Choice experiment	Beef enhanced/enriched with CLA	Canada
6	Chang, Moon, & Balasubramanian, 2012	Choice experiment	Soy burger/cheese/milk/tofu	USA
7	Chowdhury, Meenakshi, Tomlins, & Owori, 2011	Choice experiment	Orange-fleshed sweet potatoes rich in Vitamin A	Uganda
8	Defrancesco & Galvan, 2005	Contingent valuation	Red chicory with antioxidants	Italy
9	De Groote, Kimenju, & Morawetz, 2011	Auction	Fortified maize	Kenya
10	Emunu, McCann-Hiltz, & Hu, 2012	Contingent valuation	Omega-3 beef	Canada
11	Hellyer et al., 2012	Auction	Whole grain/half and half bread sandwich; whole grain granary bread sandwich; bread sandwich with inulin	UK
12	Hu et al., 2011	Survey	Blueberry herbal tea/basil vinegar/syrup	USA
13	Huffman, Jensen, & Tegene 2010	Hedonic price	Spread "Benecol"	USA
14	Krystallis & Chrysochou, 2012	Choice experiment	Snack food enriched with calcium, vitamins and fibers	Greece
15	Marette, Roosen, Blanchemanche, & Feinblatt-Mélèze, 2010	Auction	Yogurt for lowering cholesterol	France
16	Markosyan et al., 2007	Contingent valuation	Apples with antioxidants	Canada
17	Maynard & Franklin, 2003	Contingent valuation	High-CLA milk/butter/yogurt	USA
18	Moro, Veneziani, Sckokai, & Castellari, 2014	Choice experiment	Catechine-enriched and probiotic yogurt	Italy
19	Muth et al., 2009	Hedonic price	Carb-conscious breakfast bars/cereals	USA
20	Munene, 2006	Contingent valuation	Spread for healthy heart/to reduce cholesterol; bread to reduce the risk of heart disease	USA
21	Naico & Lusk, 2010	Choice experiment	Orange-fleshed sweet potatoes rich in Vitamin A	Mozambique
22	Nordström, 2012	Contingent valuation	Wholesome canteen takeaway	Denmark
23	Øvrum et al., 2012	Choice experiment	Cheese low in (saturated) fat	Norway
24	Teratanavat & Hooker, 2005	Choice experiment	Tomato juice with higher level of lycopene/ containing soy	USA
25	Tra, Moritaka, & Fukuda, 2011	Contingent valuation	Bone health and diabetic powder milk	Vietnam
26	Van Wezemael, Caputo, Nayga, Chrysochoidis, & Verbeke, 2014	Choice experiment	Beef with iron claim/fat claim/protein claim	Netherlands, Belgium, France, UK
27	Zaikin & McCluskey, 2013	Contingent valuation	Apples with antioxidants	Uzbekistan



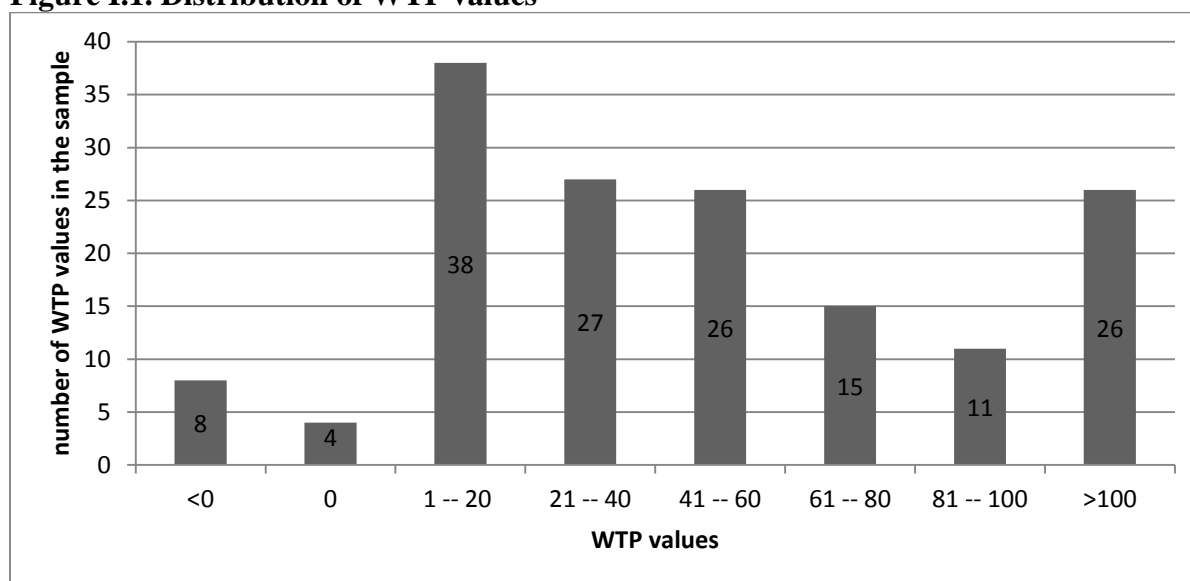
were identified, the published version was used for the analysis. The search resulted in 27 studies fitting our search criteria (table I.1, alphabetical order), including 22 journal articles, three conference papers, one thesis and one report published in the period from 2003 to 2014.

From these 27 studies, 155 WTP estimates were extracted. In case a study did not report the price premiums in percentage terms, they were calculated as follows:

$$\text{Premium WTP} = \left( \frac{\text{WTP}_{\text{product with health attribute}} - \text{WTP}_{\text{base product}}}{\text{WTP}_{\text{base product}}} \right) * 100.$$

The distribution of resulting WTP values is presented in Figure I.1. It can be observed that the variation in WTP estimates is very high, with the lowest WTP value being equal to -39% and the highest value equal to a 400% price premium. In general, most studies report positive valuations of healthy attributes in foods by consumers.

**Figure I.1. Distribution of WTP values**

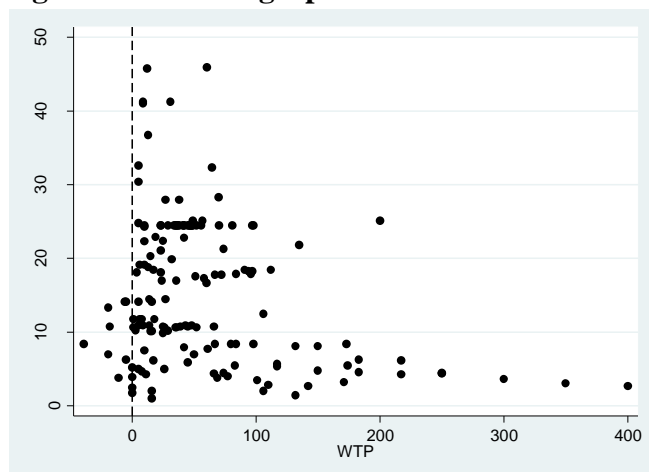


Besides this rather high variation in reported values of WTP, the studies included in our analysis also differ in sample size and the number of WTP values reported per study (see Appendix A). The simple mean of reported price premiums for the entire sample equals 58.42%, while the weighted mean is 41.04 % (weighted means for each study are in Appendix A).

Since we observe a significant overbalance of positive valuations, we test for publication selection bias via a funnel graph (Stanley, 2005). Given that not all studies report standard errors, we use the sample size as a determinant of variance (Van Houtven, 2008). A visual investigation of the funnel graph (Figure I.2) plotting price premiums against the inverse of the square root of the sample sizes highlights a significant skewness towards positive WTP values. This might be due to either a publication selection bias or a real

positive valuation of health attributes. Thus, the following meta-analysis aims to explore the sources of heterogeneity and possible biases in estimates.

**Figure I.2. Funnel graph of WTP values**



To explain variations in WTP, available information regarding the characteristics of each study was summarized to determine the categories to be included in the meta-analysis. Major differences between studies that could explain the variation in WTP estimates were subsequently divided into the following main categories: year and country of data collection; product of interest and health benefit evaluated; and the method of elicitation. From these categories, twelve explanatory variables were constructed (table I.2).

**Table I.2. Definitions and means of explanatory variables**

Variable	Definition	Mean (std. dev.)
Non_hypothetical	1 if the method used is non-hypothetical valuation; 0 otherwise	0.11 (0.31)
Choice experiment	1 if the method used is choice experiment; 0 otherwise	0.52 (0.50)
Contingent valuation	1 if the method used is contingent valuation; 0 otherwise	0.37 (0.49)
Europe	1 if the place of study is Europe; 0 otherwise	0.50 (0.50)
USA	1 if the place of study is USA; 0 otherwise	0.16 (0.37)
Canada	1 if the place of study is Canada; 0 otherwise	0.10 (0.31)
Region_other	1 if the place of study is other than previous three; 0 otherwise	0.24 (0.43)
Dairy	1 if the product valued is dairy; 0 otherwise	0.26 (0.44)
Fruits/vegetables	1 if the product valued are fruits or vegetables; 0 otherwise	0.17 (0.37)
Product_other	1 if the product valued is other than listed above; 0 otherwise	0.57 (0.50)
Cholesterol	1 if lowering cholesterol is indicated as a health benefit; 0 otherwise	0.14 (0.34)
Attribute_other	1 if the healthy attribute indicated was other than listed above; 0 otherwise	0.86 (0.34)
Year99_07	1 if the data were collected in 1999-2007; 0 otherwise	0.32 (0.47)
Year08_11	1 if the data were collected in 2008-2011; 0 otherwise	0.68 (0.47)

Different types of WTP elicitation methods were used in the studies surveyed, including contingent valuation, choice experiments, experimental auctions in different formats and hedonic price regressions, while one study employed a survey with a modified payment card approach. We construct three variables defining the method of research: the variable “non-hypothetical” includes all studies based upon experimental auctions and real purchase data; the variable “choice experiment” includes values obtained from choice experiments; and the variable “contingent valuation” includes all studies that employed either a contingent valuation method or a survey.

The majority of WTP estimates (89%) were obtained using hypothetical valuations in the form of contingent valuations or choice experiments, whereas non-hypothetical values account for only 11% of the valuations. Regarding the regional focus of the research, Europe clearly dominates as the location for most of the studies (50%), whereas only 16% of the research was performed on data obtained in the USA and 10% in Canada. Other study regions were Japan, Kenya, Uganda, Mozambique, Vietnam and Uzbekistan. According to the period of data collection, two periods were determined, namely 1999-2007 and 2008-2011<sup>6</sup>, to investigate whether valuations have changed over time. Products used in the valuations were very heterogeneous, although it was possible to classify the investigated base products in three groups of dairy products (26%); fruits/vegetables (17%) and all others (57%). The latter category includes bread and grain products, meat, spreads with plant-derived ingredients, soy products, wholesome canteen takeaway and products under the general term “functional food”. Despite the heterogeneity in health benefits presented for consumer valuations, we distinguish one attribute that was investigated most frequently, namely cholesterol. Indeed, “reducing/lowering cholesterol” as a single health benefit or in combination with other health benefits was evaluated in 14% of the studies. Unfortunately, we are unable to include socio-demographic characteristics of the samples in our meta-analysis due to missing or inconsistent reporting across studies.

#### ***1.4. Results***

Due to the high variation in WTP estimates, an analysis of potential outliers was performed. Accordingly, potential outliers are first identified through plotting the leverage against the normalized residuals squared. As a result, few studies with WTP values having high residuals

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<sup>6</sup> We decided to split the sample in these two time periods since we assume a possible impact on the set up of scientific research by the implementation of the EU Regulation on Nutrition and Health Claims in December 2006.

and higher than average leverage are identified, whereby study 25 (numbered as in table I.1) includes values with particularly high residuals. Subsequently, influential values were identified by plotting leverage values against studentized residuals regarding Cook's distances<sup>7</sup>. The study by Tra et al. (2011) requires special attention since a normality plot also indicates this study as having extremely large values.

**Table I.3. Mean WTP values for the total sample and excluding outlier**

Variable	Obs	Mean	Std. dev.	Min	Max
WTP total sample	155	58.42	68.40	-39	400
WTP excluding outlier	137	43.95	42.38	-39	200

Tra et al. (2011) report a very high variation of WTP values for diabetes and bone health milk, ranging from 0 to 400% (see Appendix A). Highest valuations were obtained for diabetes milk, which is also priced higher on the market than bone health milk. The sample included people living in luxury apartment regions in the city of Hanoi. The authors indicate a direct relationship between the income level and WTP estimates for milk with health benefits. Considering that the WTP values from this paper might bias our estimation, we run regressions including and excluding observations from this study (mean values including and excluding outlier are reported in Table I.3).

**Table I.4. Results of weighted OLS estimations**

Variables	OLS (total sample)		OLS (excluding outlier)	
	Coefficient	Std.err.	Coefficient	Std.err.
<b>Methodology</b>				
Choice experiment	25.37	16.82	14.22	10.62
Contingent valuation	61.27***	17.49	29.72***	11.88
<b>Study Region</b>				
Europe	-5.04	23.86	-2.81	14.87
Canada	-50.04***	18.60	-44.41***	11.62
Region_other	78.18***	26.00	-0.25	20.02
<b>Base Product</b>				
Dairy	-8.98	12.19	-35.18***	8.55
Fruits/vegetables	-83.00***	15.73	-28.27**	12.78
<b>Health Benefit</b>				
Cholesterol	48.43***	14.68	49.45***	9.15
<b>Time period</b>				
Year08_11	-11.70	22.45	1.09	14.13
Constant	29.15	19.02	36.76***	11.91
Obs	155		137	
R <sup>2</sup>	0.41		0.41	
Adj. R <sup>2</sup>	0.37		0.37	

\*, \*\*, \*\*\* refers to statistically significant at the 95%, 99%, 99.9% level.

<sup>7</sup> Critical value for Cook's distance is calculated as  $4/n$ , where  $n$  is the number of observations; critical value for residuals is  $|2|$ ; hat values have critical value of  $(2k+2)/n$ , where  $k$  is the number of predictors and  $n$  again is the number of observations.

*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

We estimate initial weighted OLS with the percentage price premium as a dependent variable and weights equal to squared sample sizes of each study for the total sample (Table I.4).

Following Lagerkvist and Hess (2011), we perform several tests to choose the appropriate model for our meta-regression analysis. A test for variance inflation factors indicated that VIFs for all variables are below 10 and tolerance values are higher than 0.1. Testing for heteroscedasticity with the Breusch-Pagan test results in  $\chi^2 = 27.90$  with  $p = 0.00$ . Thus, we reject the assumption of homoscedasticity and estimate a random effects model  $WTP_i = \beta X_i + u_i + \varepsilon_i$ , with  $WTP_i$  being the percentage price premium elicited from study  $i$ ,  $X_i$  the vector of independent variables and two error terms,  $u_i \sim N(0, \tau^2)$ , where  $\tau^2$  is the between-study variance, and  $\varepsilon_i \sim N(0, \sigma_i^2)$ , where  $\sigma_i^2$  is the standard error of the estimated effect in study  $i$ . We employ the Stata meta-regression command specifically designed for meta-analyses (Harbord & Higgins, 2008). This command allows analyzing study-level data and estimates the between-study variance and the coefficients by weighted least squares when the outcome variable is continuous with the weights being  $w_i = 1/(\sigma_i^2 + \tau^2)$ .

**Table I.5. Results of the meta-regression (excluding outlier)**

Variables	Coefficients	Std. err.	p-values	Monte-Carlo permutations	
				Unadjusted p-values	Adjusted p-values
<b>Methodology</b>					
Choice	17.43*	9.97	0.083	0.075	0.417
CV	31.92***	11.55	0.007	0.006	0.041
<b>Study Region</b>					
Europe	2.55	13.46	0.850	0.851	1.000
Canada	-42.09***	10.67	0.000	0.000	0.001
Region_other	4.21	18.70	0.822	0.816	1.000
<b>Base product</b>					
Dairy	-35.53***	8.27	0.000	0.000	0.000
Fruits/vegetables	-26.47**	12.08	0.030	0.029	0.178
<b>Health Benefit</b>					
Cholesterol	52.10***	8.88	0.000	0.000	0.000
<b>Time period</b>					
Year08_11	-0.93	12.65	0.942	0.944	1.000
Constant	31.37***	11.78	0.009		
Obs	137				
$\tau^2$	741.4				
I <sup>2</sup>	91.32%				
Adj. R <sup>2</sup>	51.68%				

\*, \*\*, \*\*\* refers to statistically significant at the 95%, 99%, 99.9% level.

The results of the meta-regression are reported in table I.5. Residual variation due to heterogeneity is measured by  $I^2$  and equals 91.32%, whereby 51.68% of the between-study variance is explained by the included covariates.

Monte-Carlo permutations are also employed to avoid type I error and achieve a better assessment of the statistical significance of the observed relationships. The results in “unadjusted p-values” column very closely correspond to the p-values obtained from the initial regression. After adjusting for multiplicity, all p-values increase. However, most observed relationships persist.

The results of the meta-regression imply that the elicitation method, the carrier product, the specific health benefit and the place of the study significantly influence variations in WTP estimates across studies.

First, hypothetical methods of WTP elicitation produce higher valuations compared to non-hypothetical methods such as experimental auction and real purchase data. This result corroborates the findings of Lusk et al. (2005) and Dannenberg (2009).

Second, with respect to the base product, the results indicate that the WTP estimates for a specific health attribute are significantly lower in case of dairy products (milk, yogurt, cream cheese, cheese, butter and ice cream) and fruits and vegetables than for all other product categories included.

Third, according to our results, the specific health attribute “cholesterol lowering” leads to significantly higher WTP estimates than any other health/nutrition claim. The valuations of this attribute varied from 0% to 200%, with the highest values referring to the spread for lowering cholesterol reported in the thesis by Munene (2006).

Finally, the location of data collection influences WTP estimates. Our results indicate that there are no significant differences between studies conducted in Europe, the United States and other regions, although studies conducted with Canadian consumers report statistically significant lower WTP values.

### ***1.5. Discussion and conclusions***

This study was motivated by the need for systematical evidence on consumers' valuations of healthy attributes in food products. For this purpose, 27 publications reporting 155 estimates were analyzed, with the results demonstrating that WTP estimates are influenced by the elicitation method, the base product, the place of study and the health attribute.

In general, it can be noticed that despite an established connection between diet and the development of NCD, economics and marketing research thus far has failed to provide a

systematic view of consumers' valuations of different healthy attributes in food and consequently the potential demand for these products. The studies reviewed reported very different valuations of healthy attributes in foods. Moreover, they significantly differ in essentially all parameters of the research, including the regions of data collection, methodology and analysis of the results. A lack of consistency in scientific research about health claims and health concerns has already been emphasized by van Kleef, van Trijp, and Luning (2005). Although it seems rather difficult to draw general conclusions about consumers' WTP for healthy attributes in foods, this research summarizes the efforts undertaken thus far and can be employed to determine directions for future analysis.

Our analysis confirms the findings of some previous studies that hypothetical elicitation methods – i.e. choice experiments as well as contingent valuations – lead to higher WTP values than non-hypothetical elicitation methods such as experimental auctions. This finding is most likely due to the so-called “hypothetical bias”, which has been widely discussed in environmental and agricultural economics (see e.g. Lusk & Hudson, 2004; Lusk & Schroeder, 2004; Murphy, Allen, Stevens, & Weatherhead, 2005).

As discussed in the literature review section of the paper, for product attributes such as “geographical indication” and “social responsibility” it has been observed that real purchase data and incentive compatible methods produce higher WTP estimates than other methods (Deselnicu et al., 2013; Tully & Winer, 2014). This effect can be attributed to the elicitation method when participants of the experimental auction increase their bids due to the competitiveness, for example (Tully & Winer, 2014). On the other hand, the nature of the attribute itself can influence price premiums when consumers demonstrate clear preferences for local products, which is a familiar and easy-to-understand concept compared to long-lagged potential health benefits.

Consequently, our research results indicate that WTP values obtained from choice experiments might be misleading in estimating consumer demand for health-enhancing foods.

Given that WTP involves utility levels subjectively estimated by consumers, it reflects the complex subjective perception and evaluation of different attributes. This study indicates that the base product significantly affects consumers' valuations, whereby only product-specific measures might be truly demand-revealing. In attempts to estimate demand prospects for certain products, consumer perceptions of the base product might play a decisive role in the valuation.

Regarding the base product, no consistency on the interaction between carrier product and health claim has been found in previous research. For example, Siegrist, Stampfli and Kastenholz (2008) and Ares, Giménez and Gámbaro (2008) find that health claims on products already carrying a healthy image are more positively perceived by consumers than health claims on less healthy base products. Van Kleef et al. (2005) even find that consumers may entirely ignore health information on foods that meet hedonic needs (for example, a candy bar). However, some studies also show that consumers have a higher preference and value the healthy attribute more strongly for products that are considered less healthy (e.g. Bech-Larsen & Grunert, 2003). In our study, WTP values for a specific health benefit are significantly lower for dairy products and fruits and vegetables than for other product categories *ceteris paribus*. Indeed, this effect persists in Monte-Carlo permutations, possibly indicating that even if a healthy image of a base product fosters consumers' acceptance of functional ingredients, it might not lead to higher monetary valuations of the functional ingredient itself. By contrast, our results actually indicate that the WTP for an added health benefit is significantly lower for already-healthy products such as fruits and vegetables. Unfortunately, due to the limited number of observations, it was not possible to include interactions between variables characterizing carrier products and health benefits. This could be undertaken in future research with more data becoming available.

The specific health benefit of "lowering cholesterol" leads to significantly higher WTP values than all other health benefits included. This result supports the findings by Van Wezemael et al. (2014), who performed a cross-cultural study on valuations of nutritional and health claims. In comparison to other claims, a health claim that included lowering cholesterol levels received the highest valuations compared to other claims; indeed, this result was true for most countries included in the research. The authors explain this effect with a more widespread awareness of the connection between nutrition and cholesterol levels compared to other substances.

However, it should be mentioned that there is no unified way to present the health attribute for valuation among the studies surveyed in this paper. Some studies indicate the healthy substance, like vitamin A or Omega-3 fatty acid. In this case, true valuation would require previous knowledge of the substance itself, as well as its influence on health by consumers. In other cases, evaluated health claims indicate the health benefit without mentioning the active substances, such as "cancer-fighting". All such differences call for better designed studies in line with the existing regulatory measures. For example, in the



European Union, health claims on foods are controlled by the Regulation (EC) no. 1924/2006, and recent research may be centered around the claims listed in the document.

A significant negative coefficient of the variable “Canada” indicates that Canadian consumers are willing to pay lower price premiums for health-enhancing foods than consumers in other countries, which has not been reported before. Closer investigation of the studies reporting data about Canadian consumers demonstrate that the authors indeed present cautious prognoses for the Canadian market of foods with health benefits, emphasizing the need for additional evidence about consumer preferences and potential market for foods with health benefits (see e.g. Emtun et al., 2012; Maynard & Franklin, 2003). It was also observed in several studies that proven scientific evidence is necessary for the market success of functional foods in Canada (Hobbs, Malla, Sogah, & Yeung, 2014). Thus, we assume that lower valuations of healthy attributes in Canada might be due to a lack of proven scientific evidence, which needs to be delivered to consumers through trustful information sources.

Further primary research is necessary to provide sufficient WTP estimates to produce coherent policy implications. Moreover, heterogeneity among studies arising from the base product, the potential health benefit and the communication strategy or consumer characteristics could be reduced by more standardized methodology. This study indicates that despite the need for assessing potential demand for healthy attributes in foods, economic and marketing research to date lacks concise indications of consumers' WTP, which could be applied for policy implications.

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Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis

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*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

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Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis

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*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

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*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

**Appendix I.1. Number of respondents for each WTP value and weighted means for each study**

Study number (according to Table 1)	Reported WTP premiums (%)	Number of respondents	Weighted mean
1	-11	14	0.4
	-5	39	
	0	27	
	5	25	
	11	18	
	16	4	
	16	1	
2	58	300	58
3	24	288	15.7
	19	524	
	10	497	
	23	327	
	23	445	
	17	340	
	13	354	
	5	615	
4	173	70	173
5	27	780	32.5
	38	780	
6	94	333	89.4
	97	333	
	67	317	
	72	317	
	91	340	
	112	340	
	84	321	
	96	321	
7	-18	115	28.35
	45	115	
	25	115	
	66	115	
	39	115	
	43	118	
	5	118	
	48	118	
	14	118	
	9	118	
	26	113	
	1	113	
	52	113	
36	113		
	35	113	
8	64.5	1045	64.5
9	25	500	25
10	9	1685	9.5
	5	1064	
	13	1351	
	5	924	
	12	2095	
11	6	138	8.3
	18	138	
	1	138	

*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

	8	138	
12	4	327	
	15	412	17.8
	32	395	
13	134.9	477	134.9
14	98	70	
	84	70	
	67	70	58
	80	70	
	-39	70	
15	66	19	
	0	15	
	8	22	39.8
	101	12	
	69	14	
	26	25	
16	6	365	8.0
	10	365	
17	15	103	
	16	103	18.6
	25	98	
18	42	600	32.5
	23	600	
19	57	632	
	200	632	102
	49	632	
20	59.9	278	
	69.7	800	
	49.6	609	58.87
	60.5	2108	
	35.6	289	
21	51.3	308	51.3
22	-19	177	
	10	590	
	42	518	
	74	454	
	106	155	
	132	65	
	174	30	
	10	56	
	42	63	
	74	20	
	106	4	41.9
	132	2	
	171	10	
	-19	48	
	3	105	
	29	104	
	45	35	
	61	59	
	77	16	
	110	8	
	142	7	
23	27	208	
	14	208	15.6
	16	200	
	5	200	
24	31	1704	20



*Section I. Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products:  
A Meta-analysis*

	9	1704	
25	17	38	
	50	48	
	83	30	
	117	29	
	150	23	
	183	21	
	217	18	
	250	19	
	0	3	149.8
	117	32	
	150	65	
	183	39	
	217	38	
	250	20	
	300	13	
	350	9	
	400	7	
	0	6	
26	47	600	
	70	600	
	35	600	
	45	600	
	48	600	
	23	600	
	49	600	
	97	600	
	52	600	
	36	600	
	47	600	
	29	600	
	46	600	
	98	600	47.71
	81	600	
	34	600	
	56	600	
	41	600	
	36	600	
	38	600	
	37	600	
	42	600	
	10	600	
	48	600	
27	-5.8	200	-5.4
	-5.0	200	

## **Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach<sup>8</sup>**

### ***II.1. Introduction***

When environmental changes and bio-technological advances lead to the transformation of end-products deeper understanding of consumers decision-making is required to obtain more knowledge on resistance to innovations. Advances in the bioeconomy result in the development of innovative products ranging from biofuels to vaccines or new packaging material. In agriculture and, more specifically in crop breeding, bio-technologies lead to the development of new foods that might not only be beneficial for the environment but also for consumers health and well-being.

However, the introduction of novel products into consumer market often faces consumer resistance. Taking novel foods as an example, it has been observed that consumers acceptance of foods with health benefits depends on a variety of factors (Siró, Kápolna, Kápolna, & Lugasi, 2008; Frewer, Scholderer, & Lambert, 2003) and that a certain health benefit is not necessarily valued strongly by consumers (Verbeke, 2006). Among possible reasons for novel food product market failures are: low trustworthiness or knowledge about foods with health benefits, unwillingness to pay higher prices, and concerns about taste and naturalness (Onwezen & Bartels, 2011). Moreover, technologies not directly related to the production of a certain product that are negatively perceived by some consumer groups (like genetic modification) can be a source of resistance to innovations for all the products that have any kind of technological transformation (not even necessarily GM) involved (Frewer et al., 2003).

Changes at the consumer markets that follow the advances in bioeconomy require knowledge about consumer preferences towards novel foods and about the reasons for novelty resistance. From a methodological point of view, it requires deviation from traditional models of consumer behavior that sometimes fail to explain consumers decision-making towards more flexible models that incorporate previously unaccounted for factors.

The analysis of consumer preferences is traditionally based on the assumption of rationality. However, research on departures from rationality in decision-making (see e.g.

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<sup>8</sup> This section of the dissertation is submitted as Dolgoplova, I., Teuber, R., Bruschi, V., Weber, G.-W., Danilenko, N., Galitskiy, E. (2015) "Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach" in Pinto A., Zilberman D. (eds.) *Modelling, Dynamics, Optimization and Bioeconomics II*.

(Kahneman & Tversky, 1979; Tversky & Kahneman, 1986; 1991) allows for modelling of psychological effects that can provide new insights in consumer decision making concerning the acceptance of novel products.

This study combines recent advances in the applications of the Kahneman and Tversky reference dependence approach with traditional modelling of consumer choices. Our work will draw upon one of the possible cognitive anomalies in decision-making process – reference points. Applied to food choice decisions, the reference point effects approach can provide evidence on previously not accounted for determinants of consumer choices.

Experimental evidence supporting distortions of rationality in consumer behavior have been mainly obtained from specifically designed procedures (Bateman et al., 1997; Banerji & Gupta, 2014). Additionally, evidence supporting the existence of reference points in consumers' choices was found in real market data (e.g. Lattin & Bucklin, 1989; Hardie, Johnson, & Fader, 1993; Hu, Adamowicz, & Veeman, 2006). However, no attempts have been made so far to include the implications of loss aversion and reference point effects into the analysis of experimental auctions data on consumer choices of novel foods.

Novel functional foods belong to the category of credence goods. Consumers' perception of credence goods is complicated by the inability to measure quality levels before or after the purchase or even consumption. In the context of novel foods with health benefit when consumers are dealing with high levels of uncertainty, the existence of reference points might provide more information for explaining the heterogeneity among consumer choices. As pointed out by Hu et al. (2006), heterogeneity in consumer attitudes may come not only from traditionally considered characteristics like socio-demographics, knowledge, taste, and product attributes but also from the framing of the decision process. From the reference dependence perspective heterogeneity might also arise from the influence of reference prices as well as the influence of gains and losses.

In a broader microeconomic context, it also raises questions related to consumers' preferences formation. Consumers' valuations might not only arise directly from the possible health effects. It is also possible to assume that consumers might value health benefit in the context of the prices they usually pay for the products of the same category or their preferences for such products.

Thus, this chapter contributes to the literature on modeling consumers' preferences by comparing a random utility approach with a reference point effects approach. We employ data from experimental auctions designed to measure willingness-to-pay (WTP) for novel

bakery foods with health and environmental benefits. Our aim is to understand if the application of reference point effects will provide new insights on the process of consumers' preferences for such foods.

Our chapter is organized as follows. Section 2 provides an overview of the literature on reference point effects in consumer choices. Section 3 describes our experimental setting and the results of the bidding procedure. Section 4 consists of two parts: the first part describes the results of the traditional random utility approach to the data, while the second part presents results from the reference point effects approach. Conclusions are presented in Section 5.

## ***II.2. Literature Survey on Reference Dependence Approach to Modeling Consumer Behavior***

The reference point effects approach to consumer choices belongs to a relatively new area of economic and marketing research that takes root in prospect theory by Kahneman & Tversky (1979). The basic elements of this approach include the existence of reference points, gains and losses, and the effect of loss aversion. Reference points can be represented by price, quality or activity that choice alternatives are compared to. Gains and losses are, respectively, positive and negative departures from a reference point. Loss aversion implies that losses outweigh gains in choice decisions.

Reference point effects have been incorporated into models of consumer choice by several scholars. A theoretical and empirical approach to incorporate reference point effects into traditional economic theory of consumer choice has been performed by Putler (1992). He specifies a utility function that includes gains and losses and discusses implications for traditional economic and marketing paradigms of consumer choice. When applied to retail data on egg sales, Putler's theoretical framework provides significant results for reference price effects and asymmetric responses on gains and losses.

Lattin & Bucklin (1989) investigated reference effects of price and promotion. They formalize promotional reference point as consumer's prior exposure to the promotional activities of a specific brand and price reference point as consumer's exposure to the price of a specific brand on previous purchases. Applied to scanner panel data on ground coffee, the model of consumer response proves significant reference effects of promotional activity.

Kalwani & Yim (1992) suggest operationalizing price gains and losses using the expected prices directly elicited from consumers. Dummy variable representing gains takes the value of 1 in case if expected price exceeds retail price and 0 otherwise. The loss variable

is constructed as being equal to 1 if a retail price exceeds expected price and 0 otherwise. They observe the outweighing effects of losses compared to the effects of gains.

Modelling reference points for both price and quality of orange juice based on scanner panel data has been done by Hardie et al. (1993). The authors operationalize gains as the amount by which quality or price of a specific brand exceeds that of the reference brand, and losses as the amount by which quality or price of a specific brand is below that of a reference brand. Incorporating reference points into a multinomial logit model proves consistent with loss aversion and decreases heterogeneity and nonstationarity of the model.

Reference points have also been included into models of food attribute demand. Hu et al. (2006) analyze reference points for price and genetically modified ingredients in pre-packaged sliced bread. Reference points are obtained from questions on consumers' regular bread purchases conducted before the discrete choice experiment. They observe strong reference point effects, especially for the price. The economic implications of reference point effects include possible changes in welfare measures of consumer choices.

More recently, Hess, Rose, & Hensher (2008) found support for the prospect theory view of decision making when applied to car travel data from discrete choice experiments. They offer evidence of framing effects in respondents' decision-making, so that preferences are formed not relative to the absolute values of the attributes, but relative to differences in values according to a specific reference point.

However, testing for the presence of reference point effects has not always provided significant results. The universality of loss aversion in consumer choices has been questioned in the scanner panel data analysis by Bell & Lattin (2000). They employed data on refrigerated orange juice and additional 11 product categories to test the reference dependent model. They found no asymmetric price response when applying a brand specific reference dependent model. They also reported decreasing evidence of loss version in the reference dependent model.

In general, most studies indicate that accounting for reference effects in consumer choice provides additional evidence on the framing of consumer decision-making.

### **II.3. Experimental Design and Results**

In this chapter we use data from a survey followed by experimental auctions (second price sealed bid Vickrey auctions), designed to determine consumers' willingness-to-pay for health-enhancing attributes in novel food that contributes to preserving biodiversity.

The cereal food products that were presented to the consumers are not yet marketed novel foods with health benefits: a bread roll and 130 gram pack of biscuits. Both products are produced from an old wheat variety that contains anthocyanin – a natural substance of purplish color that is potentially beneficial for health. Old wheat varieties also help in preserving biodiversity. Due to the novelty in content and appearance, consumer preferences for anthocyanin-rich cereal products are formed during the auction as respondents get information about the properties and potential benefits of the products. During the auction, participants submitted bids for the products with health-enhancing and environmental attributes. Potential market prices of the products were not revealed to the consumers during the auctions.

The possibility to elicit non-hypothetical monetary values of health-enhancing attributes is the main advantage of an experimental auction procedure (see e.g. Lusk, Feldkamp, & Schroeder, 2004; Shogren et al., 2001). The second-price Vickrey auction format is an incentive compatible and willingness-to-pay revealing mechanism (Noussair, Robin, & Ruffieux, 2004), which is also effective in measuring consumers' willingness to pay for quality differences in food products (Umberger & Feuz, 2004). However, compared to other auction mechanisms it might generate higher valuations (Lusk et al., 2004).

**Table II.1. Characteristics of Participants (N=212)**

Variable	Definition	Mean	St. dev.
Gender	1 = male; 2 = female	1.726	0.447
Age	age in years	22.322	6.617
Education	Educational level 1=BS; 2=MS; 3=PhD	1.224	0.451
Income (€) <sup>9</sup>	1≤660; 2=661-1320; 3=1321-1980; 4≥1981	2.633	1.006
Nutrition-related illnesses	1=yes; 2=no	1.726	0.447
Sport activities	1=yes; 2=no	1.604	0.490
Smoking	1=yes; 2=no	1.811	0.392
Alcohol consumption	1=every day; 2=few times a week; 3=few times a month; 4=few times a year; 5=never	3.526	0.818

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<sup>9</sup> Participants indicated income level in Russian rubles. Corresponding amounts in Euro were calculated according to average monthly exchange rate in December 2013.

Experiments were organized at the campuses of two universities in Russia: at the Higher School of Economics in Moscow and at the Baikal National University of Economics and Law in Irkutsk in December 2013. Participants included mainly students (see Table II.1). Due to the fact that in this chapter we are mainly interested in methodological issues the sampling composition does not place a burden on the analysis.

The auction procedure consisted of the following stages:

1. Upon arrival, each participant received 200 Rubles (approx. 5 Euros) incentive and was assigned a unique ID to track her bids over the auction rounds. Moreover, participants were asked to complete a survey covering the following topics: (i) demographic information; (ii) health-related lifestyle; (iii) consumption patterns and preferences for bread (roll) and biscuits; (iv) beliefs about connection between food and health; (v) knowledge about anthocyanin and old wheat varieties and (vi) their willingness-to-pay for products with health benefits (see part IV of the Annex).

2. Thereafter, the auctioneer explained the auction procedure to the participants and answered questions. The participants were informed that at the end of the auction process one auction round will be randomly drawn and the winner of the round will be required to purchase the auctioned good for the 2<sup>nd</sup> highest price.

3. Next, participants were asked to bid for a candy bar to get familiar with the auction procedure.

4. Three bidding rounds for each product were performed. In the first round only basic information indicating that the product presented for visual inspection does not have any particular characteristics were provided. Participants submitted their sealed bids for the base product. Then, in the second round participants were informed about one of the two attributes (health-enhancing (i.e. anthocyanin) or environmental (i.e. old varieties)) and asked to submit bids again. In the last round, one more attribute from the above-mentioned was added and participants were asked to post the bids again. The order of the attributes introduced was randomized. After that the whole procedure was repeated with another product.

The information about health-enhancing attribute was as follows: *“Anthocyanins are a group of reddish to purple and blue colored flavonoids belonging to natural phenols. They are widespread in flowers, fruits and vegetables like fresh berries, grape vine or red cabbage. Anthocyanins have been a part of the human diet for centuries and have been used as traditional medicines to treat hypertension, pyrexia, dysentery, urinary problems, and the common cold. Anthocyanins act as powerful antioxidants and demonstrate potential health*

effects against: cancer, aging and neurological diseases, inflammation, diabetes, bacterial infections, fibrocystic disease”.

The other information provided to the participants stressed the environmental attribute: “The origin of the purple grain trait rich in anthocyanin lies in tetraploid wheats from Ethiopia and can be referred to as old wheat variety. Old wheat varieties are considered to have higher levels of certain nutrients, and consequently special nutritional quality, participate in preserving biodiversity and had not been used for long time in mass production.”

5. At the end, one auction round was randomly chosen as binding, the winner of this round was identified and the audience was informed about the winning price.

Considering the already significant length of the procedure, we did not include repetitions to avoid participants’ fatigue as there exist evidence that repetition might not have an improving effect on the bids (Aseff, 2004).

We chose a sequential order for the attribute introduction as it uncovers the evolution of the bids in reaction to the attributes introduced. Previously, a sequential order for eliciting willingness-to-pay was performed by Marette *et al.* (2008) to determine the effect of risk and benefit information on the choice of fish species, by Marette *et al.* (2010) for evaluating the effect of health information on consumer’s choices of functional food, and by Rozan, Stenger, & Willinger (2004) to estimate WTP for food safety.

The results of the experiment produced four main data points: (i) hypothetical price premiums for health-enhancing foods from the questionnaire, (ii) bids at first “no information” round; (iii) bids at the second “+ one attribute” round, and (iv) bids in the third “+ two attributes” round. Combining survey and auction data allows us to compare stated and revealed preferences following (Adamowicz, Louviere, & Williams, 1994).

**Table II.2. Descriptive statistics of bids (in Russian Rubles)**

	Bread			Biscuits		
	Base product	One attribute	Two attributes	Base product	One attribute	Two attributes
Mean	14.24	25.54	32.75	21.19	27.03	38.02
St. dev.	21.23	27.99	34.55	17.31	22.67	41.23
# of zero bids	58	25	22	30	29	25

A basic analysis of experimental data suggests that bids for both products increased from round to round. Descriptive statistics for the bids is presented in Table II.2. The levels of mean bid increases for additional attributes are quite substantial. This evidence is supported by a Wilcoxon test of pairs of means ( $p < 0.01$ ). We can assume that preferences for each additional attribute are distributed so that a product with two attributes is preferred to a



product with only one attribute. The number of zero bids is decreasing in each round as new information about health-enhancing attributes is received. It indicates that additional attributes can initiate a purchase for some consumers who were not interested in the grain products with basic characteristics.

#### **II.4. Analysis of consumer choice**

##### *II.4.1 Random utility approach*

The traditional way to obtain welfare measures on consumer choices is the random utility approach, in which utility from a choice alternative consists of deterministic and stochastic parts:  $U_{ij} = V_{ij} + \varepsilon_{ij}$ , where  $U_{ij}$  – is the utility level of the product attribute  $j$  for respondent  $i$ ,  $V_{ij}$  – is the deterministic part of respondent  $i$ 's utility function, and  $\varepsilon_{ij}$  is the stochastic part. If a respondent indicates the intention to pay more for a product alternative or actually submits bid higher than the market price during the action, she makes a decision between the two choices. Each choice can be described as the linear random utility model, in our notation:  $V_{ij} = \alpha_j p + \beta_j z_i + \gamma_j w_{ij} + \varepsilon_{ij}$ , where  $p$  is the market price of the product;  $z_i$  stands for individual  $i$ 's characteristics;  $w_{ij}$  represents the attributes of the alternative product;  $\varepsilon_i$  denotes unobservable stochastic Gumbel distributed random term.

Then, for each individual  $i$ , the utilities of possible choices can be described as:  $V_{ij}^0$  for the base product and  $V_{ij}^1$  for the product with a health benefit. The respondents' choice alternative  $V_{ij}^1$  is denoted  $Y = 1$  and states that  $U_{ij}^1 > U_{ij}^0$ . If a respondent chooses  $V_{ij}^0$ , then  $Y = 0$  and  $U_{ij}^1 \leq U_{ij}^0$ . Then,  $\text{Prob}(Y = 1 | \mathbf{z}_i, \mathbf{w}_{ij}^0, \mathbf{w}_{ij}^1) = \text{Prob}(\mathbf{x}', \boldsymbol{\beta} + \varepsilon > 0 | \mathbf{x})$ , where all the observable differences between two utility functions are collected in  $\mathbf{x}'$ ,  $\boldsymbol{\beta}$ , and  $\varepsilon$  summarizes the differences in random elements.

The logistic distribution model is:  $\text{Prob}(Y = 1 | \mathbf{x}) = \frac{\exp(\mathbf{x}'\boldsymbol{\beta})}{1 + \exp(\mathbf{x}'\boldsymbol{\beta})}$ .

As stated earlier, four major information points about consumer preferences from the experimental auction are available. We also use data from the survey performed before the auction to derive stated preferences for health-enhancing foods. Consequently, we estimate one stated preference and three revealed preference models. A description of the variables included in all estimations is presented in Table II.3.

In the stated preference model, the dependent variable is constructed from the yes/no answers to the question: “Are you willing to pay price premium for food that can improve

*Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*

*your health?*” Dependent variables for the revealed preferences models are constructed considering the price level of the region.

**Table II.3. Description of explanatory variables**

Variable	Description
<b>Factors related to product consumption</b>	
Frequency	How often do you consume bread/biscuits? (5–every day; 4–few times a week; 3–few times a month; 2–few times a year; 1–never)
Price	Please, indicate how important is price for your choice of bread/biscuits (1–most important; 0–otherwise)
Taste	Please, indicate how important is taste for your choice of bread/biscuits (1–most important; 0–otherwise)
Healthiness	Please, indicate how important is health for your choice of bread/biscuits (1–most important; 0–otherwise)
Novelty	Please, indicate how important is novelty for your choice of bread/biscuits (1–most important; 0–otherwise)
Tradition	Please, indicate how important is tradition for your choice of bread/biscuits (1–most important; 0–otherwise)
Connection between food and health	Do you agree that consumption of certain foods can influence your health? (1–yes; 0–otherwise)
Previous purchases of health-enhancing food	Have you ever bought food because it can improve your health status? (1–yes; 0–otherwise)
Consent to pay price premiums for products with health-enhancing attributes	Are you willing to pay price premium for food that can improve your health? (1–yes; 0–otherwise)
<b>Socio-demographic &amp; lifestyle characteristics</b>	
Gender	1 - male; 0 - female
Income (rubles per month)	1– <30000; 2– 30001 - 60000; 3– 60000 - 90000; 4– > 90000
Nutrition-related illnesses	Do you have nutrition-related illnesses? (1–yes; 0–no)
Sport	Do you do sport regularly? (1–yes; 0–no)
Smoke	Do you smoke? (1–yes; 0–no)
Alcohol	How often do you consume alcohol? (5–every day; 4–few times a week; 3–few times a month; 2–few times a year; 1–never)
<b>Product-related characteristics</b>	
Attribute value	Dummy variable – 1 if bid in the corresponding round exceeds bid in the previous round; 0 otherwise
Price	Average market price of a corresponding product <sup>10</sup>

Since Vickrey auctions are demand revealing and participants are assumed to submit bids that reflect their true valuation of the product, we constructed a dependent binary variable which equals “1” if a participant submitted a bid higher than the market price for the base product (i.e., bread roll of biscuits without any additional characteristics), and “0” in any

<sup>10</sup> Average prices for bread and biscuits are calculated based on statistical reports for Moscow and Irkutsk region for December 2013. Russian federal service of government statistics <http://www.gks.ru/dbscripts/cbsd/dbinet.cgi?pl=1921001>

*Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*

other case. Discretization of the auction results is necessary for the comparability between stated and revealed preferences models. The variable indicates that the consumer maximizes utility if her valuation of the auctioned bread or biscuits is high enough to buy this bread or a pack of biscuits at the market.

**Table II.4. Coefficients from binary logit estimations (1% significance level)**

Utility function variables	Stated preferences		Revealed preferences (1 <sup>st</sup> round)		Revealed preferences (2 <sup>nd</sup> round)		Revealed preferences (3 <sup>d</sup> round)	
	bread	biscuits	bread	biscuits	bread	biscuits	bread	biscuits
<b>Factors related to product consumption</b>								
Frequency	-0.25	0.11	0.02	0.25	0.00	0.20	0.10	0.14
Price	-1.57	-----	0.53	1.47	-1.27	0.93	-0.17	0.84
Taste	-1.15	-0.10	-0.74	-0.29	-1.04	-0.38	-0.29	0.13
Healthiness	0.35	-0.30	-0.51	-0.33	-0.46	-0.34	-0.19	-0.97
Novelty	-0.42	-0.36	0.51	-0.53	-0.46	-0.48	0.14	-0.11
Tradition	-1.40	-0.68	0.29	-----	0.29	0.83	-0.07	-0.07
Connection between food and health	2.31***	2.20***	-1.01	-0.55	-0.36	-1.00	-0.55	-0.17
Previous purchases of health-enhancing food	1.80***	1.89***	1.62***	0.66	0.76	0.88	0.98	1.93***
Consent to pay price premiums for products with health-enhancing attributes	-----	-----	0.56	0.34	0.46	0.15	0.65	0.17
<b>Socio-demographic &amp; lifestyle characteristics</b>								
Gender	0.70	0.23	-0.18	0.10	-0.23	-0.69	0.17	0.22
Income	0.04	0.05	-0.40	0.07	-0.26	-0.04	-0.20	-0.13
Nutrition-related illnesses	-0.18	-0.48	0.48	-0.76	0.09	-0.71	0.31	0.34
Sport	-0.81	-1.19	0.41	0.38	0.18	-0.10	-0.09	-0.11
Smoke	0.01	0.05	1.18	0.40	0.68	0.42	0.61	0.51
Alcohol	-0.06	0.07	0.27	0.17	0.27	0.23	-0.13	0.58
<b>Product-related characteristics</b>								
Attribute value	-----	-----	-----	-----	2.47***	2.24***	1.82***	2.30***
Price	-0.05	-0.06	-0.42***	-0.28***	-0.26***	-0.27***	-0.19***	-0.32***
Constant	1.21	-0.52	3.42	3.41	1.72	3.56	2.12	1.48
AIC	183.752	184.003	215.728	230.861	227.731	210.611	228.801	188.343
BIC	236.364	232.550	271.629	283.310	286.919	269.800	287.990	247.513
Pseudo R <sup>2</sup>	0.27	0.24	0.31	0.27	0.28	0.35	0.21	0.40

Multinomial logit is mostly employed for the estimation of additive random utility models; however, we use binary logit model as it provides better fit for our data<sup>11</sup>. The results of the logit regressions including participants' characteristics and variables concerning consumer preferences for bread and health-enhancing foods are presented in Table II.4. We

<sup>11</sup> The consistency of binary choice models with random utility has been discussed in McFadden (1974); Luce (1977); Greene (2012).

*Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*

can see different preference structures underlying stated and revealed choices. Factors positively influencing stated preferences for health-enhancing foods are previous purchases of such foods and a perceived connection between food consumption and health. The average market price was not statistically significant in the stated preference estimation indicating that respondents' considerations of hypothetical price premiums have lower predictive power than the actual revealed preferences. In the case of bids submitted by the participants in the first round (base product) only previous purchases of health-enhancing food in the case of bread and price for both bread and biscuits were significant. For revealed preferences estimations, statistically significant factors of bid increases were the attributes introduced during the auction and the market price.

Since the coefficients of the logit regressions are not directly interpretable, we obtain contrasts of predictive margins that demonstrate changes in probabilities associated with each level of significant predictors holding other covariates at observed values (see Table II.5).

**Table II.5. Contrasts of predictive margins for statistically significant explanatory variables (1% significance level, covariates at observed values)**

	Contrasts of predictive margins							
	Stated preferences		Revealed preferences (1 <sup>st</sup> round)		Revealed preferences (2 <sup>nd</sup> round)		Revealed preferences (3 <sup>d</sup> round)	
	bread	biscuits	bread	biscuits	bread	biscuits	bread	biscuits
Attribute value	-----	-----	-----	-----	0.45***	0.37***	0.32***	0.32***
Previous purchases of health-enhancing food	0.28***	0.33***	0.23***	-----	-----	-----	-----	0.27***
Connection between food and health	0.38***	0.38***	-----	-----	-----	-----	-----	-----

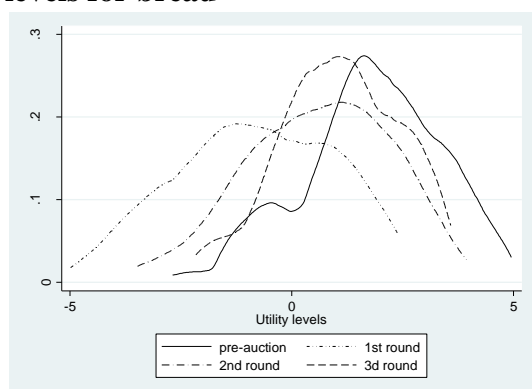
All the significant predictors are dummy variables with only two levels. For the stated preferences estimation previous purchases of health-enhancing foods increase the probability of paying price premiums for health-enhancing attributes in foods by 28% and 33% for bread and biscuits, respectively. In case respondents see a strong link between food consumption and health, the probability of paying price premiums for health-enhancing attributes increases by 30% for both products. For the first round of the auction we observe that for respondents who agree that consumption of certain foods influences health the probability of paying the price higher than market price for the bread base product is 23% higher. For the second and the third rounds of the auction, the highest increase in the probability of paying higher prices is provided by the introduction of additional product attributes. Previous purchases of health-enhancing foods were a significant predictor for the purchase of biscuits in the third auction

round with an increase in probability of 27%. The introduction of positive attributes has a stronger influence on bid values in the second round than in the third.

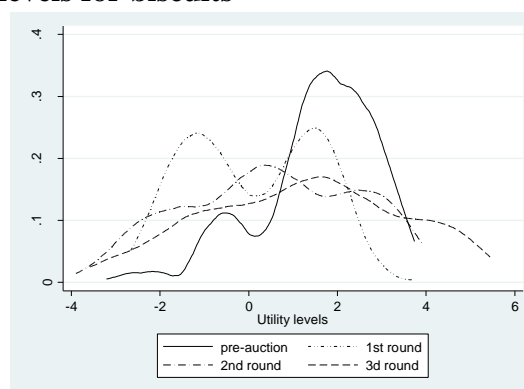
The results indicate that respondents have preferences for the introduced attributes both for bread and biscuits and that previous purchases of health-enhancing foods as well as the realization of a connection between food and health are significant determinants for both products.

In a next step, we estimate utility values based on stated and revealed preferences and plot kernel densities of utility values distribution for the pre-auction survey and three rounds of the auction (see Figures II.1 and II.2).

**Figure II.1. Kernel distribution of utility levels for bread**



**Figure II.2. Kernel distribution of utility levels for biscuits**



The distributions appear to be quite different indicating that utility levels inferred from hypothetical statements are higher than values from real bidding during the auction for both products. Consumers overestimate the propensity to pay price premiums when asked about hypothetical values, but decrease their valuations when faced with a specific product and specific benefit. This result corroborates to some degree the results reported by Lusk & Schroeder (2006). However, if we compare utility levels between the auction rounds we can observe an increasing utility from one to another round for bread, however, in the case of biscuits utility implications might be more complicated. Our previous results demonstrated that utility levels during the auction rounds are mostly influenced by the value of the attributes introduced and average market prices. In the subsection 4.2 we investigate if the reference point approach could shed more light on the process of consumer decision-making.

#### **II.4.2 Reference point effects**

The reference point effects approach suggests that each product is evaluated from a certain reference point, which can be represented by previously experienced prices or preferences.

As Tversky & Kahneman (1992) define it: “*in the evaluation of outcomes, the reference point serves as a boundary that distinguishes gains from losses*”. Closely related to the reference point is the idea of status quo bias in decision-making. *Status quo* is the current preferences of the individual that are preferred relative to new alternatives (McFadden, 1999). From a behavioral point of view this approach can be supported by, for example, causal model of gene technology acceptance, where acceptance is determined by perceived benefits and perceived risks (Siegrist, 2000). It was also observed that when individuals face sequential choices, the subsequent decision is not independent from individual’s initial status (Samuelson & Zeckhauser, 1988). Thus, it can be assumed that in our experimental setting the subsequent bids of the participants are influenced by their own previous bids.

We fit the utility model that explains bid formation in the context of reference price effects on data from our second-price Vickrey auction. We estimate two models for revealed preferences. For the first model, a random utility approach as described in subsection 4.1 is employed but now including additional parameters for reference point, gains and losses. Consequently, in the first case, the respondent maximizes utility when the perceived gains of an additional product attribute measured relative to a reference point lead to increasing their bid so that the respondent is able to purchase the product on the market. In our estimation including reference point effects we employ the same dependent variable as in the random utility estimation and the following specification:

$$V_{ij} = \alpha_j p + \beta_j z_i + \theta_j RP_i + \gamma_j Gain_i + \delta_j Loss_i + \varepsilon_{ij}$$

where  $V_{ij}$  is the deterministic part of the respondent’s  $i$  utility function;

$p$  the average market price of the product;

$z_i$  individual  $i$ ’s characteristics;

$RP_i$  reference point for the product directly elicited from respondent  $i$  in the previous round;

$Gain_i$  dummy variable which equals 1 if auction bid exceeds reference price for this round, and equals 0 otherwise;

$Loss_i$  dummy variable which equals 1 if auction bid is less than reference price for this round, and equals 0 otherwise;

$\varepsilon_{ij}$  is the error term.

For the second model we include probability weighting. The basis for our weighted model is Savage’s subjective utility model:  $U_i = p_i V_i$ , where  $p_i$  represents subjective probability (Savage, 1972). We use subjective probabilities elicited from the stated choice

*Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*

model as weights following the behaviorist interpretation of subjective probabilities (Baron & Frisch, 1994).

**Table II.7. Results of the logit estimations (1% significance level)**

Utility function variables	Revealed preferences (2 <sup>nd</sup> round)		Revealed preferences (3 <sup>d</sup> round)		Revealed preferences (weighted) (2 <sup>nd</sup> round)		Revealed preferences (weighted) (3 <sup>d</sup> round)	
	bread	biscuits	bread	biscuits	bread	biscuits	bread	biscuits
<b>Factors related to product consumption</b>								
Frequency	-0.28	-0.08	-0.53	-0.14	-0.22	-----	-0.61	0.25
Price	-1.57	-0.92	1.67	0.18	-1.94	-----	2.28	-----
Taste	-0.61	-2.33	2.38	-0.14	-0.86	-2.00	2.58	-0.57
Healthiness	-0.18	0.19	2.67	-1.13	-0.43	0.72	3.13	-1.75
Novelty	-1.52	-2.50	1.57	-3.99	-1.61	-2.25	1.75	-3.80
Tradition	0.07	6.67	2.73	-1.53	-0.11	7.86***	2.94	-1.56
Connection between food and health	0.17	-1.48	1.60	0.21	-0.35	-4.31	1.11	0.06
Previous purchases of health-enhancing food	0.19	0.02	-0.49	2.22***	0.04	-0.06	-0.22	2.79***
Consent to pay price premiums for products with health-enhancing attributes	1.14	0.83	1.14	0.00	1.10	1.43	1.45	-0.07
<b>Socio-demographic &amp; lifestyle characteristics</b>								
gender	0.36	-1.77	2.29***	-0.16	0.22	-2.59***	1.89	-0.24
income	-0.18	-0.85	0.33	-0.03	-0.06	-1.24***	0.39	-0.09
nutr_ill	0.23	-0.15	1.00	0.79	0.12	-0.49	0.71	0.72
sport	-0.05	-0.19	-0.09	-0.45	0.14	-----	-0.15	-0.47
smoke	0.77	0.78	0.64	-0.02	0.70	1.42	0.91	0.71
alcohol consumption	0.57	-0.42	-0.93	0.75	0.46	-0.54	-1.36	0.49
<b>Product-related characteristics</b>								
price	-0.18	-0.64***	-0.23	-0.42***	-0.14	-0.67***	-0.23	-0.44***
reference point	0.27***	0.44***	0.48***	0.22***	0.24***	0.43***	0.49***	0.22
gains	3.67***	4.43***	4.12***	2.82***	3.49***	4.75	4.60***	3.21***
losses	-12.93***	-10.48***	-2.76	-1.35	-12.32***	-12.73	-2.44	-2.64
constant	-3.87	9.26	-5.78	-0.40	-3.31	12.95	-4.66	-0.69
AIC	144.21	99.066	99.74	110.620	124.94	74.576	83.23	80.975
BIC	209.98	164.832	165.51	176.385	190.71	129.595	148.99	142.467
Pseudo R <sup>2</sup>	0.61	0.78	0.76	0.72	0.58	0.79	0.77	0.75

Incorporating probabilities into decision-making models builds on the assumption that decision outcomes are influenced by the importance of the outcomes to the decision maker. In our setting, we assume that the probabilities of purchasing foods with health-enhancing and environmental benefits elicited from the survey reflect subjective probabilities that the respondent submits an auction bid higher than the market price of the product.

**Table II.8. Contrasts of predictive margins for statistically significant explanatory variables (covariates at observed values)**

	Contrasts of predictive margins							
	Revealed preferences (2 <sup>nd</sup> round)		Revealed preferences (3 <sup>d</sup> round)		Revealed preferences (weighted) (2 <sup>nd</sup> round)		Revealed preferences (weighted) (3 <sup>d</sup> round)	
	bread	biscuits	bread	biscuits	bread	biscuits	bread	biscuits
average margin RP at gains	0.03***	0.02***	0.02***	0.01***	0.02***	0.02***	0.02***	0.01***
average margin RP at losses	0.00	0.01***	0.02***	0.02***	0.00**	0.01	0.02***	0.01***
gains	0.34***	0.22***	0.20***	0.17***	0.33***	0.22***	0.21***	0.17***
losses	-0.61***	-0.42***	-0.12*	-0.08	-0.58***	-0.50***	-0.10*	-0.14

Using the *Akaike Information Criterion (AIC)* and the *Bayesian Information Criterion (BIC)* as indicators of model fit, models involving reference point effects provide a significantly better fit than models based solely on the random utility approach. Moreover, models that use probability weights from a stated choice estimation have a better fit than estimations without weights.

The results indicate that reference points are highly significant in all estimations (table II.7); however, as we cannot interpret the coefficients in the estimation directly, we look at the predicted probabilities (table II.8). Results regarding average predicted probabilities for reference points at gains and losses indicate the response of the dependent variable, in our case the willingness to purchase product with health-enhancing and environmental attributes introduced, to the reference point when attributes are being perceived either as gains or as losses. Due to the fact that a reference point is represented by a continuous variable, the values in the table indicate only the rate at which dependent variable would be changing if this rate is constant.

Predicted probabilities for gains and losses demonstrate that perceived gains of the product attributes increase the probability of purchase by the range of 17-34% depending on the estimation method. More importantly, perceived losses decrease the probability of purchase by the range of 8-61% depending on the estimation method that fit the idea of an asymmetrical response to gains and losses.

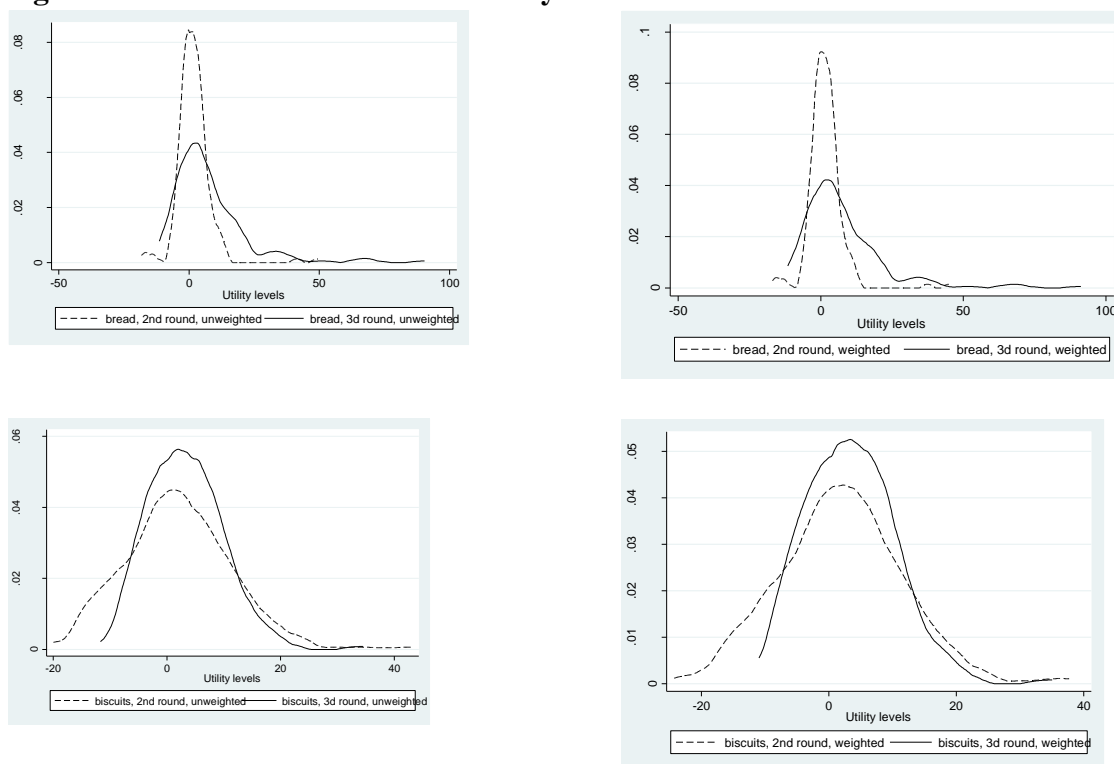
Our results support the existence of relative rather than absolute utility values. Predicted utility values for bread and for biscuits are presented in Figure II.3.

We observe that the distribution of utility values produced by reference point effect approach (figure II.3) differ from the ones produced by random utility approach (figure II.1 and II.2). Utility distributions obtained from reference point effects estimations produce more



diverse utility levels and indicate the presence of more heterogeneous consumer preferences than the random utility estimations.

**Figure II.3. Kernel distribution of utility levels**



### II.5. Conclusions and discussion

In this research we inferred additional information on consumers’ preferences for foods with health-enhancing and environmental attributes by applying both traditional random utility and reference point approaches to experimental auction data.

A random utility approach allowed us to identify the most significant factors influencing the bids. Differences between utility levels inferred from hypothetical and revealed preferences models indicated significant overestimation in consumers’ stated choices, which is line with previous research (Lusk & Shogren, 2007).

Differences between preferences underlying utility values in stated and revealed models can have different reasons. However, it seems reasonable to assume that framing of the choices played a significant role in our setting. The survey that was presented to the respondents before the auction was aimed at eliciting attitudes, knowledge and preferences, while the auction procedure was strictly aimed at valuation. Consequently, respondents might have perceived these two parts of the experiment as separate, which resulted in different factors influencing stated and revealed choices.

## *Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*

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According to random utility approach health-enhancing and environmental attributes introduced to the respondents during the auction are positively valued and their presence significantly increases the probability of purchase (table II.4 and II.5). However, it provides no evidence on consumers' negative valuations of the attributes.

Reference point effects models were estimated only for the second and third rounds, as the base product introduced in the first round served as a reference point. The results of the reference point approach support the existence of reference points and asymmetrical effects of gains and losses in the preferences for health-enhancing and environmental attributes for consumers in our sample (table II.7). Differences in bids provided by respondents reflect preference formation during the auction. As in a real market situation, reference points differ among different individuals. As pointed out by Hu et al. (2006) in this case different welfare measures exist for different consumers which pose new questions for marketing and policy-making issues regarding novel foods.

Interestingly enough, even with only positive attributes presented to the respondents we observe that consumers value the attributes not only positively but also negatively, i.e. relative to the base product attributes are perceived not only as gains but also as losses and thus lower the utility levels. Moreover, these losses may not only refer to monetary losses but also to perceived losses regarding the use of technology, lack of trust or interest, etc. Thus, it's not only that consumers might not be willing to pay higher prices for health-enhancing and environmental attributes but the purchase decision itself is altered by the presence of new attributes.

Consequently, reference point effects approach brings to the attention relative measures and the framing of decisions. In contrast to random utility approach, reference point effects approach indicate that the value of certain attributes for consumers are not product specific, but are specific to certain individual reference point that serves as an anchor in decision making about purchase. This view provides more complex representation of the possible attribute valuations by consumers. Further research could provide evidence on what constitutes reference points and gains and losses for consumers. Policy implications and marketing strategies could be aimed not only at better representation of novel attributes but at overcoming the negative influence of perceived losses.

Evidence on the presence of reference points and gains and losses also provides insights on previously unexplained heterogeneity (Hu et al., 2006), by accommodating the role of preferences, beliefs and attitudes in consumers' decision-making. Reference point

model fit measured by  $PseudoR^2$  and Akaike Information Criterion and Bayesian Information Criterion indicate that part of consumer-specific heterogeneity was explained in the models that include reference points. Models taking into account weights, where weights are formed from previous beliefs fit better than unweighted models.

The auction data presented in this paper included sequential bidding. The sequential order of introducing product attributes might have influenced the outcomes. Loewenstein & Prelec (1993) demonstrated that when introduced to the sequence of outcomes people show preference for improvement, which in our case might have inflated the stakes, as we have introduced only positive product characteristics. This drawback could be overcome in the future research by adjusting the experimental design.

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*Section II. Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach*

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## **Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia<sup>12</sup>**

### ***III.1. Introduction***

Emerging economies are characterized by profound changes in economic and social order that involve transformations in life-styles and life quality for all segments of the society. These tremendous socio-economic changes are also reflected, besides all, in consumer behavior. However, consumer behavior in emerging and transitional economies is heavily understudied. As stated by Steenkamp & Burgess (2002) more than 80% of the world's consumers live in emerging economies, however, consumer research has been mainly concentrated on Western countries.

Post-communist economies followed some common socio-economic trends influencing consumer behavior like high income inequalities with the majority of the population having low incomes which made economic determinants of food choice (i.e., prices, income) very important (Petrovici, Ritson, & Ness, 2002). Brosig & Ratering (1999) specify the following factors influencing consumer behavior in a transitional economy: “a) the range of food products available on the market; b) changed purchasing power and relative prices; c) continuous changes in consumer preferences; and d) structural breaks in consumer preferences”. Although these general factors were mutual among many post-communist countries, they were also complemented by country-specific idiosyncrasies which resulted in a different, complex, still-evolving behavior at consumer markets.

Recent trends in consumer behavior across the world include market development of so called functional foods or foods with benefits (Granato et al., 2010) and Russia is also a part of this trend. Through observing post-communist socio-economic trends and analyzing qualitative and quantitative data we discuss major characteristics of Russian consumers' perceptions and valuations of foods with health benefits.

The structure of this chapter is as follows. In the next section, we describe major socio-economic factors related to the consumption of foods with health-enhancing properties in Russia based on the existing literature. The third section describes the product employed and the methodologies of the qualitative and quantitative parts of the research. In the fourth

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<sup>12</sup> Partial results of this chapter were published as: Dolgoplova, I., Teuber, R., Bruschi, V. (2013) *Recent trends in consumer behavior concerning foods with health benefits in Russia*, in: Pedro Ferreira, André Vieira (Eds.): *International Conference on Marketing & Consumer Behavior – 2013 Back to Basics: consumer-centric marketing or target-centric marketing*, Porto, 16-17 May 2013., pp.104-114.

section we provide empirical evidence from focus groups, a survey and an experimental auction to discuss factors influencing functional food consumption in Russia. Section five concludes.

### ***III.2. Major socio-economic factors influencing consumption of foods with health benefits***

#### ***III.2.1. Price as a factor in food choice decisions***

Russia faces economic developments typical for emerging economies: high income inequality and a majority of the population having low incomes. According to a Credit Suisse Emerging Consumer survey, 39% of households in Russia have income of less than 1000 USD per month and, besides, one third of the household income is spent on food (Credit Suisse, 2011). Total food expenditure on food by Russian households equals 250 bn USD in 2014 which is a significant part of total expenditure (931 bn USD)<sup>13</sup>. Besides, the first years of the transformation process were characterized by very fast price increases including prices for food. However, this growth was not equal among different product groups. More pronounced increases were reported for dairy and bread products while prices for vegetables and potatoes increased more slowly because people started to produce them on their own garden plots (Ovcharova & Popova, 2008).

Consequently, food prices are reported to be one of the most important factors for food choice in Russia by Honkanen (2006) and Honkanen & Frewer (2009). This observation, however, is not specific for Russia. In a study about Hungary, Poland and Russia, Shama (1992) shows that consumers in all these three countries became more price conscious during the transition period.

Besides, changing economic conditions also influence the availability of food. In particular, Liefert (2004) shows that inadequate access to food by certain socio-economic groups in Russia is caused by high income inequality and garden plot availability. Moreover, Russia is characterized by notable difference in incomes between geographical areas, where Moscow presents the exceptional case of higher incomes and diversified consumer choices (Kotilainen *et al.*, 2006) which also contributes to unequal food access.

Based on the information above price is supposed to serve as an important factor in food choice decisions, especially for consumers in remote geographical areas.

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<sup>13</sup> Euromonitor.Russia Country Factile. URL: <http://www.euromonitor.com/russia/country-factfile> (assessed 12 May 2015).



### ***III.2.2. Preferences for traditional products in food choice decisions***

When faced with decreasing income, consumers do not necessarily change their diet – instead they change the strategies of household food supply. Dore *et al.* (2003) demonstrate that income and a healthy diet are not directly related for poorer consumers, who switch to cheaper foods and household food preparation to keep existing eating patterns. Thus, subsistence farming also becomes a general way to escape poverty (Denisova, 2012). Studies about household behavior in Bulgaria and Russia show that consumers do apply similar strategies to keep the dietary patterns during transition times. They tend to produce more food in the household, especially at private garden plots (Ivanova *et al.*, 2006; Kostov & Lingard, 2002; Seeth *et al.*, 1998). The same tendency was also observed for the Czech Republic (Dofkova *et al.*, 2007). As Shanahan *et al.* (2003) point out, there exist different levels of household dependence on local food ecosystems and Russian household demonstrate high level of dependency on domestic food provision. This level of dependency also differs throughout the country, and consumers at the periphery Russia are more dependent on local foods and also have stronger preferences for them.

The range of available food products has changed dramatically during the transition. Substantial decrease in agricultural output that has started in early 1990's (Liefert, 2004) was compensated mainly by imports. In 1996, imported food accounted for 35% of total food consumption in the country (Ovcharova & Popova, 2008). Recently, food production is concentrated in central Russia with Moscow and St. Petersburg regions as producers of most food products, whereas 40% of total food consumption is still imported (Kotilainen *et al.*, 2006).

However, Russians are very cautious in their consumption of imported foods, despite (or because of) significant share of imported product at the market. Domestic food is considered to be more natural, contains less chemicals and preservatives and appeals to Russian traditions (Thelen & Ford, 2006).

It should be also noted that from a cultural hedonic framework perspective Russia belongs to higher context cultures that are characterized by the value placed on traditional foods, unwillingness to try novel foods, and tendency to favor taste over nutrition (Wansink, Sonka, & Cheney, 2002). Consequently, it is possible to assume that Russian consumers demonstrate preferences for traditional products and are cautious about novel and unfamiliar foods.

### **III.2.3. Health status as a factor of food choice decisions**

The health crisis of the Russian population introduced itself in the late 1990's and has deep historical and cultural roots, some of which are also responsible for the current attitude of Russians towards health in general and health-enhancing food in particular. As Tragakes & Lessof (2003) point out: "The paternalistic Soviet philosophy did not encourage the development of responsibility of the individual with respect to lifestyle issues that have a major bearing on health (alcohol use, smoking, diet, etc.)...". Besides, Soviet recommended "norms" of food consumption strengthened the tradition of a heavy intake of livestock products such as meat, eggs, and dairy products among Russian consumers (Liefert, 2004).

The deterioration of health that accompanied economic growth in Russia was reported to have as the leading cause of death non-communicable diseases followed by external causes of injury and poisoning all being consequences of poor diet, smoking and alcohol consumption (see e.g., Marquez et al., 2007; Tragakes & Lessof, 2003). Alarming health statistic is also reflected in surveys monitoring Russians' self-rated health, with results that do not change significantly over the years, keeping high-rates of average and poor health (see table III.1).

**Table III.1. Russians' self-rated health (%)**

	Bobak (1998)		Perlman (2008)		Rosstat (2008)	VCIOM		
	Men	Women	Men	Women	-----	2009	2010	2011
Very good	6	3	3.2	1.1	28.8	5	6	5
Good	33	19	35.2	20.1		37	38	39
Average	45	49	50.3	58.5	59	46	44	46
Poor	15	25	9.7	16.9	10.8	10	10	9
Very poor	2	5	1.6	3.5		2	2	1
No answer	-----	-----	-----	-----	1.4	-----	-----	-----

*Sources: VCIOM (ВЦИОМ) monitoring "Russians' Health Status", press issue No. 1912 <http://wciom.ru/index.php?id=459&uid=112205>; Bobak, Pikhart, Hertzman, Rose, & Marmot (1998); Perlman & Bobak (2008); Goskomstat [http://www.gks.ru/free\\_doc/2008/demo/zdr08.htm](http://www.gks.ru/free_doc/2008/demo/zdr08.htm).*

At the same time some recent studies report a growing interest of Russians in a healthy lifestyle. The Federal Service of State Statistics (Rosstat) in 2008 performed a selective survey named "The influence of behavioral factors on health status of the population". The results show that good health is now one of the most important values for Russian people. Most respondents (84.2%) realize that their health status mostly depends on themselves. This is consistent with the results of consumer focus group interviews by Popova

et al. (2010) demonstrating that recently Russians are actually becoming more attentive to their health than in the past. Agriculture and Agri-Food Canada (2010) also identifies that as much as 82% of Russians in 2007-2009 started to pay more attention to their health.

However, according to the same Rosstat survey mentioned above, most Russians do not have enough knowledge about what constitutes healthy lifestyle. For example, when feeling sick, 62.7% of Russians prefer self-treatment with the use of medicine or folk methods and 24.9% of people who prefer self-treatment consider alcohol as folk medicine for cold or other sicknesses. Besides, a lot of people are influenced by negative social norms and traditions. Typical answers to the questions like: “Why do you smoke?” or “Why do you drink alcohol?” are: “Out of habit” or “Because of traditions”.

The rapidly growing market of functional foods or foods with health benefits is usually attributed to the alarming health statistics in Russia. Sales of functional foods in Russia have been steadily increasing in current years and the market was estimated to account for EUR 1.1 million in 2009 (Agriculture and Agri-Food Canada, 2011). Thus, the Russian functional food market is still rather small compared to the European market. However, several studies have reported a growing interest of Russians in health-enhancing foods (Popova *et al.*, 2010; Agriculture and Agri-Food Canada, 2010a). Most popular functional foods in Russia are: probiotic dairy products, bakery products with different supplements, fruit/vegetable juices, and baby food (Agriculture and Agri-Food Canada, 2011).

Consequently, it can be assumed that Russian consumers have low nutritional knowledge and make health-enhancing food choices based on traditions.

In the following we provide empirical results from focus group discussions, a survey and an experimental auction to further discuss the above-mentioned factors.

### ***III.3. Methods***

#### ***III.3.1. Product of interest***

As an example of a novel food with health benefits we used anthocyanin-rich bakery products for both qualitative and quantitative parts of the research. Since bakery products are eaten on a regular basis and in rather large quantities in Russia, they provide a promising way to increase the intake of certain positive ingredients such as for example dietary fiber, carotenoids or anthocyanins. Anthocyanins are a group of reddish to purple and blue colored flavonoids which are naturally occurring in fruits and vegetables like fresh berries, grape wine or red cabbage. There exists scientific evidence that anthocyanins possess anti-inflammatory, anticancer, antidiabetic and ocular health-enhancing properties due their

antioxidant properties (e.g., Abdel-Aal et al., 2014; Butelli et al., 2008; He & Giusti 2010; Hou et al., 2004).

Until so far, there has been no link between anthocyanins and cereal or bakery products since the usually grown wheat varieties do not contain anthocyanins. However, there has been an increasing scientific interest in recent years in blue and purple wheat varieties that naturally contain anthocyanins (Eticha et al., 2011; Li and Beta, 2011). Moreover, purple and blue wheat varieties belong to the so-called old or ancient grain varieties. Old grain varieties were found to possess a higher nutritional content than modern varieties, since significant negative correlations between grain yield and grain mineral concentrations have been reported due to a *dilution* effect (Fan et al., 2008; Zhao et al., 2009).

### III.3.2. Focus group interviews

Four focus group interviews were conducted in two Russian cities, Moscow and Irkutsk, with 30 participants in total. The selection of the cities was aimed at representing the difference between capital city and periphery. Participants were recruited through personal connections. The following criteria were used to select participants: gender, age, educational and income levels. The structure of the groups was heterogeneous, displaying differences in main selection criteria (see table III.2). The number of participants in the groups varied from five to nine. Participants were asked to identify their income level according to the following income groups: 1 - up to 750 €/month, 2 - 751-1500 €/month, 3 - 1501-2250 €/month, 4 - more than 2251 €/month<sup>14</sup>.

**Table III.2. Focus Groups Characteristics**

	Moscow		Irkutsk	
	M.1.	M.2.	I.1.	I.2.
Participants	9	5	8	8
Gender (male/female)	5/4	2/3	4/4	4/4
Range of participants' age	from 26 to 61 years old	from 24 to 44 years old	from 25 to 73 years old	from 22 to 70 years old
Educational level	BS/MS	BS/MS/PhD	BS/MS/PhD	BS/MS/PhD
Range of participants' income level (groups)	1-4	1-3	1-3	1-4

Besides, participants were asked to complete a short questionnaire before the interviews with questions about the presence of children, food-related chronic diseases, smoking and alcohol consumption.

<sup>14</sup> Participants indicated income level in Russian rubles. Corresponding amounts in Euro were calculated according to average monthly exchange rate in December 2012.

The interviews were semi-structured and performed using a guide based on (Barrios et al., 2008; Chambers, Lobb, & Mortimer, 2006; Honkanen & Voldnes, 2006). Topics discussed included general patterns in consumption behavior, connection between food and health, and consumers' perception of foods with health benefits (focus group guidelines can be found in Appendix I).

Each interview took 70 to 90 minutes and was video and audio recorded. All the interviews were conducted in Russian by one of the authors who is a native Russian speaker. All recorded data were transcribed and translated from Russian into English.

Data were analyzed using classical content and comparative analysis and contextualized counts of categories.

### ***III.3.3. Survey and experimental auction***

Four focus group interviews informed the development of the food auction process, including the questionnaire development and the choice of the products to be employed in the experimental auctions. Two different bakery products reflecting different levels of perceived healthiness and naturalness were auctioned: a bread roll and a pack of biscuits. A bread roll is an example of a staple grain-based food with a positive health image whereas biscuits represent an occasional/hedonistic grain-based food with a neutral or negative health image (Shepherd et al., 2012). Employing these two products allows us to investigate whether the marginal WTP for the health-enhancing attribute differs across products with different levels of perceived healthiness and naturalness.

The quantitative part of our research consisted of a survey followed by an experimental auction (second price sealed-bid Vickrey auction) and a short post-auction questionnaire. Auctions were organized at the campuses of two universities, namely the Higher School of Economics in Moscow and the Baikal National University of Economics and Law in Irkutsk.

We specifically chose these two cities to obtain data from different regions and living environments in Russia. Moscow, with its approximately 12 million inhabitants, is the capital and the largest city of the Russian Federation. It is often considered to be different from other parts of Russia due to its economic prosperity and influence of Western trends most inhabitants are assumed to follow. Irkutsk, with around half a million inhabitants, is located in Siberia close to the Baikal Lake, a rather remote location. The income level is below the

one in Moscow<sup>15</sup> and also the influence of Western trends is assumed to be significantly lower.

Using an experimental auction setting allows us to elicit consumer preferences *ex ante* by creating an active market situation with real monetary consequences. Moreover, by choosing an experimental auction design we avoid the commonly found bias in hypothetical evaluation methods such as contingent valuation or choice experiments (Lusk and Shogren, 2007). The chosen auction mechanism was a Vickrey 2<sup>nd</sup> price auction with a full bidding process. In a 2<sup>nd</sup> price Vickrey auction all participants provide their sealed bids simultaneously and at the end only the participant submitting the highest bid purchases the product paying a price equal to the 2<sup>nd</sup> highest bid. This auction mechanism was chosen because it deals with on margin bidders, requires only a limited amount of products, and is easy to explain to participants (Lusk and Shogren, 2007). We did not provide a reference price to participants, since the products are common products and we assume that each participant is familiar with the market price. Moreover, bids were not posted between rounds to avoid bid affiliation, which means that bids are influenced by previous bids.

**Table III.3. Participants' characteristics (N=212)**

Variable	Definition	Mean	St.dev.
Gender	1-male; 0-female	0.27	0.45
Age	age in years	22.32	6.62
Education	1-BS; 2-MS; 3-PhD	1.22	0.45
Income (in EUR) <sup>16</sup>	1- [<660]; 2-[661-1320]; 3-[1321-1980]; 4-[>1981]	2.63	1.00
Nutrition-related illnesses	0-yes; 1-no	0.73	0.45
Sport	0-yes; 1-no	0.60	0.49
Smoke	0-yes; 1-no	0.81	0.39
Alcohol consumption	1-every day; 2-few times a week; 3-few times a month; 4-few times a year; 5-never.	3.53	0.82

First, consumers were asked to complete a survey in which they provided demographic information (table III.3), and answered questions about grain products consumption; connection between food and health; knowledge about anthocyanin and old wheat varieties; willingness to buy and to pay for foods with health benefits (Appendix IV).

The auction itself was divided into several stages. The aim of the preliminary stage was to familiarize subjects with the procedure. This was done via a trial auction using a candy bar.

<sup>15</sup> According to the Russian Federal Service of Statistics, the average monthly household income in Moscow in 2013 was 55100 Russian rubles (approx. 1224 euro), whereas in Irkutsk region it was only 19424 Russian rubles (approx.. 431 euro). [http://www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/population/level](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/level).

<sup>16</sup> Participants indicated income level in Russian rubles. Corresponding amounts in Euro were calculated according to average monthly exchange rate in December 2013.

Then, participants were provided with approx. two euros incentive and asked to post bids for an anthocyanin-rich bread roll and cookies, respectively. Participants were informed that consumption of the product by the auction winners is mandatory upon completion of the auction and that they can buy only one unit of the product. They could submit any bid within indicated price range or zero bid, if they were not interested in the product at all. The bread roll and the pack of biscuits were presented but subjects could only make visual inspection of the product.

In total three bidding rounds were performed. At the first round no information were provided about the attributes of the product and participants submitted their sealed bids. Then, participants were informed about either the anthocyanin or old varieties as product attribute and asked to submit bids again. In the last round information about the second attribute was provided and participants were asked to post the last round of bids.

The information provided to the participants during the auction stressed in one case the health benefit of anthocyanins, i.e. *“Anthocyanins are a group of reddish to purple and blue colored flavonoids belonging to natural phenols. They are widespread in flowers, fruits and vegetables like fresh berries, grape vine or red cabbage. Anthocyanins have been a part of the human diet for centuries and have been used as traditional medicines to treat hypertension, pyrexia, dysentery, urinary problems, and the common cold. Anthocyanins act as powerful antioxidants and demonstrate potential health effects against: cancer, aging and neurological diseases, inflammation, diabetes, bacterial infections, fibrocystic disease.”* The other information provided to participants stressed the old variety attribute, i.e. *“The origin of the purple grain trait rich in anthocyanin lies in tetraploid wheats from Ethiopia and can be referred to as old wheat variety. Old wheat varieties are considered to have higher levels of certain nutrients, and consequently special nutritional quality, participate in preserving biodiversity and had not been used for long time in mass production.”*

#### ***III.4. Discussion of results***

##### ***III.4.1. Results from focus group discussions and survey***

In this part of the paper results from focus group discussions and the survey among the Russian consumers are employed to discuss the factors developed from the existing literature. In the subsequent part of the paper we use the data from experimental auctions to see if there is any statistical evidence in support of the influence of above-mentioned factors.

III.4.1.1. Price as a factor in food choice decisions

**Table III.4. Focus groups participants' opinions about the place of price in food purchase decisions**

Moscow	Irkutsk
<p>"...if I like something I take and don't even look at the price. Last time I tried to calculate how much I spend on food, it was in the year 2002 when I just started to live by myself and it lasted for about a month but then I decided that if I don't eat what I want, I will not be able to think well, to work well".</p> <p>"I tried to find the producers of natural products, I even wanted to create the cooperative in the village where I live. But unfortunately there we have population with very different incomes and very different preferences... So, everybody is buying food depending on financial opportunities. There is the supply of natural products oriented at the consumers with very high income. The products are not labeled but prices are still very high".</p> <p>"Yes, price is correct but still the quality of the product is on the first place and then goes price".</p> <p>"No, for me price is not important. Whether it is high or low for a certain product the most important thing is that the product is not filled with colorants and preservatives, and soya".</p>	<p>"Price is on the second [place]. First place is for diversity, but price is on the second".</p> <p>"For me price is also on the second place. Quality is on the first, ingredients".</p> <p>"Price is on the second place. On the first is healthiness and freshness".</p> <p>"You know, how it is in our shops...you look at the product and it looks good, you bring it home – and it is not tasty at all. And what to do? You cannot bring it back. You don't look at the price, just the product should look yummy, and you think that it is healthy".</p> <p>"For me price is on the second place, and the first is for freshness".</p> <p>"The quality of the product is most important, what is it made of, where was it produced. Price is the second factor".</p>

It is obvious from citations in table III.4 that price does not occupy most important place in consumers' purchase decisions and hedonic factors like taste, naturalness and freshness are major impulses for purchase. Similar results are obtained from the survey for such products as bread and biscuits (Figures III.1, III.2, III.3, III.4).

Price is considered very important for a purchase decision of bread and biscuits by only few participants both in Moscow and Irkutsk, with slight overbalance of price importance in Irkutsk. This difference can be explained by the income disparities between Moscow and the periphery. According to the Russian Federal Service of Statistics, the average monthly household income in Moscow in 2013 was 55100 Russian rubles (approx. 1224 euro), whereas in Irkutsk region it was only 19424 Russian rubles (approx. 431 euro)<sup>17</sup>.

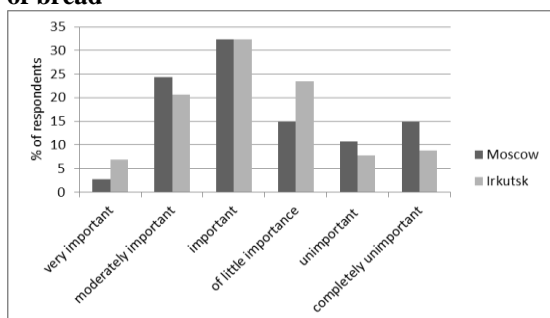
<sup>17</sup> Russian Federal Service of Statistics.

[http://www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/population/level](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/level).

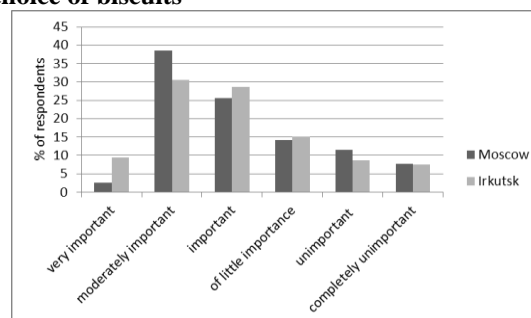


At the same time, taste clearly dominates the factors influencing purchase decisions in both cities with again slight overbalance in Moscow perhaps due to more developed food market with more different food options available.

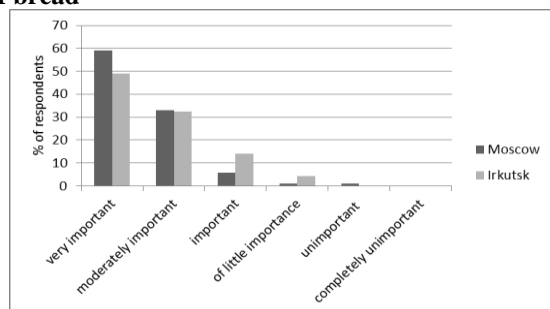
**Figure III.1. The importance of price for the choice of bread**



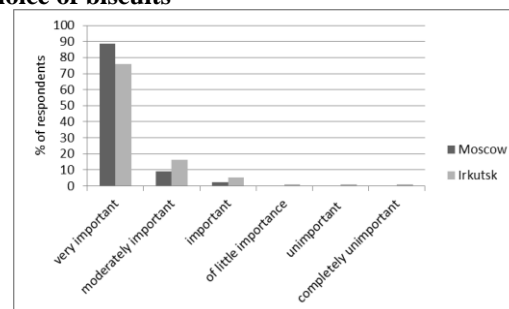
**Figure III.2. The importance of price for the choice of biscuits**



**Figure III.3. The importance of taste for the choice of bread**



**Figure III.4. The importance of taste for the choice of biscuits**



Consequently, based on the focus group discussions and survey data we cannot confirm that price is the most important factor of food choice for respondents in our sample for bread and biscuits.

#### **III.4.1.2. Preferences for traditional products in food choice decisions**

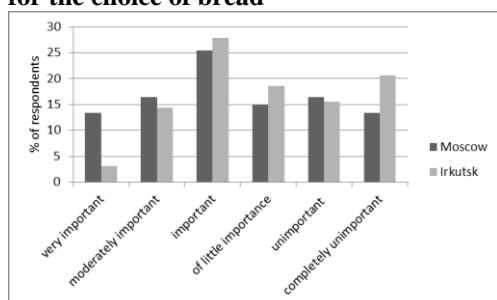
The results of the discussion about the role of traditions in consumers' food choice decisions indicate that there exists a well-pronounced tendency to choose traditional products over innovative ones (table III.5). The survey results also confirm that "being traditional" seems to be an important factor in food purchase decisions (Figure III.5 and III.6).

Traditional perceptions of food products seem to have a major influence on Russian consumers' purchase decisions. They serve as a quality and safety guarantee, replacing formal justifications like labels or certification. Besides, for consumers living at the peripheral regions of Russia availability of regional products strengthens the connection with traditional food products.

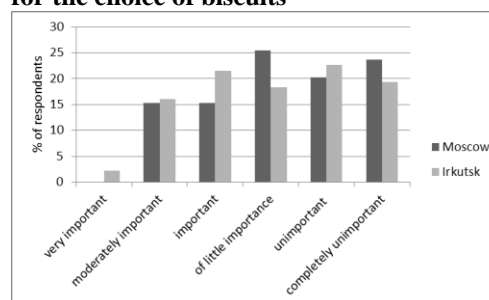
**Table III.5. Focus groups participants’ opinions about the place of traditions in food purchase decisions**

Moscow	Irkutsk
<p>“I just think that there exist traditional products, historical, like sour cheese, and there are modified – yogurt and so on. I think that it is better to orient on traditional products, because they are checked by time, by tens, hundreds of years. With new products you should be careful”.</p> <p>“I personally move towards absolutely traditional products”.</p> <p>“I already said that I prefer traditional products, but innovative products they change all the time. All the time. And the probability that it will really be something exceptional is very low”.</p> <p>“You know, I would agree with Alla, probably, but I’m more emotionally unstable person, so I tend to like more traditional products. I usually don’t think about new options, I do what I’m used to and eat what I’m used to”.</p>	<p>“My choice of products depends mostly on traditions, Russian traditions and price and I prefer more healthy food: soups, porridges, lard, meat – everything that is necessary in our region... Also my family eats a lot of self-grown food. We eat our own meat, vegetables, so I don’t pay for it”.</p> <p>“Yes, like Valeriy, I tend to buy more traditional products. I would buy rice, usual rice, buckwheat, usual buckwheat”.</p> <p>“If there would be traditional package... For me, for example, carton package is better than plastic package”.</p>

**Figure III.5. The importance of being traditional for the choice of bread**



**Figure III.6. The importance of being traditional for the choice of biscuits**



#### III.4.1.3. Health status as a factor of food choice decisions

It became clear from the focus group discussions that participants perceive health-enhancing products as traditional, natural foods without additives. Substantial regional differences can also be observed. If Muscovites strive for naturalness, which is quite logical for the residents of a metropolis, consumers from Irkutsk are strongly influenced by regional climatic conditions and try to adjust their diet to a severe Siberian climate (table III.6).

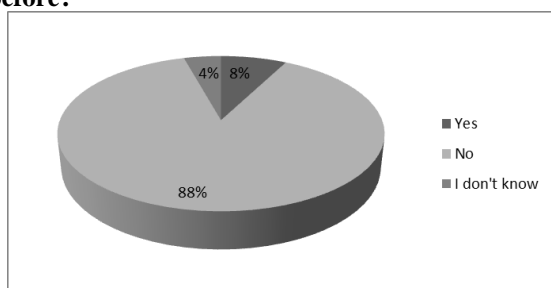
Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia

**Table III.6. Focus groups participants' opinions about the place of healthiness of food products**

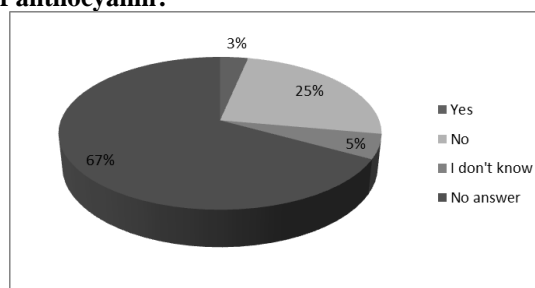
Moscow	Irkutsk
<p>"It's what we know from childhood – porridges are healthy foods, healthy nutrition. In kindergartens they feed children with porridge, parents feed their children with porridges..."</p> <p>"I try to buy healthy food, not processed somewhere at the factory. To say so, products in their clean form, clean meat without fat, preferably beef, grains, vegetables, fruits, dairy, also without any additives. I also try to watch my weight, not to buy sweets... I tend more to natural products".</p> <p>"Most healthy products are from your own garden".</p> <p>"Healthy products are only the ones I've grown at my dacha and cooked myself. So that I didn't put any chemistry in there. That is the healthy product".</p>	<p>"First of all I prefer to eat meat. I think that in our conditions it is difficult to survive without meat. It is a healthy product. Second fruits and vegetables, of course in our conditions it is difficult to find fresh ones, so when it is possible..."</p> <p>"So Siberian berries: buckthorn, currant, blueberries, cranberries are the most healthy products we can consume in winter".</p> <p>"Healthy food is not expensive: grains, dairy. The dairy from Irkutsk region compared to Petropavlovsk Kamchatskiy or Vladivostok is like a fairytale".</p> <p>"Because we were taught from the childhood – you should eat porridge, it is healthy!"</p>

Consumers' low knowledge about health-enhancing substances in food products can be illustrated by the results of the answers to the questions about anthocyanin. Only 8% heard about this substance and only 3% of respondents know about health effects of it (Figures III.7. and III.8.)

**Figure III.7. The distribution of answers to the question: "Have you ever heard about anthocyanin before?"**



**Figure III.8. The distribution of answers to the question: "Are you familiar with the health effects of anthocyanin?"**



At the same time, as was mentioned before, consumers see the connection between food consumption and purchase food that can improve their health. This contradiction between almost absent knowledge about health-enhancing substances and the understanding of the role that food plays in sustaining health status has several possible reasons. First, as discussed before, Soviet norms of healthy nutrition promoted mostly cheap, simple foods that did not involve complicated production processes. Second, food market development in the transformation years was quite chaotic lacking strict control and low level of food security that severely undermined consumers' trust in new and imported foods. Third, financially

uncertain years of transformation pushed consumers more towards exploiting garden plots or the wild, thus strengthening the tradition of consuming locally grown natural products.

To sum up, the results of our inquiry indicate that for the respondents in our sample, price does not serve as a major factor of food purchase decisions. This result is surprising regarding the level of incomes and food prices in Russia and is not in line with the research performed in other transitional economies. Preferences for traditional products and still important role of Soviet-style consumption patterns strengthen the resistance towards novel foods.

We further describe the results of an experimental auction to find additional support for the influence of factors described above.

#### **III.4.2. Results from experimental auction**

We now turn to the results of the experimental auction aimed at eliciting consumer's valuations of health-enhancing attributes in bread and biscuits.

Mean statistics of the bids submitted during the auction is presented in Table III.7. Since the order of the attributes introduced was randomized, we present the descriptive statistics with regard to the order of the attributes. Irrespective of the order of the attributes, the bids for both products increase in each round and the amount of zero bids decreases. It indicates that additional attributes can initiate a purchase for some consumers who were not interested in the grain products with basic characteristics.

**Table III.7. Means and standard deviations of the auction bids**

	Bids for bread roll						Bids for biscuits					
	Obs	Mean	Std. Dev.	Min	Max	Zero bids	Obs	Mean	Std. Dev.	Min	Max	Zero bids
Whole sample												
I round	212	14.24	21.23	0	200	58	212	21.19	17.31	0	150	31
II round	212	25.54	27.99	0	200	25	212	27.03	22.67	0	150	29
III round	212	32.75	34.55	0	200	22	212	38.03	41.23	0	270	25
Moscow												
I round	90	18.24	18.63	0	150	13	90	24.32	14.20	0	80	7
II round	90	30.2	30.43	0	155	9	90	32.81	23.40	0	150	5
III round	90	40.93	38.67	0	199	7	90	43.59	39.72	0	270	3
Irkutsk												
I round	122	11.29	22.59	0	200	45	122	18.71	19.02	0	150	24
II round	122	22.11	25.64	0	200	16	122	22.77	21.21	0	105	24
III round	122	26.72	29.92	0	200	15	122	33.93	42.01	0	200	22

Noticeable differences in bid levels between Moscow and Irkutsk reflect existing inequalities in incomes and price levels. An average price for bread roll is about 9 rubles in Irkutsk, when in Moscow the same product costs about 18 rubles. Prices for biscuits are 18

*Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia*

and 22 rubles respectively<sup>18</sup>. The reference prices were not provided to the consumers during the auction and thus bids reflect consumer perceptions of differences in price levels between Moscow and Irkutsk.

**Table III.8. Description of the explanatory variables**

Variable	Description
Factors related to product consumption	
Frequency of consumption	How often do you consume bread/biscuits? (5–every day; 4–few times a week; 3–few times a month; 2–few times a year; 1–never)
Price	Please, indicate how important is price for your choice of bread/biscuits (1–most important; 0–otherwise)
Taste	Please, indicate how important is taste for your choice of bread/biscuits (1–most important; 0–otherwise)
Healthiness	Please, indicate how important is health for your choice of bread/biscuits (1–most important; 0–otherwise)
Novelty	Please, indicate how important is novelty for your choice of bread/biscuits (1–most important; 0–otherwise)
Tradition	Please, indicate how important is tradition for your choice of bread/biscuits (1–most important; 0–otherwise)
Connection between food and health	Do you agree that consumption of certain foods can influence your health? (1–yes; 0–otherwise)
Previous purchases of health-enhancing foods	Have you ever bought food because it can improve your health status? (1–yes; 0–otherwise)
Consent to pay price premiums for products with health-enhancing attributes	Are you willing to pay price premium for food that can improve your health? (1–yes; 0–otherwise)
Socio-demographic & lifestyle characteristics	
Gender	1 - male; 0 - female
Age	Age in years
Education	1-BS; 2-MS; 3-PhD
Income (rubles per month)	1– <30000; 2– 30001 - 60000; 3– 60000 - 90000; 4– > 90000
Nutrition-related illnesses	Do you have nutrition-related illnesses? (1–yes; 0–no)
Sport	Do you do sport regularly? (1–yes; 0–no)
Smoke	Do you smoke? (1–yes; 0–no)
Alcohol	How often do you consume alcohol? (5–every day; 4–few times a week; 3–few times a month; 2–few times a year; 1–never)
Product-related characteristics	
Attributes order_old	1 – if first attribute introduced is “Old varieties”; 0 - otherwise
Attributes order_old_Ant	1 – if second attribute introduced is “anthocyanin”; 0 - otherwise
Attributes order_Ant	1 – if first attribute introduced is “anthocyanin”; 0 - otherwise
Attributes order_Ant_old	1 – if second attribute introduced is “Old varieties”; 0 - otherwise

To determine the factors influencing the levels of bids we estimate the following random effects model:  $Bid_{ijt} = \alpha + X_{ijt}\beta + v_{ij} + \varepsilon_{ijt}$ ;

<sup>18</sup> Federal service of government statistics. <http://cbsd.gks.ru/>.

*Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia*

where  $Bid_{ijt}$  is the bid submitted by respondent  $i$  for product  $j$  in round  $t$ ;  $X_{ijt}$  summarizes explanatory variables;  $v_{ij}$  and  $\varepsilon_{ijt}$  are error terms. A description of the variables included in all estimations is presented in Table III.8.

We estimate models for the whole sample for two products and separately for Moscow and Irkutsk.

**Table III.9. Estimation results**

Variables	Random effects GLS					
	Bread	Biscuits	Bread		Biscuits	
			Moscow	Irkutsk	Moscow	Irkutsk
Frequency of consumption	-0.20	1.83	0.83	3.53	0.32	1.95
Importance of _____ for food consumption						
- price	-2.06	9.00	25.48	-16.52	66.12***	-8.15
- taste	4.74	-0.89	12.74	0.68	30.06*	-14.42
- health	12.83	1.51	23.61**	8.54	48.21***	-31.02**
- novelty	7.21	5.33	39.45	-1.80	-38.99	-7.00
- tradition	15.85*	-2.75	14.83	19.16	---	-14.26
Connection between food and health	-0.38	-4.52	-1.04	-4.25	-8.75	11.12
Previous purchases of health-enhancing foods	9.43*	8.91**	16.90*	8.20	11.67	7.63
Consent to pay price premiums for products with health-enhancing attributes	6.76	1.87	1.88	7.50	1.89	1.16
Gender	1.29	-2.52	-5.06	10.22	-3.46	-4.23
Age	0.10	-0.12	0.63	0.32	-0.10	0.31
Education	-1.22	0.25	-7.73	-27.09	-2.78	-17.73
Income	1.79	0.04	0.41	-1.07	0.59	-0.38
Nutrition-related diseases	3.97	1.94	2.03	8.21	-1.15	6.70
Sport	-3.75	4.19	-1.94	-5.72	5.33	4.93
Smoking	-2.51	-4.68	-6.17	-3.31	-9.23	2.43
Alcohol consumption	-0.46	-0.10	5.74	-6.82*	0.58	2.33
Attributes order_old	10.45***	8.98***	19.11**	10.47***	8.12***	6.77
Attributes order_old_Ant	16.64***	19.81***	28.41***	16.27***	17.49***	22.17***
Attributes order_Ant	11.69***	2.56	11.31***	9.66***	9.72	3.07
Attributes order_Ant_old	20.76***	13.58***	22.26***	12.86***	18.62**	14.34***
Intercept	-7.73***	12.68	-37.72	30.95	-8.97	9.85
R <sup>2</sup>	0.15	0.11	0.25	0.21	0.22	0.13
Observations	588	587	264	324	263	324

\*, \*\*, \*\*\* denote significance at 90%, 95%, and 99% level, respectively.

The results of the estimations in general support the data received from the focus group discussions and the pre-auction survey. The importance of traditional characteristics for willingness to pay for foods with health-enhancing attributes is directly supported in the case of bread in a general estimation for both cities and indirectly through significant coefficients for the attribute “Old varieties” in almost all the estimations. When introduced first, health-enhancing attribute “anthocyanin-rich” produces lower significant or

insignificant estimates compared to the attribute “Old varieties”. This result is related to low knowledge about health-enhancing substances and indicates that if novel functional food that is being introduced to the Russian market which emphasizes health benefit alone without reference to traditions or naturalness, perhaps it will not be very well received by consumers.

We cannot directly support or reject the influence of factors discussed in this section based on the results of the estimations. Price, taste, health, tradition, previous purchases of health-enhancing foods and alcohol consumption show up significantly in some models but there does not seem to be a systematic impact.

### ***III.5. Conclusions***

In general, Russian consumers’ behavior reflects the transitional character of the economy. Consumers are still developing preferences and attitudes, allocating to the different parts of the market, creating strategies to keep habitual diet in a changing environment.

The results of our focus group study show that price might play not as important role as is usually assumed for emerging economy with high income inequality. In the case of post-communist countries where the role of Soviet norms and institutions is still high, healthy nutrition is perceived as a combination of not expensive products that are also available for production at the garden plots, like grains and vegetables.

Russian consumers demonstrate a low knowledge about functional foods and define healthiness of food by traditions, sensory characteristics and the place of product origin. Consumers at less developed periphery markets have specific strategies for optimizing their diet and demonstrate stronger preferences for traditional, regional products.

Health-enhancing substances that are well-known gain more consumer acceptance (Bech-Larsen & Scholderer, 2007); however, consumers that participated in our research demonstrate very low level of knowledge about health-enhancing substances that can be present in foods. Their knowledge is mainly limited to the properties of food traditionally perceived as healthy.

Russian consumers’ propensity to traditional foods makes it crucial that novel functional food types are in line with traditional diet and the base product is familiar to the consumers. Previous research has already confirmed carrier product as being important for consumers’ perception of functional foods, since the health claim might not be perceived independently from the carrier (e.g., Ares & Gámbaro, 2007; Siegrist et al., 2008; Saba et al., 2010; Annunziata & Vecchio, 2013).

Thus, the influence of economic factors might be offset by the influence of institutional factors in Russia. Changes in income levels and the availability of food products at the market might not lead to changes in the diet composition. Soviet diet norms and propensity to traditional products still have high impact that outweighs trends in functional foods development.

This inquiry into Russian consumers' perceptions and valuations of foods with health benefits has some limitations. First of all, the characteristics of the samples do not allow generalizations to the whole Russian population. Second, we could not include sensory tests due to a lack of anthocyanin-containing wheat. Thus, future research needs to include sensory test of the product since taste has been reported as significant factor affecting individual choices and preferences also for functional foods (e.g. Poulsen, 1999; Childs & Poryzees, 1997; Tuorila & Cardello, 2002; Gilbert, 2000).



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Section III. Major Factors Influencing Functional Food Consumption in a Post-Communist Economy: the case of Russia

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## **Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-neophobia in a Cross-Cultural Context<sup>19</sup>**

### ***IV.1. Introduction***

Consumer choices of functional foods involve increasing risk and complexity. Risk and complexity mainly appear from growing information flow about functional foods, and the confusing messages that this information might contain (Falguera *et al.*, 2012). It has been observed that labels, quality assurance schemes, and traceability actually have a poor effect on consumer's acceptance by adding complexity to food choice decisions (Gellynck *et al.*, 2006). Consumers' lack of knowledge about recent advancements in food technologies is another source of complexity (Siegrist, 2000).

Risk also appears as an important factor of consumers' willingness to trial functional foods (O'Connor & White, 2010). More precisely, sources of risk for consumers emerge at different levels: at institutional level, concerning risk of poorly functioning institutional systems related to food production and distribution; and at product level related to the safety and quality of food products (based on Poppe & Kjærnes, 2003).

Risk and complexity lead to the lack of trustworthiness in functional foods which has been indicated as one of the reasons responsible for functional products' acceptance by consumers (Siró *et al.*, 2008) , and subsequent market failures (Onwezen & Bartels, 2011). Food-neophobia, that is the tendency to avoid new foods, can also to some degree be regarded as a consequence of the lack of social trust. Novelty in foods can appear from adding functional attributes (Urala & Lähtenmäki, 2004) and thus complicates consumer perceptions.

From a theoretical perspective, trust serves as a mean for the reduction of complexity and dealing with risk (Luhmann, 1979; 2000). At the same time, many aspects of functional foods' acceptance are connected with trust and the importance of trust in promoting novel functional foods cannot be overestimated. Due to the wide range of possible trust-related aspects of consumer acceptance of functional foods a qualitative inquiry can provide valuable insights.

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We draw on data from focus group discussions about functional foods carried out in Russia and Germany. Although the countries share some common health trends, they are quite polarized in terms of their functional food market development.

Both countries face a high prevalence of non-communicable diseases (NCDs) and obesity which, among other reasons, are caused by an unhealthy diet. According to the World Health Organization (WHO), NCDs were responsible for 86% of total deaths in Russia and for 91% of total deaths in Germany in 2014. In the same year obesity rates were 26.5% in Russia and 25.1% in Germany (WHO: Russia, Germany, 2014).

At the same time, Germany is one of the leading markets for foods with health benefits in Europe, and also the country with the largest amount of companies that market at least one functional product (Stein & Rodríguez-Cerezo, 2008). The German functional foods market is estimated to account currently for around EUR 5 billion and is expected to expand further (Lindel, 2015). This market development is influenced by a growing consumer awareness of the connection between food and health as well as an increasing availability of functional foods that are nowadays also sold at discount stores and via Internet (Lindel, 2015). Most popular functional foods available at the German market are probiotic yogurts, yogurt drinks, and vitamin-enriched drinks.

A survey on consumer attitudes carried out in four European member states in 2006 showed the following results for Germany (N=116): the term “functional foods” was familiar to one fifth of the respondents, but only 10% of them could give examples of functional foods. German consumers are best informed about the functional properties of calcium, followed by probiotics, omega-3 fatty acids, dietary fiber, folic acid, and lycopene. The survey results indicate further that younger consumers are usually better informed about functional food, and price does not seem to be a major barrier for purchasing these products (Stein & Rodríguez-Cerezo, 2008).

In the recent years food consumption expenditures comprised about 14% of total expenditures of German households<sup>20</sup>. In terms of socio-demographic characteristics of functional food consumers in Germany it can be noted that there are about 68% women among buyers and only 52% among non-buyers of functional foods; functional food buyers are on average younger than non-buyers (average age of the former is 45 years compared to 51 years of the latter) and that functional food buyers have on average a higher household

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<sup>20</sup> Federal Statistical Office.

[https://www.destatis.de/EN/FactsFigures/SocietyState/IncomeConsumptionLivingConditions/ConsumptionExpenditure/Tables/PrivateConsumption\\_D\\_LWR.html](https://www.destatis.de/EN/FactsFigures/SocietyState/IncomeConsumptionLivingConditions/ConsumptionExpenditure/Tables/PrivateConsumption_D_LWR.html) (assessed 14.01.2015).

income than non-buyers (2,560 EUR/month compared to 2,240 EUR/month) (Menrad & Sparke, 2006).

Looking at the functional foods market in Russia, the following points are noteworthy. Sales of functional foods in Russia have been steadily increasing in current years and the market was estimated to account for EUR 1,1 million in 2009 (Agriculture and Agri-Food Canada, 2011). Thus, the Russian functional food market is still rather small compared to the German market. However, several studies have reported a growing interest of Russians in health-enhancing foods (Popova *et al.*, 2010; Agriculture and Agri-Food Canada, 2010a). Most popular functional foods in Russia are: probiotic dairy products, bakery products with different supplements, fruit/vegetable juices, and baby food (Agriculture and Agri-Food Canada, 2011).

Even though the market is growing in Russia only very few local studies about functional food consumption in Russia are available<sup>21</sup>. For example, a survey about consumer preferences in the Altai region (N=500) demonstrated very little knowledge of consumers about functional foods and enriched foods. More than a half of respondents (56%) consider their knowledge about functional foods as insufficient and 10% as non-existent (Mayurnikova *et al.*, 2010). Another consumer survey about functional foods was conducted in the city Nakhodka in Primorskiy Kray (N=500). Most of the respondents (88%) agreed that a balanced diet can help reducing the negative influence of poor ecological conditions they live in and the risk of some diseases (Tabakaeva, 2009).

According to a Credit Suisse Emerging Consumer survey, 39% of households in Russia have income of less than USD 1000 per month and usually one third of the household income is spent on food (Credit Suisse, 2011). Consequently, price was found to be one of the most important factors for food choice in Russia (Honkanen, 2006; Honkanen & Frewer, 2009). Another important food choice factor resulting from recent economic conditions is availability of food. In particular Liefert (2004) showed that there exists inadequate access to food by certain socio-economic groups caused by low incomes and garden plot availability.

Thus, even though the Russian functional food market is growing to the best of our knowledge, there is no scientific consumer study available for Russia addressing more general issues related to functional foods perceptions. We aim at filling this research gap by presenting focus group results for Russia and Germany in a comparative way.

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<sup>21</sup> With local studies we refer to studies that are only available in Russian-language and thus are not accessible to a wider audience.

Discussions about functional foods or foods with health benefits, especially when it involves cross-cultural applications, require clarity in definitions. However, a unified international definition of functional foods does not exist, although at the European level several attempts were made to create common legislative basis for functional foods market. The most recent definition of functional food proposed by European Commission Concerted Action on Functional Food Science in Europe (FUFOSE) is: “a food that beneficially affects one or more target functions in the body beyond adequate nutritional effects in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease. It is consumed as part of a normal food pattern. It is not a pill, a capsule or any form of dietary supplement” (European Commission, 2010). A very similar definition is provided by the National Standard of Russian Federation (GOST, 2011): “A functional food is a specific food product designed for systematic consumption by all age groups of the healthy population, that has scientifically proven and confirmed qualities, that decrease the risk of diet-related diseases, prevents or supplements the deficit of nutrients, supports or improves health due to the presence of functional food ingredients”. Besides these rather similar definitions of functional foods in both markets the regulations of the functional food market differ significantly between the two countries. In Germany, issues related to functional food are controlled by European level regulations. Apart from basic regulations on labelling information and health and fraud protection, health claims on foods are controlled by the Regulation (EC) no. 1924/2006. It states that health claims can only be allowed if they are based on commonly accepted scientific results and do not mislead the consumer. It also describes the requirements necessary for specific health claims to be placed on a product.

In Russia, the regulations are limited to the definitions of “functional food” and “claim of efficiency of functional food”<sup>22</sup> (GOST, 2011). No regulation exists on obtaining a functional food claim and the specific contents of these claims. It is also noteworthy that many regulations in Russia are more of declarative character and even if they exist on paper it does not mean that they also are applied in practice.

In the following we will now present results from eight focus group discussions about consumers' acceptance and perception of functional foods carried out in Russia and Germany in 2012 and 2013. The specific aim of our study is to analyze the role of trust and food-

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<sup>22</sup> Claim of efficiency of functional food is a specific term described in the Russian National Standard that roughly refers to the term “health claim” used in European regulatory documents.

neophobia in consumers' acceptance and perception of functional foods that emerged from these focus group discussions.

The paper is organized as follows. A literature review about trust and neophobia issues related to functional foods is presented in the next section. Section three describes methodology and data collection process. Section four presents the results and in section five we discuss our findings.

#### ***IV.2. Literature review***

Both trust and food-neophobia have been regarded as important factors of consumers' functional food acceptance at different levels of socio-economic system.

Trust in regulatory bodies and sources of information about new technologies (Frewer *et al.*, 2003) as well as trust in food industry as a whole (Siegrist *et al.*, 2008) were indicated as an influential factor for consumers' acceptance of functional foods. Moreover, technologies not directly related to the production of a certain product that are negatively perceived by some consumer groups (like genetic modification) can be a source of distrust for all the products that have any kind of technological transformation (not even necessarily GM) involved (Frewer *et al.*, 2003).

The acceptance of technological transformations is closely related to the acceptance of innovations by consumers, which can be influenced by the characteristics of the whole socio-economic system. Such elements of the system as economy, policy, social environment and social trust frame consumers' acceptance of the innovation (Ronteltap *et al.*, 2007). Henson (1995) also points out the complexity of all the possible factors influencing the acceptance of the innovation and subsequent difficulties of addressing the issues related to this acceptance. Consequently, there exists relative conservatism of consumers concerning innovations in foods. It was confirmed, for example, by the study of Kühne *et al.* (2010), which supported the importance of preserving sensory properties of traditional foods for consumers.

Furthermore, concerns about the carrier or base product are closely connected with food neophobia, or the tendency to avoid new foods. It was found that food neophobia is related to demographic variables like gender, age, and education. Moreover, familiarity of a food was suggested to be not a cultural but an individual experience (Tuorila *et al.*, 2001), in which case cultural generalizations might not be applicable for the introduction of the new products into the market. Close results were reported by Hursti & Sjöden (1997) who found age and gender-related neophobia levels, but failed to prove that there exist similar levels of



food-neophobia within one family. At the same time food-neophobia was reported to be significant predictor for willingness to buy some types of functional foods (Siegrist *et al.*, 2008).

Trustworthiness of health claims (Siró *et al.*, 2008; Annunziata & Vecchio, 2013) and not enough knowledge about the ingredients of the functional product and their potential effect on health (Barrios *et al.*, 2008) are also important factors of consumer acceptance of functional foods. Manufacturers' claims were a concern for about 80 percent of focus groups participants in a study on foods with therapeutic claims: participants tend not to trust claims provided by manufacturers (Bhaskaran & Hardley, 2002). A connection between nutrition and taste information on labels and willingness to try novel foods was reported by McFarlane & Pliner (1997) and Martins *et al.* (1997).

As was mentioned before, trust is not only connected with the increasing complexity of factors faced by consumers but also with food-related risks. Food safety represents the major risk-related concern, however, animal welfare and environment add to the possible risk issues (Miles & Frewer, 2001). According to a qualitative study by van Kleef *et al.* (2006), consumers in Europe are concerned that technological development does not only reduce existing risks but also creates new, previously unknown risks. However, they also point out that habitual consumption might not include risk considerations at all. Consumers also lack knowledge on food safety management and base their perceptions mostly on a general trust in the food system.

The analysis of the existing literature highlights that the acceptance of functional foods is closely connected with trust at different levels of the socio-economic system, whereas food neophobia is more directly related to the product and personal food experiences. Our further analysis presents how information and risks related to functional foods are perceived by consumers in Russia and Germany and which mechanisms consumers use to deal with them.

### ***IV.3. Methodology and Data Collection***

Altogether eight focus group interviews were conducted. Four interviews were carried out in Russia (two focus groups each in Moscow and Irkutsk) in December 2012 and four in Germany (two focus groups each in Halle and Goettingen) in January 2013. In total 59 people participated in the discussions. Participants were recruited through snowball sampling, mainly because of the organizational difficulties related to performing scientific research in Russia, especially as a foreign research institution. Group structure was heterogeneous in

*Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-neophobia in a Cross-Cultural Context*

terms of sex and age. Participants were required to be at least partially responsible for grocery shopping. Depending on the attendance level group size varied from 5 to 9 people. Participants were almost evenly distributed according to sex and covered the age range from 22 to 73 years old.

Each interview lasted between 70–90 minutes and was recorded by video and audio. The interviews were conducted in local language, Russian or German, and later all recorded data were transcribed and subsequently translated into English.

**Table IV.1. Focus group discussion guidelines**

Discussion topics	Objectives	Questions
Food purchasing and consumption contexts with respect to diet and health	- to explore consumers' diet preferences; their opinions about the connection between food and health and if health considerations are an important factor in food consumption decisions	<ol style="list-style-type: none"> <li>1. What types of foods do you tend to buy and eat?</li> <li>2. What are your reasons for buying those foods?</li> <li>3. Is your long-term health status influenced by your food preferences?</li> <li>4. Are any of your food choice decisions price-driven?</li> </ol>
Functional food perception	- to explore consumers' existing knowledge about functional foods; attitudes toward functional foods considering health effects; factors and information influencing the willingness to consume functional foods	<ol style="list-style-type: none"> <li>1. Do you know anything about health-enhancing foods (functional foods) and if so, how do you know about them?</li> <li>2. What is your opinion about functional foods?</li> <li>3. What do you know about the health effects of those foods?</li> <li>4. What do you think of buying this type of food and what factors or circumstances would enable you to purchase functional foods?</li> <li>5. What would a best friend or family member say about you buying this product?</li> </ol>
Novel foods: attitudes, knowledge, factors influencing consumption decision	- to understand consumers' attitudes toward and reasons for novel foods consumption in general as well as factors and information influencing the willingness to consume novel foods (in our case: novel cereal products with antioxidant properties)	<ol style="list-style-type: none"> <li>1. What cereal products do you consume?</li> <li>2. Why do you consume cereal products?</li> <li>3. Have you ever heard about antioxidants?</li> <li>4. Are you familiar with health effects of antioxidants?</li> <li>5. What would make you more likely to buy cereals with antioxidant properties rather than conventional ones?</li> <li>6. Are there any factors that would stop you from buying such foods?</li> <li>7. Who do you trust to provide you with information about this food?</li> <li>8. Which information on the food label would influence your decision of buying this food?</li> </ol>

During the discussions, visual aids were used to help participants get impressions of functional foods and their qualities. Functional foods were discussed in general but also a specific product category – cereal products with anthocyanins were presented to the consumers as an example of functional foods. Anthocyanins are natural phenols that are

strong antioxidants which are usually not present in grain products. This product category was chosen because of the fact that grain products and especially bakery products comprise a large part of the diet both in Germany and Russia. Besides, bakery products with health-enhancing properties experience an increasing demand in both countries (Agriculture and Agri-Food Canada, 2011; 2010a; 2010b). PowerPoint presentation slides picturing examples of functional foods such as probiotic yogurts, bakery products, fruits and vegetables were presented. "Antioxidant properties" was used as a health claim example for the discussion. The interviews were semi-structured and a description of the discussion guidelines is presented in table IV.1.

During the analysis of the discussion transcripts, trust and neophobia appeared to be the most pronounced concerns (especially for the interviews performed in Russia). Content analysis and contextualized count of categories supported the idea that consumers' concerns related to trust and neophobia significantly dominated the discussions about functional foods.

**Table IV.2. Categories related to trust and neophobia**

Russia	Germany
	Trust
Label/certification	Label/certification
Medicine doctors	Internet/Press/TV
Commercials	Price
Informal networks	
	Neophobia
Traditions	Price

Focus group transcripts were then read multiple times and all the words and phrases related to trust and neophobia were grouped together. Content analysis allowed for identifying central concepts related to trust and neophobia, which appeared to be different between Russian and German participants (table IV.2).

#### **IV.4. Results**

##### **IV.4.1. General results of the discussions in both countries according to discussion topics**

###### **IV.4.1.1. Food purchasing and consumption contexts with respect to diet and health**

Discussions about food consumption concentrated on sensory characteristics, with taste being the most important for consumers in both countries. Consumers agreed that when it comes to food, no matter what the possible health benefits may be, the major factor responsible for any purchase is still taste. Even if the first purchase could be provoked by some marketing technique, subsequent purchases strongly depended on the product's taste. According to two respondents, identified as male (M): "I think taste has the critical importance in this case,

*probably I would be interested in the new product..." – M, 24, Russia; "I could imagine that it (the new product – I.D.) would be bought because of the taste and not because of a subjectively noticeable health effect." – M, 55, Germany.*

A potentially higher price for anthocyanin-rich foods was of more concern for Germans than for Russians. However, the underlying reasons differ. While Russians are worried that a higher price would negatively affect their budget, Germans want to be sure that the price premium is paid for an actual improvement in their well-being: *"For a higher price I wouldn't buy. Because it's the product that you eat every day and in a month it will make a serious amount of money..." – F, 62, Russia; "[p]rice and benefit are the background, and when I buy the roll and it tastes like a roll and I feel exactly the same like after the normal roll, why should I pay more money for the same taste and the same feeling? – M, 52, Germany.* A possible explanation for these attitudes might be that consumer types with a rational accentuation are reported to be mostly present in Germany (Horska and Sparke, 2007).

The overwhelming dominance of taste as most perceived benefit indicates the convergence of consumers' perception of functional food mainly as food, and emphasizes the importance of nutrition-related hedonic characteristics.

#### ***IV.4.1.2. Functional food perception***

Consumers stated that they couldn't decide about the purchase of functional food if they did not have enough knowledge about specific health-related features of the product, concerning, for example, the amount of product needed to be consumed, the time frame during which the product should be consumed, etc. *"I personally am only convinced if I know that it is proven in the long term and you see that the person who ate is stronger or something." – M, 22, Germany; "If it matters to you then you can inform yourself: which chemical substance is it, what does it consist of, from where does it come, how important is it for the body and so on." – M, 29, Germany.*

Surprisingly, the idea of a reward for consuming functional foods as a part of healthier lifestyle and improved well-being did not appear in the discussions. As mentioned by Urala and Lähteenmäki (2004), the good feeling appearing from using functional foods could serve as a benefit for functional foods purchase. However, based on our interviews it seems that consumers question the connection between nutrition and health, or at least are not ready to use novel functional foods in place of foodstuffs traditionally considered healthy.

Perhaps diseases not related directly to nutrition are not seen as preventable by consuming certain foods (Siró, Kápolna, Kápolna, & Lugasi, 2008).

Consumers are supposed to consider potential health effects when making a decision about purchase. However, it is clear from the discussions that consumers see foods with health benefits “first and foremost as foods” (Siró et al., 2008). Moreover, consumers question the whole idea of possible health improvement via functional food consumption: *“Altogether I’m skeptical when somebody says antioxidants work well against cancer, to lower the risk. Often it was the case that something was advertised because an internal study says it’s great. Ten years later it emerges that it boosts cancer. I’m really skeptical.”* – F, 29, Germany; *“I think it is all marketing trick. What is yogurt? It’s just the usual clabber. But the new fashion word, and it’s all going on, than they add also the word “bio”, so it’s all active now. Saying, let’s make digestion better. Finally it all comes to the fact that our body stops functioning, based on all these additives.”* – M, 54, Russia. In both Germany and Russia, consumers were skeptical about functional foods’ influence on health. At the same time, consumers could be motivated to purchase if a product would address a specific deficiency in their body: *“Maybe if your doctor looks at your blood samples and tells you that you have some insufficiency. And then I have the products with some vitamins and those without, and then I would of course prefer those with it.”* – M, 23, Germany; *“If there existed some diseases, the negative consequences of which could be reduced with the help of this product, if this action could be observed in a short but not long term then as a factor of recovery this product would go.”* – F, 62, Russia.

#### **IV.4.1.3. Novel foods: attitudes, knowledge, factors influencing consumption decision**

Bread is for most focus group participants a traditional product and eaten on a regular basis. Many participants specifically stated that they prefer dark bread both in Russia and Germany. Breakfast cereals are not consumed regularly by Russian consumers, who prefer more traditional porridge for breakfast. *“Recently I try to buy more healthy foods, for breakfast I buy bread or oat meal...”* – M, 24, Russia. *“Dark bread in any case. Well, muesli too, but I love crunchy muesli. Yes, definitely muesli, but mainly bread...”* – F, 23, Germany.

An absolute lack of knowledge about anthocyanins and their possible effect on human health emerged during all the discussions. Nevertheless, after providing a short description about anthocyanins and their health-related properties participants showed a general willingness to buy and try anthocyanin-rich cereals at least once. *“When there is such bread*

*in the bakery, they say it's special; you buy it once for testing" – M, 29, Germany. "I would probably buy it to try but I'm not sure that it would become my everyday product" – F, 29, Russia.*

In general, discussions about novel foods concentrated around the concepts of trust and food-neophobia which are discussed at more depth in the following sub-sections.

#### ***IV.4.1. Distrust and food-neophobia in Russian consumers' perceptions of functional foods***

Post-communist societies and especially Russia are characterized by low trust in formal institutions (Pehlivanova, 2009; Shlapentokh, 2006; Sapsford & Abbott, 2006). Besides, it was indicated that Russian consumers demonstrate the lowest level of trust in food safety compared to European consumers (Berg *et al.*, 2005). Indeed, as was observed during the discussions, Russians distrust most of the information coming from food-industry related institutions. When asked about trust in information sources concerning functional foods, replies centered around skeptical judgments about different parts of food system.

*"You know, anything can be written on a label in Russia. In Europe labels have certain marks that most consumers trust. So, what should I trust in?" – Female, 53 years old.*

*"I'm very distrustful concerning commercials. So, I don't trust all these statements on the food labels". – Female, 54 years old.*

*"For me certification is important. Because, you know... Who should we trust... in Russia... Because they write "natural", and how would you check it, on a bread... Difficult, you know". – Female, 40 years old.*

Since a health benefit represents a potentially valuable attribute of functional food products for consumers, recommendations of medical institutions could be of support in promoting healthy diet choices. However, due to the observed reluctance of consumers to trust doctors, that is also reflected in general low trust in medical institutions in post-Soviet Russia (Temkina & Zdravomyslova, 2008; Aronson, 2007), recommendations from medical institutions perhaps lack the chance to influence food choices of Russian consumers.

*"It is difficult to trust doctors because in their offices you can often see different promoters". – Female, 40 years old.*

*"You know, they (doctors) look at your income level, and then recommend you something". – Female, 53 years old.*

*“As in the old joke: one person asks another: why are you so sad? The answer is: my doctor has forbidden me to drink alcohol. Then the first person says: well, I gave my doctor 500 rubles and he has allowed me to. Here is the trust to doctors”. – Male, 54 years old.*

Distrust in formal institutions leads to increasing value of informal networks. Since food-related institutions in Russia are perceived as being not reliable at all, consumers compensate lack of institutional trust via developing personal knowledge and acquiring additional information about the products (Popova *et al.*, 2010). This motive appeared frequently during the discussions. Participants referred to informal networks often and in every part of the interview. *“...we don't buy anything in the supermarket, but my husband goes to the market and also makes social contacts there – this is very comfortable... he has stable contacts to buy better products at lower prices, sometimes sellers even call him and say when certain product arrives and at which price” – Female, 62 years old.*

*“The only reliable information channel in our country is word of mouth. So I would gather a group of retired people and give them new product for free, tell them about all the health benefits, and later these retired people, when they visit hospitals..., when they are in a line..., tell each other, and it will be advertisement for free. They will also tell their grandchildren and their children...” - Female, 31years old.*

*“I'm sitting here and thinking that I would gladly buy new product not because of advertisements on TV, but if I would find it by myself somewhere at the corner of a shop and tell my friends later: “Look, what a cool thing I have found!” But if I see it on TV – then immediately I would say “No”. I would like to find it by myself and then whisper to a friend” – Female, 38 years old.*

In addition to all the above mentioned issues with trust Russian consumers demonstrate propensity to a culturally embedded food-neophobia. Replies, that reflect the existence of food-neophobia did not only appear in the last part of the discussion which was related to novel food perceptions, but were present from the start, and persisted as a sort of guarding mechanism throughout the interviews. Participants demonstrated caution about new products in general, which is strongly supported by the idea that traditional, local products with well-known properties are always the best choice:

*“I just think that there exist traditional products, historical, like sour cheese, and there are modified products – yogurt and so on. I think that it is better to orient on traditional products, because they are checked by time, by tens, hundreds of years. With new products you should be careful.” – Male, 52 years old.*

*“We are taught by life, practice, and our parents that clabber is for the stomach, blueberries for the eyes, sour cheese for one thing, sour cream for another.”* – Female, 53 years old.

Such statements corroborate the results by Thelen and Ford (2006), and also support the idea that since some functional foods are innovative (Frewer *et al.*, 2003; Urala & Lähteenmäki, 2004; Ronteltap *et al.*, 2007; Kühne *et al.*, 2010; Onwezen & Bartels, 2011; Bornkessel *et al.*, 2011), this attribute produces additional barriers for consumer acceptance, especially in Russia.

Thus, most participants were also rather skeptical towards the specific functional food category, i.e. anthocyanin-containing cereal products discussed. Several participants questioned the need for another bread type since there is already such a large choice among breads nowadays and others questioned the need of anthocyanin-containing cereal and bakery products if anthocyanins are anyway present in berries. However, also in this discussion part informal networks were mentioned as potential information source to get interested in this new product category.

To sum up, with increasing risk and complexity that accompany consumer choices of functional foods, low levels of social trust in Russia are compensated via informal networks and following traditional diet. Deep cultural roots of social distrust make it difficult to communicate the advantages of novel functional foods through the system of formal institutions. From this perspective, consumer acceptance of novel functional foods in Russia strongly depends on the ability of novel functional products to fit into the traditional diet.

#### ***IV.4.2. Distrust and food-neophobia in German consumers' perceptions of functional foods***

Despite being one of the most developed markets of functional foods in the world, German consumers are not very trustful (Peters *et al.*, 2007). Poppe & Kjærnes (2003) report the results of comparative analysis about trust in food in Europe. Germany was among the countries surveyed in this study and Germans appeared to be one of the least trustful consumers in Europe (other countries surveyed were: Denmark, Great Britain, Italy, Norway, Portugal). Specifically, Germans tend not to trust media and food manufacturers. Similar results we observed in our focus group discussions, however, when asked about trustful information sources, German consumers were much more specific than Russians, not questioning the system as a whole but rather specific marketing techniques.



*"The label of the product I would not trust at all. I mistrust marketing way too much for that". – Female, 21 years old.*

*"I don't trust any packaging, I think every product has its marketing saying what this product has more or is able to do better and I personally don't believe any of that". – Female, 27 years old.*

*"It's typical: no preservatives, no flavor enhancers, only natural ingredients. Then you turn it around and yeast extract is listed. When you don't know it you think: "Oh, no flavor enhancers, I buy it". But yeast extract is a flavor enhancer. For me, on a label a lot could be printed but I would definitely not trust it." – Female, 27 years old.*

Consumer trust in the food industry in Germany has been undermined due to several food scandals (Stein & Rodríguez-Cerezo, 2008) such as, for example, salmonella in chicken (Poppe & Kjærnes, 2003). Consequently, the most trustworthy stakeholders in the field of functional foods in Germany are nutrition advisors, medical doctors, research institutes and consumer groups. During our interviews, many German consumers referred to scientific information as a trustful source and impulse for purchase.

*"... science magazines, reportages or something like that". - Female, 27 years old (one more participant agrees).*

*"Health magazines (two more participants agree) like "Hauptsache Gesund" ("The Main Point – Health") - there different new things are presented. You never know, if it's right, but they test the product and say if what's written on a label really is contained". – Female, 57 years old.*

*"[b]ut in the end it comes back to what I think, that I needed some kind of more scientific proof rather than just a TV commercial or an ad in a magazine telling me it is healthy," – Male, 24 years old.*

*"Somehow it has to be analyzed – if I only eat this kind of bread rolls for some time, then – scientifically or clinically tested – I feel better in this and that area". – Male, 30 years old.*

Another interesting perspective on the question of trust that came from German consumers is that higher price of a product can be a source of distrust. This perspective appeared in the first part of the discussions about price being a factor of food choice. If a price is perceived higher than usual, consumers start to question if this higher price is justified:

*"I'd also say I mistrust the term itself a bit, because I think with the present jurisdiction it can be misused quite easily. And even if it wasn't misused so that functional is actually functional in the sense of an ingredient that is really good, I still don't know if the price is justified. The price difference, I think, is too high in many cases, when a product is marketed". – Male, 30 years old.*

*"I have to say I'm always a bit insecure because I can't trust the products in the supermarket. For example, for the oil, I have too little information and I get trapped too fast, I think I can't really differentiate between poor and high-quality olive oil. I don't think one can see it just from the price". – Female, 27 years old.*

*"I wouldn't be willing either to pay a price that is too high because I also think you can cover it with other groceries. In general I'm always skeptical when it comes to new products; I mean it's only a combination of two known ones". – Male, 23 years old.*

A possible explanation for these attitudes might be that consumer types with a rational accentuation are reported to be mostly present in Germany (Horska and Sparke, 2007).

Food-neophobia and the propensity to consume traditional products were much less pronounced among German participants. Although some consumers demonstrated a kind of reluctance to purchasing new products, it was expressed with doubts: *"I don't find it bad either. On the one hand I think: Why not the tried and trusted, sugar instead of ... what was it called? ... Anyway, I'm rather a friend of this. But I ask myself why these varieties didn't exist for so long? Why ... what ...efficiency probably". – Female, 29 years old.*

Contrary to most of the respondents in Russia, some German participants were enthusiastic of trying novel foods and especially the discussed anthocyanin-containing cereal products: *"I guess I would try this in any case because as I mentioned I like to try new, exotic thing. Extraordinary grain varieties are interesting to me. I would test it but wouldn't aim my diet plan at this. It looks healthy, and other sorts of grains are healthy too, I would try it". – Female, 22 years old. "My parents would be interested. They are both nutrition-conscious, they try a lot. My father always has strange things at home (giggling). He says: "It's very new, very great and very modern". Well, they both pay attention to nutrition. I guess they would be interested". – Female, 23 years old.*

This finding of lower levels of food-neophobia among German participants might be either one of the reasons why the German functional food markets is one of the largest worldwide or it is a consequence of it. With higher levels of social trust and a system of trustful formal institutions that is able to communicate the advantages of novel functional

foods to the consumers, consumer acceptance in Germany is more dependent on price-value relationship and whether health claims are scientifically proven.

#### ***IV.5. Discussion of results***

Distrust related to the potential health benefits of the products, and the information provided during marketing campaigns is shared by participants in both countries. However, whereas in the case of German participants distrust is related to specific institutions and food safety scandals, Russian participants project distrust in formal institutions inherited from Soviet times on health claims and commercials about functional foods. Consequently, Russian consumers' distrust is more culturally enrooted and probably more difficult to overcome.

The existing Russian regulatory measures on functional food also do not contribute to improving consumers' trust in information coming from food-industry related institutions. This regulatory vacuum contributes to the existence of non-justified health-related labels and marketing campaigns.

Moreover, food-neophobia was also mainly expressed by Russian participants. As far as Russian respondents are concerned, novelty is a critical factor in decisions about food purchases in the sense that novel food is not purchased if traditional analogs with similar characteristics are available. This attitude corroborates the results of Ares *et al.* (2008). Previous research has already confirmed that the carrier product is very important for consumers' perception of functional foods and, moreover, that the health claim might not be perceived independently from the carrier (Ares & Gámbaro, 2007; Siegrist *et al.*, 2008; Saba *et al.*, 2010; Annunziata & Vecchio, 2013). This statement is indirectly confirmed in the present study by consumers' references to products that are traditionally considered healthy.

It was observed that "functional foods are culturally distinct category between food and medicine" (Niva, 2007) and this distinction might manifest itself differently in different cultures. It is interesting that from the Russian perspective the formal institutional systems behind both attributes (food-industry and health care) are distrusted. If consumers lack efficient systems to overcome increasing complexity and risk in dealing with development of novel functional foods, then market potential for such foods becomes very limited. Credibility of novel functional foods is supposed to be supported by something other than traditions, for example, trustful health claim. However, in the case of Russia this does not seem to happen.

Reducing risk and complexity is possible when a system of trustful institutions that are able to deliver information concerning novelty and functionality to the consumers exists.

*Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-neophobia in a Cross-Cultural Context*

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Focus group discussions demonstrate that consumers seek trustful source of information, however, in different socio-economic conditions different institutional systems serve as the source. In the case of Russia we observe informal self-developed networks that circle around traditional perceptions. In the case of Germany we see that objective, scientifically proven information can positively influence the acceptance of functional foods.

Two different perspectives on trust and neophobia issues did emerge from the discussions and provide a valid qualitative exploratory inquiry into consumers' acceptance of functional foods. However, since we employ focus groups with a limited number of participants generalizations with respect to the whole German and Russian population and direct cross-cultural comparisons are of course not applicable. Thus, future research should aim at investigating these aspects further in a quantitative way to derive representative results on this topic.

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*Section IV. Consumers' Perceptions of Functional Foods: Trust and Food-neophobia in a Cross-Cultural Context*

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### **3 CONCLUDING DISCUSSION**

The complexity and controversy of research outcomes in the field of consumer perceptions and valuations of health-enhancing attributes in food products has been raised in the Introduction and motivated this dissertation. This controversy arises from unclear connection between income levels and the demand for functional foods, disputed values of a health-enhancing attributes for the consumers, and increasing complexity in consumers' decision-making. Thus, research presented in this dissertation aimed at developing evidence on consumers' perceptions and valuations of health-enhancing attributes in food products, advancing the methodological approach for studying consumer food choices, and summarizing existing knowledge on the topic. As a result, the analysis presented in this dissertation addresses research questions and provides some findings in the field of consumer perceptions and valuations of health-enhancing attributes in food products.

First, from the summary of the current research presented in this dissertation (section 1), we observe that up to date economics and marketing research fails to provide systemic unbiased evidence on consumer valuations of health-enhancing attributes in food products. Despite the need for assessing potential demand for functional foods, especially in developing countries, current research results in very heterogeneous outcomes. Nonetheless, a meta-analysis of the literature provides evidence on the current state of the art. It has been shown that the carrier product, the health-enhancing attribute, the elicitation methodology, and the place of study significantly influence willingness to pay estimates.

Potential directions for future research include a closer connection to the regulations of functional foods. For example, in Europe, Regulation (EC) no. 1924/2006 could be used for health and nutritional claim examples on the food products. Another important finding from the literature analysis is that the methodology used for eliciting consumer valuations is partially responsible for overestimation of these valuations. The question remains then if consumers indeed value the health benefit or does the method push the valuations up, thus providing misleading outcomes?

It has been also observed that very few studies include negative valuations of health-enhancing attributes by consumers. This evidence contradicts with multiple market failures faced by functional foods. Consequently, when analyzing consumer valuations more attention should be paid to explaining low or negative willingness to pay values.

Results of the meta-analysis informed the use of the non-hypothetical elicitation method as experimental auction for obtaining the data on consumers' WTP for anthocyanin-rich bakery products. Using the data from second-price Vickrey auction and a survey, traditional random utility approach was used to elicit probabilities of functional food purchase. Then, the same data was used to include perceived reference points, gains and losses to determine how they influence the probability of purchase. As expected, losses significantly outweigh gains in respondents' purchase decisions.

Results obtained and presented in section 2 demonstrate that a reference point effect approach provides more evidence on negative valuations compared to traditional random utility approach, as it clearly indicates that health-enhancing attributes in food products can be perceived negatively by consumers. Moreover, it provides an indication that negative valuations can have more impact on consumers' purchase decisions than positive valuations. These negative valuations arise from the individual framing of the decisions, where alternatives are compared to relative individual reference points. Consequently, if the decision context matters then wider perspective on decision-making should be taken into account to determine what constitutes reference points and gains and losses in consumer decisions.

Emerging economy perspective (Russia) provides an indication that factors influencing consumer behavior cannot be generalized across countries even at a certain level of income. Although post-communist emerging economies share some common trends in consumer behavior, country-specific trends were indicated by Russian consumers during focus group discussions. For example, it was stated that consumers do not consider price as important as hedonic characteristics of a product (taste, naturalness, freshness). This trend was observed before for developed economies. Our research indicates that despite income limitations consumers still do not want to sacrifice taste for lower price. However, their strategy to keep existing food preferences would involve switching to more garden plot production, exploiting the wild or informal networks to ensure food provision and safety. These strategies lead to another observed trend among consumers in our sample: strong preferences for traditional and regional products. Consequently, if a novel food with health benefits is introduced to the Russian market it will be probably not very successful if it does not fit into traditional perceptions of health-enhancing products. Moreover, inability to fit traditional diet can produce negative perceptions of novel foods resulting in refuse to purchase them. Our results also indicate that in the case of Russia regional differences in consumer perceptions exist. Due to the differences in incomes and availability of food

products between Moscow and the periphery of Russia, consumers report different valuations for the same products.

When compared to the data from industrialized economy with developed market of functional food (Germany), our analysis indicate that contextual factors of decision making do differ between the two countries and these differences need to be taken into account not only when constructing communication and marketing strategies but also when analyzing available data.

Results indicate that consumers both in Germany and Russia demonstrate a certain level of mistrust in functional foods; however the reasons for this mistrust are different between the two countries. While German respondents' distrust is related to specific institutions and food safety scandals, Russian participants project distrust in formal institutions inherited from Soviet times on health claims and commercials about functional foods. Consequently, Russian consumers' distrust is more culturally enrooted and probably more difficult to overcome.

Moreover, food-neophobia was also mainly expressed by Russian participants. As far as Russian respondents are concerned, novelty is a critical factor in decisions about food purchases in the sense that novel food is not purchased if traditional analogs with similar characteristics are available.

Thus, research reported in this dissertation stresses the importance of institutional factors influencing consumer behavior in both developing and developed economies. Besides, methodological framework traditionally used for analyzing consumer preferences and valuations can be modified to incorporate additional factors. At the same time, products and health claims used for consumer research need to be chosen carefully based on geographical location of the study, income level, and, most importantly, existing market regulations.

## Appendices

### *Appendix I. Discussion Guide for the Focus Group*

**Topic:** Russian consumers' attitudes toward and intentions to consume foods with healthy attributes (on the example of anthocyanin-rich cereal products).

**Total time required:** about 90 min

#### **I. Introduction (10 min)**

Dear participants, first of all I would like to thank you for taking part in our research. The aim of the project is to discuss your opinions, attitudes and perceptions of anthocyanin-rich cereal products. This means that your task is to respond to some questions and discuss them, regarding your preferences, purchase decisions, food habits etc.

This research is performed by the Leibniz Institute of Agricultural development in Central and Eastern Europe (IAMO). The purpose of the study is to gain knowledge about new trends in healthy food choices, and to extend the existing knowledge about Russian and German consumer behavior.

My name is Irina Dolgoplova. I'm a PhD student at the department of Agricultural markets at IAMO. Today I will be your moderator. So, I will manage the discussion and ask questions related to our topic but I will not participate in the discussion directly.

Also, let me remind you of some ground rules. Please try to speak only one person at a time. There are no right or wrong answers, but rather different points of view and experiences. Please feel free to share your point of view, even if it differs from what others have said. Keep in mind that we are interested in both positive and negative comments. Please remember that moderator can interrupt you, so that we are sure to cover all the topics of the discussion.

As you can see we are recording the discussion. No names though will be used in the analysis of your answers. All the information will remain confidential and results will be used only for scientific purposes. Do you have any questions at this point?

Now I would like you to write your name on the cards and briefly introduce yourself to the group.

#### **II. Discussion Guidelines:**

##### **II.1. Food purchasing and consuming contexts with respect to diet and health (20 min)**

*Objectives:* to explore consumers' diet preferences; their opinions about the connection between food and health; their opinions on choice between price and health benefits in food.

*Questions:*

1. What types of foods do you tend to buy and eat? (e.g. vegetables, fruits, meats, processed foods, etc.)
2. What are your reasons for buying those foods? (nutrition value, vitamin consumption, family members, etc.)
3. Is your long-term health status influenced by your food preferences? (give examples)

4. Are any of your food choice decisions price-driven? Are you ready to pay more for healthy benefits in food?

## **II.2. Anthocyanin-rich cereals: attitudes, knowledge, factors influencing consumption decision (20 min).**

*Objectives:* to understand consumers' attitudes toward and reasons for cereals consumption in general and considering specific products; factors and information influencing the willingness to consume this product.

### *Questions:*

1. What cereal products do you consume?
2. Why do you consume cereal products?
3. Have you ever heard about anthocyanin or flavonoids? Are you familiar with health effects of anthocyanin?

*Moderator presents the group anthocyanin-rich cereals, explains the difference of the product from conventional wheat.*

4. What do you think about these cereals?
5. What would make you more likely to buy these cereals rather than conventional ones? (e.g. health effects, place of production, price, etc.)
6. Are there any factors that would stop you from buying such foods? (e.g. price, fear of additives, lack of knowledge, etc.)
7. Who do you trust to provide you with information about this food? (standards, labels, friends and family, supermarkets, scientists, etc.)
8. Which information on the food label would influence your decision of buying this food? (result of conventional breeding, health benefits of anthocyanin, etc.)
9. Would you buy anthocyanin-rich cereals if the price is equal? If they are more expensive, if so which price premium would you be willing to pay in %?

## **II.3. Identification and relevance of functional foods concept (15 min)**

*Objectives:* to explore consumers' existing knowledge about functional foods; attitudes toward functional foods considering health effects, perception of anthocyanin-rich products as functional foods; willingness to buy these products, importance of price, sensory characteristics and societal opinions.

1. Do you know anything about foods with health benefits - functional foods and how do you know about them? (commercials, internet, doctors, etc.)

*Moderator gives the definition of functional foods and examples of functional foods.*

2. What is your opinion about functional foods? (are those foods with additives, marketing tricks or real health-enhancing foods).
3. What do you know about the health effects of those foods? (health effects of probiotics, Omega-3, flavonoids, etc.)
4. Do you think of buying this type of food (discuss possible difference in price on the example of anthocyanin-rich cereals) and what factors or circumstances would enable you to purchase functional foods? (e.g. health problems, age, children, sick family members, etc.)

5. Do you think there is a difference between functional and conventional foods sensory characteristics? (do consumers feel that products with health benefits have different taste, smell, appearance. Do, for example, more taste and health benefits motivate for paying higher price?)
6. How do you think Russian or German society in general feels about functional foods? (general societal perception of functional foods)
7. What would a best friend or family member say about you buying this product? (environmental factors influencing consumption decisions).

#### **II.4. Identification and relevance of “Old Wheat Varieties” concept (15 min).**

*Objectives:* to explore consumers’ existing knowledge about and attitudes toward old varieties of wheat; perception of anthocyanin-rich products as old wheat varieties; willingness to buy these products, importance of price, sensory characteristics and societal opinions.

1. Have you ever heard about old wheat varieties and if so, what were your information sources?

*Moderator explains the concept of old wheat varieties.*

2. What are your opinions and feelings about these product types? Do they carry more positive or negative characteristics?
3. Do you think of buying this type of food (discuss possible difference in price on the example of anthocyanin-rich cereals) and what factors or circumstances would enable you to purchase products from old wheat varieties? (e.g. interest, prestige, health concerns, etc.)
4. Do you think there is a difference between old variety and conventional wheat sensory characteristics?
5. How do you think Russian or German society in general feels about old varieties products? (general societal perception of old varieties products)

#### **II.5. Discussion of possible claims on the product label.**

1. Which of the following claims is more likely to be the reason for buying a product: “Product from old wheat variety”, “Product with health benefits”, “Product from old wheat variety with health benefits”?
2. For which of these claims you would pay more money? How much more money?

Claims and prices are presented on the screen.

#### **II.6. Other issues**

1. Apart from those already discussed, are there any other issues that are relevant in consumption of anthocyanin-rich cereals?

#### **III. Closing (5 min)**

Closing remarks

Thank the participants for their contribution and attending.

Appendix 2. Visual aids used during the discussions

<p><b>What Are Anthocyanins?</b></p> <ul style="list-style-type: none"> <li>Anthocyanins are water-soluble pigments that may appear red, purple, or blue. They belong to a parent class of molecules called flavonoids.</li> <li>Anthocyanins occur in all tissues of higher plants, including leaves, stems, roots, flowers, and fruits.</li> </ul> 	<p><b>Anthocyanins -</b></p> <ul style="list-style-type: none"> <li>act as powerful antioxidants;</li> <li>demonstrate potential health effects against: cancer, aging and neurological diseases, inflammation, diabetes, bacterial infections, fibrocystic disease.</li> </ul> 			
<p><i>Plants rich in anthocyanins are:</i> blueberry, cranberry, bilberry, black raspberry, red raspberry, and blackberry, blackcurrant, cherry, eggplant peel, black rice, Concord grape, muscadine grape, red cabbage, and violet petals.</p> 	<p><b>Functional Food –</b></p> <p>is a natural or processed food that contains known biologically-active compounds which when in defined quantitative and qualitative amounts provide a clinically proven and documented health benefit.</p> 			
<p><b>Old wheat varieties</b></p> <p>have greater biodiversity, are better balanced in nutrients, have higher nutritional value.</p> 	<p>1. Which one of the following statements would make you purchase this product:</p> <table border="1" data-bbox="880 1368 1235 1440"> <tr> <td>1 Product from old wheat variety</td> <td>2 Product with health benefits</td> <td>3 Product from old wheat variety with health benefits</td> </tr> </table> <p>2. How much more money would you agree to pay for this attribute? (in percent from the usual price paid for the same product)</p>	1 Product from old wheat variety	2 Product with health benefits	3 Product from old wheat variety with health benefits
1 Product from old wheat variety	2 Product with health benefits	3 Product from old wheat variety with health benefits		



**Appendix 3. Focus group participant's questionnaire**

**Focus Group number:**

**Respondent Information:**

Name, Surname \_\_\_\_\_

Phone \_\_\_\_\_

Gender  Male  Female

Age  <18  19-30  31-49  50-70  >71

Education  school or vocational school degree  
 university degree  
 higher degree

Occupation \_\_\_\_\_

Household income (RUB)

<30000  30001-60000  60001-90000  >90001

Q1: Do you have children aged 16 or under?  Yes  No

Q2: Do you have any food-related chronic diseases?  Yes  No

Q3: Do you have relatives or family members with food-related illness?  Yes  No

### Appendix 4. Pre-auction questionnaire

Place \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ ID \_\_\_\_\_

#### 1-3. How often do you consume...

1. ...bread?	2. ...biscuits?	3. ...breakfast cereals?
1. every day	1. every day	1. every day
2. few times a week	2. few times a week	2. few times a week
3. few times a month	3. few times a month	3. few times a month
4. few times a year	4. few times a year	4. few times a year
5. never	5. never	5. never

**4-21. Please, range the factors that influence your purchase decision of ... from most important to least important** (*Please, indicate the rank only for those factors that you consider important, where 1 – is the most important factor.*)

...bread...	...biscuits...	...breakfast cereals...
4. price	5. price	6. price
7. taste	8. taste	9. taste
10. healthiness	11. healthiness	12. healthiness
13. time-saving	14. time-saving	15. time-saving
16. novelty	17. novelty	18. novelty
19. traditions	20. traditions	21. traditions

**22. Do you agree that consumption of certain foods can influence your health?**

1. yes

2. no

3. I don't know

----- go to question 28

**23-26. Do you agree that consumption of certain foods can decrease the risk of ...**

**23. ... cancer?**

1. totally agree      2. somewhat agree      3. neutral      4. somewhat disagree      5. completely disagree

**24. ... inflammatory diseases?**

1. totally agree      2. somewhat agree      3. neutral      4. somewhat disagree      5. completely disagree

**25. ... cardio-vascular diseases?**

1. totally agree      2. somewhat agree      3. neutral      4. somewhat disagree      5. completely disagree

**26. ... diabetes?**

1. totally agree      2. somewhat agree      3. neutral      4. somewhat disagree      5. completely disagree

**27. ...overweight?**

1. totally agree      2. somewhat agree      3. neutral      4. somewhat disagree      5. completely disagree



1. healthy                      2. expensive      3. exclusive      4. trendy      5. tasty

**39. Would you buy food products made from old wheat varieties?**

1. yes

2. no

3. I don't know

----- go to question 42

**40. Would you pay price premium for the food products made from old wheat varieties?**

1. yes

2. no

3. I don't know

-----go to question 42

**41. If yes, in indicate the amount (in percent)?**

1.  $\leq 10\%$

2. 11-20%

3. 21-30%

4. 31-40%

5. 41-50%

6.  $\geq 50\%$

**42. Gender:**

1. male

2. female

**43. Age: \_\_\_\_\_ years**

**44. Level of education:**

1. Bachelor degree or lower

2. Master degree

3. PhD and higher

**45. What is your monthly household income (in Russian rubles):**

1.  $\leq 30\ 000$

2. 30 001-60 000

3. 60 001-90 000

4.  $\geq 90\ 000$

**46. How many people live in your household? \_\_\_\_\_**

**47. How many children before 12 years old are in your household? \_\_\_\_\_**

**48. Do you have nutrition-related illnesses?**

1. yes

2. no

**49. Do you exercise regularly?**

1. yes

2. no

**50. Do you smoke?**

1. yes

2. no

**51. How often do you consume alcohol?**

1. every day

2. few times a week

3. few times a month

4. few times a year

5. never



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## Curriculum Vitae

### PERSONAL INFORMATION

**Irina S. Dolgoplova**

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Sex Female | Date of birth 10/03/1978 | Nationality Russian

### WORK EXPERIENCE

16/07/2012–Present

#### Researcher/PhD Student

Leibniz Institute of Agricultural Development in Transition Economies (IAMO)/Martin Luther University, Halle (Saale) (Germany)

Research topic: "Consumers' Perceptions and Valuations of Healthy Attributes in Novel Foods".

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#### Junior visiting fellow

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Research project on the connection between political regimes and economic development

01/07/2011–01/09/2011

#### Researcher

University der Bundeswehr

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Research project on energy policy in Germany

01/06/2009–01/06/2010

#### Researcher

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Research project "Oil prices and economic growth in Turkey"

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#### Associate Professor

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Teaching courses: Economics, Managerial Economics, Management

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#### Senior lecturer

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#### Assistant Professor

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01/09/1998–27/04/2000 **Diplom in International Economics**

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**PERSONAL SKILLS**

Mother tongue(s) Russian

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
Turkish	C1	C1	C1	C1	C1
German	B2	B2	B2	B2	B2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user  
[Common European Framework of Reference for Languages](#)

Computer skills Good command of Microsoft Office tools (Word, Excel, Power Point)  
Experience in Stata, EViews, Latex

**ADDITIONAL INFORMATION**

**Publications** LATEST  
PUBLICATIONS

Dolgopolova, I., Teuber R. (2015) "Consumers' Willingness to Pay for Health-enhancing Attributes in Food Products: A Meta-analysis" – *In Review in Food Policy*.

Dolgopolova, I., Teuber, R., Bruschi, V. (2015) "Consumers' Perceptions of Functional Foods: Trust and Food-neophobia in A Cross-cultural Context" – *International Journal of Consumer Studies*, forthcoming.

Dolgopolova, I., Teuber, R., Bruschi, V., Weber, G.-W., Danilenko, N., Galitskiy, E. (2015) "Modelling Consumer Preferences for Novel Foods: Random Utility and Reference Point Effects Approach" – *In Review in Pinto A., Zilberman D. (eds.) Modelling, Dynamics, Optimization and Bioeconomics II*.

Bruschi, V., Shershneva, K., Dolgopolova, I., Canavari, M., Teuber, R. (2014) "Consumer perception of organic food in emerging markets: evidence from Saint Petersburg, Russia" – forthcoming in *Agribusiness*.

Dolgopolova, I., Teuber, R., Bruschi, V. (2013) "Recent trends in consumer behavior concerning foods with health benefits in Russia", in: Pedro Ferreira, André Vieira (Eds.): *International Conference on Marketing & Consumer Behavior – 2013 Back to Basics: consumer-centric marketing or target-centric marketing*, Porto, 16-17 May 2013, pp.104-114.

Dolgopolova, I., Hu, B., Leopold, A., Pickl, S. (2014) "Economic, Institutional and Technological Uncertainties of Emissions Trading - a System Dynamics Modeling Approach", *Climatic Change*, January, DOI: 10.1007/s10584-013-1006-y

**ACADEMIC  
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Alexandr Herten Scholarship (Mikhail Prokhorov Foundation), Vienna (Austria), 2012

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TÜBİTAK Research Scholarship for Foreign Citizens 2216, Ankara (Turkey), 2009-2010

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