

The role of price in consumers' purchase decisions on organic food

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Declaration of originality

This dissertation is based on four journal articles which are published by the author, co-authored by Prof. Dr. Ulrich Hamm, Dr. Sabine Plaßmann, Dr. Enrique Garcia Moreno-Esteva and Dr. Meike Janssen. Two of the articles are handed to a journal and are currently under review. The articles were submitted to scientific journals and undergo a peer-review process. The articles are:

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I declare that this thesis is my own work. Information derived from the published and unpublished work of others has been acknowledged in the text. This work or parts thereof have not been submitted in any form for another degree at any university or other institute of tertiary education.

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List of abbreviations

BLE	German Federal Agency for Agriculture and Food (Bundesanstalt für Landwirtschaft und Ernährung)
EEG	electroencephalogram
e.g.	Exempli gratia = for example
EU	European Union
i.e.	Id est = that is
PwC	PricewaterhouseCoopers
SOR	stimulus-organism-response
SR	stimulus-response
USA	United States of America
WTP	willingness-to-pay

1 Introduction

1.1 Price as a barrier to growth of the organic food market

The organic agricultural sector experienced a large expansion on a global scale since the 1970s and 1980s when, through environmental movements, organic farming first began to flourish (BLE, 2011). In the European Union (EU), which is the second largest market for organic food with a retail sales value of 30.7 billion € in 2016, the organic market increased by 108% from 2006 to 2015 (Lernoud and Willer, 2018). In the early phase of expansion, high growth rates are not unusual, however, from 2015 to 2016 the organic market still grew by 22% in Ireland and France (Lernoud and Willer, 2018). At present, organic products are an established component of the assortment in most retail stores in industrialized countries, from hypermarkets to discount stores. In the EU, all major supermarkets meanwhile sell organic products under their private labels (Sahota, 2018). From the EU policy side, organic agriculture is promoted and receives financial support. The interest of policy-makers in organic agriculture is reflected in the increase in research projects published on the topic and in the amount of research funding made available (Willer *et al.*, 2017).

Although this development is decidedly positive for the organic sector, the growth rates are not as high as studies about consumer attitudes towards organic food suggest. Denmark, Luxemburg and Switzerland with only 9.7%, 8.6% and 8.4% organic retail sales from the total retail sales, respectively, were at the top of all countries in 2016 (Lernoud and Willer, 2018). In Germany, organic food accounted for 5.1% of retail sales in 2016 (Lernoud and Willer, 2018), while in the same year 24% of respondents of one German study stated to purchase organic food exclusively or frequently (Ökobarometer, 2016). Similarly, Janssen (2018) found that the expenditure on organic food of only 3% of German households exceeds a fifth of their total food budget while at the same time more than 20% stated a positive attitude towards organic food. The share of respondents stating to purchase organic food exclusively or frequently would suggest a distinctly higher retail sales share than realised in the market. This disparity has not changed in the last years, since the organic retail sales share in Germany rose only slightly by 1.5 % from 2013 to 2016 (Willer and Schaack, 2015), while the self-perception of the Germans' organic purchase frequency remained quite stable with a stated exclusive or frequent purchase of 22% to 24% (Ökobarometer, 2013, 2016).

In the years 2013, 2016 and 2017, the share of participants intending to purchase organic food exclusively or frequently *in the future* was 2%, 7% and 5%, respectively, higher than the share of respondents who stated to *currently* purchase organic food exclusively or frequently (Ökobarometer, 2013, 2016, 2017). In these figures, respondents expressed their intention to increase their purchase share of organic food in the future. However, the authors of the

Ökobarometer (2017) study explained that the average purchase frequency of organic food has not changed over the last years. Other studies also showed positive attitudes that most consumers have towards organic food (Aertsens *et al.*, 2009; Hughner *et al.*, 2007). The intentions and attitudes of consumers, however, do not completely translate to purchase intentions and behaviour.

A rich body of research exists on the reasons that hinder consumers from buying organic food. The higher price of organic food, lack of availability of organic products, lack of trust in organic production/certification, unfavourable product appearance, lack of information on organic food, poor presentation of organic products, insufficient marketing, satisfaction with current food sources, and sensory/cosmetic defects of organic food were identified as the barriers perceived by consumers in the past decade (Aertsens *et al.*, 2009; Hughner *et al.*, 2007; Padel and Foster, 2005; Padilla Bravo *et al.*, 2013; Wier *et al.*, 2008). A recent study from Germany identified the price of organic food as the main barrier (for 63% of participants), followed by larger assortment of products in conventional quality (for 36%), trust in or preference for a specific conventional brand or producer (for 31%), low availability of organic products in the preferred retail store (25%), better fulfilment of needs and expectations, such as taste, (22%) and longer shelf life of conventional products (19%) (PwC, 2017).

The list of barriers for organic purchase offers several points of departure for actors wanting to promote the consumption of organic food. A task for product development, for instance, is the creation of organic food products with more favourable appearance and taste as well as widening the product range to offer organic alternatives to more conventional products (Aschemann-Witzel and Zielke, 2017; Buder *et al.*, 2014). A task for retail, on the other hand, is to increase the availability of organic products in the shops (Bezawada and Pauwels, 2013). Different actors, from producers to government members, could be involved in the provision of more information on organic food and in increasing public trust in organic farming and certification (Aertsens *et al.*, 2009; Aschemann-Witzel and Zielke, 2017; Lee and Yun, 2015). Looking at each of these barriers in detail would open a field of research by itself. However, these are not in the focus of this dissertation.

Less intuitive is the course of action to tackle the purchase barrier perceived as the largest by many consumers, namely the price of organic food. The reason for this difficulty lies in the multi-facet role price plays for buyers and sellers. First of all, price can be defined as the amount of money a customer has to transfer to the seller to obtain a unit of a product or service (Monroe, 2005; Pechtl, 2014). The costs, competition and the willingness-to-pay (WTP) of consumers are the main factors determining the price (Spiller, 2001). From a macro-economic perspective, price is a tool to match supply with demand for goods and services in order to allocate resources to optimise the society's welfare (Monroe, 2005).

For sellers, price is the factor with the strongest impact on profit compared to sales amount and costs (Simon and Fassnacht, 2016). Competitors and customers react very sensitive to changes in price which gives price a powerful role in marketing (Diller, 2008). Furthermore, price is the only marketing tool which directly generates revenues (Monroe, 2005). The use of pricing or price changes does not require investments beforehand, in contrast to other marketing tools (Simon and Fassnacht, 2016).

For buyers, the price of a product or service includes more than the amount of money transferred to the seller. Further elements of price from consumer perspective are discounts, costs for transportation to and from the location of purchase, the time sacrificed for the purchase, additional costs for postponed payment, operating costs, maintenance costs and disposal costs (Diller, 2008). This list is not exhaustive and encompasses some of the costs that can occur during a products' lifecycle. For food products, there are usually no additional costs for postponed payment, operating costs or maintenance costs.

Moreover, there are psychological components to price which are important to consider for practitioners and researchers. Some of these psychological phenomena are odd prices, the threshold price, and the anchor price (Monroe, 2005; Simon and Fassnacht, 2016). Without aiming to give an exhaustive list, one more psychological phenomenon of price is mentioned due to its crucial role in the marketing of organic food. It is the perceived price-quality relationship, implying that buyers use price as a cue to assess product quality, i.e. a higher price suggests a higher product quality (Monroe, 2005; Völckner and Hofmann, 2007). This phenomenon was also observed for organic food with important implication for pricing decisions (e.g. Hjelm, 2011; Marian and Thøgersen, 2013; Padel and Foster, 2005; Thøgersen and Ölander, 2006), even though the actual price-quality correlation was found to be low for food products (Schulze *et al.*, 2008).

Organic food is, on average, sold at a higher price level than conventional food (Hamm *et al.*, 2007; Spiller, 2001), and the question whether the prices need to be lowered to increase the market share is debatable. There are several reasons for and against lowering organic food prices. The most prominent reasons for lowering organic food prices are, first, that price is mentioned in most surveys as a barrier to purchase organic food, if not the most important barrier (Aertsens *et al.*, 2011; Gottschalk and Leistner, 2013; PwC, 2017), and second, that there are studies showing, with the help of sales figures, a decrease in sales of organic products with a rise in price, and vice versa (Bezawada and Pauwels, 2013; Liebe *et al.*, 2016). Ngobo (2011) found an inverted U-shaped relationship between prices of organic food and purchase quantity. The reason for a decrease in purchase quantity with very low organic prices lies in price-quality relationship expected by consumers (Ngobo, 2011). This assumed link between price and quality is one important argument against lowering prices because if a low price suggests a low quality, the credibility of organic products is affected (Hill and Lynchehaun, 2002; Marian *et al.*, 2014). It has to be kept in mind that consumers buy organic

food first and foremost out of health-, environment- and animal welfare-related reasons, reflecting a value-orientation in food shopping (Aertsens *et al.*, 2011; Goetzke *et al.*, 2014; Gottschalk and Leistner, 2013; Hughner *et al.*, 2007).

Emerging from the information available on the organic market development and potential, and the relevance and functions of the price of organic food, this dissertation aims to provide further insight into the role of the price of organic food for consumer behaviour. The geographical scope for the primary research included in the dissertation is Germany, and for the secondary research global. The unit of investigation are consumers. The dissertation takes a comprehensive view on several aspects of the research topic. The specific research objectives are given in the following subchapter.

1.2 Research objectives and approach

Based on the situation that the organic market lags behind its potential size, the aim of this dissertation is to investigate consumer behaviour regarding the highest perceived barrier to organic food purchases – the price. It is assumed that the results on psychological effects of prices, such as the effect of odd prices or design factors of price tags, are true for organic food as well. Therefore, the focus of this dissertation is on the magnitude of the price, more specifically, on consumers' reaction to organic food prices which is also referred to as price sensitivity, price awareness or price consciousness (Diller, 2008; Pechtl, 2014). The overall research question of this dissertation is: How price-sensitive are consumers concerning organic food? An answer to this question will provide further orientation for the price policy for organic food products. It is aimed to investigate price sensitivity of consumers regarding organic food from different angles to gain more insights into the price as major barrier to the purchase of organic food. The concepts contained in the specific research objectives are depicted in a conceptual framework in section 2.2. This will clarify their relationship to each other and the general understanding of consumers' purchase behaviour that stands behind this dissertation.

The specific research objectives of the dissertation are:

- 1) to describe the state of knowledge on consumers' price sensitivity regarding organic food,
- 2) to identify knowledge gaps,
- 3) to explore visual price information acquisition as a precondition of price-related affective, cognitive and intentional processes inside of consumers, more specifically,
 - a. to reveal actual visual information acquisition of organic and conventional prices and packages which is an indicator of price sensitivity,

- b. to differentiate the patterns of visual information intake of organic and conventional prices and packages between organic, conventional, and occasional organic buyers,
 - c. to get insights into the sequence of visual information intake of organic and conventional prices and packages, and thus price sensitivity, of organic and conventional consumers,
- 4) to examine consumer-internal price-related processes which are preconditions for consumers' price-sensitive behavioural response, more specifically,
- a. to shed light on organic consumers' price knowledge for organic products,
 - b. to elicit organic consumers' WTP for organic products,
 - c. to investigate the effect of organic price evaluation on the purchase decision,
- 5) to measure the individual relevance of price as a moderator of consumer-internal price-related processes and as an indicator of price sensitivity, and
- 6) to investigate price-sensitive behaviour.

The research objectives were not addressed in a single study. Instead, a stepwise research approach encompassing four studies was adopted (see Table 2 in section 2.3). Research objectives 1) and 2) were achieved by a literature review study (see section 3.1). The following two studies examined a precondition of price-related processes by investigating the visual information acquisition of prices (see sections 3.2 and 3.3), targeting research objectives 3) a to 3) c. Moreover, the second study tackled research questions 4) c and 6). The third study served research objective 5) by measuring the individual relevance of the price for the purchase decision. The fourth study (see section 3.4) provided insights on the knowledge gaps identified by the first study, i.e. on consumers' price knowledge for organic foods, as well as for a widely studied field, the WTP for organic food. Therefore, the fourth study was concerned with research objectives 4) a and 4) b. Additionally, the fourth study provided important insights on consumers' price-sensitive behaviour in the shop, tackling research objective 6).

The first study was based on secondary data, while the second, third and fourth study mainly used primary data. The first study had an exploratory nature, and the fourth study had a descriptive research design (Kotler *et al.*, 2016; Wrenn *et al.*, 2002). The second and third study had a quasi-experimental research design since a laboratory test market (simulated test market) was used which was classified by some authors as experimental or quasi-experimental (e.g. Wrenn *et al.*, 2002). However, the second and third study lack characteristics of true experiments since the stimuli (prices or products) were not manipulated, thus there was only one test condition and no control group (see McBurney and White, 2010). It was controlled for several independent variables, though (e.g. brand familiarity, product category and number of product variants). The simulated test market was, therefore, used for an observation under controlled conditions.

1.3 Outline

The remainder of the dissertation is structured as follows: The *second* chapter includes background to this dissertation. First, theoretical background on price sensitivity is given. Then, the conceptual framework is presented that served as a basis for the dissertation. Next, the possibilities to measure price sensitivity and the methods used in this dissertation are described.

The *third* chapter presents the reprints and yet unpublished manuscripts of four journal articles and a description of the authors' contributions to each of the articles. The first article contains a literature review on consumer behaviour regarding the price of organic food. A systematic search for empirical journal articles was conducted, and the found articles were structured according to the stimulus-response and stimulus-organism-response paradigms of consumer behaviour. The articles were classified as price elasticity of demand studies, studies on price perception and evaluation, studies on price knowledge, and studies on the WTP for organic food. This article provides insights into the state of the art of different aspects of price sensitivity of consumers regarding organic food.

Next follow two empirical articles on the actual visual information acquisition of prices. Consumers were sampled on the streets of a German city and participated in a shopping task with mobile eye-tracking glasses in a laboratory test supermarket. The measurement of actual visual price information intake is not prone to the types of bias that occur in surveys and reflects real information acquisition behaviour. Therefore, these measurements give insights into price-sensitive behaviour during shopping of organic consumers, conventional consumers and occasional organic consumers. This approach is innovative to the question of price-sensitive behaviour regarding organic food and can prove behavioural differences on an individual level.

The fourth article turns to the investigation of the concepts of price knowledge, WTP and the actual purchase of organic products. With a sample of German organic consumers, this article tries to answer questions on the precision of price knowledge of organic consumers with an innovative approach testing participants only on products that they were planning to purchase and that were therefore truly relevant to them. Furthermore, participants who stated to be willing to pay less than the product costed that day in the retail store were approached again after they had finished shopping to find out whether they behaved consistently with their stated WTP.

In the *fourth* chapter, the results of the research are discussed. The chapter is structured according to the conceptual framework presented in section 2.2. The findings of this dissertation on visual information intake, intervening organism-internal processes and actual purchase decision are compared to research results of other authors. The interpretation and

relevance of the findings is reflected upon. Furthermore, the merits and limitations of the dissertation are laid out.

The *fifth* chapter presents conclusions drawn from the results on the research question of the dissertation. Further, implications and recommendations for practice and research are carved out. A summary of the dissertation in English and German language is found in chapter *six*.

2 Background

2.1 Theoretical background on price sensitivity

Price consciousness, price sensitivity and price awareness are closely related terms. Price sensitivity can be defined as the “[...] extent to which individuals perceive and respond to changes or differences in prices [...]” (Wakefield and Inman, 2003, p. 201). In general, sensitivity refers to the level of awareness and to the magnitude of change in a dependent variable provoked by a change in an independent variable (WebFinance Inc., 2017). Comparing price sensitivity and price awareness, it can be noted that sensitivity includes internal processes and the response, while price awareness has been defined as “[...] the ability of buyers to recall prices paid” (Monroe, 2005, p. 120) and refers to an internal process. Pechtl (2014) used price sensitivity synonymous to price consciousness and described price consciousness as different degrees of behavioural response of buyers to the quality and price of products. Important aspects of price consciousness are the perceived importance of price, the preference for products with low prices (and qualities), and the search for good deals (Pechtl, 2014). Diller (2008) equates price consciousness with price behaviour. In this dissertation, concepts of all three terms are researched but in the following only the term price sensitivity will be used.

Price sensitivity is a characteristic of individuals that has a large scale of possible degrees. A precondition for price-sensitive behaviour is a point of reference to compare and judge prices against, called reference price (Monroe, 2005; Schiffman and Kanuk, 2010). Reference prices are, on the one hand, external, i.e. an individual must acquire price information to develop a reference price, and, on the other hand, internal, i.e. the individual retrieves prices or price ranges from memory which is called price knowledge (Monroe, 2005; Schiffman and Kanuk, 2010). Internal reference prices are dynamic because they are constantly updated by new external price information (Monroe, 2005; Schiffman and Kanuk, 2010). An internal reference price can be a price point or a range (Monroe, 2005). The internal reference price offers a benchmark to develop an individual WTP.

The preconditions for price-sensitive behaviour are a) that a person is facing a price stimulus, b) that a person is taking in information of that stimulus, and c) that internal processes are taking place, d) producing a response to the price stimulus based on reference prices. This dissertation has its focus on preconditions b), c) and d). The preconditions for price-sensitive behaviour are laid out in more detail in the next section on the conceptual framework.

2.2 Conceptual framework of price-related consumer behaviour

Since this dissertation's aim was to investigate consumers' visible and invisible reactions to the prices of organic foods, a model of consumer behaviour which includes consumers' purchase decisions as well as internal processes was deemed to fit the purpose. The model chosen is the neobehaviouristic stimulus-organism-response (SOR) paradigm as described by Jacoby (2002). For this dissertation, Jacoby's model was adapted to focus on price-related processes. Similar adaptations of the SOR paradigm were used by Diller (2008), Bösenner (2015) and Plaßmann-Weidauer (2011). A stimulus in the SOR paradigm is basically an input from the environment such as advertisement, brands or logos. In this dissertation, the stimulus is the price of organic food, including price features such as the visual appearance of the price (font type, colour, font size, etc.) and the content of the price, i.e. its absolute and relative magnitude or discounts (Diller, 2008).

The organism in the SOR paradigm represents the person-internal, individual processing of stimuli. Since individual internal factors were found to have a high explanatory power regarding behaviour, research increasingly focused on organism-internal processes (Aschemann-Witzel and Zielke, 2017; Jacoby, 2002). The measurement of organism-internal processes is challenging, since the variables cannot be directly observed (Solomon, 2015). It is assumed, however, that the processes in the organism are driven by intervening variables which can be measured directly or indirectly through indicators (Jacoby, 2002). Different intervening variables are distinguished, even though this distinction is not always clear (Diller, 2008). A common general distinction is into affective, cognitive and intentional/attitude processes (e.g., Diller, 2008; Kotler *et al.*, 2016). Affective processes are, for example, emotions and motivation while cognitive processes are perception, learning and memory (Foscht *et al.*, 2017). In a price-adapted SOR paradigm these become price emotions, price interest, price perception, price learning and knowledge, and price evaluation (Diller, 2008). Intentions (/attitudes) occupy a middle position overlapping with affective and cognitive processes (Foscht *et al.*, 2017). Adapted to a price context, they turn into price intentions (/attitudes), such as WTP or price preference (Diller, 2008).

Once consumers have developed a clear preference or when consumers have formed a price image of organic food, the actual information intake and the subjective perception of prices changes. Aschemann-Witzel and Niebuhr Aagaard (2014) observed that organic food prices can be ignored during shopping due to the image that organic products are more expensive than conventional products, even though a positive attitude towards organic food was adopted. Visual information acquisition of prices is a precondition for internal processes finally leading to a reaction to prices. Therefore, the variable 'visual price information acquisition' is included in the adapted SOR paradigm in Figure 1.

Visual price information acquisition is situated partly outside and partly inside the organism because it is a process taking place in the organism but it is an observable variable. It has been shown that visual information acquisition is partly driven by top-down processes, i.e. that consumers can partly consciously steer their visual information intake (Bialkova *et al.*, 2014; Gidlöf *et al.*, 2017). Therefore, there is a link into both directions between visual price information acquisition and intervening variables.

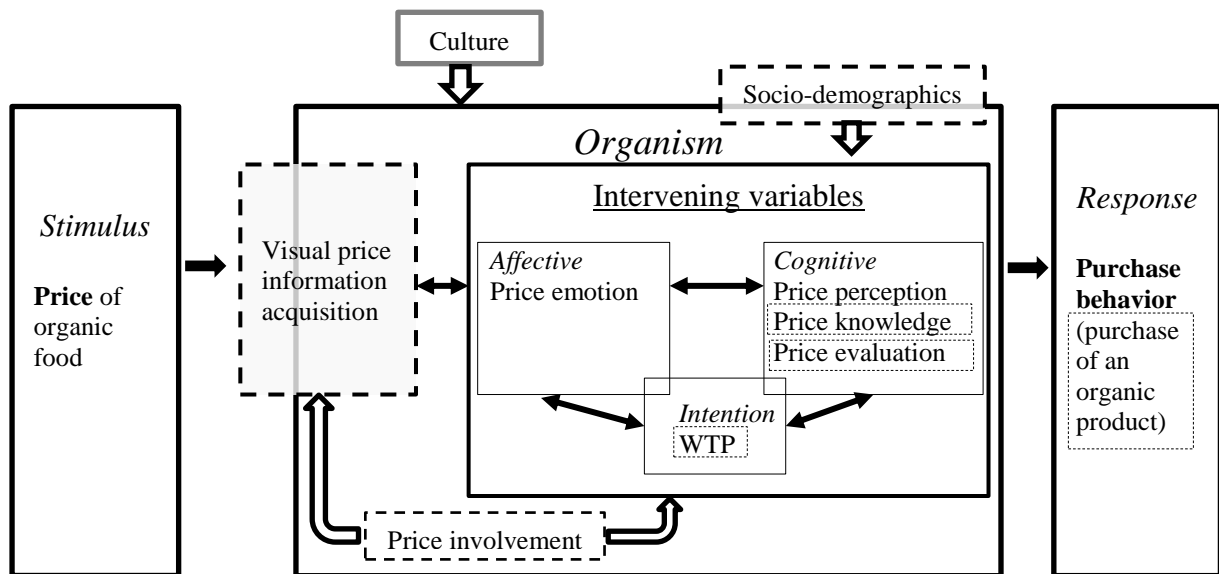


Figure 1: Price-adapted stimulus-organism-response paradigm

Based on Buxbaum (2016), Diller (2008), Foscht *et al.* (2017), Jacoby (2002), Solomon (2015)
Dotted boxes: constructs investigated in the empirical studies of the dissertation

Another important variable affecting the intensity of affective, cognitive and intentional processes is involvement (Foscht *et al.*, 2017). Zaichkowsky (1985, p. 342) defined involvement as a “[...] person’s perceived relevance of the object based on inherent needs, values, and interest.” Involvement can also be described as a state of activation or arousal (Kroeber-Riel *et al.*, 2009). As moderator variable, involvement has the effect of a positive or negative amplifier (Foscht *et al.*, 2017). A person’s involvement can be directed towards different objects or situations, such as involvement with advertisements, products or purchase decisions (Solomon, 2015). In this dissertation, price involvement is investigated. Beside an individual predisposition for information search and risk aversion, involvement is a parameter affecting the degree of information search (Kroeber-Riel *et al.*, 2009). Information can be searched internally, in a person’s memory, or externally, through visual information acquisition. Therefore, price involvement is also linked to visual price information intake in the conceptual framework.

Socio-demographic factors are situated partly inside and partly outside the organism because these characteristics are part of the organism but they are observable. Especially income was often assumed to explain organic purchase behaviour but was found to stay behind psychographic factors, such as attitudes, in explanatory power (Aschemann-Witzel and

Zielke, 2017). A further directly observable variable influencing the consumers' purchase decision process is culture (Solomon, 2015).

2.3 Measurement of price sensitivity

Research questions on price sensitivity can be tackled by different approaches since various aspects of price sensitivity can be studied in the organism and in the response. Several processes in the organism are linked to price sensitivity, and the response to prices can vary in its degree of price sensitivity. Research approaches can be broadly distinguished in observation, survey and experiment (Armstrong *et al.*, 2017). A non-exhaustive list of research approaches specified to measurement options of the constructs relevant for this dissertation is given in Table 1.

Visual price information acquisition can be measured by directly asking through, for example a questionnaire or interview, but Balcombe *et al.* (2015) showed that the stated (non-) attendance of information is not reflected in the visual (non-) attendance. Therefore, the stated attention does not seem to be a valid indicator of visual information acquisition. Observational techniques with or without experimental designs were in the past less applied to questions of consumer price sensitivity for organic food. The mechanical observation method eye-tracking has a much higher precision compared to the alternatives of stated attention or video- / human-based observation. From economics of information it is assumed that people collect just as much information as they need to make an informed decision, and that the most important pieces of information are collected first (Solomon, 2015). Thus, eye-tracking is assumed to be a valid indicator for the degree of price sensitivity of a person, observing the amount and sequence of price information collected. Another method of mechanical observation of price information acquisition is the information display matrix. However, the information display matrix is less like a real purchase decision than, for instance, mobile eye-tracking glasses used in a laboratory test store or in a real store. Another major advantage of eye-tracking is that the eye-movements during complex tasks can hardly be influenced by consumers deliberately (Duchowski, 2007). Therefore, a bias intentionally induced by the participants is very unlikely. Still, eye-tracking is very sensitive to framing of the task (e.g., eye movements are different in free viewing or search task paradigms), to noise from the environment (e.g., different light conditions) and to individual differences (eye-trackers have to be calibrated to each individual) (Duchowski, 2007; Holmqvist *et al.*, 2011). Nonetheless, eye-tracking was chosen in this dissertation to measure visual price information acquisition.

The next construct, price knowledge, can be elicited by an interview (or other forms of surveys). Price recall has been mostly used as a measure of price knowledge in the past (Eberhardt *et al.*, 2009), and is as well used in this dissertation. However, it is debated whether price recall is the best indicator of price knowledge (Eberhardt *et al.*, 2009; Kenning

et al., 2011). The measurement of price knowledge for each item on a participants' shopping list was only one set of questions among several others in the second study. Therefore, only price recall was used as a measure for price knowledge to avoid interviewee fatigue instead of complementing with measures of price ranking or price recognition.

Table 1: Overview of research methods for relevant constructs

	CONSTRUCT	OBSERVATION	SURVEY	EXPERIMENT
ORGANISM	Visual price information intake	Eye-tracking, information display matrix	Stated attention through questionnaire/ interview	In combination with eye-tracking or questionnaire/ interview
	Price knowledge	-	Price recall, recognition, deal spotting, price ranking, self-assessment	In combination with recall measurement, deal spotting or price magnitude judgements
	Price evaluation	Scanner data, household panel data, retail panel data	Questionnaire/ interview (e.g., direct questioning (also as attitudes), price categorization)	In combination with questionnaire/ interview, conjoint analysis
	WTP	(see response)	Direct questioning, contingent valuation	Auctions, conjoint analysis, discrete choice analysis
	Price involvement	Arousal through pupilometry, EEG ¹ or Galvanic Skin response	Questionnaire/ interview	In combination with observation or survey, e.g. manipulating arousal
RESPONSE	Purchase behaviour	Scanner data, household panel data, retail panel data, direct observation (field/laboratory)	Stated purchase behaviour through questionnaires/ interviews	Store test (field/ laboratory)

Based on Armstrong *et al.* (2017), Breidert *et al.* (2006), Diller (2008), Eberhardt *et al.* (2009), Foscht *et al.* (2017), Gijsbrechts (1993), Jedidi and Jagpal (2009), Simon and Fassnacht (2016), Wrenn *et al.* (2002)

Note: The list is not exhaustive. ¹EEG: electroencephalogram

Price evaluation, which can be distinguished into price acceptability and value for money, can be measured by means of scanner data (including household and retail panel data) or surveys with or without experimental conditions (Diller, 2008). As for other pricing research,

questions on the evaluation of a price for a unit of a product or service can be posed as a direct question, by ranking or rating products, with or without the presentation of reference alternatives, or in form of tasks, such as a price classification (compare Gijsbrechts, 1993; Lichtenstein and Bearden, 1988). In this research, price evaluation was asked from participants directly in form of statements with agreement/disagreement rating scales. The ratings on two statements, one on price acceptability and one on value for money, poured into the analysis. The subject of the statements was organic food, and the implicit reference conventional food. Since price evaluation was only a small part of the research, the approach was deemed sufficient and favourable compared to operationally more labour-intensive procedures as conjoint analysis or price classification tasks. Scanner data could not be used within the design of the superordinate study.

WTP was measured by direct questioning in Rödiger *et al.* (2016) (section 3.4). This technique is criticised for low validity due to a hypothetical bias (Frykblom, 2000; Jedidi and Jagpal, 2009). Miller *et al.* (2011), however, refuted the critique to direct questioning pointing out that the technique yielded a correct demand curve, and that it is well-suited for frequently purchased, non-durable goods. Moreover, discrete choice analysis and conjoint analysis could not have been implemented in the study design which foresaw that participants were asked about their WTP for the items they had on their shopping list. It would not have helped to achieve the study aim if hypothetical product profiles were created for all real products in the shops, and thus discrete choice analysis and conjoint analysis were not used (Simon and Fassnacht, 2016). Contingent valuation could have been used, however, it is usually applied to nonmarket goods such as environmental system services (Boyle, 2003; Rodríguez *et al.*, 2008). Since respondents were asked on food products that they were familiar with and possibly even had the habit of frequent purchase, the advantage of direct questioning was that the fixed format of contingent valuation did not limit the answers and respondents were not biased by given prices.

A specialised approach to measure price sensitivity based on consumers' statements is the van Westendorp price sensitivity meter (Simon and Fassnacht, 2016). In this procedure, participants are asked what the highest price is they would be willing to pay for a unit of a product, which price would be too expensive, too cheap, expensive but still in the consideration set, and inexpensive but still in the consideration set (Ceylana *et al.*, 2014; Simon and Fassnacht, 2016). An advantage of this method is that it is possible to determine price thresholds, too expensive/cheap price levels, penetration and indifference prices (Simon and Fassnacht, 2016). Moreover, the fine-grained insights on stated price sensitivity can be gathered and combined with other consumer characteristics, be it socio-demographic or psychographic. A disadvantage of this and other methods based on statements is that there is a difference between stated attitudes or intentions and choice behaviour which diminishes the conclusiveness to actual purchase behaviour (Simon and Fassnacht, 2016). Furthermore, the focus on the questions on price could lead to an overemphasis of the price attribute (Simon

and Fassnacht, 2016). Since the aim of the fourth study was not to determine key figures for pricing decisions, the simplified version of only asking about the maximum price participants were willing to pay for an item was sufficient.

Involvement is often measured through questionnaires or interviews. Several scales for measuring the concept of involvement in marketing were developed (e.g., Bearden *et al.*, 2011; Bruner, 2014). Existing involvement scales were developed to cover several aspects of involvement. This constitutes a major advantage over mechanical observation techniques measuring arousal which might cover only one aspect of involvement, i.e. physical arousal. Furthermore, mechanical observation techniques such as pupilometry, electroencephalogram (EEG) and Galvanic Skin response are very sensitive to environmental influences (e.g., light, framing of task) and must be used under strongly controlled conditions. Moreover, it is difficult to determine if a change in physical arousal was exclusively provoked by the stimulus. Therefore, the third study relied on a statement-based measure of price involvement. However, since only one aspect was measured, i.e. price importance, it should be regarded as an approximation to price involvement.

Investigating real purchase behaviour, price sensitivity is often studied through price elasticity of demand which indicates the change in demand with a change in price (Casado and Ferrer, 2013). This analysis technique is based on market data, e.g. from retail scanner data or from household panel data (Simon and Fassnacht, 2016). Conceptually, this approach provides a large-scale overview of consumers' demand related to price changes and food budget allocation to different commodities. However, it has drawbacks as well: first, due to the macro-level approach, different product qualities cannot easily be taken into account (Schröck, 2014). Second, consumer behaviour cannot be inferred from price changes if a product was out of stock or if a new competitor entered the market. Therefore, it is questionable whether the historical price and sales volume data are reliable to project future consumer behaviour (Simon and Fassnacht, 2016). Simon and Fassnacht (2016) further pointed out that a low price elasticity can occur at a high price difference without significantly influencing sales volume, and that a high price elasticity often means that there is a low difference in prices. The measurement of price elasticities is also complicated by heterogeneous consumer behaviour regarding the price (Liu *et al.*, 2009). Furthermore, price elasticities from different studies cannot be easily compared and generalised since the results strongly depend on product characteristics and competition (Liu *et al.*, 2009; Simon and Fassnacht, 2016). Price elasticity values are also affected by strong brands, the degree of product differentiation, promotions and product positioning (Simon and Fassnacht, 2016).

Even though calculating price elasticities based on market data is a widely applied approach to investigate consumers' purchase response to prices, a different approach was applied in the fourth study. Consumers who indicated a WTP lower than the store price were asked upon exiting the store after shopping whether they had bought the item. This approach enabled a

direct link between stated WTP and actual purchase behaviour. Furthermore, it was possible to analyse if there was a difference in the prices of products that were purchased and those that were not purchased, as well as whether there were differences in the individual price expectations. Thus, this approach allowed a very detailed look at the factors that were present during a decision for or against purchase which constituted an advantage over scanner data from the participating shops as well.

Table 2 sums up the information given in section 2 and provides a brief overview of the four studies this dissertation is based on. The dissertation's research objectives, concepts and approaches to research and measurement are arranged to display which of them each study encompasses and to help guide the reader through the following sections. As can be seen from Table 2, the dissertation has a quite comprehensive approach to the research question investigating a precondition for price-related processes, a moderator of information intake and price-related processes, three price-related processes, and consumers' purchase response. Furthermore, different types of research, research approaches, and data collection methods are applied in the dissertation: analysis of secondary and primary information, exploratory and descriptive approaches, surveys and controlled observation.

Table 2: Overview of characteristics of the studies underlying this dissertation

STUDY	1	2	3	4
RESEARCH FOCUS	State of knowledge, knowledge gaps	Preconditions of price-related processes, price-related processes, response	Preconditions of price-related processes, moderator of price-related processes	Price-related processes, response
OBJECTIVES NO.	1), 2)	3) a, 3) b, 4) c, 6)	3) a, 3) c, 5)	4) a, 4) b, 6)
SOR CONCEPTS	Intervening variables, respons	Visual price information intake, price evaluation, response	Visual price information intake, price involvement	Cognitive (price knowledge), intentional (WTP), response
RESEARCH APPROACH AND DESIGN	Exploratory	Descriptive	Descriptive	Descriptive
	Secondary data	Primary data	Primary data	Primary data
	Systematic literature review	Controlled observation, survey	Controlled observation, survey	Survey
		Visual price information intake: eye-tracking	Visual price information intake: eye-tracking	Price knowledge: price recall
		Price evaluation: rating price acceptability and value for money	Price involvement: rating price importance	WTP: direct questioning
		Response: observation of choice		Response: observation of choice

3 Reprints and manuscripts under review

3.1 How are organic food prices affecting consumer behaviour? A review

Table 3: Contributions to the article "How are organic food prices affecting consumer behaviour? A review"

TITLE OF ARTICLE	How are organic food prices affecting consumer behaviour? A review
JOURNAL, YEAR, VOLUME, PAGES	Food Quality and Preference, 2015, 43, 10-20
AUTHORS LIST (*CORRESPONDING AUTHOR)	Manika Rödiger*, Ulrich Hamm
CONTRIBUTION TO ARTICLE (CONTRIBUTION TO ARTICLE IN %)	Manika Rödiger (75%): Structure of article, draft of all sections of the manuscript, editorial tasks Ulrich Hamm (25%): Development of idea, outline and research questions, feedback to manuscript
ASSOCIATED PROJECT (TITLE, FUNDING, START AND END TIME)	Wissensstandsanalyse zum Verbraucher- und Ernährungsverhalten bei ökologischen Lebensmitteln mit Einbezug der Außer-Hausverpflegung (Consumer purchase and consumption behaviour regarding organic food – Analysis of the state of the art); Research project funded by the German Federal Organic Farming Scheme and Other Forms of Sustainable Agriculture (BÖLN).; April 2011 to November 2011
PROJECT LEAD	Prof. Dr. Ulrich Hamm
PROJECT HANDLING	Dr. Sarah Hemmerling, Dr. Rosa Schleenbecker, Prof. Dr. Achim Spiller, Dr. Salome Wägeli
TASKS OF DOCTORAL CANDIDATE	Updating the literature search for price up to December 2013; writing an article on price; October 2013 to December 2014



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How are organic food prices affecting consumer behaviour? A review



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ABSTRACT

This article reviews research on consumer behaviour regarding the price of organic food published from January 2000 to December 2013, in order to identify the current state of research and research gaps. The publications were classified into stimulus–response or stimulus–organism–response paradigm based studies. Organism–internal processes were further divided into ‘affective’, ‘cognitive’ and ‘intentional’ processes. Moreover, for a systematic review the categories ‘price elasticity’, ‘price perception and evaluation’, ‘price knowledge’, and ‘willingness-to-pay’ were built. The majority of studies were based on a stimulus–organism–response paradigm. 20 studies in the sample analysed the price elasticity of demand and reported partly contradictory results. There were no studies on affective processes in the sample. A solid body of knowledge exists on the cognitive processes ‘price perception and evaluation’ while very few studies investigate ‘price knowledge’. The majority of studies were concerned with the willingness-to-pay for organic food and yielded mixed and contradictory results. The explanatory power and conclusiveness of research is impaired by weak sampling techniques (e.g., convenience sampling, sampling at few locations) and data collection methods. The improvement of sampling techniques, the increase of comparability of results and the deepening of analyses is recommended.

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1. Introduction

As [Marian, Chrysochou, Krystallis, and Thøgersen \(2014, p. 52\)](#) ascertained from several studies, the attitude of consumers towards organic food is in general positive with typically associated benefits being superior taste, more environmental-friendliness, improved health, safer food, and more animal welfare. A frequently reported reason for not buying organic food was price, since it was usually premium priced ([Marian et al., 2014, p. 52](#)). The assumption that a larger share of consumers would buy organic food if it was less costly, however, is strongly questioned by the results of [Bunte, van Galen, Kuiper, and Tacken \(2010, p. 404\)](#). Their study, conducted in the Netherlands, showed that even if prices for organic food were lowered to the level of conventional products, this did not lead to significantly higher sales. Additionally, [Green et al. \(2013, p. 3\)](#) revealed a strong difference in the price elasticity of consumer demand by product groups in their review article. Therefore, the role of price in the purchase decision is still a matter of debate.

In order to give an overview of the state of the art of research on consumer behaviour regarding prices for organic food, this article constitutes a literature review of publications from January 2000 to December 2013. A further objective was to point out realms of research that lack sufficient attention. The studies covered are embedded in a theoretical framework and the state of the art is analysed within the categories ‘price elasticity’, ‘price perception and evaluation’, ‘price knowledge’, and ‘willingness-to-pay’. The methodologies, sampling techniques, sample size, current state of research, and research gaps of each category are briefly analysed.

2. Theoretical framework

In consumer behaviour literature, behaviouristic and neobehaviouristic approaches can be found to explain consumer behaviour. A behaviouristic approach is the stimulus–response paradigm in which external stimuli (S), e.g., a marketing stimulus, lead to consumer responses (R), e.g., purchase behaviour. A consumer represents a black box in which the decision process that leads to the responses takes place according to certain consumer characteristics. Internal processes within the black box cannot be observed and thus, are not a component of scientific research ([Armstrong & Kotler, 2009, p. 163](#); [Solomon, Bamossy, Askegaard, & Hogg, 2006, p. 62](#)). If the S–R paradigm is applied to research consumer behaviour regarding the product price, the response of consumers (R) to prices

(S) is monitored, e.g., purchase behaviour (R) linked to the price of a product (S).

The neobehaviouristic approach is comprised of the stimulus (S) – organism (O) – response (R) paradigm in which the black box is replaced by the organism whose internal processes may as well be the subject of investigation ([Jacoby, 2002, p. 51](#)). In O, the development of internal processes is triggered by S and results in R ([Jacoby, 2002, p. 52](#); [Lee, Ha, & Widdows, 2011, p. 1196](#)). In contrast to the S–R paradigms, the S–O–R paradigms have a strong focus on the organism, and approach the analyses of internal organismic (O) factors by assuming that there are internal intervening variables (e.g., attitudes) which can be directly or indirectly measured through indicators ([Jacoby, 2002, p. 51](#)).

In a price-adapted S–O–R paradigm, prices (S) initiate internal processes (O) which lead to purchase or non-purchase behaviour (R). To approach the internal processes regarding price in O, [McGuire's \(1976, p. 315\)](#) general paradigms of human motivation, the structural approach to attitudes ([Evans, Jamal, & Foxall, 2006, p. 67](#)), and the model of the consumers' decision process ([Armstrong & Kotler, 2009, p. 178](#)) are drawn upon. Accordingly, it is assumed that internal processes (O) can be categorised into affective processes, cognitive processes, and behaviour intentions (or conative processes).

Usually, the consumer decision-making process is described as being composed of need recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behaviour (e.g., [Armstrong & Kotler, 2009, p. 178](#)). For the study of consumers' price behaviour, the information search, evaluation of alternatives, and purchase decision stages are of interest. Stages of the consumer decision process can be assembled of affect, cognition, and/or intention. In combination, a rough model of the organismic processes regarding price is the result (see [Table 1](#)). Applied to price, affective processes may constitute the realm of emotions connected with price, while cognitive processes depict the realm of beliefs and knowledge connected to price including price learning (which may result from information search), price evaluation and price perception. Behaviour intentions applied to price can include purchase intentions.

The depicted price-related paradigms are not comprehensive. Of course, price-related decisions and purchase processes are more complex, begin much earlier, and have further reaching consequences ([Kotler, Keller, Brady, Goodman, & Hansen, 2009, p. 246](#)). Furthermore, consumers do not solely base their purchase decision on price; the cost-performance-ratio is evaluated instead. Thus, to

Table 1

Price-adapted organism-internal processes within an S–O–R paradigm (Sources: compiled from [Armstrong & Kotler, 2009, p. 178](#); [Evans et al., 2006, p. 67](#); [McGuire, 1976, p. 315](#)).

		Organism	
Stimulus	Affect	• Emotions regarding price	Response
	Cognition	• Perception of price • Beliefs regarding price • Search of price information, price learning, price knowledge • Evaluation of prices and price alternatives	
	Intention	• Intention to pay a price, decision concerning a price	

((organic AND farming) OR (organic AND agriculture) OR (organic AND food) OR (organic AND drink) OR (organic AND beverage)) AND ((consum*) OR (private AND household*)) AND ((price AND perception) OR (price AND awareness) OR pricing OR (price AND adjustment) OR cost* OR (price AND policy) OR (willingness-to-pay) OR WTP OR (price and behavi*) OR purchase*)

Fig. 1. Search terms applied for the literature search on consumer behaviour regarding organic food (source: own).

completely understand consumers' decisions from a marketer's perspective, price policy cannot be regarded separately, especially from product policy but from the full spectrum of the interdependent marketing measures as well (Armstrong & Kotler, 2009, p. 296). Additionally, other factors such as the social and cultural environment may play a role in the decision process (Armstrong & Kotler, 2009, p. 163).

3. Methodology and overview of the reviewed studies

3.1. Selection of relevant studies

The sample of academic journal articles was retrieved through a comprehensive literature search on consumer behaviour regarding the price of organic food. Eight databases (AgEcon, CabAbstracts, Web of Science, Science Direct, EconPapers, Emerald Insight, NAL Catalog, EBSCO) were searched with the search terms in Fig. 1. The set of search terms was developed on the basis of relevant terms usually used in publications on the topic. The search terms were deployed to at least title, keywords and abstract.

While some country-specific certification bodies use the terms 'ecological' and 'biological', they are rarely found in scientific literature. The English term used by most certification bodies is 'organic' (e.g., USDA Organic, Soil Association Organic Standard, EU Organic Farming, Australian Organic, Canada Organic Regime, China Organic Product Certification Mark, see www.organic-bio.com/en/labels, IPOREX S.A., 2013, n.p.). Therefore, the terms 'ecological' and 'biological' were not included in the search. The keywords 'subject' and 'participant' were not included either since these terms refer to the sampling and data collection process rather than to a person in the role of consumer. The general term 'customer', which is also used for business buyers, was not included as it was very likely that, when referring to private household consumption, the terms 'consumer' or 'consumption' would at least appear in the abstract. In addition to the search of the databases, the acquired articles' reference lists were checked for further relevant studies.

The total hit list output of the databases was screened manually regarding the thematic suitability of the articles. Included in the

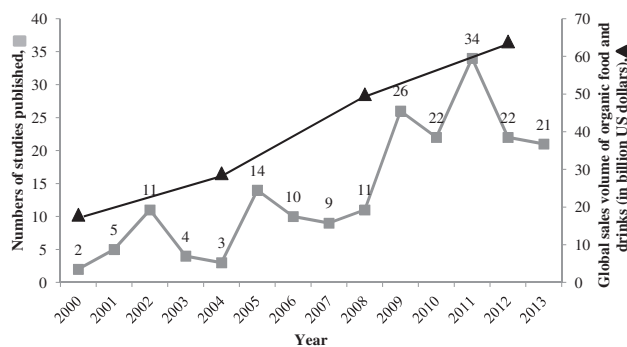


Fig. 2. Publication dynamics of articles on consumer behaviour regarding the price of organic food sampled for this study (2000–2013, source: own) and global sales volume of organic food and drinks in billion US dollars. Source: Sahota, 2014, p. 128.

analysis were peer-reviewed, English-language journal articles published between January 2000 and December 2013. Only articles reporting empirical studies were used, and if results were presented in more than one article, only the article with the highest relevance for the review was included. Journal articles which treated price in the analyses but did not report differentiated results were not included. In all, 194 journal articles fulfilled the requirements and were used for analysis.

The number of publications on the topic multiplied from two in 2000 to 20 in 2013 with a peak of 34 publications in 2011 (see Fig. 2). The rising number of publications corresponds to the rising importance of organic food for consumers which has been observed over the last 30 years (Sahota, 2014, p. 127). The drop in publications after 2011, however, does not correspond to the development of the global organic food market which showed a relatively continuous rise in the period 2000–2012 (Sahota, 2014, p. 128).

In Table 2, the number of studies according to continents of research is listed. The total number in Table 2 is higher than the number of articles used since two studies (Grzelak & Maciejczak, 2013; Mueller Loose & Remaud, 2013) were conducted on more than one continent. In the time period from 2000 to 2013, most studies on consumer behaviour regarding the price of organic food took place in Europe (90) and North America (68). This is not surprising since the popularity of organic food developed mostly in countries on these continents (Sahota, 2014, p. 129). Even though organic food is produced on all continents, its consumption is still mainly centred in Europe and North America (Sahota, 2014, p. 127). The number of publications with an Asian geographical scope has increased due to a growing economic importance of organic food production, especially in China, where a rising middle-class can fulfil their needs for safer food (Sirieix, Kledal, & Sulitang, 2011, p. 2; Yin, Wu, Du, & Chen, 2010, p. 1361).

As price levels, price differences to conventional food, and demand elasticity differ between food groups, Table 3 shows the number of studies concerned with different types of food. Most studies treated product groups for which the organic market share is relatively large – vegetables, fruit, dairy, and eggs (Greene, 2014, n.p.; Hamm & Gronefeld, 2004, p. 47; Wier, O'Doherty Jensen, Andersen, & Rosenkvist, 2005, p. 414). In relation to the organic market share, meat is overly represented as a subject of investigation. The reason for this phenomenon is the relative and absolute price difference between organic and conventional products, which is especially high for pork and poultry, and leads to price posing a major barrier for purchase (Hamm & Gronefeld, 2004, p. 115).

3.2. Analysis of studies

In order to ensure compatibility, the constructs of the theoretical framework were reconciliatory compared with the research objects of the articles sampled. The sampled studies were classified regarding the behavioural paradigm (S–R or S–O–R) they were based on. Moreover, the studies were grouped according to the

Table 2
Articles on consumer behaviour regarding the price of organic foods (2000–2013) according to the geographical location of research (source: own).

Continent	No. of studies
Africa	7
America (total)	72
North America	68
Asia	22
Europe	90
Oceania	5

Table 3

Number of studies on the topic 'consumer behaviour' regarding the price of organic foods (2000–2013) concerning different food groups (source: own).

Food group	No. of studies
Vegetables	55
Fruit	36
Dairy	32
Meat	29
Eggs	11
Fish and seafood	7
Bread	6
Oil	4
Others (baby food, jam, juice, flour, chocolate, coffee, wine, dishes, multi-ingredient food, rice, muesli)	14

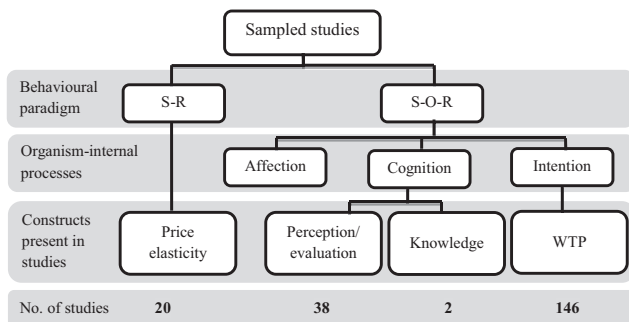


Fig. 3. Categorisation scheme of articles on consumer behaviour regarding the price of organic food, 2000–2013 (source: own).

four constructs present in the sample: 'price elasticity', 'price perception and evaluation', 'price knowledge', and 'willingness-to-pay' (WTP). There were no studies included in the sample which investigated affective processes regarding the price of organic foods (see Fig. 3).

Within the categories, methodological aspects (data collection method, sampling technique and sample size), the current state of research and research gaps were identified. Research gaps were determined on the basis of pricing textbooks (e.g., Monroe, 2003; Rao, 2009) and scientific journal articles on behavioural pricing (e.g., Homburg & Koschate, 2005). An assessment of methodological aspects and the state of research was undertaken on the basis of appropriate literature. Sample sizes were distinguished between data directly sourced from consumers, such as surveys and household panels, and data not directly sourced from consumers, such as retail scanner data and inventories. If more than one sample was drawn, the total sample size was included.

For a better appraisal of the results presented, the countries of research and year of publication were mentioned in the text or in parentheses. The total numbers of studies within categories were mentioned as well as the number of studies applying a certain data collection method or sampling technique. It should be noted that these numbers differ from the overall total and sub-totals since

Table 4

Range, median, missing information and number of publications in the categories <100, 100–499, 500–999, >999 of studies on the price elasticity of organic food ($n = 15$) sourcing data directly from consumers.

Min. (cons.)	Max. (cons.)	Median (cons.)	n.i. (total)	<100	100–499	500–999	>999
154	20,000	2,310	1	0	4	2	9

n.i.: no clear information given; cons.: data directly sourced from consumers.

some studies applied a mixed methods approach. Furthermore, indications on sampling techniques or data collection methods were missing in some publications. Moreover, a number of studies addressed more than one construct (cf. Fig. 3) and therefore appeared in more than one category. In these cases, different data collection methods were often used to research different constructs.

3.3. Limitations

The present study has several limitations. First, it is assumed that a very large number of relevant studies was identified. However, due to a lack of accessibility, not all articles identified as relevant for the study could be analysed. The number of studies that could not be accessed, even after direct requests were made to the authors, was six of the total 200 studies identified. Secondly, a deep analysis of the studies accessed was not feasible due to the large total number of studies to be analysed, as the main aim of the present study was the systematic and structured compilation of the key facts and contents of publications on the topic.

4. Consumer behaviour paradigms

The majority of the articles sampled were based on the S–O–R paradigm. In most studies the object of research was a consumer-internal state or process, e.g., perceptions, knowledge, or WTP. Only one category of articles applied the S–R paradigm. These were studies that investigated the price elasticity of demand which is widely assumed to be an indicator of the responsiveness of the demanded quantity of a good to a price change of a product (Monroe, 2003, p. 43). In this context, the price elasticity of demand is understood to represent the response (R) of consumers to prices (S). However, it must be noted that the studies on price elasticity did not actually measure individual consumers' responses at the point of sale. The basis for analyses was, instead, sales/purchase and price figures which do not permit complete certainty about the cause-and-effect relationship between prices and consumers' purchase reactions. The assumption that the studies on price elasticity of demand are applicable to the S–R paradigm is, therefore, of a hypothetical nature.

5. Price elasticity

5.1. Methodology and sample

All of the 20 studies on price elasticity approached the topic quantitatively. The majority (12 studies) used household panel data for their analyses. Four studies acquired sales data; auctions and face-to-face interviews were applied by three studies, respectively. Twice each, data were collected via the internet or by a choice experiment. Moreover, one telephone interview, one contingent valuation, and one store test was conducted.

Regarding the sampling techniques, the use of convenience sampling was indicated by three studies, and simple random sampling and systematic sampling by one study, respectively. A large share of the studies did not point out the sampling technique. However, this is an important criterion for the overall interpretation of the results and the question arises whether conclusions can be drawn for the total population (which happens too often in practice).

The studies which sourced data directly from consumers (15) included a wide range of sample sizes with a minimum of 154 and a maximum of 20,000 respondents and the median at 2,310 (see Table 4). The majority (9) had a sample size >999. Household panel studies were responsible for the large sample sizes. There

were four studies using retail scanner data with the number of observations ranging from 104 to 6,750 (median 280).

5.2. Current state of research

The results for studies on price elasticity of demand regarding organic food were mixed, even within product groups. Several studies investigated the elasticity of demand for cow milk. While Bernard and Bernard (2009, p. 832, USA) and Schröck (2012, p. 288, Germany) found a low own-price elasticity of organic milk demand, Jonas and Roosen (2008, p. 202, Germany) and Lopez and Lopez (2009, p. 462, USA) found the own-price elasticity to be great. Furthermore, Monier, Hassan, Nichèle, and Simioni (2009, p. 17, France) determined the demand for organic milk to be price-rigid. The results of Alviola and Capps (2010, p. 385, USA) indicated that the cross-price elasticity between organic and conventional milk was higher for organic milk than for conventional milk, i.e., if prices increase for conventional milk the increase of purchases of organic milk was higher than vice versa. However, Lopez and Lopez (2009, p. 460, USA) showed that in comparison with other milk types (lactose-free, different fat contents, different brands) organic milk had the lowest cross-price elasticities suggesting that organic consumers rarely substitute organic with conventional milk when the price of the organic product increased.

Fourmouzi, Genius, and Midmore (2012, p. 691) showed that in the UK own-price elasticities for organic fruit and vegetables were approximately three times higher than for conventional ones. Cross-price elasticities between organic and conventional produce indicated that consumers of organic fruit and vegetables were relatively reluctant to change to conventional (Fourmouzi et al., 2012, p. 691). A higher own-price elasticity for organic vegetables than for conventional vegetables was confirmed by Kasteridis and Yen (2012, p. 413, USA). On the contrary, Zhang, Huang, Lin, Epperson, and Houston (2011, p. 453, USA) found own-price elasticities were not always higher for organic vegetables than for conventional ones; they were actually inelastic except for potatoes. The results of Zhang et al. (2011, p. 453) regarding cross-price elasticities indicated that a decrease in organic price premiums would lead to a strong increase in the purchase of organic vegetables.

Beef was subject of investigation in two studies in the sample. While Corsi and Novelli (2011, p. 43) revealed that in Italy the demand for organic beef became more inelastic between 2001 and 2003, Anders and Moeser (2008, p. 467) differentiated between the price elasticity for different beef cuts in Canada. Ground beef was found to be highly elastic in comparison to roast and steak which was inelastic.

Two studies in the sample attempted to draw conclusions regarding the overall price elasticity of demand for organic products. While results of Bunte et al. (2010, p. 404) for the Netherlands implied that price elasticity was low, the contrary was the case for the results of Bezawada and Pauwels (2013, p. 44) who found that the price elasticity in the USA was high.

5.3. Research gaps

The major food groups, except for cereals, were present in the studies on price elasticity. However, the picture is everything but clear due to contradictory results. Therefore, more comparable research is needed in order to find clear evidence. For these analyses, panel data should be the method of choice due to a comparatively higher validity and reliability than that of self-conducted surveys by telephone or face-to-face interviews in a few locations. In most countries where organic food has significant market shares, household or retail panel data from market research companies exist. However, using such data as an indicator of price behaviour

is critical as the cause-and-effect relationship is not necessarily given. Stock-out situations, for instance, may bias the results of price elasticity studies with panel data.

Liu, Otter, and Allenby (2009, p. 61) called for caution since own- and cross-price elasticities are difficult to precisely determine when the number of varieties in a product category is large. Moreover, consumers may act heterogeneously regarding the decision whether to buy organic products depending on product categories but also on different situations and usages. Differences in the price elasticity of demand for organic food might also exist between countries.

6. Price-related affective processes

No publications on price-related affective processes of consumer behaviour regarding organic food were identified. However, a short review related to the general retailing context (not specific to organic food) is given below: Purchase intentions may be affected by price-related emotions as they mediate the role of cognitive price-related processes (Peine, Heitmann, & Herrmann, 2009, p. 59; Zielke, 2011, p. 331). Negative price emotions translated to more passive consumer behaviour. Positive price emotions, on the other hand, led to more proactive consumer behaviour (Peine et al., 2009, p. 59) and to stronger purchase intentions. However, emotional arousal did not significantly impact purchase decisions (Somervuori & Ravaja, 2013, p. 486). With rising involvement, price enjoyment increased, and stronger enjoyment was correlated with a more positive perception of quality (O'Neill & Lambert, 2001, p. 231). An increase in involvement was related to an increased WTP as well (Campbell, DiPietro, & Remar, 2014, p. 47). O'Neill and Lambert (2001, p. 232) also found that enjoyment coupled positively with surprise, and surprise was positively linked to price consciousness.

The perception of a price-level was linked to enjoyment, fear and interest, while distress and anger coupled more with the perception of value (Zielke, 2011, p. 348). Low prices resulted in significantly higher facial muscle activity related to positive emotions than did high prices (Somervuori & Ravaja, 2013, p. 486). However, in a study on discount stores, Zielke (2011, p. 348) found that low prices increased contempt and shame, while they reduced distress and anger if high value was perceived.

7. Price perception and evaluation

7.1. Methodology and sample

Regarding the methodological approach of the 38 studies on price perception and evaluation, 28 publications used quantitative and 15 qualitative methods; some studies used a mixed methods approach. Within the studies that used quantitative methods, 11 conducted face-to-face interviews, five studies used self-completion paper questionnaires, and four studies used mail surveys, while three used web-based surveys and contingent valuation method, respectively. Conjoint experiments, computer assisted personal interviews (CAPI), and household panels were used in two studies, correspondingly. In the sample, each was applied

Table 5

Range, median, missing information and number of publications in the categories <100, 100–499, 500–999, >999 of quantitative studies on the price perception and evaluation of organic food ($n = 26$) sourcing data directly from consumers.

Min.	Max.	Median	n.i.	<100	100–499	500–999	>999
120	13,074	416	0	0	15	4	9

n.i.: no clear information given.

Table 6

Range, median, missing information and number of publications in the categories <50, 50–99, >999 of qualitative studies on the price perception and evaluation of organic food ($n = 11$) sourcing data directly from consumers.

Min.	Max.	Median	n.i.	<50	50–99	>99
7	181	23	4	9	0	2

n.i.: no clear information given.

once: telephone interviews, computer assisted telephone interviews (CATI), an auction, a choice experiment, and the use of sales data. The most frequently applied sampling technique was simple random sampling (8 studies), followed by convenience sampling (6), quota sampling (3), and stratified sampling (3). In eight studies the sampling technique was not clearly indicated. The sample sizes were in the range of 120–13,074 with the median at 416 respondents (see Table 5). Fifteen studies had a sample size between 100 and 499, nine studies larger than 999, while in four studies the sample size was between 500 and 999.

Qualitative methods applied were focus groups (8), in-depth interviews (3), guided interviews (3), laddering (1), observation (1), and two unspecified qualitative interviews. Four qualitative studies used convenience sampling and another four systematic sampling. Judgment sampling was used in two studies while quota sampling was used in one study. In three studies the sampling technique was not indicated. The sample sizes of the qualitative studies ranged between seven and 181, with the median at 23. The study with only seven respondents interviewed organic food traders and was a mixed methods study with a consumer survey in the second step (Aryal, Chaudhary, Pandit, & Sharma, 2009). Exact information on the sample size was not given in four studies (see Table 6). The studies using focus groups held between two and 50 focus group discussions with 15–181 participants in total.

7.2. Current state of research

The most frequently reported result with regard to the price perception and evaluation was the role of price for purchase and consumption of organic food (reported 17 times). At least eight of these studies showed that price was perceived as a major barrier or disadvantage for the purchase of organic food. However, Lockie, Lyons, Lawrence, and Mummery (2002, p. 33) revealed that Australian organic food consumers were just as price sensitive as non-organic consumers, and Kuhar and Juvancic (2010, p. 78) found that even if Slovenian consumers regarded themselves as price conscious, this did not significantly affect their purchases of organic fruit and vegetables. Furthermore, Tarkiainen and Sundqvist (2005, p. 817, Finland) concluded that the buying intention was not negatively affected by price perception. However, the explanatory power of the study was decreased due to the low price premium for organic bread and flour in Finland.

Studies on the perception and judgement of price differences between organic and conventional food were strongly represented in the sample (12). Besides studies that simply reported whether consumers perceived a price difference, Aryal et al. (2009, p. 18) and Yin et al. (2010, p. 1364) differentiated the directions of respondents' perceptions. Yin et al. (2010, p. 1364) revealed that 24% of Chinese consumers perceived organic food as overly expensive, 55% perceived it as expensive, and 16% judged the price as reasonable. In Nepal, 40% of the consumers stated that the price of organic food was reasonable (Aryal et al., 2009, p. 18). Other authors differentiated the price perception according to consumer segments, e.g., Hjelm (2011, p. 338) disclosed that Danish pragmatic consumers perceived organic food to be too expensive whereas Danish value-oriented consumers perceived the prices as reasonable.

Four studies covered the relationship between the price of organic foods and their quality, value or desirability, respectively.

Andersen (2011, p. 444) found that for Danish consumers a high price increased the desirability of organic products. Similarly, the results of Marian and Thøgersen (2013, p. 111) imply that for Danish consumers a high price indicated a high product quality, and that a low price had a negative impact on the expected taste. For olive oil, Sandalidou, Baourakis, and Siskos (2002, p. 400) showed that Greek consumers were not satisfied with the price–quality relationship. Zielke (2010, p. 748, country of research not known) compared the impact of the perceived product value and the perceived price level on the purchase in organic food stores and found that the impact of the perceived value is significantly stronger.

Only one study dealt with the relationship of consumption occasion and product price (Almli et al., 2011, p. 115, France & Norway). One other study touched on the justification for price premiums from the consumer perspective (Andersen, 2011, p. 445, Denmark). One study measured whether consumers perceived in-store implemented price reductions of organic food (Bunte et al., 2010, p. 406, Netherlands). Wathieu and Bertini (2007, p. 123, USA) researched the effect of price ranges on cognitive processes and purchase intentions and came to the conclusion that intermediate price ranges were most thought-provoking. Ngobo (2011, p. 98, France), moreover, disclosed that high prices attracted organic food consumers up to a certain threshold. Finally, one study investigated the price reference effect for organic olive oil and found that a price reference of a conventional product had a positive effect on the WTP for the organic product (Gil & Soler, 2006, p. 113, Spain).

7.3. Research gaps

Relatively few studies exist about reference prices, anchor prices, and price thresholds in the organic sector – four studies were included in the sample. There are some studies on the topics of the price–quality relationship and the price–value perception regarding organic food; however, the topic seems by far insufficiently grasped. A stronger quantitative focus of the latter would allow for a more accurate approximation of the impact of these phenomena on purchase decision-making. The topic of odd/even prices with regard to organic food was not covered at all. Knowledge about the above mentioned topics would allow managers to make more accurate decisions on consumer-oriented pricing for organic food.

In studies using focus group discussions as data collection method the number of focus groups depends on the homogeneity of views on the topic of research. However, Bryman (2008, p. 477) points out that there is a tendency towards 10–15 focus groups. Therefore, studies using four or less focus groups might be limited in their explanatory power.

8. Price knowledge

8.1. Methodology and sample

Of the two studies that treated price knowledge regarding organic food, one used a quantitative (Bunte et al., 2010) and one a qualitative (Chang & Zepeda, 2005) approach. For the quantitative approach face-to-face interviews were conducted with a sample of 4,728 respondents lacking a clear indication of the sampling method. The qualitative study used focus groups as data collection method and sampled 36 participants by judgment.

8.2. Current state of research

Bunte et al. (2010, p. 406) tested the price knowledge of organic and non-organic buyers in an experiment in the Netherlands: While one fifth of all respondents had no knowledge of the price of a product they had just bought, consumers of organic products

generally knew the prices. Overall, the prices of organic food were slightly overestimated. Similarly, in the study of [Chang and Zepeda \(2005, p. 163\)](#) conducted in Australia, most respondents could not determine the price difference between organic and non-organic food.

These results correspond in part to results of general consumer price knowledge research (not specific to organic) of which some findings are presented in the following: While a relatively large number of studies reported low consumer price knowledge (e.g., [Dickson & Sawyer, 1990, p. 49](#)), [Goldman \(1977, p. 73\)](#) differentiated in that he found price knowledge to be inversely correlated to socio-economic status. Price knowledge was, moreover, better for frequently purchased products ([Vanhuelen & Drèze, 2002, p. 80](#)). Findings of [Vanhuelen and Drèze \(2002, p. 80\)](#) indicated that price memory was formed rather, by a sense of magnitude than by the accurate price of the last purchase, was generated over a period of time, and included different memory types, such as photographic representations or sound. [Rosa-Diaz \(2004, p. 406\)](#) found that consumers knew the price relationship between different brands better than the actual prices. It was further revealed that price knowledge depends on the importance a subject placed on price ([Rosa-Diaz, 2004, p. 406](#)). [Binkley and Bejnarowicz \(2003, p. 32\)](#) concluded that the main factor leading to low price knowledge was the information cost, and [Vanhuelen and Drèze \(2002, p. 80\)](#) found that promotions enhanced memorisation of prices.

8.3. Research gaps

With only two studies on price knowledge in the sample, this realm of research is under exploited for organic food. In the sample, there were no studies on price information processing, price learning and price memory. Studies that test for price knowledge absolutely and studies that test for knowledge of the difference between organic and conventional prices are lacking.

9. Willingness-to-pay

9.1. Methodology and sample

Of the 146 studies covering the realm of WTP measurement, 144 applied a quantitative and 17 a qualitative approach, including 15 studies with a mixed methods approach. The three major data collection methods used in quantitative studies were face-to-face interviews (68), choice experiments (43), and contingent valuation (41). In 16 studies, data were collected via the internet and in another 12 studies data were collected through mail surveys. Auctions and conjoint experiments were conducted in 10 studies, each. Sensory testing (7), the use of household panel data (7) and sales data (7), Becker–DeGroot–Marschak (BDM) or similar lotteries (6), telephone interviews (6), computer assisted personal interviews (2), computer assisted telephone interviews (2), word association tests (1), information-display-matrices (1) and market inventories (1) were applied less often. The largest share of the quantitative studies gained their sample by convenience sampling (34). In 26 studies random sampling was applied, 20 used stratified

Table 7
Range, median, missing information and number of publications in the categories <100, 100–499, 500–999, >999 of quantitative studies on the WTP for organic food ($n = 138$) sourcing data directly from consumers.

Min. (cons.)	Max. (cons.)	Median (cons.)	n.i. (total)	<100	100–499	500–999	>999
30	14,436	384	2	6	82	19	31

n.i.: no clear information given; cons.: data directly sourced from consumers.

Table 8

Range, median, missing information and number of publications in the categories <50, 50–99, >99 of qualitative studies on the WTP for organic food ($n = 11$) sourcing data directly from consumers.

Min. (cons.)	Max. (cons.)	Median (cons.)	n.i. (total)	<50	50–99	>99
6	220	29	6	8	1	2

n.i.: no clear information given; cons.: data directly sourced from consumers.

sampling, 17 quota sampling, seven samples were collected by systematic sampling, and in one study, random digit-dialling was used. 138 studies sourcing data directly from consumers indicated their sample size: the range was 30–14,436 respondents with the median at 384. 82 studies had a sample size between 100 and 499, 19 between 500 and 999 and 31 more than 999 (see [Table 7](#)). The study with 30 participants conducted a functional Magnetic Resonance Imaging experiment combined with a lottery ([Linder et al., 2010](#)). Four studies sourced data not directly from consumers but used retail data instead, with 1,015–198,719 observations (median 1,837).

Most of the qualitative studies were conducted with focus groups (10). In three studies, in-depth interviews were used. Twice guided interviews and laddering were applied, respectively. For most studies, the sampling technique was not clearly indicated. Three studies applied systematic sampling, two quota sampling, and one judgmental sampling. The range of the sample sizes of the studies with clear indications (11) was between 6 and 220 with the median at 29. The majority (8) of qualitative studies had a sample size smaller than 50 (see [Table 8](#)). The study with 6 participants was a mixed-methods study with a focus group discussion forming the first step.

9.2. Current state of research

The 146 studies on the WTP mostly researched the price premiums which consumers would pay for organic food compared to conventional food (106 studies). In total, 24 studies differentiated between the WTP premiums for additional attributes of organic food ([Heid & Hamm, 2013, Germany](#); [Zander & Hamm, 2010, 5 European countries](#)), the WTP originating from different purchase motivations ([Aldanondo-Ochoa & Almansa-Sáez, 2009, Spain](#); [Cicia, Del Giudice, & Ramunno, 2009, Italy](#)), the effect of information ([Bougherera & Combris, 2009, France](#); [Gifford & Bernard, 2011, USA](#); [Rousseau & Vranken, 2013, Belgium](#)), brands ([Bauer, Heinrich, & Schäfer, 2013, Germany](#)), the share of organic ingredients in food ([Batte, Hooker, Haab, & Beaverson, 2007, USA](#)), or premiums for different organic labels (18 studies). Moreover, most studies concerned with the WTP for organic food reported the factors affecting the WTP, while this was the main focus of 15 studies. Due to the high number of studies in this subcategory, results can be summarised only in a compressed and general form.

Three studies investigated the development of the WTP for organic food over time. [Gonzalez \(2009, p. 507\)](#) found for Costa Rica that the average WTP rose from a 5.6% premium in 1999/2000 to a 25.1% premium in 2007/2008. For the USA, [Stevens-Garmon, Huang, and Lin \(2007, p. 112\)](#) were able to show that the overall average premiums for organic fruit and vegetables increased by 42% from 2001 to 2004. [Corsi and Novelli \(2011, p. 43, Italy\)](#) focused on beef in their study and concluded that, comparing the years 2001 and 2003, the demand for organic beef decreased but at the same time the share of consumers willing to pay high premiums increased as a result of the “mad cow” disease outbreaks.

There was no clear picture of the WTP a premium for organic food. All studies found that a large share of consumers was willing to pay a higher price for organic food, however, many studies revealed that the WTP differed by product categories (e.g.,

Krystallis, Fotopoulos, & Zotos, 2006, p. 100, Greece; Urena, Bernabéu, & Olmeda, 2008, p. 23, Spain), and consumer segments (e.g., Langen, 2011, p. 418, Germany; Liljenstolpe, 2011, p. 142, Sweden). While the WTP was especially high for the product categories biscuits, vegetables, pasta, poultry, meat, legumes, cheese, fruit, and bread, it was found to be relatively lower for milk, cereals, and potatoes (Krystallis & Chryssohoidis, 2005, p. 330, Greece; Sanjuán, Sánchez, Gil, Gracia, & Soler, 2003, p. 141, Spain; Yin et al., 2010, p. 1364, China). Hamzaoui-Essoussi and Zahaf (2012, p. 15, Canada) reported that there was a clear association between consumer segment, product category, and WTP. It must be noted, though, that the above reported results were retrieved in different countries.

As a general insight regarding consumer segments, it can be concluded that consumers with more positive attitudes towards organic food had a higher WTP than those with less positive attitudes (Bean & Sharp, 2011, p. 247, USA; Gil, Gracia, & Sánchez, 2000, p. 220, Spain; Lund, Andersen, & Jensen, 2013, p. 464, Denmark). Besides psychographic factors, consumer segments were also formed on the basis of socio-demographic data, purchase frequency, and the share of organic food of total food expenses (e.g., Urena et al., 2008, p. 23, Spain; van Loo, Hoang Diem, Pieniak, & Verbeke, 2013, p. 2126, Belgium). Studies grouping consumers according to their purchase frequency, revealed that habitual buyers have the highest WTP compared with occasional and non-buyers, while current organic consumers have the highest WTP compared to potential and non-buyers (van Loo et al., 2013, p. 2126, Belgium; Gil et al., 2000, p. 220, Spain; Sanjuán et al., 2003, p. 142, Spain). Moreover, findings imply that socio-demographic data have little influence on the WTP, at least less than attitudes (Batte et al., 2007, p. 152, USA; Botonaki, Polymeros, Tsakiridou, & Mattas, 2006, p. 86, Greece; Gil & Soler, 2006, p. 119, Spain). Regarding the influence of socio-demographic data on the WTP, contradicting results were obtained on the influence of family size, gender, educational level, and marital status. As for family size, evidence of both a negative influence (Batte et al., 2007, p. 152, USA; Bhatta, Doppler, & Bahadur, 2010, p. 207, Nepal; Ghorbani & Hamraz, 2009, p. 13, Iran), as well as a positive influence was found (Shuzzler, Govindasamy, & Adelaja, 2003, p. 155, USA; Smith, Huang, & Lin, 2009, p. 738, USA; Wong, Raghunathan, Escalante, & Wolfe, 2010, p. 83, USA). The finding that women had a higher WTP for organic food (Briggeman & Lusk, 2011, p. 24, USA) is accompanied by the finding that men had a higher overall WTP – which gender had the higher WTP differed by product group (Bhatta et al., 2010, p. 207, Nepal; Wong et al., 2010, p. 83, USA; Urena et al., 2008, p. 23, Spain). Regarding the influence of education level on the WTP, in contrast with Ghorbani and Hamraz (2009, p. 13, Iran) who found that the influence was negative, Bhatta et al. (2010, p. 207, Nepal) and Smith et al. (2009, p. 738, USA) found it positive. Another variable which yielded contradicting results regarding its effect on the WTP was marital status. Here as well, findings of a positive effect (Botonaki et al., 2006, p. 86, Greece; Smith et al., 2009, p. 738, USA) were accompanied by findings of a negative effect (Gil & Soler, 2006, p. 119, Spain). The results regarding household income were less contradicting. Most studies found a strong positive influence of the income variable on the WTP (e.g., Shuzzler et al., 2003, p. 155, USA; Wong et al., 2010, p. 83, USA), except for one that found the influence to be weak (Ghorbani & Hamraz, 2009, p. 13, Iran). More specifically, results implied that a middle income had a stronger positive effect on the WTP than a high income (Briggeman & Lusk, 2011, p. 24, USA; Haghiri, Hobbs, & McNamara, 2009, p. 90, Canada). The results of a large number of studies imply that age has a positive effect on the WTP (e.g., Bhatta et al., 2010, p. 207, Nepal; Shuzzler et al., 2003, p. 155, USA).

Moreover, the WTP differs between countries: In an international comparison (UK, France, Germany, US East Coast, US Midwest, francophone Canada, anglophone Canada) on organic wine, the lowest average WTP was found in francophone Canada, the highest average WTP in Germany (Mueller Loose & Remaud, 2013, p. 152). Another study on tomatoes compared the WTP in Ghana, Benin, and Burkina Faso and found the WTP in Benin and Burkina Faso to be higher than that in Ghana (Probst, Houedjofonon, Ayerakwa, & Haas, 2012, p. 305).

18 studies were concerned with the effect of labelling on the WTP. Two studies compared consumers' WTP for labelled and non-labelled organic products and found that the labelling of products increases the WTP (Bhatta et al., 2010, p. 204, Nepal; Hu, Batte, Woods, & Ernst, 2012, p. 505, USA). Other studies compared the effect of the application of different labels (e.g., Aprile, Caputo, & Nayga, 2012, Italy; Bond, Thilmany, & Bond, 2008, USA; Gerrard, Janssen, Smith, Hamm, & Padel, 2013, UK) or of the combination of labels (Karahan Uysal et al., 2012, Turkey; Onozaka & McFadden, 2011, USA; Tagbata & Sirieix, 2008, France).

In two studies on the effect of information on the WTP, participants were exposed to the information that organic production has environmental benefits but does not affect the healthiness, tastiness, or safety of food. While Bougherera and Combris (2009, p. 332, France) indicated a decrease of the WTP, the opposite was the case for the results of Rousseau and Vranken (2013, p. 35, Belgium). In a third study the information provided comprised of the legal requirements and key facts for organic or natural labelled products was found to increase the WTP of the majority of the participants, while at the same time decrease the WTP of nearly a third of the participants (Gifford & Bernard, 2011, p. 285, USA).

9.3. Research gaps

The field of WTP measurement is covered by a relatively large number of studies for organic food. However, results are partly ambiguous or even contrary. An in-depth analysis of results and reasons for differences and contradictions is not possible in the scope of this article (for reviews of general WTP measurement for any product reference is made to: Backhaus, Wilken, Voeth, & Sichtmann, 2005; Breidert, Hahsler, & Reutterer, 2006; Miller, Hofstetter, Krohmer, & Zhang, 2011; Voelckner, 2006).

In the presence of the ambiguities and contradictions despite the large number of studies on the WTP, an increase in comparability in order to draw meaningful conclusions for practitioners seems necessary. Therefore, it is noteworthy that a large share of studies applied contingent valuation method even though it is criticised for its incentive-incompatibility and susceptibility for hypothetical bias (Jedidi & Jagpal, 2009, p. 43). As Voelckner (2006, p. 142) revealed, the WTP is significantly higher in a hypothetical context than in a real context, and when comparing the WTP resulting of various methods, the values differed by 2–26%. Therefore, incentive-compatible methods should be applied to add more quality to the relatively large amount of publications.

Experimental auctions and lotteries were used in a relatively low number of studies even though many auction and lottery methods are incentive-compatible and achieve lower WTP values than other methods prone to overstating (Jedidi & Jagpal, 2009, p. 50). The drawbacks of auctions are that they are not mimicking the natural consumer behaviour process and are susceptible to gambling behaviour (Voelckner, 2006, p. 139). In this light, it is meaningful that choice experiment methods were present with a high number of studies as they are closer to the actual purchase situation especially if they include a binding purchase and a no-buy-option (Jedidi & Jagpal, 2009, p. 51; Miller et al., 2011, p. 173). Closest to the actual purchase situations are field experiments. Therefore, in field experiments the highest external validity

of results can be achieved (Malhotra, Birks, & Wills, 2012, p. 393). However, these methods were not applied in any of the studies analysed reflecting the low use frequency in marketing research in general (Ryals & Wilson, 2005, p. 347). The main reasons for the decision against a field experiment are the high costs in terms of money and time, the complex administration and difficult implementation, the security of product-related information and the uncertain persistency of the results (Aaker, Kumar, Day, & Leone, 2011, p. 328; Malhotra et al., 2012, p. 395).

In some cases, explanatory power of studies might be decreased due to a small sample size, in qualitative as well as in quantitative studies. Often sampling was done in only one or two cities which cannot be regarded as representative for a whole country due to regional differences. Regarding the sampling, only representative household panels or store tests in several parts of a country combined with survey questions on attitudes, values etc. allow for a conclusion on general consumer behaviour. As mentioned under Section 7.3., for focus group discussions one session seems to be too few to result in reliable information.

10. Conclusions

The price of organic food and its price premiums over conventional food have been of great interest to researchers as 194 research studies were identified in the time span from January 2000 to December 2013. In comparison, in a similar literature review study, only 48 studies on consumers' perceptions of organic product characteristics (Schleenbecker & Hamm, 2013) were identified in the time span from January 2000 to June 2011.

Of the 194 articles retrieved, the majority researched consumer-internal processes connected to consumer behaviour regarding the price of organic food. Only 20 articles investigated resulting consumer behaviour while two studies included both. In order to get conclusive insights into consumer behaviour and to specify consumer behaviour models, the results of research on consumer-internal processes need to be matched with tests of actual consumer behaviour, e.g., price tests at the point of sales.

From the perspective of consumer behaviour theories, the lack of studies on affective processes is a significant gap since knowledge on the cognitive as well as on the affective component is needed to design effective pricing strategies (cf. Evans et al., 2006, p. 29). The affective processes influence attitudes, and thus evaluation, learning and memory of prices (cf. Assael, 2004, p. 523; Jansson-Boyd, 2010, p. 71).

The often reported result that organic food prices are a major barrier to purchase is only conditionally useful for practitioners since the market volume is in fact growing and results for the price-quality relationship indicate reasonable opportunities for future organic markets in the light of trends in consumer attitudes (e.g., increasing awareness for environmental and social topics). Furthermore, there is not much sense in drawing conclusions from the price sensitivity of all consumers in a country if some consumers are not interested in buying organic food at all, and if only a very small proportion of all consumers is responsible for a high percentage of all organic food purchases. As Buder, Feldmann, and Hamm (2014, p. 391) have shown in an analysis of household panel data for the German market, 17% of the German population were responsible for 76% of all organic food purchases. Thus, it is advisable for further studies to pay special attention to the consumer price behaviour of heavy and medium buyers of organic food. Moreover, price-sensitive behaviour requires a certain degree of price knowledge (Plasmann-Weidauer, 2011, p. 171). The small amount of empirical evidence on this topic prohibits well-founded argumentation although existing findings indicate that general consumer price knowledge is rather low (differences may exist

between food groups). In order to increase the explanatory power of research, a stronger focus on suitable sampling techniques is needed. Since there is now a body of research on the topic, it is recommended to increase the depth of analyses of future research. Mixed results for the price elasticity of demand, and partly for the WTP, indicate need for further investigation. To increase the quality of conclusions that can be drawn from the existing state of the art, the comparability of studies should be improved.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.foodqual.2015.02.002>.

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3.2 Who cares about prices? An eye tracking study with consumers of organic and conventional food

Table 4: Contributions to the article "Who cares about prices? An eye tracking study with consumers of organic and conventional food"

TITLE OF ARTICLE	Who cares about prices? An eye tracking study with consumers of organic and conventional food
JOURNAL, STAGE IN ARTICLE PUBLICATION	Scientific journal, under review (13.12.2018)
AUTHORS LIST (*CORRESPONDING AUTHOR)	Manika Rödiger*, Ulrich Hamm
CONTRIBUTION TO ARTICLE (CONTRIBUTION TO ARTICLE IN %)	Manika Rödiger (85%): Idea development and outline of article, structure of article, data analysis, draft of all sections of the manuscript, editorial tasks Ulrich Hamm (15%): Feedback to manuscript
ASSOCIATED PROJECT (TITLE, FUNDING, START AND END TIME)	Die visuelle Preisinformationsaufnahme während der Kaufentscheidung bei ökologischen und konventionellen Lebensmitteln (Visual price information intake during the purchase decision of organic and conventional products); no third-party funding; August 2016 to November 2017
PROJECT LEAD	Prof. Dr. Ulrich Hamm
PROJECT HANDLING	Manika Rödiger
TASKS OF DOCTORAL CANDIDATE	Development of the study; planning, administration and conduction of study; data processing and analysis; writing an article; August 2016 to April 2018

Who cares about prices? An eye tracking study with consumers of organic and conventional food

Manika Rödiger, Ulrich Hamm

Abstract

There is a knowledge gap regarding the visual information search for organic prices during shopping. This study aimed to give insights on this subject and thus measured the visual information search using mobile eye-tracking glasses in a laboratory test market with 148 consumers. Study participants had to decide for one among six unfamiliar brands in each of two categories. Consumers were grouped according to their choices in the test market into ‘conventional consumers’, ‘regular organic consumers’ and ‘occasional organic consumers’. These groups were investigated regarding their visual search for organic compared to conventional package and price information. The results showed that only 4.1% of participants did not look at any organic prices. Further, most (organic) price tags are fixated at least once and approximately three quarters of (organic) price tags were reexamined after a first look. There was no difference between regular organic, occasional organic and conventional consumers in the amount of visual attention allocated to organic prices; however, of the time that participants spent looking at organic alternatives, conventional consumers gazed significantly longer at organic prices than regular and occasional organic consumers. The fixation durations on organic packages, conventional prices and conventional packages were significant predictors of the choice of organic and conventional products. The results imply that the precondition for price comparisons and evaluations, i.e. noticing prices, is met for most products in all consumer groups. Regular and occasional organic consumers pay attention to organic and conventional prices despite their organic ‘predisposition’. Even though conventional consumers are more focused on prices, many of them chose a conventional product which was higher priced than an organic alternative. Hence, other motivations also play a determining role for their choices.

Keywords: consumer behaviour, organic food, price, eye tracking, visual attention, purchase decision

1 Introduction

Research has identified several barriers to the purchase of organic food, such as price, availability, visual appearance, taste, mistrust, eating habits, and a lack of appropriate cooking skills (Aertsens *et al.*, 2009; Buder *et al.*, 2014; Hughner *et al.*, 2007; Padilla Bravo *et al.*, 2013). Price has been discussed as a key barrier by many authors (Aertsens *et al.*, 2009; Gottschalk and Leistner, 2013; Hughner *et al.*, 2007; Lee and Yun, 2015; Padilla Bravo *et al.*, 2013). However, the scientific discussion of the role of price for organic food sales is multifarious. Some findings indicate that organic sales increase with lower organic prices (Bezawada and Pauwels, 2013; Fourmouzi *et al.*, 2012; Jonas and Roosen, 2008; Schröck, 2012) while others show no such relationship between price and demand (Bunte *et al.*, 2010; Monier *et al.*, 2009; van Herpen *et al.*, 2012) or point to an inverted U-shaped relationship (Ngobo, 2011).

These previous research findings applied to all consumers. A closer look, however, reveals differences among consumer groups. Padel and Foster (2005), for instance, distinguished between occasional and regular organic consumers. Their focus group discussions revealed that occasional organic consumers perceived organic food prices as too high for their available budget, while regular organic consumers regarded organic food as good value for money. From studies on the willingness-to-pay and the price elasticity of demand for organic food, it is known that regular organic consumers differ from occasional organic and conventional consumers by showing a higher willingness-to-pay and a lower price sensitivity (Aschemann-Witzel and Zielke, 2017; Janssen, 2018). Therefore, it can be concluded that price as a barrier to the purchase of organic food plays a different role for regular organic, occasional organic, and conventional consumers.

A logical precondition for consumers' responses to prices is that information on prices is noticed. However, beside assumptions, very little is known about the actual intake of organic price information of conventional consumers. After decreasing organic food prices in a real supermarket without a distinct increase in organic sales, the authors hypothesised that many consumers who were used to purchasing conventional food did not even notice the price change in organic food (Bunte *et al.*, 2010). In another study in a real supermarket, a consumer with a positive attitude towards organic food justified the purchase of a conventional product by citing the high prices of organic food, even though the organic alternative was offered that day at the same price; a fact that had gone unnoticed (Aschemann-Witzel and Niebuhr Aagaard, 2014). Hence, even if conventional consumers had positive attitudes towards organic food, but usually did not purchase organics due to the premium price, they may not have reacted to price reductions simply because they did not notice them.

Moreover, it is not known whether, or to what degree, regular organic consumers pay attention to organic prices. Instead, it is speculated that they pay little attention to organic

food prices due to their high willingness-to-pay and low price elasticity of demand for organic food (Aschemann-Witzel and Zielke, 2017; Janssen, 2018).

There is a research gap regarding the visual acquisition of organic price and package information by consumers in a purchase situation, and differences in this regard between regular organic, occasional organic, and conventional consumers. The aim of the study is to fill this research gap using eye-tracking in a laboratory test shop. The advantage of eye-tracking is that it is an objective, unbiased measure of visual information intake (Feiereisen *et al.*, 2008), compared to surveys which do not reflect real gaze behaviour (Balcombe *et al.*, 2015) and can be prone to social-desirability or interviewer bias (Grover and Vriens, 2006; Wrenn *et al.*, 2002). A shopping situation with unfamiliar products, such as shopping in a foreign country, was simulated. This enabled research on the (share of) visual attention on organic and conventional package and price information that consumers needed to decide to buy or to not buy organic products.

2 Literature review and research questions

2.1 Consumer segmentation

Instead of describing the average consumer, the advantage of segmentation is the group-specific investigation and profiling regarding the differences to other groups and similarities to members of the same group (Nie and Zepeda, 2011). This enables marketers to purposefully address one or more specific groups with marketing activities. Hence, segmentation is necessary to understand how a certain product, for example organic food, can be made relevant to different consumer groups and how the product can be positioned in the market to be competitive (Vanhonacker *et al.*, 2007).

There are many studies that have segmented consumers with the aim of characterizing potential or actual organic food consumers. Zander *et al.* (2015), for instance, identified four clusters in a study conducted in six European countries: ‘organic disinterested’ consumers, ‘organic sceptics’, ‘committed organics’ and ‘pragmatic organics’ (segmentation was done based on attitudes towards organic farming and EU legislation). Nie and Zepeda (2011) grouped United States consumers based on food related lifestyle factors. They identified two of four groups in which more than half of the group members bought organic food occasionally. Schäufele and Hamm (2018) investigated German wine consumers based on their attitudes towards organic and local/domestic food, as well as towards responsibility for the environment and society. Of the six groups they identified, three groups had a higher expenditure share for organic wines. Żakowska-Biemans (2011) segmented Polish consumers into five groups, based on food choice and food related lifestyle factors, of which two had a higher share of organic food expenditure than the other groups. Another way of grouping consumers is according to their purchase behaviour towards organic food, such as their expenditure share for or purchase frequency of organic food.

2.2 *Human visual attention in food shopping situations*

Eye-movements are characterised by fixations, during which the eyes are relatively still while focusing a locus, and saccades, which are the movements of the eyes from one locus to the next (Duchowski, 2007; Holmqvist *et al.*, 2011). Only a small part of the eye, the fovea, allows the eye to see sharply and thus, objects must be fixated for closer examination (Holmqvist *et al.*, 2011). Areas of the eyes outside the fovea, so called parafoveal and peripheral vision, also deliver information to the brain. However, this kind of information is of a contextual nature (Duchowski, 2007; Rayner, 1998). Thus, humans can understand what kind of scene they are looking at, how the scene is spatially composed, and how cluttered the visual field is in just one fixation (Chandon *et al.*, 2009). During saccades, little or no information is acquired (Holmqvist *et al.*, 2011; Rayner, 1998). Even though attention and fixations can decouple, in normal situations and in complex tasks they are closely linked. Thus, observing the fixations of individuals allows conclusions on the information they process to be drawn (Holmqvist *et al.*, 2011; Rayner, 1998).

From a marketing perspective, the drivers of visual attention are of interest because visual attention influences choice (Orquin and Mueller Loose, 2013). Previous studies established a link between the count or duration of fixations on a product and the probability of choosing that product (Chandon *et al.*, 2009; Gere *et al.*, 2016; Gidlöf *et al.*, 2017; Orquin and Mueller Loose, 2013; Pärnamets *et al.*, 2016). Chandon *et al.* (2009), for instance, showed that the fixation count is positively correlated with product consideration and choice. The results of Glaholt and Reingold (2009) confirmed that gaze duration was generally longer for chosen items. This observation is categorised as a utility effect, meaning that information with a greater importance for choice-making is looked at longer (Orquin and Mueller Loose, 2013).

A lower level of visual attention is allocated to prices than to packages (Balcombe *et al.*, 2015; van Loo *et al.*, 2014). Krajbich *et al.* (2012) found fixations on prices to be shorter than fixations on packages. Krajbich *et al.* (2012) further showed that, in a choice situation for one product at a time, more fixations on the price were associated with a high probability of no-buy, while more fixations on the package made a purchase more probable.

2.3 *Research questions*

Based on the literature background on human visual attention and consumer segmentation, the following research questions (RQ) related to the differentiation between regular organic, occasional organic and conventional consumers are driving the analysis:

- RQ1: How many regular organic, occasional organic and conventional consumers ignore price information?
- RQ2: How many different price tags are viewed at least once by regular organic, occasional organic, and conventional consumers?
- RQ3: What is the share of prices that are refixated after they had been looked at once by regular organic, occasional organic, and conventional consumers?

RQ4: How do regular organic, occasional organic, and conventional consumers differ in the allocation of visual attention to organic and conventional prices and packages of unfamiliar products?

RQ5: Can the visual attention allocated to organic and conventional prices and packages, together with attitudes towards organic food, predict consumers' decisions for or against the purchase of organic food products?

3 Material and Methods

3.1 Study design

The study was designed to observe participants' visual attention during a shopping task in which they had to choose one product per product category from two different product categories. Participants faced product categories that they were familiar with because in a screening question they claimed they bought them at least 'sometimes'. However, the specific products were supposedly unfamiliar to them since they consisted of Swiss and Austrian brands which were not sold in German supermarkets. The reason for using familiar product categories was that the purchase situation should be as realistic as possible. Unknown products were used to rule out habitual purchases and therefore, to stimulate participants to acquire as much information as necessary for them to decide. It is assumed that by giving participants a shopping task instead of letting them view the scene freely, the visual attention recorded by an eye-tracker would reflect their information search for the product that best fitted their preferences (based on utility effect, Orquin and Mueller Loose, 2013). Impulse buying was avoided as far as possible by the non-use of in-store advertising, product placement, or price reduction communication. Participants had no time limit for their choices.

3.2 Study procedure

A laboratory test shop was set up in a German city which contained laptops for the questionnaire beside mock-up supermarket shelves. The study procedure involved participants going shopping in the test shop with eye-tracking glasses to record their eye-movements and their product choices. Then they answered the questionnaire. Before equipping participants with the eye-tracker, the participants were told that the eye-tracker would record their eye-movements. A three-point calibration of the eye-tracking glasses was performed in front of a shelf containing four dishwashing detergents. Then, the actual shopping task was explained to the study participants according to the following script:

'Please imagine that you are going to shop for food in a normal supermarket. Behind the next partition, you will find the supermarket in which you will actually shop and pay for food with your money. You need the following two items: Strawberry jam and fusilli noodles. You purchase one item each, i.e. one jar of strawberry jam and one package of fusilli noodles. Choose the products that you

would choose on a normal shopping trip. You can touch all products. Take as much time as you would for a normal shopping trip.'

3.3 Product stimuli

Regarding the practicability of sampling, it was necessary to use products purchased frequently by German consumers. However, product categories which are very frequently purchased and are strong determinants for price impression such as milk, butter, bread, and yogurt, have a strong impact on gaze behaviour (Lourenço *et al.*, 2015; Simon and Fassnacht, 2016; Sprott *et al.*, 2003). The decision was made in favor of strawberry jam and fusilli noodles since the aforementioned criteria hold and these products do not undergo seasonal price variations (similar in Clement, 2007).

To create a realistic setting, four conventional and two organic items were placed in the test market for each product category. The final selection of items was based on a high similarity of product characteristics such as fruit content and package size (see Figure 2 and Figure 3).

To set the prices of the items, prices in two discount stores, two hypermarkets, and one supermarket were collected and compared for all strawberry jams and fusilli noodles for sale. On this basis, a realistic price range and price difference between organic and conventional items was portrayed on the laboratory shelves.



Figure 2: Strawberry jams on the shelf of the test market

Source: own photo



Figure 3: Fusilli noodles on the shelves of the test market

Source: own photo

3.4 Questionnaire

The structured questionnaire was designed for computer-assisted self-interviewing purposes. The answer categories were mostly provided in the form of seven-point balanced scales with all points labelled with numbers, and end- and midpoints also labelled with text. The survey included questions on the purchase frequency, the importance of several product characteristics for their choice in the test market, statements to examine personal interest in food purchasing, attitude towards organic food and its price, and the perceived price-performance ratio of organic food. The statements were mostly adapted from literature: the personal interest in food purchasing from Bearden *et al.* (2011, p. 266), the statements on the perceived price-performance ratio of organic food from Netemeyer *et al.* (2004), and the statements on trust towards organic food from Janssen and Hamm (2012). Furthermore, socio-demographic data on age, highest educational level, household size, number of children living in the household, actual household income, perceived household income relative to the German average, and gender were collected.

3.5 Eye-tracking device and processing of eye-tracking data

Mobile eye-tracking glasses by SensoMotoric Instruments (SMI, Teltow, Berlin) that sampled binocularly at a rate of 60 Hz were used. The video-based gaze data were mapped on photos

of the products (Figure 2 and Figure 3) with the software BeGaze™ of SensoMotoric Instruments. An event-based mapping procedure was used in which the algorithm of the software detects and aggregates fixations in a specified radius (SensoMotoric Instruments, 2015). The events were mapped independently by two researchers, each with one half of the participants. Areas of interest (AOIs) for the product packages and price tags were created. To check for inter-coder reliability, 15 videos were mapped by both researchers. The inter-coder reliability was checked for the variables ‘fixation duration’ and ‘fixation count’ for all AOIs. The overall average consensus was 81.73% (SD 32.60, n=552) which can be rated as good (Stemler, 2004).

The eye-tracking data quality was assessed separately for each product. The data quality for the products was judged sufficient per case if there was either no drift or a drift that was small enough to capture the data in a large AOI, and if there were no major data gaps. For these cases and products, the AOIs were visually checked if, with their size, they captured all fixations of the cases with sufficient data quality.

3.6 Eye-tracking parameters

The analyses are based on the parameters ‘fixation count’ and ‘fixation duration’. The total fixation duration is defined as the sum of fixation durations on all AOI’s for noodles and jam. The total fixation duration covered a very sizeable span: \bar{x} =33.21 seconds, SD=20.88 seconds, x_{\min} =4.78 seconds, x_{\max} =104.73 seconds. In some analyses, the share of fixation duration was used instead of the absolute fixation duration since the intention was to investigate how consumers divide their visual attention between different sources of information. The share of fixation duration was calculated according to equation 1 where x is a placeholder for subjects of interest, for example organic jam prices.

$$\text{Share of fixation duration on } x = \frac{\text{fixation duration on } x}{\text{total fixation duration}} \quad (\text{equation 1})$$

The participants spent 57% of the total fixation duration looking at jams and 43% on noodles. However, the shares of fixation duration allocated to conventional and organic prices and packages within the time spent looking at one of the product categories, respectively, did not differ significantly except for shares of fixation duration spent on conventional jam packages versus conventional noodle packages (organic noodle and jam prices: T(147)=1.03, p=0.30; organic noodle and jam packages: T(147)=1.61, p=0.11; conventional noodle and jam prices: T(147)=0.37, p=0.72; conventional noodle and jam packages: T(147)=-2.21, p=0.03;). Therefore, it was assumed reasonable to aggregate fixation durations of jam and noodles for organic and conventional prices and packages, each. Hence, variables that were used for further analyses always correspond to fixation duration on organic and conventional prices and packages aggregated for jam and noodles.

3.7 Sample

Study participants were sampled by quota sampling combined with systematic sampling. According to the German population (Statistisches Bundesamt, 2017), the quotas regarding gender were 51% females and 49% males. For age, in both genders, the quotas were 50% in the age groups 18-44 and 45 or older, respectively. To start, study participants were approached systematically (every third person) on the central shopping street of a medium sized German city with average purchasing power (Michael Bauer Research GmbH, 2017). The aim was to achieve a sample of German food shoppers, so no quotas or filter questions for organic or conventional shopping habits were used. To take part in the study, participants had to reply positively to two questions to confirm whether they were at least partially responsible for the food shopping in their household, and whether they bought jam and noodles at least occasionally.

In total, 255 participants took part in the study of which 250 completed both the survey and the shopping task. Six cases were ignored for the analyses due to implausible answers in the survey. Income statements which were below the social assistance level in Germany were treated as missing values. Ten cases were excluded because they were identified as outliers regarding the total fixation duration. The aggregation of eye-tracking data from jam and noodles resulted in a further reduction of the sample that could be used for analysis because, for 86 participants, the quality of the eye-tracking data for either jam or for noodles was too poor for analysis. The aggregated variables could not be calculated for these participants. Thus, the sample size for analysis is 148.

The resulting sample corresponds relatively well to the population of the city under investigation (see Table 5). The variables ‘mean age’ and ‘mean number of household members’ are particularly similar for both groups. The average monthly disposable household income is also very close. Differences become apparent upon examining specific age groups, the shares of men and women, and the number of households with children in general, and those with more than three children, specifically. These differences occurred because of the high number of cases that had to be excluded due to data quality issues.

Table 5: Socio-demographic characteristics of the sample and the population of the investigated city, 2016

		Sample	City under investigation ^a
Gender (n=148)	Female	46.6%	51.0%
	Male	53.4%	49.0%
Age (n=145)	Average	43.4 years	42.6 years
	18-44	46.9%	38.5%
	45-64	41.4%	26.6%
	>64	11.7%	19.5%
Households (n=147)	Average number of household members	2.0 persons	1.9 persons
	1-person households	46.9%	51.9%
	Households with children	24.5%	17.2%
	Households with 3 or more children	4.8%	12.5%
Household income (n=141)	Average monthly disposable household income (sample: 2016 / city of investigation: 2014)	1778.20€	1699.33€

^aSource: Stadt Kassel – Fachstelle Statistik (2017), disposable household income based on Hessisches Statistisches Landesamt (2016)

3.8 Statistical analyses

First, the grouping variable, i.e. independent variable for the analyses RQ1-4 and dependent variable for RQ5, is explained: Since participants had to choose one jar of jam and one package of noodles, and in each product category the choice could be made for one of the conventional or one of the organic options, the purchase decision was classified into three categories: no organic product (two conventional), one organic product (one conventional and one organic), or two organic products (no conventional). The product choice in the test market and the stated expenditure share for organic food of the total food budget (measured in four categories: 0-5%, 6-10%, 11-20%, and 21% or more) were medium strongly associated, shown by Kendall's $\tau_b=0.40$, $p<0.01$. A Kruskal-Wallis-test supported the assumption of a relationship between the number of organic products chosen in the test shop and the stated expenditure share for organic food ($H(2)=37.4$, $p<0.01$). Therefore, it is assumed that the choice of organic food in the test market roughly reflects choice behaviour regarding organic food in real purchase situations. Accordingly, the group of consumers having selected no organic product in the test market is labelled 'conventional consumers', the group having selected one organic product is the group of 'occasional organic consumers', and the group having chosen two organic products is named 'regular organic consumers'.

RQ1 to RQ4 were analyzed by descriptive statistics and analysis of variance (ANOVA). The dependent variables of the analyses of variance were fixation counts, share of refixations, the absolute values and shares of fixation duration on organic and conventional prices and packages of the total fixation duration, and the shares of fixation duration on organic (conventional) prices of the fixation duration on all organic (conventional) prices and packages, as well as the shares of fixation duration on all prices and packages. The nonparametric Kruskal-Wallis-test was used instead of ANOVA if the dependent variable was non-metric or if assumptions for ANOVA were strongly violated. The Welch-test was applied instead of the F-test in cases where homogeneity of variance was violated. Hochberg's GT2 Post-hoc test was used when variances were homogeneous because it can cope with different group sizes. The Games-Howell Post-hoc test was applied when variances were inhomogeneous for the same reason (Field, 2013).

For RQ5, a multinomial logistic regression analysis was conducted. The independent variables were the fixation durations on organic packages, and conventional price and package information. The variable fixation duration on organic prices was not used in the model because of a strong correlation with the fixation duration on conventional prices and the results of an ANOVA showing no significant difference in organic price fixation duration between the groups. Attitudes towards organic food, household income, and the importance of price for the purchase decision made in the test shop were additional independent variables in the analysis. For the multinomial logistic regression analysis, the data were checked for multivariate outliers by Mahalanobis distance. Five outliers were identified and excluded from the analysis.

4 Results

Before addressing the study's research questions, the choices participants made between the differently priced brands of jam and noodles in the test shop are described (see Table 6). The (conventional) jam with the lowest price (0.79€) was chosen by 33.1% of participants and the low-priced organic jam (1.29€) by 27.7%. The lowest-priced (conventional) noodles (0.99€) were selected by 37.8% of participants and the low-priced organic noodles (1.19€) by 27.0%. No brand was left unchosen by the participants.

Of the regular organic consumers, 63.6% chose the low-priced organic jam, and 81.8% the low-priced organic noodles. Thus, most regular organic consumers opted for the low-priced organic alternative. Of the conventional consumers, 57.7% took the lowest-priced conventional jam, and 54.9% the lowest-price conventional noodles. In the group of the occasional organic consumers, most decided for the low-priced organic jam (45.5%), while 18.2% chose the lowest-priced conventional jam. In the noodles category, 38.6% decided for the lowest-priced conventional noodles, 29.5% for the low-priced organic noodles and 18.2%

for the higher-priced organic noodles. Hence, in the noodles category, most occasional organic consumers decided for the lowest-priced conventional option. Both regular and occasional organic consumers, mostly opted for the low-priced organic product amongst the organic alternatives offered.

Table 6: Choice of jam and noodle brands

	Brands	Price (€)	All participants (n=148)	Regular organic consumers (n=33)	Occasional organic consumers (n=44)	Conventional consumers (n=71)
Jams	Grandessa	0.79	33.1%	-	18.2%	57.7%
	MigrosBio (organic)	1.29	27.7%	63.6%	45.5%	-
	Sonngut	1.39	18.9%	-	15.9%	29.6%
	Grandessa Naturrein	1.99	7.4%	-	9.1%	9.9%
	NaturAktiv (organic)	1.99	10.1%	36.4%	6.8%	-
	Meinl	2.99	2.7%	-	4.5%	2.8%
Noodles	Spar	0.99	37.8%	-	38.6%	54.9%
	NaturAktiv (organic)	1.19	27.0%	81.8%	29.5%	-
	MClassic	1.39	5.4%	-	0.0%	11.3%
	Ja! (organic)	1.59	9.5%	18.2%	18.2%	-
	Coop	1.79	14.9%	-	6.8%	26.8%
	Denner	1.99	5.4%	-	6.8%	7.0%

4.1 Participants ignoring price information (RQ1)

As can be seen in Table 7, overall, 1.4% of participants did not fixate any of the price tags. The share of participants that either ignored all organic or all conventional prices was slightly higher with 4.1% of participants with no fixations on organic prices and 3.4% with no fixations on conventional ones. It should be noted that the chance of fixating a conventional price was higher since there were twice as many conventional products than organic products on the shelves. Occasional organic consumers revealed the highest shares of non-fixations of all prices, organic prices, and conventional prices.

Table 7: Shares of participants who ignored prices

Prices	All participants (n=148)	Regular organic consumers (n=33)	Occasional organic consumers (n=44)	Conventional consumers (n=71)	Test statistic	Effect size η^2
All prices	1.4%	0.0% ^a	4.5% ^a	0.0% ^a	H(2)=4.76	0.019
Organic	4.1%	3.0% ^a	6.8% ^a	2.8% ^a	H(2)=1.22	0.005
Conventional	3.4%	6.1% ^a	6.8% ^a	2.8% ^a	H(2)=4.77	0.019

Note: ^{a, b, c} different letters mark significant group differences; *significant at $\alpha=0.05$ /intermediate effect, **significant at $\alpha=0.01$ /strong effect

4.2 Different price tags fixated (RQ2)

Table 8 shows that the participants fixated, on average, 9 out of 12 price tags. Moreover, three out of four organic price tags were noticed on average, while six out of eight conventional price tags were fixated at least once.

Regular organic, occasional organic, and conventional consumers did not differ in the amount of organic prices they noticed. They differed, however, in the number of conventional price tags and price tags noticed overall. In both cases, there was a significant difference between the conventional and regular organic consumers with the former noticing a higher number of price tags.

Table 8: Number of prices fixated at least once

Prices	All participants (n=148)	Regular organic consumers (n=33)	Occasional organic consumers (n=44)	Conventional consumers (n=71)	Test statistic	Effect size ω^2
All prices	9.08 (3.30)	7.48 ^a	8.73 ^{a,b}	10.04 ^b	F(2, 69.05)= 7.38**	0.084*
Organic	3.01 (1.16)	2.76 ^a	2.95 ^a	3.15 ^a	F(2, 145)= 1.38	0.005
Conventional	6.07 (2.36)	4.73 ^a	5.77 ^a	6.89 ^b	F(2, 66.01)= 9.98**	0.122*

Note: The numbers in the table refer to means (standard deviations). There were four organic and eight conventional price tags. ^{a, b, c} different letters mark significant group differences; *significant at $\alpha=0.05$ /intermediate effect, **significant at $\alpha=0.01$ /strong effect

4.3 Share of prices refixated (RQ3)

Overall, 72.9% of prices that had been fixated at least once were revisited by the participants (see Table 9). The share of refixated organic prices was, at 74.8%, slightly higher than that of conventional prices at 71.9%. The share of overall price refixations was relatively similar among regular organic, occasional organic and conventional consumers, ranging between 71.4% and 73.7%. The lowest share of refixations could be observed for regular organic consumers concerning conventional prices with a refixation share of 67.3%. The same group showed the highest share of refixations with 76.6% of organic prices reexamined after a first look.

Table 9: Shares of price tags that were refixated

Prices	All participants	Regular organic consumers	Occasional organic consumers	Conventional consumers	Test statistic	Effect size ω^2
All prices (n=146)	72.9%	71.4% ^a	72.6% ^a	73.7% ^a	F(2, 143)=0.11	-0.012
Organic (n=142)	74.8%	76.6% ^a	73.4% ^a	74.8% ^a	F(2, 139)=0.09	-0.013
Conventional (n=143)	71.9%	67.3% ^a	72.9% ^a	73.3% ^a	F(2, 140)=0.50	-0.007

Note: There were four organic and eight conventional price tags. ^{a, b, c} different letters mark significant group differences; *significant at $\alpha=0.05$ /intermediate effect, **significant at $\alpha=0.01$ /strong effect

4.4 Allocation of visual attention (RQ4)

Overall, participants allocated about one quarter of their fixation duration to price information and three quarters to information on packages (see Table 10). The quarter of total visual attention allocated to prices was equally divided between organic and conventional prices with approximately 12% each. The division of visual attention between organic and conventional packages was also relatively even, with conventional packages receiving about 5% less visual attention.

Regular organic consumers paid significantly less attention to prices and more to packages than conventional consumers. When distinguishing between organic and conventional prices and packages, all three groups differed significantly in the shares of visual attention to organic packages and conventional packages and prices, but not in the share allocated to organic prices. Conventional consumers had the highest shares for conventional packages and prices, while regular organic consumers had the lowest. For organic packages it was the opposite.

Considering only the time participants spent examining organic alternatives, the data show that conventional consumers allocated nearly a third of their visual attention to prices, while regular organic consumers spent less than 15% of their time on prices. A similar pattern could

be observed for the share of visual attention allocated to prices considering only the time participants looked at conventional alternatives.

An examination of group differences regarding the absolute fixation duration revealed that all three groups differed significantly in their fixation duration on organic packages with conventional consumers fixating the shortest time and regular organic consumers the longest. Moreover, regular organic consumers and conventional consumers differed significantly in the duration they spent looking at conventional prices. Here, it was the regular organic consumers who gazed shorter at conventional prices than conventional consumers.

Table 10: Shares of and absolute fixation duration (SD) on organic and conventional prices and packages

Fixation duration	All participants (n=148)	Regular organic consumers (n=33)	Occasional organic consumers (n=44)	Conventional consumers (n=71)	Test statistic	Effect size ω^2
<i>Shares of fixation duration</i>						
Prices of total	24.0% (17.1)	15.8% ^a	22.1% ^{a,b}	29.0% ^b	F(2, 145)= 7.72**	0.083*
Packages of total	76.0% (17.1)	84.2% ^a	77.9% ^{a,b}	71.0% ^b	F(2, 145)= 7.72**	0.083*
Organic prices of total ¹	11.9% (9.4)	9.7% ^a	11.7% ^a	13.0% ^a	F(2, 145)= 1.36	0.005
Organic packages of total ¹	40.5% (17.2)	60.4% ^a	43.9% ^b	29.1% ^c	F(2, 145)= 79.88**	0.516**
Conventional prices of total ¹	12.0% (9.4)	5.7% ^a	10.0% ^b	16.3% ^c	F(2, 92.7)= 24.97**	0.205**
Conventional packages of total ¹	35.6% (13.5)	24.2% ^a	34.4% ^b	41.7% ^c	F(2, 86.8)= 29.36**	0.249**
Organic prices of organic	24.2% (19.0)	14.4% ^a	20.7% ^a	30.9% ^b	F(2, 88.8)= 12.35**	0.117*
Conventional prices of conventional	24.5% (17.2)	17.3% ^a	23.0% ^{a,b}	28.7% ^b	F(2, 145)= 5.50**	0.057
<i>Absolute fixation duration (s)</i>						
Organic prices ¹	1.39 (1.70)	1.35 ^a	1.39 ^a	1.40 ^a	F(2, 145)= 0.01	-0.014
Organic packages ¹	4.93 (4.75)	9.33 ^a	4.86 ^b	2.92 ^c	F(2, 59.23)= 17.53**	0.268**
Conventional prices ¹	1.33 (1.50)	0.84 ^a	1.18 ^{a,b}	1.65 ^b	F(2, 145)= 3.80*	0.036
Conventional packages ¹	3.81 (2.82)	3.43 ^a	3.59 ^a	4.13 ^a	F(2, 145)= 0.89	-0.002

Note: ^{a,b,c} different letters indicate significant difference; *significant at $\alpha=0.05$ /intermediate effect, **significant at $\alpha=0.01$ /strong effect. ¹The figures presented were adjusted for the different amounts of product variants for organic and conventional and show the average for one item.

4.5 The explanatory power of visual attention in purchase decisions (RQ5)

A multinomial logistic regression model was estimated to test the hypothesis that the visual attention paid to organic and conventional prices and packages, together with attitudes, is useful in explaining purchase decisions. The visual attention variables, fixation duration on organic packages, conventional packages, and conventional prices (in seconds, s), were used as predictors for the participants' decision for two conventional products (conventional consumers), one organic and one conventional product (occasional organic consumers) or two organic products (regular organic consumers) in the test shop. Based on theoretical considerations and findings of previous studies, additional variables were tested for their model fit (see Table 11). All variables, except for the visual attention variables, were centred to their means before using them in the model.

The visual attention variables were significant predictors for the participants' choice of organic product variants. The fixation duration on organic packages had the strongest effect with a one second increase in fixation duration increasing the odds of selecting one instead of no organic product by 282%, and for the choice of two instead of no organic product by 487%, everything else held constant. The amount of visual attention on conventional packages and prices had a significant negative impact on the choice of one or more organic products in the test shop. One second of increase in fixation duration on conventional prices decreased the odds of choosing two organic products by 63% and one organic product by 48%.

A positive attitude towards the value for money of organic food had a significant positive impact on the choice of two organic products. With an increase of one scale point in the rating of the statement 'When I eat organic food, I feel that it is worth it.' a rise in odds of 99% for the choice of two instead of no organic product can be expected. All other items included in the analysis proved non-significant in their effect on the choice of organic products.

Table 11: Results of a multinomial logistic regression analysis on the purchase decision (group membership)

	B (SE)	95% Confidence Interval for Odds Ratio		
		Lower	Odds Ratio	Upper
Occasional organic (1 organic product) vs. conventional consumers (0 organic product)				
Constant term	-0.27 (0.50)	-	-	-
FD on organic packages (s)	1.34 (0.28)**	2.23	3.82	6.57
FD on conventional prices (s)	-0.66 (0.30)*	0.29	0.52	0.92
FD on conventional packages (s)	-1.18 (0.28)**	0.18	0.31	0.53
When I eat organic food, I feel that it was worth the money.	0.17 (0.18)	0.83	1.19	1.70
I think organic food is too expensive.	-0.07 (0.18)	0.66	0.94	1.33
Organic food is healthier than conventional food.	0.06 (0.19)	0.72	1.06	1.54
I think organic food is environmentally-friendly.	-0.01 (0.17)	0.71	0.99	1.39
Household income (relative to average)	-0.16 (0.21)	0.56	0.85	1.29
Importance of price for purchase decision	-0.05 (0.23)	0.61	0.95	1.50
Regular organic consumers (2 organic products) vs. conventional consumers (0 organic product)				
Constant term	-1.86 (0.75)*	-	-	-
FD on organic packages (s)	1.77 (0.31)**	3.20	5.87	10.77
FD on conventional prices (s)	-0.99 (0.43)*	0.16	0.37	0.87
FD on conventional packages (s)	-1.63 (0.34)**	0.10	0.20	0.38
When I eat organic food, I feel that it is worth the money.	0.69 (0.26)**	1.19	1.99	3.34
I think organic food is too expensive.	-0.27 (0.26)	0.46	0.76	1.27
Organic food is healthier than conventional food.	0.52 (0.31)	0.92	1.69	3.09
I think organic food is environmentally-friendly.	-0.34 (0.27)	0.42	0.71	1.22
Household income (relative to average)	0.08 (0.29)	0.62	1.09	1.91
Importance of price for purchase decision	-0.24 (0.29)	0.44	0.78	1.39

Note: $n=143$. Pseudo- $R^2=0.61$ (Cox&Snell), $=0.69$ (Nagelkerke). Model $\chi^2(19)=132.92$, $p<0.01$, $-2LL=166.68$, goodness-of-fit: Pearson(266)=243.01, $p=0.84$; Deviance(266)=166.68, $p=1.00$. 75.5% of cases correctly classified. *significant at $\alpha=0.05$, **significant at $\alpha=0.01$

5 Discussion

First, the results (RQ1-3) showed that there were few participants, to be precise only 4.1%, who ignored all organic prices. This implies that nearly all participants had the opportunity to process actual organic price information and notice that there was a relatively low-priced organic alternative. Participants further noticed, on average, three out of four organic price tags. Also, conventional prices were noticed by most participants with only 3.4% of participants ignoring all conventional prices, and on average six out of eight price tags being noticed. Hence, participants could potentially compare most of the organic prices to conventional prices. 74.8% of the organic prices and 71.9% of the conventional prices that were fixated at least once were refixated indicating that most prices were further investigated.

A major difference between this study and that of Bunte *et al.* (2010) is that unfamiliar products were used so that no habitual choices could be made and the information needed to make a decision had to be acquired by participants. Despite the results showing that most conventional and organic prices were noticed and probably compared, the relatively low-priced organic offer for jam and noodles did not strongly influence conventional consumers' choices. This was shown by the medium strong correlation between the stated expenditure share for organic food of the total food budget, and the number of organic products chosen in the test market. Of the participants who claimed they usually spent 0-5% of their food budget on organic food, none selected two organic products in the test shop and 21.9% selected one organic product. Hence, the reason for taking a conventional product rather than an organic one was not because conventional consumers did not notice organic prices due to habits. The results confirm that relatively low organic prices do not lead to a distinct change in purchase decision for organic food in conventional consumers, even when most prices are noticed.

Participants who selected two conventional products ('conventional consumers'), two organic products ('regular organic consumers'), and one each ('occasional organic consumers') were compared regarding the allocation of visual information to organic and conventional prices and packages (RQ4). First, it was shown that regular and occasional organic consumers search for organic and conventional price information in a purchase situation with unfamiliar products. Therefore, assumptions that organic consumers do not pay attention to organic prices are not confirmed.

Further, the results imply that 'conventional consumers', 'occasional organic consumers' and 'regular organic consumers' differ in their need for price information, i.e. regular organic consumers have a lower need for price information than conventional consumers. This is in line with findings of Zander *et al.* (2013) who revealed that organic buyers heeded price information the least.

Next, the predictive power of visual attention for the choice of organic vs. conventional food was examined in a multinomial logistic regression analysis (RQ5). The fixation duration on

organic packages had a significant positive impact, increasing the odds of selecting one or two compared to no organic products in the test shop with an increase in fixation duration. The relationship between the fixation duration on conventional prices and packages was significantly negative regarding the choice of one or two organic products compared to no organic product in the test shop. This is in line with findings of Gidlöf *et al.* (2017) stating that the duration of visual intake of a product has a high predictive power of the purchase decision (similar findings by Chandon *et al.*, 2009; Pärnamets *et al.*, 2016; for a review see Orquin and Mueller Loose, 2013).

Krajbich *et al.* (2012) found that in a choice situation with one product, longer fixation duration on the price increased the odds of the decision against choosing it. In choice situations with six products each, comparing the decision for and against organic products, Krajbich *et al.*'s (2012) finding could not be confirmed. Instead, conventional consumers fixated organic and conventional prices longer than organic consumers (of the total organic and conventional fixation time, respectively). Above all, the findings of this study indicated a positive relationship between longer fixation durations on conventional prices and the choice of conventional products.

6 Conclusions

This study addressed several research questions concerning the visual attention paid to organic prices and packages compared to conventional prices and packages. Regarding previous studies raising questions about consumers' acquisition and processing of organic prices (e.g., Aschemann-Witzel and Niebuhr Aagaard, 2014; Bunte *et al.*, 2010), the particular aim of this study was to provide quantitative insight on consumers' information search for organic food prices while shopping.

In purchase situations with unfamiliar products, very few consumers ignore all prices. Consumers acquire price information for most products offered. Moreover, nearly two thirds of the prices that were fixated once are refixated and hence, are further processed cognitively after a first glance. The results of the study imply that the precondition for price comparisons and evaluations is met for most products and thus, pricing policies meet fertile ground.

Since price is only one component in the evaluation of a product and price tags contain less information than packages, the intuitive assumption that more visual attention is allocated to packages than to prices was confirmed by the results. From this it can be concluded that product attributes that justify a higher price, as in the case of organic production, should be communicated on the front of the package to influence the price-performance-ratio judgement.

The study also showed that regular organic consumers pay attention to organic and conventional prices in a purchase situation with unfamiliar products; however, they focus

their visual attention less on price information than conventional consumers. Nonetheless, regular, as well as occasional organic consumers, generally choose the lower-priced organic option of unfamiliar brands.

Conventional consumers, on the other hand, proved to be the most price-sensitive group in the study. They spent a significantly higher share of their fixation time on organic products searching for organic price information than regular organic consumers did. However, the price was not the reason for choosing a conventional product for all conventional consumers, since approximately 40-45% of conventional consumers chose a higher-priced conventional product over an organic alternative. Moreover, the medium strong correlation between the stated expenditure share for organic food and the purchase decision in the test shop underpinned that the offer of a relatively low-priced organic alternative did not lead to a distinctly higher purchase rate of organic food in conventional consumers. Thus, even though conventional consumers search for more price information to make their decision, price was not their only reason to decide against organic options. It can be assumed that conventional consumers' attitudes towards organic food must change first before they take advantage of low-priced organic alternatives on a distinctly noticeable scale.

The results of this study proved that fixation duration is a strong predictor of organic vs. conventional food product choice. In a model together with attitudes, household income and the importance of price in decision making, only the fixation durations remained a significant predictor for all levels of product choice. In accordance with previous findings on nutrition labelling (e.g., Bialkova *et al.*, 2014), it can be assumed that gaze behaviour is strongly determined by personal motivation because longer fixation duration on organic packages and shorter fixation duration on conventional prices and packages increased the odds of choosing organic products.

It must be noticed that the study design including only unfamiliar products is thought to cover the gaze behaviour in the decision process especially well since in a normal shopping situation most products are familiar, so only new products need to be compared to the familiar ones. In this study, participants had to evaluate all products. At the same time, this constitutes a limitation because the results are not transferable to all purchase situations. It can be assumed that information acquisition behaviour is different in habitual purchase situations in which consumers know that they want to purchase the product they usually purchase and do not compare other products. Another limitation is that the assortment offered in a product category is greater in actual supermarkets than it was in this study. This increases the complexity of choice for consumers in real supermarkets and might alter information search behaviour. It would be useful to address the effect of the complexity of the product choice in future research.

In a future study, it would be interesting to systematically test under what circumstances, e.g. regarding different price levels and communication of prices and benefits, a distinct increase in organic food purchases occurs in conventional consumers.

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3.3 Different ways of looking at it – A sequence analysis of organic and conventional food consumers' visual information acquisition

Table 12: Contributions to the article "Different ways of looking at it – A sequence analysis of organic and conventional food consumers' visual information acquisition"

TITLE OF ARTICLE	Different ways of looking at it – A sequence analysis of organic and conventional food consumers' visual information acquisition
JOURNAL, STAGE IN ARTICLE PUBLICATION	Scientific journal, under review (13.12.2018)
AUTHORS LIST (*CORRESPONDING AUTHOR)	Manika Rödiger*, Enrique Garcia Moreno-Esteva, Ulrich Hamm, Meike Janssen
CONTRIBUTION TO ARTICLE (CONTRIBUTION TO ARTICLE IN %)	Manika Rödiger (60%): Idea development and outline of article, structure of article, data analysis, draft of the manuscript, editorial tasks Enrique Garcia Moreno-Esteva (20%): Data processing (extraction of phases and dwell counts), contributions to several sections Ulrich Hamm (10%): Feedback to manuscript Meike Janssen (10%): Feedback to manuscript
ASSOCIATED PROJECT (TITLE, FUNDING, START AND END TIME)	Die visuelle Preisinformationsaufnahme während der Kaufentscheidung bei ökologischen und konventionellen Lebensmitteln (Visual price information intake during the purchase decision of organic and conventional products); no third-party funding; August 2016 to November 2017
PROJECT LEAD	Prof. Dr. Ulrich Hamm
PROJECT HANDLING	Manika Rödiger
TASKS OF DOCTORAL CANDIDATE	Development of the study; planning, administration and conduction of study; data processing and analysis; writing an article; August 2016 to April 2018

Different ways of looking at it – A sequence analysis of organic and conventional food consumers’ visual information acquisition

Manika Rödiger, Enrique Garcia Moreno-Esteva, Ulrich Hamm, Meike Janssen

Abstract

It is of significant importance in food marketing to know which pieces of information available during shopping are most relevant to consumers. The visual search behaviour of consumers allows inference on the relevance of information based on what information is acquired and when. It is assumed that price is a major barrier to the purchase of organic food. However, little is known about consumers’ actual acquisition of information on organic food prices. To examine the information acquisition behaviour of consumers of organic and consumers of conventional food, a shopping simulation study was run in which participants were invited to choose between different unfamiliar organic and conventional product alternatives while wearing eye-tracking glasses. The data were divided into three visual attention phases: orientation phase, comparison phase, and evaluation phase. The information intake in the phases was investigated comparing organic and conventional consumers. Organic consumers acquired less information on conventional prices in the orientation and evaluation phases. It is concluded that for organic consumers, price information is less relevant to making a purchase decision compared to consumers of conventional food.

Keywords: consumer behaviour, organic food, price, visual attention phases, eye-tracking, sequence analysis

1 Introduction

Daily food choice situations require a large amount of information processing for decision-making from consumers (e.g., Perry and Grace, 2015). Information economics assumes that individuals obtain just enough information necessary to make an informed decision (Solomon, 2015). Consumers weigh up the cost of obtaining pieces of information against benefits - costs being the time, effort, expenditure, and inconvenience of the search (Zander and Hamm, 2012; Hoyer and MacInnis, 2010), and benefits being purchase decisions that satisfy their preferences. If an extra piece of information is higher in marginal cost than in marginal added-value, that extra piece of information will not be collected (Solomon, 2015). Information economics further assumes that the most valuable pieces of information are collected first (Solomon, 2015). Therefore, the analysis of information search behaviour allows conclusions to be made regarding which pieces of information are more relevant for consumers than others (Zander and Hamm, 2010).

Eye-tracking enables the mechanical observation of visual information search and has been applied in many studies related to food marketing (e.g., Bialkova *et al.*, 2014; Clement, 2007; Chandon *et al.*, 2009; Siegrist *et al.*, 2015). However, most studies based on eye-tracking use the sums of the duration or count of eye-tracking parameters such as fixations or dwells. An analysis of the sequence in which pieces of information are visually acquired is less widespread (examples of studies with a sequential analysis of eye tracking data are, for instance Clement, 2007; Krajbich *et al.*, 2012; Russo and Leclerc, 1994). This study adopts a sequential perspective to analyse its data.

The present study is concerned with consumers' decisions to purchase or not purchase organic food products. The organic food market has grown markedly in the last decades (Willer and Lernoud, 2018). However, the results of consumer surveys suggest the organic food market is not reaching its potential. In surveys, consumers expressed very positive attitudes towards organic food and declared their buying intention (Frostling-Henningsson *et al.*, 2014; Moser, 2016). Previous findings stressed the importance of price as a barrier to the purchase of organic food products (Aertsens *et al.*, 2011; Buder *et al.*, 2014; Gottschalk and Leistner, 2013). Therefore, in this study, special attention is paid to consumers' search behaviour for price information during a purchase decision.

The aim of this study is to provide insight into consumers' decision making to purchase or not to purchase organic products with a focus on the search for price information in different attention phases. In section 2, the theoretical background of the research is provided, and the research questions are presented. In section 3, the study design and the methods of data collection, data processing, and data analysis are explained. The results of the study are presented in section 4 and discussed in section 5. In section 6, conclusions are drawn.

2 Theoretical Background and Research Questions

2.1 Decision-making and information search

Three basic types of consumer decision-making are distinguished: cognitive, habitual, and affective decision-making (Solomon, 2015). The different types can interact in a decision-making process. It is broadly agreed that food purchasing is dominated by habitual decision-making since it is frequently repeated and, for most consumers, a rather low involvement activity with a relatively low financial and social risk (Hoyer and MacInnis, 2010; Marshall and Bell, 2004; Solomon, 2015). However, the strong growth of the organic market (Willer and Lernoud, 2018) indicates that many people have made a cognitive effort to change their habits at some point, switching from conventional to organic food products. Previous studies suggested that ethical consumption decisions encompass a higher cognitive activity since they require more complex decision-making (Newholm and Shaw, 2007; Lusk and Briggeman, 2009). This underpins the assumption that organic food consumers made a cognitive effort to change their purchasing habits due to ethical aspects such as environmentally-friendly production or animal welfare concerns which are both primary motivators in the purchase of organic food (Gottschalk and Leistner, 2013; Aertsens *et al.*, 2011).

The cognitive decision-making process consists of the stages ‘problem recognition’, ‘information search’, ‘evaluation of alternatives’, ‘product choice’, and ‘outcomes’ (Solomon, 2015). This research is focused on the stage ‘information search’. Information search is a process in which individuals "identify appropriate information to help aid [their] choice in a decision-making situation" (Szmigin and Piacentini, 2015, p. 92). Part of the information search can be conducted internally in one's own memory, but even experienced shoppers supplement with external information (Solomon, 2015; Szmigin and Piacentini, 2015). Confirming the assumptions of information economics, evidence accumulation models showed that information is visually collected until an information threshold is reached and a decision can be made (Orquin and Mueller Loose, 2013).

2.2 Human gaze behaviour

Human gaze behaviour is distinguished into fixations, where the eye is relatively still while focusing on a locus and taking in information, and saccades, where the eyes move from one locus to another, taking in little and somewhat contextual information (Holmqvist *et al.*, 2011; Rayner, 1998). Usually, fixations and attention are coupled so that the research of fixations allows inference on attention (Holmqvist *et al.*, 2011; Rayner, 1998). Chandon *et al.* (2009) stated that in the first fixation, the semantic category, the spatial layout, and the level of clutter can be identified. For more details, individuals need to fixate objects, and re-examinations can be interpreted as an increase in information intake (Chandon *et al.*, 2009; Balcombe *et al.*, 2015).

Based on information economics and empirical findings on gaze behaviour, it is assumed that consumers address their visual attention most to those attributes that are most relevant to their decision. This is deemed a utility effect (Orquin and Mueller Loose, 2013). Several studies have shown a close relationship between a high number of fixations or longer fixation durations and product choice (e.g., Chandon *et al.*, 2009; Gere *et al.*, 2016; Gidlöf *et al.*, 2017; Pärnamets *et al.*, 2016). Regarding consumers' gaze behaviour, it is known that, compared to the product package, price receives a relatively low amount of visual attention in product choice situations (Balcombe *et al.*, 2015; van Loo *et al.*, 2014). This could be the result of a higher amount of attribute information communicated on the package. Moreover, a relation between the last fixations and the final product choice was shown (Krajbich *et al.*, 2010).

The visual information acquisition can be divided into several phases. So far, there is no clear evidence on the number of phases, so different authors use different numbers. A basic distinction can be made between the phases 'overview' or 'orientation', 'comparison' or 'discovery', and 'checking' or 'evaluation' (Orquin and Mueller Loose, 2013; Husić-Mehmedović *et al.*, 2017). The first and the last phase were found to have shorter fixations than the middle phase (Krajbich *et al.*, 2010). The middle phase is characterized by comparisons between products in the consideration set (Orquin and Mueller Loose, 2013).

2.3 Research questions

The research questions (RQs) behind this study are related to the distinct phases of visual information acquisition. Moreover, two groups of consumers, specifically consumers who chose a conventional product and consumers who chose an organic product during the shopping task, are compared regarding their visual information search. Hereinafter, the groups are called 'organic consumers' and 'conventional consumers' in reference only to their choice in the study.

RQ1: How much information do organic and conventional consumers collect on organic and conventional prices and packages during the orientation phase?

It is assumed that less price than package information is acquired in the orientation phase by both organic and conventional consumers because more information on product attributes to form a consideration set is given on the package. Further, it is assumed that organic consumers acquire less information on prices overall than conventional consumers since they are less price-sensitive (Aschemann-Witzel and Zielke, 2017) and possibly search specifically for organic products if they have an organic predisposition.

RQ2: How much information do organic and conventional consumers collect on organic and conventional prices and packages in the comparison phase?

In the comparison phase, it is assumed that organic and conventional consumers compare a relevant subset of the products offered. It is expected that the comparison phase is the phase with the most dwell because it is the point in the decision process in which information is compared most extensively. Further, it is expected that conventional consumers take in more information on prices than organic consumers, as they are assumed more price-sensitive.

RQ3: How much information do organic and conventional consumers collect on organic and conventional prices and packages in the evaluation phase?

Krajbich *et al.* (2010) found that the last pieces of information taken in were often related to the final choice. Thus, regarding the evaluation phase, it is hypothesized that organic consumers mostly take in information on organic products followed by organic prices, while conventional consumers take in relatively more conventional package information than conventional price information.

3 Materials and Methods

3.1 Study design

To investigate the information intake of consumers, an eye-tracking study was conducted in a mock-up shop in a laboratory. The idea was to provide the study participants an experience which was as close as possible to a real shopping experience. The general procedure of the study was that participants first went shopping in the laboratory shop with the eye-tracking glasses recording their eye movements, and afterwards completed a self-administered computer-assisted questionnaire. At the end, participants were granted a 10€ allowance.

Three red markers on products on a shelf were used to calibrate the eye-tracking glasses to each participants' eyes. After calibration, the participants were asked to imagine they were going shopping for strawberry jam in a normal supermarket. The participants were further instructed to choose the product they would normally choose and to take as much time as they usually took (no time limit).

3.2 Sampling

Participants for the study were sampled on the main shopping street of a medium-sized German city with an average purchase power of its inhabitants. Quota sampling was applied with quotas on gender and age according to the German population (51% females, 49% males, in each gender group 50% in the age groups 18-44 and 45 or older, respectively). Eligible participants were at least partially responsible for household shopping and bought at least sometimes jams. Of the 255 participants that took part in the study, the data of 189 participants could be used. Five participants were excluded because they did not complete the shopping task or the questionnaire. 52 participants had to be excluded due to the low quality of their eye-tracking data. Nine participants were excluded because they stated that they did

notice the organic products on the shelves, yet they purchased an organic product. For the variables gender, mean age, mean number of household members, and mean monthly disposable household income, the sample resembles the population of the city under investigation quite well (see Table 13).

Table 13: Characteristics of the sample

		Sample	City under investigation ^a
Gender (n=189)	Female	46.6%	51.0%
	Male	52.9%	49.0%
Age (n=183)	Average (SD)	42.5 (16.6)	42.6
Household members (n=188)	Average (SD)	2.0 (1.3)	1.9
Monthly disposable household income (n=181)	Average (SD)	1735.79€ (1325.88) ^b	1699.33€

Note: SD=standard deviation, ^a Source: Stadt Kassel – Fachstelle Statistik (2017), disposable household income: Hessisches Statistisches Landesamt (2016), ^b respondents were asked to indicate their income class of six classes, disposable household income calculated based on class means excluding the upper class ('6000€ or more' per month)

3.3 Product stimulus

Strawberry jam was selected as product stimulus in the laboratory shop because it is bought by many German consumers making it possible to find enough study participants. The use of a seasonal product was avoided since they are not sold all year and represent a specialty. Moreover, it was important that the product not need cooling. Jam met all the demands. Strawberry is at the top of the list of popular jam flavours in Germany, thus, strawberry jam was chosen as a product stimulus.

Swiss and Austrian brands not sold in German supermarkets were used to avoid habitual purchases and to ensure that each participant had the same level of knowledge about the items. The unfamiliar brands also minimized the possible internal information search in the memory. Two organic and four conventional product variants were placed on the shelf (see Figure 4). Prices for the test items were set according to a realistic price range and price difference between organic and conventional products. To this end, information on the price of strawberry jams was gathered at two hypermarkets, two discount stores and one supermarket in the study region (see Table 14).

Table 14: Brands of strawberry jam used as product stimuli and their prices

	Brands					
	Grandessa	NaturAktiv (organic)	Meinl	MigrosBio (organic)	Sonngut	Grandessa Naturrein
Price	0.79€	1.99€	2.99€	1.29€	1.39€	1.99€
Unit price (100g)	0.18€	0.40€	0.60€	0.26€	0.31€	0.44€

Note: The order of the brands in the table is equivalent to the order on the shelf.

3.4 Eye-tracking data collection

Eye-tracking is a mechanical observation technique of the participants' eye-movements permitting the monitoring of visual information intake. It is generally agreed that eye-tracking is a measure for cognitive information processing (Feiereisen *et al.*, 2008; Feng, 2003). The technique is regarded as an unbiased and objective measure (Feiereisen *et al.*, 2008; Graham *et al.*, 2012; Helmert *et al.*, 2017). Eye-tracking measures all information intake, including unconscious intake, because the level of control over eye-movements is low. Furthermore, it can be used in realistic or close to realistic settings.

Throughout the shopping task in the present study, the participants wore a set of mobile eye-tracking glasses from SensoMotoric Instruments. The eye-tracking glasses sampled both eyes at a rate of 60 Hertz. The device records the locus of vision of the participants during the shopping experiment, indicating which information was looked at, when during the shopping task it was looked at, and for how long. The mobile eye-tracking device has a main camera which records the scene in front of the participant, and two auxiliary cameras which record the eyes. Its similarity to a normal pair of glasses, including its light weight, enables a much more realistic setting than eye-trackers attached to monitors with a head and/or chin rest. The eye-tracking glasses of SensoMotoric Instruments use the reflection of infrared light on the pupil to calculate the position of the gaze in the scene.

The video-based gaze information of the participants was manually mapped on a photo of the product with the SensoMotoric Instruments' software BeGaze™. Areas of interests (AOI's) were created to get quantitative information on the participants' gaze behaviour (see Figure 4). To capture all gaze information, even if there was a small drift in the data, the AOI's were slightly larger than the product packages, and for the price tags the AOI's reached further downwards due to a tendency in the data for a larger drift at the bottom of the scene.

Nowadays, eye-tracking devices are quite accurate, although some data was deemed unworthy of further consideration and was removed from the final data sample under analysis. To judge the data quality, the videos of all participants were checked for drift, i.e. imprecise gaze locations, and for gaps between gaze points indicating erroneous recording of the eye movements or faulty aggregation of gaze points by the inbuilt algorithm. Two researchers

independently judged the quality for one half of the participants each. 20 videos were checked by both researchers with an intercoder reliability of Kappa 0.82 (SE 0.071) which is a very good result (McHugh, 2012).



Figure 4: Areas of interest for the front view of strawberry jams

Information on time stamps for each AOI in the sequence, indicating at which moment the participants focused their vision on the corresponding AOI's, and which moment the participants moved their eyes away from the AOI was retrieved. The moments during which the participant's eyes are relatively fixed on an AOI are called fixations. If several consecutive fixations happen to occur in the same AOI, the entire time span during which eyes are focused on the same AOI is called dwell time (Holmqvist *et al.*, 2011). Thus, for each participant, a sequence of fixations and a sequence of dwells are available. The difference between the two is that several consecutive fixations on the same AOI correspond to one single dwell on that AOI. In the analyses, sequences of dwells and dwells counts are used because the research interest of this paper pertains to the order of information intake from different products and price tags rather than the information intake of different pieces of information from each package.

3.5 Methods of data analysis

Research questions Q1-Q3 on the amount of information collected on organic and conventional prices and packages in the different phases were analysed by calculating the average dwell counts and using descriptive and bivariate statistics (t-tests). To tackle research questions Q1-Q3, the orientation, comparison and evaluation phase had to be identified.

In this study, the definition of the phases was made using the same criteria as Russo and Leclerc (1994), i.e. the first phase (screening or orientation/overview) is characterized by a lack of dwells back on an AOI that was previously looked at, meaning that in this phase no item is looked at twice. With the first repeated dwell (re-dwell) the comparison phase begins ('evaluation phase' in Russo and Leclerc, 1994). The third phase, evaluation phase, is again

characterized by a lack of re-dwells, counted from the end of the dwell sequence to the beginning ('verification phase' in Russo and Leclerc, 1994).

Several studies found that in the first and last phase, the fixations are shorter than in the middle phase (Clement, 2007; Glöckner and Herbold, 2011; Krajbich *et al.*, 2010; Russo and Leclerc, 1994). Glöckner and Herbold (2011) defined the different phases based on the fixation durations. However, Reutskaja *et al.* (2011) found that the average fixation duration decreases with increasing numbers of items in a set which could lead to different durations of fixations in the three phases in different studies. Therefore, in this study the phases are defined by re-dwells, as described above.

4 Results

4.1 Overview of participants' gaze and 'purchase' behaviour

The most frequently 'purchased' product was the cheapest jam (29.1%) (see Table 15). The most expensive jam was chosen the least. In total, 39.7% of participants chose an organic jam and 60.3% chose a conventional jam.

The products' packages received distinctly more first and last dwells than the prices (75.2% vs. 25.8%, 71.4% vs. 28.6%). The first dwells also show a tendency towards an accumulation on the centrally located products. This holds for both, packages and prices. The centrally located conventional and organic jam received exactly the same share of first dwells on the package. The share of last dwells did not correspond closely with the shares of 'purchases'.

Table 15: Share of 'purchases', first and last dwell per brand

		Brands						Sum
		Grandessa	NaturAktiv (organic)	Meinl	MigrosBio (organic)	Sonngut	Grandessa Naturrein	
Share of purchases		29.1%	12.7%	3.2%	27.0%	18.5%	9.5%	100.0%
First dwells	Package	1.6%	13.2%	22.8%	22.8%	12.7%	2.1%	75.2%
	Price	0.5%	2.7%	7.4%	11.1%	2.1%	1.1%	24.8%
Last dwells	Package	10.6%	14.3%	7.4%	9.0%	9.5%	20.6%	71.4%
	Price	6.4%	5.8%	1.6%	4.2%	4.2%	6.4%	28.6%

N=189.

Table 16 gives an overview of several parameters of participants' gaze behaviour. The sequence length was on average 36.5 dwells, with organic consumers having on average a

longer sequence length, with 38.8, than conventional consumers with 34.9. This difference was, however, not statistically significant. The shares of organic and conventional packages and prices looked at was very high with around 95% of packages and around 80% of prices paid attention to. This shows that consumers visually investigated most packages and prices. Organic and conventional consumers differed significantly in the mean share of organic packages and conventional prices they visited with their gaze. Organic consumers looked at a higher share of organic packages and at a lower share of conventional prices than conventional consumers. The consumer groups did not differ in the share of organic prices and conventional packages they acquired information from.

Table 16: Overview of consumers' sequence length and shares of organic and conventional packages and prices viewed

	Organic consumers (n=75)	Conventional consumers (n=114)	Consumers overall (n=189)	Test statistic (T)	Effect size (Cohen's d)
Mean sequence length (SD)	38.8 (25.9)	34.9 (18.6)	36.5 (21.8)	-1.21	-0.18
Mean share (SD) of organic packages visited	98.7% (8.1%)	93.0% (19.8%)	95.2% (16.4%)	-2.73**	-0.41
Mean share (SD) of conventional packages visited	96.7% (11.1%)	94.1% (15.7%)	95.1% (14.1%)	-1.325	-0.20
Mean share (SD) of organic prices visited	80.0% (31.8%)	81.1% (32.9%)	80.7% (32.4%)	0.236	0.04
Mean share (SD) of conventional prices visited	68.3% (36.6%)	87.7% (21.4%)	80.0% (29.9%)	4.145**	0.62*

Note: SD=standard deviation, * significant at $\alpha=0.05$ /intermediate effect, **significant at $\alpha=0.01$ /large effect

4.2 Gaze behaviour in different attention phases (RQ1-3)

In figures 4 to 6, the average dwell counts of organic and conventional consumers in the orientation phase (OP), comparison phase (CP), and evaluation phase (EP) are depicted in response to research questions 1 to 3. The orientation phase was relatively short with, on average, 4.8 dwells, considering that there were six jam brands on the shelf and, on average, only about 3.4 packages were looked at before looking back to packages that had been

previously noticed. It is also noteworthy that price information was already acquired in the orientation phase. As expected, less price than package information was acquired in the orientation phase by both organic (OC) and conventional consumers (CC) ($T_{OC(74)}=-11.3$, $p<0.01$; $T_{CC(113)}=-7.4$, $p<0.01$).

The comparison phase consisted of the most dwells of all phases, with on average 25.5 dwells. The evaluation phase was shortest with 3.9 dwells on average. Overall, there were significantly more dwells on prices in the comparison than in the orientation and evaluation phases ($T_{OP-CP(188)}=-11.9$, $p<0.01$; $T_{CP-EP(188)}=12.0$, $p<0.01$). The dwell counts on packages differed significantly between the three phases - the comparison phase with the most and the evaluation phase with the least dwells ($T_{OP-CP(188)}=-14.1$, $p<0.01$; $T_{CP-EP(188)}=15.3$, $p<0.01$; $T_{OP-EP(188)}=5.9$, $p<0.01$).

It stands out that in the orientation phase, conventional consumers have, on average, more dwells in total, while in the comparison phase, organic consumers have more. In the orientation phase, organic consumers acquired significantly more information on organic packages than conventional consumers who searched significantly more for conventional price information. Also, considering the sum of dwells on organic and conventional prices in the orientation phase, organic consumers had significantly less dwells on prices than conventional consumers ($T(175.4)=2.9$, $p<0.01$). This confirms the previously formed assumptions that organic consumers search less for price information in the orientation phase than conventional consumers.

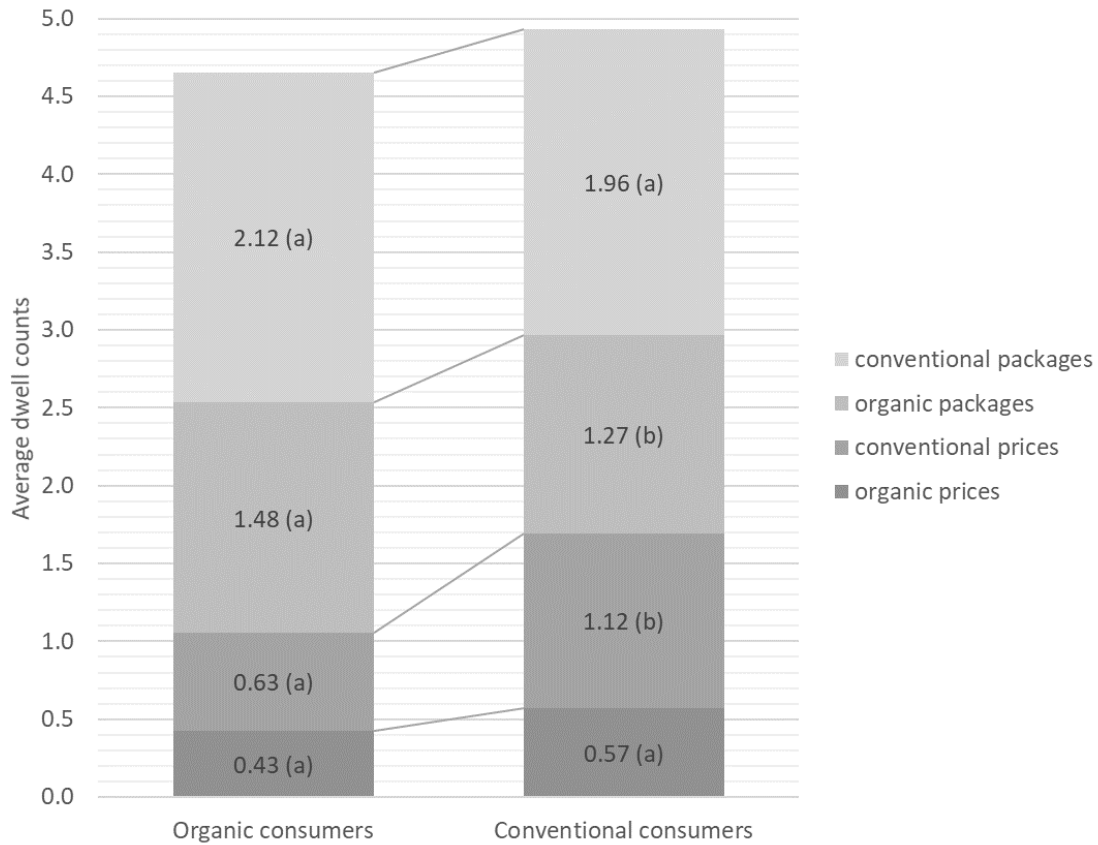


Figure 5: Dwell counts on organic and conventional prices and packages in the orientation phase

Note: Different letters mean significant differences at $\alpha=0.05$ between organic and conventional consumers. $N=189$. There were two organic and four conventional variants on the shelf.

In the comparison phase, it was the organic consumers who searched more for organic price, organic package, and conventional package information, and less for conventional price information than conventional consumers. The differences were, however, only statistically significant for the dwell count on organic packages. The assumption that conventional consumers take in more information on prices (sum of organic and conventional) cannot be confirmed ($T(187)=0.5$, $p=0.63$).

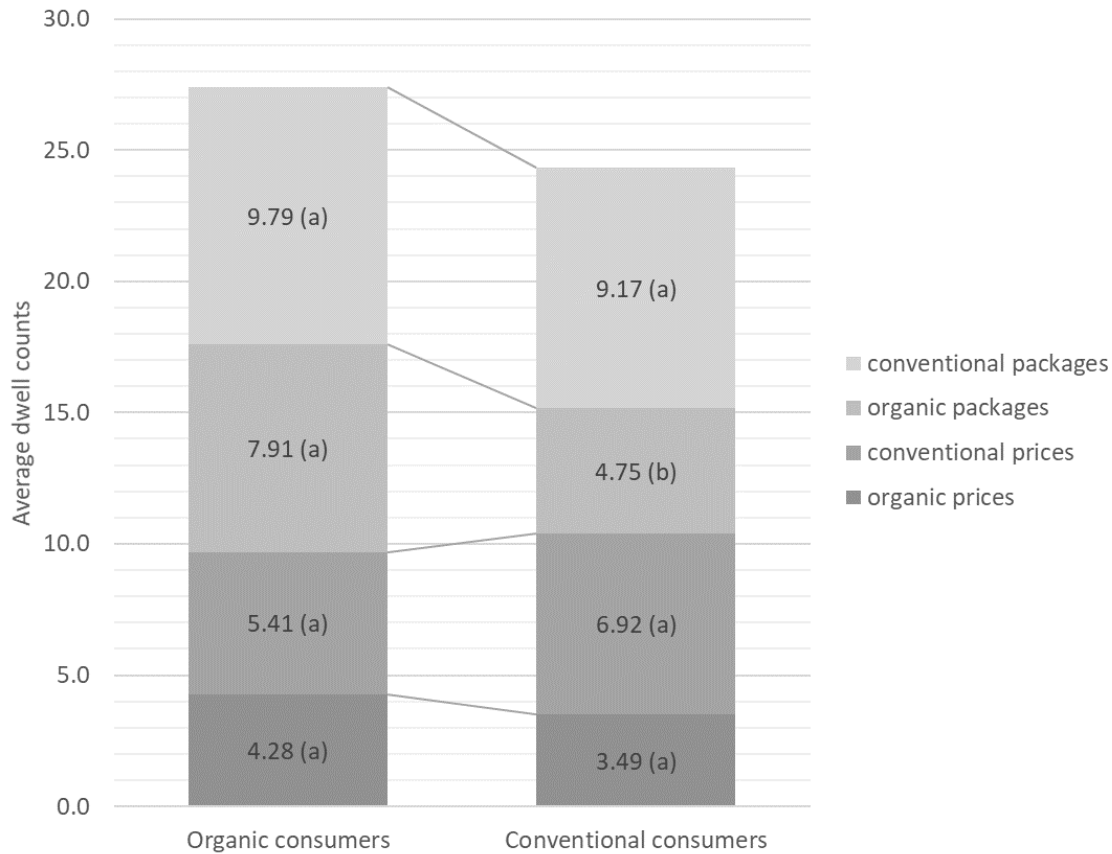


Figure 6: Dwell counts on organic and conventional prices and packages in the comparison phase

Note: Different letters mean significant differences at $\alpha=0.05$ between organic and conventional consumers. $N=189$. There were two organic and four conventional variants on the shelf.

In the evaluation phase, a significant difference between the groups became apparent in the number of dwells on conventional prices and on organic packages, with organic consumers taking in less conventional price and more organic package information. Regarding the hypotheses on the gaze behaviour of organic consumers in the evaluation phase, it cannot be confirmed that this group acquired the most information from organic packages because their gaze dwelled significantly more on conventional packages ($T(74)=-3.7$, $p<0.01$). Organic and conventional prices were, without a significant difference in the number of dwells on them ($T(74)=-0.6$, $p=0.55$), looked at least by organic consumers.

For conventional consumers, on the other hand, the hypothesised gaze behaviour could be confirmed. This group looked the most at conventional packages, second most at conventional prices, followed by organic packages, and finally, the least at organic prices. These differences were significant ($T_{\text{conv.pack.-conv.price}}(113)=3.6$, $p<0.01$; $T_{\text{conv.price-org.pack}}(113)=-8.8$, $p<0.01$; $T_{\text{org.pack.-org.price}}(113)=2.7$, $p<0.01$).

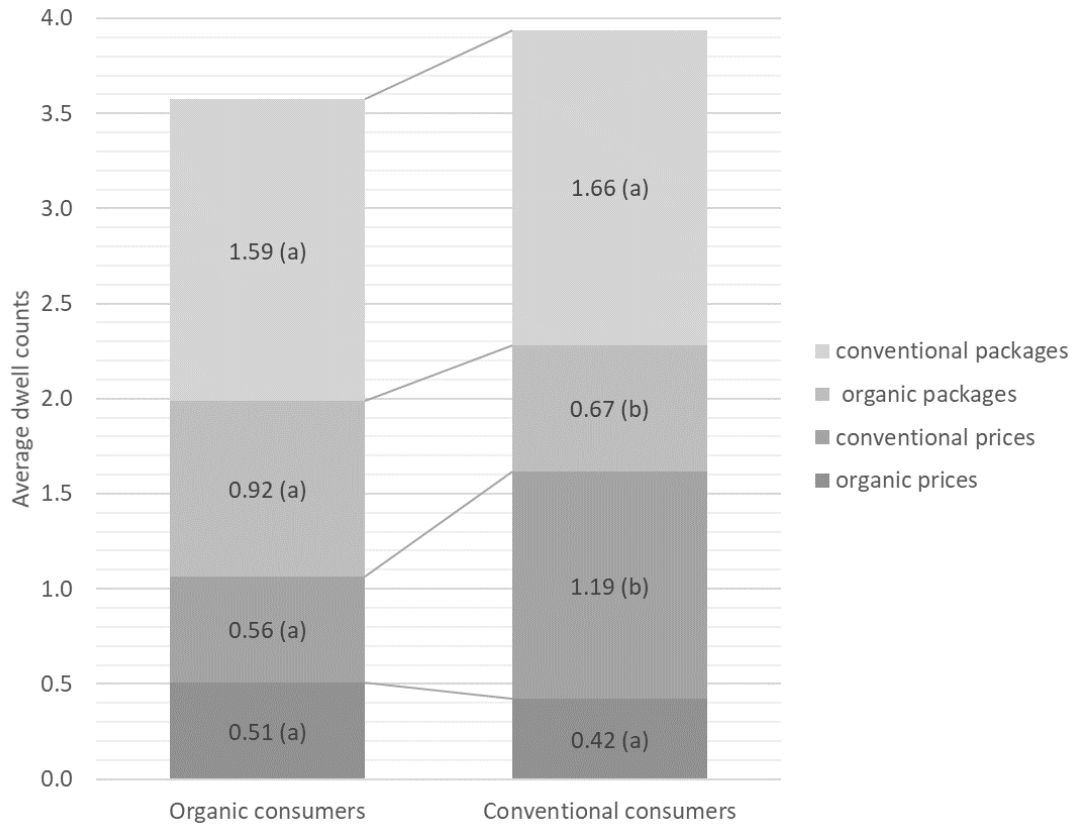


Figure 7: Dwell counts on organic and conventional prices and packages in the evaluation phase
Note: Different letters mean significant differences at $\alpha=0.05$ between organic and conventional consumers. $N=175$. There were two organic and four conventional variants on the shelf.

4.3 Importance of product characteristics for choice

In a questionnaire, consumers rated several product characteristics regarding their importance to their choice of jam. Consumers picking a conventional jam rated the price significantly more important for their choice of jam in the test shop than those choosing an organic jam (see Table 17). This is reflected by the dwell sequence patterns as organic consumers searched less for price information in the orientation and evaluation phases. Another significant difference was revealed regarding the indication of the country of origin of the product. This characteristic was more important to organic consumers than to conventional consumers. The package size, referring to the amount of content for a given price, was significantly more important for conventional consumers.

With respect to the results from the analysis of the dwells in the three defined attention phases it can be noted that the country of origin and organic production are characteristics that might need more search on the package which might explain the longer time organic consumers needed to decide. On the other hand, price and package size are features that are more directly visible which might explain the shorter decision-making of conventional consumers.

Table 17: Importance of product characteristics for choice of organic and conventional consumers

Importance of ... for 'purchase' decision	Consumer group	Mean rating ¹	Test statistic (T) ²	Effect size (Cohen's d)
Price	Conventional	5.4	3.5**	0.52*
	Organic	4.5		
Country of origin	Conventional	3.6	-2.8**	-0.42
	Organic	4.5		
Package size	Conventional	4.5	2.7**	0.40
	Organic	3.8		

Note: ¹scale from 1=not at all important to 7=very important, ²degrees freedom=186, * significant at $\alpha=0.05$ /intermediate effect, ** significant at $\alpha=0.01$ /large effect.

5 Discussion

From the distribution of first dwells (see Table 3), a central fixation bias can be suspected in the data (see Atalay *et al.*, 2012; Peschel and Orquin, 2013). This is, however, assumed not problematic because the data were aggregated into organic and conventional products which both have central as well as peripheral locations on the shelf. The aggregation of data of products with various locations on the shelf is assumed to outbalance the central fixation bias. Furthermore, from the last dwell and the brands chosen by participants, no central fixation bias can be suspected. Thus, it is suggested that the central fixation bias might be most present at the very beginning of the decision process.

Moreover, since all products had only one facing and the package sizes were very similar, no saliency bias is expected from these factors. Products were, however, not tested regarding the saliency of their package designs, which might have biased the participants' gaze behaviour (see Milosavljevic *et al.*, 2012).

Based on theoretical considerations, the comparison phase was expected to yield the most interesting differences between participants who decided for an organic and those who decided for a conventional jam since it was assumed that it constitutes an evaluation of the subset of jams considered for choice (compare Orquin and Mueller Loose, 2013). However, the only significant difference between consumers who chose an organic and those who chose a conventional jam was that the former had more dwell counts on organic packages. This indicates that participants who decided for an organic jam had conventional brands in their consideration set, too. Since the share of organic jam 'purchases' is higher in this study than in the German market, there must have been many consumers in the organic buyer group who are usually not regularly purchasing organic products. Hence, it is logical that these consumers also had conventional jams in their consideration sets.

In the evaluation phase, organic consumers had on average 0.92 dwells on organic and 1.59 on conventional packages. From these numbers, it can be inferred that a large share of participants who decided for an organic jam did not fixate an organic jam last. Instead, most seemed to have looked at a conventional jam before finishing their purchase. In contrast, Krajbich *et al.* (2010), who conducted an eye-tracking experiment in which the stimuli were shown on a screen, found a relationship between the last fixation and product choice. The deviation between Krajbich *et al.*'s (2010) findings and the gaze behaviour of participants in this study could be the result of this study's rather realistic conditions in which participants walked through a simulated supermarket aisle instead of sitting in front of a computer screen. It was observed that some participants let their gaze roam along the shelf when they walked out of the test shop, and due to the higher number of conventional jams offered the probability was higher that the gaze landed last on a conventional alternative.

The rating of the importance of product attributes for the choice of participants picking a conventional or organic jam allowed the interpretation that the utility effect is reflected in the sequence of dwells. First, conventional consumers searched for significantly more conventional price information in the orientation and evaluation phases of the choice decision. This is in line with the great importance these consumers placed on price. Moreover, this agrees with previous findings showing that for consumers of organic food, price is less important than for conventional consumers (Aschemann-Witzel and Zielke, 2017; Bezawada and Pauwels, 2013; van Herpen *et al.*, 2012). Second, organic consumers' significantly higher number of dwells on organic packages but also relatively high amount of acquisition of conventional package information can be interpreted as an indicator for their search for products from organic farming or from a certain country, based on their importance ratings.

Regarding the validity of the orientation, comparison, and evaluation phases, this study's results are in line with those of Glöckner and Herbold (2011) who found no effect of an initial screening, indicating that there was no screening of all information before a comparison. Glöckner and Herbold (2011), however, defined screening based on the duration of fixations. In this study, a lack of a total screening before changing to the comparison phase is suspected, since all except for three participants looked at some information in the comparison phase that they had not seen previously in the orientation phase. This was also found by Russo and Leclerc (1994) who pointed out that brands that had not been noticed in the first phase are examined in the second phase. Also, in Russo and Leclerc's (1994) study not all phases were present for all participants. In this study, the first two phases could be identified for all participants while in 14 cases the third (evaluation) phase was lacking.

The difference in the number of total dwell counts as well as the number of dwells on prices between the comparison phase and the other two phases resulted from the definition of the phases, i.e. a lack of re-dwells in the orientation and evaluation phase. Hence, it is probable

that the middle (comparison) phase is longer and entails more dwells on prices. This is a limitation of the definition of phases as proposed by Russo and Leclerc (1994).

This study confirmed the finding of Balcombe *et al.* (2015) and van Loo *et al.* (2014) of less visual attention being allocated to prices than to packages. The mentioned studies, however, gained this insight from choice experiments combined with eye-tracking where participants were sitting in front of a computer screen. This study confirmed the finding from a close to realistic shopping situation with mobile eye-tracking glasses.

6 Conclusions

This paper presented findings from a sequential analysis of eye-tracking data yielded from a shopping task that participants conducted in a laboratory mock-up shop. Participants had to choose between unfamiliar organic and conventional strawberry jam brands. The analysis of the data revealed that organic consumers look at price less than conventional consumers in the orientation and evaluation phase, but seem to compare organic and conventional prices for their decision. Moreover, organic consumers searched significantly more for information from organic packages than conventional consumers in the orientation, comparison, and evaluation phases.

Considering the utility effect apparent in gaze behaviour (see Orquin and Mueller Loose, 2013), it is concluded that characteristics inherent to the product core, such as process characteristics, are more important to organic consumers, since they searched package information first before they started weighing up the costs. Hence, product characteristics favoured by this consumer group, such as organic production and country of origin (see Hempel and Hamm, 2016), should be made easily detectable on the front of a package, so that products satisfying organic consumers' preferences quickly find their way into consumers' consideration set.

Conventional consumers, on the other hand, searched significantly more for information on conventional prices in the orientation and evaluation phases. Based on the utility effect in gaze behaviour and this groups' importance ratings for price and package size, it is concluded that information on price-performance-related product characteristics is more relevant to them. This group seems to have a preconceived determination to purchase conventional food since they did not take in significantly less organic price information than organic consumers even though a comparably low-priced organic alternative was offered. Hence, the success of organic price reductions to gain new customers without increasing the perceived benefit of organic food via additional communication efforts is judged doubtful based on this data.

The study has several limitations. First, it was conducted in only one German city and is not representative of the German population. Second, the results of this study cannot be translated

to normal shopping situations since the study participants faced unfamiliar brands in the test shop and could not select the jams that they usually purchase. Furthermore, the range of products offered is much larger in normal supermarkets which is presumed to influence decision-making and gaze behaviour. Third, the study relies on one product only. It is possible that there is an effect from the chosen product category on the choice and gaze behaviour.

For more insights on the gaze behaviour during the evaluation of the consideration set, it is recommended to group consumers based on their stated purchase behaviour for organic food. Then, gaze behavioural differences in the comparison phase of intensive organic buyers, frequent organic buyers, occasional organic buyers, and conventional buyers could be compared. Moreover, it is suggested that in a future study, the phases could be defined based on the fixation duration and then be compared to this study's results to provide insight on the effect the method of defining the phases has. Since German consumers are assumed to be more price conscious than consumers of other nationalities, it is suggested to replicate this study in other countries. It is furthermore suggested that future studies investigate whether different products would lead to different results.

Acknowledgments

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3.4 Organic consumers' price knowledge, willingness-to-pay and purchase decision

Table 18: Contributions to the article "Organic consumers' price knowledge, willingness-to-pay and purchase decision"

TITLE OF ARTICLE	Organic consumers' price knowledge, willingness-to-pay and purchase decision
JOURNAL, YEAR, VOLUME, ISSUE, PAGES	British Food Journal, 2016, 118, 11, 2732-2743
AUTHORS LIST (*CORRESPONDING AUTHOR)	Manika Rödiger*, Sabine Plaßmann, Ulrich Hamm
CONTRIBUTION TO ARTICLE (CONTRIBUTION TO ARTICLE IN %)	Manika Rödiger (55%): Structure of article, draft of all sections of the manuscript, editorial tasks Sabine Plaßmann (30%): Data analysis Ulrich Hamm (15%): Feedback to manuscript
ASSOCIATED PROJECT (TITLE, FUNDING, START AND END TIME)	Kaufbarriere Preis? – Analyse von Zahlungsbereitschaft und Kaufverhalten bei Öko-Lebensmitteln (Purchasing barrier price? Analysis of the willingness to pay and the purchasing behaviour on organic products); Research project funded by the German Federal Organic Farming Scheme and Other Forms of Sustainable Agriculture (BÖLN); April 2007 to April 2009
PROJECT LEAD	Prof. Dr. Ulrich Hamm
PROJECT HANDLING	Dr. Sabine Plaßmann
TASKS OF DOCTORAL CANDIDATE	Writing an article; January 2015 to July 2016

Organic consumers' price knowledge, willingness-to-pay and purchase decision

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Abstract

Purpose – The purpose of this paper is to gain insights into organic consumers' price sensitivity by investigating price knowledge, willingness-to-pay and real purchase decision.

Design/methodology/approach – Organic food consumers' price knowledge, willingness-to-pay and real purchase decision were examined in a comprehensive field study with 642 respondents. An innovative method was used to collect data for products that were truly relevant to the respondents: before entering the shop, respondents were asked about the items on their shopping list, the prices they expected to find and the maximum prices they were willing to pay. If respondents stated a willingness-to-pay value below the actual store price, they were approached again after shopping to verify their purchase decision.

Findings – The great majority of respondents failed to estimate the correct store price. The deviation between the estimated price and the actual store price was on average 19.9 per cent. The respondents were willing to pay on average 52.7 per cent above store prices. It was revealed that in 67.0 per cent of the cases, respondents bought a product even though the store price was higher than the willingness-to-pay they stated upon entering the store.

Practical implications – Category-specific insights into price knowledge and willingness-to-pay of organic consumers might be used for price differentiation strategies.

Originality/value – To the authors' knowledge, this is the first study to investigate organic consumers' item- and store-specific price knowledge, willingness-to-pay and real purchase decision in a single-source approach.

Keywords Consumer behaviour, Organic food, Willingness-to-pay, Price knowledge, Price sensitivity, Purchase decision

Paper type Research paper

Introduction

Many studies have showed that the price of organic food, which is usually higher than conventional food, is a major barrier for consumers to purchase (more) organic products (Aertsens *et al.*, 2009). It can be assumed that price sensitive behaviour implies consumers have, through perceiving and processing price information, an individual, internal reference which allows them to define the upper limit of what they are prepared to pay (Monroe, 2005). In order to express price sensitive behaviour, a person must divide market items between those with an acceptable price and those with an unacceptable price. Therefore, it is argued here that a premise for price sensitive behaviour regarding organic food purchase is a relatively good price knowledge which is the result of perceived and processed price information and a defined maximum willingness-to-pay (WTP).

Past research has often revealed relatively low levels of consumers' price knowledge for food products in general (e.g. Evanschitzky *et al.*, 2004; Kenning *et al.*, 2011; Pechtl, 2008). However, little evidence exists regarding organic food (Aschemann-Witzel and Zielke, 2015; Hemmerling *et al.*, 2015). A study conducted in the UK revealed that



consumers are aware that the price of organic food is usually higher than that of conventional food (Hill and Lynchehaun, 2002). An Australian study came to the same conclusion, adding that consumers were not able to quantify the difference (Chang and Zepeda, 2005). In a further study conducted in the Netherlands, buyers of organic food generally knew the price of an item quite well immediately after they had bought it. However, organic food prices were slightly overestimated (results not reported quantitatively, Bunte *et al.*, 2010). The state of research on consumer price knowledge of organic food does not give comprehensive insight since most of it is rather vague and not item- and store-specific. It is questionable whether the results of studies on conventional products are applicable to organic products since, unlike conventional products, organic products have specific characteristics such as premium prices and ethical attributes (Marian *et al.*, 2014; Pearson *et al.*, 2011; Zander and Hamm, 2010).

In contrast to price knowledge, many studies on WTP for organic food products have been published since 2000 (Rödiger and Hamm, 2015). Most studies establish a WTP of, on average, 10-30 per cent over comparable, conventional products for the majority of shoppers, with a range of 0-105 per cent (e.g. Aryal *et al.*, 2009; Aschemann-Witzel and Zielke, 2015; Budak *et al.*, 2005; Cicia *et al.*, 2002; Du Toit and Crafford, 2003; Haghjou *et al.*, 2013). The amount of the premium varies greatly between studies with different designs, countries of study, time of study, sample composition (organic and/or conventional consumers) and products.

In this study, item- and store-specific price knowledge, WTP and real purchase decision were investigated to draw conclusions on the price sensitivity of organic buyers. The objective of this paper is first, to contribute to the body of evidence concerning consumers' price knowledge of organic food which is quantitatively researched for different food products and second, to investigate whether organic food shoppers behave consistently if their stated WTP is below the actual store price. To the authors' knowledge, this is the first publication reporting price knowledge on organic food quantitatively while also verifying whether organic buyers behave consistently if they state a WTP below the actual store price.

Theoretical background

The concepts of both, price knowledge and WTP, are rooted in the assumption that individual reference prices exist. The reference price of a person is composed of a range of prices that are used to judge external price stimuli, and it refers to a specific product or a product category (Monroe, 2005). The construct is dynamic since the range is updated if the person is exposed to new price information (Monroe, 2005). The existence of reference prices implies some form of price knowledge, established by perceiving and processing price information. It also constitutes a benchmark for the individual WTP. Therefore, price knowledge forms the basis for individual price expectations and WTP, and is a determinant for price sensitive behaviour (Monroe, 2005).

Price knowledge

There is a cluster of terms regarding the concept of memorising prices. We use the term price knowledge to refer to the general concept of memorising prices, and the terms price recall, price recognition and price magnitude judgment to indicate different abilities in retrieving information from memory (similar as in Kenning *et al.*, 2011; compare also

Monroe and Lee, 1999). Price recall is the act of recollecting the price for a specific brand as in knowing something by heart and remembering an exact figure. The majority of studies on price knowledge applied price recall tests (Eberhardt *et al.*, 2009; Estelami and Lehmann, 2001; Monroe and Lee, 1999). Variations in results can be attributed to different research designs, product categories tested, as well as diverse socioeconomic, macroeconomic and environmental determinants (Evanschitzky *et al.*, 2004).

The individual price knowledge has different reference points such as a specific brand and/or a specific store. To measure price knowledge accurately, it is consequently necessary to include these reference points in the data collection (i.e. price knowledge measurement should be item- and store-specific; Aalto-Setälä and Raijas, 2003). Furthermore, the temporal dimension of price knowledge is of practical relevance for research since the time of data collection (before, during or after shopping) determines which type of memory is tapped and whether long-term or short-term memory is engaged. For research on the reference price, testing price knowledge before shopping seems optimal since the answers are at that time not influenced by short-term memories of the recent exposure to prices (Evanschitzky *et al.*, 2004; Vanhuele and Drèze, 2002).

WTP

The maximum WTP is the maximum price at which a consumer would buy a unit of a product or service (Wang *et al.*, 2007). The WTP of an individual or a household can generally be estimated based on panel data or data generated from surveys or experiments. Direct questioning (i.e. self-stated WTP) is one of several common elicitation methods for WTP (Jedidi and Jagpal, 2009). In literature, the direct questioning method is criticised for having a higher probability of leading to inaccurate results due to incentive-incompatibility and hypothetical bias (Backhaus *et al.*, 2005; Frykblom, 2000; Jedidi and Jagpal, 2009; List and Gallet, 2001). However, Miller *et al.* (2011) revealed that hypothetical methods also lead to correct demand curves and pricing decisions. Furthermore, they showed that a direct elicitation approach is more suitable for relatively over-priced, more frequently purchased, non-durable products (Miller *et al.*, 2011), as food products are.

Material and method

Data were collected by a survey taken in front of two conventional supermarkets with an assortment of organic products, as well as in front of two specialised, organic food stores. The survey was operationalised with structured, computer-assisted, face-to-face interviews. The interviewees were approached before they entered the store to do their shopping. They were asked which organic products they were planning to buy and what prices they expected to find for these products in that specific store. This procedure ensured a strong interest on the part of the interviewees in the products and their prices, thus avoiding hypothetical responses. Furthermore, the direct questioning method was used to elicit WTP by asking respondents at what price they would no longer buy an item. The exact questions asked were:

- (1) Please name the organic food products you are about to buy.
- (2) You named the product [...]:
 - Could you please give the details of the product? Which brand, flavour, fat content do you want to buy?

-
- What amount do you want to buy?
 - Please state the price at which this product is probably sold in this store.
 - At what price would the product be too expensive for you to choose not buy it?
 - How often do you purchase this product at this store?

Other questions included filter questions, sociodemographic questions and questions on buying habits. If interviewees stated a WTP below the store price for a product, they were approached again after they had finished their shopping to ask whether they had purchased the product or not. Due to the purchase decision verification when WTP was below the store price, and due to the item-specific measurement of price knowledge and WTP, only organic buyers could be included in the sample.

A particularity of the data collection was that consumers were asked about the details of the products such as the brand, the specific type or flavour, the amount, the package size, the fat content and other necessary information to identify the item in the stores' product lists. Thereby, the responses regarding the expected (recalled) prices could be linked to one specific item in the specific store and it was clear which product characteristics the interviewees had in mind when stating their expected price for an item. This laborious procedure ensured unambiguous inference regarding the price recall abilities of the interviewees.

The data were collected in two cities located in the centre of Germany. Judgement sampling was used to select stores because they ought to be representative for typical German retailers. Conventional food stores had to have a broad range of organic food in order to increase the probability of attracting organic food consumers. Since the aim was to include a broad range of organic consumers regarding education, income, age, family status and consumption intensity of organic food, the location (i.e. neighbourhood) of the stores influenced the sampling. The four cooperating stores were selected in order to represent different store types regarding location, product range and clientele. The two organic stores had less than 400 m² sales area while of the two conventional stores, one had less than 800 m² and the other had more than 800 m².

Interviewees were sampled through systematic convenience sampling (i.e. every third person entering the respective store was asked to participate). Suitable interviewees were people who were usually responsible for the household shopping, stated they intended to buy organic food at the respective store at that moment, and stated they were regular shoppers at the respective store so that it was certain that the interviewees had previous experiences with buying organic food in that specific store. Interviewers were present in front of the stores from Monday to Saturday during all opening hours. In total, 642 interviews were suitable for analysis.

The mean age of participants was 50 and 71.0 per cent were female. The large share of female respondents reflects the situation in Germany where most of the food purchases are still made by women (Max Rubner-Institut, 2008). Interview refusals did not differ between males and females, thus this aspect was not expected to cause bias. The majority of the respondents (61.3 per cent) had earned a university degree (see Table I). This was clearly above the German average. From some review studies, it is known that no unambiguous relationship between education and organic food consumption could be established (Aertsens *et al.*, 2009; Hughner *et al.*, 2007). However, a number of studies confirmed a tendency towards relatively high educational levels among organic food consumers (Dettmann and Dimitri, 2009; Petersen *et al.*, 2013;

Characteristic	Description	Sample (%)	Population (%) ^a
Age (<i>n</i> = 639)	< 25 years	4.1	13.3 ^b
	25-34 years	10.6	13.7 ^b
	35-44 years	21.1	18.3 ^b
	45-54 years	27.7	17.8 ^b
	55-64 years	18.9	13.5 ^b
	> 64 years	17.5	23.4 ^b
Gender (<i>n</i> = 641)	Female	29.0	51.4 ^b
	Male	71.0	48.6 ^b
Educational level (<i>n</i> = 641)	Highest level of education		
	9 years of schooling	2.5	39.3 ^b
	10 years of schooling	9.5	27.7 ^b
	University entrance qualification	26.7	24.4 ^b
	University degree	61.3	<i>Thereof 53.2^b</i>
Occupation (<i>n</i> = 642)	Employed	61.5	70.0 ^b
	Not employed ^c	38.5	30.0 ^b
Household size (<i>n</i> = 641)	Number of household members		
	1	26.2	39.4 ^b
	2	41.5	34.0 ^b
	3	13.6	13.1 ^b
	4	13.3	9.9 ^b
	≥ 5	5.5	3.6 ^b

Table I.
Sociodemographic
characteristics of
the sample

Notes: ^aConsidering the German population over 14 years of age in 2008; ^bown calculations based on Federal Statistical Office Germany (2015a); ^cincluding unemployed as well as, e.g., housewives/-men, students, or pensioners

Source: Author's own

Shafie and Rennie, 2012; Wier *et al.*, 2008). The majority of the respondents were employed and lived in a household with two people (see Table I). The average monthly net household income of the sample was €2,558.1 (€1,303.3 std, *n* = 595) which was below that of the population with €2,914.0 (Federal Statistical Office Germany, 2015b).

Furthermore, 76.5 per cent of interviewees were mainly responsible for food shopping in their households and 23.5 per cent alternated with other household members. The majority of interviewees indicated they shopped for organic food in the respective store more than once a week (53.4 per cent) or once a week (33.2 per cent). Only 2.6 per cent of interviewees stated they shopped in the respective store once a month only and another 10.7 per cent shopped once in 14 days in the store. Interviewees made their organic food purchases in 2.7 stores on average (1.2 std).

The results of the recall accuracy, person and product related, were checked for outliers to ensure that the mean values were not biased. However, results changed only in the position after the decimal point when deleting outliers so all values were kept in the data set for calculations.

Results and discussion

Price recall accuracy

Person-related price recall was operationalised as the individual deviation of the expected prices from the actual prices. It was differentiated between exact price recall (0 per cent deviation from actual price), price recall with > 0-10 per cent deviation, > 10-20 per cent deviation and > 20 per cent deviation. The respondents in this survey failed to estimate the actual prices by an average of 19.9 per cent (19.2 std, *n* = 574).

A large share (37.8 per cent) over or underestimated the actual prices by > 20 per cent. About one-quarter of respondents' estimates were each in the range of > 10-20 per cent (25.8 per cent of interviewees) and > 0-10 per cent (25.1 per cent of interviewees). A minority of 9.2 per cent recalled prices exactly while 2.1 per cent stated the price was irrelevant for them. There was no significant difference in price knowledge between consumers purchasing in conventional and consumers purchasing in specialised organic food stores ($T = -0.389$, $df = 523.381$, $p = 0.697$, $n = 562$, Levene test $p = 0.018$). Thus, the results indicate that organic food shoppers of specialised organic and of conventional stores do not differ in terms of their price knowledge.

The comparability between the results of this study and the study of Bunte *et al.* (2010), who found that organic consumers generally knew the prices of organic food, is low since Bunte *et al.* (2010) did not report exact deviations. Price recall studies on conventional food products had mixed results (e.g. Olavarrieta *et al.*, 2012; Rosa-Díaz, 2004; Vanhuele and Drèze, 2002). However, taking only studies into account in which recall accuracy was tested before shopping, the average deviation of 19.9 per cent of this study is quite close to that of Eberhardt *et al.* (2009) with 23.8 per cent, and Jensen and Grunert (2014) with 19.3 per cent. Regarding the share of respondents who recalled prices without deviation, 9.2 per cent in this study is higher compared to the result of Kenning *et al.* (2011) with 4.3 per cent. This study also revealed a higher share of respondents recalling the price within ± 10 per cent margins with 34.3 per cent compared to 19.4 per cent in Kenning *et al.* (2011).

The product-related price recall (i.e. price recall accuracy per product category) was highest for "bread and pastries" with an average deviation of the expected price from the actual price of 14.1 per cent. The mean price recall accuracy was second best for "potatoes" with a deviation of 17.0 per cent, followed by "eggs" with 17.7 per cent deviation (see Table II). The lowest mean price recall accuracy was found for the category "condiment/oils/fats" with 74.1 per cent deviation of expected prices from actual prices. For the categories "condiment/oils/fats" and "deep-frozen products", none of the respondents knew the exact prices. In the categories "beverages", "deep-frozen products", "spreads" and "others" no respondent stated that the price was irrelevant. While 17.2 per cent of item prices were recalled without deviation ($n = 1,433$), 37.1 per cent were underestimated vs 42.1 per cent that were overestimated. Only for a few items (3.6 per cent) respondents stated that price was irrelevant for them. Considering all product categories, in nine of 13 categories the shares of overestimation were higher than that of underestimation (see Table II).

Regarding the aspect of overestimation, this study's results are in line with the results of Bunte *et al.* (2010) and Hoogland *et al.* (2007) who also found that the majority of consumers overestimated organic food prices. In price knowledge studies on conventional food products, evidence is mixed (e.g. Aalto-Setälä and Rajjas, 2003; Evanschitzky *et al.*, 2004; Pechtl, 2008; Rosa-Díaz, 2004).

Maximum WTP

On average, the WTP, i.e. the price a person was willing to pay on top of the real store price, was 52.7 per cent (48.2 std; calculation of the mean and standard deviation excluding the responses "unlimited WTP" with $n = 39$). The large standard deviation indicates a wide distribution of responses. Table III shows the share of responses according to WTP categories. Nearly 40 per cent of interviewees were willing to pay > 60 per cent on top of the real store prices, while of all respondents, more than a quarter would be willing to pay > 80 per cent higher prices.

Table II.
Price recall accuracy per product category, direction of deviation (price under vs overestimation) and mean maximum willingness-to-pay (WTP)

Product category	n	Deviation of recalled from actual price						Price irrelevant (%)	Price overestimated (%)	Price underestimated (%)	WTP (%) ^b
		Mean (%) ^a	0%	> 0-10%	> 10-20%	> 20%					
Beverages	24	18.8	29.2	25.0	12.5	33.3	0.0	25.0	45.8	46.3	
Bread/pastries	185	14.1	15.7	41.6	19.5	21.1	2.2	30.3	51.9	37.3	
Condiment/oils/fats	6	74.1	0.0	16.7	0.0	66.7	16.7	83.3	—	155.4	
Deep-frozen products	11	20.1	0.0	36.4	27.3	36.4	0.0	90.9	9.1	50.9	
Eggs	43	17.7	4.7	34.9	25.6	32.6	2.3	30.2	62.8	30.4	
Fruit (fresh)	366	19.2	25.7	17.2	12.8	38.8	5.5	38.5	30.3	50.3	
Meat/sausages	62	33.7	4.8	21.0	11.3	59.7	3.2	56.5	35.5	81.7	
Milk/dairy products	297	19.6	16.5	25.6	23.2	30.3	4.4	46.8	32.3	59.9	
Other	20	14.1	20.0	15.0	45.0	20.0	0.0	60.0	20.0	64.6	
Potatoes	28	17.0	10.7	28.6	17.9	39.3	3.6	53.6	32.1	60.0	
Spread (sweet/savoury)	14	19.8	21.4	21.4	14.3	42.9	0.0	50.0	28.6	40.8	
Side dishes/flour/cereals	55	25.4	9.1	27.3	18.2	43.6	1.8	67.3	21.8	67.2	
Vegetables (fresh)	322	26.0	14.6	15.8	18.3	48.4	2.8	39.8	42.9	48.4	

Notes: n, total sample sizes in product categories. ^aExcluding respondents who answered that price is irrelevant (n = 12); ^bexcluding respondents who stated to purchase the item at any price coded as "unlimited WTP" (n = 39)

Source: Author's own

Viewing the average WTP per product category (see Table II), the span between the highest (155.4 per cent for "condiment/oils/fats") and lowest (30.4 per cent for "eggs") value is large. For the most frequently purchased products in this study, the values for the WTP were 50.3 per cent for "fresh fruit" ($n = 366$), 48.4 per cent for "fresh vegetables" ($n = 322$), 59.9 per cent for "milk and dairy products" ($n = 291$), and 37.3 per cent for "bread and pastries" ($n = 183$).

The mean WTP, 52.7 per cent, is higher than that of other studies on organic food (see section "Introduction"). The study confirms a wide variety of WTP values between product categories, however, in no product category in this study was the mean WTP below 30.0 per cent. One might argue that this divergence from other studies might be the result of the influence of the elicitation method used. However, Miller *et al.* (2011) proposed that the open-question method seems to be well suited for lower-priced, frequently purchased, non-durable goods. Since our approach was extremely detailed regarding the reference of the stated prices of the interviewees, one might also argue that the results might be very realistic. When interpreting the relatively high WTP values, the fact that the sample is composed of organic buyers who value organic food more highly than non-organic buyers must be kept in mind. The samples of many other studies on the WTP for organic food also include non-users of organic food who possibly decrease average WTP values due to their lower individual WTP.

Real purchase decision

If interviewees stated a WTP lower than the actual store price, they were approached again after they had finished their shopping to find out whether they had behaved consistently with their stated WTP. Overall, for 9.8 per cent of the products, interviewees stated a maximum WTP lower than the real store price (see Table IV). In 70 per cent of these cases, the interviewees were able to approach interviewees after shopping ($n = 97$). In 30 per cent of these cases, this was not possible because the interviewees were either interviewing another person at that moment or were engaged in the recruitment of other interviewees.

WTP categories (%)	% of respondents ^a	Cumulative (%)
0	2.3	2.3
> 0-20	22.8	25.1
> 20-40	22.5	47.6
> 40-60	15.5	63.1
> 60-80	10.7	73.8
> 80-100	6.2	80.0
> 100	13.2	93.2
Unlimited WTP	6.9	100.0

Notes: $n = 569$. ^aRounding error included

Source: Author's own

Table III.
Average maximum willingness-to-pay (WTP) for organic food

Direction of the WTP	% of products ($n = 1,425$)
Negative	9.8
Exactly zero	7.8
Positive	73.4
Unlimited WTP	9.1

Source: Author's own

Table IV.
Direction of the product-specific mean maximum willingness-to-pay (WTP)

Of the products for which the stated price was below the store price 67.0 per cent ($n = 65$) were purchased and 33.0 per cent ($n = 32$) were not purchased. The average percentage deviation from the WTP to the store price was 21.1 per cent for purchased products (13.5 std) and 20.3 per cent for non-purchased products (12.5 std). Interestingly, there was no significant difference regarding the price level between purchased and non-purchased products ($T = -0.296$, $df = 95$, $p = 0.768$, $n = 97$). There was no unambiguous price level above the stated (lower than store price) WTP at which interviewees decided not to purchase an item.

These observations question the extent of the general price sensitivity of organic consumers. Even though the store prices were higher than the maximum prices the consumers stated they would accept, two-thirds of them bought the item anyway. Obviously, WTP was not the decisive factor in these cases. Another factor might be that, during their shopping, respondents noticed that they had a low level of price knowledge, indicating that their price expectations and WTP are not realised in the market. Furthermore, another factor might be that the effort to go to another store that offers the respective product at a lower price is too great.

Implications

If it is assumed that price sensitive behaviour requires relatively accurate price knowledge and a defined maximum WTP, the findings of this study indicate that the majority of German organic consumers is not behaving consistently price sensitively for the product categories examined. The verification of the purchase decision when an interviewee stated a WTP below the store price supports this conclusion, since two-thirds of interviewees purchased the item anyway. Due to the absence of a clear price limit above which German organic consumers reacted with non-purchase when the store price was above their stated maximum WTP, it can be assumed that price has a rather subjective and emotional role in the decision process and is not part of a strongly rational decision-making process in a food-purchasing situation. However, the results support this conclusion only for organic consumers. Price may have a different role in the decision process of consumers who do not (yet) buy organic food.

The results of this study suggest that, rather than generally decreasing organic food prices to compete on the market, category-specific insight can be used to decrease prices for product categories for which price knowledge is relatively high and WTP is relatively low. Insight into differences in price knowledge and WTP between product categories and between clusters of consumers could effectively be used to elaborate price differentiation strategies. Furthermore, instead of generally decreasing prices to compete on the market, it is proposed to intensively communicate the high value and ethical attributes of organic food to consumers since, for the majority of consumers, the price-performance ratio rather than price alone appears to be decisive.

Limitations

A limitation of this study is the store sampling. The stores were selected by judgment sampling and based on their willingness to cooperate since they had to share sensitive information about price policy and product assortment. Due to the high coordination effort, it was not possible to include a larger sample of stores. However, a small store sample is not unusual in price knowledge studies (compare e.g. Jensen and Grunert, 2014; Vanhuele and Drèze, 2002). In all, it is not claimed that the study is representative of the price knowledge of German organic food shoppers.

Regarding the study design factors with an effect on recall accuracy identified by Estelami and Lehmann (2001), the average number of products for which a respondent recalled prices was 2.5 (1.5 std) and can be considered to allow for high recall accuracy. Monetary incentives, which were found to have a positive impact on recall accuracy (Estelami and Lehmann, 2001), were not offered to respondents in this study. Estelami and Lehmann (2001) further identified a positive effect of the inclusion of a “don’t know”-option on price recall accuracy. In this study, the face-to-face interviews allowed the interviewers to note the reasons for price recall or WTP statement refusals. If respondents stated that they did not know the price for an item, the answer was treated as missing value. However, in a relatively high number of cases respondents stated that the price was irrelevant to them since they would purchase the item anyway or they would reduce the number of items purchased to reduce the total shopping bill. As this response occurred quite frequently it was coded separately and was reported as “price irrelevant” and “unlimited WTP”, even though in fact consumers presumably do not have an unlimited WTP for a food item.

Since purchasing food is usually done with low involvement decisions and in short intervals, maybe even as a daily activity, Monroe (2005) suggested that this type of purchase decision is normally based on price magnitude judgments, consequently price recall is not the optimal measure. Due to the study design, however, it was not possible to use price magnitude judgment as a measure since the aim was to quantify store- and item-specific price knowledge.

Another limitation to comprehensively investigating price as a barrier to organic food purchase, is that the group of consumers who do not buy organic food could not be included due to the study design. Furthermore, the categorisation of price knowledge and WTP in “rather low” or “rather high” is relatively arbitrary.

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4 Discussion

The discussion of the results is structured according to the conceptual framework, i.e. variables that chronologically come first in the adapted SOR framework are discussed first. The results of the three studies were individually discussed in the respective journal articles. This section discusses the results of the investigated SOR processes from the perspective of the research questions of the dissertation. The merits and limitations of the dissertation are discussed at the end of the section.

4.1 Internal processes of consumers' price sensitivity

4.1.1 Visual information intake

In the second and third article (sections 3.2 and 3.3), the visual price information intake was investigated as precondition for and indicator of consumers' price-sensitive behaviour regarding organic food. According to information economics, an individual searches just as much information as necessary to make a decision while more relevant information are taken in first (Solomon, 2015). Hence, it can be assumed that a consumer, for whom price is more important for product choice than for another consumer, takes in earlier in the decision process and more pieces of information on prices. A consumer who gives price a stronger weight in the decision process than another consumer can be regarded as more price-sensitive compared to the other. Consequently, it is assumed that a higher degree of price sensitivity leads to a higher intake of price information.

All consumer groups of the second study, i.e. regular organic, occasional organic and conventional consumers, looked on average a non-zero share of their gaze duration at organic food prices. Only about 4.1% of the study participants ignored organic prices completely and most of the price tags were at least fixated once. Most of the conventional prices were looked at as well, implying that the participants could have compared organic and conventional prices. Moreover, about three quarters of prices that were fixated once were refixated. Hence, it can be argued that all consumer groups have fulfilled the precondition for internal processes and responses linked to price sensitivity regarding organic food.

The shares of and absolute gaze duration that regular organic, occasional organic and conventional consumers spent looking at organic prices did not differ significantly, and accounted approximately for 7% to 8% or 1.35 to 1.40 seconds. The relatively low share of attention to organic prices specifically and to prices in general corresponds well to findings of other studies that the price draws less visual attention than other product attributes (Balcombe *et al.*, 2015; Chandon *et al.*, 2009; van Loo *et al.*, 2014).

Organic consumers spent a smaller share of gaze duration looking at price information in total and on conventional prices than conventional consumers. Furthermore, organic consumers spent a lower share of fixations on organic prices of the time inquiring organic products. The difference between consumer groups in the acquisition of varying pieces of information can be interpreted as best serving their information need to decide for a food product. This was confirmed in several eye-tracking studies (e.g. Gidlöf *et al.*, 2017). The argument that the observed gaze behaviour could have been biased by stimulus-driven gaze behaviour, and is thus not mainly reflecting information needs, can be countered by accumulated evidence for the dominance of goal-driven gaze behaviour in food purchase decisions (Gidlöf *et al.*, 2017; van der Laan *et al.*, 2015). Hence, it can be stated that organic consumers had a lower need for price information to decide for organic products. Therefore, the visual intake of price information can be used as an indicator for price sensitivity, and the results imply that organic consumers are significantly less price-sensitive than other consumer groups.

This was also confirmed by the findings of the third study in which the eye-tracking data were analysed sequentially. The findings showed that in all three attention phases (orientation, comparison and evaluation phase) organic consumers did not acquire significantly more organic prices than conventional consumers. Moreover, in the first and third phases, organic consumers took in significantly less conventional price information. According to information economics, this can be interpreted as prices having a lower relevance for decision-making for organic than for conventional consumers (Solomon, 2015).

So far, three other eye-tracking studies, of which one was published in a journal listed in the Web of Science, included the attribute 'organic' in their research on food. However, the studies in sections 3.2 and 3.3 are, to the author's knowledge, the first publications of an eye-tracking study on the prices of organic food. In one study, the organic attribute was not tested with eye-tracking data, instead attitudes towards organic were used to group consumers (Fiala *et al.*, 2016). In another study on wine labels, the organic attribute was investigated with eye-tracking, however without price information (Gofman *et al.*, 2009). One eye-tracking study conducted on organic food in the USA, finally, used eye-tracking in combination with experimental auctions. They did not investigate the gaze behaviour on organic prices but, interesting and linked to this dissertation, they found that with increasing visual attention on organic apple juice the WTP of participants rose (Rihn and Yue, 2016). However, the authors did not distinguish between gaze on price and on package. Hence, this result adds to the previous findings of a strong relationship between gaze duration/ count and purchase that the intermediate process 'price intention' shows the same directional relationship.

The distinction between different consumer groups in the present study added insights that, on average, all groups looked for a certain share of duration at organic and conventional price tags during all stages of decision-making independent of their purchase decision. This could be due to orientation and for establishing a consideration set (Husić-Mehmedović *et al.*,

2017). Similar to other studies, the share of gaze duration on packages and prices was indicative for choice. Gidlöf *et al.* (2017, p. 35) stated that “[...] just the eye-tracking data was enough to predict, with 90% accuracy, whether any given product would be purchased [...].” This shows the high predictive potential of eye-tracking data, and the potential of eye-tracking research. However, as with purchase behaviour data it is challenging to determine the relevant processes that result in a certain gaze behaviour.

4.1.2 Perceived price importance

Price importance in the second and third article (sections 3.2 and 3.3) was used as an approximation to price involvement. In section 3.3, a group of organic and conventional consumers was asked about the importance of price for the choice of strawberry jam. It was revealed that for those participants characterised as conventional buyers the price was ‘rather important’ to ‘important’¹ for their choices. Organic buyers, on the other hand, rated price as ‘neither important nor unimportant’¹ to ‘rather important’. Thus, the findings suggest a relationship between the individual perceived price importance and the choice of organic products. This is in line with Padilla Bravo *et al.* (2013) who revealed that the perceived price importance has a negative impact on organic food purchases. In section 3.2, however, the effect of the perceived price importance on the number of organic products chosen turned out to be not significant in a model together with gaze data and additional items. Consequently, the use of perceived price importance as an indicator of price-sensitive behaviour could not be clearly confirmed.

The results from section 3.3 are in contrast to those of Lockie *et al.* (2002) who found that Australian organic and conventional consumers both rated price as highly important for food choice and did not differ significantly in their ratings. Lockie *et al.* (2002) concluded that organic consumers are just as price-sensitive as conventional consumers. In a Czech study with organic and conventional consumers, 56.6% stated that the price is ‘important’ or ‘quite important’ for the choice of food products (Frýdlová and Vostrá, 2011). The authors did not distinguish the ratings between organic and conventional consumers, thus, the findings cannot be compared in more detail.

In the conceptual framework in section 2.2, an impact of price involvement on visual price information acquisition was assumed. The results of the third study confirm this assumption as reasonable because significant differences were found between conventional and organic consumers in their dwell counts on conventional prices and in their price importance ratings. Conventional consumers had more dwell counts on conventional prices and higher price

¹ On a scale with the labels 1=not at all important, 4=neither important nor unimportant, 7=very important.

importance ratings than organic consumers. The impact of price involvement on cognitive, affective and intentional processes that was assumed in the conceptual framework was not investigated in the third study and could not be linked to the fourth study since the data stemmed from different samples.

In the third study of this dissertation, participants rated the importance of ten to eleven different product attributes for their choice of which one was the price. Participants simultaneously were reminded of various characteristics of the products, and thus it can be assumed that price was not overemphasised by the procedure. Even though the question was not posed as a constant sum scale, it can be assumed that participants rated the items somewhat in relation to each other if they aimed to reveal their true answers. Hence, it is suggested that the responses represent externally valid importance ratings of organic and conventional buyers.

4.1.3 Price knowledge

In the conceptual framework of this dissertation, price knowledge has the status of an organism-internal cognitive process determining price-sensitive behaviour, being influenced by price involvement and visual information acquisition, and affecting the WTP. The widely accepted reference price concept (e.g., Monroe, 2005) implies that consumers must have a certain price knowledge to be able to act price-sensitive. In section 3.4, the average absolute deviation of recalled from actual organic prices was 19.9% (Rödiger *et al.*, 2016). This can hardly be interpreted as high price recall accuracy, and thus it implies that German organic consumers are not highly price-sensitive in their purchase behaviour. The findings in section 3.4 showed distinct differences in price knowledge of organic consumers between product categories. This is in line with findings, not specific to organic consumers, of Kenning *et al.* (2011), Jensen and Grunert (2014), Rosa-Díaz (2004), and Olavarrieta *et al.* (2012), while Estelami and Lehmann (2001) found no evidence for cross-category variation of price knowledge. Assuming a relationship between price knowledge and price-sensitive behaviour from the conceptual framework, this finding implies that organic consumers can behave more price-sensitive for some and less for other product categories. This assumption is supported by Andreyeva *et al.* (2010) who calculated the price elasticity of demand for different product categories based on a meta-analysis not specific to organic food and found that the price elasticity estimates differ between product categories. Thus, this seems to be a general phenomenon and not specific to organic food.

Next, an impact of price involvement on price knowledge was established in the conceptual framework. In section 3.3, a lower perceived price importance was found for organic than for conventional consumers. Therefore, it could be deemed reasonable that the price recall accuracy was not very high for organic consumers in Rödiger *et al.* (2016). However, the

relationship between perceived price importance and price knowledge could not be analysed statistically since the data were from different samples. A comparison with price recall accuracy (not specific to organic food) elicited by other studies approaching consumers before shopping showed that the deviation of recalled from actual prices was comparable: 23.8% in Eberhardt *et al.* (2009) and 19.3% in Jensen and Grunert (2014). This indicates that organic and conventional shoppers, on average, do not differ in their price recall abilities, contrary to expectations from a higher perceived price importance in conventional consumers. The standard deviations of Eberhardt *et al.* (2009) and the study in section 3.4 were very similar as well, with 0.223 and 0.192, respectively (no standard deviations were given in Jensen and Grunert, 2014). This, together with the similar recall accuracy, suggests that organic and conventional consumers have the same precondition for price-sensitive behaviour in form of price knowledge.

The assumption that price knowledge of organic and conventional consumers does not differ significantly is further relevant for the interpretation of findings on the visual information acquisition, since the knowledge of an individual is determined by information acquired. Theoretically, the relationship between the amount of information searched and consumer product knowledge is expected to have an inverted U-shape (Hoyer and MacInnis, 2010; Solomon, 2015). If it is assumed that organic and conventional consumers have the same level of memory of internal reference prices, it can further be suggested that organic and conventional consumers, on average, search for the same amount of information for products relevant to them. The results in sections 3.2 and 3.3, however, showed that regular organic consumers spent 9.7% of their total gaze duration looking at organic prices, conventional consumers looked 16.3% of their total gaze duration at conventional prices. This is contradictory to theoretical expectations and findings on price knowledge.

Differences between product categories were also found regarding the question whether organic food prices are rather over- or underestimated. Most organic consumers underestimated the prices for four product categories (beverages, bread/pastries, eggs, fresh vegetables) while for the remaining nine product categories the majority overestimated prices. There are not many comparable studies on this topic and findings are not unambiguous. While Spiller *et al.* (2004) found an underestimation of the price of organic oat flakes by consumers occasionally and seldom purchasing organic food, the price of the product category 'side dishes/flour/cereals' was overestimated by 67.3% of organic consumers in Rödiger *et al.* (2016). Bunte *et al.* (2010) and Hoogland *et al.* (2007) confirmed an overestimation of the prices of several organic food products combined from mixed samples of organic and conventional buyers. This finding is relevant for the research question of this dissertation, since it points to differences in price perception and price images – concepts with implications for marketing decisions. The results underline the interpretation of differences in the price sensitivity of organic consumers for different product categories.

Another important question is how accurate price knowledge must be to enable consumers to act upon it. Researchers subjectively labelled certain average percentage deviations of price recall as ‘good’, ‘reasonable’, ‘low’ or ‘poor’ (Aalto-Setälä and Rajjas, 2003; Bunte *et al.*, 2010; Kenning *et al.*, 2011; Spiller, 2001). Since for food the item prices are relatively low, a price recall deviation of, on average, 20% is not high in absolute monetary terms, and does not mean a high monetary penalty for consumers. On the other hand, a price increase of 20% would result in a considerable rise in profits for sellers.

4.1.4 Price evaluation

Another organism-internal cognitive process in consumers’ organic price-related behaviour is price evaluation. In section 3.2, price evaluation was included in the data analysis with two items, one on price acceptability and one on value for money regarding organic food. The item on price acceptability, ‘I think organic food is too expensive’, did not have a significant effect on the choice of one or two organic products compared to two conventional products in a multinomial logistic regression model together with gaze data and additional items. The item on value for money, ‘When I eat organic food, I feel that it was worth the money’, was found to have a significant effect on the choice of two compared to no organic products. The relationship was positive, hence, a higher than average perceived value for money of organic food increased the probability to choose two instead of no organic product.

It is interesting to note that the perceived expensiveness of organic food did not have a significant effect in the model, while the perceived value for money of organic food had a significant effect. This might indicate that, from a marketing perspective, it is more promising to focus on increasing consumers value perception of organic food than to decrease their costliness perception (see also Janssen, 2018; Torres-Ruiz *et al.*, 2018). It can be hypothesised that the item on price acceptability did not have a significant effect because consumers are assumed not to expect low prices from a product which has an additional value compared to other products.

Other research had also included items on the price acceptability and value for money of organic food. Zagata (2012) showed that for consumers from the Czech Republic who bought at least sometimes organic food price acceptability was only a moderate barrier to purchase organic food. From Zagata’s study, the effect of organic price acceptability on purchase is not known from conventional consumers (Zagata, 2012). Bryła (2016) found in a representative sample of Polish consumers that a majority of 33.3% thought the price of organic food is rather acceptable and another 28.5% were undecided. They did not compare organic and conventional consumers’ price acceptability ratings. In Janssen’s (2018) study a majority of 57.5% of German respondents fully or rather disagreed to be willing to accept higher prices for organic food. Also, only about 10% of Dutch teenage pupils thought that organic food is

not expensive (Stobbelaar *et al.*, 2007). Krystallis *et al.* (2006) revealed that 44.6% of Greek respondents thought that organic foods' price-performance-ratio is unfavourable. None of the cited studies, however, compared organic and conventional consumers on their ratings for price acceptability and value for money of organic food and their impact on the purchase decision. Therefore, no direct comparison of the findings with results of other studies can be undertaken.

4.1.5 Willingness-to-pay

The WTP is depicted in the conceptual framework as an organism-internal intentional process determining price-sensitive behaviour, being influenced by price knowledge, perceived price importance and visual price information intake. Literature review in the first article has shown that price sensitivity concerning organic food was mostly researched through the WTP (in 146 of 194 articles) (Rödiger and Hamm, 2015). A high number of different aspects of WTP were studied, however, without conclusiveness on the general WTP a premium for organic food. Reasons for the lack of conclusiveness are, among others, different samples (organic consumers vs. consumers in general), country-specific differences and product-specific differences. In section 3.4, the finding of previous studies that the WTP differs between product categories was confirmed (Krystallis *et al.*, 2006; Ureña *et al.*, 2008). Interestingly, for eggs, which are the most frequently purchased fresh organic product category in Germany (Ökobarometer, 2017), the WTP in our study was the lowest (30.4%). Similarly, for fresh fruit and vegetables, which are the second most frequently purchased organic product categories (Ökobarometer, 2017), the WTP values elicited in the fourth study were average with approximately 50%.

Comparing results on WTP of Rödiger *et al.* (2016) with a study on organic consumers from two Spanish cities (Sanjuán *et al.*, 2003), consumers in Rödiger *et al.* (2016) had a higher WTP for vegetables (48.4% vs. 22.7%/37.6%) and potatoes (60.0% vs. 15.1%/12.8%). For fresh fruit, there was a large difference between the WTP of participants in one Spanish city (23.3%) compared to another Spanish city (67.0%), so that the result in section 3.4 was in between (50.3%). In another Spanish study, regular organic consumers revealed an even lower WTP with 18.9% for vegetables (section 3.4: 48.4%), 17.1% for fruit (section 3.4: 50.3%), 17.6% for red meat and sausages (section 3.4: 81.7%), 15.3% for dairy products (section 3.4: 59.9%), and 14.9% for eggs (section 3.4: 30.4%) (Ureña *et al.*, 2008). Thus, compared to Spanish organic consumers the German organic consumers of the fourth study often had a distinctly higher WTP.

The higher WTP values elicited by the fourth study compared to other studies could partly be attributed to different elicitation methods (Völckner, 2006) as well as to country-specific

differences. While Germany is one of the largest organic markets in the world (9.5 billion €), the Spanish market is much smaller with 1.7 billion € (Lernoud and Willer, 2018). Therefore, the acceptance of organic products among German consumers is higher which in turn might lead to a higher WTP. Overall, the German organic consumers in this study's sample were on average willing to pay 52.7% premium on top of the prices in the market, implying rather low price sensitivity. Despite a large range of WTP values, the average additional WTP from studies all over the world with different samples is assumed approximately 30% (Aschemann-Witzel and Zielke, 2017). The hypothesis that German consumers are less price-sensitive regarding organic food is strengthened by a recent study revealing similarly high WTP estimates with 60% on top of conventional prices for chocolate, 56% for milk, 52% for chicken breast fillet and 38% for coffee (PwC, 2017).

In the conceptual framework, price knowledge has an impact on WTP. For the three product categories with the lowest and highest mean deviation of recalled from actual prices, a tendency can be supposed that the average WTP is lower for products for which average price knowledge is better. Since this relationship did not appear very distinct, it is hypothesised that product-specific characteristics play an important role in the variation of the relationship between categories. For example, the WTP for potatoes is considerably higher than that for eggs and bread/pastries, even though the price knowledge is similar for these categories. Since potatoes are a seasonal product with relatively higher prices in spring and lower prices in autumn, the WTP values which were stated in winter probably included the higher prices. Bread/pastries and eggs, on the other hand, are to a lower degree subject to seasonal variations.

Perceived price importance is, in the conceptual framework, assumed to have an influence on the WTP. The results from section 3.3 on the lower ratings of price importance for organic consumers and the results from section 3.4 on the relatively high WTP values elicited by organic consumers seem to be congruent. Participants who chose an organic product in section 3.3 rated the attribute 'organic' as 'rather important' for their choice (on average 5.3 on a seven-point-scale), while participants who chose no organic product rated it as 'rather unimportant' (2.9). The price was rated as 'neither important nor unimportant' (4.5) by participants who chose an organic product. Organic consumers value organic food higher due to its environmental, animal-welfare, and health benefits, among others (Aertsens *et al.*, 2009) so that the price becomes less important for them. Thus, the results are in line with previous findings pointing to a higher perceived price-performance ratio of organic food by organic consumers, leading to a higher WTP (Bean and Sharp, 2011; Lund *et al.*, 2013).

In the conceptual framework, visual price information acquisition is depicted as having an impact on WTP due to its role of updating the internal reference price. Interestingly, it seems that organic consumers, relative to conventional and occasional organic consumers, do not need much visual price information intake to update their internal reference price and develop

a WTP. Organic consumers took in nearly half of share of price information than conventional consumers (15.8% vs. 29.0%). Despite their lower visual price information intake, they seem to have approximately the same level of price knowledge. The higher WTP, therefore, seems to be the result of the high value that organic consumers attach to organic products, rather than of price considerations, again, implying a lower price sensitivity of organic consumers.

4.1.6 Socio-demographics

The literature review showed that there is low consensus about the effects of socio-demographic characteristics on the WTP for organic food (indicating price sensitivity regarding organic food). There were mixed findings on the effects of family size, gender, educational level and marital status. In section 3.4, the organic consumers had a higher share of university alumni and of households with 2, 4 and ≥ 5 members than present in the general population (Rödiger *et al.*, 2016).

In the literature review, a higher degree of consensus regarding the effect on the WTP for organic food was found for household income and age of consumers. Most studies found a strong relationship between household income and the WTP. A middle income had the strongest effect on the WTP for organic food (Briggeman and Lusk, 2011; Haghiri *et al.*, 2009; compare also Ngobo, 2011). In section 3.2, the household income was not a significant predictor of the number of organic products chosen in the test shop. In section 3.4, the average household income of the organic consumers was even below the average of the German population (€2,558.1 vs. €2,914.0) (Rödiger *et al.*, 2016). This result underlines the findings from the literature review that the relationship between household income and the expenditure on organic food, or the respective intention, is not assumed linear.

4.2 Consumers' purchase decision regarding organic food prices

The last part of the conceptual framework is the response of consumers representing consumers' purchase decision. For practitioners, the purchase decision is the most important expression of price sensitivity. All four articles in the dissertation include results on consumers' purchase decisions regarding organic food. However, all articles looked at the topic from different angles.

In the second and third article (sections 3.2 and 3.3), the product choice was recorded. In section 3.3, it was observed that organic consumers rated the country of origin more, and price and jar size less important than conventional consumers. That local production is important to organic consumers was also shown by Hempel and Hamm (2016) (see also

Hughner *et al.*, 2007). Organic and local production are related to the values universalism and security which are important motivators to buy organic food (Aertsens *et al.*, 2009; Baker *et al.*, 2004; Brunsø *et al.*, 2004). Values are determinants of consumers' internal processes such as attitudes (Brunsø *et al.*, 2004), and thus, this finding can be interpreted as a confirmation of the SOR paradigm because it shows that the same stimulus leads to different outcomes based on the processes in the consumer. The model linking visual information search behaviour to the purchase decision in section 3.2 provided the insight that visual information acquisition, which is strongly influenced by the personal shopping-goal (e.g. Bialkova *et al.*, 2014) and thus by organism-internal processes, is a significant predictor of the final choice. This pours into the same stream of insight as section 3.3.

In section 3.4, the purchase decision of participants who stated a lower maximum WTP than the store price was systematically investigated. This was the case for 9.8% of the products. The result, i.e. 67% (n=65) of purchases were done despite a store price higher than the stated WTP, seems to question the validity of WTP estimates based on stated preference methods. There was no significant difference in the deviation from WTP to store prices between the products that were and those that were not purchased. The price levels of the products that were and those that were not purchased did also not differ significantly. There are other possible reasons for this finding: for example, for a certain product category for which price knowledge is low the consumer could have developed a price expectation which is not met in the market. Another possible reason is that the consumer's reference price was outdated due to seasonal price fluctuations. Independent of the reason why WTP values below the store price were stated, the finding shows that the elicited WTP should not be taken as a reliable indicator for price-sensitive purchase behaviour. In a real-life purchase setting, consumers might decide to purchase the respective product nonetheless, possibly because they accept that their expectation was unrealistic, or because the effort to search for a cheaper price is too high.

The literature review underpins the finding that organic consumers often purchase products despite they stated a WTP below the store price (Rödiger and Hamm, 2015). When the price difference between organic and conventional food decreases, more people switch to organic food, and when the price difference increases, people switch proportionally less to conventional alternatives. Transferred to the result on the purchase behaviour in section 3.4, this would explain the finding by arguing that organic consumers are less likely to purchase a conventional product even if the organic product is more expensive than they expected.

Bunte *et al.* (2010) revealed valuable results for the study in section 3.4 from a real-life experiment in Dutch supermarkets in which they decreased the prices of organic products to the level of conventional alternatives. In their experiment, the price elasticity of demand for organic products was low. In fact, many consumers did not notice that there is *no* or *hardly any* price difference. In the same line, Aschemann-Witzel and Niebuhr Aagaard (2014) made

the observation that an organic-inclined consumer bought conventional lemons not noticing that organic lemons were offered at the same price. Together with the results on purchase behaviour in section 3.4, these findings stress that an important barrier to organic food purchases is the subjective perception of organic prices rather than actual prices, and that the importance of price decreases if a change in purchase behaviour in favour of organic food can be induced.

4.3 Merits and limitations

The dissertation has several merits and limitations.

First, many authors of literature review studies on organic food consumption have not embedded their work in a theory for a classification and structure of research (e.g. Aschemann-Witzel and Zielke, 2017; Hemmerling *et al.*, 2015; Hughner *et al.*, 2007; Pearson *et al.*, 2011; Schleenbecker and Hamm, 2013; Thøgersen, 2010). Other authors used the Theory of Planned Behaviour as a theoretical fundament for their literature review or meta-analysis on organic food consumption (e.g. Aertsens *et al.*, 2009; Scalco *et al.*, 2017). Rödiger and Hamm (2015) used the SOR framework as a conceptual basis to systematically structure and synthesise existing findings. The advantages of the SOR framework over the Theory of Planned Behaviour were that it includes affective processes, price knowledge and behaviour. The SOR framework has a broader conceptualisation of consumer behaviour while the Theory of Planned Behaviour includes quite specific concepts which are measured by a low number of studies, for instance perceived behavioural control. Therefore, the SOR framework proved to be an appropriate fundament for the literature review in this dissertation. The SOR framework also proved to be useful in studying price-specific or unspecific consumer behaviour regarding organic food in, for instance, Lee and Yun (2015) and Plaßmann-Weidauer (2011).

The literature review, furthermore, defined scientific quality criteria for research to be included. First, no ‘grey’ literature was comprised in the literature review, such as reports or non-peer-reviewed conference contributions. And second, only peer-reviewed articles were used for the literature review. Hence, it can be assumed that the literature review synthesised results of scientifically sound studies.

Moreover, the articles for the literature review were systematically searched with a pre-defined Boolean search term. Thus, the highest possible transparency of the search procedure was ensured and a replication of the search is possible. A final noteworthy merit of the literature review is the high number of journal articles (n=194) that were analysed to produce the structured overview of the findings. Due to the high number of articles on the WTP (n_{WTP}=146), the respective findings, however, could not be analysed in-depth.

Regarding the study in sections 3.2 and 3.3, a merit to point out is the large sample size. A total of 255 participants took part in the study of which 148 (3.2) and 189 (3.3) could be used for analysis. Studies with mobile eye-tracking glasses are, compared to studies with fixed eye-trackers, a lot more labour-intensive in data preparation and accompanied by a higher share of data quality too low to be included in analysis. Thus, in studies with mobile eye-tracking glasses the sample size often ranged between 25 and 60 (Behe *et al.*, 2013; Clement, 2007; Gidlöf *et al.*, 2017; Lufimpu-Luviya *et al.*, 2014; Hummel *et al.*, 2017; Snyder *et al.*, 2015). Higher numbers of participants were achieved by Groeppel-Klein *et al.* (2013) with 260, Koenigstorfer *et al.* (2014) with 160, and Hurley *et al.* (2013) with 127 participants. While it is less important for exploratory research to have a medium to high sample size, for studies that want to measure an effect or determine the real value of parameters, an adequate sample size is necessary to have a good precision in analysis (Sarstedt and Mooi, 2014). A further strength of the sampling in sections 3.2 and 3.3 is that the sample consisted of consumers. In other studies, university students were asked for participation (e.g., Bialkova *et al.*, 2014; Menon *et al.*, 2016; Reisen *et al.*, 2008; Su *et al.*, 2012). Moreover, the study in sections 3.2 and 3.3 applied quota sampling with quotas for age and gender so that older and male consumers are represented as well. From experience, it is known that young women are more willing to participate in studies than older or male persons. A weakness of the sampling is that it was only done in one German city.

A major merit of sections 3.2 and 3.3 is that, to the author's knowledge, they are pioneer publications in the field of price research regarding organic food purchasing with eye-tracking. As already discussed in section 4.1.1, there is only one publication using eye-tracking on organic food reporting the relationship between gaze behaviour and price behaviour (Rihn and Yue, 2016). Other publications including the organic attribute in some way did not investigate the price (Fiala *et al.*, 2016; Gofman *et al.*, 2009). Furthermore, these studies were not conducted with mobile eye-tracking glasses that facilitate the use of real products. With mobile eye-tracking glasses participants can move freely as in walking along a shopping aisle and act naturally as in a real shopping situation by, for example, touching products. The fact that the technology became affordable for a broader research community is a recent development (Behe *et al.*, 2013). Furthermore, the equipment became lighter in weight and easier to handle (Behe *et al.*, 2013). Hence, an increasing number of publications in food marketing is to be expected in the future.

Another merit of the study in sections 3.2 and 3.3 is a close to real shopping situation in the laboratory. The external validity of a study situation for research on purchase behaviour is assumed to be lower if pictures of food products on a monitor are used (such as in Ares *et al.*, 2014; Bialkova *et al.*, 2014; Drexler and Souček, 2016; Fiala *et al.*, 2016; Helmert *et al.*, 2017; Husić-Mehmedović *et al.*, 2017; Oliveira *et al.*, 2016; Siegrist *et al.*, 2015). While there is a study with mobile eye-tracking glasses that uses a projection of a supermarket shelf on a wall of a laboratory (Hummel *et al.*, 2017), there are very few studies conducted with eye-

tracking glasses in real supermarkets (Clement, 2007; Gidlöf *et al.*, 2017; Groeppel-Klein *et al.*, 2013). Manipulations on products in real supermarkets as in Groeppel-Klein *et al.* (2013) are so far rarely done because a close collaboration with and the agreement of the supermarket director is necessary. Therefore, a mock-up store including several shelves in a laboratory is a useful compromise between a large degree of realism of the shopping situation and controlled conditions (approach also used by Koenigstorfer *et al.*, 2014). Moreover, products from Austria and Switzerland were used which are not available in brick and mortar stores in Germany to avoid a bias through brand familiarity.

Limitations in sections 3.2 and 3.3 can be found in the study design. A more profound investigation of the effect of prices of organic food on consumers' gaze and choice behaviour could have been facilitated if the prices of the test products would have been manipulated. This was not done because the intention behind the study was to observe consumer behaviour in a highly realistic shopping situation including a realistic price setting. A further limitation is that price perception was not measured due to a limitation of the number of questions and their prioritisation to avoid interviewee fatigue. This variable would have been a potentially insightful link between visual price information acquisition and attitudes towards the price of organic food and the participants' choices. Another weak point of the study is that the products used were not tested for design features or saliency, which both could have had a significant effect on the gaze behaviour and product choice (Clement *et al.*, 2013; Milosavljevic *et al.*, 2012). However, Gidlöf *et al.* (2017) found that consumers can make saliency work in favour of them in shopping situations which counters the assumed limiting effect of saliency on the study results.

It is a merit of section 3.4 that the price knowledge and WTP measured were, first, asked only for products which were truly relevant to respondents since they stated to have planned to purchase them in that moment. Furthermore, the answers were recorded for concrete items by asking for product characteristics (brand, fat content, flavour, package size, amount, etc.). Therefore, the given values could be linked to one specific item in the shop, and the price knowledge and WTP could be calculated precisely (as recommended by Aalto-Setälä and Raijas, 2003). Moreover, the measurements were store-specific, as different stores can have different price levels. This very labour-intensive approach is, to the author's knowledge, unique so far. A consequence of the approach, however, was that only organic consumers could be used as participants to measure price knowledge and WTP for organic food. A limitation of the sampling is that participants were only recruited in two German cities. A more solid basis for conclusions could have been built if participants had been sampled from several geographically dispersed locations in Germany.

A merit of section 3.4 is as well the approach to verify consumers' purchase decision if they had stated a WTP below the store price. This approach examined the consistency of stated WTP and purchase behaviour. It revealed an insight relevant to the discussion on the validity

of stated WTP and calls for further investigation. To the author's knowledge, no other study with this also very labour-intensive approach has been published so far.

A further limitation of section 3.4 is the measurement approach to consumers' price knowledge. Diller (2008) stated that price knowledge is the sum of implicit and explicit components of knowledge which explains the mismatch between consumers high interest in prices and low measured price recall accuracy. Diller (2008) identified the source of the mismatch as wrong approaches to and assumptions of price knowledge measurement. The study used only one approach to measure consumers' price knowledge, measuring explicit price knowledge based on price recall accuracy. It is possible, however, that consumers would have revealed a better price knowledge if other measurement approaches had been applied additionally.

In the following, the specific merits of the author of this dissertation to the study in section 3.4 are stated, since the data and results used in section 3.4 are part of a project and dissertation previously conducted. The complete manuscript in section 3.4 was developed by the author of this dissertation. For the introduction including the state of knowledge mostly different more recent international academic literature was used. Also, the theoretical background on price knowledge focusing on different concepts and measurement options (e.g. price recall, price magnitude judgement, deal spotting etc.) differed through its discussion in the context of recent, international scientific literature. A different focus, specifically on relevant factors in price recall and WTP measurement, was chosen in the theoretical background chapter. The manuscript was based on a different conceptual framework, more specifically the reference price concept and not the SOR framework as in Plaßmann-Weidauer (2011). Additionally to the educational level and occupation, data from the German population on age groups and household size were gathered and presented in the table including the characteristics of the sample. Moreover, a comprehensive table including category-specific results on the price knowledge and WTP was created. The results were discussed in the light of recent findings on the topic. The implications and limitations of the study were developed by the author of the dissertation, except for the limitation on the store and organic consumer sample. Only the figures of the calculations and content from the materials and methods section are equivalent to content in the dissertation of Plaßmann-Weidauer (2011). The raw data and parts of the calculations were used in a different theoretical connection.

Overall, the strength of the dissertation lies in the original research approaches applied in sections 3.2, 3.3 and 3.4. These approaches delivered new insights on the respective research questions. All empirical studies, section 3.2, 3.3 and 3.4, tried to increase the external validity of results through their approaches. In sections 3.2 and 3.3, this was attempted by a mock-up store in a laboratory, and in section 3.4 it was assured by asking respondents on products relevant to them and validating their actual purchase. Furthermore, the research of this dissertation is well grounded in the SOR paradigm which proved useful in gaining

understanding of the response and price-related internal processes of consumers regarding organic food and in structuring existing knowledge in the literature review. A drawback of the overall approach of the dissertation is that the empirical data of the sections 3.2/3.3 and 3.4 did not stem from a single-source approach. This made the statistical analysis of some relationships in the SOR framework impossible.

5 Conclusions and recommendations

5.1 Conclusions

Looking at the role of price in consumers' purchase decisions on organic food from the perspective of the price-adapted SOR paradigm (section 2.2), there are still many knowledge gaps and much inconclusiveness from different results. On the organism-internal processes there is little in-depth insight for most categories and a strong imbalance in the number of studies on the different processes. It is therefore concluded that more research is needed to fully understand price sensitivity regarding organic food (specific recommendations for future research are given in section 5.3). Preferably, future research should be based on a conceptual framework, such as the price-adapted SOR paradigm, to enable systematic research on the different aspects of price sensitivity regarding organic food. From the literature review it is further concluded that more appropriate research methods should be applied, such as incentive-compatible methods and field experiments, and that sampling techniques should be improved, for instance in sample size and the amount of sampling locations.

The dissertation provided insights on some of the shortcomings identified in the literature review. A gap was, for example, filled by presenting detailed results on consumers' price knowledge of organic food. Also, the field research of organic consumers' purchase decisions yielded new and valuable insight in real purchase behaviour, calling the external validity of results and conclusions based on surveys into question. It was observed that, when consumers stated a WTP higher than the store price, most of them bought the item in question nonetheless. For methods of WTP elicitation based on statements of consumers this means that a share of answers is externally not valid.

The dissertation further provided new insight on an assumption reported by Bunte *et al.* (2010) and Aschemann-Witzel and Niebuhr Aagaard (2014), i.e. that consumers, even organic-inclined consumers, do not realise when there is no or hardly a price difference between an organic product and conventional alternatives. With eye-tracking the dissertation showed that nearly all consumers notice organic and conventional prices. There is no significant difference in visual information acquisition of organic prices between organic and conventional consumers. Hence, the reason for the phenomenon is assumed to be a process after the mere visual information uptake. The perceived importance of price for the product choice, on the other hand, proved effective in discriminating consumers who decide for an organic product from consumers who choose a conventional product. Therefore, the perceived price importance should be included as a factor in attempts to explain purchase behaviour regarding organic food. Also, price evaluation, more specific the perceived value for money of organic food, was shown to be closely related to the choice of organic food products.

Regarding price-sensitive behaviour towards organic food, the gaze behaviour patterns of regular organic, occasional organic and conventional consumers revealed that regular organic consumers take in less price information in total (organic and conventional) than the other groups. From an information economics standpoint, it can be argued that organic consumers are, therefore, less price-sensitive than the other groups.

The purchase share of organic products was in the third study much higher than the average share of organic products on the German market. It is noteworthy that even though the group of participants that have decided for an organic product can be assumed to comprise of a large share of consumers who usually do not have a high expenditure share on organic food, they rated the price significantly less important than the participants that chose a conventional product. This implies that among those with lower expenditure shares on organic food there are also consumers who do not seem to be very price-sensitive. The offer of unfamiliar food brands ruled out habitual purchase decisions. Hence, it is suggested that there are consumers with usually low expenditure shares on organic food who can be stimulated by purchase situations outside their habits, such as taste promotions or special placement and presentation of brands, and by rather low-priced organic alternatives to purchase more organic food.

Price knowledge on organic food is presumably not the decisive factor in price-sensitive behaviour towards organic food since it was not very accurate for organic consumers. A comparison between the price knowledge of organic consumers and the price knowledge of consumers in general (not specified regarding their organic food purchases) revealed in other studies suggests that organic consumers know organic prices neither distinctively better nor worse than conventional consumers know conventional prices. Due to the differences in price knowledge between product-categories, it can be argued that price sensitivity differs for product categories. Similarly, the WTP differed between product categories, resulting in the same conclusion. Overall, the WTP was relatively high, implying that the evaluation of organic food is supposedly stronger influenced by other attributes than price.

5.2 Recommendations for marketing practice

For regular organic food consumers, the price plays a subordinate role, though it is not unimportant. This is concluded from the combined insights on price importance ratings, and visual price information acquisition supported by the findings on price evaluation, price knowledge, WTP and actual purchase decision. It is therefore recommended to strengthen the motivation for buying organic food in communication measures to assure regular organic food consumers in their purchasing behaviour. Since it is much more difficult and expensive to gain new customers than it is to retain customers, efforts need to be undertaken to strengthen customer satisfaction (Güse, 2012; Stock-Homburg, 2012). A higher degree of customer

satisfaction has positive effects on customer loyalty, including more cross-purchases and word-of-mouth recommendations, as well as on the WTP and thus the economic success of a company or sector (Homburg, 2006; Stock-Homburg, 2012). Only about 3% of German households belong to the group of regular organic consumers who are characterized by an expenditure share on organic food of 20% or more (Buder, 2011). This shows the relevance of actions to increase customer satisfaction because even among regular organic consumers, there is a large potential to increase expenditure shares on organic food.

Occasional organic consumers seem to be less decided in weighing up between price and performance of organic food, and the results showed that they are more price-sensitive than regular organic consumers. This is inferred from the price importance ratings and the gaze behaviour data. Based on the insight that it is more difficult and expensive to gain new customers, this group is also highly important for the organic sector because they already have an inclination to buy organic food but their expenditure share of organic food is relatively low (Buder, 2011). It is recommended to increase the perceived value for money of organic food because the multinomial logistic regression model has shown a significant effect from this item on the purchase decision. For the identification of tipping points in the relation between organic food product evaluation and price perception, it is necessary to get more insights for this consumer group to better understand the nature of the purchase barrier from their view.

Independent of the degree of price sensitivity, the largest share of visual attention was on product packages. Conventional consumers looked on average 29.1% of the gaze duration at organic packages. During this time, it is assumed, consumers search for information relevant to them to make a decision for a product that satisfies their needs. Inman and Winer (1998) found that 59% of purchases are done spontaneously in store. Hence, for organic products this means that their packages can play an important role in communicating their benefits to undecided consumers in store. Detailed information on the reasons for and against organic food in the decision process of undecided consumers is necessary to provide the relevant information on the packages.

What can also be concluded is that price tag design can be used to visually distinguish organic from conventional food to facilitate the orientation of consumers searching for organic products. This could facilitate a quicker formation of the consideration set of organic consumers and, consequently, increase consumer satisfaction with the retail store. This conclusion is drawn from the insight price tags are looked at by nearly all consumers and usually contain less information than packages. That all consumers looked for a certain share of gaze duration at organic and conventional price tags could result from an orientation process (Husić-Mehmedović *et al.*, 2017). The conclusion is supported by Helmert *et al.* (2017) who showed the effect of price tag design on purchase for suboptimal foods and Drexler and Souček (2016) who found an effect on attention for distinctively marked price tags.

5.3 Recommendations for future research

Several recommendations for future research can be identified from the findings and discussion of this dissertation. First, the literature review revealed that there was no study published on affective processes regarding organic food prices. Since affective processes are assumed to have an impact on the response in the SOR paradigm, it would increase the understanding of consumers' purchase behaviour regarding organic food if such information on this variable would be available. It should be investigated if affective processes linked to organic food and its prices are different from affective processes not specific to organic food.

Second, research recommendations were identified in the field of organic food price knowledge. It would be interesting to test which level of price knowledge, in combination with other explanatory factors, is necessary to act price-sensitive. The estimates of price recall accuracy should be linked to purchase behaviour to find out which levels of price knowledge influence it. Moreover, it would be worthwhile to find out if the product categories for which knowledge of organic food prices is better are the same for conventional and for organic consumers. This insight is relevant for the design of price promotion activities targeted to organic-inclined conventional consumers.

Third, it is recommended to study price perception and evaluation of organic food more in-depth. Differences were found in the share of respondents over- and underestimating prices between product categories. It is deemed possible that these differences result from product category differences in price perception and price image. Therefore, it is recommended to research product category differences in price perception for organic food. Furthermore, insight on how occasional organic consumers perceive organic prices in relation to different magnitudes and ranges of conventional prices could help to clarify questions on the purchase behaviour of occasional organic consumers. This assumption is supported by Thøgersen and Ölander (2006) who revealed that the less consumers perceive organic food as expensive the higher the likelihood of an organic purchase. The results of this dissertation revealed that the share of consumers who ignore prices is very low. Hence, a lack of response to reduced organic food prices, as observed by Bunte *et al.* (2010) for instance, is assumed to originate from consumers' processing of acquired price information.

The dissertation also showed that it is worthwhile observing purchase behaviour in reality since consumers might act differently than expected from survey results and/or in hypothetical purchase situations. Therefore, it is called for field experiments which have the advantage that the influencing factors can be observed. For future research, it would be interesting to systematically investigate if consumers in other countries who stated a lower WTP than the store price purchase the respective products nonetheless. This insight has potentially large implications for the evaluation of research results from methods based on consumer statements.

6 English and German Summary

6.1 Summary

Despite continuous growth of the organic market throughout the last decades, the sector lags behind its potential (BLE, 2011). Even in the countries with the largest organic markets, the share of sales volume of organic food is below the two-digit range even though consumers state positive attitudes towards organic food and purchase intentions in surveys (Lernoud and Willer, 2018; Ökobarometer, 2017). The barriers for organic food purchase are well-researched. Among the reasons for not buying organic food, price is commonly specified as the main limitation, as many consumers perceive organic food prices too high (Aertsens *et al.*, 2009; Padilla Bravo *et al.*, 2013; PwC, 2017). Yet, the price is a sensitive topic for consumers and marketers alike. While product prices represent the monetary sacrifice consumers have to part with in order to obtain a product (Monroe, 2005), to marketers on the other hand prices are essential for the final performance of the company as prices have a higher impact on profits than production costs or sales volume (Simon and Fassnacht, 2016). Moreover, price is the only marketing instrument that directly generates revenues without necessary investments (Simon and Fassnacht, 2016). As such, prices will always be cause of controversy between consumers and marketers, as the first seek to optimize its purchasing price and the latter seek to optimize its selling price.

Hence, the research question of this dissertation is how price-sensitive consumers do react regarding organic food. Guided by the stimulus-organism-response paradigm, five organism-internal constructs (price knowledge, willingness-to-pay, price involvement, price evaluation, visual price information acquisition) and actual purchase decisions are examined to gain insights on consumers' price sensitivity. These investigations are treated in four scientific journal articles, which this dissertation is based on.

The first article reports a literature review study on the price behaviour of consumers regarding organic food. A price-adapted stimulus-organism-response paradigm is established which is used to structure the identified scientific literature accordingly. Eight data bases were searched for the time span 2000-2013 for English language, empirical, peer-reviewed journal articles. In total, 194 studies were identified as relevant to the study. The aim of the literature review was to find out what the state of knowledge is and which research gaps exist. The study contains 20 articles on the price elasticity of demand which were not classified into the stimulus-organism-response paradigm but into the stimulus-response paradigm. As for the stimulus-organism-response paradigm, the study includes 38 articles on the perception and judgement of organic food prices, two studies on the price knowledge of organic food prices,

and 146 articles on the willingness-to-pay for organic food. Research gaps were found for price emotions linked to organic food (no articles), and price knowledge of organic food.

The articles on the price elasticity of demand showed different results for own-price elasticity, even within product categories as well as between countries. For cross-price elasticity of milk, the results unambiguously revealed that organic consumers respond hardly price-sensitive to price increases. The articles on price perception and evaluation reported clearly that the price was stated as the main purchase barrier by consumers, and that organic food is perceived expensive by most consumers. Regarding price knowledge, the articles did not give detailed results so that it could just be asserted that consumers do not know exact prices and rather overestimate organic prices. The articles on the willingness-to-pay reported diverse results, thus, due to the large range of results no clear inference could be made on the premium consumers are willing to pay for organic food. However, all studies found that a large share of consumers is ready to pay a premium. The amount of premium, however, differs for product groups.

The second article examined the visual price information acquisition and the price evaluation of organic food in relationship to the purchase decision. A laboratory test shop in which participants went shopping while wearing mobile eye-tracking glasses offered unfamiliar organic and conventional food products. The participants were asked to choose one jar of strawberry jam and one package of fusilli noodles out of six alternatives, each (two organic and four conventional). After the shopping task participants filled a self-administered computer-assisted questionnaire. The participants were approached on the main shopping road of a central German city. Quota sampling was applied with quotas for gender and age to represent the age and gender structure of the German population. The gaze data and questionnaire responses of 148 participants were used for analysis since.

The second article showed that only 4.1% of participants did not look at any organic price tag. Moreover, most price tags, organic and conventional, were fixated at least once and approximately three quarters of price tags that were fixated once were reexamined. Nearly half of the participants (48.0%) chose two conventional products, 29.7% chose an organic product in one of the product categories, and 22.3% chose an organic product in both product categories. These three groups of consumers differed significantly in the amount of visual attention allocated to organic packages, conventional packages, and conventional prices. There was no significant difference between groups in the amount of visual attention allocated to organic prices. Of the time that participants spent looking at organic alternatives, consumers who selected no organic product gazed significantly longer at organic prices than consumers who chose one or two organic products. The choice of organic and conventional products was significantly predicted by the fixation durations on organic packages, conventional prices and conventional packages in a multinomial logistic regression model.

The perceived value for money of organic food, which represents a dimension of price evaluation, had a significant impact on the choice of organic products as well.

The third article investigated visual price information acquisition and perceived price importance (as an approximation to price involvement). It is based on the same study as the second article. Hence, the study design and sampling procedure were identical. For the third article, the eye-tracking data of only one product of the test shop was examined in a sequential analysis investigating three visual attention phases during decision-making: the (first) orientation phase, comparison phase and (final) evaluation phase. The information intake in the phases of participants who decided for an organic and those who decided for a conventional product was compared. The gaze and questionnaire data of 189 consumers could be used for analysis.

The comparison phase was longer than the orientation and evaluation phase. Differently than expected, few significant differences between consumers who decided for an organic and those who chose a conventional product were apparent in the comparison phase. A significant difference was that consumers who decided for an organic product looked more at organic packages. In the orientation and evaluation phases, consumers who decided for an organic product acquired less information on conventional prices, additionally to taking in more organic package information. Moreover, they looked at a higher share of organic packages and a lower share of conventional prices. In the evaluation phase which represents the final stage in decision-making, the gaze behaviour of consumers who chose a conventional product was as hypothesised: They looked the most at conventional packages, followed by conventional prices and organic packages. Organic prices were looked at the least. The gaze behaviour of consumers who selected an organic product was not as expected since they acquired information from conventional packages the most, then from organic packages, and to a very similar amount from conventional and organic prices.

The fourth article researched the price knowledge, willingness-to-pay, and purchase decision of organic consumers. 642 organic consumers participated in a survey which took place in front of two supermarkets with a broad organic food assortment and two retail stores specialized to organic food in two central German cities. Consumers were approached before entering the store to ask them about the products they were planning to buy. For these products participants were asked to estimate the store price and to state what the most would be they were willing to pay. If a participant stated a maximum willingness-to-pay below the store price, she/he was approached after shopping again to follow up on the purchase decision.

The deviation of the recalled from the actual store price was on average 19.9%. Price knowledge was best for the product category 'bread and pastries' (14.1%), followed by the product categories 'potatoes' (17.0%) and 'eggs' (17.7%). Moreover, 42.1% of the item prices were overestimated, while 37.1% were underestimated. The premium that respondents were

on average ready to pay for organic food was 52.7%. More than a quarter of participants were even ready to pay a premium of more than 80.0%. The willingness-to-pay was highest for the product category 'condiments/oils/fats' with 155.4% and lowest for 'eggs' with 30.4%. For 9.8% of the products participants stated a willingness-to-pay lower than the store price. For 70.0% of these products the purchase decision could be followed up. It was revealed that 67.0% of the products were bought despite the higher price, while 33.0% of the products were not bought. There was no significant difference between the groups in the price level.

The results of the studies in this dissertation are interpreted based on the stimulus-organism-response paradigm. The visual price information acquisition was identified as a precondition for further organism-internal processing of price information. The results of the second and third study showed that this precondition was met since nearly all consumers looked at organic and conventional prices and only very few participants ignored prices. Moreover, the gaze behaviour of participants revealed that consumers choosing organic products have a lower need to acquire price information which, based on information economics, can be interpreted as a lower price sensitivity. This is consistent with the finding that participants who decided for organic products rated the price lower in importance for the purchase decision and the perceived value for money of organic food higher. The results on price knowledge and willingness-to-pay showed that organic consumers do not possess strong preconditions to be able to act price-sensitive. The results, however, revealed as well that there are differences between product categories regarding price knowledge and willingness-to-pay, and thus regarding processes determining price-sensitive behaviour. The findings on the actual purchase decision underline the afore-mentioned interpretation since two thirds of the products for which a willingness-to-pay below the store price was stated were purchased nonetheless.

In the literature review many knowledge gaps and inconclusiveness from different results were identified of which some were addressed by the presented research. The dissertation provides new insights on the visual information acquisition of organic food prices, on organic consumers' price knowledge, and on actual purchase behaviour. Since the precondition for organism-internal processing of price information was met, a lack of response to organic price reductions as noticed by some authors (Aschemann-Witzel and Niebuhr Aagaard, 2014; Bunte *et al.*, 2010) can be assumed to originate from consumers' individual processing. It was further shown that consumers purchasing organic food are less price-sensitive than consumers purchasing conventional food based on their visual information acquisition behaviour, their stated importance of price, their stated willingness-to-pay, their price knowledge, and their purchase behaviour. Since price knowledge of organic consumers was not very accurate and comparable to that of other studies not specific to organic, it is assumed that it is not the decisive factor in price-sensitive behaviour. For marketing practice, it is recommended to

strengthen organic consumers' purchase motivation in communication measures and to increase the perceived value for money for occasional organic consumers.

6.2 Zusammenfassung

Trotz des über die letzten Dekaden anhaltenden Wachstums des Marktes für ökologische Lebensmittel, bleibt der Sektor hinter seinem Potential zurück (BLE, 2011). Sogar in den Ländern mit den größten Märkten für ökologische Lebensmittel liegt der Anteil des Verkaufsvolumens unter dem zweistelligen Bereich (Lernoud und Willer, 2018), obwohl Verbraucher in Befragungen positive Einstellungen zu Öko-Lebensmitteln und zu diesbezüglichen Kaufabsichten äußern (Ökobarometer, 2017).

Die Hinderungsgründe für den Kauf von Öko-Lebensmitteln sind in der bestehenden Forschungsliteratur bereits eingehend untersucht worden. In der Liste der Hinderungsgründe sticht ein Grund als besonders gewichtig hervor: der Preis von Öko-Lebensmitteln, der von Konsumenten als zu hoch empfunden wird (Aertsens *et al.*, 2009; Padilla Bravo *et al.*, 2013; PwC, 2017). Doch der Preis ist nicht nur für Konsumenten ein sensibler Punkt, da er das monetäre Opfer darstellt, das sie darbringen müssen, um in den Besitz eines Guts oder einer Leistung zu kommen (Monroe, 2005). Auch für Produzenten und Händler hat der Preis eine besondere Rolle, da er, verglichen zu den Produktionskosten und der Verkaufsmenge, den größten Einfluss auf den Gewinn hat (Simon und Fassnacht, 2016). Zudem ist der Preis das einzige Marketinginstrument, das direkt Einnahmen generiert, ohne dass Investitionen nötig sind (Simon und Fassnacht, 2016). Der Preis bildet daher ein Spannungsfeld zwischen Konsumenten und Verkäufern, da die ersteren ihren Einkaufspreis und die letzteren ihren Verkaufspreis optimieren möchten.

Daraus ergibt sich die Forschungsfrage dieser Dissertation, wie preissensibel Verbraucher bei Öko-Lebensmitteln reagieren. Geleitet von dem Stimulus-Organismus-Reaktion Paradigma wurden fünf Organismus-interne Konstrukte (Preiswissen, Zahlungsbereitschaft, Preisbeurteilung, Preisinvolvement, visuelle Preisinformationsaufnahme) und die tatsächliche Kaufentscheidungen untersucht, um Aufschlüsse über die Preissensibilität von Verbrauchern zu erhalten. Diese Untersuchungen wurden in vier wissenschaftlichen Zeitschriftenartikeln abgehandelt, auf denen die Dissertation beruht.

Der erste Artikel ist eine Literaturanalyse zum Preisverhalten von Verbrauchern bei Öko-Lebensmitteln. In diesem Artikel wurde ein Preis-adaptiertes Stimulus-Organismus-Reaktion Modell etabliert, anhand dessen die vorhandene wissenschaftliche Literatur strukturiert wurde. Es wurde in acht Datenbanken für den Zeitraum 2000-2013 nach englischsprachigen, empirischen, wissenschaftlichen Zeitschriftenartikeln, die einem Gutachterverfahren unterzogen wurden, gesucht. Insgesamt wurden für den genannten Zeitraum 194 relevante Artikel identifiziert. Ziel der Literaturstudie war es, den Forschungsstand zu erheben und Forschungslücken aufzuzeigen. Die Studie enthält 20 Artikel zur Preiselastizität der

Nachfrage, die nicht dem Stimulus-Organismus-Reaktion, sondern dem Stimulus-Reaktion Paradigma zugeordnet wurden. Des Weiteren enthält die Studie 38 Artikel zur Wahrnehmung und Beurteilung von Öko-Lebensmittelpreisen, zwei Studien zum Preiswissen bei Öko-Lebensmitteln und 146 Studien zur Zahlungsbereitschaft für Öko-Lebensmittel. Es zeigten sich Forschungslücken im Bereich Preisemotionen bei Öko-Lebensmitteln, zu dem keine Studie gefunden wurde, aber auch im Bereich Preiswissen bei Öko-Lebensmitteln, der nur zwei Studien enthielt.

Die Studien zur Preiselastizität zeigten unterschiedliche Ergebnisse für die Eigenpreiselastizität auf, auch innerhalb einzelner Produktgruppen und zwischen verschiedenen Ländern, und ließen daher keine eindeutige Zusammenfassung zu. Anders war es bei den Ergebnissen zur Kreuzpreiselastizität bei Milch, die eindeutig darauf hinwiesen, dass Verbraucher, die ökologische Milch kaufen, recht unsensibel auf Preissteigerungen reagieren. Die Studien zur Preiswahrnehmung und -bewertung zeigten deutlich, dass der Preis von Verbrauchern als der größte Hinderungsgrund genannt wurde und Öko-Lebensmittel von den meisten Verbrauchern als teuer wahrgenommen werden. Die Studien zum Preiswissen machten keine genauen Angaben, sodass nur festgestellt werden konnte, dass Verbraucher die Preise von Öko-Lebensmitteln nicht genau kannten und diese eher überschätzten. Die Studien zur Zahlungsbereitschaft wiesen vielfältige Ergebnisse auf, jedoch kein klares Bild über die Höhe des Aufpreises, den Verbraucher für Öko-Lebensmittel zu bezahlen bereit waren. Alle Studien fanden jedoch, dass es einen hohen Anteil an Verbrauchern gab, die bereit waren, ein Aufpreis zu zahlen, und dass dieser Aufpreis sich zwischen Produktgruppen unterschied.

Der zweite Artikel untersuchte die visuelle Preisinformationsaufnahme und die Preisbeurteilung von Öko-Lebensmitteln im Zusammenhang mit der Kaufentscheidung. Zu diesem Zweck wurde in Kassel im Labor ein kleines Test-Lebensmittelgeschäft mit unbekanntem ökologisch und konventionell hergestellten Lebensmitteln simuliert, in dem die Studienteilnehmer einkaufen gingen, während sie eine mobile Eye-Tracking-Brille trugen. Die Teilnehmer wurden angewiesen, ein Glas Erdbeermarmelade und eine Packung Nudeln aus jeweils sechs Alternativen (zwei ökologischen und vier konventionellen) auszuwählen. Nach dem Einkauf beantworteten die Teilnehmer eigenständig einen Computer-gestützten Fragebogen. Die Blick- und Fragebogendaten von insgesamt 148 Verbrauchern konnten für die Datenanalyse verwendet werden. Die Studienteilnehmer wurden auf der Haupteinkaufsstraße angesprochen. Es wurde ein Quotensampling-Verfahren angewendet, um die Geschlechts- und Altersstruktur der deutschen Bevölkerung in der Stichprobe widerzuspiegeln.

Die Ergebnisse zeigten, dass nur 4.1 % der Teilnehmer auf kein Preisschild eines der ökologischen Produkte schaute. Des Weiteren wurden die meisten der ökologischen und konventionellen Preisschilder beachtet und ungefähr drei Viertel der beachteten Preisschilder wurden mehrmals angeschaut. Fast die Hälfte der Studienteilnehmer (48,0 %) wählte aus

beiden Produktkategorien konventionelle Alternativen, 29,7 % wählten in einer der beiden Produktkategorien ein Öko-Produkt und 22,3 % wählten in beiden Produktkategorien eine Öko-Variante. Diese drei Gruppen unterschieden sich signifikant in der Menge der visuellen Aufmerksamkeit, die jeweils auf die Packungen von Öko-Lebensmitteln und die Preise und Packungen von konventionellen Produkten fiel. Kein signifikanter Unterschied zwischen den Gruppen bestand für die Menge der visuellen Aufmerksamkeit, die auf die Preise von Öko-Lebensmitteln fiel. Von der Zeit, die die Teilnehmer auf ökologische Packungen und Preise schauten, nahmen Verbraucher, die sich für zwei konventionelle Produkte entschieden, signifikant mehr Preisinformationen auf als Verbraucher, die ein oder zwei Öko-Produkte wählten. Die Blickdauer auf Packungen von ökologischen und konventionellen Produkten und auf die Preise von konventionellen Produkten stellten in einem multinomialen logistischen Modell signifikante Prädiktoren für die Entscheidung für ökologisch oder konventionell produzierte Produkte dar. Die wahrgenommene Preiswürdigkeit von ökologischen Lebensmitteln, welche eine Dimension von Preisbeurteilung darstellt, hatte ebenfalls einen signifikanten Einfluss auf die Wahl von Öko-Produkten im Modell.

Der dritte Artikel untersuchte die visuelle Preisinformationsaufnahme und die wahrgenommene Wichtigkeit des Preises für die Kaufentscheidung (als Annäherung an Preisinvolvement). Der Artikel basiert auf der selben Studie wie der zweite Artikel. Das Studiendesign und die Stichprobenziehung sind daher identisch zu der zum zweiten Artikel beschriebenen. Für den dritten Artikel wurden jedoch nur die Daten eines der Produkte aus dem Test-Lebensmittelgeschäft verwendet und in drei Phasen visueller Aufmerksamkeit – der (ersten) Orientierungs-, der Vergleichs- und der (letzten) Evaluierungsphase – sequentiell analysiert. Es wurde die Informationsaufnahme in den Phasen von Teilnehmern, die ein ökologisches, und solchen, die ein konventionelles Produkt gewählt haben, verglichen. Die Blick- und Fragebogendaten von 189 Teilnehmern konnten für die Analyse verwendet werden.

Die Vergleichsphase war länger als die Orientierungs- und Evaluierungsphase. Anders als erwartet gab es kaum signifikante Unterschiede in der Vergleichsphase zwischen Verbrauchern, die ein ökologisches, und solchen, die ein konventionelles Produkt wählten. Ein signifikanter Unterschied war, dass Verbraucher, die sich für ein Öko-Produkt entschieden, mehr Informationen von Packungen von ökologischen Produkten aufnahmen. In der Orientierungs- und Evaluierungsphase schauten Verbraucher, die ein Öko-Produkt wählten, weniger auf konventionelle Preise und gleichzeitig mehr auf Öko-Packungen. Zudem betrachtete diese Gruppe einen höheren Anteil der Packungen ökologischer Produkte im Regal und einen niedrigeren Anteil der Preisschilder konventioneller Produkte. In der Evaluierungsphase, welche die letzte Phase in der Kaufentscheidungsfindung darstellt, zeigte sich das Blickverhalten der Verbraucher, die ein konventionelles Produkt wählten, wie vorher angenommen: Diese Gruppe schaute am meisten auf Packungen konventioneller Produkte, gefolgt von Preisen konventioneller Produkte und Packungen ökologischer Produkte. Preise

ökologischer Produkte wurden am wenigsten beachtet. Das Blickverhalten in der Evaluierungsphase von Verbrauchern, die ein ökologisches Produkt wählten, war hingegen anders als erwartet, da diese Gruppe am meisten Informationen von Packungen konventioneller Produkte aufnahm, gefolgt von Packungen ökologischer Produkte. Zu einem ähnlich niedrigen Anteil nahm diese Gruppe Informationen von konventionellen und ökologischen Preisen in der letzten Phase auf.

Der vierte Artikel untersuchte das Preiswissen, die Zahlungsbereitschaft und die Kaufentscheidung von Öko-Konsumenten. Im Rahmen der quantitativen Umfrage wurden 642 Verbraucher befragt. Die Befragungen fanden vor zwei konventionellen Supermärkten mit einem Angebot an Öko-Lebensmitteln und zwei auf Öko-Lebensmittel spezialisierten Geschäften statt. Es wurde in zwei mitteldeutschen Städten befragt. Die Verbraucher wurden angesprochen, bevor sie die Geschäfte betraten, und gebeten, die Produkte aufzuzählen, die sie zu kaufen geplant hatten. Für die genannten Produkte wurden die Verbraucher gebeten, die Ladenpreise zu schätzen und die maximale Zahlungsbereitschaft anzugeben. In dem Fall, dass ein Verbraucher oder eine Verbraucherin eine Zahlungsbereitschaft angab, die unter dem tatsächlichen Ladenpreis lag, wurde er/sie nach dem Verlassen des Geschäftes erneut angesprochen, um zu erfragen, wie die Kaufentscheidung für das betroffene Produkt ausgefallen war.

Die Abweichung des erinnerten Preises von dem tatsächlichen Ladenpreis betrug im Mittel 19,9 %. Produkt-bezogen war das Preiswissen am besten für die Produktkategorie ‚Brot und Gebäck‘ (14,1 %), gefolgt von den Kategorien ‚Kartoffeln‘ (17,0 %) und ‚Eiern‘ (17,7 %). 42,1 % der Produktpreise wurden überschätzt, während 37,1 % unterschätzt wurden. Der Aufschlag, den die Befragten bereit waren, zusätzlich zum Ladenpreis für Öko-Lebensmittel zu bezahlen, betrug im Durchschnitt 52,7 %. Mehr als ein Viertel der Befragten war sogar bereit, einen Aufschlag von über 80,0 % zu bezahlen. Produkt-bezogen wurde die durchschnittlich höchste Zahlungsbereitschaft für die Produktkategorie ‚Würzmittel, Öle und Fette‘ mit 155,4 % und die niedrigste für ‚Eier‘ mit 30,4 % angegeben. Für 9,8 % der Produkte wurde eine maximale Zahlungsbereitschaft unter dem Ladenpreis angegeben. Für 70,0 % dieser Fälle konnte der schlussendlichen Kaufentscheidung nachgegangen werden. Es zeigte sich, dass 67,0 % der Produkte trotz des höheren Preises gekauft wurden und 33,0 % der Produkte nicht gekauft wurden. Es gab keinen signifikanten Unterschied zwischen den Gruppen im Ladenpreis.

Die Ergebnisse der in der Dissertation enthaltenen Studien werden im Kontext des Stimulus-Organismus-Reaktion Paradigma interpretiert. Die visuelle Informationsaufnahme wurde als Voraussetzung für die Organismus-interne Verarbeitung von Preisinformationen identifiziert. Die Ergebnisse der zweiten und dritten Studie zeigten, dass diese Voraussetzung erfüllt ist, da beinahe alle Studienteilnehmer die Preise von ökologischen und konventionellen Produkten sahen und nur sehr Wenige die Preise ignorierten. Zudem offenbarte das Blickverhalten der

Teilnehmer, dass Verbraucher, die ökologische Preise wählten, weniger Preisinformationen aufnahmen, um ihre Entscheidung zu treffen. Basierend auf der Informationsökonomik kann dies als niedrige Preissensibilität interpretiert werden. Dies ist konsistent mit der geringeren Wichtigkeit, die diese Gruppe dem Preis bei der Entscheidungsfindung zusprach, und der besseren Bewertung der Preiswürdigkeit von ökologischen Lebensmitteln dieser Gruppe. Die Ergebnisse zum Preiswissen und zur Zahlungsbereitschaft zeigten, dass Öko-Käufer keine starken Voraussetzungen haben, um preissensibel handeln zu können. Die Ergebnisse zeigten jedoch auch, dass es Unterschiede zwischen den Produktkategorien gibt, was das Preiswissen und die Zahlungsbereitschaft und somit die Voraussetzung zu preissensiblen Handeln anbelangt. Die Ergebnisse stimmen grundsätzlich mit den Ergebnissen bereits vorhandener Studien überein. Die Ergebnisse zur tatsächlichen Kaufentscheidung unterstreichen die genannte Interpretation, da in zwei Dritteln der Fälle, in denen eine niedrigere Zahlungsbereitschaft als der Ladenpreis angegeben wurde, das Produkt trotzdem gekauft wurde.

Aus der Literaturstudie wurden Wissenslücken identifiziert, von denen einige durch die Artikel dieser Dissertation gefüllt wurden. Die Dissertation bietet neue Einsichten in das visuelle Informationsaufnahmeverhalten bei Öko-Lebensmitteln, in das Preiswissen von Verbrauchern ökologischer Lebensmittel und in die tatsächliche Kaufentscheidung. Da die Voraussetzung für die Organismus-interne Verarbeitung von Preisinformationen von ökologischen Lebensmitteln in dieser Forschungsarbeit erfüllt wurde, wird davon ausgegangen, dass eine ausbleibende Reaktion auf niedrige Preise ökologischer Lebensmittel, wie von manchen Autoren beobachtet (Aschemann-Witzel und Niebuhr Aagaard, 2014; Bunte *et al.*, 2010), aus der individuellen Verarbeitung resultiert. Basierend auf dem visuellen Informationsaufnahmeverhalten der Studienteilnehmer, der Wichtigkeit des Preises für die Kaufentscheidung, der Zahlungsbereitschaft, des Preiswissens und der tatsächlichen Kaufentscheidung wurde weiterhin gezeigt, dass Verbraucher, die ökologische Lebensmittel kaufen, weniger preissensibel sind als Verbraucher, die konventionelle Lebensmittel kaufen. Da das Preiswissen von Verbrauchern, die ökologische Lebensmittel kaufen, nicht sehr genau und vergleichbar zu dem in anderen, nicht speziell auf Öko-Lebensmittel ausgerichteten Studien ist, wird angenommen, dass das Preiswissen nicht entscheidend für preissensibles Verhalten ist. Für die Marketingpraxis wird empfohlen, die Kaufgründe für ökologische Lebensmittel in Kommunikationsmaßnahmen zu stärken sowie die Wahrnehmung der Preiswürdigkeit insbesondere im Hinblick auf Gelegenheitsökokäufer zu verbessern.

7 Annex

In the annex, further contributions of the author of this dissertation, which are not connected to the thesis topic, are presented.

7.1 Further journal articles

Janssen, M., Rödiger, M., Hamm, U. (2016): Labels for Animal Husbandry Systems Meet Consumer Preferences: Results from a Meta-analysis of Consumer Studies. In: Journal of Agricultural and Environmental Ethics, vol. 29, issue 6, p. 1071-1100. For fulltext: <http://link.springer.com/article/10.1007%2Fs10806-016-9647-2>

Janssen, M., Busch, C., Rödiger, M., Hamm, U. (2016): Motives of consumers following a vegan diet and their attitudes towards animal agriculture. *Appetite* 105, p. 643-651. For fulltext: <http://www.sciencedirect.com/science/article/pii/S0195666316302677>

7.2 Conference proceedings

Rödiger, M., Janssen, M., Hamm, U. (2017). Multi-level animal welfare labels reflect consumer preferences: Insights from a systematic review. Talk at the 7th International Conference on the Assessment of Animal Welfare at Farm and Group level, 5.-8. September 2017, Ede, Netherlands. Proceedings ISBN: 978-90-8686-314-3.

Rödiger, M., Hamm, U. (2018): Organic prices through the consumers' lenses. Contribution handed in on 24.04.2018 for the conference 2018 of the Austrian Society for Agricultural Economics, 27-28 September 2018, University of Natural Resources and Life Sciences, Vienna, Austria.

7.3 Presentations

Rödiger, M., Hamm, U. (2017): Visual intake of price information of organic food - a shopping task with Eye Tracking Glasses. Poster presented at the 19th European Conference on Eye Movements (ECEM), 20.-24. August 2017, Wuppertal University, Germany.

- Hamm, U., Rödiger, M. (2017): Produkt- und Preisdifferenzierung auf der Basis von Tierhaltungsverfahren. Vortrag gehalten von U. Hamm im Rahmen des Agrarökonomischen Seminars der Universität Göttingen am 21.11.2017.
- Rödiger, M., Janssen, M. (2017): Einstellung veganer Verbraucher zur landwirtschaftlichen Tierhaltung. Vortrag für die Fachtagung Nachhaltige Landwirtschaft und die Zukunft tierischer Nahrungsmittel, 21.-22. April 2017, Evangelische Akademie Sachsen-Anhalt e. V., Wittenberg.
- Steinhauser, J., Rödiger, M. (2017): Eye-Tracking in der Marketingforschung. Vortrag für das Modul "Konzepte und Methoden der Marketingforschung", Fachbereich Landschaftsnutzung und Naturschutz, 11. Mai 2017, Master-Studiengang Öko-Agrarmanagement, Hochschule für nachhaltige Entwicklung Eberswalde.
- Rödiger, M., Hamm, U. (2015): Einstellungen von Veganern zur Landwirtschaft und Schlussfolgerungen für den ökologischen Landbau. Vortrag beim 9. Fachgespräch "Vegane Ernährung" des Hessischen Ministeriums für Umwelt, Klimaschutz, Landwirtschaft und Verbraucherschutz, 2. Dezember 2015, Wiesbaden.

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