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van Doorn, Jenny; Verhoef, Peter C.

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Drivers of and Barriers to Organic Purchase Behavior[☆]

Jenny Van Doorn*, Peter C. Verhoef

The Faculty of Economics and Business, University of Groningen, P.O. Box 800, NL-9700 AV, Groningen, Netherlands

Abstract

Using a cost–benefit approach, this study is the first to jointly investigate supply-side factors and consumer characteristics that drive or hinder organic purchases. With scanner data that track actual purchase behavior in 28 product categories, the authors find that organic products are less popular in vice categories and categories with high promotional intensity and more popular in fresh versus processed categories. Biospheric values that reflect a person's concern for the environment and animal welfare increase organic purchases. Quality and health motives drive organic purchases only in certain categories, in particular categories with a low promotional intensity. Egoism and price consciousness act as barriers to organic purchases.

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Keywords: Organic consumption; Sustainability; Food retailing

In recent decades, organic food has developed impressively, from a neglected niche market to the food market mainstream. Advocates of organic food include celebrities and politicians alike; President Barack Obama even earmarked \$50 million to promote organic farming (The Week 2009). Yet despite this strong interest from the public, policy makers, and companies, attention to sustainability and organic topics in academic marketing literature has been relatively scarce (Mick 2008). This limited attention is especially surprising considering the intriguing discrepancy between consumers' sustainable intentions and opinions and their actual buying behaviors. In Europe, market shares for organic food in 2012 ranged between around 2% in France and the Netherlands and 7.6% in Denmark; in the United States, they reached 4.3% (Willer and Lernoud 2014). In this study, we focus

on organic food and organic purchase behavior as particular forms of sustainable products and sustainable consumption behavior, which may also include green energy consumption, recycling, and so forth (e.g., Gleim et al. 2013). Our definition of organic food reflects the array of requirements for production and packaging labeling of organic food that regulators have developed in Western countries (see Guilabert and Wood 2013). Previous research in multiple disciplines, including marketing and consumer research, environmental psychology, sociology, and agricultural economics, has tried to explain purchase rates for organic products but offers mixed and inconclusive results, as well as some important limitations (see Appendix A).

First, few studies examine actual purchase behavior using behavioral data; instead, they rely on self-reported behavior or purchase intentions (e.g., Thøgersen 2011). These measures rarely are effective proxies for actual organic purchase behavior due to socially desirable response biases (Sun and Morwitz 2010). Second, prior research studies consumer characteristics, such as proenvironmental beliefs and attitudes and health motivation, and supply-side factors, such as price, availability and category characteristics, in isolation. For example, Bezawada and Pauwels (2013) focus on supply-side variables but do not consider the effects of theoretically relevant individual-level variables, whereas Steg, Dreijerink, and Abrahamse (2005) only consider consumer-level variables. Yet omitting either type of factor might lead to biased conclusions (Steenkamp and Gielens

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* Corresponding author.

E-mail addresses: j.van.doorn@rug.nl (J. Van Doorn), p.c.verhoef@rug.nl (P.C. Verhoef).

Table 1

Comparison of our study with two other studies on organic purchase behavior.

Study characteristics	Ngobo (2011)	Bezawada and Pauwels (2013)	This study
Aggregation level	Individual households	Category sales	Individual households
Dependent variable	Organic purchases	Organic category sales	Organic share of category purchase
Number of product categories	50 (market A)/56 (market B)	56	28
Sample size	3,323 households (market A)/3,619 households (market B)	75 stores	1246 households
Supply-level variables	Price Advertising/display Distribution	Price Sales Promotions Vice versus Virtue “directly from the farm” categories Category frequency Storability Impulsivity Category expensiveness Category wallet share	Price Promotional Intensity Distribution Vice versus Virtue Fresh
Consumer-level variables	Sociodemographics	Organic Segment (based on purchase behavior)	Consumer Values Psychographic Attitudes Sociodemographics
Additional effects	Nonlinear effects of price and distribution		Interactions between values/attitudes and supply-side variables Non-linear effects of values/attitudes Mediating role of values/attitudes for sociodemographics

2003). Studying both consumer- and supply-side variables also offers a means to examine their interplay as well, given that certain consumer characteristics may be particularly relevant in certain categories.

Third, the majority of existing research offers only a few explanatory variables that relate closely to organic purchase behavior, such as proenvironmental values, beliefs, and attitudes. In particular, the impact of supply-side factors on organic purchase behavior is due to limited and conflicting empirical evidence still unclear. Interestingly, Ngobo (2011) offers rather counterintuitive results, indicating that shoppers are less likely to purchase organic items at lower prices or when they find a wider distribution of products; possibly because Ngobo's (2011) model excludes attitudes and values and may therefore be not complete.

Fourth, empirical evidence about the extent to which self-oriented motivations, such as health motivation, drive or impede organic consumption is mixed and inconclusive. Some authors claim that self-oriented motivations drive organic consumption (e.g., Schifferstein and Oude Ophuis 1998); others posit that buying organic food is only motivated by other-oriented attitudes and values (Thøgersen 2011). General self-oriented consumer attitudes or psychographics, such as price and quality consciousness, have not been investigated.

Therefore, this study seeks to investigate which supply-side factors and which self- and other-oriented consumer attitudes and values drive versus hinder organic purchases, building on a large database of actual purchase behavior by 1,246 consumers in 28 product categories. Our comprehensive framework

includes multiple, theoretically relevant variables, including supply-side drivers of and barriers to organic consumption, such as the vice nature of a category or high prices, and other- and self-oriented consumer attitudes and values that may drive or impede organic purchases (Steg, Dreijerink, and Abrahamse 2005; Stern, Dietz, and Kalof 1993).

The first contribution of this study is that it, to the best of our knowledge, is the first that simultaneously investigates the effect of demand-side consumer-level variables and supply-side variables on actual organic purchase behavior. In doing so we contribute to the existing literature in marketing and retailing and specifically also add to the recent studies of Ngobo (2011) and Bezawada and Pauwels (2013) (see Table 1 for a comparison). Second, we also study the interplay between consumer values and attitudes and supply-side variables by including interaction effects. Beyond that, we explore the presence of non-linear effects (e.g., van Doorn, Verhoef, and Bijmolt 2007) and investigate whether consumer attitudes mediate the effect of sociodemographics. Third, we provide empirical insights on whether organic purchase behavior is mainly driven by self-oriented or other-oriented motives (e.g., Thøgersen 2011).

Conceptual Framework

We adopt a cost–benefit approach in our conceptual framework (see Fig. 1), following previous studies that seek to explain organic purchase behavior (Bezawada and Pauwels 2013) and studies of consumer behavior in retailing (e.g., Ailawadi, Neslin, and Gedenk 2001). Perceived benefits of organic food include

Fig. 1. Conceptual model.

health, nutritional value, animal welfare, and environmental protection (e.g., Paul and Rana 2012). These benefits can be more other- or more self-oriented (Thøgersen and Crompton 2009). The costs of consuming organic products include difficulties obtaining the products, high prices, or specific quality risks (e.g., Bezawada and Pauwels 2013; Gleim et al. 2013). In our conceptual model, we do not directly observe the perceived benefits and costs, but we assume that the independent variables we study affect them, which in turn drive consumer behavior. For example, the potential health benefits of organic products may be more salient to a health-conscious consumer.

We consider two groups of variables that might affect cost–benefit perceptions of organic food and thereby drive organic purchase behavior: (1) supply-side or category-level variables and (2) demand-side or consumer-level variables (e.g., Steenkamp and Gielens 2003). We consider three category-level variables that may impact the perceived costs and benefits of choosing an organic option (Bezawada and Pauwels 2013; van Doorn and Verhoef 2011): (1) vice versus virtue products, (2) promotional intensity within a category, and (3) whether products in a category are fresh or processed. Furthermore, we include price and availability as two important variables directly affecting the perceived costs of choosing an organic product. Previous literature has presented conflicting evidence, with Bezawada and Pauwels (2013) finding negative price elasticities and a positive effect of the availability of organic options and Ngobo (2011) finding the opposite. In line with standard micro-economic theory we expect a negative effect of price and assume that availability positively affects the purchase of organic products (Ataman, Mela, and van Heerde 2008). We do not put forward specific hypotheses on these two variables, as these effects are rather obvious.

At the consumer level, multiple types of variables have been included as determinants of organic product consumption, such as values (e.g., Steg, Dreijerink, and Abrahamse 2005), psychographic variables (Pino, Peluso, and Guido 2012; Verhoef 2005), beliefs about the benefits of organic products (i.e., health

benefits, product quality; Schifferstein and Oude Ophuis 1998; van Doorn and Verhoef 2011), and sociodemographics (Thompson 1998). Our focus is on the impact of consumer values and psychographic variables, which should influence the perceived benefits and costs of organic products (Ailawadi, Neslin, and Gedenk 2001).

We distinguish other- and self-oriented values and attitudes; these should influence the salience of other-focused benefits, such as a better environment, and self-oriented benefits, such as healthiness and taste, and costs. We include biospheric values that reflect a person's concern for the environment and animal welfare and altruistic values as other-oriented values that should drive other-focused benefits. Health motivation and quality consciousness relate to specific self-oriented benefits (Schifferstein and Oude Ophuis 1998; Vermeir and Verbeke 2006). Egoism (Steg, Dreijerink, and Abrahamse 2005) and price consciousness (Ailawadi, Neslin, and Gedenk 2001; Ailawadi, Pauwels, and Steenkamp 2008) increase the perceived costs of organic products and thus may impede organic purchases.

We acknowledge that different supply-side factors may be more (or less) important for different consumers depending on the benefits they seek from organic products. We therefore explore the interplay between supply-side factors and biospheric values, health motivation and quality consciousness. Lastly, we also control for the effect of sociodemographics.

Hypotheses

Supply-Side Drivers and Barriers

Virtue versus Vice Categories. Virtue and vice products usually are conceptualized in relation to each other, as relative virtues and relative vices. Relative vices (or “wants”; i.e., chocolate, wine, beer) provide an immediate pleasurable experience but contribute to negative long-term outcomes, such as weight gain and alcoholism. Relative virtues (“shoulds”; i.e., yogurt, vegetables, fruit) are less gratifying and appealing in

the short term but have fewer negative long-term consequences (Wertenbroch 1998). Extensive research shows that a vice versus virtue nature affects consumers' responses to products, assortments, and packages (Hui, Bradlow, and Fader 2009).

Theoretical rationales about the effect of vice or virtue on consumers' preferences for purchasing organic suggest opposing effects. One view proposes a compensatory relationship between items that are wholesome and good for consumers with things that are exciting and fun, such that stimuli and activities can be classified as wholesome or fun, but not both (Kivetz and Simonson 2002). Adding a wholesomeness claim to a vice product thus might lead consumers to suspect reduced enjoyment and pleasure (Raghunathan, Walker, and Hoyer 2006), such that consumers might be more reluctant to purchase organic in vice rather than in virtue categories.

Another view proposes that an organic label can provide a guilt-reducing complement to vice food. The consumption of vice products is usually associated with feelings of guilt that require special justifications (Khan and Dhar 2006). Consumers can reduce their guilt by linking a vice product to a good cause (Strahilevitz and Myers, 1998), in which case consumers likely choose organic offerings in vice rather than in virtue categories. However, Verhoef (2005) indicates that the effect of guilt on organic purchase behavior is limited.

Because quality and taste are the dominant motives for food choice (Vermeir and Verbeke 2006), potential negative taste inferences should lead to lower perceived benefits of organic vice food, such that consumers are less likely to purchase organic options in vice categories. This prediction matches empirical evidence that shows that consumers are less responsive to promotions of organic vice food (Bezawada and Pauwels 2013) and findings of decreased consumer willingness to pay for organic vice products (van Doorn and Verhoef 2011).

H1. Consumers are less likely to purchase organic products in vice than in virtue categories.

Promotional intensity. We include promotional intensity as a second supply-side variable, defined as the extent to which brands within a category compete using extensive price promotions (Steenkamp, van Heerde, and Geyskens 2010). If price promotions in a category are frequent, product alternatives come to seem interchangeable or as commodities with low perceived differentiation, so consumer decision making relies predominantly on price (Mela, Gupta, and Jedidi 1998). In contrast, organic products usually include a price premium, so in categories with greater promotional intensity, the perceived costs of organic products will increase and induce consumers to buy fewer organic products. We hypothesize:

H2. The promotional intensity of a product category negatively affects the purchase of organic products.

Freshness. Important benefits of purchasing organic are more natural and environmental-friendly production methods, for instance using fewer pesticides and fertilizers and refraining from preventively treating livestock with medication. Organic end products therefore should not contain residues of these chemicals (Bourn and Prescott 2002); this product benefit should

be particularly salient for products that do not undergo much processing potentially altering residue levels. We therefore hypothesize:

H3. Consumers are more likely to purchase organic products in fresh than in processed categories.

Other-Oriented Consumer Characteristics

Biospheric and Altruistic Values. A person's values determine the extent to which she or he weighs individual interests, such as money and convenience, against collective interests, such as a better environment or animal welfare. Sustainable behavior researchers often distinguish three general values: egoistic, altruistic, and biospheric (Steg, Dreijerink, and Abrahamse 2005). The first implies that people try to maximize their own individual outcomes, whereas collective values might focus on the welfare of other people (altruistic) or the natural environment (biospheric) (Schultz 2001; Stern, Dietz, and Kalof 1993). Biospheric (or ecospheric) values are defined as a value orientation that reflects concern with nonhuman species or the biosphere (Steg, Dreijerink, and Abrahamse 2005, p. 416; Stern, Dietz, and Kalof 1993). Consumers with high biospheric values consider environmental benefits and animal welfare important, other-oriented benefits of organic products and should be more likely to behave sustainably. We expect consumers with strong biospheric values to be more likely to purchase organic products.

H4. Biospheric values have a positive effect on the purchase of organic products.

The influence of altruism is less clear. An altruistic value orientation implies that the person assigns more value to concerns beyond his or her immediate own interest, such as the welfare of other people. Purchasing organic could be associated with higher other-oriented benefits for altruistic persons. From a theoretical standpoint, a positive relationship seems likely between altruistic values and sustainable attitudes and behavior (Steg, Dreijerink, and Abrahamse 2005), though empirical evidence often fails to confirm such a significant relation (Nordlund and Garvill 2002; Schultz 2001). An explanation may be that altruism focuses on the well-being of other (known) people, rather than the welfare of society as a whole (Kogut and Ritov 2007). Despite unclear empirical evidence, we adopt the dominant theoretical suggestion of a positive effect of altruism on sustainable behavior.

H5. Altruistic values have a positive effect on the purchase of organic products.

Self-Oriented Consumer Characteristics

Health motivation. Health motivation is "consumers' goal-directed arousal to engage in preventive health behaviors" (Moorman and Matulich 1993, p. 210). Evidence about the health benefits of organic food is inconsistent; the U.S. Department of Agriculture stresses that organic label requirements do not imply that organic foods are healthier (Guilabert and Wood 2013). Still, organic food is often perceived as healthier

than conventionally produced food, because of its smaller scale and more natural production methods with fewer pesticides and fertilizers (Guilabert and Wood 2013); health-conscious consumers in particular should value the health benefits of organic products and therefore be more likely to buy them. Yet Thøgersen (2011) questions whether consumers purchase organic for health reasons and attributes the positive relation found in previous research to consumers justifying the higher costs of organic purchases by post hoc rationalizations about their healthiness. Pino et al. (2012) also do not find a significant relationship between health motivation and organic buying intentions. Despite these inconsistent findings, we follow our initial reasoning that health-conscious consumers value the (self-oriented) health benefits of organic food and hypothesize:

H6. Health motivation has a positive effect on the purchase of organic products.

Quality consciousness. Quality consciousness is defined as the extent to which a consumer prefers high quality products rather than compromising on quality and buying at a low price (e.g., Ailawadi, Neslin, and Gedenk 2001). A presumed primary reason that consumers purchase organic is their belief that organic food offers higher quality and tastes better (Paul and Rana 2012; Vermeir and Verbeke 2006). These self-oriented benefits should make buying organic particularly appealing for quality-conscious consumers. Yet recent empirical evidence has created some doubt about consumers' positive quality connotations toward sustainable products, mainly for specific product categories (Luchs et al. 2010; van Doorn and Verhoef 2011). Still we expect that organic products are appealing to quality-conscious consumers and hypothesize:

H7. Quality consciousness has a positive effect on the purchase of organic products.

Egoistic values. Consumers with strong egoistic values place their own interests above collective interests and therefore should have a lower propensity to display sustainable behavior (Steg, Dreijerink, and Abrahamse 2005). For egoistic customers, the costs of purchasing organic products might be very relevant, while they should not attach value to other-oriented benefits. This effect has not received unequivocal empirical support either though (Stern, Dietz, and Kalof 1993). Still, from a theoretical perspective we hypothesize:

H8. Egoistic values have a negative effect on the purchase of organic products.

Price consciousness. Price consciousness is defined as the willingness of consumers to spend time and energy to shop around to purchase (grocery) products at the lowest price (Lichtenstein, Ridgway, and Netemeyer 1993). Because organic products tend to be more expensive than their conventional counterparts (Bezawada and Pauwels 2013), we expect more price-conscious consumers to be less likely to purchase organic, because they will strongly perceive the high costs of organic products. We formulate the following hypothesis:

H9. Price consciousness has a negative effect on the purchase of organic products.

Interaction Effects

We explore the interplay between supply-side factors and biospheric values, health motivation and quality consciousness because these consumer characteristics are closely related to the most important benefits of purchasing organic as identified in literature: environmental and animal welfare benefits, health and taste benefits (Bezawada and Pauwels 2013; Schifferstein and Oude Ophuis 1998; Thøgersen 2011). Health motivated consumers who purchase organic products because they are produced in a more natural way with fewer pesticides and fertilizers may for instance perceive greater health benefits in fresh categories (Guilabert and Wood 2013). Quality conscious consumers may focus less on price, and therefore the negative effect of price premium may be weaker for quality conscious consumers and they may be less affected by price promotions (e.g., Ailawadi, Neslin, and Gedenk 2001). Finally consumers with high biospheric values will value the core benefits of organic products more, and therefore, they might be less hindered by barriers, such as high prices and low availability. They also may be to a lesser extent influenced by measures to stimulate purchase behavior, such as promotions (Bezawada and Pauwels 2013). In sum we thus expect some moderating effects of health consciousness, quality consciousness and biospheric value on the effects of some supply side factors. Given the large number of potential moderating effects, we do not put forward specific hypotheses on each of these moderating effects. We will though explore these in models where we include interactions between these three attitudes and supply side variables.

Control Variables: Demographics

We include gender, education, age, income, and household size as control variables. Women might be more inclined to buy more organic products, because they express more concern for communal goals than men (Winterich, Mittal, and Ross 2009). Environmental issues and problems are often complex and may be better understood and grasped by consumers with more education (Dietz, Stern, and Guagnano 1998; Ngobo 2011). Empirical evidence about the relation between age and sustainable behavior is mixed (e.g., Dietz, Stern, and Guagnano 1998; Thompson 1998). Consumers with more income should be less affected by the costs of organic products and more likely to behave sustainably, though empirical evidence on this link is inconclusive (Thompson 1998). Finally, household size might have an effect on organic purchase behavior, because it correlates positively with price sensitivity (Richardson, Jain, and Dick 1996). The effects of these sociodemographics might not be very strong though, because our model already includes values and attitudes that may mediate their influence (Ailawadi, Neslin, and Gedenk 2001). We explore these interrelations in an additional analysis.

Research Methodology

Data Collection and Measures

We used three types of data: (1) household-level behavioral data about organic purchase behavior, (2) data pertaining to supply-side factors, and (3) household-level survey data about consumer characteristics and sociodemographic information. We collected the consumer data from the Dutch GfK household panel, and the supply-side data reflected consumers' perceptions or actual data from the panel or market (Narasimhan, Neslin, and Sen 1996; Steenkamp et al., 2010). The GfK panel is well-suited to test our conceptual model, as it contains actual organic purchase behavior of households. Moreover, GfK enabled us to collect additional survey data on specific constructs, such as biospheric values, among households of their panel. We obtained these survey data for 1,246 of the more than 4,000 households included in the GfK household panel. We thus combine actual purchase data of organic products, which contrasts with prior studies mainly considering purchase intentions or self-reports, with survey data on consumer attitudes, and data on supply-side factors. Importantly, GfK also made other consumer characteristics of their panel members beyond sociodemographics available to us, in particular important psychographic attitudes, such as price- and quality consciousness.¹ Moreover, from the GfK panel we can also infer data on some marketing variables, such as prices of organic products. The usefulness of these data is also revealed by prior influential studies using similar data on for example the actual adoption of new products (instead of adoption intentions), consumer characteristics and marketing variables (e.g., Steenkamp and Gielens 2003).

Organic purchases. In the GfK household panel, more than 4,000 Dutch households scan all their food purchases using in-home scanning devices.² We collected data about purchases in 29 food categories, as listed in Table 2, including fruit and vegetables, meat, coffee, cereals, and dairy products. These are the largest food categories that jointly constitute about 80% of the food purchases of Dutch households. By screening more than 100,000 stockkeeping units, GfK has established whether purchased items carry organic labels (e.g., EKO, BIO). Our data span two periods of 20 weeks each (November 2007–March 2008; November 2008–March 2009). We excluded one category (canned fruits) without any organic purchases in the observation period. An overview of the categories is provided in Table 2. We also report some statistics on the supply-side variables price and availability and distinguish vice and virtue categories.

We measure a household's share of organic purchases as the number of organic items household i buys in category c during period t , relative to the total number of items purchased in category c :

$$SOP_{organic,cit} = \frac{items_{organic,cit}}{items_{cit}}, \quad (1)$$

where $SOP_{organic,cit}$ is the share of purchases of organic products by household i in category c ; $items_{organic,cit}$ refers to the number of organic items purchased by household i in category c in period t ; and $items_{cit}$ is the number of items purchased by household i in category c in period t . The average SOP of organic products was 1.1% in the first and 1.2% in the second period of observation, ranging from .03% for fish to approximately 17.6% for meat substitutes. We choose SOP instead of, say, share of wallet as our dependent variable because of our focus on the choice process of organic products. As a robustness check, we repeated our analysis with share of wallet as a dependent variable.

Supply-side factors. We classified vice products (such as alcohol, chocolate and sweets) versus virtue products (such as bread, cereals and vegetables and fruit) according to the distinction by Hui et al. (2009). Data on categories' promotional intensity came from Steenkamp et al. (2010) for 18 categories; data for the remaining 11 categories were collected in an additional questionnaire completed by 242 respondents in April 2009, assigned randomly to rate three product categories. We coded whether a category is fresh or processed based on Goldman, Ramaswami, and Krider (2002).

The price premium demanded for organic products is calculated as the difference (as a percentage) between the average price of organic and conventional products (purchased by the whole household sample of $N > 4,000$) in a category using GfK data. We derive the measure for the availability of organic products by relating the number of organic options available in a category (purchased by the whole household sample of $N > 4,000$) to the total number of options available in a category. We validated this measure by examining the number of organic and conventional products available in each category in five middle-sized supermarkets of different retail chains in two geographic areas; the correlation between the two measures was .71.

Consumer characteristics. To measure values and health motivation a survey administered to part of the GfK panel in November 2007 provided 1,246 usable responses. Moreover, as mentioned GfK administers a yearly panelist survey to measure price and quality consciousness (Ailawadi, Pauwels, and Steenkamp 2008). We used the data from the 2008 survey. In Table 3 we report the sources, reliability, and descriptive statistics for our attitudinal and supply-side measures; Appendix B contains the specific items. The majority of the alphas exceed the critical threshold of .7 (Nunnally and Bernstein 1994). Only the quality consciousness scale had an alpha just below .70, with a value of .69. We also executed a principal components analysis, which resulted in six factors (eigenvalues > 1); all items loaded on their respective constructs. The only exception was a reverse-scaled item from the quality consciousness scale that also loaded on price consciousness. Still, we decided to work with the full

¹ We thank AIMARK and specifically Jan-Benedict Steenkamp and Alfred Dijks for arranging this data support through GfK.

² This panel is operated under the ISO 9001 quality procedure. Part of this procedure is that GfK calculates, for each household, a predicted level of purchases. The moment the scanning behavior of the household is below or above the predicted level, the field department contacts the household. If there is no plausible reason for the deviation (e.g., on holiday, buying for a wedding) and the household maintains lower scanning than expected, it will be expelled from the panel, and the panelist will not appear in the sample. For more information on GfK please visit www.GfK.com.

Table 2
Overview of the categories included in our study.

		Fresh category	Average share of organic purchases	Average price premium	Average availability
Virtue categories	Bread	Yes	.87%	19.04%	6.14%
	Canned vegetables	No	1.00%	4.99%	5.10%
	Cereals	No	1.94%	51.63%	10.76%
	Dairy products	Yes	1.89%	4.60%	8.50%
	Eggs	Yes	.46%	68.56%	5.09%
	Meat substitutes	Yes	17.58%	12.88%	24.36%
	Vegetables and fruit	Yes	2.48%	−6.75%	10.56%
	Ready-made meals	No	.41%	31.51%	.084%
	Soup	No	.28%	103.09%	2.38%
Vice categories	Alcohol	No	.15%	−30.48%	1.09%
	Beer	No	.10%	32.51%	.66%
	Cheese	Yes	.77%	8.68%	6.13%
	Crisps and salty biscuits	No	.24%	84.55%	1.93%
	Chocolate	No	.36%	41.90%	2.03%
	Cookies and pastries	No	.88%	83.59%	2.52%
	Nuts	No	.23%	69.43%	1.78%
	Soft drinks	No	.31%	140.05%	3.35%
	Sweets and candy	No	.16%	115.64%	.91%
Neither vice nor virtue categories	Baking ingredients	No	.77%	12.92%	9.58%
	Butter and margarine	Yes	.44%	69.23%	3.28%
	Chicken	Yes	1.18%	9.57%	19.34%
	Coffee and tea	No	1.05%	120.46%	9.23%
	Fish	Yes	.03%	178.95%	.37%
	Meat	Yes	1.61%	12.33%	15.77%
	Meat products	Yes	.67%	39.86%	8.52%
	Rice and pasta	No	1.53%	29.43%	8.30%
	Sandwich filling	No	1.16%	80.75%	11.62%
	Seasoning	No	.55%	106.71%	3.38%

Table 3
Measures and reliability.

Scale	Source	Cronbach's alpha	Mean	SD	<i>r</i> with SOP ^a
<i>Supply-side factors</i>					
Vice category (dummy variable)	Hui, Bradlow, and Fader (2009)	n.a.	.39	.49	−.061 ^{**b}
Promotional intensity	Steenkamp, van Heerde, and Geyskens (2010)	.72	3.16	.62	−.041 ^{**}
Price premium	n.a.	n.a.	53%	.52	−.058 ^{**}
Availability	n.a.	n.a.	6%	.06	.139 ^{**}
<i>Consumer characteristics</i>					
Short Schwartz Value Survey:	Steg, Dreijerink, and Abrahamse (2005)	.88	4.36	1.36	.076 ^{**}
Biospheric values					
Altruistic values		.81	4.99	1.14	.018 ^{**}
Egoistic values		.76	2.07	1.17	−.006
Health motivation	Moorman (1990)	.77	4.35	1.05	.043 ^{**}
Quality consciousness	Ailawadi, Pauwels, and Steenkamp (2008)	.69	3.45	.581	.041 ^{**}
Price consciousness	Ailawadi, Pauwels, and Steenkamp (2008)	.79	3.55	.72	−.061 ^{**}

^a Correlation coefficient with share of organic purchases, where ** implies that *r* is significant at 1% level.

^b This is a correlation between a categorical and a continuous variable. Calculating such a correlation is statistically not fully correct.

three-item scale of Ailawadi et al. (2008), considering the recommendation to use reverse-scaled items in multi-item scales (Baumgartner and Steenkamp 2001).

We used the panel identifiers to link the survey data to the behavioral data. In terms of their demographics, 88% of the respondents were women. In addition, 59.4% of the respondents lived in one- or two-person households, 32% in three- or four-person households, and 8.6% of our respondents lived in households with five or more people. Regarding age, 40% of respondents were less than 45 years; 48.5% between 45 and 64 years, and 11.4% were at least 65 years of age. For education, we found that 35.6% had an associate's/BA/BS degree, and 35.9% went to graduate school. The average monthly income of 53.8% of our sample was less than 2,100 €, whereas 13.9% earned more than 3,100 €. Compared with the full household panel ($N > 4000$), the respondents included in the database were somewhat younger and more educated, less likely to have a low to very low income, and from larger households ($p(\chi^2) < .01$), probably because our survey was administered by the Internet, whereas the annual household survey of the panel also can be completed by paper-and-pencil survey.

We gathered 52,305 observations of the SOP of organic products from 1,246 households in 28 categories over two periods, though not every respondent purchased in every category in every period. In Appendix C, we report the correlation matrices. The availability of organic products correlated negatively with the average price premium for organic food and the category's promotional intensity, which implied that availability of organic food was higher in categories with a smaller price premium, where greater demand for organic options can be expected. Furthermore, the availability of organic products was lower in promotionally intense categories, where frequent promotions induced consumers to decide largely on the basis of price. As expected, biospheric values correlated positively with altruistic values and health motivation; quality and price consciousness correlated negatively. The correlations were below .40, with three exceptions: that between biospheric values and altruistic values reached .62, and the correlations between vice and promotional intensity (.47) and availability (−.48).

Model

Our dependent variable was restricted between 0 and 1 and followed a binomial distribution:

$$SOP_{organic,cit} \sim \text{Binomial}(items_{cit}, \pi_{cit}) \quad (2)$$

We therefore used a logistic model for proportions (Hox 2010) to assess the impact of supply-side and consumer characteristics on the share of purchases of organic products. The dependent variable (SOP) is observed on the respondent and category level; the independent variables are observed on one or the other. The observations thus are not independent, suggesting the need for multilevel analysis (Hox 2010). We modeled the impact of the independent variables as fixed effects and allowed for random effects on the respondent level. We also pooled the data over two periods of observation and accounted for time-specific effects by

including a dummy variable:

$$\begin{aligned} \text{logit}(\pi_{cit}) = & \beta_{0i} + \sum_{l=1}^4 \varphi_l \cdot \text{supply}_{lct} + \sum_{j=1}^2 \gamma_j \cdot \text{other}_{ji} \\ & + \sum_{k=1}^4 \delta_k \cdot \text{self}_{ki} + \sum_{m=1}^5 \psi_m \cdot \text{demo}_{mi} \\ & + \theta \cdot \text{period2}, \quad \beta_{0i} = \beta_0 + u_{0i} \end{aligned} \quad (3)$$

where supply_{lct} is the supply-side characteristic l of category c in period t , other_{ji} is the other-oriented attitude or value j of household i , self_{ki} is the self-oriented attitude or value k of household i , demo_{mi} is the demographic variable m for household i , and period2 is a time dummy.

The usual lowest error term in multilevel models does not appear in Eq. (3), because it has no useful interpretation for the logistic multilevel model. In the binomial distribution, the lowest level variance is completely determined when the proportion is known (Hox 2010). Only 6.2% of the SOPs we observed were larger than 0, which should not be a problem for our large sample size (King and Zeng 2001). Still, we chose Bayesian methods for estimation, which tend to perform better than maximum likelihood estimation in dealing with skewed data and the more complex structure of multilevel logit models (Hox 2010). We used Markov chain Monte Carlo methods with diffuse priors, a burn-in of 5,000, and 500,000 iterations. We compared our model against an intercept-only model and found that it outperformed that alternative with respect to the deviance information criterion statistic (Browne 2009) (i.e., 46,474 for our model versus 53,371 for the intercept-only model). For comparability, we standardized all our measures.

Empirical Results

Main Effects

In Table 4, we provide the estimates and standard errors for our multilevel model. In line with H₁, H₂ and H₃, consumers were less likely to purchase organic in vice categories ($\beta = -.318, p < .01$) and in categories with higher promotional intensity ($\beta = -.147, p < .01$) and more likely to purchase organic in fresh categories ($\beta = .084, p < .01$). As expected, the average price premium had a negative ($\beta = -.520, p < .01$) and availability of organic products a positive ($\beta = .412, p < .01$) effect on the share of organic purchases. A biospheric value orientation had a strong positive effect on a consumer's SOP for organic produce ($\beta = .365, p < .01$), in support of H₄. Surprisingly though, an altruistic value orientation negatively affected the purchase of organic products ($\beta = -.147, p < .05$). We thus cannot confirm H₅.

The impact of health motivation on organic purchases, though in the predicted direction, did not reach significance ($\beta = .069$,

Table 4
Influence of Supply-Side Factors and Consumer Characteristics on Organic Purchases.

	Main effects	Hypothesis	Interaction of supply-side factors with		
	Mean estimate (SE)		Biospheric values Mean estimate (SE)	Health motivation Mean estimate (SE)	Quality consciousness Mean estimate (SE)
Vice	−.318** (.036)	H ₁	−.209** (.042)	−.314** (.038)	−.346** (.038)
Promotional intensity	−.147** (.011)	H ₂	−.174** (.012)	−.141** (.011)	−.126** (.011)
Fresh	.084** (.031)	H ₃	−.024 (.036)	.130** (.033)	.073* (.033)
Price premium	−.520** (.019)		−.590** (.022)	−.536** (.020)	−.545** (.020)
Availability	.412** (.013)		.472** (.015)	.411** (.013)	.419** (.013)
Biospheric values	.365** (.062)	H ₄	.134 (.087)	.364** (.060)	.361** (.060)
Altruistic values	−.147* (.060)	H ₅	−.145* (.058)	−.146* (.059)	−.144* (.058)
Health motivation	.069 (.050)	H ₆	.070 (.049)	.593** (.080)	.068 (.048)
Quality consciousness	.038 (.051)	H ₇	.044 (.053)	.037 (.052)	.603** (.078)
Egoistic values	−.139** (.048)	H ₈	−.139** (.047)	−.138** (.047)	−.137** (.048)
Price consciousness	−.183** (.052)	H ₉	−.179** (.052)	−.182** (.053)	−.182** (.053)
Vice × biospheric			−.125** (.025)		
Promotional int. × biospheric			.233** (.061)		
Fresh × biospheric			.131** (.021)		
Price premium × biospheric			.197** (.030)		
Availability × biospheric			−.157** (.020)		
Vice × health				.031 (.025)	
Promotional int. × health				−.305** (.060)	
Fresh × health				−.144** (.021)	
Price premium × health				.030 (.030)	
Availability × health				−.033 (.021)	
Vice × quality					.084** (.022)
Promotional int. × quality					−.532** (.056)
Fresh × quality					−.015 (.019)
Price premium × quality					.083** (.026)
Availability × quality					−.045* (.020)
Education	.294** (.051)		.294** (.050)	.296** (.051)	.293** (.051)
Gender: male	−.334* (.153)		−.325* (.151)	−.334* (.155)	−.343* (.153)
Age	.073 (.050)		.071 (.051)	.072 (.050)	.072 (.051)
Income	.070 (.052)		.071 (.050)	.075 (.052)	.074 (.052)
Household size	−.221** (.052)		−.222** (.051)	−.222** (.052)	−.226** (.052)
Constant	−6.363** (.058)		−6.384** (.060)	−6.416** (.059)	−6.382** (.059)
Dummy: Period2	.059** (.02)		.059** (.020)	.058** (.020)	.061** (.020)
DIC	46473.98		46370.58	46326.93	46301.98

** Significant at $p < .01$.

* Significant at $p < .05$.

$p > .05$).³ We therefore cannot confirm H₆. Quality consciousness ($\beta = .038$, $p > .05$) had no significant effect on organic purchases, so we cannot support H₇ either. In accordance with H₈ and H₉, egoistic values ($\beta = -.139$, $p < .01$) and price consciousness ($\beta = -.183$, $p < .01$) exerted a significant negative effect on organic purchases.

In line with previous literature (Thompson 1998), education related positively to organic purchasing ($\beta = .294$, $p < .01$), and women were more likely to purchase organic than men ($\beta = -.334$, $p < .05$). Age ($\beta = .073$, $p > .05$) and income ($\beta = .070$, $p > .05$) did not significantly affect a household's share

of organic purchases, though household size had the expected negative effect ($\beta = -.221$, $p < .01$). Thus sociodemographics still affect organic purchase behavior, even when we included values and attitudes as explanatory variables.

Interaction Effects between Consumer Characteristics and Supply-Side Variables

Consumer characteristics and supply-side variables might interact, in that consumers who value the benefits of organic products might be less affected by their costs. We therefore additionally include the interactions between biospheric values, health motivation and quality consciousness with supply-side variables because these consumer characteristics relate to the most important benefits of purchasing organic as identified in literature. As we show in Table 4, a somewhat counterintuitive

³ We also estimated a model without price premium, as one might argue that health motivation might not play a role because of price. Health motivation is still not significant in this model.

effect is that consumers with a biospheric value orientation were *less* likely to purchase organic in vice categories, as suggested by the negative interaction effect ($\beta = -.125, p < .01$). The significant positive interactions between a biospheric value orientation and promotional intensity ($\beta = .233, p < .01$) and freshness of a category ($\beta = .131, p < .01$) indicate that consumers with high biospheric values purchased more in fresh categories and also purchased when promotional intensity was high. We furthermore found significant interactions between a biospheric value orientation and category price premium ($\beta = .197, p < .01$) and the availability of organic products ($\beta = -.157, p < .01$); that is, consumers with high biospheric values were less sensitive to the price of organic products and purchased organic products even when their availability was poor.

The model including interaction effects between health motivation and the supply-side factors shows a significant positive main effect of health motivation ($\beta = .593, p < .01$) on organic purchases, accompanied by two negative interaction effects indicating that health motivated consumers are less likely to buy in categories with a high promotional intensity ($\beta = -.305, p < .01$) and – somewhat counterintuitive – in fresh categories ($\beta = -.144, p < .01$). When also including interaction effects between quality consciousness and the supply-side factors, the main effect of quality consciousness is positive and significant ($\beta = .603, p < .01$), yet the negative interaction effect between quality consciousness and promotional intensity ($\beta = -.532, p < .01$) indicates that quality conscious consumers are less likely to buy organic in categories with high promotional intensity. Interestingly, quality conscious consumers are more likely to purchase organic in vice categories ($\beta = .084, p < .01$), also purchase organic if its availability is poor ($\beta = -.045, p < .05$) and are willing to pay a higher price ($\beta = .083, p < .01$).

Nonlinear Effects of Consumer Characteristics⁴

Given evidence in literature that the effect of consumer characteristics on behavior may be non-linear, implying that only extreme attitudes and values may affect behavior (van Doorn, Verhoef, and Bijmolt 2007), we estimate models including quadratic and cubic terms of the consumer characteristics. We find nonlinear effects of biospheric values on organic purchases ($\beta = .382, p < .01$ for the main effect of biospheric values, $\beta = .095, p < .01$ for the squared term), indicating that organic purchases exponentially increase with stronger biospheric values. We furthermore find a significant cubic term for quality consciousness ($\beta = -.100, p > .05$ for the main effect of quality consciousness, $\beta = .049, p < .05$ for the cubic term) indicating a s-shaped relationship between quality consciousness and organic purchases.

⁴ We thank the editor and one anonymous reviewer for these suggestions. We estimated the nonlinear effects for the main effects model only; the detailed results can be requested from the first author.

⁵ We performed these checks for the main effects model; the detailed results can be requested from the first author.

Robustness Checks⁵

We performed multiple robustness checks. First, we inspected the VIFs of our model that ranged between 1.00 and 1.71, indicating that multicollinearity was unlikely to be a problem (Hair et al. 2009). Given that some variables show strong correlations (i.e., between altruistic and biospheric values, availability and price), we estimated models where we left out one of these variables. The main results remained very similar. In the model without biospheric values though the effect of altruistic values is insignificant ($\beta = .060, p > .05$), while the effect of health motivation is positive and significant ($\beta = .117, p < .05$). This indicates that a biospheric value orientation and health motivation may to a certain extent coincide.

Second, we estimated an OLS model which did not fit with the structure of our multilevel data, nor did it take into account that our dependent variable was a proportion between 0 and 1. Still, most effects remained stable, with the notable exception of a positive effect of the vice nature of a category ($\beta = .296, p < .01$), of health motivation ($\beta = .148, p < .01$) and quality consciousness ($\beta = .083, p < .05$). The dummy variable denoting whether a category is fresh or process is not significant anymore ($\beta = -.086, p > .05$).

As a third robustness check, we estimated a separate logit-model explaining the purchase of organic products ($N = 52,305$) and a regression model explaining the quantity purchased by a consumer in a category ($N = 3,332$). We used robust variance estimates that adjust for within-cluster correlation. The purchase incidence model replicates almost all of our results with the notable exception of a positive effect of promotional intensity on organic purchases ($\beta = .196, p < .01$). The model explaining purchase quantity shows fewer significant effects and two effects opposing our hypotheses, suggesting that respondents purchase larger quantities of organic products in vice ($\beta = .067, p < .01$) and smaller quantities in fresh categories ($\beta = -.135, p < .01$).

Finally, as a fourth robustness check, we reestimated our model using the share of wallet of organic purchases as a dependent variable, instead of the share of organic purchases. The coefficients associated with the average category price premium and the vice nature of a category were no longer significant. The negative effect of altruism was only significant at $p < .1$; the coefficient associated with an egoistic value orientation remained negative but just failed to reach an acceptable significance level. The absence of a negative effect of a price premium in the SOW model may have arisen because the negative effect of the price premium on the share of purchases was partially offset in the SOW model by the higher price of the organic purchase.

Endogeneity of Price and Availability

The price premium and availability of organic products in supermarkets might be endogenous, for instance managers may be inclined to offer more organic options in categories in which organic products have been successful. We discussed this issue with experts in retailing and organic products. Leading retailers, such as Albert Heijn in the Netherlands, have introduced their

product line on organic brands as part of their sustainability and corporate social responsibility strategy. Moreover, the presence of organic products also depends on the sufficient supply of organic products by for example farmers. The price of organic products is also not only driven by strategic considerations, but can for a large part be attributed to higher production cost that vary between categories. For example, the price premium for organic meat is much higher than for some grocery products (e.g., [van Doorn and Verhoef 2011](#)), which is for a large part due to a larger difference in production costs. Although these substantive considerations do not fully rule out endogeneity, they show that endogeneity of availability and price may be a less severe problem with organic products.

The difference in production costs between organic products and their conventional counterparts may be suited instruments for the price premium of organic products. Unfortunately, we do not have that information for all our categories. An alternative may be information on (wholesale) prices from other markets ([Rossi 2014](#)); we took the (wholesale) price premium for the US market for 19 of our 28 categories from [Bezawada and Pauwels \(2013\)](#); these appear unrelated with the price premiums identified in our sample and are therefore not suited as instruments. Lastly, we used additional supply-side variables as instruments for price and availability,⁶ yet these instruments are not very strong (*F*-statistic of the first-stage regression < 10 ([Staiger and Stock 1997](#)); Cragg–Donald *F*-statistic indicates that instruments are weak at $p = .05$ ([Stock and Yogo 2004](#)). In the model using these instruments, availability fails to reach a satisfactory level of significance ($\beta = -.007, p > .05$); all other results remain stable. Yet, given that [Rossi \(2014\)](#) and cautions that IV estimators should only be used when strong and valid instruments are available, we focus on models without IV estimators.

*Sociodemographics and Attitudes*⁷

Prior research in retailing has exhibited a mediating role of psychographic variables for the effect of sociodemographics on purchase behavior. In our model, sociodemographics exerted a

significant impact on organic purchase behavior when attitudes were included, implying that attitudes did not fully mediate the influence of demographics on organic purchase behavior. Still, sociodemographics might relate to attitudes. We therefore estimated a seemingly unrelated regression (SUR) model, in which we link the sociodemographic variables to the included attitudinal variables. Our results show that sociodemographic variables indeed related significantly to the included attitudes and values. However, they lacked strong explanatory power, with *R*-square values ranging from .01 to .08. Several relationships were as expected; for example, consumers with more education indicated higher biospheric values ($\beta = .052, p < .01$), as did women ($\beta = -.108, p < .01$). Furthermore, income revealed a negative relationship with price consciousness ($\beta = -.193, p < .01$) and a positive relationship with quality consciousness ($\beta = .130, p < .01$). The results of this additional analysis suggest that sociodemographics might have a dual role: they relate directly to the purchase behavior of organic products, and they also are related to attitudes that explain organic purchase behavior.

Discussion

Growing attention centers on sustainable, and specifically organic, products. Yet we suffer from a lack of systematic research in consumer and marketing research. We used a unique database that describes actual organic purchase behavior in 28 categories. Of our 9 stated hypotheses, we confirmed 6. With respect to the supply-side drivers and barriers of organic purchases, we find that the share of purchases of organics is lower in categories with a high promotional intensity, a finding not reported so far. Confirming prior research (e.g., [Bezawada and Pauwels 2013](#)), we find lower shares of organic products in vice categories, in categories with relatively higher priced organic products and in categories with fewer organic options available. Notable, these findings contrast [Ngobo \(2011\)](#) who finds positive price elasticities and a negative effect of availability.

As expected and confirming prior literature (e.g., [Steg, Dreijerink, and Abrahamse 2005](#)), biospheric values are the most important driver of organic purchases of individual households; we find that organic purchases exponentially increase with stronger biospheric values. Consumers with a biospheric value orientation are also less affected by poor availability of organic products, are willing to pay a price premium for organic products and also buy organic in categories with high promotional intensity. Interestingly, the share of organic purchases of consumers with strong biospheric values also is more negatively affected by the vice nature of a category, which is somewhat counter-intuitive. Perhaps a strong biospheric value orientation cannot fully compensate for the potential negative quality inferences about organic vice products, as established in prior literature ([van Doorn and Verhoef 2011](#)). We also find a positive exponential effect of biospheric values suggesting that the tendency to buy organic products becomes much stronger when consumers have very high biospheric values (see also [van Doorn, Verhoef, and Bijmolt 2007](#)). Interestingly, altruism does not drive organic share of purchases and may even have a negative effect. Yet,

⁶ Additional supply-side variables we included were:

- Average share of the category in the household budget (calculated using GfK panel data)
- Average interpurchase time in a product category (calculated using GfK panel data).
- Category competitiveness ([Narasimhan, Neslin, and Sen 1996](#); we counted the number of brands in a category in five middle-sized supermarkets of different formulas and computed weighted averages based on the market shares of the different formulas).
- Advertising intensity within a category (as provide by [Steenkamp, van Heerde, and Geyskens \(2010\)](#) for 18 categories; data for the remaining 11 categories were collected in an additional questionnaire completed by 242 respondents in April 2009).
- Whether a category is animal-derived (dummy variable).

⁷ We thank an anonymous reviewer for this suggestion. The detailed results can be requested from the first author.

we caution that we do not find this effect when we exclude biospheric values from our model.

Self-oriented motives, such as health motivation and quality consciousness do not have a significant linear effect on organic share of purchases when we only consider their main effects, suggesting that health and quality motives are not as important drivers of organic purchase behavior as previously assumed (Pino et al., 2012). Notably, our results support the notion put forward by Thøgersen (2011) that other-oriented motives and benefits are the main driving force of organic purchases. However, we arrive at somewhat more fine-grained conclusions that may resolve conflicting findings in previous literature when we also consider the interplay between health motivation, quality consciousness and supply-side factors. Our results suggest that health motivated consumers purchase more organic, but not in categories with many promotions and not in fresh categories. In heavily promoted categories, health motivated consumers may be more likely to find health-related products on discount and prefer these to organic products. The result that health motivated consumers buy less organic in fresh categories is somewhat surprising, given that potential health benefits of organic food, such as the use of less chemicals, should be more salient in fresh categories. Future research could focus on explaining why this occurs.

Interestingly, the negative quality associations regarding organic vice food (van Doorn and Verhoef 2011) seem to be less pronounced for quality conscious consumers. While quality conscious consumers refrain from purchasing organic in categories with many promotions, they are less affected by poor availability of organic options and high prices, making them a potential interesting target group for retailers. Furthermore, we show that the main effect of quality consciousness is more complex, with an initial negative linear and a positive quadratic effect.

Implications for Retailers and Manufacturers

From a targeting perspective organic products are most attractive to a specific segment: consumers with strong biospheric values. A challenge is to make organic products attractive for a broader audience. Health motivated and quality conscious consumers are according to our results only a suitable target group in certain categories, in particular categories without many promotions of alternative products that potentially are better suited to fulfill their health or quality oriented goals. Quality conscious

consumers are also slightly less affected by high prices and low availability of organic options and also purchase organic in vice categories and may therefore be an interesting target group. Emphasizing potential health and quality benefits of organic products in certain categories may therefore be a worthwhile strategy. Yet, we caution that the effects we find for quality conscious and health motivated consumers are rather weak compared to the strong effects we find for consumers with strong biospheric values.

On a more tactical level, retailers might target specific demographic segments, such as consumers with higher education, women, and small households because these segments show a greater interest in organic products. Our results also suggest that virtue categories with a low promotional intensity are the best candidates for new organic product introductions.

Limitations and Further Research

Our study has several limitations. By aggregating the data over time, we achieve a more stable assessment of purchase behavior because the results are not affected by seasonal patterns or weekly promotions, yet this choice also reduces insights into the potential dynamics in purchasing patterns. We aggregated the data over brands and retailers, though purchase behaviors related to a brand with an organic claim might differ from those for organic private labels. Specifically, researchers might study the effects of the presence of strong brands.

Our data are limited to food purchases; additional research should consider the possibly different drivers of organic purchases in other categories such as clothing. We study organic purchases in one country only. The market share of organic food in the Netherlands in 2012 was with 2.3% somewhat lower than in the US (4.3%; Willer and Lernoud 2014), yet in both countries the organic market grew much more than the market for conventional foods. In general there is a need to study drivers of organic purchase behavior in other countries accounting for intercultural and supply-side differences.

We also did not explicitly measure consumer attitudes (perceived benefits and costs) toward organic products in specific categories as potential drivers, which additional research could include as observed variables. Finally, we could not satisfactorily account for the potential endogeneity of price and availability; researchers might execute natural experiments to determine the effect of price and availability.

Appendix A. Selective Overview of Research on Organic Purchasing

Authors	Independent variables				Dependent variable
	Supply-side factors	Consumer characteristics			Actual purchase behavior
		Other-oriented consumer characteristics	Self-oriented consumer characteristics	Demo-graphics	
Steg, Dreijerink, and Abrahamse (2005)		X	X		
Stern, Dietz, and Kalof (1993)		X	X	X	
Schifferstein and Oude Ophuis (1998)			X	X	
Dietz, Stern, and Guagnano (1998)		X		X	
Pino, Peluso, and Guido (2012)		X	X		
Shamdasani, Chon-Lin, and Richmond (1993)	X	X			
Vermeir and Verbeke (2006)	X	X			
Bezawada and Pauwels (2013)	X				X
Ngobo (2011)	X			X	X
Thøgersen (2011)		X	X		
This study	X	X	X	X	X

Appendix B. Measures

Promotional intensity (Steenkamp, van Heerde, and Geyskens 2010) (1–5 agree-disagree scale)^a

- There is always a special offer on (X).
- It is easy to find a special offer on (X).

Values (Steg, Dreijerink, and Abrahamse 2005) (0 (not at all important)–7 (of supreme importance))^b

- Equality: equal opportunity for all (altruistic)
- Respecting the earth: live in harmony with other species (biospheric)
- Social power: control over others, dominance (egoistic)
- Unity with nature: fitting into nature (biospheric)
- A world at peace: free of war and conflict (altruistic)
- Wealth: material possessions, money (egoistic)
- Authority: the right to lead or command (egoistic)
- Social justice: correcting injustice, care for the weak (altruistic)
- Protecting the environment: preserving nature (biospheric)
- Influential: having an impact on people and events (egoistic)
- Helpful: working for the welfare of others (altruistic)
- Preventing pollution: protecting natural sources (biospheric)
- Ambitious: hard-working, ambitious, striving (egoistic)

Health Motivation (Preventive Orientation) (Moorman 1990) (1–7 agree-disagree scale)^b

- I try to protect myself against health hazards I hear about.
- I am concerned about health hazards and try to take action to prevent them.
- I try to prevent health problems before I feel any symptoms.

Quality Consciousness (Ailawadi, Pauwels, and Steenkamp 2008) (1–5 agree-disagree scale)^c

- I always strive for the best quality.
- Quality is decisive for me while buying a product.
- Sometimes I save money on groceries by buying products of lower quality. (reversed)

Price Consciousness (Ailawadi, Pauwels, and Steenkamp 2008) (1–5 agree-disagree scale)^c

- For me, price is decisive when I am buying a product.
- Price is important to me when I choose a product.
- I generally strive to buy products at the lowest price.

^a Data available within GfK at the category level.

^b Survey questions asked in specific survey on purchase behavior of sustainable and health products.

^c Survey questions collected in yearly questionnaire among panel members.

Appendix C. Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Vice	1											
(2) Promotional intensity	.466**	1										
(3) Fresh category	-.330**	-.236**	1									
(4) Price premium	.231**	.014**	-.266**	1								
(5) Availability	-.481**	-.158**	.420**	-.377**	1							
(6) Biospheric values	-.001	-.002	.001	-.001	.008	1						
(7) Altruistic values	.000	-.001	.002	.001	.003	.615**	1					
(8) Egoistic values	-.003	-.002	.003	.002	.002	.131**	.078**	1				
(9) Health motivation	-.003	-.003	.001	.002	.005	.289**	.231**	.137**	1			
(10) Quality consciousness	.004	.003	.001	.001	-.004	.139**	.130**	.125**	.155**	1		
(11) Price consciousness	-.005	-.004	.000	.000	.003	-.016**	.025**	-.027**	-.017**	-.398**	1	
(12) Share of organic purchases	-.061**	-.041**	.056**	-.058**	.139**	.076**	.018**	-.006	.043**	.041**	-.064**	1
N		52,305		52,305	52,305	52,305	52,305	52,305	52,305	52,305	52,305	52,305

** Significant at 1% level.

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