



An extended theory of planned behavior to predict consumers' willingness to buy mobile slaughter unit meat



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ARTICLE INFO

Article history:

Received 23 August 2016

Received in revised form 22 December 2016

Accepted 30 January 2017

Available online 1 February 2017

Keywords:

Animal welfare

Consumer acceptance

Mobile slaughter units

Theory of planned behavior

Value belief norm theory

Personal norms

Consumer decision making

ABSTRACT

The current study investigated the determinants of consumers' intention to purchase meat from mobile slaughter units (MSU). The theory of planned behavior (TPB) and the value belief norm theory (VBN) were used as conceptual lenses to guide this investigation. We conducted a survey among 329 respondents in the Netherlands who buy meat for themselves and/or for others. The results indicated that (1) TPB and VBN explain a high proportion of the variance in consumers' intention to buy MSU meat, and that (2) an extended TPB that includes peoples' attitude, personal norm, subjective norm, and perceived behavioral control turned out to be the best model to predict willingness to buy MSU meat. Further implications for future research and practice are discussed.

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1. Introduction

In 2013, >568 million production animals were slaughtered for meat in the Netherlands – i.e., 1.5 million animals per day (CBS, 2014) – and these animals were transported from farm to slaughterhouses. Road transport is a very common practice worldwide, but in recent years the public has become more concerned about the welfare of animals during transportation (e.g., Knowles & Warriss, 2007). Transport is generally stressful for animals: it contributes significantly to a reduction in animal welfare and has the potential to result in a loss of production (Appleby, Cussen, Garcés, Lambert, & Turner, 2008; Chambers, Grandin, Heinz, & Srisuvan, 2001; Knowles, Warriss, & Vogel, 2014; Lambooi, Pluister-Jansen, Graven, Bemelman, & Hoste, 2011; Schwartzkopf-Genswein et al., 2012). In a study of Vimiso and Muchenje (2013) it was found that the method and duration of animal transport had a negative effect on colour, pH and bruising. The lowest percentage of bruises was found in animals that were received on hoof from the farm to the slaughter facility. The major stressors for production animals during transport are the loading and unloading procedures, inadequate micro-climate, and the duration of the transport (Hartung & Springorum, 2009). Given the growing concern among consumers regarding animal welfare in general (European Commission,

2016), and transportation of animals in particular (Gavinelli, Ferrara, & Simonin, 2008; Knowles et al., 2014), this investigation studies consumers' willingness to pay for meat from animals slaughtered on the farm itself.

Reduction in animal transport for slaughter can be achieved by building slaughterhouses near farms or by using mobile slaughter units (MSUs). An MSU is a mobile animal-slaughtering facility that can be moved between locations (Carlsson, Frykblom, & Lagerkvist, 2007; Lambooi et al., 2011). Reasons for using MSUs could include the increased quality of meat, the reduced stress level for the animals, and the decreased risk of injuries and fractures (Eriksen et al., 2013; Carlsson et al., 2007; Lambooi et al., 2011). MSUs are not yet widely used, but it could be presumed that it offers a way to improve animal welfare as well as to foster the development of regional food chains (Johnson, Marti, & Gwin, 2012). In the Netherlands, so far MSUs are not used and MSU meat is therefore unavailable, but the issues raised could focus possible concerns around animal welfare and meat quality.

MSU adoption depends on a wide range of parties in the meat production chain, such as farmers, supermarkets, butchers, and, importantly, consumers – who in the end pay for the product. If consumers do not buy MSU meat – which should be properly labeled and certified as such so that it can be recognized – when it is available on the market, for instance because of higher costs compared to conventional meat, producers cannot sell their meat and investments in MSUs will not be viable. In a previous study, consumers' willingness to pay for mobile slaughtered cattle, pigs, and chickens was investigated for Swedish consumers, and results indicated these consumers were willing to pay more

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for meat from mobile slaughtered cattle and pigs (Carlsson et al., 2007). In that research, the researchers focused on consumers' willingness to pay and preferences for non-market food product quality attributes, but they did not investigate the psychological determinants of consumers' buying behavior regarding MSU meat (Carlsson et al., 2007; Liljenstolpe, 2008). Elucidation of these psychological determinants could be very helpful for producers who are planning to sell MSU meat, because it would enable them to anticipate these determinants in their marketing strategy.

If people cannot refer to their habits and past behavior, their future behavior is guided by intention (Danner, Aarts, & De Vries, 2008). This would also be the case for buying MSU meat, because MSU meat is not yet available on the market in most countries, including the Netherlands. Two theoretical models are used to investigate the main determinants of consumers' intention to buy MSU meat: the theory of planned behavior (TPB) (Ajzen, 1991) and the value belief norm theory (VBN) (Stern, Dietz, Guagnano, & Kalof, 1999). Combined, these two models form the conceptual lens through which we look at consumer decision making regarding MSU meat.

1.1. Theory of planned behavior

According to TPB, people's intention to perform a particular behavior is driven by their attitude, subjective norm, and perceived behavioral control (Ajzen, 1991, 2006). For the current study, this would imply that consumers who have a positive attitude toward buying MSU meat, who perceive support from their surroundings (subjective norm), and who believe in their own ability to buy MSU meat (perceived behavioral control) should have a stronger intention to buy MSU meat (Klößner, 2013; López-Mosquera & Sánchez, 2012).

The theory of planned behavior is applied in a wide range of contexts, such as predicting organic food consumption (Aertsens, Verbeke, Mondelears, & Van Huylenbroeck, 2009). These studies indicate that TPB can be used successfully in predicting food consumption behavior. Meta-analyses suggest that the theory can predict 39 to 42% of the variance in intention (Armitage & Conner, 2001; Godin & Kok, 1996).

1.2. Value belief norm theory

Value belief norm theory, proposed by Stern and associates (Stern et al., 1999; Stern, 2000), links factors in a causal chain to predict pro-environmental behavior (see Fig. 1). As the name of the theory suggests, the causal factors of the behavior are categorized as values, beliefs, and norms. Within these categories, there are different variables, which are briefly explained.

Persons have their *values* in life. These values can vary in importance and can be seen as peoples' desirable goals, which serve as guiding principles in life (Schwartz, 1992). Within VBN theory, three values are presented. *Biospheric values* reflect people's belief that it is worth protecting

nature, that nature has some kind of intrinsic value (Stern et al., 1999; Stern, 2000). *Altruistic values* are expressed concerning the welfare of others, for example their own family, children, or community (Stern, 2000; Stern et al., 1999). *Egoistic values* are those values linked with one's own welfare (Stern et al., 1999; Stern, 2000). It is argued that these egoistic values have a negative association with what is commonly called green consumer behavior, and that altruistic and biospheric values have a positive association with green consumer behavior (De Groot & Steg, 2008; Nordlund & Garvill, 2002). All three values have an impact on the next variable in the causal chain, beliefs.

Within VBN theory, three kinds of *beliefs* are taken into account: (1) the *new ecological paradigm*, the belief that people have the ability to change or affect nature (Dunlap & Van Liere, 1978), (2) the *adverse consequences* for valued objects, people's beliefs in the adverse consequences of not performing pro-social behavior (Han, 2015), and (3) the perceived ability to reduce threat (*ascription of responsibility*), people's belief that their own actions could prevent those consequences from happening.

Ascribed responsibility directly affects the pro-environmental personal norms within the VBN causal chain. *Personal norms* determine whether a person should or should not engage in the behavior in question to prevent the negative outcomes from happening. They reflect people's sense of obligation to act pro-environmentally (Stern et al., 1999).

VBN theory has been used in a range of contexts, such as ecological risk perceptions (Slimak & Dietz, 2006). According to literature reviews, VBN theory explains 19% to 35% of the variance in behavior (Stern et al., 1999; Kaiser, Hübner, & Bogner, 2005).

1.3. The current research

A questionnaire was developed with the aim of testing two models that can identify determinants of Dutch consumers' decision making concerning the purchase of MSU meat. The first is the VBN model (see Fig. 1), the second model being TPB with personal norm added (see Fig. 2). Testing this second model serves two purposes: it allows for testing the conventional TPB model within an MSU meat context, and it allows for investigating the role of personal norm as an additional predictor in the TPB model.

2. Method

2.1. Sample

The relationship between the factors that make up the VBN and TPB models was investigated among members of the general Dutch public. The participants, who were approached via e-mail lists and social network sites, were invited to take part in the research, and they were encouraged to spread the survey among acquaintances in order to increase diversity in the study sample. In total, 525 people opened the

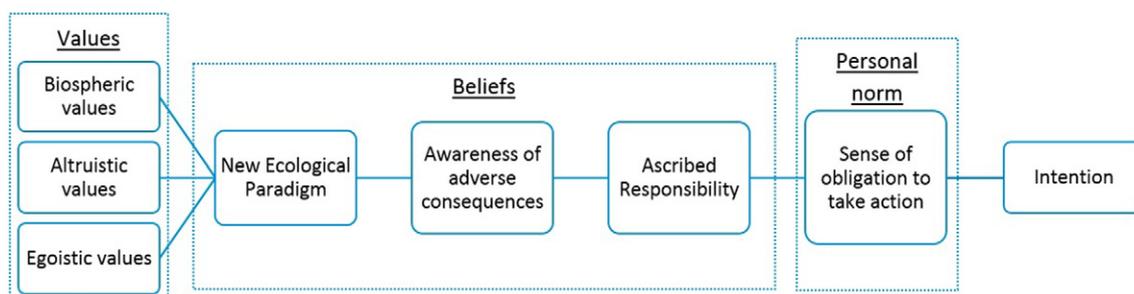


Fig. 1. Conceptual model used to predict intention to buy mobile slaughter unit meat based on the value belief norm theory.

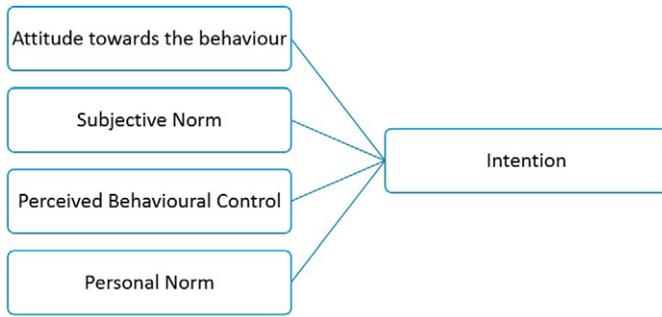


Fig. 2. Conceptual model used to predict intention to buy mobile slaughter unit meat based on the theory of planned behavior extended with personal norm.

questionnaire and answered some or all questions. After removal of 135 incomplete questionnaires and the responses from 61 persons who indicated that they never buy meat, 329 respondents remained and form the sample on which analyses were performed.

2.2. Procedure and measures

At the start of the questionnaire, demographic variables were ascertained and questions about meat consumption were asked, then values and the new ecological paradigm were assessed. Subsequently, the definition of MSU meat was introduced to the participants and the prices per kilogram MSU pork and MSU beef when animals are slaughtered in an MSU and cut in a butchers were presented. These higher costs were based on Lambooij et al.'s (2011) study and were presented as: MSU pork will cost €0.96 per kilogram more than non-MSU pork, and MSU beef will cost €1.31 per kilogram more than non-MSU beef. Furthermore, it was stated that MSU meat is not yet available in the Netherlands, but for some questions, participants were asked to assume that MSU meat is available on the market in the Netherlands, and labeled accordingly. Then the remaining questions pertaining to the VBN and TPB models and to the intention to buy MSU meat were assessed. The questionnaire items were measured on 7-point Likert scales. Unless otherwise stated, the questionnaire items were statements to which respondents could react by indicating their agreement – from ‘completely disagree’ to ‘completely agree’.

Values. Steg, Dreijerink, and Abrahamse's (2005) items were used to measure the three values, and respondents were asked to indicate the importance they attached to a list of value objects. A sample item on the biospheric value scale is ‘preventing pollution’ (1 = very unimportant, 7 = very important; 4 items, $\alpha = 0.89$). The altruistic subscale was also measured with four items (sample item: ‘social justice’; $\alpha = 0.88$), as was the egoistic subscale (sample item: ‘wealth’; $\alpha = 0.78$).

The new ecological paradigm was measured with 15 items on Dunlap, Van Liere, Mertig, and Jones's (2000) revised new ecological paradigm scale. A sample item is ‘humans are severely abusing the environment’ ($\alpha = 0.76$).

Awareness of adverse consequences was measured using Jansson, Marell, and Nordlund's (2011) five items adapted to the present research context ($\alpha = 0.64$). A sample item on this scale is ‘Buying MSU meat will increase the animal welfare of production animals’.

Ascribed responsibility was measured using six adapted items from Ibtissem (2010). A sample item is ‘I am jointly responsible for animal welfare problems’ ($\alpha = 0.72$).

Personal norm was measured with Ibtissem's (2010) six items adapted to the MSU context. Example item: ‘I feel morally obligated to buy MSU meat, regardless of what others do’ ($\alpha = 0.90$).

Attitude toward the behavior was measured with seven semantic differential items; examples: ‘for me buying MSU meat is...‘extremely desirable’ to ‘extremely undesirable’, or ‘extremely bad’ to ‘extremely

good’, or ‘extremely negative’ to ‘extremely positive’ (Kim & Han, 2010). The combined index reached high reliability ($\alpha = 0.94$).

Subjective norm (SN) was measured using three items based on Kim and Han (2010): ‘most people who are important to me think I should be willing to buy MSU meat’, ‘most people who are important to me would want me to buy MSU meat’, and ‘people whose opinions I value would prefer that I buy MSU meat’ ($\alpha = 0.95$).

Perceived behavioral control was measured with two items based on Kim and Han (2010): ‘I am confident that, if I want to, I can buy MSU meat’ and ‘I have the resources, time, and opportunities to buy MSU meat’ ($\alpha = 0.71$).

Intention to buy MSU meat was measured on the basis of Verbeke and Vackier's (2005) three items: ‘The chance of my buying MSU meat when it is available on the market is high’, ‘my willingness to buy MSU meat is strong’, and ‘I am planning to buy MSU meat when it is available on the market’ ($\alpha = 0.96$).

2.3. Overview of data analysis VBN model

The causal chain was regressed onto preceding variables in the causal chain (Steg et al., 2005). Multiple regression analyses were tested in five phases, presented in Table 1. Within each phase, step 1 and step 2 were tested. First, the variable that directly influenced the dependent variable was entered in the regression analysis and formed step 1, and then the remaining variables from the chain were entered in the regression analysis and formed step 2 (see Table 1). In step 2, it was assessed whether additional variance in the dependent variables is explained by the other preceding variables (Steg et al., 2005). Through these multiple comparisons, the chance of a Type I error (false positives) is increased. Therefore, the Bonferroni correction was used; this resulted in a significance level of $P < 0.006$ (0.05 divided by the nine regression analyses).

2.4. Mediation within VBN theory

In the causal chain of the VBN model, it is assumed that (1) personal norm mediates the relationship between ascribed responsibility and intention, (2) ascribed responsibility mediates the relationship between awareness of adverse consequences and personal norm, (3) awareness of adverse consequences mediates the role between the new ecological paradigm and ascribed responsibility, and (4) the new ecological paradigm mediates the role between the three values (biospheric, altruistic, and egoistic) and awareness of adverse consequences. To formally test for mediation, following Jakovcevic and Steg (2013), a bootstrap analysis (Preacher & Hayes, 2004) was employed to test the reduction in the direct effect. This approach involves computing 95% confidence intervals (CIs; 5000 bootstrap resamples) around indirect effects; mediation is indicated by CIs that do not contain zero.

3. Results

3.1. Sample

Most respondents were female (72%), aged 25 or younger (42.2%), or between 26 and 35 years (29.8%). Respondents reported a monthly net income of less than €850 (32%), between €850 and €1700 (25%), or between €1700 and €2550 (21%). In terms of completed education, bachelor of applied sciences (34%) and intermediate vocational education (29%) were most often reported. Almost 47% of the respondents eat meat several times a week and 32% of the respondents eat meat daily. The two main reasons for respondents to buy MSU meat were increased animal welfare (63.5%) and the quality of the meat (18.5%). The price (50.2%) and the doubt about whether animal welfare actually increases (20.1%) were the two main reasons for respondents not to buy MSU meat.

Table 1
Dependent variables and independent variables of Step 1 and Step 2 per phase of the regression analysis of the value belief norm model.

Phase	Dependent variable	Independent variables step 1	Independent variables step 2
1	Intention	Personal norm	Personal norm, Ascribed responsibility, Awareness of adverse consequences, New ecological paradigm, Egoistic values, Altruistic values, Biospheric values
2	Personal norm	Ascribed responsibility	Ascribed responsibility, Awareness of adverse consequences, New ecological paradigm, Egoistic values, Altruistic values, Biospheric values
3	Ascribed responsibility	Awareness of adverse consequences	Awareness of adverse consequences, New ecological paradigm, Egoistic values, Altruistic values, Biospheric values
4	Awareness of adverse consequences	New ecological paradigm	New ecological paradigm, Egoistic values, Altruistic values, Biospheric values
5	New ecological paradigm	Egoistic values Altruistic values Biospheric values	

3.2. Value belief norm model

Means, standard deviations, and correlations of the eight variables in the VBN model are reported in Table 2. To test the causal chain of VBN theory, multiple regression analyses were performed (see Table 3). All models were at a significance level lower than 0.001 and therefore the Bonferroni requirement ($P < 0.006$) is met for all regression analyses. Below, the results per regression analysis are described.

Personal norm was positively associated with intention to buy MSU meat ($\beta = 0.62, P < 0.001$). Personal norm significantly explained 39% of the variance in intention to buy MSU meat ($P < 0.001$). When the other variables further up the causal chain of the VBN model were added, 44% of the variance in intention was explained. Personal norm contributed the strongest to this model, with $\beta = 0.49$ ($P < 0.001$). After personal norm, awareness of adverse consequences explained most of the variance in intention to buy MSU meat ($\beta = 0.21, P < 0.001$), and ascribed responsibility also contributed significantly ($\beta = 0.11, P < 0.05$). The other variables did not show significant relations with intention.

In the next regression analysis (phase 2, step 1), personal norm was the dependent and ascribed responsibility the independent variable. In this model, 40% of the variance in personal norm was explained by ascribed responsibility ($\beta = 0.63, P < 0.001$). When awareness of adverse consequences, new ecological paradigm, egoistic values, altruistic values, and biospheric values were added to the model (step 2), AR still contributed the most to the variance in personal norm ($\beta = 0.40, P < 0.001$). Awareness of adverse consequences ($\beta = 0.32, P < 0.001$), new ecological paradigm ($\beta = 0.16, P < 0.001$), and altruistic values ($\beta = 0.11, P < 0.05$) also explained significant amounts of the variance in personal norm. This model explained 55% of the variance in personal norm ($P < 0.001$).

In phase 3, the dependent variable was ascribed responsibility. Awareness of adverse consequences explained 17% of the variance in ascribed responsibility ($P < 0.001$). The stronger awareness of adverse consequences, the stronger ascribed responsibility ($\beta = 0.41, P < 0.001$). In

step 2 of phase 3, awareness of adverse consequences, new ecological paradigm, egoistic values, altruistic values, and biospheric values were included as the independent variables. In this model, 31% of the variance in ascribed responsibility was explained ($P < 0.001$). The three factors awareness of adverse consequences ($\beta = 0.32, P < 0.001$), biospheric values ($\beta = 0.26, P < 0.001$), and new ecological paradigm ($\beta = 0.21, P < 0.001$) positively affected ascribed responsibility.

Awareness of adverse consequences was the dependent variable in phase 4. In step 1, the independent variable new ecological paradigm ($\beta = 0.20, P < 0.001$) explained 4% of the variance in awareness of adverse consequences ($P < 0.001$). In step 2 of phase 4, the independent variables egoistic values ($\beta = -0.16, P < 0.01$), biospheric values ($\beta = 0.14, P < 0.05$), new ecological paradigm ($\beta = 0.11, P = 0.06$), and altruistic values ($\beta = 0.11, P < 0.08$) accounted for 10% of the variance in awareness of adverse consequences ($P < 0.001$). In the last step, new ecological paradigm was the dependent variable. The independent variables were the three values: biospheric values ($\beta = 0.49, P < 0.001$), egoistic values ($\beta = -0.16, P < 0.001$), and altruistic values ($\beta = -0.14, P < 0.05$), and they explained 21% of the variance in the new ecological paradigm variable ($P < 0.001$).

3.3. Mediation

The results of the bootstrap analyses for indirect effects are presented in Table 4. The predicted mediating roles of personal norm, ascribed responsibility, awareness of adverse consequences, and new ecological paradigm are supported by the bootstrapped estimates, as the value 0 was not included in their 95% confidence intervals. Specifically, and in line with the VBN model, personal norm mediated the relation between ascribed responsibility and the intention to buy MSU meat, and ascribed responsibility mediated the relation between awareness of adverse consequences and personal norm. Furthermore, the results showed the mediating role of awareness of adverse consequences for the relation between new ecological paradigm and ascribed responsibility. The

Table 2
Means, standard deviations, and Pearson correlations among variables of the value belief norm model.

		M	SD	1	2	3	4	5	6	7
1	Biospheric values	5.60	1.01							
2	Altruistic values	5.85	0.95	0.48***						
3	Egoistic values	3.73	1.10	0.13*	0.07					
4	New ecological paradigm	4.86	0.65	0.41***	0.09	-0.11†				
5	Awareness of adverse consequences	4.98	0.87	0.22***	0.18**	-0.15**	0.20***			
6	Ascribed responsibility	4.69	0.96	0.38***	0.13*	-0.11*	0.38***	0.41***		
7	Personal norm	4.51	1.27	0.39***	0.26***	-0.10†	0.41***	0.55***	0.63***	
8	Intention	4.85	1.49	0.21***	0.19***	-0.01	0.17**	0.50***	0.45***	0.62***

† $P < 0.10$.

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

Table 3
Results of regression analyses of the value belief norm model on intention to buy mobile slaughter unit meat.

Phase	Dependent variable	Independent variable	β step 1	β step 2	R ² step 1	R ² step 2	ΔR ²
1	Intention	PN	0.62***	0.49***	0.39***	0.44***	0.05***
		AR		0.11*			
		AC		0.21***			
		NEP		−0.08			
		EV		0.08†			
		AV		0.06			
2	Personal norm	BV		−0.08	0.40***	0.55***	0.15***
		AR	0.63***	0.40***			
		AC		0.32***			
		NEP		0.16***			
		EV		−0.00			
		AV		0.11*			
3	Ascribed responsibility	BV		0.05	0.17***	0.31***	0.14***
		AC	0.41***	0.32***			
		NEP		0.21***			
		EV		−0.07			
		AV		−0.07			
		BV		0.26***			
4	Awareness of adverse consequences	NEP	0.20***	0.11†	0.04***	0.10***	0.06***
		EV		−0.16**			
		AV		0.11†			
		BV		0.14*			
5	New ecological paradigm	EV	−0.16**		0.21***		
		AV	−0.14*				
		BV	0.49***				

Note. PN = Personal norm; AR = Ascribed responsibility; AC = Awareness of adverse consequences; NEP = New ecological paradigm; EV = Egoistic values; AV = Altruistic values; BV = Biospheric values.

† P < 0.10.

* P < 0.05.

** P < 0.01.

*** P < 0.001.

mediated role of new ecological paradigm between the relation of biospheric values and awareness of adverse consequences was found, and also between egoistic values and awareness of adverse consequences. The predicted mediating role of new ecological paradigm for the relation between altruistic values and awareness of adverse consequences could not be established, because this bootstrap analysis did not yield a significant result.

3.4. Theory of planned behavior and personal norm model

Means, standard deviations, and correlations of the TPB model variables and personal norm are reported in Table 5. To test this extended model, a regression analysis was performed that included two steps. In the first step, the conventional TPB variables – attitudes, subjective norm, and perceived behavioral control – were entered. The second

step included the personal norm variable to investigate whether adding this factor from the VBN model could better explain consumers' intentions to buy MSU meat.

Table 6 shows that – in line with the established TPB model – attitudes, subjective norm, and perceived behavioral control were all positively related to intention to buy MSU meat. Furthermore, in step 2, personal norm was added, and this second model showed that all predictors had positive associations with intention to buy MSU meat. Importantly, the increase in explained variance went up significantly (from R² = 0.55 to R² = 0.59). The standardized regression coefficients furthermore indicated that attitude was the most important predictor of intention to buy MSU meat (β = 0.39), followed by personal norm, perceived behavioral control, and subjective norm (βs = 0.24, 0.19, 0.17, respectively).

4. General discussion

To understand consumers' intention to buy MSU meat, two models with a focus on the drivers for behavioral intentions were tested: the value belief norm model and the theory of planned behavior model extended with personal norm. MSU meat is currently not available (yet) on the Dutch market, so in this hypothetical case people cannot refer

Table 4
Bootstrap analysis of indirect relationships.

Independent variable	Mediator	Dependent variable	Indirect effect	SE	95% confidence interval for indirect effect	
					Lower	Upper
AR	PN	IN	0.55***	0.11	0.35	0.77
AC	AR	PN	0.30***	0.06	0.19	0.41
NEP	AC	AR	0.10**	0.04	0.04	0.19
EV	NEP	AC	−0.019†	0.01	−0.06	−0.002
AV	NEP	AC	0.018	0.02	−0.01	0.05
BV	NEP	AC	0.045*	0.02	0.003	0.09

Note. AR = Ascribed responsibility; AC = Awareness of adverse consequences; NEP = New ecological paradigm; EV = Egoistic values; AV = Altruistic values; BV = Biospheric values; PN = Personal norm; IN = Intention.

† P < 0.10.

* P < 0.05.

** P < 0.01.

*** P < 0.001.

Table 5
Means, standard deviations, and Pearson correlations among variables of the extended theory of planned behavior model.

	M	SD	1	2	3	4
1 Attitude	5.00	1.14				
2 Subjective norm	3.53	1.45	0.44***			
3 Perceived behavioral control	5.33	1.29	0.34***	0.24***		
4 Personal norm	4.51	1.27	0.59***	0.50***	0.32***	
5 Intention	4.85	1.49	0.68***	0.51***	0.45***	0.62***

*** P < 0.001.

Table 6

Results of regression analyses of the extended theory of planned behavior model on intention to buy mobile slaughter unit meat.

Step and variables	1	2
1. Attitude	0.50***	0.39***
Subjective norm	0.23***	0.17***
Perceived behavioral control	0.22***	0.19***
2. Personal norm		0.24***
ΔR^2	0.55***	0.03***
R^2	0.55***	0.59***

Note. Standardized regression coefficients are reported.

*** $P < 0.001$.

to their past habits and past behavior (Danner et al., 2008), and therefore consumers' behavior will be guided by intention. The VBN model (Stern et al., 1999) explained 44% of the variance in consumers' intention to buy MSU meat. Support was found for the causal chain in the theory, and the results demonstrated that, when other variables further up the chain were added to the model, the percentage of explained variance increased (Stern et al., 1999; Stern, 2000). Further, in line with work by Steg et al. (2005) evidence was found for the mediating roles of personal norm, ascribed responsibility, and awareness of adverse consequences, but the mediating role of the new ecological paradigm was only partially supported, because it was not observed for the relation between altruistic values and awareness of adverse consequences.

The model based on the theory of planned behavior explained 55% of the variance in Dutch consumers' intention to purchase MSU meat, but it is noteworthy that, when this model was extended with personal norm from VBN theory, 59% of the variance could be explained. The original TPB model does not include moral drivers of behaviors, and VBN does not include non-moral motivations to predict the behavior at stake (Klöckner, 2013). The present research addressed this gap by adding the VBN variable personal norm to the TPB variables, resulting in an extended TPB model with personal norm. Personal norm has already been added to TPB in other research (e.g., Bruijnijis, Hogeveen, Garforth, & Stassen, 2013; Parker, Manstead, & Stradling, 1995; Thøgersen, 2002; Verbeke & Vackier, 2005). Moreover, Thøgersen (2002) used the extended theory successfully to investigate the determinants of purchasing organic and nonorganic red wine, and it has also been shown that adding personal norm leads to an increase in explained variance in intention to act pro-environmentally (Harland, Staats, & Wilke, 1999). This would mean, for the current study, that the extended model can predict more completely consumers' intention to buy MSU meat than TPB and VBN alone can. Given the relatively higher explanatory power of the extended TPB model, this model could be worthwhile to further explore in the context of issues that include aspects of personal norms, such as organic meat consumption, vegetarianism, and cultured meat (cf. Goodwin & Shoulders, 2013).

4.1. Intention to buy MSU meat and explained variance

The VBN and TBP models explained a substantially higher proportion of variance compared to the explained variance in extant research. For VBN studies, this varies between 19 and 35% of the variance in behavior (Kaiser et al., 2005; Stern et al., 1999), and for TPB studies the range is around 39 to 42% (Armitage & Conner, 2001; Godin & Kok, 1996). The observation that the current study explained a higher proportion of variance could lie in the fact that MSU meat is not available on the Dutch market and that therefore consumers might perceive MSU meat as a hypothetical product. Future behavior is strongly guided by people's habits, but, in the current study, consumers could not refer to what they normally do – their habits and past behavior (Danner et al., 2008). Therefore, it is unlikely that consumers have reasons for not intending to buy MSU meat. Furthermore, it is possible that the high positive intention of this study's respondents toward buying MSU meat could lie in the fact that >70% of the respondents were female

and research has shown that females are more conscious than males about their decision making regarding meat consumption (Ruby, 2012; Dagevos, Voordouw, Van Hoeven, Van der Weele, & De Bakker, 2012). Indeed, our results show that women had a slightly higher intention to buy MSU meat, but including gender as a factor did not change the results obtained.

4.2. Environmental concerns and animal welfare concerns

In the current study, the new ecological paradigm did not predict awareness of adverse consequences as strongly as described in earlier work (Kaiser et al., 2005). A reason for this might be that, when it comes to buying MSU meat, animal welfare concerns might weigh more heavily than environmental concerns. There is not such a strong environmental concern about buying MSU meat as can be seen, for instance, about purchasing organic food products (Verhoef, 2005). Although the results showed a small explained variance in awareness of adverse consequences by the new ecological paradigm variable, it might be that the first part of VBN theory, from values to new ecological paradigm and from new ecological paradigm to AC, is not entirely applicable to the context of buying MSU meat.

4.3. Practical implications

The results of this study can be used by actors along the MSU meat value chain. In order to convince consumers to buy MSU meat, producers and retailers should consider the specific drivers of intentions to buy MSU meat in their communication and marketing strategy. Attitude, personal norm, subjective norm, and perceived behavioral control together predicted the highest proportion of consumers' intention to buy MSU meat; however, attitude and personal norm seemed to be the strongest determinants. Therefore, we would recommend focusing on these two determinants in communications with consumers; this can be done by considering some specific aspects. First, provided that such conclusions are supported by additional animal welfare and meat quality studies, communication could focus on some superior features of MSU meat. For example, MSU meat being a product associated with better animal welfare and better meat quality could be two points to make explicit as advantages of MSU meat and could enhance positive attitudes in consumers. So, informing consumers about these possible aspects of MSU meat might contribute to attitude change in consumers, which then could result in actual purchasing behavior. Secondly, MSU meat could be promoted by making it salient that consumers can make a change and that purchasing this MSU meat could be seen as a moral obligation. This can be achieved by making people aware of the consequences of their behavior and of the fact that their purchasing behavior can have an impact on how animal products are produced along the value chain, including transportation practices. MSUs may provide a welfare advantage in terms of eliminating the stress of (long-distance) transport, the stress of loading and unloading onto trucks, and the stress of mixing with unfamiliar animals at the slaughter plant. Furthermore, concerning stunning and sticking MSUs should at least meet animal welfare standards as required for standard slaughter practice. Therefore, it should be required that operators of MSUs must be trained in animal handling and in the correct application of stunning and killing method and in the proper maintenance of equipment. Thirdly, a certification system and quality label for MSU meat could function as a hallmark for consumers at point-of-purchase situations (e.g., supermarkets, specialty shops) by the use of labels (AgriHolland, 2013). This might help consumers to understand the benefits of buying this product; this would help consumers to form their attitude toward the meat and to make a well-considered decision. In the Netherlands, there is for example a quality label called *Beter Leven Keurmerk* (Better Life Trademark) in which one, two, or three stars indicate how the welfare of the production animals was ensured. This animal welfare label has been effective in transforming the production meat market; this

shows that commercial success can coexist with improved welfare for production animals (Dierenbescherming, 2015), and such labeling systems are also widely called for by European citizens (European Commission, 2016).

4.4. Limitations and future directions

As already mentioned, consumers' actual purchasing behavior could not be measured, because MSU meat is currently not available in the Netherlands. Therefore, the association between consumers' intention and their actual behavior could not be assessed. Other studies that investigated the purchase of organic foods showed positive and significant relations between intention and behavior (e.g., Aertsens et al., 2009; Tarkiainen & Sundqvist, 2005).

It is likely that most consumers do not exactly know what an MSU or what MSU meat is – even with the explanation offered in this study's questionnaire. This will expectedly not hold them back to form attitudes about the meat production chain. Indeed, (consumer) behavior often is the result of perceptions and attitudes that are not necessarily based on facts, or having scientific knowledge and expertise (Kaiser & Fuhrer, 2003).

Furthermore, this investigation focused on MSU pork and beef meat and not on other types of MSU meat such as lamb and poultry. Perhaps respondents would have had a different intention toward buying MSU meat of other production animals. Such a species-specific influence on consumers' behavior was observed in a study by Carlsson et al. (2007), where Swedish consumers were willing to pay more for mobile slaughtered pork and beef, but not for MSU poultry meat.

It would be interesting to perform the current research again, once MSU meat becomes available on the Dutch market. In this way, the actual buying of MSU meat and the link between Dutch consumers' intention and behavior can be established, thereby overcoming one limitation of the current study. For this future research, we recommend using the extended TPB model including personal norm, because this model explained the highest proportion of variance in intention to buy MSU meat.

5. Conclusion

Consumers' purchasing decisions of MSU meat can be best explained by an extended TPB that includes attitude, personal norm, subjective norm, and perceived behavioral control. Therefore, we conclude that consumers who have a positive attitude, feel morally obligated to take action, perceive supportive social norms, and believe in their own ability to buy MSU meat have a stronger intention to buy MSU meat.

Appendix A

Values (Steg et al., 2005). BV = biospheric values; AV = altruistic values; EV = egoistic values.

Indicate how important the following values are for you.

(1 = very unimportant; 7 = very important)

Protecting the environment (BV).

Preventing pollution (BV).

Respecting the earth (BV).

Unity with nature (BV).

Social justice (AV).

Helpful (AV).

Equality (AV).

A world at peace (AV).

Authority (EV).

Social power (EV).

Wealth (EV).

Influential (EV).

New ecological paradigm (Dunlap et al., 2000).

Now some statements will follow to get an idea of how you perceive nature. For these statements you have to indicate whether you agree or disagree. Indicate your level of agreement or disagreement to the statements.

(1 = completely disagree; 7 = completely agree)

We are approaching the limit of a number of people the earth can support.

Humans have the right to modify the natural environment to suit their needs.

When humans interfere with nature it often produces disastrous consequences.

Human ingenuity will insure that we do not make the earth unlivable.

Humans are severely abusing the environment.

The earth has plenty of natural resources if we just learn how to develop them.

Plants and animals have as much as right as humans to exist.

The balance of nature is strong enough to cope with the impacts of modern industrial nations.

Despite our special abilities humans are still subject to the laws of nature.

The so-called "ecological crisis" facing humankind has been greatly exaggerated.

The earth is like a spaceship with very limited room and resources.

Humans were meant to rule over the rest of nature.

The balance of nature is very delicate and easily upset.

Humans will eventually learn enough about how nature works to be able to control it.

If things continue on their present course, we will soon experience a major ecological catastrophe.

Awareness of adverse consequences (Jansson et al., 2011).

The next questions will be about your view on MSU meat. Please note! For these questions it is assumed that MSU meat is available on the market in the Netherlands.

Could you indicate to what extent you agree or disagree with the following statements?

(1 = Completely disagree; 7 = Completely agree)

Buying MSU meat will indirectly increase the stress level of production animals.

It is a problem that people do not buy MSU meat.

Buying MSU meat will increase the animal welfare of production animals.

The animal welfare of production animals will improve if we buy more MSU meat.

Low animal welfare is a problem for society.

Ascribed Responsibility (Ibtissem, 2010).

Please indicate below to what extent you agree or disagree with the statements. Please note! For these questions it is also assumed that MSU meat is available on the market in the Netherlands. Please tick the appropriate box which indicates your level of agreement or disagreement to the statements.

(1 = completely disagree; 7 = completely agree)

I am jointly responsible for animal welfare problems.

I feel jointly responsible for the animal welfare problems of production animals.

I feel jointly responsible for the increased stress level of production animals before they got slaughtered.

My contribution to animal welfare problems is negligible.

Not only the government and food industry are responsible for high non-MSU meat consumption, but me too.

In principle, individuals at their own cannot contribute to the increase of animal welfare.

Personal norm (Ibtissem, 2010).

Please indicate below to what extent you agree or disagree with the statements. Could you tick the appropriate box which indicates your level

of agreement or disagreement to the statements? Please note! For these questions it is also assumed that MSU meat is available on the market in the Netherlands.

(1 = completely disagree; 7 = completely agree)

People like me should do everything they can to increase the welfare of production animals.

I feel morally obliged to buy MSU meat, regardless of what others do. If I would buy meat today and MSU meat is available on the market, than I would feel morally obliged to buy MSU meat.

I feel guilty when I buy meat from animals which perceived a high stress level before the animals are slaughtered.

I feel obliged to bear animal welfare in mind in my daily behavior.

I would be a better person if I actively take into account the welfare of production animals.

Attitude (Kim & Han, 2010).

For this question it is also assumed that MSU meat is available in the Netherlands, in for instance a supermarket. Please tick the boxes that are applicable to you. Could you indicate to what extent buying MSU meat fits within the seven scales which are mentioned below?

(7-point Likert scales used)

For me buying MSU meat is:

Extremely undesirable – extremely desirable.

Extremely bad – extremely good.

Extremely unpleasant – extremely pleasant.

Extremely foolish – extremely wise.

Extremely unfavorable – extremely favorable.

Extremely unenjoyable – extremely enjoyable.

Extremely negative – extremely positive.

Subjective norm, perceived behavioral control and intention (Kim & Han, 2010; Verbeke & Vackier, 2005). SN = subjective norm; PBC = perceived behavioral control; I = intention.

Could you indicate below to which degree you agree or disagree with the statements? Please note! For these questions it is also assumed that MSU meat is available on the market in the Netherlands.

(1 = completely disagree; 7 = completely agree)

Most people who are important to me think I should be willing to buy MSU meat (SN).

Most people who are important to me would want me to buy MSU meat (SN).

People whose opinions I value would prefer that I buy MSU meat (SN).

I am confident that if I want to, I can buy MSU meat (PBC).

I have the resources, time and opportunities to buy MSU meat (PBC).

The chance that I buy MSU meat when it is available on the market is high (I).

I am planning to buy MSU meat when it is available on the market (I).

My willingness to buy MSU meat is big (I).

References

- Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. *British Food Journal*, *111*, 1140–1167.
- AgriHolland, B. V. (2013). Dossier keurmerken. Retrieved from <http://www.agriholland.nl/dossiers/keurmerken/home.html>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211.
- Ajzen, I. (2006). Behavioral interventions based on the theory of planned behavior. Retrieved from <http://people.umass.edu/~ajzen/pdf/tpb.intervention.pdf>
- Appleby, M. C., Cussen, V. A., Garcés, L., Lambert, L. A., & Turner, J. (2008). *Long distance transport and welfare of farm animals*. Oxfordshire: CABI.
- Armitage, J. C., & Conner, M. (2001). Society efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*, *40*, 471–499.
- Bruijnijis, M., Hogeveen, H., Garforth, C., & Stassen, E. (2013). Dairy farmers' attitudes and intentions towards improving dairy cow foot health. *Livestock Science*, *155*(1), 103–113.
- Carlsson, F., Frykblom, P., & Lagerkvist, C. J. (2007). Consumer willingness to pay for farm animal welfare: Mobile abattoirs versus transportation to slaughter. *European Review of Agricultural Economics*, *34*, 321–344.
- CBS (2014). Vleesproductie; aantal slachtingen en geslacht gewicht per diersoort. In Statline. Retrieved from statline.cbs.nl/StatWeb/.
- Chambers, P. G., Grandin, T., Heinz, G., & Srisuvan, T. (2001). Guidelines for humane handling, transport and slaughter of livestock. Retrieved from <http://www.fao.org/docrep/003/X6909E/x6909e00.htm>
- Dagevos, H., Voordouw, J., Van Hoeven, L., Van der Weele, C., & De Bakker, E. (2012). *Vlees vooraf (snog) vanzelfsprekend: Consumenten over vlees en vleesmindere*. Den Haag: LEI Wageningen UR.
- Danner, U. N., Aarts, H., & De Vries, N. K. (2008). Habit vs. intention in the prediction of future behavior: The role of frequency, context stability and mental accessibility of past behavior. *British Journal of Social Psychology*, *47*, 245–265.
- De Groot, J. I. M., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, *35*, 347–375.
- Dierenbescherming (2015). BeterLeven Keurmerk. Retrieved from <http://beterleven.dierenbescherming.nl>
- Dunlap, R. E., & Van Liere, K. D. (1978). The new environmental paradigm: A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, *9*, 10–19.
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, *56*, 435–442.
- Eriksen, M. S., Rødbotten, R., Grøndahl, A. M., Friestad, M., Andersen, I. L., & Mejdell, C. M. (2013). Mobile abattoir versus conventional slaughterhouse: Impact on stress parameters and meat quality characteristics in Norwegian lambs. *Applied Behavioral Science*, *149*, 21–29.
- European Commission (2016). *Attitudes of EU citizens towards animal welfare. Special Eurobarometer 442. Wave EB84.4. TNS opinion & social*. Brussels: European Commission.
- Gavinelli, A., Ferrara, M., & Simonin, D. (2008). Formulating policies for the welfare of animals during long distance transportation. *Veterinaria Italiana*, *44*(1), 71–86.
- Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, *11*, 87–98.
- Goodwin, J. N., & Shoulders, C. W. (2013). The future of meat: A qualitative analysis of cultured meat media coverage. *Meat Science*, *95*(3), 445–450.
- Han, H. (2015). Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tourism Management*, *47*, 164–177.
- Harland, P., Staats, H., & Wilke, H. A. M. (1999). Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Psychology*, *29*, 2505–2528.
- Hartung, J., & Springorum, A. C. (2009). Animal welfare and transport. *Welfare of production animals: Assessment and management of risks* (pp. 149–168). Wageningen: Wageningen Academic Publishers.
- Ibtissem, M. H. (2010). Application of value beliefs norms theory to the energy conservation behavior. *Journal of Sustainable Development*, *3*, 30–40.
- Jakovcevic, A., & Steg, L. (2013). Sustainable transportation in Argentina: Value, beliefs, norms and car use reduction. *Transportation Research Part F: Traffic Psychology and Behaviour*, *20*, 70–79.
- Jansson, J., Marell, A., & Nordlund, A. (2011). Exploring consumer adoption of a high involvement eco-innovation using value-belief-norm theory. *Journal of Consumer Behaviour*, *10*, 51–60.
- Johnson, R. J., Marti, D. L., & Gwin, L. (2012). *Slaughter and processing options and issues for locally sourced meat*. US Department of Agriculture, Economic Research Service, LDP-M-216-01 Retrieved from ers.usda.gov/media/820188/ldpm216-01.pdf
- Kaiser, F. G., & Fuhrer, U. (2003). Ecological behavior's dependency on different forms of knowledge. *Applied Psychology. An International Review*, *52*, 598–613.
- Kaiser, F. G., Hübner, G., & Bogner, F. X. (2005). Contrasting the theory of planned behavior with the value-belief-norm model in explaining conservation behavior. *Journal of Applied Social Psychology*, *35*, 2150–2170.
- Kim, Y., & Han, H. (2010). Intention to pay conventional-hotel prices at a green hotel: A modification of the theory of planned behavior. *Journal of Sustainable Tourism*, *18*, 997–1014.
- Klöckner, C. A. (2013). A comprehensive model of the psychology of environmental behavior: A meta-analysis. *Global Environmental Change*, *23*, 1028–1038.
- Knowles, T., & Warriss, P. (2007). Stress physiology of animals during transport. *Livestock Handling and Transport (Chapter 19)*. Oxfordshire: CAB International.
- Knowles, T., Warriss, P., & Vogel, K. (2014). Stress physiology of animals during transport. In T. Grandin (Ed.), *Livestock handling and transport: Theories and applications (4th edition, chapter 21)*. Oxfordshire: CAB International.
- Lambouij, E., Pluister-Jansen, L., Graven, W., Bemelman, Y., & Hoste, R. (2011). *Haalbaarheid mobiel slachthuis en uitsnijderij. Rapport 460*. Lelystad: Wageningen UR Livestock Research.
- Liljenstolpe, C. (2008). Evaluating animal welfare with choice experiments: An application to Swedish pig production. *Agribus*, *24*, 67–84.
- López-Mosquera, N., & Sánchez, M. (2012). Theory of planned behavior and the value-belief-norm theory explaining willingness to pay for a suburban park. *Journal of Environmental Management*, *113*, 251–262.
- Nordlund, A. M., & Garvill, J. (2002). Value structures behind proenvironmental behavior. *Environment and Behavior*, *34*, 740–756.
- Parker, D., Manstead, A. S. R., & Stradling, S. G. (1995). Extending the theory of planned behavior: The role of personal norm. *British Journal of Social Psychology*, *34*, 127–137.

- Preacher, K. L., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36, 717–731.
- Ruby, M. B. (2012). Vegetarianism: A blossoming field of study. *Appetite*, 58, 141–150.
- Schwartz, D. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in experimental social psychology*. Vol. 25. (pp. 1–65). Orlando, FL: Academic Press.
- Schwartzkopf-Genswein, K. S., Faucitano, L., Dadgar, S., Shand, P., González, L. A., & Crowe, T. G. (2012). Road transport of cattle, swine and poultry in North America and its impact on animal welfare, carcass and meat quality: A review. *Meat Science*, 92(3), 227–243.
- Slimak, M. W., & Dietz, T. (2006). Personal values, beliefs, and ecological risk perception. *Risk Analysis*, 26, 1689–1705.
- Steg, L., Dreijerink, L., & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, 25, 415–425.
- Stern, P. C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56, 407–424.
- Stern, P. C., Dietz, T. A., Guagnano, G. A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human Ecology Review*, 6, 81–97.
- Tarkiainen, A., & Sundqvist, S. (2005). Subjective norms, attitudes and intentions of Finnish consumers in buying organic food. *British Food Journal*, 107, 808–822.
- Thøgersen, J. (2002). Direct experience and the strength of the personal norm-behavior relationship. *Psychology and Marketing*, 19, 881–893.
- Verbeke, W., & Vackier, I. (2005). Individual determinants of fish consumption: Application of the theory of planned behavior. *Appetite*, 44, 67–82.
- Verhoef, P. C. (2005). Explaining purchases of organic meat by Dutch consumers. *European Review of Agricultural Economics*, 32, 245–267.
- Vimiso, P., & Muchenje, V. (2013). A survey on the effect of transport method on bruises, pH and colour of meat from cattle slaughtered at a South African commercial abattoir. *South African Journal of Animal Science*, 43, 105–111.