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Extending the theory of planned behavior to examine the role of meat-eater identity: The case of dry-aged beef

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ABSTRACT

Dry-aged beef provides superior qualities and a unique taste experience due to its exceptional sensory attributes, including tenderness, juiciness, and flavor, compared to traditional beef. Our study focused on the factors that impact consumers' intention to consume and willingness to pay for dry-aged beef. We implemented an extended version of the Theory of Planned Behavior (TPB) model that contains a measure of meat-eater identity to analyze the intention to consume and the willingness to pay a premium for dry-aged beef steak that has undergone 21–30 days of aging. An online survey was conducted with a stratified sample of Italian respondents ($n = 944$). The data were analyzed using partial least squares structural equation modeling (PLS-SEM). The TPB's effectiveness was enhanced by adding the meat-eater identity construct to the model. Specifically, it was found that the participants' meat-eater identity significantly influenced their intention to consume. The results also revealed that the most critical impact of identity comes from the mediated influence of attitudes, subjective norms, and perceived behavioral control. Finally, the intention to consume strongly influenced the willingness to pay for a dry-aged beef steak.

1. Introduction

While meat consumption in Europe is decreasing, there is a growing trend towards premium quality beef products like dry-aged beef (StraitsResearch, 2022). This trend is supported by the rising demand in the food service industry, especially in high-end restaurants (Laster et al., 2008). Many food service establishments now offer dry-aged beef as a premium menu item, catering to discerning consumers willing to pay more for a top-quality dining experience. Some of the leading players in Europe's dry-aged beef market include The Butchershop Bar & Grill in the UK, Beefbar in France and Italy, and La Vaca y La Huerta in Spain.

The dry-aging process involves maintaining optimal conditions, such as temperature, humidity, and ventilation, in the refrigerators where the meat is stored (Savell, 2008). Studies have shown that dry aging can improve meat palatability by making it more tender, juicy, and flavorful (Álvarez, Mullen, Hamill, O'Neill, & Álvarez, 2021; Campbell, Hunt, Levis, & Chambers Iv, 2001; Feuz, Umberger, Calkins, & Sitz, 2004; Lancaster et al., 2022; Sitz, Calkins, Feuz, Umberger, & Eskridge, 2006), which are important quality factors for the meat industry to focus on (Schroeder, Tonsor, & Mintert, 2013). The mentioned qualities can enhance how customers view dry-aged beef as a high-quality product, which results in a higher price in the market.

However, dry-aging meat is a more expensive process than wet-aging. The former process implies costs associated with investments in specialized refrigerators, energy costs, and reduced saleable yields (Dashdorj, Tripathi, Cho, Kim, & Hwang, 2016; Smith, Gill, Lunt, & Brooks, 2009). Instead, to achieve wet aging, the meat must only be cut and portioned shortly after slaughter and then vacuum sealed in plastic. This air-tight packaging enables the enzymes present in the muscle to naturally break down connective tissue and fibers, resulting in tenderized meat. Smith et al. (2008) state that dry-aged meat prices should be increased by up to 19% to achieve the same net sales value and margin as wet-aged processed meat. Conversely, developing a more enhanced flavor could make dry-aged meat more attractive to consumers than wet-aged meat (Álvarez et al., 2021; Dashdorj et al., 2016).

This study thoroughly examines the factors influencing consumers' intention to consume and willingness to pay for dry-aged beef. By delving into the psychosocial factors that come into play, we expect to gain valuable insights into how marketers could enhance the

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consumption of dry-aged beef.

Previous studies have widely used the Theory of Planned Behavior (TPB) (Ajzen, 1991) to predict food consumption, including meat consumption (e.g., Carfora, Caso, Sparks, & Conner, 2017; Coker & van der Linden, 2022; Lentz, Connelly, Mirosa, & Jowett, 2018; Wolstenholme, Carfora, Catellani, Poortinga, & Whitmarsh, 2021). However, although TPB has successfully allowed the prediction of intentional and actual behaviors, there was considerable unexplained variance determined by psychological constructs not included in this conceptual framework (Armitage & Conner, 2001). Several studies (Hagger, Anderson, Kyriakaki, & Darkings, 2007; Rise, Sheeran, & Hukkelberg, 2010; Sparks & Shepherd, 1992; Whitmarsh & O'Neill, 2010; Wolstenholme et al., 2021) suggested the importance of dispositional constructs, such as self-identity, in influencing the intention to consume. It has been found that self-identity, i.e. perceptions that can influence intentional behavior and provide guidance when people plan to act (Hagger & Chatzisarantis, 2006), can directly affect the intention to consume. Moreover, some studies have found that self-identity impacts the intention to consume through attitudes, social norms, and perceived behavior control (Whitmarsh & O'Neill, 2010; Wolstenholme et al., 2021).

The concept of self-identity is especially significant when it comes to eating meat (De Boer & Aiking, 2018; Povey, Wellens, & Conner, 2001). Previous studies have shown that identifying as a meat-eater leads to a higher likelihood of intending to consume meat (Povey et al., 2001; Wolstenholme et al., 2021). Therefore, meat-eater identity might help to explain meat consumption as consumers attempt to maintain consistency between their behavior and their self-identity.

To provide a comprehensive understanding of the factors that influence consumers' purchasing behavior towards dry-aged beef, we implement the extended TPB model presented by Wolstenholme et al. (2021) for meat consumption to study the direct impact of meat-eater identity on the intention to consume. Furthermore, we analyze the importance of TPB by studying the indirect effect of an individual's meat identity on the intention to consume through the mediation constructs attitudes, subjective norms, and perceived behavioral control. Finally, we extend the standard TPB model to analyze the impact of intention to consume on the willingness to pay (WTP) for buying dry-aged beef. It should be noted that simply desiring to consume a product does not automatically equate to being willing to pay a higher price for it. This is particularly true when there are alternative choices, such as for meat products. Especially if there are other options available as in case of meat products. To this end, several studies have analyzed the impact of the intention to consume on the willingness to pay for effectively buying a specific product (e.g. Homburg, Koschate, & Hoyer, 2005; Stefani, Romano, & Cavicchi, 2006; Yeh & Hartmann, 2021).

We use Italy as a case study. It has been reported (Coldiretti, 2018) that the average yearly meat consumption per person in Italy has reduced to 79 kg, one of Europe's lowest rates. Furthermore, some studies predict that decreasing consumption will continue (Farchi, De Sario, Lapucci, Davoli, & Michelozzi, 2017; Wolstenholme et al., 2021). Promoting value-added products like aged beef could be a viable solution to tackle this issue and help alleviate the current crisis in the Italian beef market (ISMEA, 2020).

In summary, the current study aimed to explore various psychosocial factors that influence the intention to consume for dry-aged beef, proposing the TPB (Ajzen, 1991), which extend the model to include meat-eater identity and the willingness to pay a premium for a dry-aged beef steak. Our final goal is to understand how psychosocial factors affect the decision to consume and purchase dry-aged beef, with the intent of promoting this value-added product.

The remainder of this paper is organized as follows. Section two reviews TPB studies where this conceptual framework was extended with the meat-eater identity construct. Section three illustrates the conceptual framework implemented in this study. Section four defines the methodological approach used to achieve stated objectives. Section five presents the results of the PLS-SEM estimation. Section six discusses the implications of the results and concludes with some suggestions for future research.

2. Background and theoretical framework

The TPB (Ajzen, 1991) is a widely applied behavioral model that extends the theory of reasoned action (Fishbein, Ajzen, & Belief, 1975). The idea of reasoned action has proposed that the concept of behavioral intention (e.g., "I intend to consume dry-aged beef") mediates the relationship between attitude and actual behavior. Additionally, Fishbein et al. (1975) suggested that social norms play a role in predicting intentions. Attitude pertains to evaluating behavioral outcomes as positive or negative, good or bad, pleasant or unpleasant (e.g., For me, buying dry-aged beef would be good"). Subjective norms, on the other hand, refer to social pressure from significant people, such as family members (such as a spouse, children, or parents), neighbors, or co-workers whose opinion is important for many behaviors (such as "Most of the important people in my life believe that I should eat dry-aged beef"). The TPB introduced a third concept, perceived behavioral control, as a predictor of intentions. According to Ajzen (1991), perceived behavioral control refers to a person's ability to carry out a particular behavior based on non-motivational factors like the availability of resources/technology, time, skills, money, other people's cooperation, and knowledge (for example, "For me, buying dry-aged would be easy"). Thus, TPB provides insights into various psychosocial factors that affect the intention to consume and the actual behavior (see Armitage and Conner (2001) for a review).

2.1. The theory of planned behavior, past behavior, and self-identity

According to various authors, the TPB model needs to be revised because a significant portion of the variance in intentions to consume continues to be unexplained (Armitage & Conner, 2001; Webb & Sheeran, 2006). Ajzen (1991) emphasized the possibility of incorporating additional predictors in TPB to enhance the explained variance in behavioral intention. Some studies have found that one's sense of self-identity, a significant and long-lasting aspect of one's self-perception (e.g., "I think of myself as a 'meat consumer'"), can have a direct influence on the behavioral intention to consume goods or services, even when attitudes, social norms, or perceived behavioral control have been taken into account (Armitage & Conner, 1999; Conner & Armitage, 1998). Accordingly, the self-identity of being a meat-eater will tend to predict intentions above the components of TPB (Hagger et al., 2007; Sparks & Shepherd, 1992; Whitmarsh & O'Neill, 2010).

Nonetheless, there have been concerns regarding self-identity's significance in shaping one's intentions. For instance, self-identity is believed to be linked to behavioral outcomes comparable to affective outcomes that result from behavior (Eagly & Chaiken, 1993), suggesting that attitudes should encompass self-identity's impact on intention.

As a second argument, self-identity may only be a reflection of an individual's past actions and may not have a direct influence on their intention to consume once their past behavior has been considered, Bem (1972).

Rise et al. (2010) proposed a systematic review and meta-analysis to evaluate the role of self-identity in the TPB. According to this study, an individual's self-identity directly and significantly influences the intention to consume, even considering the TPB constructs. In addition, and unlike Bem (1972)'s idea, the impact of self-identity on the intention to consume increases when past behavior has been included in the analysis.

Self-identity may also affect intentions to consume indirectly by influencing attitudes, perceptions of control, and subjective norms (Bellec et al., 2010; Cadel, 2013; Hagger et al., 2007). The argument is that those with a strong sense of self-identity are more likely to have positive attitudes, stronger feelings of control, and a greater sense of social pressure to perform the appropriate behavior. Further, personality traits may affect behavioral intentions by influencing TPB constructs

(Rise et al., 2010).

As previous studies have shown, the concept of identity is crucial in meat-eating behavior (e.g., De Boer & Aiking, 2018; Povey et al., 2001; Wolstenholme et al., 2021). Meat identity refers to how individuals identify with meat consumption, either as a core part of their identity or as a reflection of their values and beliefs. For example, Piazza et al. (2015) have introduced the concept of 4Ns, i.e., the belief that eating meat is natural, normal, necessary, and nice. This belief has been shown to be deeply ingrained in many cultures and societies (Hopwood, Piazza, Chen, & Bleidorn, 2021). People who strongly identify with meat consumption are more likely to believe in the 4Ns and see meat as an essential part of their diet and lifestyle. They may also be more resistant to changing their meat consumption habits, despite evidence that a plant-based diet can be just as healthy and satisfying.

2.2. Willingness to pay for dry-aged beef

Few studies have analyzed the willingness to pay for dry-aged beef (Berger et al., 2018; Feuz et al., 2004; Laster et al., 2008; Ortez, Widmar, Thompson, & Kim, 2022; Sitz et al., 2006). According to Berger et al. (2018), 26% of respondents had previous experience with dry-aged beef. Furthermore, 77.5% of participants viewed aging as a positive term. However, only 19% of the sample group of respondents were willing to pay an extra US$ 3.00 per 0.45 kg for dry-aged beef. According to Laster et al. (2008), 34% of the participants had consumed dry-aged beef in the past, and an equivalent percentage of respondents were willing to spend an additional US$ 4.88 per 0.45 kg for dry-aged beef; Sitz et al. (2006) reported an average willingness to pay a premium of US$ 2.02 per 0.45 kg, and Feuz et al. (2004) indicated the lowest extra bid (US$ 0.33 per 0.45 kg) for a dry-aged steak.

Various authors (e.g., Chong et al., 2019; McCallum, Cerroni, Derbyshire, Hutchinson, & Nayga, 2022; Nocella, Wu, & Cerroni, 2023) have highlighted the importance of psychological factors in influencing consumers' willingness to pay for different products. However, none of the prior research has specifically examined the potential effects of psychological factors on the willingness to pay for dry-aged beef. Feuz et al. (2004) and Ortez et al. (2022), who stands as the only exceptions, focused only on the impact of sensory qualities on the price of dry-aged beef. Their findings revealed that tenderness and flavor analysis were the primary factors influencing the amount people were willing to pay.

3. The present study

Based on the literature reviewed above, the study aimed to investigate how TPB constructs, attitudes, perceived behavioral control, subjective norms, and the meat-eater identity affect individuals' intention to consume and willingness to pay for a dry-aged beef steak. Specifically, with respect to meat-eater identity, our aim is to contribute to existing literature by examining its direct and indirect roles in predicting people's intentions to consume and buy dry-aged beef. In synthesis, by establishing potential differences in the psychosocial factors associated with intentions to consume and buy dry-aged beef, we would like to contribute towards a greater understanding of how to promote a value-added product like aged beef.

After considering the TPB and reviewing prior research (e.g. Carfora et al., 2017; Povey et al., 2001; Wolstenholme et al., 2021), we hypothesized that attitudes, subjective norms, perceived behavioral control, and meat-eater identity would positively predict intentions to consume dry-aged beef (Hypothesis 1 – H1). Following Wolstenholme et al. (2021) and Ajzen (2004), we used the reflective (direct) measures for attitudes, social norms and perceived behavioral control. Considering the importance of meat-eater identity in potentially explaining intention to consume dry-aged beef (Armitage & Conner, 2001; Rise et al., 2010; Wolstenholme et al., 2021) we expected an improvement in the model's capacity to predict the intention of consuming dry-aged beef (Hypotheses 2 – H2).

We also hypothesized that meat-eater identity would positively influence the TPB variables: attitudes, subjective norms, and perceived behavioral control (Hypothesis 3 – H3) as well as having a significant positive indirect effect on intention to consume dry-aged beef through each of these variables (Hypothesis 4 – H4), (Wolstenholme et al., 2021). The previous hypothesis was consistent with research showing that identity can influence the formation of attitudes, subjective norms, perceived behavioral control, and subsequent behavioral intentions as individuals strive to maintain consistency between their identity and actions (Hagger et al., 2007; Wolstenholme et al., 2021). We hypothesized that previous experience in consuming dry-aged meat can significantly and positively influence the behavioral intention also when meat-eater identity is also considered in the analysis, (Rise et al., 2010), (Hypothesis 5 – H5). Finally, we hypothesized that intention to consume significantly and positively predicts the willingness to pay a premium for a dry-aged beef steak, (Hypothesis 6 – H6).

Many of previous hypotheses can be assessed by evaluating the signs and significance of the path coefficients. However, we also investigate the acceptability of the extended structural model where meat-eater identity influences directly and indirectly through attitude, subjective norms, and perceived behavioral control the intention to consume dry-aged beef, against two competing and more parsimonious models. The first model was the traditional TPB model, with attitude, subjective norms, and perceived behavioral control as predictors of intention to consume dry-aged beef. A further model expanded the previous one to consider how past consumption experience influences the intention to consume. Information selection criteria proposed by (Sharma, Sarstedt, Shmueli, Kim, & Thiele, 2019) allowed this analysis.

4. Materials and methods

4.1. Sample and procedure

The study was conducted, with the ethical approval of the University of Sassari, using an online questionnaire created on the Qualtrics platform and distributed through a private agency. The survey was piloted in October 2022 with 100 respondents and concluded from 3rd November 2022 to 10th November 2022. The sample of respondents was stratified by age, education level, gender, and area of residence to reflect the distribution of the Italian population. The final number of collected questionnaires was 1254, representing adults residing throughout Italy, with 48% in the North, 31% in the South and Islands, and 21% in the Centre of Italy. Inclusion criteria were applied to guarantee that only meat-eaters were included in the analysis. Specifically, individuals who responded positively to the statement, “I am a person who likes to eat meat,” were considered eligible. Out of the total sample, 310 questionnaires (24.7%) were excluded due to a negative response to the previous question. As a result, the final number of participants was 944.

4.2. Survey design and measures

The questionnaire used in this research was divided into four sections. The first section introduced the participants to the research objectives and the dry-aging beef procedure. The second section used nominal and ordinal scales to measure variables related to the respondents' socioeconomic characteristics, such as gender, education, age, and income level. The third section consisted of questions about meat-eater identity and constructs pertaining to the TPB model, attitudes, subjective norms, perceived behavioral control, and intention to consume dry-aged beef. The final section concentrated on the willingness to pay questions.

TPB constructs and meat-eater identity cannot be quantified directly (Straub, Boudreau, & Gefen, 2004). Indirect quantification of them is possible by observing and measuring specific indicators using scaling methods (Gefen, Straub, & Boudreau, 2000). To gather information about the participants' attitudes on consuming aged beef, a five-point

Likert-type scale was utilized. The scores ranged from "Strongly disagree" with a value of 1 to "Strongly agree" with a value of 5 (see Table 2 for the frequency of responses and mean and standard deviation of scores).

Below, we introduce the measures used in the present study.

4.2.1. Meat-eater identity

The meat-eater identity was measured by four items adapted from (Blake, Bell, Freedman, Colabianchi, & Liese, 2013). These items focused on the respondents' pleasure in consuming meat at each meal, cooking meat, trying new types of meat, and their opinion regarding the importance of meat consumption on one's health.

4.2.2. Attitude

Attitude was measured by six items. Participants were asked to rate the taste, juiciness, tenderness, digestibility, origin, price, and color of aged meat based on previous literature on consumer attitudes towards meat eating (Richardson, MacFie, & Shepherd, 1994).

4.2.3. Subjective norms

Three items were examined to gauge subjective norms: the respondent's perception of the increase in the consumption of dry-aged beef among the people close to her/him, the participant's perception that most people think of dry-aged beef as a premium quality product, and how happy their families would be if they consumed aged beef, The items were adapted from Wolstenholme et al. (2021).

4.2.4. Perceived behavioral control

The perceived behavioral control construct was evaluated through three items: the ability to find butcher shops selling dry-aged beef, the availability of time to purchase it, and the willingness to buy it despite others' opinions.

4.2.5. Intention to consume

The intention to consume dry-aged beef was measured through three statements: the desire to consume the product, purchasing it from specialized butchers, and recommending it to others for regular consumption.

4.2.6. Willingness to pay

To assess the monetary value people place on dry-aged beef, the participants were surveyed about their willingness to pay a higher price per kilogram for a steak aged for at least 21–30 days, compared to a conventional cut sold just 3–5 days after slaughter. A payment card technique (Mitchell & Carson, 1981) was used to accomplish this task. Participants were provided various offers ranging from 0.0 euros to 20 euros or higher and were requested to select the maximum premium price they would be willing to pay. The range of bids was established during the survey's preliminary pilot stage.

Finally, we used a dichotomous variable to investigate whether respondents had previously consumed dry-aged beef.

4.3. Statistical analysis

Structural equation modeling (SEM) was employed to estimate the extended TPB model using Smart-PLS4 software (Ringle, Wende, & Becker, 2022). Other research has utilized the SEM approach to analyze the TPB model (e.g., Cooper, Barkatsas, & Strathdee, 2016; Dunn, Mohr, Wilson, & Wittert, 2011; Sabbagh, Gutierrez, Lai, & Nocella, 2023; Zhang, Huang, Yin, & Gong, 2015). SEM is a type of multivariate analysis that combines factor and path analysis (Garson, 2015).

In this study, we used the type of SEM that focuses on theory development and prediction, known as PLS-SEM. The specification of PLS-SEM involves two steps. The first step requires defining the latent variables in terms of the outline indicators by specifying measurement models. This task reflects a principal component approach where the factor loadings are estimated to assess the relative importance of the latent variable's variance, and the principal factor indicator is computed. If the factor loadings are higher than 0.70, it can be concluded that the latent variable is reliable (Chin, 1998; Garson, 2013; Hair, Risher, Sarstedt, & Ringle, 2019). However, an accepted significance threshold is also a factor loading >0.50 (Hair, Black, Babin, & Anderson, 2013). The variance inflation factor (VIF) is used to determine the presence of collinearity both between constructs and between items (i.e for the outer and for the inner model). VIF values should not exceed 3 to reject concerns of collinearity (Hair et al., 2019). When assessing the consistency and reliability of a group of items, Cronbach's alpha (Cα) and Composite Reliability (CR) measures were used. There is a large literature over the acceptability of the values of the two measures. A common interpretation for Cα is that values between 0.5 and 0.7 are reported as acceptable (moderate) reliability and values higher than 0.7 for good reliability (Taber, 2018). Acceptable values for CR are those that exceed 0.7. To assess the convergent validity of each latent indicator, we use the average variance extracted (AVE). Values >0.50 show that the variable describes at least 50% of the variance of its items (Hair, Black, Babin, & Anderson, 2010; Henseler, Ringle, & Sinkovics, 2009). AVE statistics are also helpful in testing the discriminant validity of each construct. The HeteroTrait-MonoTrait ratio indicator (HTMT) has been used for further analysis of the discriminant validity of each construct (Henseler, Ringle, & Sarstedt, 2015). If the value is <0.90, it is still acceptable (Hair et al., 2019; Hair, Hult, Ringle, & Sarstedt, 2022; Henseler et al., 2015).

In the process of PLS-SEM analysis, the second step involves estimating and testing the structural model. The main goal of this step is to examine the links between the variables in the model and evaluate the theoretical relationships (Hair et al., 2013).

As introduced in section 3, we assessed the acceptability of the extended structural model (Model 3) against two competing models. The first was the traditional TPB model (Model 1), with attitudes, subjective norms, and perceived behavioral control as predictors of intention to consume dry-aged beef. In Model 2, Model 1 was expanded to consider how previous consumption experience influences the intention to consume.

To achieve the objective, we utilized various information selection criteria proposed by (Sharma et al., 2019) within the PLS-SEM framework. Specifically, Sharma et al. (2019) presented two sets of model selection criteria. The first set selects a model that closely resembles the unknown true model responsible for generating the observed data, which in turn establishes the correlation patterns between the variables of importance. The relevant criteria in this set are Akaike's final prediction error (FPE), Akaike information criterion (AIC), corrected AIC (AICc), and unbiased AIC (AICu). Using AIC-type criteria has a key advantage in that it enables the comparison of different models based on how far they are from the actual true model without needing to know the exact distance. The model that displays the lowest value according to these criteria will be chosen.

The second set of criteria for selecting a model aims to determine its accuracy and choose the one with the highest probability of being right based on the available data. These criteria are known as asymptotically consistent, which indicates that as the sample size increases, the criteria will suggest the true model with a probability approaching unity. Such criteria are Schwarz's Bayesian information criteria (BIC), Hannan and Quinn's criteria (HQ), and corrected HQ (HQc). As before, a researcher will select the model with the smallest value on these criteria.

5. Results

The demographic and socioeconomic characteristics of the participants are presented in Table 1. Most participants were female (mean = 0.48, standard deviation = 0.16) and aged between 45 and 60 years old.

Educational level was categorized as either having a degree lower than a high school diploma, having a high school diploma, or having a university diploma. Results showed that most participants had a high

Table 1
Descriptive statistics of the socioeconomic variables.

Socio-economic variables	Response scale	Sample (*N = 944*)	
		Mean	Std. Dev.
Age	0: 18–49 years 1: 50–64 years 2: >65 years	0.97	0.03
Gender	0: Female 1: Male	0.48	0.16
Educational level	0: Lower than a high school diploma 1: High school diploma 2: University degree	1.02	0.02
Income level	0: <10,000 1: 10,000–20,000 2: 20,000–30,000 3: 30,000–40,000 4: 40,000–50,000 5: >50,000	2.25	0.05
Number of family members	Number	2.80	0.04
Household's weekly quantity of meat consumption (Kg)	Number	2.34	0.06
Household's frequency of meat consumption	0: Never 1: 1 time a week 2: 2 times a week 3: 3 times a week 4: 4 times a week 5: 5 times a week 6: 6 times a week 7: All days	3.39	0.05

school diploma and an annual income between 20,000 and 40,000 euros. The average family size was less than three people ($\mu = 2.80$, $\sigma = 0.04$), and on average, the respondent consumed 2.34 Kg of meat per week ($\mu = 2.43$, $\sigma = 0.06$), which amounts to an average annual meat per capita consumption of about 44 Kg. Lastly, 45% of the participants reported previous experience with aged meat consumption ($\mu = 0.45$, $\sigma = 0.16$).

5.1. The measurement model

There are no collinearity issues since all values of VIF for the outer (i.e. between constructs) as for the inner model (i.e. between items) are lower than 3, (Hair et al., 2019). Specifically, the VIF values range between 1.00 and 1.82 for the outer model and from 1.00 to 2.15 for the inner model.

As reported in Table 2, the standardized item loadings of all observed indicators on their corresponding latent constructs ranged from 0.50 to 0.82, thus being acceptable, (Field, 2018).

Observing the frequency distribution of meat-eater identity scores, respondents seem to prefer meat in their daily diet. Further, the data suggests they enjoy cooking and trying different types of meat and believe it to be an essential part of a healthy diet. Concerning attitude, respondents believed that dry-aged beef has a better taste, is juicier, softer, and more easily digestible than conventional meat. The darker color of the dry-aged meat did not deter their purchasing decision, and they thought that a higher price was justified for dry-aged beef.

Concerning subjective norms, the participants were neutral on whether they noticed an increase in the consumption of dry-aged beef among their acquaintances or if most people thought that aged beef was of better quality. Finally, their families would be pleased in case respondents purchased dry-aged beef.

When it comes to perceived behavioral control, the participants believed they had enough time to purchase dry-aged meat and were inclined to do so, irrespective of others' viewpoints. Nonetheless, they were uncertain about the specific butchers from whom they could procure this type of meat.

Concerning the intention to consume, the participants expressed their desire to buy dry-aged beef in the future, primarily from specialized butchers. They also planned to recommend others to try dry-aged beef. Approximately 45% of participants reported having prior experience with dry-aged beef.

Regarding the amount individuals are willing to pay, the study found that the maximum premium for 1 kg of dry-aged steak aged 21 to 30 days is 3.0 euros. Of all the respondents, 37% declined to pay any premium, while the remaining 598 respondents had an average willingness to pay of euro 4.7 per kilogram of dry-aged steak. The distribution of willingness to pay is illustrated in Fig. 1.

We evaluated the Composite Reliability (CR) and Cronbach's alpha (Cα) to determine construct reliability. According to the results in Table 3, the CR for each variable was above the accepted threshold levels. Values of Cα ranged from moderate to good acceptability (Taber, 2018). We assessed convergent validity using the Average Variance Extracted (AVE), which showed that the AVE values for each construct are higher than the threshold of 0.5, indicating convergent validity.

All HTMT values are below the 0.8 threshold, indicating no correlation issues (values below 0.8 were also detected for the inner model variables, which have not been included for brevity but are available upon request).

5.2. Estimation results – structural model

The results of the PLS-SEM estimation are presented in Table 4. We used the bootstrapping technique (Streukens & Leroi-Werelds, 2016) with 10,000 iterations to calculate standard errors of estimates.

Based on the analysis of Model3, it was found that TPB constructs significantly influenced the intention to consume dry-aged beef. Specifically, the participants' attitude ($\beta = 0.35$; $p < 0.001$), perceived behavioral control ($\beta = 0.26$; $p < 0.001$), and subjective norms ($\beta = 0.22$; $p < 0.001$) played a significant role in predicting the intention. Further, meat-eater identity contributed positively and significantly ($\beta = 0.08$; $p < 0.001$). Thus, according to the findings, H1 was supported, suggesting that the intention to consume dry-aged beef was linked to attitude, subjective norms, perceived behavioral control, and meat-eater identity. Previous experience of dry-aged beef consumption, which resulted significantly in impacting the intention to consume ($\beta = 0.11$; $p < 0.01$), supporting hypothesis H5.

Additionally, H3 was also supported, because meat-eater identity had a significant positive effect on attitude ($\beta = 0.29$; $p < 0.001$; $R2 = 0.09$) and perceived behavioral control ($\beta = 0.29$; $p < 0.001$; $R2 = 0.09$) and subjective norms ($\beta = 0.27$; $p < 0.001$; $R2 = 0.07$).

Respondents' intention to consume strongly influences the willingness to pay for dry-aged beef ($\beta = 0.35$; $p < 0.001$; $R2 = 0.14$), supporting hypothesis H6. The results also highlight that education ($\beta = 0.09$; $p < 0.001$) and income ($\beta = 0.06$; $p < 0.05$) influence the willingness to pay for dry-aged beef, with more educated and wealthier consumers being more likely to pay more. Other sociodemographic variables such as gender, age, or region of residence were found not significant and not included in the final estimation of the model.

The hypothesis H4 was tested looking at the indirect impact through attitude, subjective norms, and perceived behavioral control on intention to consume dry-aged beef. Table 5 summarizes the direct and indirect impacts of the meat-eater identity variable on the intention to consume dry-aged beef.

The identity of being a meat-eater significantly impacts the desire to consume dry-aged beef and the critical impact comes from the mediation of the TPB's construct attitude, subjective norms, and perceived behavioral control ($\alpha = 0.24$, $p < 0.001$). Attitudes were found to have the most significant impact ($\alpha = 0.08$, $p < 0.001$), with perceived behavioral control and subjective norms following closely behind. The results showed that meat-eater identity directly and significantly impacts intentions ($\alpha = 0.09$, $p < 0.001$), even after considering past experiences consuming dry-aged meat. After combining the indirect and

Table 2
Descriptive statistics of the dry-aged beef items and latent components.

Dry-aged meat items and latent components	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Loading	Sample (*N = 944*)	
							Mean Score	*Std. Dev.*
Meat-eater Identity (MI)							3.54	0.58
I am a person who likes to consume a small quantity of meat at every meal	48 (5.08%)	259 (27.44%)	292 (30.93%)	301 (31.89%)	44 (4.66%)	0.56	3.04	0.87
I am a person who likes to cook meat	21 (2.22%)	49 (5.19%)	175 (18.54%)	493 (52,22%)	206 (21.82%)	0.59	3.86	0.89
I am a person who likes to taste new types of meat	15 (1.59%)	68 (7.20%)	200 (21.19%)	467 (49.47%)	194 (20.55%)	0.75	3.80	0.90
I am a person who thinks that meat consumption is essential for one's health	18 (1.91%)	74 (7.84%)	269 (28.50%)	466 (49.36%)	117 (12.39%)	0.63	3.62	0.84
Attitude (ATT)							3.42	0.67
I prefer to eat dry-aged beef as it is tastier than conventional meat	41 (4.34%)	75 (7.94%)	394 (41.74%)	312 (33.05%)	122 (12.82%)	0.81	3.42	0.96
I prefer to eat dry-aged beef as it is juicier than conventional meat	44 (4.66%)	86 (9.11%)	372 (39.41%)	345 (36.55%)	97 (10.28%)	0.69	3.39	0.95
I prefer to eat dry-aged beef as it is softer than conventional meat	32 (3.39%)	73 (7.73%)	301 (31.89%)	379 (40.15%)	159 (16.84%)	0.77	3.59	0.97
I prefer to eat dry-aged beef as it is more digestible than conventional meat	41 (4.34%)	70 (7.42%)	389 (41.21%)	334 (35.38%)	110 (11.65%)	0.69	3.43	0.94
The darker color of the dry-aged beef does not influence my purchase choice	65 (6.89%)	173 (18.33%)	300 (31.78%)	312 (33.05)	94 (9.96%)	0.60	3.21	1.07
I believe that a higher price for dry-aged beef is justified	36 (3.81%)	89 (9.43%)	265 (28.07%)	455 (48.20%)	99 (10.49%)	0.61	3.52	0.94
Subjective Norms (SN)							3.11	0.65
I have noticed an increase in the consumption of dry-aged beef among the people close to me	100 (10.59%)	225 (23.83%)	459 (48.62%)	139 (14.72%)	21 (2.22%)	0.57	2.74	0.91
People close to me think that dry-aged beef has a better quality	41 (4.34%)	100 (10.59%)	461 (48.83%)	289 (30.61%)	53 (5.61%)	0.76	3.23	0.87
My family would be happy if I bought dry-aged beef	26 (2.75%)	109 (11.55%)	452 (47.88%)	282 (29.87%)	75 (7.94%)	0.85	3.36	0.91
Perceived Behavioral Control (PBC)							3.39	0.71
I have the time to buy dry-aged beef	35 (3.71%)	94 (9.96%)	365 (38.67%)	361 (38.24%)	89 (9.43%)	0.81	3.40	0.92
I know butchers where I can buy dry-aged beef	114 (12.08%)	220 (23.31%)	263 (27,86%)	260 (27.54%)	87 (9.22%)	0.56	2.99	1.66
I can decide to buy dry-aged beef regardless of what others think	26 (2.75%)	40 (4.24%)	224 (23.73%)	482 (51.06%)	172 (18.22%)	0.77	3.79	0.89
Intention to Consume (IC)							3.34	0.49
I intend to purchase dry-aged beef in the future	52 (5.51%)	67 (7.10%)	351 (37.18%)	384 (40.68%)	90 (9.53%)	0.82	3.41	0.95
I will go to specialized butchers to purchase dry-aged beef	47 (4.98%)	108 (11.44%)	334 (35.38%)	343 (36.33%)	112 (11.86%)	0.81	3.39	1.00
I will recommend that other people consume dry-aged beef regularly	57 (6.04%)	102 (10.81%)	424 (44.92%)	287 (30.40%)	74 (7.84%)	0.81	3.23	0.96

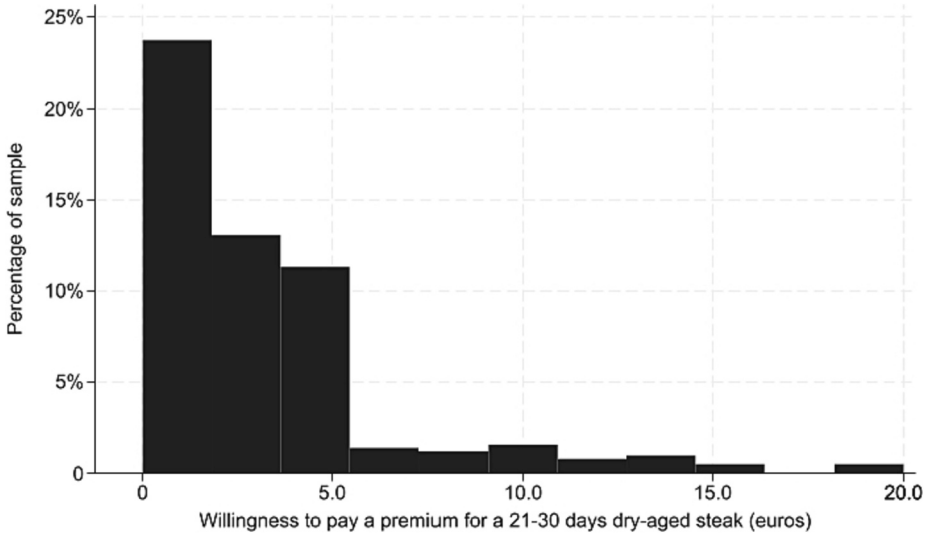

Fig. 1. Willingness to pay distribution.

Table 3
Reliability and validity measures: Constructs Composite Reliability (CR), Cronbach's alpha (Cα), and Average Variance Extracted (AVE).

	CR	Cα	AVE
MI	0.73	0.52	0.51
ATT	0.85	0.79	0.52
SN	0.77	0.56	0.54
PBC	0.76	0.52	0.52
IC	0.86	0.75	0.67

Note: MI: meat-eater identity; ATT: attitudes; SN: subjective norms; PBC: perceived behavioral control; IC: intention to consume;

Table 4
Structural models with path coefficients and statistics: Extended TPB model and nested TPB models.

Variables	Model 1	Model 2	Model 3
Intention to consume dry-aged beef (IC)			
Attitude (ATT)	0.37*	0.36*	0.35*
Subjective norms (SN)	0.24*	0.23*	0.22*
Perceived behavioral control (PBC)	0.28*	0.27*	0.26*
Past dry-aged meat consumption (PE)		0.10***	0.11***
Meat-eater identity (MI)			0.08*
R-square adj.	0.54	0.57	0.58
FPE	0.449	0.435	0.426
AIC	−756.5	−786.1	−795.3
AICu	−752.5	−781.1	−789.3
AICd	181.5	149.9	137.7
BIC	−737.1	−761.8	−766.2
HQ	−749.1	−776.8	−784.3
HQc	−749.0	−776.7	−784.1
Attitudes (ATT)			
Meat-eater identity (MI)			0.29*
R-square adj.			0.09
Subjective norms (SN)			
Meat-eater identity (MI)			0.27*
R^2 Adj.			0.07
Perceived behavioral control (PBC)			
Meat-eater identity (MI)			0.29*
R-square adj.			0.09
Willingness to pay for dry-aged beef (WTP)			
Intention to consume (IC)	0.35*	0.35*	0.35*
Education (EDU)	0.09*	0.09*	0.09*
Income	0.06***	0.06***	0.06***
R-square adj.	0.14	0.14	0.14

Note: * $p < 0.001$; ** $p < 0.01$; *** $p < 0.05$;

Table 5
Specific and total indirect and direct impacts of meat-eater identity on intention to consume dry-aged beef, Model 3.

Path	Impact	*p*-values
	α	
Specific Indirect Impact		
MI → ATT → IC	0.10	0.00
MI → PBC → IC	0.08	0.00
MI → SN → IC	0.06	0.00
Total indirect impact		
MI → IC	0.24	0.00
Direct impact		
MI → IC	0.08	0.00
Total direct and indirect impact		
MI → IC	0.32	0.00

Note: MI: meat-eater identity; IC: intention to consume; ATT: attitudes; PCB: perceived behavioral control; SN: subjective norms;
α: indirect or direct impact estimated coefficients.

direct effects of the meat-eater identity, it was found that the total impact ($\alpha = 0.30$, $p < 0.001$) was mainly due to the indirect effects, which accounted for over two-thirds of the total impact.

Finally, we tested hypothesis H2 about the importance of meat-eater identity to improve the prediction of the intention to consume dry-aged beef using the information criteria proposed by (Sharma et al., 2019) for PLS-SEM models. The results are presented in Table 4. According to the distance-based and consistent criteria (FPE, AIC, AICu, AICd, BIC HQ, HQc), the extended model (Model 3), which includes meat-eater identity, was the best model. This suggests that the meat-eater identity significantly influences the intention to consume dry-aged beef, supporting hypothesis H2.

6. Discussion and conclusions

As meat consumption declines in Italy (Coldiretti, 2018; Farchi et al., 2017; Wolstenholme et al., 2021), it becomes necessary for the meat industry to prioritize quality-added-value products such as dry-aged beef. To effectively market dry-aged beef, it is essential to have a thorough understanding of the psychological, social, and economic factors that drive its consumption and willingness to pay. Our research underscores the importance of the extended Theory of Planned Behavior model, considering meat-eating identity and previous experiences of dry-aged beef consumption in predicting intentions and willingness to pay.

Meat-eater identity directly and positively impacted the intention to consume dry-aged beef. Moreover, meat-eater identity affected intentions to consume indirectly by influencing attitudes, perceptions of control, and subjective norms. These results strengthen the suitability of self-identity within the TPB model (Armitage & Conner, 1999; Conner & Armitage, 1998; Rise et al., 2010) and explicitly support the importance of considering meat-eater identity when examining a person's intention to consume dry-aged beef. The significance of meat-eater identity remains strong in influencing the intention to consume, even when previous experiences with the consumption of dry-aged beef were considered. The last result allows us to reject the theory that meat-eater identity may only reflect an individual's past consumption and may not directly influence their intention to consume (Bem, 1972).

The results did not reject the H1 hypotheses, indicating that attitudes, subjective norms, and perceived behavioral control significantly influence individuals' intention to consume dry-aged beef. Thus, our results support the findings of previous studies (Menozzi, Sogari, & Mora, 2015; Shah Alam & Mohamed Sayuti, 2011) regarding the relevance of the TPB model in elucidating the intention to consume.

Ranking the path coefficients of attitudes, subjective norms, and perceived behavioral control, it emerges that attitudes have the most significant influence on the respondents' behavioral intention towards consuming dry-aged beef. Attitude towards consuming dry-aged beef is perceived to have superior sensory qualities compared to conventional meat, confirming the results of other studies that found meat consumption is strongly associated with a rational evaluation of its sensory properties (Kubberød, Ueland, Tronstad, & Risvik, 2002). Fishbein et al. (1975) stated that attitude could be altered through persuasive messages that may change the perceived likelihood of the expected outcomes from a behavior, introduce new relevant outcomes, and modify the evaluation of those outcomes. Thus, meat companies might provide communication messages highlighting the connection between the sensory qualities of dry-aged beef and the identity of meat lovers who enjoy trying new types of meat. This initiative can create awareness and increase a person's knowledge of the qualities related to dry-aged beef.

The results indicated that perceived behavioral control influences one's intention to consume dry-aged beef. Previous studies (Kim, Ham, Yang, & Choi, 2013; Li et al., 2020) have shown that the availability of opportunities and resources can increase the intention to consume. Our analysis found that even though people had enough time to purchase dry-aged beef regardless of others' opinions, they lacked the knowledge of where to find specialized butchers, which hindered their ability to buy and consume such meat in Italy. Employing food marketing strategies like email marketing and digital advertising to promote specialized butchers at the top of Google search results and potential customers'

social media feeds can effectively attract quality-conscious customers and help them learn about where to buy this kind of meat. Similarly, Hino (2014) suggested the need for retail companies to proceed with marketing strategies to augment consumers' knowledge of new products. Social media would be crucial to retail marketing plans, as stated by Kotler and Zaltman (1971), Felix, Rauschnabel, and Hinsch (2017), and Krymowski (2022), among others. A product's popularity online can increase sales and heighten product awareness.

Subjective norms had the least impact on people's intention to consume dry-aged beef. This indicates that respondents were less concerned about what their family, friends, and colleagues thought about consuming this type of beef. Respondents reported that most people think dry-aged beef is a luxury good. This finding corroborates the importance of focusing on the superior sensory qualities of dry-aged beef in developing marketing strategies.

Individuals who prefer consuming dry-aged beef appear to be willing to pay a premium price for a 1 Kg dry-aged beef steak. Using the standard deviation of the willingness to pay variable, it became evident that an increase of 1 standard deviation in the intention to consume construct can lead to a higher willingness to pay around 1.30 euro/kg more for a dry-aged beef steak.

Finally, we observed that individuals with higher education and income levels are more likely to pay a premium for dry-aged beef. This indicates that the sales department in the meat industry could target Italians based on their educational and income backgrounds, which could lead to an increase in the consumption of dry-aged beef and a higher willingness to pay for it.

In summary, this study aimed to thoroughly understand the psychosocial and economic aspects associated with the choice of consumption and willingness to pay a premium for dry-aged beef. PLS-SEM analysis showed that the hypotheses (1) that meat-eater identity is relevant for the behavioral intentions of consuming dry-aged beef and (2) that the meat identity effects on behavior manifest themselves through the TPB construct attitudes, subjective norms, and perceived behavioral control were largely supported. Further, the intentions to consume significantly influence the willingness to pay a premium for a dry-aged beef steak.

When conducting research with the TPB, it is important to have a clear definition of the behavior being studied. This includes identifying the target of the behavior, the action being taken, the context in which it takes place, and the relevant time period. This is known as the TACT approach. The TPB requires that all constructs be defined and assessed using the same TACT elements (construct compatibility). The principle in question was only partially explored in this study, leaving room for further research to be conducted.

There is a growing body of research on how identity influences behavior, and meat consumption has been linked to several identities (Randers & Thogersen, 2023). A meat identity can be seen as a cultural and social identity for some individuals (Povey et al., 2001) or linked to personal values and beliefs (Hopwood et al., 2021; Piazza et al., 2015). Thus, further research should explore the various aspects of meat identity to encourage the consumption of premium quality meat products like dry-aged beef. Examining the antecedents of meat consumption from this perspective could prove valuable.

Author contributions

LG: Conceptualization, methodology, formal analysis, data curation, writing-original draft. RL: Visualization, Supervision, Administration. GN: Writing – review & editing, methodology, resources. MS: Methodology, formal analysis, data curation, resources, writing-original draft.

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Ethical statement

The study was conducted in accordance with the Declaration of Helsinki, and the ethical approval in this study was granted by the University of Sassari, Research Ethics Committee, Rep. n. 189/2023 Prot. n. 46,280, 05/12/2023.

CRediT authorship contribution statement

Luciano Gutierrez: Conceptualization, methodology, formal analysis, data curation, writing-original draft. **Roberto Lai:** Visualization, Supervision, Administration. **Giuseppe Nocella:** Writing – review & editing, methodology, resources. **Maria Sabbagh:** Methodology, formal analysis, data curation, resources, writing-original draft.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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Data availability

Data will be made available on request.

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