



Exploring Purchasing Determinants for a Low Fat Content Salami: Are Consumers Willing to Pay for an Additional Premium?

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Consumers today are increasingly moving toward healthier lifestyles and food purchasing habits. This new awareness has also prompted the meat industry, usually indicted for the use of harmful compounds and ingredients such as additives, salt, and fat, to introduce innovative measures to meet demand. This study aims to assess consumer willingness to pay an additional price premium (APP) for a healthy salami by identifying which factors are more likely to have an effect on the willingness to purchase, such as socio-demographic and product and market-related attributes. An Ordered Logit model has been applied to define factors influencing consumers' willingness to pay for a low-fat salami. Results show a favorable consumer acceptance of reduced-fat salami conveyed by the willingness of consumers to pay an additional price for this product and confirm that the health awareness of consumers is an important driving force in cured meat marketing strategies.

Keywords: food choice, consumer behavior, salami, cured meat, fat content, healthy diet, ordered logit

HIGHLIGHTS

- A consumer acceptance of reduced-fat salami was shown by the willingness of consumers to pay an additional price for this product.
- Significant differences between different price thresholds were found.
- Socio-demographics characteristics of consumers (Gender, Monthly Income, Regular Sport Activity) have a positive impact on willingness to purchase.
- Consumers who engage in regular physical activity are the most willing to pay for low-fat salami.
- A negative correlation between traditional productive process and healthier salami was found.

INTRODUCTION

Over the last few years, the consumption of meat has been subject to much debate. Concerns include those regarding sustainability, health, and ethics (Dreher et al., 2021). Food safety is becoming increasingly important to consumers, and its ramifications for their health are becoming more apparent (Spina et al., 2021). As a result, researchers are more and more fascinated by the economic potential of healthier meat products to suit the expanding and complex consumer

demand. Consumer acceptance of these novel foods will determine whether this potential is achievable and how quickly it can be attained (Barone et al., 2021). Meat products are considered rich in B vitamins, minerals, trace elements, and protein with a high biological value, but also some other bioactive components (Sharma et al., 2013; Bohrer, 2017). However, they have a rather negative consumer image due to their connection to diseases prevalent in Western societies such as cardiovascular disease, cancer, and obesity (Micha et al., 2010; Van Wezemael et al., 2010; Toldrá and Reig, 2011). The relationship between a proper diet and good health cannot be denied, and food companies could be playing a more significant role (Annunziata and Pascale, 2011). Just consider industrial food production, often to blame for using unhealthy compounds or excessive amounts of fat, sugar, and salt. To this end, the World Health Organization has proposed the following, to open up a closer dialogue with the food industry: fewer saturated fats, more fruit and vegetables, and incentives for the marketing and production of healthier products (WHO, 2020).

The meat industry has to face contemporary lifestyle changes, adopting adaptive and innovative measures to meet the expectations of demand and develop the production of healthier processed meats (Hathwar et al., 2012; Di Vita et al., 2019). The major innovations and approaches are aimed at either reducing the fat and salt content, as well as making use of less nitrate and nitrite, or improving the health benefits of the contents, like the inclusion of functional ingredients (Toldrá and Reig, 2011). The challenge is keeping the consumer satisfied (Hoppu et al., 2017). Consumer preferences and perceptions of quality when purchasing meat products are influenced by a variety of factors that relate to the senses; however, psychological and marketing factors also play an important role (Caracciolo et al., 2010; Lanfranchi and Giannetto, 2021).

As indicated in the literature (Hung et al., 2016; Shan et al., 2017; Merlino et al., 2018), we should analyse consumer behavior when purchasing healthy cured meats from different perspectives as it is affected by socio-demographic factors as well as extrinsic and intrinsic product attributes.

Even though research on the willingness to pay for healthy food products has been carried out worldwide (Wu et al., 2015; Ali and Ali, 2020), and several studies have shown empirical evidence on willingness to pay (WTP) for cured meats (Balogh et al., 2016; Garavaglia and Mariani, 2017; Schnettler et al., 2019; Teixeira and Rodrigues, 2020), there is still a lack of insights into the price related determinants for cured meats regarding the willingness to pay an additional price premium, particularly for salami.

The novelty of this paper resides in the first-time assessment of consumers' attitude toward low-fat salami by analyzing their willingness to pay an additional price. We investigated in depth whether and to what extent salami characteristics and consumer beliefs influence additional (different) price threshold, thereby filling a gap in the literature. By reviewing the existing scientific literature on cured meat and salami consumption, we investigated the willingness to pay an additional price premium for a low-fat salami, in relation to socio-demographic and product and market-related attributes.

THE MAIN DETERMINANTS OF CURED MEAT AND SALAMI CONSUMPTION

This section presents a literature review on the determinants of consumption included in our study that affect directly or indirectly the additional premium price of cured meat and salami.

Cured meats are consumed all over the world and appreciated for their full flavor, but also for their price and convenience (Brunner et al., 2010; Gaviglio and Pirani, 2016). For these kinds of products, consumers seem to pay particular attention to health and fat content during the purchase compared to others (Grunert, 2006). Despite some research stating that pricing has a significant impact on consumer purchase intentions for processed meat (Resurreccion, 2004), price is not always the main determining factor. Indeed, quality, production method, and origin often hold more weight (Bernabéu and Tendero, 2005; Realini et al., 2013; Font-i-Furnols and Guerrero, 2014). Taste, and other sensory characteristics, remain decisive indicators for product approval and repeat purchases (Sindelar et al., 2007; Saeed et al., 2013). Prices, especially of traditional foods, have been observed to enhance the level of tradition and naturalness shown on the labeling (McEachern and Willock, 2004; Honeyman et al., 2006; Abrams et al., 2010; Gifford and Bernard, 2011; Chamhuri and Batt, 2013; Risius and Hamm, 2017). Price preferences are also related to the socio-demographic characteristics of consumers (Font-i-Furnols et al., 2011).

Fat and Other Unhealthy Attributes

It is the high fat content in meat products that is noticeable when we compare them to other categories of processed foods (Alves et al., 2016). They impact a population's diet greatly, firstly due to this high fat content, ranging from 15 to 35%, and secondly because they are consumed in large quantities (Bis-Souza et al., 2020). Italian-type salami can be full of saturated fat (up to 32%) according to physicochemical parameters, and high in salt, poor in fiber, and lack bioactive molecules (Pérez-Burillo et al., 2020).

Salami products are an important source of both high biological value proteins and animal fats, rich in saturated fatty acids and cholesterol. The outcome of lessening the fat content in a meat product is usually undesirable because this affects both texture and taste (Campagnol et al., 2011; Henning et al., 2016), as well as causing a reduction in the amount produced (Han and Bertram, 2017). Djinnovic-Stojanovic et al. (2019) established that healthier dry sausages (with lower salt and fat content) may be produced with no negative effects on the physicochemical and biochemical properties of the end product. Many attempts to manufacture emulsified meat products with a lower fat content have been made. Several studies have shown that replacing animal fat with dietary fiber is one of the most successful techniques (Tomaschunas et al., 2013; Ktari et al., 2014; Petersson et al., 2014; Zhuang et al., 2016). In addition, consumer preference for meat products with physiological and nutritional benefits has grown considerably (Han and Bertram, 2017).

The food industry has been motivated to limit and reduce the quantities of trans fatty acids (FA) and saturated FA, salt, and free sugars in foods currently available and acceptable to consumers.

Ansorena et al. (2019) in a study on the labeling of processed meat products argued that fat is the nutrient most frequently mentioned in the nutrition claims and the expression “low-fat” the most used.

Severini et al. (2003) highlighted that by partially substituting pork backfat with extra-virgin olive oil, the chemical, physical, and sensory features of the product remained largely unchanged with the exception of water activity and firmness. Dudinskaya et al. (2021) in their study analyzed European consumers’ preferences regarding fat, concluding that there is no homogeneity between countries. In France and Italy, for example, consumers appreciate the lack of visible fat more, and for this reason they choose leaner meat cuts with less visible fat content.

As for the consumption of salt, its intake in developed economies is extremely high (Burnier, 2021). In the Western world, almost 70% of salt intake derives from foods that have been processed, and 20% of that from meat products (Ruusunen and Puolanne, 2005). There is a small, natural amount of salt present in fresh foods, but this amount rises staggeringly when processed (Inguglia et al., 2017). For instance, fresh pork normally has 70 mg of sodium/100 g, while bacon contains around 1,480 mg sodium/100 g (Henney et al., 2010).

Excessive dietary salt intake relates to an increased risk of hypertension affecting more than 25% of the world adult population (Adrogué and Madias, 2007), which results in a major risk factor for stroke and other cardiovascular disorders, as well as diabetes and kidney disease (Doyle and Glass, 2010). Too much salt is also the driving force of obesity (Allison, 2018). There is strong evidence to support that a reduction in salt intake worldwide would lead to improved public health (He and MacGregor, 2009). In order to lessen current salt intake significantly, a shift in both the production of commercial foods and consumer behavior is required (Bryła, 2020). Among processed foods, meat products are one of the most common sources of sodium (Desmond, 2006). There are researchers who have evaluated the acceptance of lower salt meat products (Guàrdia et al., 2006), and they have shown that replacing sodium chloride with potassium chloride (resulting in 50% less salt) is a motivating factor, particularly among women, and that they are more receptive to dry sausages. Other research on sensory characteristics of low-sodium salami has highlighted that salami prepared with a 64% reduction of Na was received highly by consumers (De Almeida et al., 2016).

Nitrate and nitrite salts are important, widely used food additives in cured meats. They convey a better flavor and aroma, retain the typical red-pinkish color of the meat, slow down the process of oxidation, and have antimicrobial properties (Govari and Pexara, 2018; Ferysiuk and Wójciak, 2020). However, despite the advantages of these additives, the presence of nitrites in processed meat and their long-term intake may have major human health consequences (Sebranek and Bacus, 2007; Aoki et al., 2010). The European Union regulates the use of nitrite (Reg. No. 1333/2008), asking that greater attention be paid not only to the finished product but also to the presence of these preservatives throughout the production process (Haouet et al., 2016). Producers must protect the typicality of their products

and, at the same time, ensure food safety. They are particularly interested in developing technologies aimed at the production of cured meats without nitrites and nitrates. For this reason, the use of starter cultures has become commonplace in the salami industry, consisting of strains of lactic bacteria and micro-staphylococci chosen according to desired characteristics (Cenci-Goga et al., 2012; Aquilanti et al., 2016).

The idea of replacing sodium nitrite with various plant extracts has also been the focus of research, since fruits and vegetables are made up by different kinds of phenolic compounds, which have a favorable effect on human health (Alahakoon et al., 2015; Munekata et al., 2020).

Sensory Attributes

In recent years consumer demand for low-fat and low-sodium meat products have been on the rise (Ruusunen and Puolanne, 2005), and there has been a growing interest in creating meat products with better health benefits, such as dry fermented sausages reformulated (Beriaín et al., 2011; Aaslyng et al., 2014). However, consumer behavior and expectations regarding the sensory assessment of traditional meat products are becoming less predictable. Research on low-fat and salt in fermented sausages has produced contradicting results in sensory characteristics. According to Tuorila et al. (1994), sensory expectations concerning lower fat products are often minimal. Mendoza et al. (2001), Olivares et al. (2010), and Henning et al. (2016) achieved higher aroma, flavor, color, texture scores, and greater acceptability in high-fat dry fermented sausages than lean sausages. Barone et al. (2021) claim that consumers are usually wary of meat products that are healthier since they are unfamiliar. However, they noted that the partial replacement of meat with plant-based ingredients and the resulting reduction in fat and salt was accepted. Consumer perception and the favorable reception of chicken and beef salami with regard to the fat and salt content was also investigated by Djinnovic-Stojanovic et al. (2019). Their results highlighted how Serbian consumers find healthy meat products more appealing. These findings have been confirmed also by other studies, which have shown that consumers are willing to pay a higher price for cured meats or sausages with limited sodium and fat content (Lee et al., 2015; Romagny et al., 2017). Moreover, other authors have shown an improvement in odorous volatile compounds in lean sausages (Chevance et al., 2000; Muguerza et al., 2002). Reducing salt may also have negative effects on sensory characteristics, leading fermented sausages to have a lighter tone, a less salty flavor, a minor distinctive taste, and less microbial stability (Corral et al., 2013; Laranjo et al., 2017). In addition, the sensory properties of the sausage with regards to consumer satisfaction in terms of taste, flavor, and texture are not affected by the addition of preservatives, while there are differences in color attributes, with a preference for the appearance of sausages containing preservatives (Braghieri et al., 2016).

Animal Welfare

Recent studies on the consumption of meat and meat derivatives have brought to the attention the possibility of agricultural production processes affecting consumer attitudes and their wish

to purchase meat products from farms that are environmentally friendly (Migliore et al., 2015; Caracciolo et al., 2016; Stampa et al., 2020; Burnier et al., 2021).

Consumer concerns for the consequences of animal breeding related to human health, environmental impacts, and animal welfare have led to preferences for sustainably farmed meat (Aiking et al., 2006; Stampa et al., 2020). Consumer WTP and preference are significantly greater when information is provided to consumers (Napolitano et al., 2010). Even though previous research has suggested the possibility of a positive correlation between consumer behavior and sustainable products, studies on consumer behavior and sustainable farming methods are limited (Hwang et al., 2020).

Furthermore, not only do ethical concerns influence purchasing behaviors for sustainable products, but so do diverse cognitions of sensory perceptions. Hwang et al. (2021) assess the impact of information of sustainability on sensory assessments and consumer purchasing behaviors for three kinds of sustainable agricultural production: free of antibiotics, animal welfare, and grazing livestock. They discovered that consumers are generally willing to pay more for salami in all three informed conditions, and in particular for animal welfare.

Packaging

Consumers, overall, prefer packaged over-the-counter pork rather than that purchased from a butcher (Špička and Náglová, 2022). Regarding the satisfaction of the packaging format in dry cured ham, in the study of Mesías et al. (2013), just one of the clusters, identified as a traditional consumer, attributed very low importance to this attribute, while for the other two clusters it was the most or the second most important attribute for consumers. The study by Ortiz et al. (2020) investigates consumer preference for the two types of ham packaging formats, vacuum packaging and modified atmosphere packaging, showing a greater preference for vacuum-packed products capable of preserving their sensory characteristics.

Indication of Origin

The information on the origin for consumers is a strong element of preference in purchasing a food product (Pilato et al., 2015). The geographical origin is assumed as a quality concept, and European quality schemes that guarantee the link with the territory positively influence the WTP of consumers in the case of Parma ham (Mancini et al., 2019). However, although the protected designation of origin (PDO) regime for dry cured ham appeals to a certain segment of costumers, the region of origin is a powerful instrument, even more than the country of origin (Van Ittersum et al., 2003) and a stronger quality evaluation than EU certification schemes (Resano et al., 2012). In consumer preference for Iberian PDO ham, the most influential attributes are the price, type of ham (Mesías et al., 2010), cured ham breed, and its regional origin, while a foreign origin is penalized by consumers (Resano et al., 2007). The WTP estimates for meat products are related to the attributes considered, the country of origin where the analysis is conducted (Cicia and Colantuoni, 2010), and the geographic location of the consumers involved in the survey (Resano-Ezcaray et al., 2010). Moreover,

consumer WTP estimates for GI labels differ due to certain features of product and market or political institutions that affect the premium price consumers are willing to pay for such GI labels (Deselnicu et al., 2013).

METHODOLOGY

Data Collection

We carried out a qualitative and quantitative analysis over a sample of 484 Italian consumers to assess which drivers move consumers toward salami with 30% less fat. This percentage was identified according to research on frankfurter cooked sausage, whereby a 25–30% reduction of fat levels does not affect significantly texture and other sensory properties (National Research Council, 1988).

Data were collected by trained interviewers on the topics of the questionnaire by direct interviewing consumers after a random walk recruitment (Di Vita et al., 2020, 2021a). The survey was based on a multi-section questionnaire and, to improve the reliability of the answers, only regular consumers of processed meat who were responsible for purchasing such products were selected. The study assessed consumer attitudes in relation to a convenience sample, which may produce unbalanced frequency classes compared to the general population, limiting to some extent the possibility of inference. However, this sampling method has proven to be quite consistent, considering that the reliability of the results is not compromised (Etikan et al., 2016; Testa et al., 2019; Di Vita et al., 2021a,b). The administration of the final version of the questionnaire was preceded by 2 main steps: the focus group and a pilot survey.

Concerning the focus group, a range of specialists such as academics, entrepreneurs, and food technologists were invited to discuss main determinants of salami consumption. Subsequently they were asked to select which attributes could influence the willingness to pay (WTP) for a reduced-fat salami: thematic nodes and consequent questions were included in the preliminary questionnaire employed for the pilot survey. It was conducted on 40 consumers before administering the final questionnaire to test the effectiveness and degree of understanding of the questions. The final version of the survey, derived from the focus group and the pilot survey, consisted in four sections: (1) General characteristics of salami consumption; (2) Importance of intrinsic and extrinsic attributes of salami consumption; (3) WTP for different salami categories, including reduced-fat salami; (4) socio-demographic characteristics of the sample.

The questions in the survey were organized as binary (yes/no answer) and multiple-choice answers in the case of sections Introduction and Results and as seven-point Likert scale in section The Main Determinants of Cured Meat and Salami Consumption. For example, the importance of the different attributes in section The Main Determinants of Cured Meat and Salami Consumption concerning intrinsic and extrinsic characteristics was explored as perceived importance by consumers as follows:

“How important do you think the following intrinsic characteristics are for defining the quality of a salami?”

Once the list of characteristics was provided, consumers expressed their opinion on the Likert scale by indicating 1 = *not important* and 7 = *very important*.

Data and information were collected by trained interviewers in Sicily in large-scale retail trade shops via face-to-face methods and resulted in 484 valid observations whose consumer characteristics are shown in **Table 1**. Regarding the categorization of age groups, some aspects should be described in more detail. In fact, age was transformed from a continuous variable into an ordinal variable, namely age cohort; to this aim, the classification proposed by Brosdahl and Carpenter (2011) was employed. The classification divides the generations as follows: Millennials: those born between 1982 and 2000; Generation X: people born between 1961 and 1981; the Older Generation group finally collected those born before 1961, i.e., the cohorts of Baby Boomers and the Silent Generation.

Data Analysis

The assessment of willingness to pay for a reduced-fat salami was performed by means of an ordinal scale representing discrete alternatives of increasing additional premium (AP). Specifically, the alternatives were: not willing to pay an AP; willing to pay up to 10%; between 10 and 20%, between 20 and 30%; more than 30%. Considering that the dependent variables were expressed in a categorical dimension, an ordered logit model was performed to assess which predictors affect the willingness to pay for the product. The model laid on the structural model for ordinal outcomes with a single continuous latent variable (Rabe-Hesketh and Skrondal, 2008; D’Amico et al., 2016).

The latent variable AP_i^* is employed to model the discrete alternatives of the dependent variable, and consequently the model can be expressed as follows:

$$AP_i^* = X_i' \beta + \varepsilon_i \tag{1}$$

where AP_i^* is latent and continuous ranging from $-\infty$ and $+\infty$; X_i' represent the vector of regressors; β is the vector of model coefficient; and ε_i represent the vector of error terms.

The model also includes the estimation of a set of coefficients or intercept terms as cut-points in the latent variable AP_i^* distribution as follows: $(\alpha_1 < \alpha_2 \dots < \alpha_{j-1})$ with $(J-1)$. The cut-points are considered threshold values for switching from one category of the observed variable AP to another. Cut points are typically considered as nuisance parameters needed for estimation purposes, although having no intrinsic meaning (Greene and Hensher, 2010).

Thus, the ordinal variable AP is linked to the latent variable AP_i^* as shown below:

$$AP_i = j \text{ if } \alpha_{j-1} < AP_i^* \leq \alpha_j \tag{2}$$

where $j = 1$ to J and $\alpha_0 = -\infty$ and $\alpha_J = \infty$.

Once the model was obtained, the problem of correlation between the regressors or multicollinearity arose.

TABLE 1 | Socio-demographic characteristics and consumption habits of the sample ($n = 484$).

Group of Variables	Items	Frequency	Percent
Age cohort	Millennials	300	61.98
	Generation X	145	29.96
	Older generations	39	8.06
Gender	Male	254	52.48
	Female	230	47.52
Body Mass Index (BMI)	Underweight	37	7.64
	Normal weight	293	60.54
	Overweight	118	24.38
	Obese	36	7.44
Family members (n)	1	22	4.54
	2	72	14.88
	3	124	25.62
	4	196	40.50
	5	58	11.98
	6	12	2.48
Education	Elementary and middle schools	130	26.86
	High school	175	36.16
	Bachelor's and master's degrees	151	31.20
	Higher education	28	5.78
Monthly family income	No answer	93	19.21
	Up to 1,500 €/month	230	47.52
	Between 1,501 and 3,000 €/month	117	24.17
	Between 3,001 and 4,000 €/month	28	5.79
	Over 4,000 €/month	16	3.31
Regular sport activity	No	272	56.20
	Yes	212	43.80
Habits	Salami consumption (hg/week) Mean-SD	1.12 (0.94)	
	Price paid for salami (€/hg) Mean-SD	1.28 (0.72)	

Multicollinearity can be a relevant issue in regression due to the undesired correlation among predictors reducing the capacity of the model to recognize significant variables (Daoud, 2017). To check the reliability of the model in terms of multicollinearity phenomena, the Variance Inflation Factor (VIF) analysis was employed. Based on the current literature, the interpretation of the analysis should be performed on the $1/VIF$ ratio, which should be >0.2 to indicate that the model is not affected by multicollinearity problems that could lead to invalid results (Mehmetoglu and Jakobsen, 2016).

The last step of the model implied the study of marginal effects since the information provided by the coefficients of the ordered logistic regression are not directly interpretable in terms of probability (Greene and Hensher, 2010). To overcome this

TABLE 2 | Descriptive statistics of the variables used in the Ordered Logit model.

Variables	Mean	SD
Overall taste	4.67	1.22
Color	5.32	1.24
Texture	5.38	1.15
Nitrites content	2.46	1.80
Packaging	4.72	1.71
Italian origin	6.48	0.67
PDO/PGI	5.91	0.77
Animal welfare	6.33	1.16

problem, the estimation of probability changes was carried out by means of the average marginal coefficients. This assessment allows the estimation of how a marginal variation in the value of a regressor impacts the probability of the result, holding the other predictors at their mean values (Boes and Winkelmann, 2006).

RESULTS

Our research aim was to analyse what variables influence consumers' willingness to pay an additional price premium for a healthy salami with low-fat content. To this purpose, different socio-demographic characteristics shown in **Table 1** and intrinsic/extrinsic salami attributes in **Table 2** were tested in the econometric model.

Starting from the summary statistics, some first insights can be drawn from **Table 2** where the mean value and standard deviation of the tested characteristics are shown. Animal welfare and Italian Origin ranked the most popular followed by PDO/PGI and texture. Nitrites content, overall taste, and packaging ranked lower with a mean average between 2.46 and 4.72, which underlines a certain degree of interest in these attributes. The low importance attached to the nitrite content in salami suggests that consumers prefer to avoid this substance in the final product. Regarding the willingness to pay an additional price/extra for reduced-fat salami, the distribution of frequencies among the different classes was the following: 7.44% of the sample were not willing to pay extra; 33.26% of the sample were willing to pay up to 10%; 50.83% were willing to pay between 10 and 20%; 7.02% were willing to pay between 20 and 30%; and 1.45% of the sample were willing to pay more than 30%.

Moving on to the core of the paper, i.e., the estimation of the effects of attributes and socio-demographic characteristics on consumers' willingness to pay an "additional price for healthy salami," **Table 3** shows the results of the regression model. In the estimated model, the pseudo R^2 (McFadden, 1973) was calculated to assess the goodness of fit; the obtained value of 0.136 is acceptable based on current literature (Liu et al., 2015; Yano et al., 2021).

Table 3 shows that only 7 out of the 17 regressors are statistically significant at 5%, and 1 variable is significant at 10%. The four categories of cut points are also reported in the table.

Starting with texture as an intrinsic attribute, the model suggests that consumers who value this characteristic are less

TABLE 3 | Ordered logit model results on WTP for reduced fat salami ($n = 484$).

Variables	Coef.	p-value
Overall taste	0.024	0.823
Color	0.149	0.197
Texture	-0.217	0.042
Nitrites content	-0.288	0.000
Packaging	-0.044	0.490
Italian origin	0.211	0.281
PDO/PGI	-0.416	0.004
Animal welfare	0.174	0.102
Age cohort	0.179	0.256
Gender	-0.534	0.007
Body Mass Index (BMI)	-0.181	0.163
Family members	-0.065	0.457
Education	0.140	0.266
Monthly family income	0.332	0.002
Regular sport activity	0.420	0.036
Salami consumption	-0.249	0.071
Price paid for salami	0.698	0.000
Cut 1	-3.388	
Cut 2	-0.673	
Cut 3	2.671	
Cut 4	4.531	
Goodness of fit	Mc Fadden r square	0.136
	Log likelihood	-481.483

willing to pay for a low-fat salami. A similar result was obtained for nitrite content, with consumers who considered this attribute important being less interested in a reduced-fat salami. Considering the extrinsic attributes, only the PDO/PGI label, reflecting the quality and regional specificity of salami, was significant. The coefficient obtained suggests that respondents interested in this quality certification are less inclined to pay an additional price for a reduced-fat salami.

The table also highlights the role of socio-demographic characteristics that were found to be significant. The coefficient of gender suggests that males are more interested in this product and households with a high income as well. Finally, the variable sport activity was also significant, and the model implies that people who have a regular sporting activity are more willing to pay an additional price premium for this type of salami.

The negative coefficient concerning consumer habits, measured with the variable "Salami consumption," indicates that consumers who consume large amounts of product are less willing to pay an additional price for a reduced fat salami, suggesting an opposite relationship between product quantity and quality. The other variable, "Price paid for salami," indicates the actual price at which the sample purchases salami. The model suggests respondents that consume expensive products are more willing to pay for a healthier product.

The validation of the model in terms of multicollinearity is shown in **Table 4**. The table presents the outcome of the variance inflation factor (VIF) analysis and emphasizes the absence of multicollinearity among the variables included in the model. This

TABLE 4 | Variance Inflation Factor (VIF) analysis of the model.

Variables	VIF	1/VIF
Overall taste	2.08	0.48
Color	2.28	0.44
Consistency	1.63	0.62
Nitrites content	2.41	0.42
Packaging	1.46	0.68
Italian origin	2.06	0.49
PDO/PGI	1.38	0.73
Animal welfare	1.77	0.57
Age cohort	1.18	0.85
Gender	1.12	0.89
Body Mass Index (BMI)	1.09	0.92
Family members	1.09	0.92
Education	1.49	0.67
Monthly family income	1.12	0.89
Regular sport activity	1.14	0.88
Salami consumption	1.90	0.53
Price paid for salami	2.09	0.48
Mean VIF	1.60	

information is given by the 1/VIF ratio. In truth, when the ratio is >0.2 , multicollinearity cannot be considered relevant as the stability of the coefficients provided by the logistic regression is satisfactory.

Since direct interpretation of the coefficients in an ordered response model is uncertain (Greene and Hensher, 2010), further investigation of the outcomes may be needed. Therefore, the findings of the model, shown in **Table 3**, have been further elaborated to assess predicted probabilities and marginal effects. Indeed, the coefficients of logistic models only indicate the magnitude of impacts, positive or negative, on the probability of a certain result for the dependent variable (Smith et al., 2009). In addition, the marginal effects applied to the ordered logistic model permit us to observe probability variation across the discrete alternatives of the dependent variable (D'Amico et al., 2016). Furthermore, since the predicted probabilities from the logistic regression shown in **Table 3** can change over the categories of the dependent variable, we can use the marginal effects to quantitatively assess how much they increase or decrease the probability of the outcome. **Table 5** provides insights for the significant variables.

Analyzing the interpretation of socio-demographic characteristics on the willingness to pay an additional price on a reduced-fat salami, we focus on significant marginal effects related to gender, monthly family income, and regular sport activity. Indeed, since the ordered logistic regression allows evaluating the probability variation across each level of the ordinal scale, in this second step, more coefficient is provided for the covariates. The interpretation of marginal effects should be focused on significant coefficients that indicate that the probability of the change provided within the level assessed on the ordinal scale is distinguishable from zero (Esarey and Sumner, 2018). Starting with gender, the study of marginal

effects provides deeper insight than the mere interpretation of the coefficient in the logistic regression. In fact, the general effect indicates that men are more interested in reduced-fat salami. The general trend can be deeply explored by the marginal coefficient, which indicates that women are more willing to pay an additional price premium to 10% (6.5% in terms of probability). Instead, males are more willing to pay an additional price premium: between 10 and 20% (6.2%), between 20 and 30 (2.9%), and more than 30% (around 1%). Turning to the variable “Monthly family income,” the marginal coefficients suggest that the probability of an additional price premium increases for higher incomes in the case of premium prices of 10–20% (3.8%), 20–30% (1.8%), and more than 30% (around 1%). People with lower incomes, on the other hand, can be more willing to pay up to 10% (4%). Finally, people who practice sport regularly are more willing to pay an additional price premium for the alternatives 10–20% (4.8%), 20–30% (2.3%), and more than 30% (around 1%).

DISCUSSION

The results of our work generally confirm the initial assumption that there is a higher willingness to pay for low-fat salami on the basis of certain variables that have been investigated. Moreover, the distribution of frequency of the responses shows that respondents were willing to pay an additional price premium mainly up to 10% and between 10 and 20 for reduced-fat salami. This fact confirms consumers' ever-growing attention to food products perceived as “healthy” and that healthier meat products are a well-established market that could be further developed (Guàrdia et al., 2006; Schnettler et al., 2019). Therefore, these research findings could have a direct influence on the meat industry since it has to understand the attributes that consumers feel are relevant.

In our study, the variables that most affect the consumption of low-fat cured meats relate to intrinsic characteristics (Texture, Nitrites), extrinsic characteristics (PDO/PGI), and socio-demographic and consumption characteristics (Gender, Monthly Income, Regular Sport Activity, Price paid for salami). In particular, variables within the “socio-demographic” group have a positive impact on WTP.

In detail, the texture variable appears relevant, but as the importance attached by consumers to this attribute increases, the WTP for low-fat salami decreases. On the other hand, tenderness, fragrance, and texture have always been among the most important sensory attributes, especially for pork that has been cooked (Miller, 2020). Válková et al. (2007) had already highlighted these results, emphasizing that texture is one of the most significant factors that affects consumers' opinion of ham quality. Ordóñez et al. (2001), in their research, found that higher fat frankfurters were considered more satisfactory by consumers than experimental lower fat frankfurters, precisely because of their consistency, while other studies found that a frankfurter with a low fat content was more likely to be consumed than conventional ones (Rocha et al., 2019). Similarly, Shan et al. (2017) examined consumers' judgment on reducing fat in meat

TABLE 5 | Average marginal effects for significant variables derived from the ordered logit model.

Variables	Not willing to pay	Up to 10%	Between 10 and 20%	Between 20 and 30%	More than 30%
Texture	0.015	0.026	-0.025	-0.012	-0.003
p-value	0.046**	0.040**	0.039**	0.053*	0.101
Nitrites content	0.018	0.035	-0.033	-0.016	-0.004
p-value	0.001***	0.000***	0.000***	0.001***	0.029**
PDO/PGI	0.026	0.050	-0.048	-0.023	-0.006
p-value	0.007***	0.004***	0.005***	0.008***	0.049**
Gender	0.033	0.065	-0.062	-0.029	-0.007
p-value	0.010***	0.006***	0.007***	0.011**	0.053*
Monthly family income	-0.021	-0.040	0.038	0.018	0.005
p-value	0.003***	0.002***	0.002***	0.005***	0.039**
Regular sport activity	-0.026	-0.051	0.048	0.023	0.006
p-value	0.042**	0.035**	0.036**	0.044**	0.096*
Salami consumption	0.016	0.030	-0.029	-0.014	-0.003
p-value	0.078*	0.068*	0.069*	0.080*	0.133
Price paid for salami	-0.043	-0.085	0.082	0.038	0.009
p-value	0.001***	0.000***	0.000***	0.001***	0.028**

*, **, *** Indicate significant marginal effects at p-values 0.1, 0.05, and 0.01, respectively.

products, confirming that survey participants did not mention any significant changes regarding the flavor of either product.

The same can be said for nitrite content. This reinforces the hypothesis that consumers who are particularly attentive to intrinsic variables (therefore related to the naturalness of the product) are less willing to pay for products perceived as modified (Galati et al., 2019). A recent study (Di Vita et al., 2019) has in fact highlighted the relevance of variables linked to properties such as being nitrite-free and salt reduction in consumer choices, underlining the significant consumer propensity for paying extra for salami with such characteristics. Hung et al. (2016) reached the same conclusions when he studied consumer attitudes and purchase intent toward processed meat products containing the addition of natural compounds and reduction of nitrites.

Concerning the analysis of the incidence of the PDO/PGI variable, again, people who are sensitive to the traditional productive process of the meat products are less used to paying more for low-fat salami. This finding is consistent with the previous literature on the role of PDO certifications in food products, whereby the consumer values more the typicality than industrialized food (Garavaglia and Mariani, 2017).

Considering the attitude based on gender literature, concerning healthy food products and attributes, have provided divergent results. The role of gender could be non-significant (Bruschi et al., 2015); however, several researchers reported that woman find nutritional labels more important than men when selecting meat products and are more willing to pay for healthy food (Rimal, 2005; Timpanaro et al., 2020), while other studies reveal that males are more satisfied with healthy characteristics in some products, such as dry-cured ham (Resano et al., 2011).

In our case, women are interested in reduced-fat salami but are willing to pay an additional price premium only for the lowest alternative (up to 10%). This result suggests that the gender effect may be influenced by the product evaluated in the study or the origin of the consumers.

In addition, the respondents actively doing regular physical exercise were more inclined to pay a higher price for health and wellness food products, consistent with both expectations and other studies carried out on processed meats. In particular, the consumers surveyed who do sports seem to be more in favor of paying an additional price for a healthy salami (Di Vita et al., 2019). That physical activity variables also positively influence WTP was also found in a study on salty bread (Di Vita et al., 2016).

Interestingly, the subjects who do regular physical exercise are those who, by far, are the most willing to pay for low-fat salami, even more so than those in the high-income bracket. This finding is consistent with existing literature that highlight how healthy eating motivation is associated with healthy lifestyles. This research is in line with prior studies which have examined the link between healthy motivation, consumption, and lifestyle behavior like sport and exercise (Wardle and Steptoe, 2003; Harty et al., 2007).

As far as income is concerned, the previous studies are confirmed where low family income is associated with a poor-quality dietary intake (Wolfson et al., 2019), along with a limited consumption of fruit and vegetables in favor of more sugar-sweetened beverages and a general consumption of high-fat foods. Indeed, Naughton et al. (2015) illustrated how social class status influences diets, with higher classes being linked to diets of better quality and lower classes tending to have diets that are nutrient poor and rich in energy. These findings, then, are consistent with other research stating that healthier food options are more often bought by consumers with higher education levels and incomes (Sajdakowska et al., 2018); furthermore, they are willing to pay an additional price for foods with lower fat and salt (Nordström and Thunström, 2015).

Ortega et al. (2011) and Wu et al. (2015) have determined that consumers' pork meat preferences are influenced by factors such as gender, education, and level of income. Moreover, Balogh

et al. (2016), who investigated the WTP for a traditional food product like Hungarian mangalitzta salami, revealed how income and education may affect consumer preference and WTP. In line with previous studies, a preference for meat consumption was also found to be correlated to family economic status (de Boer and Aiking, 2018; Milford et al., 2019).

It goes without saying that WTP decreases as salami consumption increases, since the higher price would affect substantial amounts of consumption. Finally, consumers who are already used to paying higher prices show a greater willingness to pay because the marginal price increase is less significant for them.

CONCLUDING REMARKS

Several factors, such as product attributes, socio-demographics, and habits that move consumers toward the consumption of reduced-fat salami, have been detected. Through the econometric model adopted in the study, a general trend influencing the likelihood of the price premium was described and further insights were obtained through the study of marginal effects. Concerning the product attributes consistency, nitrites content and PDO/PGI were significant, suggesting the prominent role of sensory attributes, additives content, and regional specificity. Among the socio-demographic characteristics, gender, income, and sporting activity were highly significant. Finally, consumers' habits highlighted the importance of the quantities consumed which negatively affects the willingness to pay.

This paper has several implications for both marketers and producers. As for producers, our study suggests the feasibility for the reduction of fat in cured meat by producing foods that are less harmful to health. Healthier products are appreciated by different consumer segments, so by including information on the label in different forms, such as nutritional claims, these

products can be differentiated. Product differentiation can also allow both small producers and large companies to extend the range of interested consumers, improving sales and hence increasing revenues.

The main limitation of this study mainly relies on the sample method adopted, namely convenience sampling. Even though this sampling approach has been largely used in the literature, and the reliability of results is accepted, the results should be interpreted with care as the potential for inference in the wider population is lower than the stratified method.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

GD: conceptualization, methodology, writing—original draft, writing—review and editing, and supervision. RZ: methodology, writing—original draft, writing—review and editing, formal analysis, data curation, and validation. DS: writing—original draft, writing—review and editing, formal analysis, data curation, and validation. GM: writing—original draft, writing—review and editing, and data curation. GL: methodology and supervision. MD'A: conceptualization, supervision, project administration, and resources. All authors contributed to the article and approved the submitted version.

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