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Rational and moral motives to reduce red and processed meat consumption

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Abstract

This study analyzed the psychosocial aspects that predict intention to reduce red/processed meat consumption, proposing an integration of the Theory of Planned Behavior (TPB) and the Value-Belief-Norm (VBN) approaches. Participants ($N = 233$) filled in a self-report online questionnaire, measuring the intention to reduce red/processed meat consumption, and both TPB (attitude, subjective norm, perceived behavioral control, and past behavior) and VBN (universalism, general pro-environmental beliefs, awareness of consequences, ascription of responsibility, and personal norm) variables. Results of structural equation modeling showed the adequacy of the proposed TPB + VBN integrated model to predict consumers' intention to reduce red/processed meat consumption. Attitude and subjective norm were the strongest predictors of intention, followed by personal norm and past behavior. Mediation analyses showed that the impact of the VBN chain (from universalism to personal norm) on intention was mediated by attitude. Thus, consumers' intention to reduce red/processed meat consumption was associated with a rational consideration of benefits related to the behavior in question, which in turn was based on moral considerations connected to pro-environmental motives. Discussion focuses on the opportunity to integrate the (rational) TPB approach with the (normative) VBN approach, highlighting psychosocial aspects that public policy should focus on to promote a reduction of red/processed meat consumption.

1 | INTRODUCTION

Western diets are characterized by excessive red and processed meat consumption (RPMC), which has several environmental negative consequences, such as risky pollution, depletion, and the disruption of water and land resources (e.g., Gardner, Hartle, Garrett, Offringa, & Wasserman, 2019). To reduce these effects, public policies should effectively communicate the urgency of a shift to a less animal-based diet. However, there is little agreement over the degree to which public policies should leverage either rational or moral motives to promote the reduction of RPMC. While reference to rational motives implies that a behavior is the result of an individual cost-benefit analysis (e.g., Tobler, Visschers, & Siegrist, 2011), reference to moral motives implies that a behavior is based on pro-environmental and ethical concerns (Austgulen, Skuland, Schjøll, & Alfnes, 2018; de Boer, de Witt, & Aiking, 2016).

To address this problem, more evidence on the complex relationships among psychosocial motives associated with RPMC is needed. So far, only a few scholars have considered rational and moral motives simultaneously, and this is also the case for the main psychosocial factors related to them (e.g., Siegrist, Visschers, & Hartmann, 2015; Yadav, Dokania, & Pathak, 2016). In the present study, we contribute to this debate testing the integration between two theoretical frameworks that are generally used to explain pro-environmental and food choices, namely, the Theory of Planned Behavior (TPB; Ajzen, 1991) and the Value-Belief-Norm (VBN; Stern, Dietz, Abel, Guagnanon, & Kalof, 1999). The TPB is mainly focused on a rational-based explanation of the people's intention to perform a given

behavior, while the VBN is mainly focused on a value-based explanation (Kaiser, Hübner, & Bogner, 2006). Few scholars have proposed the integration of these two models (e.g., Fornara, Pattitoni, Mura, & Strazzera, 2016; Hansla, Gamble, Juliusson, & Gärling, 2008; Menzel & Bögeholz, 2010; Park & Ha, 2014). However, none of them have investigated whether such integration can contribute to better explain the intention to reduce RPMC. In the present study, we aimed to integrate the TPB and VBN to understand which psychosocial factors are more related to the consumers' intention to reduce RPMC. The two theoretical models, their integration, and related research hypotheses are discussed below.

1.1 | Theoretical framework

1.1.1 | The theory of planned behavior

The TPB (Ajzen, 1991) is a rational decision-making model, according to which the main proximal determinant of a given behavior is behavioral intention, or the motivation and conscious plan to perform the behavior. In turn, behavioral intention is described as a function of attitude, subjective norm, and perceived behavioral control toward the behavior. The TPB has been frequently applied to explain different food choices, and past scholars have confirmed the predictive power of intentions toward different food choices, such as healthy products (e.g., Carfora, Caso, Palumbo, & Conner, 2018; Caso & Carfora, 2017), sustainable foods (e.g., Han & Hansen, 2012), and risky foods (e.g., Cembalo et al., 2019). Attitude and perceived behavioral control are the main predictors of behavioral intention when food choice is associated with environmental benefits, such as selecting organic and reducing red meat consumption (Carfora, Cavallo, et al., 2019; Rees et al., 2018; Yadav et al., 2016). The role of subjective norm is less clear and seems to depend on the specific food-related behavior. For example, subjective norm has been shown to be the strongest predictor of intention in relation to food waste reduction (Stancu, Haugaard, & Lähteenmäki, 2016). However, subjective norm has failed to predict intention to purchase organic food (e.g., Yadav et al., 2016) and red meat consumption (Graça, Calheiros, & Oliveira, 2015; Zur & Klöckner, 2014).

1.1.2 | The value-belief-norm

The TPB has been often criticized for overlooking the psycho-social factors related to morality (Armitage & Conner, 2001). Consistently, several health and environmental studies have shown that the inclusion of value-based drivers increases the explanatory power of behavioral intention (e.g., Jansson, Marell, & Nordlund, 2010; Rivis, Sheeran, & Armitage, 2009; Steg & Vlek, 2009). In doing this, most authors have referred to the Value-Belief-Norm theory (VBN; Stern, 2000).

According to VBN, norm activation is triggered by a chain of five related factors, which are values, general pro-environmental beliefs, awareness of consequences, ascription of responsibility, and personal norm. Values are guiding principles in one's life (Stern et al., 1999). As to general pro-environmental beliefs, in this paper, we took into account beliefs about the interdependence between nature conservation and human progress, as proposed by the New Human Interdependence Paradigm (NHIP; Corral-Verdugo, Carrus, Bonnes, Moser, & Sinha, 2008). The awareness of consequences refers to the degree to which people are aware of the negative consequences of their behaviors on the environment. Awareness provokes an ascription of responsibility, which is the feeling of being responsible for the negative impact of the nonimplementation of pro-environmental behaviors. In turn, ascription of responsibility activates personal norm, which is related to the feeling of moral obligation to perform or refrain from a specific behavior (Schwartz, 1977). Finally, personal norm is an important factor in shaping the intention to perform a behavior (e.g., Fornara et al., 2016; Parker, Manstead, & Stradling, 1996; Turaga, Howarth, & Borsuk, 2010), including green food-related behavior (e.g., Thøgersen & Ölander, 2002).

In the domain of the studies on food choice, the VBN model has already been successfully applied to explain behavioral intention (e.g., Shin & Hancer, 2016; Yang, 2016). For example, a strong endorsement of self-transcendence values induces an intention to eat less meat (de Boer, Hoogland, & Boersema, 2007), while the awareness of consequences influences ascription of responsibility and, in turn, personal norm regarding the choice of an organic menu (Shin, Im, Jung, & Severt, 2018).

1.2 | Objectives and hypotheses

The general aim of this study was to explain consumers' intention to reduce RPMC by verifying the predicting role of both rational and moral motives. To do so, we proposed the integration of TPB and VBN frameworks. We first tested the two models separately, and then, tested the integration between them, taking into account the relationships among TPB and VBN variables (Figure 1). Our research hypotheses are described in detail below. As suggested, we have now reformulated our research hypotheses, making a first hypothesis on the TPB model (H1), a second hypothesis on the inclusion of past behavior in the TPB model (H2), a third hypothesis on the VBN model (H3), and four other hypotheses (H4–H7) on the integration of the two models.

First of all, consistent with the traditional TPB assumptions regarding the prediction of individuals' intentions, in the present study, we expected the TPB variables (attitude, subjective norm, and perceived behavioral control) to predict participants' intention to reduce RPMC (**H1**). In line with several studies within the environmental behavior context (e.g., Gkargkavouzi, Halkos & Matsiori, 2019), we also tested the presence of a positive correlation among attitudes, subjective norm, and perceived behavioral control.

We also expected that the addition of past behavior would add to the predictive power of the TPB model in predicting consumers' intention to reduce RPMC (**H2**). Both health and environmental research suggests the inclusion of past behavior in robust models that

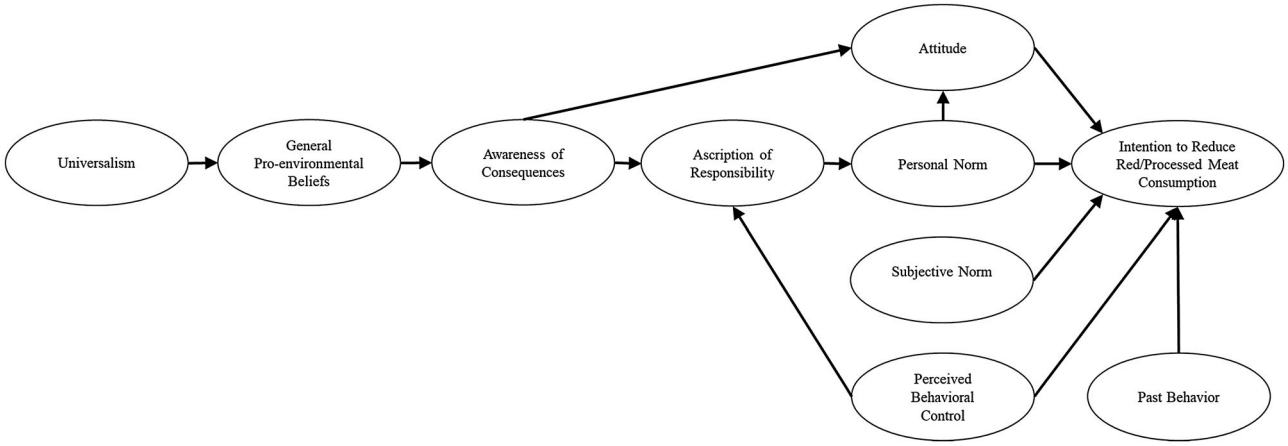

FIGURE 1 Hypothesised paths among TPB and VBN variables. For the sake of simplicity, we did not report paths among the VBN variables more than one level downstream

assess food choice intention and behavior (e.g., Klöckner, 2013), and many researchers have included past behavior as an additional variable into TPB models applied to pro-environmental and healthy food choices (e.g., Caso, Carfora, & Conner, 2016; Gkargkavouzi et al., 2019). However, the role of past behavior needs to be further investigated, given that several studies observed not only positive, but also negative links between past behavior and intention (see Sheeran, Godin, Conner, & Germain, 2017).

We also tested whether the VBN chain alone (i.e., pro-environmental beliefs, then awareness of consequences, then ascription of responsibility, and then, personal norm) would predict participants' intention to reduce RPMC (**H3**). As suggested by Stern et al. (1999, p. 84, Figure 1 caption), we also assessed whether VBN variables would have direct effects on variables more than one level downstream.

Then, we tested the VBN and TPB integration, formulating four hypotheses regarding the relationships among the TPB and VBN variables. We expected that the awareness of consequences (VBN) would predict participants' attitude toward reducing RPMC (TPB) (**H4**). Within the TPB model, attitude toward a behavior is a function of beliefs regarding the consequences of the behavior and the individual evaluation of these consequences (Ajzen & Fishbein, 1980). Accordingly, the awareness of consequences has been shown to be a significant antecedent of pro-environmental attitudes (Floress et al., 2017; Fornara et al., 2016; Halkos, Matsiori, & Dritsas, 2019).

We also hypothesized that personal norm (VBN) would predict attitude toward reducing RPMC (TPB) (**H5**). Moral values have been shown to be significant antecedents of attitude rather than intention (Raats, Shepherd & Sparks, 1995; Sparks, Shepherd, Wieringa, & Zimmermanns, 1995). Besides, attitudes related to pro-environmental behaviors are composed of a set of evaluations where personal norm has an important role (Thompson, Reimer, & Prokopy, 2015), and past studies consistently found that personal norm predicts environmental attitudes (Chen & Chai, 2010; Fornara et al., 2016; Kaiser & Scheuthle, 2003; Kaiser, 2005; Klöckner, 2013). For example, in a study on attitude toward the environment and green products, results revealed that consumers' personal norm was the most important predictor of attitude (Chen & Chai, 2010).

We expected perceived behavioral control over RPMC (TPB) to predict the ascription of responsibility of reducing meat consumption to protect the environment (VBN) (**H6**). A number of studies has supported the thesis that voluntary control is a precondition of moral responsibility (e.g., Fisher & Ravizza, 1993; Smith, 2008). However, so far such relationship has not been tested in the domain of food choice, and we did so in the present study.

Finally, we tested whether attitude (TPB) would mediate the impact of the VBN chain (universalism, then, general pro-environmental beliefs, awareness of consequences, ascription of responsibility, and personal norm) on intention (**H7**). Few authors have considered attitude as one factor that can mediate the effect of the VBN chain on intention toward pro-environmental behaviors. For example, Zhang, Geng, and Sun (2017) showed that not only personal norm, but also attitude, significantly mediated the effect between awareness of consequences and intention of environmental complaint. Importantly, a study of Klöckner (2013) on pro-environmental behavior showed that part of the impact of personal norms on intentions was mediated by attitude. Finally, Fornara et al. (2016) reported a similar result showing that personal norm had a strong indirect link with intention via attitude toward the use of green energies. These results suggest that people have a favorable attitude toward what is in line with their personal values. However, no scholar has yet assessed whether attitude mediates the impact of all VBN predictors on intention related to sustainable food choice.

2 | METHOD

2.1 | Participants and measures

The study received ethical approval from Catholic University of the Sacred Heart (Milan). In April 2018, a total of 233 online questionnaires were collected with a convenience sample of Italian consumers (107 male; 126

female; mean age = 25.91; *SD* = 12.33). To participate, consumers were required to follow no specific diet (e.g., veganism or vegetarianism). At the beginning of the online questionnaire, participants read an explanation of the study and provided written consent. Through the questionnaire, we measured TPB variables, VBN variables and past RPMC. Table 1 shows standardized factor loadings for each item. With the exception of attitude, universalism, and past RPMC, answers were given on a 7-point-scale ranging from 1 (strongly disagree) to 7 (strongly agree).

2.1.1 | Attitude

Participants' attitude toward reducing RPMC was measured with three items using a 7-point semantic differential scale ("Reducing RPMC is/would be … bad—good, positive—negative, important—not important"; Carfora, Bertolotti & Catellani, 2019; Carfora, Catellani, Caso, & Conner, 2019). Higher scores indicated a greater positive attitude toward reducing RPMC ($\alpha = .80$).

2.1.2 | Subjective norm

Participants' subjective norm was assessed with three items: "Most people who are important to me think that I should reduce RPMC"; "People who are important to me would approve my reduction of RPMC"; "People who are important to me want me to reduce RPMC" (Carfora, Caso, & Conner, 2017b). Higher scores indicated a greater perception of social pressure toward reducing RPMC ($\alpha = .86$).

TABLE 1 Results of the confirmatory factor analysis

Construct	*M*	*SD*	Items	Standard loadings	Composite reliability	*AVE*
Attitude (ATT)	4.96	1.26	ATT1	.82	.80	.57
			ATT2	.65		
			ATT3	.78		
Subjective norm (SN)	3.21	1.39	SN1	.86	.89	.73
			SN2	.74		
			SN3	.87		
Perceived behavioral control (PBC)	4.99	1.19	PBC1	.64	.83	.62
			PBC2	.90		
			PBC3	.61		
Universalism (UN)	4.92	.62	UN1	.62	.76	.53
			UN2	.60		
			UN3	.67		
General pro-environmental beliefs (GPB)	5.95	.81	GPB1	.81	.84	.64
			GPB2	.81		
			GPB3	.80		
Awareness of consequences (AC)	4.76	1.12	AC1	.89	.90	.76
			AC2	.89		
			AC3	.91		
Ascription of responsibility (AR)	4.62	1.23	AR1	.87	.85	.66
			AR2	.90		
Personal norm (PN)	3.43	1.40	PN1	.77	.84	.64
			PN2	.91		
			PN3	.82		
Intention to reduce red/processed meat consumption (INT)	4.07	1.60	INT1	.89	.91	.78
			INT2	.96		
			INT3	.93		
Self-reported past red/processed meat consumption (PB)	3.74	1.80	PB1	.70	.79	.66
			PB2	.61		

Note: ATT was measured with a 7-point semantic differential scale. SN, PBC, GPB, AC, AR, PN, and INT were measured with a response scale from 1 ("strongly disagree") to 7 ("strongly agree"). UN was measured with a response scale from 1 ("not like me at all") to 5 ("very much like me"). PB was measured with a response scale from 0 to 14.

2.1.3 | Perceived behavioral control

To measure the perception of control over reducing RPMC, we used three items: "How much do you feel that whether you reduce your red/processed meat consumption is beyond your control"; "Whether or not I reduce my RPMC is entirely up to me"; "I see myself as capable of reducing RPMC (Carfora, Caso, & Conner, 2017a). Higher scores indicated greater control over reducing RPMC ($\alpha = .76$).

2.1.4 | Universalism

To measure universalism, we employed three items of the Portrait Values Questionnaire (male and female versions), with answer scale ranging from 1 (not like me at all) to 5 (very much like me): "S/He strongly believes that people should care for nature. Looking after the environment is important to her/him"; "S/He thinks it is important that every person in the world be treated equally. S/He believes everyone should have equal opportunities in life"; "It is important to her/him to listen to people who are different from her/him. Even when s/he disagrees with them, s/he still wants to understand them" (Schwartz, 2007). Higher scores indicated a greater value of universalism ($\alpha = .70$).

2.1.5 | General pro-environmental beliefs

To assess general pro-environmental beliefs, we employed three items selected from the NHIP scale (Corral-Verdugo et al., 2008): "Human progress can be achieved only by maintaining ecological balance"; "Preserving nature now means ensuring the future for human beings"; "Human beings can progress only by conserving nature's resources." Higher scores indicated greater pro-environmental beliefs ($\alpha = .89$).

2.1.6 | Awareness of consequences

We assessed the awareness of consequences connected to an excessive RPMC with three items: "An excessive RPMC causes environmental problems"; "A reduction of RPMC contributes to the environmental protection"; "An excessive RPMC causes serious environmental problems, such as climate change" (adapted from Van Der Werff & Steg, 2015). Higher scores indicated greater awareness of consequences ($\alpha = .88$).

2.1.7 | Ascription of responsibility

Participants' ascription of responsibility was assessed with three items: "I think it is useful to reduce RPMC to reduce environmental problems"; "I can take on responsibility for the environment by reducing my RPMC"; "I think I can contribute to reducing environmental problems by reducing RPMC" (adapted from Van Der Werff & Steg, 2015). Higher scores indicated greater ascription of responsibility (mean $r = .76$; $p < .001$).

2.1.8 | Personal norm

We measured personal norm with three items: "I would feel guilty if I would not reduce my red/processed meat consumption"; "I feel morally obliged to reduce RPMC"; "Having an excessive RPMC is against my moral principles" (adapted from Van Der Werff & Steg, 2015). Higher scores indicated greater personal norm ($\alpha = .96$).

2.1.9 | Intention to reduce RPMC

To measure the intention to reduce RPC, we used three items: "I intend to reduce my RPMC"; "I plan to reduce my RPMC"; "I want to reduce my RPMC" (Carfora et al., 2017b). Higher scores indicated greater intention to reduce RPMC ($\alpha = .94$).

2.1.10 | Past RPMC

We assessed RPMC over the previous week with two items, with a response scale ranging from "0" to "more than 14": "How many servings of red meat have you eaten in the previous week?"; "How many servings of processed meat have you eaten in the previous week?" (Carfora et al., 2017b). Higher scores indicated greater consumption of red/processed meat in the previous week (mean $r = .43$; $p < .001$).

2.2 | Data analyses

All analyses were performed with a maximum-likelihood estimation approach using MPLUS 7. We first used confirmatory factor analysis to verify the measurement model. To verify the internal consistency among the measurement items for each variable, we used composite reliability. We also tested convergent and discriminant validities of our data. In the main analyses, we then verified our hypotheses (H1–H7). To do so, we ran structural equation modeling (*SEM*) analyses, which tested the goodness-of-fit of four nested models.

To test H1 regarding the TPB model, we built the basic Model 1, which included the paths from attitude, subjective norm, and perceived behavioral control to intention as free parameters. We also set correlations among TPB predictors. The regression weights of the other hypothesized paths (H2–H7) were fixed to 0. To test H2 regarding the impact of past behavior, we then included past behavior as predictor of intention (Model 2), with the regression weights of the other hypothesized paths (H3–H7) fixed to 0. We also set correlations among TPB predictors and past behavior.

To test H3 regarding the VBN model, we built the basic Model 3, which included the VBN path sequence as free parameters, from

universalism to intention to reduce RPMC through general pro-environmental beliefs, awareness of consequences, ascription of responsibility, and personal norm. We also tested if VBN model had direct effects on variables more than one level downstream. Therefore, we also included the paths from universalism to awareness of consequences, ascription of responsibility and personal norm, and the paths from general pro-environmental beliefs to ascription of responsibility to personal norm.

Finally, we built an integrated model (Model 4) where we inserted the following paths among TPB and VBN variables as free parameters: from awareness of consequences to attitude (H4); from personal norm to attitude (H5); from perceived behavioral control to ascription of responsibility (H6). We also set correlations among study variables that were not linked by a causal relationship. To investigate our H7 related to the mediating role of attitude, we tested all the simple and sequential mediation chains from VBN variables (including personal norm) to intention via attitude.

The adequacy of fit of measurement and structural models were tested using Chi-square and incremental goodness-of-fit indexes: root mean square error of approximation (RMSEA) < .05, comparative fit index (CFI) < .90, Tucker-Lewis index (TLI) < .90 and standardized root mean squared residual (SRMR) < .08 (Browne & Cudeck, 1993; Hu & Bentler, 1999). Models with significant Chi-Square test results were accepted on the condition that the CFI or TLI value reaches .95 or more, and the value of RMSEA was fewer than .08 (Hair, Anderson, Babin, & Black, 2010). To compare Model 1, 2, 3, and 4, we used a Chi-squared difference test ($\Delta\chi^2$), given their nested nature. If the $\Delta\chi^2$ value were significant for the reduced degrees of freedom, we could conclude that Model 4 had a better fit than the others.

3 | RESULTS

3.1 | Preliminary analyses

Table 1 shows means, standard deviations, composite reliability and AVE of each study variable, plus standard loadings of each item. Table 2 reports the estimates relevant to convergent and discriminant validity.

Confirmatory factor analysis showed that the measurement model fit the data satisfactorily (χ^2 (305) = 447.98, p < .001; RMSEA = .04, CFI = .96, TLI = .95, SRMR = .05). Results revealed that all the composite reliability values were greater than the minimum threshold of .60 (Bagozzi & Yi, 1988), ranging from .70 to .91. Thus, the reliability of the measurement model was confirmed.

The standardized item loadings of all observed variables on their corresponding latent constructs varied from .61 to .96 (Table 1), thus, being highly significant. The average variance extracted (AVE) from latent constructs ranged from .53 to .78. Thus, all AVE values were above the recommended threshold of .05 (Anderson & Gerbing, 1988; Fornell & Larcker, 1981). These findings showed that all measurement items presented a high convergent validity. Discriminant validity was also confirmed because all AVEs were higher than squared correlations between latent constructs (Fornell & Larcker, 1981).

3.2 | Main analyses

As shown in Table 3, the goodness of fit of Model 1 (TPB model alone) and Model 3 (VBN model alone) were not acceptable [Model

TABLE 2 Convergent and discriminant validity

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Attitude towards RPMC	**.57**	.35*	.24*	.12	.17*	.39*	.36*	.44*	.56*	−.20*
2. Subjective Norm		**.73**	.04	.08	.03	.09	.08	.11	.44*	−.16*
3. Perceived Behavioral Control			**.62**	.08	.06	.08	.22*	.23*	.13*	−.26*
4. Universalism				**.53**	.43*	.20*	.27*	.23*	.06	−.01
5. General Pro-environmental Beliefs					**.64**	.26*	.27*	.25*	.05	.03
6. Awareness of Consequences						**.76**	.65*	.53*	28.*	−.17*
7. Ascription of Responsibility							**.53**	.52*	.34*	−.29*
8. Personal norm								**.62**	.36*	−.27*
9. Intention to Reduce RPMC									**.66**	−.16*
10. Past RPMC										**.78**

Note: The values in the diagonal row (bold) are the average variance extracted by each latent construct. The numbers above diagonal are the correlation coefficients between the constructs.

Abbreviation: RPMC, red/processed meat consumption.

*p < .001.

TABLE 3 Goodness of fit and standardized factor loadings for each study model

	Model 1 (TPB model)	Model 2 (TPB model + past behaviour)	Model 3 (VBN model)	Model 4 (TPB + past behaviour + VBN model)
χ^2 (*df*)	444.96 (39); $p = .001$	421.71 (35); $p = .001$	254.37 (34); $p = .001$	6.24 (4); $p = .14$
RMSEA	.21	.22	.17	.04
CFI	.27	.30	.60	.99
TLI	.25	.24	.54	.96
SRMR	.21	.22	.16	.04
Attitude → Intention to reduce RPMC	.47**	.44**	Fixed to 0	.38**
Subjective norm → Intention to reduce RPMC	.28**	.30**	Fixed to 0	.30**
Perceived behavioural control → Intention to reduce RPMC	−.01	−.01	Fixed to 0	−.02
Past Behaviour → Intention to reduce RPMC	Fixed to 0	−.12**	Fixed to 0	−.10**
Universalism → General pro-environmental beliefs	Fixed to 0	Fixed to 0	.45**	.45**
Universalism → Awareness of consequences			.07	.07
Universalism → Ascription of responsibility			.11*	.13*
Universalism → Personal norm			.05	.05
General pro-environmental beliefs → Awareness of consequences	Fixed to 0	Fixed to 0	.23**	.23**
General pro-environmental beliefs → Ascription of responsibility			.05	.04
General pro-environmental beliefs → Personal norm			.05	.05
Awareness of consequences → Ascription of responsibility			.62**	.61**
Awareness of consequences → Personal norm	Fixed to 0	Fixed to 0	.29**	.31**
Ascription of responsibility → Personal norm	Fixed to 0	Fixed to 0	.34**	.31**
Personal norm → Intention to reduce RPMC	Fixed to 0	Fixed to 0	.37**	.14**
Awareness of consequences → Attitude	Fixed to 0	Fixed to 0	Fixed to 0	.22**
Personal norm → Attitude	Fixed to 0	Fixed to 0	Fixed to 0	.30**
Perceived behavioral control → Ascription of responsibility	Fixed to 0	Fixed to 0	Fixed to 0	.16**
R^2 attitude	–	–	–	.23
R^2 general pro-environmental beliefs	–	–	.20	.20
R^2 awareness of consequences	–	–	.07	.07
R^2 ascription of responsibility	–	–	.44	.47
R^2 personal norm	–	–	.37	.37
R^2 intention to reduce RPMC	.38	.39	.13	.42

Abbreviations: CFI, comparative fit index; *df*, degrees of freedom of chi-square statistics; RMSEA, root mean square error of approximation; RPMC, red/processed meat consumption; TLI, Tucker-Lewis fit index; TPB, theory of planned behaviour; VBN, value belief norm model; χ^2, goodness-of-fit statistics.

**$p < .001$; *$p < .05$.

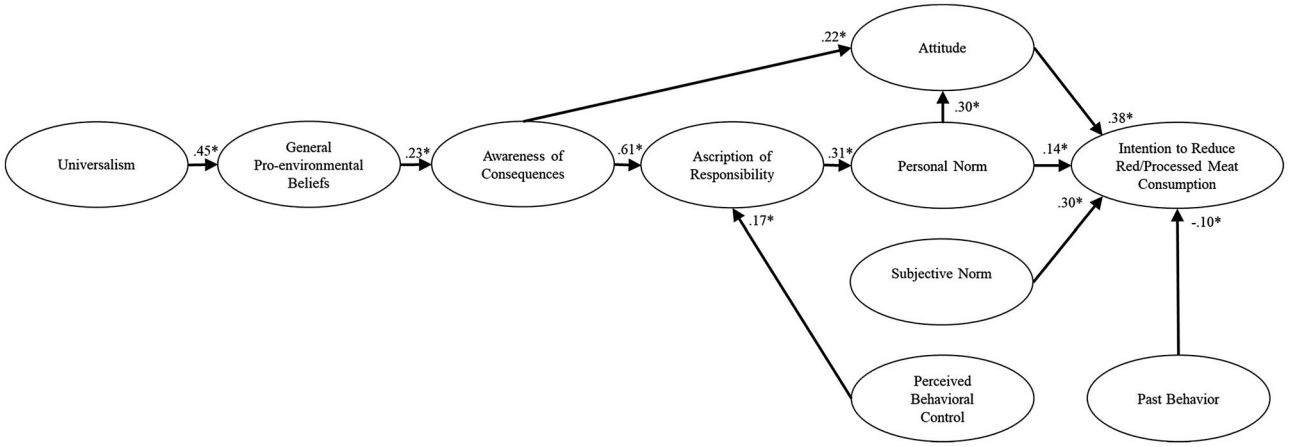

FIGURE 2 Path model with standardized regression coefficients. For the sake of simplicity, we did not report factor loadings of each item (showed in Table 1) and paths among the VBN variables more than one level downstream (showed in Table 3). *$p < .001$

1: χ^2 (39) = 449.96, $p < .001$; RMSEA = .21, CFI = .27, TLI = .25, SRMR = .21; Model 3: χ^2 (34) = 254.37, $p < .001$; RMSEA = .17, CFI = .60, TLI = .54, SRMR = .16]. The comparison between Model 1 (TPB model alone) and Model 2 (TPB model plus past behavior) supported the inclusion of past behavior in the TPB model ($\Delta\chi^2$ (4) = 23.25, $p = .001$). However, Model 2 still did not have an acceptable fit [Model 2: χ^2 (35) = 421.71, $p < .001$; RMSEA = .22, CFI = .30, TLI = .24, SRMR = .22]. The comparison between Model 2 and Model 4 ($\Delta\chi^2$ (31) = 415.47, $p = .001$) and between Model 3 and Model 4 ($\Delta\chi^2$ (30) = 248.13, $p = .001$), indicated that the integrated Model 4 (TPB + VBN) had the highest goodness of fit indices and the best explanatory power [χ^2 (4) = 6.24, $p = .14$; RMSEA = .04, CFI = .99, TLI = .96, SRMR = .04]. In Model 4, attitude ($R^2 = .23$), general pro-environmental beliefs ($R^2 = .20$), awareness of consequences ($R^2 = .07$), ascription of responsibility ($R^2 = .47$), and personal norm ($R^2 = .37$) had significant levels of explained variance. Importantly, Model 4 explained intention better ($R^2 = .42$), than the other tested models (Intention R^2: Model 1 = .38; Model 2 = .39; Model 3 = .13). For all these reasons, we accepted the integrated Model 4 as the best model to explain participants' intentions to reduce RPMC (Figure 2).

As regards the contribution of the TPB variables in explaining the intention to reduce RPMC, the results of Model 4 (Table 3 and Figure 2) showed that participants' attitude ($\beta = .38$; $p < .001$) and subjective norm ($\beta = .30$; $p < .001$) predicted the intention to reduce RPMC, while perceived behavioral control did not ($\beta = -.02$; $p = .68$). Thus, H1 was partially supported. In addition, the path of past RPMC on participants' intention to reduce RPMC was significant ($\beta = -.10$; $p < .001$), confirming H2.

As regards the contribution of the VBN variables in explaining the intention to reduce RPMC, the findings of Model 4 fully confirmed our H3. Results showed that universalism predicted general pro-environmental beliefs ($\beta = .45$; $p < .001$). Moreover, participants' pro-environmental beliefs predicted awareness of consequences ($\beta = .23$; $p < .001$), which in turn predicted ascription of responsibility ($\beta = .61$; $p < .001$). Findings also showed that ascription of responsibility predicted personal norm ($\beta = .31$; $p < .001$), which in turn explained the intention to reduce RPMC ($\beta = .14$; $p < .001$). Looking for direct effects among VBN variables more than one level downstream, we found that universalism also predicted ascription of responsibility ($\beta = .13$; $p < .001$) and awareness of consequences also predicted personal norm ($\beta = .31$; $p < .001$).

We then examined the hypothesized relationships among TPB and VBN variables. As we had stated in H4 and H5, awareness of consequences ($\beta = .22$; $p < .001$) and personal norm ($\beta = .30$; $p < .001$) influenced participants' attitude. Moreover, perceived behavioral control explained participants' ascription of responsibility ($\beta = .16$; $p < .001$), supporting our H6.

Finally, we tested H7 by assessing whether attitude toward reducing RPMC mediated the impact of the VBN chain on intention (Table 4). Results showed that the stronger mediation chains were the path from ascription of responsibility to intention via attitude (*Ind. Effect* = .14; $p = .001$), and the path from awareness of consequences to intention via attitude (*Ind. Effect* = .10; $p = .001$). The full chain from universalism to intention via the other VBN predictors was significantly mediated by attitude (.01; $p = .02$), thus, confirming H7. In sum, our results confirmed the importance of considering attitude as an important part of the sequential chain from universalism to intention to reduce RPMC, given that this mediation had a higher indirect effect on intention, compared to the chain that considered only the mediating role of the VBN variables.

4 | DISCUSSION

The purpose of the present study was to integrate an explanation of the intention to reduce RPMC based on a rational cost-benefit analysis with an explanation based on value-based motives. To do so, we integrated the TPB predictors, which are based on a rational-choice deliberation, with the VBN predictors, which are based on values and moral norms. Our results confirmed the predictive power of a model that integrates rational and moral motives (plus past

TABLE 4 Mediating paths from VBN predictors to intention via attitude

	Indirect effect	*p*
PN → ATT → INT	.14	.001
AC → ATT → INT	.10	.001
AR → PN → ATT → INT	.08	.001
AC → AR → PN → ATT →INT	.04	.001
GPB → AC → AR → PN →ATT → INT	.01	.02
UN → GPB → AC → AR →PN → ATT→INT	.01	.02

Abbreviations: AC, awareness of consequences; AR, ascription of responsibility; ATT, attitude toward reducing RPMC; GPB, general pro-environmental beliefs; INT, intention to reduce red/processed meat consumption; PN, personal norm; UN, universalism.

behavior). Our results have several theoretical and practical implications, concerning the psychosocial predictors of the intention to reduce RPMC, and also more generally the predictors of pro-environmental intentions.

First, we found that the combined TPB + VBN model is more effective than the classic TPB or VBN models in explaining RPMC, because TPB and VBN are designed to capture different aspects of a person's intention. The TPB model is meant to capture motives related to individual cost-benefit analyses, whereas the VBN focuses more on moral motives. Our results showed that participants' intention to reduce RPMC is strongly associated with a rational consideration of benefits related to the behavior in question, which in turn is based on moral considerations connected to pro-environmental motives. These results are in line with the study of Shin et al. (2018) showing that rational motives such as attitude and subjective norm are the best predictors of the intention to choose organic menu items, compared to pro-environmental motives. The present study contributes to the current literature by showing that the rational motives are not separated by the moral motives, which rather seem to be their precursors.

Second, the present study contributes to the current literature on how to explain and increase people intention to act pro-environmentally via sustainable food choices, by showing the very important role of attitude. As we hypothesized, attitude was the strongest predictor of the intention to reduce RPMC and this was partly explained by both the awareness of the environmental consequences of an excessive RPMC and the personal norm to reduce it. The indirect effect of personal norm on intention via attitude has been so far scarcely investigated in relation to pro-environmental food choices (e.g., Fornara et al., 2016; Klöckner, 2013; Zhang et al., 2017). In this regard, what we found offers support to the existence of a close connection between the sense of a moral obligation to perform a pro-environmental behavior and its consequent pro-and-cons evaluation, suggesting that moral motives may guide participants' behavioral intention only if the consequences of the behavior are positively considered in individualistic terms. This result is in line with the new human interdependence paradigm (Corral-Verdugo et al., 2008), according to which people may have a utilitarian drive to behave in an ecological way. Moreover, the results of our mediation analyses suggest that the more people are guided by environmental values, are informed about environmental problems and feel they can contribute by reducing RPMC, the more they feel an obligation to reduce RPMC. This moral chain seems to induce the formation of a strong pro-environmental attitude, which in turn stimulates an intention to protect the environment through the adoption of a sustainable diet. To sum up, moral motives seem to guide the intention to reduce RPMC because they are the precursors of a rational positive evaluation toward it. Future studies might consider which communication or behavioral strategies can be usefully employed to support the transformation of values, beliefs, and norms in a coherent and favorable attitude toward reduced RPMC.

Third, our findings suggest that not only attitude, but also subjective norm is an important predictor of the intention to reduce RPMC. A previous study conducted in Italy (Carfora et al., 2017a) had not found a significant connection between the perception of a social pressure to reduce RPMC and the intention to reduce it. These different findings might be due to the increasing awareness of the impact of RPMC on the environment, suggesting that RPMC reduction is becoming a social trend in Italy. This suggests that a public communication aimed at reducing excessive RPMC by targeting related social norms might be successful (e.g., Sparkman & Walton, 2017; Stea & Pickering, 2019). Finding out that many consumers have reduced their RPMC to protect the environment might activate individuals' desire to adhere to societal standards and might stimulate a critical thinking both on why the majority of people is reducing RPMC and whether their own contribution may be relevant.

Finally, the present study showed that participants feel a moral obligation to protect the environment from the damages associated with excessive RPMC (i.e., the ascription of responsibility) when they can control their food choice (i.e., perceived behavioral control). This is line with past studies showing that personal responsibility is perceived or attributed to others when an outcome is considered as controllable (Alicke, Buckingham, Zell, & Davis, 2008). Thus, public policy should stress the presence of alternative food choices that can substitute the nutritious values of meat, as well as it should allow people to have an easier access to more plant-based food.

Our results showed a low relationship between the awareness of the environmental consequences of excessive RPMC and participants' attitude toward reducing RPMC. This low direct effect may be attributable to the fact that attitude has also affective and conative dimensions, which we did not address here. Future studies may attempt to overcome these limitations, controlling whether our model would produce similar results both when tested in different countries and when taking into account a more complex and exhaustive definition of attitude. In our study there was also a significant but low correlation between past RPMC and intention to reduce RPMC. This result might be due to the paradoxical effects of experience, according to which past behavior may strengthen but

also weaken future intention (Sheeran et al., 2017). While usually experience enhances intention stability, in some cases, after people have acquired a certain amount of experience, further experience can reduce intention. The presence of both conditions among our consumers could explain the low relationship we found between past behavior and intention. To better understand this relationship, future research could consider whether consumers are in a process of either changing or stabilizing their intentions. This could be evaluated, for example, by assessing their stage of change (see Klöckner & Ofstad, 2017) or by verifying the interaction between experience and intention in predicting future behavior (Sheeran et al., 2017).

The present research has some limitations. First, our findings are related to a self-selected sample of Italian participants and, therefore, they are not generalizable to other populations. Second, past behavior was assessed only with self-report measures. Third, while the question on past behavior regarded eating RPMC, the assessment of intention regarded willingness to reduce RPMC, and this might be a further reason of the low correlation between past behavior and intention discussed above.

Thanks to a better understanding of the psychosocial aspects related to people's intention to reduce RPMC, our findings offer some suggestions regarding the possibility to develop effective public communication on this issue. For example, reference to subjective norm and personal norm, in addition to providing information about the environmental impact of excessive RPMC, can be fruitful strategies to encourage people to reduce their red and processed meat consumption. The same holds for a communicative stress on both rational and emotional motives related to reduced RPMC, such as health and well-being benefits (Bertolotti, Carfora, & Catellani, 2020; Carfora, Di Massimo, Rastelli, Catellani, & Piastra, 2020), anticipated affective reactions (Carfora et al., 2018), or utilitarian and hedonic motivation (Lombardi et al., 2017).

To conclude, our results suggest that research based of the Theory of Planned Behavior (TPB) can be usefully integrated with research based on the Value-Based-Norm model (VBN), providing a richer explanation of the intention to make sustainable food choices. Future research will test whether the effectiveness of this integration will be also confirmed with regard to other sustainable behavioral domains.

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