



Antecedents of green purchase choices: Towards a value-oriented model

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ABSTRACT

In this individual-differences study, we aimed to investigate the antecedents of green purchase choices by considering a wide array of situation-specific predictors, with a special focus on the role of values (green values and religiosity). In a sample of Italian respondents (N = 2340), we measured sociodemographic features (age, sex, income, education, family size), green values, religious beliefs and commitment, attitudes toward green products, information seeking on green issues, importance and uncertainty attached to green purchasing, skepticism toward green advertising, and various facets of external environmental locus of control. Hierarchical regression analysis showed that the main predictors of green purchase choices were green values, green information seeking, importance of green products, and attitudes towards green products, while religious commitment played only a minor role. A multi-layer path-analysis model depicted an articulated pattern of relationships between predictors and highlighted both the direct and the indirect effects of green values. Overall, predictors explained approximately half of the variance. Theoretically, these results offer a comprehensive and value-oriented view of green purchase choices, which can foster further investigations on pro-environmental behaviors. On the applied side, the findings suggest that nurturing green values and appealing to value-consistent behaviors can be helpful to stimulate pro-environmental purchase decisions.

1. Introduction

Green purchasing can be defined as the act of buying a variety of products manufactured in such a way so as to use fewer natural resources, cause less negative environmental impact, and produce less waste (Costa et al., 2021; Thøgersen et al., 2012). It represents one of the more relevant pro-environmental behaviors (henceforth PEBs) belonging to the individual sphere (Nguyen et al., 2016; Stern et al., 1999) that needs to be better understood in order to promote sustainable development (Alzubaidi et al., 2021; Gifford, 2014; Minton et al., 2015; Policarpo and Aguiar, 2020; Thøgersen et al., 2015; White et al., 2019), together with other PEBs belonging to the public sphere, like supporting environmental organizations or participating in environmental groups and protests.

Even if the number of individuals interested in social and environmental aspects connected to purchasing is constantly growing (De Canio et al., 2021; Costa et al., 2021), green choices are still far from being widespread (Chekima et al., 2016; Pinna, 2020). Indeed, some individuals claim to be concerned about their environmental impact, but they are not extensively engaged in green practices (Costa et al., 2021;

Song and Kim, 2018; Tseng and Hung, 2013). This inconsistency between stated environmental concern and actual green behaviors seems to be partly related to the degree of effort required by green practices (Fuentes and Sörum, 2019; Kalamas et al., 2014; Pinna, 2020). This may also hold for green products, which may be more complex to evaluate in terms of their cost-effectiveness due to their (real or perceived) higher price and sometimes complex or ambiguous information (Mainieri et al., 1997; Sharma and Joshi, 2017). Moreover, buying green products is perceived as requiring greater effort and behavioral cost (Steg et al., 2014a) and as riskier (Hassan et al., 2013), and consumers may have difficulty in appropriately weighing product attributes (Haws et al., 2014; Lin and Huang, 2012).

To better understand and foster the adoption of green purchasing, various scholars suggested the need to investigate more thoroughly the role of important internal drives such as individual values and motives, including green values (Haws et al., 2014; Nguyen et al., 2016) and religiosity (Bhuiyan et al., 2018; Martin and Bateman, 2014; Minton et al., 2015; Raggiotto et al., 2018). As pointed out by Oreg and Katz-Gerro (2006), changing individual lifestyles and behaviors requires addressing the underlying values, given that these changes also involve

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an expression of values. Indeed, making reference to green values and stimulating the reduction of cognitive dissonance via the implementation of PEBs, or through a commitment to PEBs, seems to be an effective way to promote environmental actions (Osaldiston and Schott, 2012), and this may extend to green purchasing behavior (Haws et al., 2014; Nguyen et al., 2016; Thøgersen and Ölander, 2002). In this context, an important aspect in need of more investigation relates to the direct vs. indirect role of green values as predictors of PEBs, with scholars usually assuming an indirect effect via more proximal predictors (e.g., Stern, 2000; De Groot and Steg, 2009) but not excluding a direct effect, at least in specific PEBs (e.g., Steg et al., 2014a).

However, green values may not represent the only set of relevant values when trying to predict green purchases. Indeed, given that people have multiple sets of values, the relations between these values need to be considered when studying PEBs in order to understand how different values systems contribute to the prediction of green buying behaviors (Gifford, 2014; Kautish and Sharma, 2019; Nguyen et al., 2016; Schwartz, 1999; Sharma and Jha, 2017; Steg et al., 2014b; Steg and De Groot, 2012). Besides green values, some scholars suggested that religiosity (Bhuiyan et al., 2018; Minton and Kahle, 2013; Taylor et al., 2016) could be considered as a predictor of PEBs. Indeed, some investigations detected a significant influence of religiosity on antecedents of green behaviors and PEBs, although the research on this topic is still scarce and inconsistent in its conclusions (see sect. 2.3 for a review).

Additionally, several scholars in psychological research (e.g., Bamberg and Moser, 2007; Gifford, 2014; Gifford and Nilsson, 2014; Steg et al., 2014a) and managerial research (e.g., Barbarossa and De Pelsmacker, 2016; Bhuiyan et al., 2018; Kalamas et al., 2014; Kumar et al., 2017; Sharma and Jha, 2017) pointed out the need to investigate in an integrated way a more comprehensive range of antecedents of PEBs, considering socio-demographic variables as well as different kinds of psychological constructs, while other researchers highlighted the importance of situation-specific (vs. general) predictors (e.g., Bamberg, 2003; Haws et al., 2014).

Starting from the needs and limitations pointed out by previous research, in our individual-differences study, we investigated the antecedents of green purchase choices by considering a wide array of relevant predictors in this specific context, with a special focus on the role of values (green values and religiosity). In particular, in our investigation on a sample of Italian respondents (N = 2340), we included socio-demographic features (age, sex, income, education, family size), green values, religious beliefs and commitment, attitudes toward green products, information seeking on green issues, importance and uncertainty attached to green purchasing, skepticism toward green advertising, and various facets of external environmental locus of control.

The objectives of our study were: (1) to assess the relative importance of these different predictors of green purchase choices, with a specific attention paid to green values and religiosity; (2) to assess both the direct and the indirect effects of green values and religiosity on green purchase choices. Related to these objectives, we aimed to answer the following research questions:

- (1) What is the relative importance of the different antecedents of green purchase choices included in our study in the prediction of this specific PEB?
- (2) Do green values and religiosity predict green purchase choices only through other variables (attitudes toward green products, involvement in green purchases, information seeking on green issues, skepticism toward green advertising, and external environmental locus of control) or they also exert a direct effect?

In the next section of the paper, we will specify how green values and religious beliefs and commitment are thought to be related to green purchases and we will explain the motivation for the inclusion of the other predictors considered in our research, providing empirical support via a literature review, and articulating our hypotheses for each

predictor (see also Table 1). We will then describe the method and the measures employed in our study and illustrate its results. Finally, we will discuss the theoretical, methodological, and applied implications of our findings, the limitations of our investigation, and the more promising future research directions.

2. Theoretical background and hypotheses

The theoretical background for the investigation of the role of values in PEBs is usually represented by models and frameworks that explicitly incorporate values as distal predictors (e.g., De Groot and Steg, 2007, 2009; Kautish and Sharma, 2019; Kautish et al., 2020; Nguyen et al., 2016; Steg et al., 2014a; Steg and De Groot, 2012; Stern, 2000), often expanding to a certain degree the theory of planned behavior (Ajzen, 1991) or the value-belief-norm theory (Stern, 2000). These models typically assume that values influence environmental behavior indirectly, via behavior-specific constructs such as beliefs, norms, attitudes, and intentions. In our study, we adopted a different approach in order to address the previously-mentioned need to employ a broader and situation-specific set of predictors of a given PEB (in our case green purchase choices). In particular, we derived from value-oriented theories the idea that values are fundamental distal predictors of PEBs, but we qualified them in the specific context of green purchases (see Haws et al., 2014). Moreover, following the need to investigate in an

Table 1
Summary of the hypotheses on antecedents of green purchases.

Predictor of green purchases	Relationship with green purchases	Relevant literature
Sex	Positively related (with 0/1 M/F scoring)	Chekima et al. (2016); Gifford and Nilsson (2014); Martin and Bateman (2014); Scannell and Gifford (2013); Zelezny et al. (2000)
Age	Positively related	Hines et al. (1987); Gilg et al. (2005)
Family size	Negatively related	Original hypothesis (but see Barber et al., 2014; Gilg et al., 2005)
Education	Positively related Positively related	Rice (2006) Casey and Scott (2006); Gifford et al. (1982)
Income	Positively related	Gilg et al. (2005); Khare (2015); Zhao et al. (2014)
Green values	Positively related (both directly and indirectly)	Haws et al. (2014); Kautish and Sharma (2019); Nguyen et al. (2016)
Religious beliefs, religious commitment, participation in a religious group	Negatively related (both directly and indirectly)	Eckberg and Blocker (1989); Tarakeshwar et al., (2001); Wolkomir et al. (1997); Woodrum and Wolkomir (1997)
	Positively related (both directly and indirectly)	Minton et al. (2015), 2016, 2018
Attitudes towards green products	Positively related	Chen and Tung (2014); Kautish and Sharma (2019); Kumar et al. (2017), 2021; Leonidou et al. (2010); Matthes and Wonneberger (2014); Thapa (2010)
Consumer involvement: Importance	Positively related	Thøgersen et al. (2012)
Consumer involvement: Uncertainty	Negatively related	Hassan et al. (2013); Chen and Chang (2013)
Information gathering	Positively related	Ho et al. (2015)
Skepticism towards green ads	Negatively related	Do Paço and Reis (2012); Shrum et al. (1995)
ELOC corporations	Positively related	Kalamas et al. (2014)
ELOC politics	Positively related	Kalamas et al. (2014)
ELOC God	Negatively related	Kalamas et al. (2014)
ELOC Nature	Negatively related	Kalamas et al. (2014)

integrated way a more comprehensive range of antecedents of PEBs (Bamberg and Moser, 2007; Gifford, 2014; Gifford and Nilsson, 2014), we included in our models sociodemographic variables, green values and religiosity, and several measures previously developed to investigate PEBs that can be conceived as situation-specific and more proximal predictors of green purchases (cf. Bamberg, 2003). In particular, we included attitudes toward green products, involvement in green purchases (importance and choice uncertainty attached to green products), information seeking on green issues, skepticism toward green advertising, and external environmental locus of control (ELOC) (see also sect. 3.3). The specific set of tailored predictors we used, guided by the literature review presented next (sect. 2.1 to 2.8), is a novel contribution of our study. Indeed, to the best of our knowledge, no previous study has employed this specific set of predictors, which we selected at the appropriate level of specificity to predict green product purchases and to reflect the application of green values and religiosity in everyday life contexts. In the next subsections, justifications for the inclusion of each of predictor, together with hypotheses on its role, will be specified.

2.1. Sociodemographic variables

Sociodemographic variables have been shown to predict actual or self-reported PEBs (for a review see Gifford and Nilsson, 2014). Women seem to be more committed to the state of the environment (Gifford et al., 1982) and more engaged in PEBs (e.g., Chekima et al., 2016; Martin and Bateman, 2014; Scannell and Gifford, 2013; Zelezny et al., 2000), including green purchases (Laroche et al., 2001). Older individuals seem more likely to act pro-environmentally (e.g., Hines et al., 1987; Gilg et al., 2005; Pinto et al., 2011), even if they seem to be less concerned about the state of the environment. According to some scholars, family size is positively related to PEBs (Rice, 2006), although Diamantopoulos et al. (2003) failed to find support for such a relation. Moreover, family size could also be negatively related with green purchases by limiting the family's financial budget available for green products, which are often perceived as more expensive than traditional products (e.g., Costa et al., 2021) and bought less often when income is lower (Barber et al., 2014). The literature shows mixed results about income (see Gifford and Nilsson, 2014), possibly related to variability in criterion measures. Although a few scholars have revealed a positive relationship between income and self-reported PEBs (e.g., Gilg et al., 2005; Khare, 2015; Zhao et al., 2014), other investigations obtained null results (Tilikidou, 2013). Better education (Casey and Scott, 2006; Gifford et al., 1982) and knowledge (cf. Hines et al., 1987; Kautish and Dash, 2017; Kautish and Sharma, 2020) are generally associated with more concern for the environment, willingness to be environmentally friendly, and pro-environmental action and behavior. Following these studies, we hypothesized that sex (being female), greater age, and higher income and education would be positively related with self-reported green purchases (see Table 1), while we contrasted two competing hypotheses on family size (positive vs. negative relation with green purchases).

2.2. Green values

Values have been defined as desirable trans-situational goals that represent guiding principles in the life of a person and vary in their importance (Schwartz, 1999; Schwartz and Bardi, 2001). Focusing on values is an effective way for describing and explaining similarities and differences between persons, groups, nations, and cultures (De Groot and Steg, 2007; Rokeach, 1973). Steg et al. (2014) suggested that values can promote pro-environmental behavior in various ways: by affecting the importance and perceived likelihood of different consequences of behavior (which influence choice), by activating norms affecting pro-environmental behavior, and by strengthening environmental self-identity, which in turn affects behavior. In the case of green product purchasing, all these ways can be operative. In particular, the third one

implies that people pursue specific values by engaging in activities that express values: if a person's self-concept is consistent with the meaning attributed to a behavior, the individual is more likely to engage in that particular action. Several studies have shown a relation between environmental self-identity and intentions to engage in PEBs (see Sparks and Shepherd, 1992; Steg et al., 2014a). Therefore, environmentally-oriented consumers should respond more favorably to products when these act as situational cues activating normative goals related to their core environmental value system (cf. Steg et al., 2014a), as presumably happens with green products.

The capacity of different values to predict PEBs has been the focus of previous studies (e.g., Nguyen et al., 2016; Sharma and Jha, 2017; Steg et al., 2014). While some scholars identified biospheric and altruistic values as relevant antecedents of PEBs (De Groot and Steg, 2009; Nguyen et al., 2016; Stern, 2000), other focused more on green values in relation to consumption and everyday decisions and highlighted a significant effect of green values on pro-environmental purchase behavior and intentions (e.g., Haws et al., 2014; Kautish and Sharma, 2019; Kautish et al., 2020). In our research, we focused on the latter conceptualization of green values, introduced by Haws et al. (2014) as "the tendency to express the value of environmental protection through one's purchases and consumption behaviors" (p. 337). Although green values seem to represent a particularly good predictor of green purchasing, values are a high-level construct in behavioral models of PEBs, and they are usually considered as more distal predictors of behavior than other constructs (Nguyen et al., 2016; see also Steg and De Groot, 2012). Therefore, we hypothesized that green values would be positively related with self-reported green purchases both directly (i.e., by being activated by green products and activating value-consistent purchase behavior via normative goals) and through other mediating constructs relevant in the specific purchase context: attitudes toward green products (see e.g., Kautish and Sharma, 2019), information search on green issues, and personal importance attached to green products (all presumably connected to green values).

2.3. Religious beliefs and commitment

According to some scholars, consumers' core values can be rooted in beliefs systems like religion (Minton et al., 2015), and religion can influence worldviews (e.g., Goplen and Plant, 2015) and set norms for behaviors (Cohen, 2009). The relationship between religion and environmentalism has raised an extensive debate especially in relation to Western monotheistic religions (see Leary et al., 2016). Some studies have supported White's (1967) initial hypothesis of a negative relationship between Western religions and sustainability, due to the Judeo-Christian anthropocentric idea that humans possess dominion over the Earth as an explanation for the acceptance of current environmental degradation. Indeed, some studies observed a negative effect of religiosity on environmental concern (e.g., Eckberg and Blocker, 1989; Hand and Van Liere, 1984) and a negative relation between theological conservatism and care for the environment (Tarakeshwar et al., 2001), but this support seems to hold mainly in relation to highly religious individuals or to more fundamentalistic approaches to religion (see also Wolkomir et al., 1997; Woodrum and Wolkomir, 1997). More recent studies observed a positive relationship between religiosity and product purchase (Felix and Braunsberger, 2016) and PEBs (e.g., Bhuian et al., 2018; Minton et al., 2016, 2018; Rice, 2006), although with differences between religions (Minton et al., 2015). In line with these findings, in more recent years, highly religious individuals might have been more engaged in PEBs also because prominent religious authorities (like Pope Francis) and churches are increasingly encouraging sustainability. In particular, some scholars have argued that ecological ethics and the problems of ecological degradation have become main themes of Catholic social thought (Felix and Braunsberger, 2016, see also Minton et al., 2018), which implies a commitment to taking care of other beings and nature. However, still other research has documented the lack of

impact that religious commitment has on ecocentric attitudes and behaviors (Martin and Bateman, 2014) or that of the religious orientation on environmental attitudes (Felix and Braunsberger, 2016). Moreover, empirical evidence is very scarce in the European context, the cradle of the Catholic religion (cf. Orellano et al., 2020).¹ Furthermore, although there are some studies investigating the relationship between individual environmental values and religiosity (e.g., Rice, 2006; Sharma and Jha, 2017; Tarakeshwar et al., 2001), to the best of our knowledge no study has considered at the same time green values and religiosity in the prediction of green purchase decisions.

Martin and Bateman (2014) argued that one of the possible causes for the inconsistent results in the investigation of the relation between religiosity and PEBs might reside in the variety of measures used to assess religion-related constructs (e.g. simple religious affiliation, frequency of church attendance, biblical literalism). These measures are not always effective in capturing adherence to religious values in daily life. To overcome this limitation, in our study we measured both religious beliefs and religious commitment. In particular, religious commitment, defined as “the degree to which a person adheres to his or her religious values, beliefs, and practices, and uses them in daily life” (Worthington et al., 2003, p. 85), seems to be a promising construct to predict PEBs. Indeed, since individuals vary in their religious commitment and related behaviors, compliance with religious values could represent a predictor of green buying behavior (Minton et al., 2018). Considering the possibility, justified by the literature, that religiosity may have either positive or negative effects on PEBs, we tested these two competing hypotheses (see Table 1). Additionally, given that the relation between religiosity and green purchasing behavior may be mediated by other antecedents, in particular by green attitudes, we also hypothesized to observe also such mediated effect in our study.

2.4. Attitudes toward green products

Several studies highlighted the role of attitudes in predicting behavioral intentions (see Ajzen, 1991), including the ones related to PEBs (see Bamberg and Moser, 2007). Consumers with strong environmental attitudes believe that human action is necessary to protect nature for future generations (Martin and Bateman, 2014; Thapa, 2010). Some studies identified environmental attitudes as one of the antecedents of environmentally responsible behaviors (e.g., Casey and Scott, 2006; Fraj and Martinez, 2006), green purchase intentions (e.g., Chen and Tung, 2014; Kumar et al., 2017, 2021) or behavior (Leonidou et al., 2010; Matthes and Wonneberger, 2014; Thapa, 2010). Bamberg (2003) debated the direct influence of general attitudes (like environmental concern) on behavior and highlighted the direct influence of situation-specific attitudes only. In line with this reasoning, in our study we focused on attitudes toward green products (Matthes and Wonneberger, 2014), considering that green product purchasing was our criterion variable. Thus, we expected to observe a positive relationship between attitudes toward green products and self-reported green products purchases. We also expected that part of the relation between green values and green purchases would be partially mediated by attitudes toward green products.

2.5. Consumer involvement

Consumer involvement is defined by Zaichkowsky (1985) as the “perceived relevance of the object, based on inherent needs, values and interests” (p. 342). Involvement seems to be a significant aspect in the choice of green products (see Thøgersen et al., 2012). In this context,

¹ The great majority of Italian citizens in 2021 were Christian (82.1%; with 79.7% Catholic Christians). The remaining part of the population was atheist or agnostic (16.2%), with a small percentage of individuals professing other religions (1.7%). <https://italiaindati.com/le-religioni-in-italia/>.

involvement can be measured by assessing the importance attributed to green products (see Kapferer and Laurent, 1993 in relation to the interest dimension). A different facet of involvement, which can also be relevant in the case of green products, is the uncertainty associated with choices (labeled as probability of error by Kapferer and Laurent, 1993). Indeed, green products can be associated with more choice uncertainty (Hassan et al., 2013) and their environmental benefits can also be doubted due to greenwash practices (Chen and Chang, 2013). We hypothesized that a greater degree of involvement (i.e., higher importance and lower perceived uncertainty associated with green product choices) would be associated with more self-reported green purchasing (Thøgersen et al., 2012). We also expected that individuals with stronger green values would show more involvement. Thus involvement would partially mediate the relation between green values and green purchases.

2.6. Green information seeking

Individuals who are more willing to invest time and effort in information search will have the opportunity to learn more about the attributes of products and become better at evaluating them (Solomon et al., 2013), and this knowledge may also reduce consumers' uncertainty when making a choice (Kapferer and Laurent, 1993). Previous studies highlighted the positive relationship between individuals' knowledge of environmental issues and action strategies and PEBs (see Hines et al., 1987), including pro-environmental consumer behavior (e.g., Bhuian et al., 2018). Huang (2016) highlighted a positive relation between media exposure related to global warming and PEBs, while Ho et al. (2015) observed a positive relation between traditional media attention and green buying. Thus, we expected that individuals who searched for more information on green issues would show more frequent self-reported green purchases. We also expected that the effect of green values on green purchases would be partially mediated by information search, given that individuals may show a tendency to search for (and pay more attention to/remember) information consistent with their values and beliefs (e.g., Nickerson, 1998), which, in turn, can affect their evaluation of green products (Verplanken and Holland, 2002).

2.7. Skepticism towards green ADS

Skepticism is another aspect that can affect individual orientation toward green purchases, although the results are mixed and even contrasting (see Matthes and Wonneberger, 2014). Shrum et al. (1995) observed that the female green consumers are rather skeptical of advertising. Do Paço and Reis (2012) reported to have observed a positive relation between environmental concern and the degree of skepticism toward green claims on packages or ads. Chang (2011) found empirical support for the idea that ads associated with stronger claims induce more discomfort among participants with ambivalent attitudes toward green purchasing and products, leading them to discount the believability of the ad and of green claims, and resulting in more negative evaluations of the product. However, Matthes and Wonneberger (2014) found a negative relation between green consumerism (environmental concern, attitude toward green products, and green purchase behavior) and green advertising skepticism in U.S. consumers, and they also observed that it was the higher informational utility perceived in green ads by green Austrian consumers that decreased their green advertising skepticism. In our study, we followed the skeptical green consumer view and hypothesized that skepticism would be negatively related with self-reported green product purchasing.

2.8. External environmental locus of control

The locus of control construct (Levenson, 1974; Rotter, 1966) refers to the internal or external attribution about the control over life events. In recent years, with the growing emphasis on sustainability, some

scholars have begun to investigate environmental locus of control (ELOC) as a predictor of PEBs, highlighting the role of internal and external ELOC dimensions (Cleveland and Kalamas, 2015; Kalamas et al., 2014). Our study focuses on external ELOC, whose role has been underinvestigated (Kalamas et al., 2014). Drawing from Levenson's (1974) tripartite model, which implies three scales for internal, powerful others, and chance, Kalamas et al. (2014) conceived external ELOC as a multi-faceted construct with two separate dimensions: (1) powerful-others, such as governments and corporations, and (2) superior forces, such as chance or fate, but also including nature and God. Our study focused on four specific facets of external ELOC, deemed as more relevant in the prediction of green purchases: corporations, government and politics, God, and nature. In particular, following Kalamas et al. (2014), we hypothesized that individuals ascribing more responsibility to superior forces (i.e., God and nature) would assume a more fatalistic attitude associated with a lower willingness to act pro-environmentally (Gifford, 2011). As a consequence, they should be less likely to choose green products. On the contrary, those who attribute more responsibility to human institutions and corporations would be more oriented to change the state of things by individual and collective actions, and thus be also more likely to choose green products.

3. Method

3.1. Participants

Two-thousand four-hundred and ten Christian or agnostic/atheist participants belonging to the Italian population were recruited with snowball sampling via personal contacts and social networks. This sampling method is acceptable if the researchers' primary goal is to examine the relationships between values and behaviors (Bruine de Bruin and Bostrom, 2013), provided that the sample is sufficiently ample and not severely biased about the main variables of interest. Participants who filled in the whole survey that was administered (see sect. 3.2 and Supplementary Materials) were 2365 (thus, less than 2% dropped out). Considering that 25 participants were excluded because their stated age was lower than 18, or their stated nationality was not Italian (the survey was in Italian and on the Italian population), the final sample comprised 2340 participants. Considering that an a-priori power analysis for 18 predictors in multiple regression for detecting a small effect size with 0.95 power suggested a sample size of 1496 participants, the study can be considered very well powered. In order to reduce possible sampling biases, we tried to reach a wide range of heterogeneous respondents concerning the main sociodemographic characteristics (sex, age, income, education, and family size).

The final sample was almost in line with the national average values for sex (56.2% women vs 51.30%)² and marital status (41.6% married vs 47%).³ The majority of the sample had a yearly familiar income lower than 50,000 euro (35.5% of the sample between 15,001–30,000 euro, 29.7% between 30,001 and 50,000 euro), higher but not very far from the Italian average (at the time of the study being 31,393),⁴ Our participants were, on average, six years younger than the Italian population (39.39 vs 45.4 years old), had more years of education ($M = 15.16$ vs. approximately 10.78 in individuals older than 19),⁵ and higher-than-

average household size (3.46 members vs 2.3).⁶ Participants lived mainly in Northern Italy (74.2%), with the remaining part of the sample living in Central Italy (6.1%), Southern Italy (15.8%), and the Italian islands (3.8%). The choice of Italy as the target country (and of the associated Catholic-Christian religion) was motivated by the aim to study the relationship between green values, religiosity, and green purchasing. Indeed, Italy is the cradle of the Catholic-Christian faith and represents one of the European countries with more Christian Catholics, a cultural context so far neglected in previous studies on religion. The sample included 20% of individuals reporting a high level of intrapersonal Christian-Catholic involvement, according to the scale we used to assess religious commitment (see sect. 3.3.3).⁷ This percentage was in line with the Italian population's estimated number of "active and practicing" Catholics (Garelli, 2020). The percentage of participants taking part in a religious group was 30.3%.

3.2. Design, data collection, and data analysis plan

The study followed a correlational design, which is typical for individual-differences investigations in behavioral contexts (e.g., Bruine de Bruin et al., 2007; Del Missier et al., 2020), including the one on purchase-related PEBs (e.g., Costa et al., 2021; Kautish and Sharma, 2019; Nguyen et al., 2016). The criterion variable was a self-report measure of green product purchases and all the other measures variables were predictors (see also Table 1 and sect. 3.3). Data collection was carried out through an online survey. Although the online administration has the disadvantage of excluding individuals with no Internet access, it has the advantages of geographic reach and reduced social desirability bias (see also Alzubaidi et al., 2021). The investigation was carried out following the ethical guidelines laid down by the Declaration of Helsinki, and the data collection and handling procedures ensured the anonymity of respondents and data protection. Incentives were not provided because offering them in a study including answers on issues such as green and religious values, which are related to prosocial behavior, could have been counterproductive or perceived as devaluing the responses provided by participants (e.g., Kamenica, 2012).

Data analysis was carried out in three stages. Initially, we computed descriptive statistics, reliability (as internal consistency), and indicators of discriminant validity for our measures (sect. 4.1; cf. Shaffer et al., 2016). Then, we estimated a two-step hierarchical regression model to conduct a first test our hypotheses (see Table 1) and to appraise the relative importance of predictors of green purchase choices. In the first regression step, we entered into the model the sociodemographic variables, and in the second step all the other predictors (sect. 4.2). This allowed us to assess the incremental predictive power of the variables entered in the second step and to control for the influence of socio-demographic variables in the estimation of the other effects (Cohen et al., 2014). Finally, we estimated a layered path-analysis model by using the predictors that proved to be significant in the hierarchical regression analysis (in order to constrain model complexity) and by specifying theoretically-based constraints on variable ordering (sect. 4.3). This allowed us to assess the robustness of the hierarchical regression results and to test both the direct and indirect effects of green values (and of other predictors) on green purchases, overcoming the limitations of regression models in handling the intercorrelations between predictors and in testing complex networks of relationships between constructs (Cohen et al., 2014; Hair et al., 2010).

² Italian National Institute for Statistics (ISTAT): <https://www.istat.it/it/files/2019/12/C03.pdf>; same reference for mean age.

³ Agenzia Giornalistica Italiana: https://www.agi.it/fact-checking/matrimoni-divorzi_come_cambiata_italia-6450905/news/2019-10-29/.

⁴ Italian National Institute for Statistics (ISTAT): <https://www.istat.it/it/archivio/236432>.

⁵ Computation based on data retrieved from Italian National Institute for Statistics (ISTAT): <http://dati.istat.it/Index.aspx?QueryId=55980>.

⁶ Italian National Institute for Statistics (ISTAT): <https://www.istat.it/it/files/2019/12/C03.pdf>; same reference for mean age.

⁷ This was the percentage of participants having a mean value higher than or equal to 6 on the 7-point scale of religious commitment.

3.3. Measures

The complete set of items for all the measures described in this section is provided in the Supplementary Materials. With the exception of the sociodemographic items, participants were asked to express their disagreement/agreement with the statements belonging to the various measures or were asked to provide judgments of frequency (from *never* to *very often*). The responses were always provided on 7-point scales.

3.3.1. Sociodemographic variables

We assessed sex, age, marital status, years of education, employment status, household income (in six progressive classes), family size (respondent included), and participation in religious groups.

3.3.2. Green values

We measured green consumption values with five items taken from Haws et al. (2014), including both general items (e.g., "I would describe myself as environmentally responsible") and items more linked to our context of interest (e.g., "My purchase habits are affected by my concern about the environment"). We excluded a single item of the scale ("It is important to me that the products I use do not harm the environment") due to its possible overlap with the importance item in the measurement of involvement.

3.3.3. Religious beliefs and commitment

In assessing religious beliefs, the cognitive component of religiosity frequently measured in the literature, we employed two items from the Cornwall et al. (1986) traditional orthodoxy subscale, which appraises belief in traditional Christian doctrines. Based on their face value, we selected the items that seemed more applicable in a secularized catholic country like Italy (i.e., "I have no doubts that God lives and is real", "There is life after death"). Five items of the intrapersonal subscale taken from the Religious Commitment scale (Worthington et al., 2003; see also Martin and Bateman, 2014) were used to appraise religious commitment (e.g., "Religious beliefs influence all my dealings in life"). We excluded a single item of the subscale due to its apparent weaker relation with religious commitment in everyday life ("Religion is especially important to me because it answers many questions about the meaning of life").

3.3.4. Attitudes toward green products

We measured attitudes by considering that they should better predict behaviors when there is a correspondence in measurement at least for what concerns their target and action elements (Ajzen and Fishbein, 1977), and by taking into account the findings showing the direct influence of situation-specific attitudes only (Bamberg, 2003). Therefore, we measured attitudes towards green products by using four items taken from Matthes and Wonneberger (2014), with an example being "I feel positive towards green products".

3.3.5. Consumer involvement

We measured two aspects of involvement in green purchasing: importance and uncertainty. Importance is the personal interest a person has in a specific product category, and it was assessed with a single item of the interest dimension ("I attach great importance to green products") adapted from the scale of consumer involvement of Kapferer and Laurent (1993). Uncertainty is related to the perceived risk of making a poor choice, and it was assessed by using the four items of Kapferer and Laurent's *probability of error* subscale, adapted to green purchases (e.g., "When you choose green products, you can never be quite sure it was the right choice or not").

3.3.6. Green information seeking

Green information seeking was assessed with three novel items designed to assess reliance on TV and on the web for finding information about green issues (e.g., "I watch TV programs about green issues"; see Ho et al., 2015; Huang, 2016) and environment-related activity on social

networks (see Han et al., 2018).

3.3.7. Skepticism toward green advertising

Skepticism toward green advertising was measured with three items taken from Matthes and Wonneberger (2014). An example is "I do not believe most green claims made in advertising".

3.3.8. External environmental locus of control

Following Kalamas et al. (2014), we measured four facets of the environmental ELOC. We used a total of fifteen items referred to corporations (3 items), government and politics (4 items), God (5 items), and nature (3 items). Examples are as follows: "Multinational corporations should accept the responsibility for improving the state of the environment", "Politicians can have an impact on the state of the environment", and "The current state in which we find the environment reflects God's will", "Global warming has a lot to do with our planet's natural climate cycles".

3.3.9. Green product purchases

The criterion variable was a self-report measure of green product purchases: we asked participants to report how often, in the last year, they have made a special effort to buy green products or to avoid buying products that harm the environment (Kalamas et al., 2014). To overcome the limitation represented by the tendency to assess only purchases of a specific product (see Alzubaidi et al., 2021), we measured a wide range of buying behaviors by using eleven items taken from Kalamas et al. (2014) and Matthes and Wonneberger (2014). Specifically, we investigated different nuances of green consumer purchases by focusing both on purchasing environmentally friendly alternatives (e.g., buying "food that is organically grown, without pesticides/chemicals") and on the avoidance of ecologically damaging products (e.g., avoid buying a product because "It had environmental-harmful packaging").

4. Results

4.1. Reliability and discriminant validity

Table 2 shows descriptive statistics for all the variables included in our study and their reliabilities. Reliability ranged from good to excellent (Cronbach's alpha from .84 to .94), except for the information-seeking scale that showed a lower but acceptable alpha (0.78). Discriminant validity was assessed by computing the disattenuated bivariate correlations between all the measures (i.e., the scale score correlation from which the effect of unreliability was removed; see e.g. Shaffer et al., 2016), employing Cronbach's alpha as the reliability indicator. When reliability was unavailable, due to single-item measurement, simple bivariate correlations were computed. Then, each correlation was compared with a threshold value of 0.80 to assess potential problems related to discriminant validity (Rönkkö and Cho, 2022). Only two correlations exceeded the threshold: the one between religious belief and commitment ($r = 0.82$, disattenuated $r = 0.99$) and the one between ELOC politics and ELOC corporations ($r = 0.67$, disattenuated $r = 0.85$). Thus, we estimated the hierarchical regression models (sect. 4.2) with and without the problematic variables (religious belief and ELOC politics), and results and conclusions about predictors did not change. Moreover, given that religious commitment was the only significant predictors of green purchases in hierarchical regression among the two pairs of highly-intercorrelated variables, only religious commitment was included in the path-analysis model (sect. 4.3). Thus, our models were not significantly affected by discriminant validity problems.

4.2. Hierarchical multiple regression

We conducted a hierarchical multiple regression analysis to identify

Table 2
Descriptive statistics for all the variables.

	Age	Education	Family size	Income	Green values	Rel. belief	Rel. commit.	Green attitudes	Importance	Uncertainty	Information	Skepticism	ELOC corp.	ELOC politics	ELOC nature	ELOC God	Green purchases
N	2340	2338	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340
Mean	39.39	15.16	3.46	2.73	5.24	4.34	3.60	5.19	4.76	3.81	3.37	3.80	6.08	6.01	3.78	2.05	4.26
Median	36	13	3	3	5.60	4.50	3.40	5.37	5.00	4.00	3.00	4.00	6.67	6.25	4.00	1.00	4.36
Standard deviation	15.56	3.58	1.72	1.27	1.34	2.19	2.08	1.11	1.73	1.50	1.53	1.52	1.21	1.21	1.72	1.54	1.43
Minimum	18	5	1	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	90	21	22	6	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Skewness	0.45	-0.37	1.67	0.86	-1.00	-0.19	0.20	-0.55	-0.50	-0.01	0.48	0.09	-1.90	-1.83	0.04	1.50	-0.30
Kurtosis	-0.95	-0.37	9.16	0.43	0.47	-1.44	-1.42	-0.16	-0.67	-0.73	-0.55	-0.69	3.81	3.56	-1.03	1.22	-0.64
Reliability	NA	NA	NA	NA	.92	.88	.95	.93	NA	.85	.78	.84	.87	.91	.90	.94	.93

Note. NA = Not available. Abbreviations: Rel. belief: religious beliefs; Rel. commit: religious commitment; Green attitudes: attitudes toward green products; Importance: importance of green products; Uncertainty: uncertainty in green choices; Information: information seeking on green issues; Skepticism: skepticism toward green ads; ELOC: External locus of control.

the predictors of green purchases, assess their relative contribution, and test the previously-specified hypotheses (Table 1). In the first step of the regression, we included in the model the sociodemographic variables (sex, age, income, family size, education, participation in a religious group) in order to appraise their effects on the criterion variable (self-reported green product purchases). In the second step, we included all the other relevant predictors (green values, religious beliefs and commitment, attitudes toward green products, importance of green products, uncertainty in green choices, information seeking on green issues, skepticism toward green ads, and the four ELOC measures) while controlling for the predictors added in the first step. The results of the hierarchical regression analysis are reported in Table 3.

The model, including sociodemographic variables, showed a significant effect, explaining 7% of the variance. Entering the other predictors led to a marked increase in the model explanatory power, with 53% of the variance explained. Indeed, model comparison confirmed the significant difference in R² between the models, $F(12, 2319) = 188.07, p < .001$. The estimated effects and their significance in the final model are reported in Table 4 (predictors are ordered according to their standardized effect size in the sixth column). The analysis showed that the stronger predictors of green purchases are (in descending order): green values, green information seeking, importance of green products, attitudes toward green products, uncertainty toward green choices, and sex. In particular, and as predicted, self-reported green purchases increased when the participant held stronger green values, sought for more green information, attributed more importance to green products, had more positive attitudes toward green products, and was female. Green purchases decreased when the participant perceived green choices as more uncertain. Other significant predictors with a weaker effect were religious commitment, age, family size, and ELOC God. Green purchases increased with age and external attribution to God but decreased with more religious commitment and the number of family members. Only the second finding in this last set ran against the hypothesis, while the others were aligned with our predictions.

Considering that VIF values for some of the predictors (Table 4, last column) as well as discriminant validity analysis (sect. 4.1) signaled two potential overlaps between religious belief and religious commitment, and between ELOC politics and ELOC corporations, we removed religious belief and ELOC politics from the pool of predictors and re-estimated the hierarchical regression models. The results were very similar to the ones obtained without excluding these predictors: same variance explained, same significant and nonsignificant predictors, and very similar regression coefficients (paired *t*-test: $t = -0.066, df = 15, p = .948, d = -0.016$). Therefore conclusions did not change.

4.3. Path analysis

In order to overcome potential limitations of regression analysis due to correlations between predictors, to test the hypothesis about the indirect/direct effects of values, and to offer a more comprehensive picture of the relations between the investigated constructs, we estimated a path analysis model including the main predictors of green purchases (i. e., the significant ones according to hierarchical regression analysis). The model was estimated with Amos 22 and the maximum likelihood method.

Following standard practice (e.g., Cohen et al., 2014), we ordered the variables in the model by considering the sequence of potential relations between them according to the relevant literature, and thus making more distal predictors of green purchase behavior appear earlier in the order than more proximal ones (e.g., Bamberg and Moser, 2007; Stern, 2000). This led to the following layers of predictors: demographic layer (sex, age, family size), value layer (green values, religious commitment), proximal layer (information seeking on green issues, importance of green products, attitudes toward green products, uncertainty in green choices, ELOC God).

We then estimated a model in which all the variables in a layer were

Table 3
Hierarchical regression results.

Model	R	R ²	Adjusted R ²	F	df1	df2	p
1. Socio-demographics	0.26	0.07	0.07	28.93	6	2331	< .001
2. All predictors	0.73	0.53	0.53	144.31	18	2319	< .001

Table 4
Results of the final model of hierarchical regression.

Predictor	B	SE	t	p	β	Lower 95% CI B	Upper 95% CI B	VIF
Intercept	-0.011	0.186	-0.60	0.95		-0.376	0.354	
Green values	0.362	0.021	17.32	< .001	.337	0.321	0.403	1.86
Information	0.217	0.015	14.18	< .001	.231	0.187	0.247	1.30
Importance	0.189	0.015	12.40	< .001	.228	0.159	0.219	1.66
Green attitudes	0.143	0.023	6.20	< .001	.111	0.098	0.188	1.56
Uncertainty	-0.089	0.016	-5.42	< .001	-.093	-0.122	-0.057	1.46
Sex	0.219	0.043	5.09	< .001	.076	0.135	0.303	1.09
Religious commitment	-0.047	0.019	-2.50	.012	-.068	-0.084	-0.010	3.64
Age	0.006	0.002	3.70	< .001	.060	0.003	0.008	1.31
Family size	-0.043	0.013	-3.43	.001	-.052	-0.068	-0.019	1.13
ELOC God	0.045	0.016	2.85	.004	.049	0.014	0.076	1.44
ELOC corporations	0.029	0.025	1.16	.247	.024	-0.020	0.078	2.16
Education	0.008	0.006	1.29	.198	.020	-0.004	0.020	1.17
Income	0.021	0.017	1.25	.213	.019	-0.012	0.054	1.11
ELOC politics	-0.021	0.023	-0.92	.359	-.018	-0.067	0.024	1.92
Religious beliefs	0.010	0.017	0.58	.560	.015	-0.023	0.043	3.23
Religious group	0.024	0.048	0.50	.615	.008	-0.070	0.119	1.17
Skepticism	-0.008	0.016	-0.47	.636	-.008	-0.039	0.024	1.44
ELOC nature	-0.003	0.013	-0.26	.797	-.004	-0.029	0.022	1.20

Note. Abbreviations: Importance: Importance of green products; Information: information seeking on green issues; Green attitudes: attitudes toward green products; Uncertainty: uncertainty in green choices; ELOC: External locus of control; Skepticism: skepticism toward green ads.

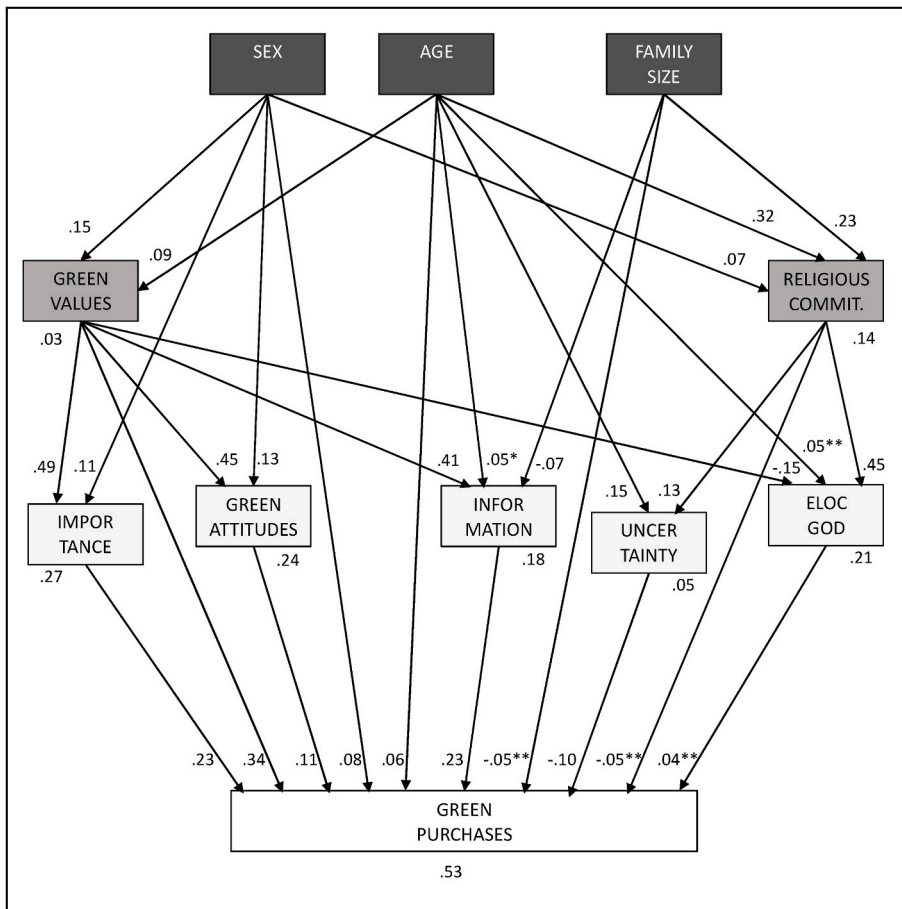


Fig. 1. Path analysis model of antecedents of green purchases

Note. Variables in the demographic layer are in dark-gray boxes, variables in the value layer are in medium-gray boxes, and variables in the proximal layer are in light-gray boxes. Numbers close to the arrows represent standardized coefficients, those under each variable represent the variance explained (R²) for that variable. All coefficients are significant at the p < .001 level, with the exceptions of those marked with ** (p < .01), or * (p < .05). For clarity, the following significant relations between predictors belonging to the same layer are not reported in the figure: Demographic layer: Sex–Age (0.11, p < .001), Age–Family size (-0.13, p < .001); Value layer: Green values–Religious commitment (0.20, p < .001); Proximal layer: Importance–Green attitudes (0.34, p < .001), Green attitudes–Information (0.14, p < .001), Uncertainty–ELOC God (0.14, p < .001), Importance–Information (0.22, p < .001), Importance–Uncertainty (0.08, p < .001), Importance–ELOC God (0.05, p = .01), Information–ELOC God (0.05, p = .01). Standard errors of all coefficients and the correlation matrix of all the variables are presented in Supplementary Materials. Abbreviations: Importance: Importance of green products; Green attitudes: attitudes toward green products; Information: information seeking on green issues; Uncertainty: uncertainty in green choices; ELOC: External locus of control.

predicted by all the variables in the preceding layers, and all the variables in each layer were fully interconnected with undirected relations, avoiding the imposition of any theoretically unjustified assumptions. Finally, all the variables of all layers were predictors of green purchasing. After estimation, we pruned the nonsignificant relations in the model to reduce its complexity, and re-estimated it. The final model is presented in Fig. 1.

The final model showed a very good fit ($\chi^2 = 25.524$, $df = 18$, $p = .111$; $\chi^2/df = 1.418$, $CFI = 0.999$, $RMSEA = 0.013$), with predictors explaining more than 50% of the variance in the criterion variable. In line with hierarchical regression, the main direct predictors of green purchases were green values, information seeking on green issues, importance of green products, attitudes toward green products (all positively related to green purchases, even when considering their interrelations), and uncertainty in green choices (negatively related to green purchases). There were also smaller effects of age, sex, and family size (being female or older was positively associated with green purchases, while having a bigger family was negatively associated with green consumption). Other small direct effects are the ones of religious commitment (negative) and ELOC God (positive), meaning that a greater religious commitment was associated with fewer green purchases, while a greater tendency to attribute control to a religious entity was associated with greater green consumption. Table 5 summarizes standardized direct and indirect effects of all the predictors on green purchases, estimated with 10,000 bootstrapping cycles and the bias-corrected percentile method.

Beyond the direct effects already described, four significant indirect effects on green purchases are apparent: three are positive (green values, sex, and age; in descending order of magnitude), and one is negative (family members). In particular, green values exert a significant indirect effect on green purchases via their relations with green information seeking, importance of green products, and attitudes toward green products, which are also positively associated. The indirect effect of religious commitment on green purchases is nonsignificant and very close to zero, perhaps for the contrasting effects of a negative path through uncertainty and a positive one via ELOC God.

As a further assessment of the importance of the green values construct (and its discriminant validity), we estimated a nested model in which all the directed relationships originating from the green values variable were removed. This model had a very poor fit ($\chi^2 = 1425.433$, $df = 23$, $p = .000$; $\chi^2/df = 61.975$, $CFI = 0.737$, $RMSEA = 0.161$), and the fit was significantly lower than the fit of the previous model ($\chi^2_{diff} = 1399.909$, $df = 5$, $p < .001$). Additionally, the variance explained in the criterion variable dropped from 50% to 44%. These findings confirmed

Table 5
Standardized direct, indirect, and total effects of predictors on green purchases with 95% confidence intervals.

Predictor	Direct effect with 95%CI [low high]	Indirect effect with 95%CI [low high]	Total effect with 95%CI [low high]
Green values	.344 [.306 .382]	.248 [.222 .275]	.592 [.562 .620]
Sex	.076 [.047 .105]	.126 [.100 .152]	.202 [.163 .238]
Age	.055 [.026 .086]	.039 [.011 .067]	.095 [.057 .133]
Family size	-.048 [-.077 -.020]	-.026 [-.038 -.014]	-.074 [-.104 -.044]
Religious commitment	-.054 [-.089 -.018]	.007 [-.009 .023]	-.047 [-.078 -.015]
Information	.229 [.197 .261]	-	.229 [.197 .261]
Importance	.228 [.190 .265]	-	.228 [.190 .265]
Green attitudes	.112 [.078 .148]	-	.112 [.078 .148]
Uncertainty	-.098 [-.127 -.069]	-	-.098 [-.127 -.069]
ELOC God	.044 [.010 .078]	-	.044 [.010 .078]

Note. Abbreviations: Information: information seeking on green issues; Importance: Importance of green products; Green attitudes: attitudes toward green products; Uncertainty: uncertainty in green choices; ELOC: External locus of control.

that the construct of green values plays an essential and unique predictive role in the model.

5. Discussion

Our study aimed to contribute to the literature on predictors of green purchases. To this aim, we analyzed the role of green values and religiosity within a broader network of relationships with other potential situation-specific predictors of self-reported green purchases, in order to provide a more comprehensive account of the antecedents of green product choices. In the following subsections we will discuss the theoretical, methodological, and applied implications of our findings, as well as the limitations of our study in relation to possible future research directions.

5.1. Theoretical and methodological implications

The result supported the idea that green values are a fundamental predictor of green purchasing, in agreement with precedent studies (Haws et al., 2014; Kautish and Sharma, 2019). They suggest that values can have a significant role when, as in our case, the nature of purchase behavior triggers value-related evaluations (Steg et al., 2014a). Notably, according to our results, values have both a direct and indirect effect on purchase behavior via several more proximal mediators.

According to our findings, religiosity seems to be very weakly related to self-reported green purchases (see also Martin and Bateman, 2014) despite our efforts to measure it also in terms of religious commitment in common life, following previous studies (Martin and Bateman, 2014; Worthington et al., 2003). According to De Groot and Steg (2009), when several competing values are activated in a particular situation, choices are based on the most important ones in that situation. In agreement with this perspective, our results show that green values are more important than religious beliefs and commitment (in our case, related to the Christian-Catholic religion) in the context of green purchasing. In this situation, choices seem to be guided by the green value system, which can affect purchase decisions in various ways (Steg et al., 2014a), including the expression of self-identity. Overall, our results suggest that to encourage green PEBs in the context of purchasing choices, individuals need to develop a green value system, which will foster the implementation of these values when making purchase decisions (Haws et al., 2014). Conversely, if the personal identity constructed over time is based primarily on a different value system, which does not attach great importance to green values, then the individual will be less likely to adopt green beliefs and behaviors (e.g., De Groot and Steg, 2007; Honkanen and Verplanken, 2004; see also De Groot and Steg, 2009 on how to cope with this issue).

In our study, we observed two minor direct effects related to religion. The first is a small positive relationship between external attribution to God and self-reported green purchases, when controlling for the stronger relations between green values and external attribution to God (negative) and religious commitment and external attribution to God (positive) and the direct effects of green values and religious commitment on green product choices. This unexpected relation runs against the idea that external attribution to religious entities *per se* fosters a more fatalistic attitude towards green behaviors and thus discourages PEBs (e.g., Gifford, 2011; Kalamas et al., 2014). A tentative explanation, which needs to be investigated in future research, may reside in the more recent attitude in a part of the Catholic-Christian community, following Pope Francis' appeals and the influential encyclical *Laudato Si'*, according to which believing in the influence of God and taking responsibility to protect the environment are not seen as conflictual but as interrelated (Felix and Braunsberger, 2016; see also Minton et al., 2018). The negative direct effect of religious commitment shows instead that individuals who declare a high level of commitment are less likely to engage in self-reported green purchases when controlling for the positive correlation between green value and commitment. This result is

compatible with the possibility that part of the more religiously-committed individuals are less environmentally-oriented (Eckberg and Blocker, 1989; Tarakeshwar et al., 2001; Wolkomir et al., 1997; Woodrum and Wolkomir, 1997). Overall, our findings show that the relationship between religiosity and green PEBs is much more complex than expected, and they suggest that the role of religiosity should be investigated together with other constructs, in particular together with environmental values.

The results of path analysis confirmed the importance of studying the interconnections of the individual value systems with other significant predictors of green purchases. Specifically, the effect of the strongest predictor, green values, needs to be considered together with the effects of other significant predictors. For what concerns the sociodemographic predictors, we highlighted the positive effects of age and sex (i.e., being female) and the negative effect of family size. The first two findings are in line with the literature on environmental psychology. Indeed, PEBs increase with age among adults (Hines et al., 1987; Gilg et al., 2005) and women are more sensitive and active when it comes to environmental issues (Chekima et al., 2016; Gifford and Nilsson, 2014; Martin and Bateman, 2014; Scannell and Gifford, 2013; Zelezny et al., 2000). The negative effect of family size on green purchases can be tentatively explained by referring to more price-oriented purchases in larger families with higher expenses (Gould et al., 2015) and to the relevance of price in green choices (Barber et al., 2014; Gilg et al., 2005). Path analysis also showed a pervasive network of relations potentially explaining the indirect contribution of these predictors. In particular, beyond its direct effect, we highlighted the indirect effect of sex through green values, attitudes towards green products, and the importance attached to green products. This result shows that being female is associated with pervasive differences in green-related values, attitudes, and involvement.

As concerns the incidence of more proximal predictors of green purchasing, our findings highlighted the predicted positive roles of green information seeking, importance of green products, attitudes towards green products, and the negative effect of uncertainty in green choices (Fig. 1). However, the direct effect of green values was more substantial than any other effect, and green values showed indirect effects through all the just-mentioned proximal predictors of green purchasing. More generally, our findings support a comprehensive layered model of green purchasing, in which the decision to buy a green product is related, directly and indirectly, with several sociodemographic features as the most distal predictors, with a value layer (mainly green values), and with several inter-related more proximal predictors, the more significant being green information seeking, importance of green products, and attitudes towards green products. Interestingly, our findings seem to provide support for the view that environmental attitudes are one of the antecedents of environmentally responsible behaviors (e.g., Casey and Scott, 2006; Fraj and Martinez, 2006), including purchase behavior or intentions (Kautish and Sharma, 2019; Leonidou et al., 2010; Matthes and Wonneberger, 2014; Thapa, 2010), when they are measured by taking into account the specific situation and behavior to be predicted (Bamberg, 2003). Although our model is necessarily incomplete and other predictors may play a relevant role, it can be considered a significant step towards the integration of different kinds of predictors, a step which has been deemed necessary to overcome the theoretical and predictive limitations of PEBs models and, more generally, to improve the predictive capacity of environmental psychology models (see Gifford, 2014).

Some consideration should also be addressed also to the nonsignificant predictors in our study. Given the high power of our investigation, it is unlikely that we missed the opportunity to detect non-negligible effects. Therefore, we should conclude that several variables were not relevant predictors of green product purchasing in our study: ELOC related to corporations, government/politics and nature, income, education, religious beliefs, and skepticism toward green ads. The absence of significant effects is rather surprising for some of these predictors. For

instance, higher education is usually associated with greater environmental concern (e.g., Casey and Scott, 2006; Gifford et al., 1982). However, this may not translate into concrete actions regarding green product choices after controlling for other predictors (including socio-demographic ones). Moreover, our sample was younger and had an overall education level higher than the national average, and this may have reduced the predictive power of education. We also expected that more skepticism toward green ads would have been associated with less frequent self-reported purchase of green products, but this was not the case. However, as we have previously illustrated, the findings on the relation between skepticism toward green ads and green consumerism are rather mixed and even contrasting (see e.g., Matthes and Wonneberger, 2014 vs. Shrum et al., 1995).

5.2. Applied implications

On the applied side, our investigation suggests that a promising way to promote more environmental-sensitive consumer choices is to focus on the value dimension. Appealing to green values and encouraging consistency and commitment when it comes to actual purchase decisions could represent an effective strategy (Osbaldiston and Schott, 2012; Steg et al., 2014a). However, this implies the need to strengthen individual green values through public policies, communication, and education, and to make more salient the link between values and value-consistent behaviors in a variety of contexts (Steg et al., 2014a), including the one related to the consumption sphere (Haws et al., 2014; Kautish and Dash, 2017). This points to the need to investigate, in future studies, other individual decisions which are critical to attaining positive consequences for the environment, such as the decision to become mindful consumers engaged in reducing consumption (Sheth et al., 2011) and to recycle and reuse products (see, e.g., Bagozzi and Dabholkar, 1994). Indeed, choosing less environmentally-harmful products or rejecting more harmful ones is only a facet of a wider issue. Our study suggests that green values and value-consistent behaviors may play an important role also in this broader context.

5.3. Limitations and future research directions

As any investigation, our study has some limitations. First, although our sample was taken from the general population and was very ample and diverse, it was not fully representative of the population. Moreover, our study was carried out in a specific country and cultural and religious context, and thus it needs to be replicated in other contexts and with other samples, although the role of values has been supported in various other cultural contexts (e.g., Haws et al., 2014; Kautish and Sharma, 2019; Kautish et al., 2020; Nguyen et al., 2016). Another methodological limitation pertains to the criterion variable: Although we employed a reliable criterion variable, different ones could be used (for instance by including different items). A further step would be to move from self-reported behaviors to actual measurement of purchases. These changes will represent valuable ways to assess the robustness of our findings. A more general limitation of all correlational individual-differences studies like ours is the absence of manipulations, which prevents claims about causality. However, manipulation is problematic when the investigation concerns strongly-established constructs like values and, in this context, it may also raise ethical concerns.

On the theoretical side, although we included a broad set of theoretically-justified predictors, using or adapting scales taken from the literature that proved to be valid and reliable, future research could consider including further predictors referred to other relevant constructs that could be tailored to the specific context of green purchase choice (e.g., environmental concern and consciousness, internal attributions, norms, perceived behavioral control; see, e.g. Bamberg and Moser, 2007; Costa et al., 2021; De Groot and Steg, 2007; Kautish and Sharma, 2018, 2020; Nguyen et al., 2016).

Finally, as previously pointed out, value-oriented investigations need

to be further extended from purchasing behaviors to the sphere of product use, including the reduce-reuse-recycle triad, to the sphere of individual economic decisions related to the environment (e.g., investments and savings), and to other environmental-relevant behaviors (such as transportation mode and eating choices). This may lead to both theoretical and applied insights. Our educated guess is that the roles of green values will prove to be more substantial and more pervasive than previously thought.

6. Conclusions

In our study, we aimed to assess the relative importance of several predictors of green purchase choices, with a specific attention paid to green values and religiosity, and to understand whether green and religious values predict green purchase choices only through other variables or also directly. According to our results, green values are the major predictor of green purchase choices and their positive effect is both direct and indirect, while religious commitment has only a weak negative direct effect. Other significant predictors with positive effects are sex (being female), age, information seeking on green issues, importance of green products, attitudes towards green products, and external attribution to God, while significant predictors with negative effects are family size, religious commitment, and uncertainty about green choices. The theoretical and applied implications of these findings have been discussed in sect. 5. In this conclusion, we want to highlight the predictive power of the value-oriented and situation-specific model we tested, which can be possibly extended with the addition of other constructs, whose measurement could be tailored to the specific context of green purchase choices.

CRedit authorship contribution statement

Giovanna Pegan: Conceptualization, Data curation, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing. **Fabio Del Missier:** Conceptualization, Data curation, Formal analysis, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing. **Patrizia De Luca:** Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jclepro.2023.136633>.

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