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From Greening to Meaning: Understanding the Content of Catholic Attitudes towards the Ecological Crisis

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Abstract: The contribution of faith organisations to public discourse on the ecological crisis appears to be intensifying, leading some to conjecture that Christians are becoming more concerned with the environment. In social science research, this observation is generally understood as the greening of religion hypothesis. Empirical studies have tried to confirm this hypothesis for over three decades, but have generally returned the same, negative results. In this paper, we argue that the ill-fated preoccupation with quantifying the extent of Christian environmental concern has overlooked the more substantive investigation of how environmentally engaged Christians think, feel about, and perform the relationship between Christianity and the environment. The purpose of this study was to investigate environmental attitudes within a parish community. We surveyed 254 parishioners in the Catholic diocese of Salford, UK. We used cluster analysis to identify groups of parishioners within the sample who exhibited especially pro-environmental attitudes. We then conducted a regression analysis on the relationships between the individuals' beliefs and the number of pro-environmental actions they performed. We found that, on the one hand, belief in the importance of caring for the environment to the Catholic faith does not result in parishioners being more ecologically active, consistent with existing findings in the literature. On the other hand, however, the importance of care for the environment to one's own religious practice results in parishioners being more ecologically active, consistent with the greening of religion hypothesis. These results point to the need for a much subtler analysis that considers the precise meaning of faith for Christian parishioners. We conclude with recommendations for further investigation of the greening of religion that can generate more detailed hypotheses from the greater level of detail afforded by this study.

Keywords: environment; Christians; attitudes

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1. Introduction

There is much at stake in determining the relationship between Christian beliefs and attitudes towards the ecological crisis. Understanding this relationship has the potential to inform the way that leaders and policymakers working with, or inside, faith organisations create and enact environmental policy [1] and the way that Christianity is understood by wider segments of society [2]. Much of the debate around this relationship has played out through conceptual writing that argues Christian belief either does or does not predispose individuals to pro-environmental attitudes [3]. Examples of more influential contributions to this discourse include historian Lynn White's 1967 essay, which contends that endemic anthropocentrism in Christian beliefs has indirectly helped to precipitate the ecological crisis. Conversely, the widely read Papal encyclical *Laudato Si'* is an example of the theological case for a Christian environmentalism, arguing that there is a coherent and effectual environmental theology present in Christianity [4]. In addition to the ongoing conceptual debate, over the last four decades a modest body of empirical work concerned with using quantitative social scientific methods to understand the direction and extent

of the relationship between contemporary Christian beliefs and ecological attitudes has also emerged [3,5]. Studies of this kind are often framed as testing the “greening of religion hypothesis”, which postulates that Christian beliefs may have some positive impact on an individual’s ecological attitudes [3,6–8]. In these empirical studies, ecological attitudes are often operationalised as ecological concern, and data from North American populations is often used (Taylor et al., 2016) [3].

In line with the conclusions of White’s (1967) [9] galvanising thesis, empirical research investigating the greening of religion hypothesis has tended to produce either mixed or negative findings on the relationship between Christian beliefs and environmental concern. Early studies generally confirmed an overall inverse relationship between Christian belief and environmental concern [10], and less environmental concern in Christian populations compared to secular populations [11]. At best, studies found an ambivalent [8,12], or weak positive relationship between Christian belief and environmental attitudes [13]. In light of the negative findings that studies were producing, many scholars began to concentrate on identifying variables that confounded, moderated, or better explained the apparent negative relationship between Christian belief and environmental concern. The variables that these studies identified included the extent of an individual’s belief in dominion theology [14], a person’s political ideology [15], their level of education [16], or the denomination of Christianity to which they belonged [11]. Once many of these previously extraneous variables were acknowledged in studies’ research methods, some studies found that the level of ecological concern in Christian populations could appear relatively similar to that occurring in secular populations [17].

More recent studies have developed more sophisticated statistical models and used larger datasets for interrogating the greening of religion hypothesis [18]. However, their findings remain broadly consistent with earlier studies, finding that Christian beliefs remained generally negatively correlated with environmental concern, despite the methodological developments of the more recent studies [19]. As with earlier studies, scholars continued to successfully identify moderating variables that helped to explain the apparent lack of greening; for example, the extent to which individuals understood the biospheric consequences of ecological damage [20], or the general level of secularisation in the society that the surveyed population was nested in [21]. Given that the idea of greening is implicitly temporal, studies which observe that there has been little change in the overall level of Christians’ ecological concern over time argue that their findings are particularly important in determining the level of greening in Christianity [22–24] (Clements, McCright, et al., 2014; Konisky, 2018; Clements, J.M.; Xiao, 2018). These studies found that there had been no overall increase in the level of Christians’ environmental concern, across all denominations, over several decades. Moreover, they found that the level of concern exhibited by Christians was typically less than that exhibited by non-Christians.

In summary, the empirical literature investigating the greening of Christianity offers seemingly consistent insight about the relative environmental concern of Christians at the inter-population level. Specifically, Christians generally appear to be generally less likely to exhibit environmental concern than non-Christians but have the potential to exhibit similar levels to non-Christian populations when extraneous variables are also modelled [3]. However, although progress has clearly been made by this literature in establishing a relatively consistent conclusion about the direction and extent of the relationship between Christian belief and environmental concern, we argue that this appears to have come at the expense of detailed empirical investigation into how the relationship between Christian belief and ecological crisis is understood by those experiencing that relationship [24].

It may be that part of why studies have continued to revisit the greening of religion hypothesis, despite such consistent findings, is because of *prima facie* observable changes that are occurring in how the environment is understood by Christianity. Perhaps the clearest example of this is the writing and reception of the ecological treatise *Laudato Si’* [4]. In it, Pope Francis begins by expressing deep concern for the environmental crisis, attributes the crisis to anthropogenic causes in line with scientific research, links his discussion of

the crisis to Scripture and Church Tradition, and describes actions that can be taken to tackle it, including those relating to spiritual eco-education, to which he devotes a great deal of attention. His main point is that humanity needs to undergo an *ecological conversion*, having as starting point an interior conversion of the heart. He states “Living our vocation to be protectors of God’s handiwork is essential to a life of virtue; it is not an optional or a secondary aspect of our Christian experience” (point 217 of *Laudato Si’*).

By some measures, *Laudato Si’* is the second most widely engaged with encyclical of all encyclicals [2]. This encyclical, in turn, has demonstrably catalysed the creation of many Christian environmental activist and Church-adjacent environmental organisations, as well as an explicit change in Vatican messaging on ecology [1]. We can also see the growth of ecological theology [25], normative social scientific accounts of ecological Christianity [26], and the extensive hortatory literature on Christianity and environment [3], as a kind of evidence for the development of Christian ecological thinking in themselves. It appears that there is a demonstrable greening of Christianity occurring, regardless of the extent to which this greening has registered in the expressed environmental concern of surveyed Christian populations. Rather than being understood as changes in aggregate levels of environmental concern, greening may be better understood as changes in Christian institutional messaging, theological output, social practices, and ways of making sense of the environment [1]. Consequently, we argue that at a statistical level, the greening of Christianity may be better investigated through an analysis of the content of the ecological attitudes exhibited by Christians, rather than just the intensity of their environmental concern.

In this study, we adopt an affect, behaviour, and cognition (ABC) inspired approach to understanding Christian ecological attitudes. Based on a classical tradition of human behaviours in psychology [27], this approach to attitudes describes attitudes as decomposable into three elements: the affective, concerned with individuals’ emotions, the behavioural, concerned with the actions of individuals, and the cognitive, concerned with individuals’ thoughts [28]. The model proposes that attitudes can be explained by combining the three primary elements of cognition (knowledge and ability), affect, and behaviour [29], so that new actions such as environmental protection behaviour may be adopted more effectively. Several research areas have used the model, including research on intentions and behavioural changes [30]. Developing a new attitude that might result in a new behaviour involves developing affective preferences (for example, “I enjoy respecting the environment”) based on existing cognitive and knowledge (for example, “I think that maintaining a clean environment is vital to my survival”), followed by generating behaviour appropriate to the new action (for example, “environmental protection activities”).

Even though we did not construct our survey based on this model, it helped us to map out the meaning of our respondents’ answers and to identify elements that might be considered to interpret knowledge (cognition), worry, and interest (emotions), as well as actual behaviour related to the ecological crisis.

2. Materials and Methods

To identify representative participants, we utilised a non-probability sampling approach (purposive sampling) to ensure that they had characteristics we sought in our sample. At the level of institutional policy, the Catholic Church in the UK takes a relatively pro-environmental position when compared to Christian institutions in many other countries. For example, some UK Catholic Dioceses have decarbonisation carbon targets that are broadly in line with the United Nations’ climate goals, and many have publicly articulated environmental policies. A diocese that has been active in environmental discussions is the Diocese of Salford, which covers Greater Manchester and the surrounding area. The bishop of the Diocese of Salford is the official spokesperson for the environment in the Catholic Church in England and Wales, and the diocese invests in staff and projects exploring the interface between ecology and Christianity. Managers at the Diocese of Salford’s environment office designed and distributed the online survey link directly to all major institutions and parishes in the diocese. Our study was cross-sectional, the survey being issued during

the spring of 2021. Self-selection bias is known to be an issue in convenience sampling for surveys on environmental themes, insofar as the more environmentally engaged are disproportionately likely to respond [31].

The survey asked for information about the participants' demographic, area of residence, beliefs regarding the role of the Church in the climate crisis, and the kinds of pro-environmental behaviour that the individual participated in. The survey consisted of thirty multiple choice questions with closed answers and three open-ended questions. Some of the closed questions asked participants not only to select a preference, but also to rank their preferences among options, for example, allowing participants to select their perceived ecological priorities.

Descriptive statistics were generated for variables relating to demographics, as well as knowledge, beliefs, and actions towards the environment. Frequencies and/or percentages (%) were reported for categorical data. Means and standard deviations (SD) were presented for continuous measures that are normally distributed.

In order to understand intra-group differences, in particular with regards to different attitudes towards the environmental crisis, the role of church and the level of engagement, a K-mean clustering analysis was performed. This procedure attempted to identify relatively homogeneous groups of cases based on selected characteristics using an iterative algorithm. Finally, a Tobit regression analysis was performed in order to identify possible predictors of activities aimed at addressing the environmental crisis.

3. Results

3.1. Socio-Demographic Information

There were 254 participants in the sample (152 females, 60% mean range age 45–54 years). The great majority of these participants was white (N = 217, 85% of all participants, rising to 93% of those who did not leave the ethnicity question blank), with a very limited representativeness of other ethnicity groups and minorities. Table 1 below shows the key characteristics of the sample.

Table 1. Characteristics of key variables.

	N	Mean	Standard Deviation	Min	Max
Gender	228	0.333	0.472	0	1
Age	225	4.560	1.388	0	6
Number of ecological activities performed	254	8.417	3.875	0	19
Belief in the importance of caring for the environment to the Catholic faith	249	4.414	1.029	1	5
Importance of care of the environment in own religious practice	249	4.141	1.125	1	5
Concerned about the climate and ecological crisis	249	4.406	0.963	1	5
Belief that the diocese should take the lead in society	246	4.354	1.103	1	5
Belief that the diocese should take the lead in its own community	245	4.204	1.134	1	5
Being in a position of authority	240	0.192	0.394	0	1

The table indicates that the average number of ecological activities performed by parishioners in the sample is quite high; however, there is a moderate amount of variation in this number ($M = 8.417$, $SD = 3.875$). Most of the participants reports concern, or great concern, about the climate and ecological crisis ($M = 4.406$, $SD = 0.963$). Many participants also reported that they felt a strong association between ecological issues and faith, showing high or very high belief in the importance of caring for the environment to the Catholic faith ($M = 4.414$, $SD = 1.029$), or as part of their own religious practice ($M = 4.141$, $SD = 1.125$). Many parishioners believed that the diocese should take the lead in society ($MD = 4.354$, $SD = 1.103$) and in its community ($M = 4.204$, $SD = 1.134$). About 19% of the sample consists of people who describe themselves as being in a position of authority, mainly priests and teachers ($MD = 01.92$, $SD = 0.394$).

Looking at the ecological activities that the parishioners perform (see the Appendix A, Table A1), the vast majority of participants reported recycling ($N = 236$, 93%), reducing food waste ($N = 194$, 76%), and shopping locally ($N = 188$, 74%). The less frequently reported activities were using an electric car ($N = 3$, 1%), using a hybrid car ($N = 11$, 4%), installing solar panels ($N = 15$, 6%), and travelling by bike ($N = 18$, 7%).

As far as sources of influence are concerned, scientists and academics come first (1.836 out of a maximum of 3), followed by Pope Francis (0.996), as one might expect, though the gap between these two is substantial (Table A2). Rather more unexpectedly, perhaps, parish priests come near the bottom of the lists of influences (0.071), above advertisements but below celebrities.

Cost considerations top the list of hinderances preventing parishioners from being more ecologically active (3.00 out of 5), followed, perhaps unexpectedly, by not knowing where to start (2.480, see Table A3). The environmental issues which are ranked highest (closest to 1 on a scale from 1 to 15) by parishioners are air pollution (3.31) and climate change (3.39), followed, much further down in the ranking, by waste (6.31), water pollution (6.44), and flooding (6.55, see Table A4). Environmental education (2.21) and setting a carbon target (1.79) are seen as the most important goals which the diocese should pursue (see Table A5). In terms of activities which parishioners would like to see to help them care more for the environment, the ones regarded of greatest importance are awareness of community and environmental benefits, as well as information about how to care for the environment (see Table A6).

3.2. Cluster Analysis

As part of the cluster analysis process, observed variables are used to group cases. The cluster analysis was organised in two steps. First, a hierarchical cluster analysis was conducted to produce a tree diagram showing the characteristics that were most similar between participants in the study. This approach is referred to as “agglomerative” [32]. In this approach, each observation was placed in its own cluster, and pairs of clusters were merged as one moved up the hierarchy. Next, we conducted a K-Means cluster analysis. By following the steps above, the analysis attempted to identify three relatively homogeneous groups of cases based on selected characteristics.

The cluster analysis processes identified three main clusters. Cluster 1, which we label as the “naive”, did not clearly support the role of the Church and Catholic faith in addressing ecological issues. People in Cluster 1 did not appear to be familiar with Church initiatives related to the ecological crisis. Additionally, they considered environmental discourse to be outside the scope of their own religious practices. The cluster consisted of a relatively small but distinctive number of individuals ($N = 29$) of mature age (range = 55–64 years). Cluster 2, which we label as the “experts”, was distinguished by a very high level of concern for environmental issues and a very high level of belief in the Catholic Church’s role in responding to the ecological crisis. In addition, they demonstrated considerable expertise in Church initiatives aimed at addressing the ecological crisis and appeared extremely involved in pro-environmental activities (they generally adopt nine or more behaviours outlined in Table A1). Participants in this cluster ($N = 127$) were mature (age range: 55–64 years), and they were the most numerous ($N = 127$).

In Cluster 3, which we label the “informed”, individuals showed moderate concern for the environmental crisis, and a moderate perception of the role of the Church and the Catholic faith. Although they considered environmental protection to be an important aspect of their own religious practice, they did not accord it the same level of importance as Cluster 2. As with Cluster 2, they adopted a high number of environmental protection behaviours. The group consisted of a relatively small number of individuals ($N = 64$) of a relatively young age (35–44 years). The boxplot below describes the differences among the three clusters and identifies the presence of outliers (see Figure 1).

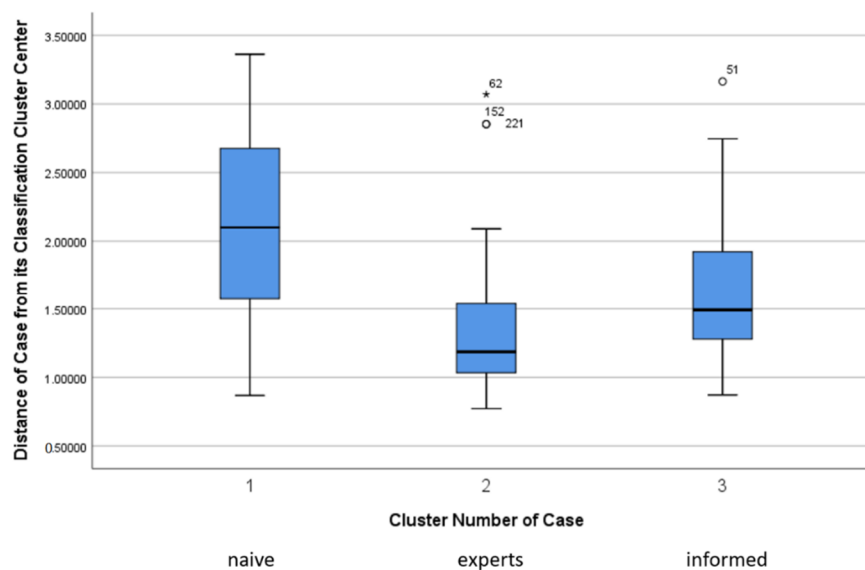


Figure 1. Boxplot of the 3 clusters: *, ° outliers from different clusters.

3.3. Intra-Cluster Differences

Univariate analysis with the Kruskal–Wallis test identified different patterns of behaviour between three clusters based on the perceived obstacles to, and resources associated with, pro-environmental behaviour. For obstacles, there was a significant difference ($p < 0.05$, adjusted using the Bonferroni correction) between Cluster 2 and the other two clusters. Cluster 2 perceives fewer obstacles than Cluster 1 and Cluster 3 (Table 2). In terms of resources, Cluster 2 had higher mean ranks than Cluster 1 and Cluster 3, suggesting a higher interest in environmental protection. Compared to the other two clusters, Cluster 2 had more experts and a greater desire for active engagement and promotion (Table 3).

Table 2. Obstacles perceived by people in each cluster.

<i>What is stopping you from doing things to help care for the environment?</i>			
	Costs Too Much Money	It Has Nothing to Do with My Faith	I Do Not Have the Time
Kruskal–Wallis H	13.176	51.447	23.874
Df	2	2	2
Asymp. Sig.	0.001	<0.001	<0.001
Mean rank Cluster 1	116.40	168.62	119.00
Mean rank Cluster 2	90.38	83.72	84.94
Mean rank Cluster 3	121.18	111.24	125.68

Table 3. Importance of resources offered by the community.

<i>What do you think will help you do more to care for the environment?</i>	Ranks		
	Cluster Number	N	Mean Rank
Information about how to care for the environment	1	24	77.42
	2	124	110.69
	3	63	107.66
	Sig. <i>p</i> value *		0.027
Being more aware of the environmental benefits	1	26	83.44
	2	125	112.54
	3	62	105.71
	Sig. <i>p</i> value *		0.011
Being more aware of community benefits	1	25	74.52
	2	123	111.30
	3	61	104.78
	Sig. <i>p</i> value *		0.011
Special liturgies and homily themes on caring for the environment	1	26	48.23
	2	125	119.04
	3	61	105.64
	Sig. <i>p</i> value *		<0.001
Support through local eco-groups / committees	1	24	49.00
	2	124	114.81
	3	61	107.10
	Sig. <i>p</i> value *		<0.001
Applying for the Live Simply award	1	25	53.16
	2	122	116.58
	3	61	101.39
	Sig. <i>p</i> value *		<0.001
Learning from others such as friends and neighbours about their environmental actions and activities	1	25	81.52
	2	125	108.16
	3	62	113.22
	Sig. <i>p</i> value *		<0.001
Community eco-projects/events -	1	25	63.44
	2	123	111.33
	3	62	110.90
	Sig. <i>p</i> value *		<0.001
Purchasing eco-products through the community	1	25	62.18
	2	122	115.12
	3	61	100.60
	Sig. <i>p</i> value *		<0.001

* *p*-value less than 0.001.

3.4. Regression Analysis

A Tobit regression analysis was performed which takes into account the censored nature of the dependent variable, which is the number of ecological activities performed, and which has a lower limit of 0 and an upper limit of 19. One regression was performed for

all observations, another for the largest and most environmentally engaged cluster, Cluster 2, and another for Clusters 2 and 3 together, which takes into account the similarities in environmental attitudes, behaviours, and cognitions in these two groups, as described in the cluster analysis above. In Table 4, no regression could be performed for Cluster 1 only, as the sample size was too small (Table 4).

Table 4. Tobit regression analysis of the number of activities undertaken to address the environmental crisis.

	All Observations	Cluster 2 Only	Clusters 2 and 3 Only
Gender	−0.263 (0.527)	−0.758 (0.655)	0.156 (0.586)
Age	0.267 (0.201)	−0.136 (0.463)	0.393 * (0.215)
Importance of caring for the environment to the Catholic faith	−0.131 (0.331)	−0.674 (0.581)	−0.458 (0.444)
Importance of care of the environment in own religious practice	0.558 * (0.310)	0.850 * (0.440)	0.608 * (0.362)
Concerned about the climate and ecological crisis	1.545 *** (0.465)	0.609 (0.755)	1.531 * (0.581)
Belief that the diocese should take the lead in society	−1.241 ** (0.512)	−2.386 *** (0.609)	−1.029 * (0.605)
Belief that the diocese should take the lead in its own community	0.314 (0.472)	1.463 ** (0.671)	0.427 (0.535)
Being in a position of authority	−1.567 ** (0.637)	−2.463 *** (0.678)	−1.241 * (0.659)
Variables as to what causes a parishioner not to take eco action	Some significant: not knowing where to start *** [−0.862 (0.335)] feeling that one is already doing enough ** [0.552(0.290)]		
Variables about the kind of help that a parishioner would like to receive	Some significant: help from friends * [0.674(0.378)]	Some significant: finding out about the community benefits ** [−1.299(0.492)], special liturgies and homilies * [−0.722(0.408)], support through local eco-groups * [0.872(0.480)]	Some significant: feeling that one is already doing enough ** [0.643(0.309)]
Variables indicating different sources of influence	Some significant: academics and scientists * [0.558(0.289)] and friends ** [−1.433(0.596)]	Some significant: academics and scientists *** [1.237(0.420)], celebrities ** [−1.271(0.583)], parish priest * [3.008(1.500)] and work colleagues *** [2.169(0.651)]	Some significant: academics and scientists *** [0.944(0.334)], Pope Francis * [0.573(0.338)], teachers/school ** [0.924(0.421)] and work colleagues ** [1.024(0.454)]
Variables indicating a parishioner's priorities as to what the diocese's eco plan should be	Some significant: growing food locally * [0.374(0.219)] and planting trees across diocesan parishes and schools * [−0.339(0.199)] and engaging in interfaith networks * [−0.440(0.250)]	Some significant: growing food locally *** [0.817(0.288)], providing electric vehicle charging facilities ** [0.538(0.231)], and planting trees across diocesan parishes and schools * [−0.420(0.245)], supporting local business ** [−0.683(0.318)] and engaging in interfaith networks *** [−0.886(0.249)]	Some significant: growing food locally ** [0.557(0.240)] and engaging in interfaith networks * [−0.485(0.269)]
Variables indicating the most pressing ecological issues for a parishioner	None significant	Some significant: climate change *** [0.376(0.092)], loss of green space ** [0.151(0.076)], depletion of natural resources * [−0.135(0.075)]	Some significant: climate change * [0.168(0.094)], waste * [0.120(0.071)]
Number of observations	188	108	163
LR Chi ²	133.42 ***	130.59 ***	106.48 ***
Pseudo R ²	0.1330	0.235	0.125
Σ	2.458 (0.127)	1.738 (0.119)	2.399 (0.134)

*** indicates significance at 1% level, ** at 5% level, and * at 10% level. Standard errors are in round parentheses.

Our first result is that demographic characteristics do not affect the number of ecological activities performed, with the exception of age in the case of Cluster 3, whereby being older is associated with performing more pro-environmental activities.

Secondly, and importantly for the purpose of this research, we find that belief in the importance of caring for the environment to the Catholic faith does not affect the number

of ecological activities performed. Instead, it is the importance of care of the environment in own religious practice that impacts, positively as expected, the number of activities. Furthermore, we find that climate change concerns significantly influence the number of ecological activities performed in all cases except Cluster 2, suggesting that cluster 2 individuals are motivated by a love for nature that is independent of the extent of its degradation, suggesting that intrinsic motivation mechanisms may be involved. With regards to the dioceses taking the lead, we found that, surprisingly, parishioners who felt that the diocese should take the lead in society were less eco-active, feeling perhaps that the burden of taking action fell not so much on them as individuals, but rather on society as a whole, and that the parish should promote such an attitude. The only significant relationship between believing that the diocese should take the lead in its community and being eco-active appeared in Cluster 2, a finding that lends itself to several possible interpretations. For example, parishioners in the other clusters might feel that the diocese is currently not doing enough and will only choose to become more active if the diocese becomes more active in the first place. Furthermore, those in a position of authority are less eco active than those who are not, perhaps because they feel that they are already fulfilling their obligations towards society through their work.

Other significant relationships that were found in at least two specifications are as follows: those who feel that they did not know where to start to be eco-active were less eco-active, whilst those who feel that they are doing enough already are more eco-active, both findings being as one would have expected. Those who trusted the messages of scientists and academics, i.e., groups who generally raise awareness about the ongoing ecological crisis, tend to be more active, as one would expect. Perhaps somewhat more surprising is the influence of friends, which also makes parishioners more active, pointing to the facilitative role of community and collective action in precipitating ecological behavior. In addition, ecological activity is associated positively with believing that the diocese should focus on promoting food locally, negatively with believing that the diocese should focus on planting trees across diocesan parishes and schools, and again negatively with believing that the diocese should engage in interfaith networks, all of which could be seen as surprising. Finally, parishioners who feel that climate change was one of their most important ecological issues were more active, as one would have expected.

4. Discussion

Debate over the greening of Christianity hypothesis, understood as a change in the aggregate levels of concern for the environment exhibited by Christians, has dominated the empirical exploration of Christian ecological action to date [3,6–8]. Motivated instead by a desire to better understand the content of Christians' environmental attitudes, we scrutinised some of the affective, behavioural, and cognitive elements of the environmental attitudes at work in our population. Our objective was not to provide an encompassing explanation of Christian ecological experience. Rather, our objective was to steer part of the empirical greening of religion discourse away from measuring aggregate environmental concern, towards more detailed investigation of how the ecologically engaged Christian activity that is actually occurring is psychologically structured. The findings of our study, which focused on a particular region and denomination, are naturally limited in their generalisability. Despite this, in studying a specific Catholic diocese in the UK, our findings have revealed complex dynamics in the relationship between Catholic parishioners and the Church's institutions in determining their ecological attitudes.

The Tobit regression analysis of the clusters revealed some very interesting findings. In particular, we identified three major tensions that emerged in how Catholic parishioners report thinking, feeling, and acting with regard to the environment. The first tension exists in how the participants felt motivated by faith. Participants who recognised that care for creation was an important part of Catholic teaching were not significantly more likely to participate in more ecological activities. However, participants who reported a greater importance of caring for the environment in their own religious practice were

significantly more likely to engage in ecological activities. This suggested, curiously, that Catholic parishioners decouple private and organised religious practice in the context of ecological attitudes. The second counterintuitive relationship we observed was an inverse relationship between belief that the diocese should take the lead in society, and level of ecological action that an individual undertook. This implied that there is a kind of deferential, yet pro environmental, belief system at work in some Catholic parishioners' attitudes, whereby action is desired, but primarily from those in authority. Lastly, and rather anti-synergistically with the preceding observation, we observed an inverse relationship between being in a position of authority in the diocese and level of action taken, whereby those with more authority in the diocese exhibited fewer environmental behaviours.

Although parishioners in our sample report, in line with *Laudato Si'* and Catholic social teaching on the environment [4], that they believe care for the environment to be an important part of the Catholic faith, their behaviour is not driven by it. Specifically, we observed that the number of ecological activities that parishioners perform is not affected by their belief in the importance of care for the environment in the Catholic faith. This, by itself, looks like a variation on the classic conclusion of the greening of Christianity literature, i.e., that Christian belief does not positively inform individual ecological action [10,18,23]. However, other aspects of our findings show that in this population, the picture is rather more complex. In our model, faith was in fact an important aspect of Catholic ecological action. However, it was the reported importance of care for the environment in *one's own faith* that was a significant determinant of parishioners' ecological action. In other words, faith matters to the ecological behaviour of ecologically engaged Catholics, but not necessarily the Catholicity of their faith. We interpret that there may be a kind of decoupling occurring in the experience of participants, where faith is somehow being separated into private and institutional categories vis-à-vis ecological action and attitudes.

Catholic discourse on faith often distinguishes between *fides quae creditur*, or faith which is believed, and *fides qua creditur*, or faith by which one believes. At the phenomenological level, this can be understood as the difference between belief in the doctrinal propositions of Catholic teaching, and the personal experience of faith through which that propositional faith is attained and expressed. This distinction might afford a valuable way of understanding these apparently contradictory findings, especially against the backdrop of the more recent developments in Catholic thought on the ecological crisis. *Laudato Si'* was published in 2015, and many of the Catholic Church's more ecological practices and institutions followed from the encyclical [1]. Given the participants' mean age of 45–54, it is likely that many participants in the surveyed population became Catholic at a time when care for the environment was not so prominent a feature of the doctrine and practice of Catholic social teaching and theology [3]. The propositional content of the parishioners' ecological beliefs might still be firmly rooted in their catechesis. Past research has found significant difference in levels of environmental concern exhibited between individuals of different denominations [11], and between individuals who believe in a dominion theology versus stewardship theology [14]. These early findings from the greening of religion literature suggest that the propositional content of what one is taught about faith does indeed matter.

However, given that there is also evidence to suggest that Christians' ecological concern roughly corresponds to the relative level of ecological concern exhibited in the wider society in which they live [17], and is informed by factors such as the individual's level of education [16], we can infer that at least some aspects of Christians' environmental attitudes are contextually sensitive and informed by more than the content of their theology. Our apparently contradictory results about the role of one's own faith versus Catholic teaching suggest it may be that the participants' day-to-day experience of faith, which underlies their more propositional beliefs (i.e., *fides qua creditur*), that is the more flexible aspect of their faith when it comes to incorporating the ecological attitudes of wider society, their education and so on.

Although we have been able to draw some cognitive and behavioral inferences about this decoupling of private faith from organised faith, the affective elements of this decou-

pling are unclear from our data. Whether parishioners feel compelled to decouple their own experience of faith from more formal Catholic faith to reconcile a contradiction that they feel to be problematic, or whether they experience the decoupling as more benign, would require a more focused investigation. Moreover, there is more that could be learned about the cognitive elements of this decoupling. There may, for example, be attributional or knowledge driven reasons for this decoupling. Parishioners may consider care for the environment to be related to all faiths in general rather than the Catholic faith in particular. This would be in line with the teaching of *Laudato Si'* [4], which explicitly invites people of all faiths and none to understand the ecological crisis as a shared issue. Alternatively, another possible cognitive antecedent of the decoupling is that parishioners have not been taught the specific way in which the Catholic faith can help them live more ecologically by the Catholic Church. Previous research has shown that scientific understanding can increase a Christian's level of environmental concern [20]. It may be possible that increased theological understanding around Catholic teaching on care for creation may also lead to an increase in an individual Catholic's level of environmental action.

The second counterintuitive finding that emerged from the regression analysis is that parishioners who feel that the diocese should take the lead in society were less ecologically active; not more, as one might have expected. We believe the mechanisms underlying this relationship bear further investigation. It is possible that whilst these parishioners are concerned about the ecological crisis, they feel the burden of taking action should not fall on them individually, but rather that it should fall on larger actors such as the diocese, or society as a whole. Alternatively, this relationship could reflect a high degree of trust in the diocese, and the institutions of the Church more broadly. These parishioners might perceive the diocese as better able to act on ecological issues than the parishioner themselves. The distinction between clusters becomes important when looking at whether the diocese should take the lead in one's own community. Here, Cluster 2, the "experts", is the only cluster for whom believing that the dioceses should take this leading role is associated with being more ecologically active, indicating perhaps that their "expertise" includes being able to see a role for the Catholic leadership that the other clusters do not see. "Expertise" clearly includes a degree of knowledge, expressed as involvement in Church initiatives aimed at addressing the ecological crisis as well as competence in handling environmental issues expressed as involvement in environmental activities.

Another remarkable result is that those participants who are in positions of authority, typically teachers and priests, are less eco-active than those who are not. There are multiple possible explanations for this relationship. Perhaps those in positions of authority feel they already fulfil their social obligations, or because priests and teachers are already involved in so many faith-based activities that they do not have the time or energy to support any further activities. It is also worth noting that the categories of ecological action specified in the survey broadly pertained to behaviours that immediately and directly affect an individual's ecological impact, such as recycling or shopping locally. A number of categories of action, such as lobbying local government or participating in interfaith forums on ecological crisis, are more available to diocesan authorities, but they were not included as outcome measures. Consequently, it is possible that priests and teachers were indeed participating in more symbolically impactful ecological activities at the expense of the more quotidian. However, concentrating only on those actions that were captured by the dependent variable, this finding is broadly in line with an in-depth qualitative study of Catholic parish priests in the United States of America. The study found low levels of ecological engagement among parish priests, driven, amongst other factors, by what the priests perceived to be an overwhelming workload and their own low levels of environmental concern and education [1]. In our study, participants reported that priests were the second least important source of influence on ecological issues, their mean ranking scoring above advertisements only. However, conversely, priests have the largest effect size of any of the sources of influence, suggesting that for those who do draw inspiration from their priest, the inspiration that they draw is sizable. This could be seen as some tentative

quantitative evidence of Wilkins' qualitative findings that the majority of parish priests in a Catholic diocese exhibit limited engagement with ecological issues; however, there is a small core of highly ecologically engaged clergy who are able to speak persuasively on ecological issues [1].

These conclusions have some implications for ecologically motivated policymakers in Christian organisations. Firstly, our evidence suggests that Christian policymakers may benefit from reflecting on the more structured elements of religious practice. Can environmental action be better facilitated through prayer, homilies, and other elements of the liturgy, such that parishioners do not need to rely predominantly on their own experience of faith for ecological motivation? Second, the emphasis that some parishioners place on the diocese to act on their behalf suggests that Christian policy makers may want to consider how to act on behalf of these parishioners. Might taking the lead in society in a way that those parishioners expect include advocating for the environment on the political stage, or being visible early adopters of sustainable technology or business practices? Lastly, there is the complex question of the inverse relationship between authority and ecological action. Might Christian policy makers wish to explore the time, resource, or motivational constraints on ecological action of some of the Church's more influential figures.

Several methodological limitations need to be considered. First, the study adopted an extreme case design and used convenience sampling [33], which resulted in a disproportionately female, white group of respondents concentrated in a specific geographical region. This implies that the study's substantive findings do not have broad generalizability and should not be considered indicative of Catholic ecological attitudes in general. Second, the regression analysis results need to be interpreted with a degree of caution as some variables that are known to play a role in explaining ecological activity are not present in the survey, such as the level of education and political orientation [15,16,20]. This may lead to omitted variable bias in the results. Finally, the dependent variable in the regression is the sum of ecological activities performed by each individual, so the data does not tell us how intensively each individual pursues any one activity. These limitations point to the desirability of designing a survey that includes the aforementioned variables and which also measures the extent to which different ecological activities are performed. Finding such a measure does not appear to be easy as it would need to identify a common way of measuring each activity; for example, the number of hours spent on each activity, or the amount of money spent on each activity, or, more likely but adding further complexity, a combination of these two dimensions.

In spite of the important methodological limitations, we should also emphasise the strengths that make our research interesting and relevant for further development. First, despite the fact that no randomised and controlled sample was used in the study, it represents a reasonably representative sample of the practicing Catholic population in Britain. Catholics in Britain make up about 7% of the adult population or 3.6 million people, of which 63% are female, and display an age distribution with more elderly people than the British adult population as a whole [34]; based on these socio-demographic characteristics, our sample appears to represent national statistics quite accurately.

Second, we chose a quantitative survey design study in order to collect data in a reliable manner (i.e., well-controlled in terms of measurement). Third, the study was able to control for a number of important extraneous variables, especially the observer-expectancy effect, which occurs when an experimenter carries out an intervention and influences the participants to produce the results they consciously or subconsciously expect. This effect was significantly reduced by proposing an anonymous online survey without the intervention of the research team. Fourth, in terms of external validity, the current research meets all the criteria for being a reproducible study. As a result of the way we detailed our methods and analysis, our study can be rerun with a different sample size, certain variables found to be significant in the literature such as the level of education can be included, and our methodology can be used to rerun the study in such a way that a higher degree of generalizability can be achieved.

Finally, one of the most important aspects that highlights how our results are distinctive and compelling is their applicability. Applicability refers to the degree to which the research findings are relevant to real-world situations. This study identifies a number of new elements to focus on and new actions to undertake at the level of the Catholic community that are highly applicable. For example, there is probably a need to better empower parish priests in their active role, there is a need to deliver ecological messages differently to distinguish the experts from the naive, as well as the need to integrate church initiatives to address the environmental crisis in a way that is more personalised and in tune with the faith of parishioners.

5. Conclusions

Several connections exist between the Catholic message and the environmental crisis which are strong and in a productive ferment. This is encouraging for interdisciplinary studies of human attitudes and behaviours and environmental sustainability. As human and environmental systems become increasingly integrated, understanding the religious dimensions of human behavior will become increasingly important for investigating how the environment and communities interact.

By focusing investigations on specific problems, religionists and scientists may be able to work together more closely in broad ecological management processes. In so doing, it might be possible for scientists to explore the ethical and spiritual dimensions of environmental research.

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Appendix A

Table A1. Activities performed by parishioners to care for the environment.

Activity	Frequency (254 highest, 0 lowest)
I recycle	236
I reduce food waste	194
I shop locally	188
I reduce single-use plastics	175
I use less energy	160
I fix things / reuse materials	160
I use reusable items	155
I buy Fairtrade products	127
I garden for wildlife	114
I buy eco-products	108

Table A1. *Cont.*

Activity	Frequency (254 highest, 0 lowest)
I use local products	85
I use public transport	70
I purchase green energy	65
I walk to school / work	64
I grow food	58
I donate to environmental charities	51
I share eco-ideas	48
I am member of an environmental group	21
I travel by bike	18
I have solar panels	15
I am member of a Live Simply team	12
I use a hybrid car	11
I use an electric car	3

Table A2. Sources of influence of parishioners' ecological views.

Influence	Importance (3 highest, 0 lowest)
Academics/ scientists	1.836
Pope Francis	0.886
Media	0.602
Government	0.449
Family members	0.421
Teachers/school	0.268
Church groups	0.189
Work colleagues	0.189
Local government	0.161
Friends	0.134
Celebrities	0.102
Parish priest	0.071
Advertisements	0.051

Note: this table is constructed so that a non-response to a particular source of influence indicates that that source has no influence.

Table A3. Difficulties in taking care of the environment.

Difficulty	Importance (5 highest, 1 lowest)
It costs too much	2.996
I do not know where to start	2.480
I do enough already	2.377
I do not have the time	2.371

Table A3. *Cont.*

Difficulty	Importance (5 highest, 1 lowest)
I do not understand what to do	2.314
It has nothing to do with my faith	2.096

Table A4. Environmental issues of importance to parishioners.

Environmental Issue	Ranking (1 highest, 15 lowest)
Air pollution	3.311
Climate change	3.390
Loss of greenspace	5.878
Waste	6.307
Water pollution	6.444
Flooding	6.555
Depletion of natural resources	6.917
Habitat destruction	7.252
Loss of trees and woodlands	7.555
Lack of access to locally grown food	8.142
Pesticides	8.591
Species loss	8.654
Fuel poverty	9.791
Wildfires	11.327
Loss of peatlands	11.681

Table A5. Respondents' beliefs as to what the eco-priorities for the diocese should be.

Eco-Priority of Diocese	Importance (5 highest, 0 lowest)
Environmental education programme across diocesan parishes and schools	2.205
Setting a target to reduce carbon emissions	1.791
Installing solar panels on churches and schools	1.264
Planting trees across diocesan parishes and schools	1.071
Seeing more greenspaces for wildlife	1.039
Curriculum related environment programme	1.016
Growing more local food	0.783
Working with local councils to provide facilities to support sustainable living (cycle routes, recycling etc)	0.626
Setting up eco-groups/committees	0.614
Sacramental programmes to include the environment	0.508
Providing electric vehicle charging facilities	0.402

Table A5. *Cont.*

Eco-Priority of Diocese	Importance (5 highest, 0 lowest)
Supporting community energy, such as developing renewable energy schemes that the community can buy shares in	0.343
Working across the Catholic church to share learning	0.327
Engaging in interfaith networks for shared learning	0.319
Providing facilities to support cycling	0.295
Supporting local businesses	0.295
Hosting eco-events and exhibitions	0.110

Table A6. What help would parishioners like to receive.

Help to Care more for the Environment	Importance (5 highest, 1 lowest)
Being more aware of the community benefits	4.065
Information about how to care for the environment	4.055
Being more aware of the environmental benefits	4.004
Community eco-projects/events	3.915
Learning from others such as friends and neighbours about their environmental actions and activities	3.881
Purchasing eco-products through the community	3.849
Support through local eco-groups/committees	3.687
Special liturgies and homily themes on caring for the environment	3.551
Applying for the Live Simply award	3.371

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