Journal of Empirical Theology

Christianity, personality and environmental concern among 13- to 15-year-old students in England and Wales

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Abstract

Lynn White's (1967) classic paper on 'the historical roots of our ecological crisis' argued that the injunction in the first chapter of Genesis for humankind to have dominion over the earth and its contents legitimated, and even demanded, exploitation of the natural environment. In his paper, 'Christianity, personality and concern about environmental pollution' Francis (1997) tested White's thesis among a sample of 20,968 13- to 15-year-old students. A major limitation in Francis' initial enquiry concerned reliance on five single-item measures. The present study addresses this weakness twenty years later on a fresh sample of 23,714 13- to 15-year-old students (comprising those who self-identify as Christian and those who self-identify as no religion, but excluding those who self-identify with other religious traditions) employing three scales of Attitude toward Christianity, Conservative Christian Belief, and Environmental Concern and Behaviour, together with the abbreviated Junior Eysenck Personality Questionnaire Revised and measures of church attendance and personal prayer. In terms of individual differences in levels of environmental concern and behaviour, multiple regression analyses demonstrate six main findings: personal factors, sex and age, are significant predictors, with females and younger students holding higher levels of environmental concern and behaviour; psychological factors are significant predictors, with higher levels of environmental concern and behaviour being associated with higher neuroticism scores, lower extraversion scores, and lower psychoticism scores; religious behaviours, church attendance and personal prayer, are significant predictors, with churchgoing and praying students holding higher levels of environmental concern and behaviour; religious affect is more significant than religious behaviours, with a positive attitude toward Christianity accounting for greater variance than churchgoing and prayer in predicting higher levels of environmental concern and behaviour; conservative Christian belief is associated with lower levels of environmental concern and behaviour (after taking

into account religious practice and religious affect); and nominal Christian affiliation is associated with lower levels of environmental concern and behaviour.

Keywords: ecological crisis, religion, youth, personality, creationism, environmental concern

Introduction

Lynn White's (1967) classic paper, 'The historical roots of our ecological crisis', threw down the gauntlet to the Christian community to take responsibility for environmental degradation. White argued that the injunction in the first chapter of Genesis for humankind to have dominion over the earth and its contents both legitimised and even demanded exploitation of the natural environment. According to White:

> Christianity is the most anthropocentric religion the world has seen… [Christianity] not only established a dualism of man and nature but insisted that it is God's will that man exploit nature for his proper ends.

White's gauntlet was reinforced by Toynbee (1972, 1973) who pointed the finger toward a key biblical text as resting at the root of the problem.

> And God blessed them, and God said unto them, be fruitful and multiply, and replenish the earth, and subdue it and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth on the earth. (Genesis 1: 28)

Alongside arguments derived from the doctrine of creation, eschatological understandings and attitudes have also played a part. Some Christians, as noted in Koehrsen, Blanc and Huber (2022), have argued that environmental degradation should be recognised as a sign of God ushering in the end times. As such it is not seen as a problem for humanity to seek to address. Indeed, some have gone further and argued that environmental degradation is to be encouraged, as hastening the return of Christ. Such attitudes have tended to be most commonly associated with conservative religious groups in the USA.

There have been two main kinds of response to White's gauntlet: one theological and the other empirical.

Theological response

The theological response has juxtaposed White's biblical account, characterised as the *dominion* orientation toward nature, with a second biblical account, characterised as the *stewardship* orientation toward nature. An early riposte of this nature was offered by Black (1970). Black's understanding was that, in biblical times, the steward had the dual role of managing the estate for profit while also ensuring the long-term viability. Short-term desires for profit were tempered by the need for long-term survival. The steward was God's deputy or representative in a symbolic sense, who recognised God's omniscience and omnipotence, but applied intelligence, reason, and moral responsibility in care for his surroundings. In similar view, Pope Paul VI, 1981 stated that 'For man to rule over nature means not to destroy but build up, not to make the world an uninhabitable chaos but a neat and attractive place to live in' (quoted in Shaiko, 1987).

The notion of stewardship is not one that is widely evident in the Bible, and arose mainly in the pre-modern era, as humans gained more control over their environment (Bauckham, 2006), and the possibility of returning nature to a utopian, pre-fall condition was seen as a possibility (Harrison, 2006). Although it is widely seen as the key theological stance for churches, as evidenced in the encyclical *laudato si'* (Pope Francis, 2015), it is not without its critics. For some it is still an anthropocentric stance that gives undue prominence to humans and is little more than dominion in disguise (Horan, 2018; Palmer, 1992). For others it is an ideal that humans cannot achieve in practice (Village, 2021). Nonetheless, the idea that humans were created to care for the environment is a widely held view in Christian circles.

A more thoroughgoing rejection of dominion has resulted in a range of creation theologies that John Haught (1993) characterised as 'sacramental'. In this view, creation is not simply a temporary stage on which humans play the drama of their salvation and which they must maintain for their survival, it is a sacred place of revelation and divine encounter.

Early examples include Matthew Fox's creation-centred spirituality (Fox, 1983, 1990), which stressed the essential goodness of a creation imbued with the presence of God. Sallie McFague proposed an ecological theology drawing heavily on the metaphor of the earth as the 'Body of God' (McFague, 1993). The development of ecotheology over the last half century (Deane-Drummond, 2008) has seen the emergence of range of approaches that share a common goal '…to retrieve the ecological wisdom embedded in the Christian tradition…' (Conradie et al., 2014, p. 1). Many of these theologies stress the unity of all creatures, placing them alongside humans in terms of their value and rights (Linzey, 2016; Moore, 2014). Such theologies counter both the dominion and eschatological arguments.

Empirical response

The empirical response has recognised that the alternative theological accounts (contrasting dominion and stewardship) lead to two contrasting hypotheses that can be tested against empirical observation. The dominion account posits a negative correlation between Christianity and environmental concern, while the stewardship account posits a positive correlation between Christianity and environmental concern. The empirical evidence from studies testing links between Christian beliefs about creation and environmental attitudes is mixed (for reviews see Hitzhusen, 2007; Pepper & Leonard, 2016; Taylor et al., 2016). While these two contrasting hypotheses seem relatively easy to formulate, their operationalisation is considerably more complex. This complexity is reflected in four issues. The first complexity concerns operationalising the notion of Christianity. The inadequacy of relying on self-assigned religious affiliation has been well documented by the debates concerning the interpretation of such data within the national census (see Francis, 2003; Bruce & Voas, 2004). The inadequacy of relying on church attendance has been well documented by the differentiation between intrinsic and extrinsic religious orientations (see Allport & Ross, 1967; Francis, 2007). The second complexity concerns operationalising the various

theological perspectives concerning dominion, stewardship, and biblical interpretation (see Village, 2020). The third complexity concerns operationalising the notion of environmental concern and the tension between attitudinal and behavioural measures. The fourth complexity concerns recognising potential contaminants that may confuse the correlation between measures of Christianity and measures of environmental concern, and then identifying appropriate strategies to control for such effects. Such contaminants may include personal factors like age and sex (Francis & Penny, 2014), and psychological factors like personality (Francis, 2019).

Early empirical studies designed to test White's thesis appeared to offer some support for this position. For example, Hand and van Lier (1984) based their study on 806 Washington State residents (a 65.4% response rate) and included a two-item measure of mastery-over-nature orientation and five multi-item measures of environmental concern: pollution control, population control, resource conservation, environmental spending, and environmental regulation. The results indicated support for the view that Judeo-Christians are generally more committed to the mastery-over-nature orientation than non-Judeo-Christians, but that this commitment varies considerably among denominations. Support for the dominion thesis was also provided by Shaiko (1987) who based his study on 3,128 members from environmental and conservation groups (a 62.5% response rate) and included five environmental issues: mastery-over-nature orientation, nuclear power, runaway technology, industrial pollution, and wilderness protection.

Eckberg and Blocker (1989) generated additional insight into the problem by assessing religion in terms of three measures: self-assigned religious affiliation, perceived importance of religion, and beliefs about the Bible. Their assessment of environmental concern included four factors: concern about use of the environment for the economy, concern about protection of the environment, concern about quality of air and water, and

concern about waste disposal. Data drawn from 300 adult residents of the Tulsa, Oklahoma, metropolitan area offered substantial support for the dominion thesis. However, when background variables were taken into account, and all the religious variables entered into the equation, the crucial predictor of lower levels of environmental concerns was belief in literal interpretation of the Bible.

Greeley's (1993) reanalysis of the 1988 General Social Survey data (Davis & Smith, 1988) also generated additional insight into the problem since, alongside one environmental variable, these data included six religious measures: biblical literalism, belief in God, religious affiliation, frequency of prayer, frequency of church attendance, and images of God. Simple correlational analysis demonstrated negative relationships between environmental concern and biblical literalism, belief in God, and Christian affiliation. On the other hand, there was no significant correlation between environmental concern and either personal prayer or church attendance. Those with a more gracious image of God (mother, spouse, lover, or friend, rather than father, master, judge, or king) were more likely to support increased spending on the environment. Greeley concludes that it is not biblical literalism as such which relates to lack of environmental concern, but rather a *rigid* political and religious narrative.

Further insight into the instability of self-assigned religious affiliation as a measure was provided by Kanagy and Willits (1993) who based their study on 3,632 adults from Pennsylvania and included the New Environmental Paradigm Scale devised by Dunlap and van Liere (1978). Using bivariate correlations, they found that religious affiliation (being Jewish or Christian) was negatively related to three of their four measures of environmentalism. However, after controlling for the effects of worship attendance, gender, age, education, and income, the relationships of religious affiliation to the environmental attitude scales were non-significant

Three other empirical studies that had begun to question the sophistication of White's (1967) account of 'the historical roots of our ecological crisis' were published by Woodrum and Hoban (1994), Kanagy and Nelsen (1995), and Wolkomir et al. (1997). In the first of these studies, Woodrum and Hoban (1994) drew on data from 332 adults in eight urban and eight rural counties across North Carolina (a 62% response rate). Religiosity was assessed by four indicators: church attendance, religious salience, biblical literalism, and attitude toward teaching biblical creation in public schools. The questionnaire also included a question about dominion over creation, a measure of environmental concern, regarding nuclear power plants and their radio active discharges, and three measures of pro-environmental attitudes. They found that dominion beliefs were prevalent in this sample, especially among those with little formal education or who were uninformed about environmental matters. However, they also found that dominion beliefs were not associated with religious saliency, church attendance, biblical literalism, or support for teaching biblical creation in public schools.

In the second of these studies, Kanagy and Nelsen (1995) drew data from 2,379 white adult participants in a national survey in the USA. Their study included three measures of religiosity (attendance, born again, personal religion), and three attitudinal questions about the environment (increase federal spending, relax environmental controls for economic growth, and self-identification as an environmentalist). Arguing that 'the most explicit and clear indicator of environmental concern' was identification as an environmentalist (p. 43), they found that none of their three measures of religiosity predicted such identification. They concluded that:

> Religious individuals were no less likely than non-religious individuals to claim to be environmentalists. These findings in particular fail to support the White hypothesis and suggest that those of Judeo-Christian traditions – even fundamentalist individuals – are no less likely to be concerned about the environment. (p. 43)

In the third of these studies, Wolkomir et al. (1997) drew data from 1,228 adults in a national study in the USA. This study found that biblical literalism was correlated positively with views of dominion, negatively with environmental concern, and negatively with pro-environmental behaviour. Multiple regression analyses found that the effects of biblical literalism were explained entirely by its relationship with dominion. Dominion served as the key predictor of low environmental concern and low pro-environment behaviours.

Against this background of a developing scientific investigation of White's thesis, Francis (1997) drew on data from the ongoing *Teenage religion and values* project (Francis & Kay, 1995; Robbins & Francis, 2010) to test the association between Christianity and concern about environmental pollution among a sample of 20,968 13- to 15-year-old students. This study brought three novel perspectives to the debate. First, it moved the enquiry to England and Wales and located it among a younger age group. Second, it operationalised religiosity in terms of four defined components: public religious practice expressed as church attendance; personal religious practice expressed as personal prayer; religious belief expressed as belief in God; and conservative Christian belief expressed in terms of accepting the Genesis account of creation in six days. Third, it included a recognised measure of fundamental individual differences in personality, the Eysenckian three-dimensional model (Eysenck & Eysenck, 1975) as a set of core control variables.

Francis (1997) employed fixed-order multiple regression in order to explore the incremental effect of personal factors (sex and age) and psychological factors (extraversion, neuroticism, and psychoticism) on environmental concern before entering religious factors into the equation. Religious factors were also entered in the fixed-order: belief in God, personal prayer, church attendance, and belief in the biblical account of creation. Four main conclusions emerged from this analysis. First, in terms of personal factors, sex emerged as a significant predictor of individual differences in levels of environmental concern. In this age

group females were more concerned than males about the risk of pollution to the environment. On the other hand, there was no significant age affect. Students in year ten (14 to 15 years of age) were neither more nor less concerned than students in year nine (13 to 14 years of age).

Second, in terms of personality factors, psychoticism emerged as the main dimension of personality implicated in shaping environmental attitudes. After taking psychoticism scores into account, neuroticism scores added further predictive power, but this was not the case for extraversion scores. In other words, the young people who recorded greatest environmental concern were those who scored low on the psychoticism scale and high on the neuroticism scale, after taking sex difference into account.

Third, after taking differences in sex, age, and personality into account, religiosity emerged as a predictor of more positive environmental attitudes among this age group. The beta weights demonstrated that belief in God was the most important of the religious factors, and that, after belief in God was taken into account, both personal religious practice (personal prayer) and public religious practice (church attendance) contributed independently additional predictive power. In other words, the young people who showed greatest environmental concern were those who believed in God, prayed, and attended church.

Fourth, after taking into account belief in God, church attendance and personal prayer, belief in the biblical account of creation was not further implicated in shaping environmental attitudes, either positively or negatively.

On the basis of these findings, Francis (1997) argued that these data provided no support for White's (1967) thesis rooting the ecological crisis within the Christian tradition. On the contrary, three aspects of religiosity included in the study (belief in God, personal prayer, and church attendance) each contributed cumulatively to promoting higher levels of environmental concern. Moreover, these data also demonstrated that belief in the biblical

account of creation *per se* was irrelevant to shaping environmental concern among this age group.

A major limitation with the study reported by Francis (1997) concerned its reliance on five single-item measures. Environmental concern was assessed by the single item, 'I am concerned about the risk of pollution to the environment'. Religious belief was assessed by the single item, 'I believe in God'. Conservative Christian belief was assessed by the single items, 'I believe that God made the world in six days and rested on the seventh'. Personal prayer and church attendance were each assessed by a single measure of frequency. A further conceptual weakness was that the study failed to include a measure of self-assigned Christian affiliation.

In two studies of churchgoers in the UK, Village (2015, 2020) explored the relationships between personality, biblical literalism, theological stance towards creation, and environmental concern. In the first study, literal interpretation of Genesis was associated with higher levels of dominion theology, which in turn was associated with reduced concern for the environment. However, dominion and literalism also predicted higher levels of stewardship theology, which was associated with greater concern for the environment and greater willingness to make sacrifices to preserve it. The second study used the Francis Psychological Types and Emotional Temperament Scales (Village & Francis, 2022a, 2022b), which included a measure of emotional temperament related to neuroticism. Psychological type preferences had some indirect predictive power on environmental concern because preference for sensing over intuition was associated with more literal interpretation of Genesis, and preference for thinking over feeling was associated with general theological conservatism, which predicted literalism, dominion theology, and eschatological beliefs that seemed to reduce concern for the environment. Greater emotional volatility (neuroticism) had a direct effect, being associated with increased concern for the environment. Others have

argued that heightened eco-anxiety, which may be a product of neurotic tendencies, may be a useful spur to positive environmentalism, provided it does not become debilitating (Stanley et al., 2021; Verplanken et al., 2020).

Research aim

Against this background the aim of the present study was to readdress 25 years later the research question posed by Francis (1997) and to do so by drawing on data generated by the Young People's Values Survey, a survey conducted among over 27,000 13- to 15-year-old students in England and Wales during the second decade of the twenty-first century. Building on the earlier Teenage Religion and Values Survey, this more recent survey was designed to include three scales relevant for a richer analysis of the connections between Christianity and environmental concern among young people: a five-item Scale of Environmental Concern and Behaviour, a five-item Conservative Christian Belief Scale, and the seven-item Francis Scale of Attitude toward Christianity. This survey also included the abbreviated form of the Junior Eysenck Personality Questionnaire Revised that allowed this aspect of Francis' (1997) study to be replicated.

Method

Procedure

In order to obtain a good representation of students identifying as Christian, the project over sampled schools with a religious character (mainly Anglican and Catholic schools within the state-maintained sector). Participating schools were asked to follow a standard procedure. The questionnaires were administered in normal class groups to all year nine (13- to 14-year-old) and year ten (14- to 15-year-old) students throughout the school. Students were asked not to write their names on the booklet and to complete the inventory under examination-like conditions. Although the students were given the choice not to participate, very few declined to do so. They were assured of confidentiality and anonymity.

A total of 163 schools participated in the project, with thoroughly completed responses from 27,524 students. In order to clarify the analyses, in the present paper attention will be focused only on those students who self-identify as of no religion or as Christian, excluding those self-identifying with other faith traditions.

Instrument

The Young People's Values Survey contained a range of questions modelled in the tradition of the CYMCA Attitude Survey (Francis, 1982a, 1982b) and the Teenage Religion and Values Survey (Francis, 2001). The present study drew on the following components.

Environmental concern was assessed by the five-item Scale of Environmental Concern and Behaviour (SECB). Each item was rated on a five-point Likert scale: agree strongly (5), agree (4), not certain (3), disagree (2), and disagree strongly (1). The specific environmental concerns selected concerned risk of pollution to the environment, risk of animals and plants becoming extinct, and risk of depleting the earth's resources. The specific behaviours selected concerned making effort to help save the world's energy resources, and making effort to recycle.

Religious affiliation was assessed by the question 'What is your religion?' followed by the checklist: none, Christian, Buddhist, Hindu, Jewish, Muslim, Sikh, and other. Those who identified as Christian were invited to specify 'with which group do you identify?' followed by the check-list: none, Baptist, Church of England/Church in Wales, Jehovah's Witnesses, Methodist, Pentecostal (Assemblies of God, Elim), Roman Catholic, Salvation Army, URC/Presbyterian, and other.

Church attendance was assessed by the question 'How often do you attend a place of religious worship (e.g. church, mosque, temple, etc.)?' rated on a five-point scale: nearly every day (5), once a week (4), once a month (3), occasionally (2), and never (1).

Personal prayer was assessed by the question 'Do you pray by yourself?' rated on a five-point scale: nearly every day (5), at least once a week (4), at least once a month (3), occasionally (2), and never (1).

Religious affect was assessed by the seven-item short form of the Francis Scale of Attitude toward Christianity (FSAC; Francis, Greer, & Gibson, 1991). Each item was rated on a five-point Likert scale: agree strongly (5), agree (4), not certain (3), disagree (2), and disagree strongly (1). The items accessed affective responses to God, Jesus, Bible, prayer, and church.

Religious conservation was assessed by the five-item Conservative Christian Belief Scale (CCBS). Each item was rated on a five-point Likert scale: agree strongly (5), agree (4), not certain (3), disagree (2), and disagree strongly (1). The items focused on beliefs about creation and beliefs about the exclusive claims of Christianity.

Personality was assessed by the abbreviated form of the Junior Eysenck Personality Questionnaire Revised (Francis, 1996). This instrument proposes three six-item scales to measure extraversion, neuroticism, and psychoticism, together with a six-item lie scale. Each item is rated on a two-point scale: no (0) and yes (1), with negatively-phased item recoded. Among the present sample the three personality scales recorded the following alpha coefficients: neuroticism, $\alpha = .72$; extraversion, $\alpha = .66$; psychoticism, $\alpha = .56$.

Sex and *school year* were both treated as dichotomous variables: male (1) and female (2); year nine (1) and year ten (2)

Participants

The present analyses were conducted on data provided by the 23,714 students who identified their religion either as Christian (N = 13,475) or as none (N = 10,239). Among those who identified as Christian, the largest denominational affiliation was as Church of England/Church in Wales (N = 5,648), followed by Roman Catholic (N = 3,102), Baptist (N

= 1,194), Pentecostal (N = 471), and Methodist (N = 386). Of these 23,714 participants, 48% were male (N = 11,452) and 52% were female (N = 12,262); 55% were in year nine (N = 12,957) and 45% were in year ten (N = 10,757). In terms of personal prayer, 11% prayed daily, a further 8% prayed at least monthly, and 21% prayed occasionally, leaving 60% who never prayed. In terms of church attendance, 17% attended weekly, a further 6% attended at least monthly, and 28% attended occasionally, leaving 48% who never attended.

Results

- insert table 1 about here -

The first step in data analysis explored the scale properties of the six instruments employed in the analyses. Table 1 demonstrates acceptable levels of internal consistency reliability for five of the six measures in terms of the alpha coefficient (Cronbach, 1951) exceeding the threshold of .65 proposed by DeVellis (2003). The lower alpha coefficient recorded by the psychoticism scale is consistent with the problems generally reported in operationalising and measuring this dimension of personality (Francis, Brown, & Philipchalk, 1992).

- insert table 2 about here -

Table two provides further information about the three measures of religious affect, environmental concern, and religious conservatism in terms of the correlations between the individual items and the sum of the other items within the scale, and in terms of the item endorsement as the sum of the agree and agree strongly responses. The Francis Scale of Attitude toward Christianity demonstrates that a positive attitude toward Christianity was recorded by between one in five and one in four of the students: 20% agreed that prayer helps them a lot, and 25% agreed that God means a lot to them. The Conservative Christian Belief Scale demonstrates that one in seven of the students accept the core statements that Christianity is the only true religion (14%) or that God made the world in six days of 24

hours (14%). The Scale of Environmental Concern and Behaviour demonstrates that over half the students are concerned about the risk of pollution to the environment (51%), about the use of the earth's resources (52%), and about animals and plants becoming extinct (55%). The proportion of students who make special efforts to address these concerns is, however, lower: 28% make a special effort to save the world's energy resources, and 34% make special effort to recycle.

- insert table 3 about here -

The second step in data analysis explored the bivariate associations between the variables used in the study. Five features of the correlation matrix presented in table 3 merit commentary. First, sex differences were statistically significant in terms of environmental concern, personality, and religion. Females recorded higher scores on neuroticism, higher scores on extraversion, and lower scores on psychoticism, as is generally consistent with the wider literature (Eysenck & Eysenck, 1975, 1991). Females recorded higher scores on religious affect, church attendance, prayer, and religious conservatism, as is generally consistent with the wider literature (Francis & Penny, 2014). Females also recorded higher scores on environmental concern. Second, age differences were statistically significant in terms of environmental concern, religious affect, and religious conservatism. In all three cases, year-ten students recorded lower scores than year-nine students. The lower scores recorded on the Francis Scale of Attitude toward Christianity is consistent with earlier work (Kay & Francis, 1996). Third, the three personality variables were all statistically significant in terms of religious affect, prayer, and church attendance, with psychoticism scores accounting for more of the variance. This finding has been well-established in the literature since the early work reported by Francis (1992). The same pattern of correlations with personality was also found for environmental concern. Greater environmental concern was associated with higher neuroticism, lower psychoticism, and lower extraversion. These

findings were consistent with the earlier work reported by Francis (1997). Fourth, the bivariate correlations also demonstrated that environmental concern was significantly associated with all four religious variables. Greater environmental concern was associated with more frequent church attendance, more frequent prayer, and more positive religious affect. These findings were consistent with the earlier work reported by Francis (1997). At the same time, however, lower levels of environmental concern were associated with greater religious conservatism. Fifth, self-assigned affiliation as Christian was statistically significant in predicting higher levels of environmental concern, as well as predicting higher frequency of church attendance, higher frequency of personal prayer, and more positive religious affect.

- insert table 4 about here -

In light of the complex pattern of bivariate association, the third step in data analysis employs a cumulative sequence of six regression models to test the incremental effect of personal factors (sex and age entered in model one), psychological factors (extraversion, neuroticism, and psychoticism entered in model two), religious behaviour (church attendance and personal prayer entered in model three), religious affect (attitude toward Christianity entered in model four), religious conservatism (conservative Christian belief entered in model five), and self-assigned Christian affiliation (entered last in model six). Each model increased significantly the variance accounted for in scores recorded in the measure of environmental concern.

When all six sets of variables are taken into account the following six main conclusions can be drawn. First, the effect of age remained consistent across all six models. Year-ten students recorded a lower level of environmental concern than year-nine students. Second, in terms of sex differences, the bivariate correlations and model one suggested that females recorded higher levels of environmental concern than males. Model two, however, suggested that psychological factors were more important than sex differences. When

personality factors were taken into account, females recorded lower levels of environmental concern than males with the same personality profile. Third, the effect of personality factors remained fairly consistent across the models. Higher levels of environmental concern were associated with lower psychoticism scores, lower extraversion scores, and higher neuroticism scores. Fourth, the bivariate correlations suggested that both church attendance and personal prayer were associated with higher levels of environmental concern. Model six, however, suggested that the effects of religious behaviour were largely mediated through the effects of positive religious affect. Scores recorded on the Francis Scale of Attitude toward Christianity provided a more effective prediction of environmental concern than religious behaviour. Fifth, when the positive effect of religious affect has been taken into account, the negative effect of religious conservatism was more prominent. Sixth, the bivariate correlation suggested that self-assigned Christian affiliation predicted a higher level of environmental concern. However, when religious behaviour and religious affect have been taken into account, model six showed a significant negative path from self-assigned Christian affiliation and environmental concern. This suggested that nominal Christian affiliation was associated with lower levels of environmental concern than found among those who describe themselves as religiously unaffiliated.

Discussion and Conclusion

The specific aim of the present study was to readdress 25 years later the research question explored by Francis (1997). That study had been designed to test White's (1967) thesis rooting the ecological crisis within the Christian tradition. The original contribution of Francis' (1997) study to the debate was rooted in three features: it moved the enquiry to England and Wales and located it among a younger age group; it operationalised religiosity in terms of four defined components (belief in God, church attendance, personal prayer, and conservative Christian belief); and it included a recognised measure of personality as a set of

core control variables. Building on Francis' (1997) original study, the present study addressed two limitations with the design of that study. First, the original study relied heavily on single-item measures to assess environmental concern, religious belief, and conservative Christian belief. The present study addressed that weaknesses by introducing three multi-item scales: the five-item Scale of Environmental Concern and Behaviour; the five-item Conservative Christian belief Scale (CCBS); and the seven-item short form of the Francis Scale of Attitude toward Christianity (FSAC). Second, the original study had failed to include in the analysis an item concerned with self-assigned religious affiliation as Christian. The present study included such a measure. Meeting its objective of testing White's (1967) thesis rooting the ecological crisis within the Christian tradition, the findings from the present analyses offered seven contributions to knowledge that now need to be tested against the wider literatures and from which recommendations need to be drawn for future research.

First, this study introduced a new multi-item measure, the Scale of Environmental Concern and Behaviour. This new measure demonstrated satisfactory psychometric properties and provided a useful instrument for assessing the correlates of individual differences in levels of environmental concern among this age group. This new measure can therefore be commended for further use and take its place alongside other related instruments tested among different constituencies, including young people shaped within other religious traditions.

Second, this study confirmed that, considered on their own, sex differences remain a significant predictor of individual differences among this age group (13- to 15-year-old students) in relation both to religiosity and to environmental concerns. Among this age group females are more likely to report religious behaviour, religious belief, and religious affect. This is consistent with the wider literatures as reviewed by Francis and Penny (2014). Among

this age group females are also more likely to report pro-environmental concern. This is consistent with the earlier findings reported by Francis (1997).

Third, this study confirmed that among this narrow age range of year-nine and year-ten students (comparing 13- to 14-year-old students with 14- to 15-year-old students) age is a significant predictor of individual differences in environmental concern. There is a lower level of environmental concern among year-ten students than among year-nine students. This is consistent with the earlier findings reported by Francis (1997). The stability of this finding across the two studies offers no encouragement for progress having been made in environmental education.

Fourth, this study confirmed the value of including a recognised measure of personality, in this case a measure operationalising the Eysenckian three dimensional model of personality. Three main conclusions emerged from the inclusion of this measure. Psychoticism scores emerged as the main predictor of individual differences in both religiosity (consistent with Francis, 1992) and in environmental concern (consistent with Francis, 1997). The apparent effect of sex differences was mediated through individual differences in personality. After taking personality variables into account, the association between religiosity and environmental concern remained. This is consistent with the earlier findings of Francis (1997).

Fifth, this study included an established measure of religious affect, the Francis Scale of Attitude toward Christianity. While the bivariate correlations demonstrated that religious behaviour (church attendance and personal prayer) were important predictors of individual differences in environmental concern alongside religious affect, the regression models demonstrated that religious affect was the strongest religious predictor and that much of the effect of church attendance and personal prayer was routed through religious affect. This finding is consistent with the wider literature concerning the Francis Scale of Attitude toward

Christianity (see Francis, 2009, 2019) and with the cognate measures designed to operationalise religious affect within other faith traditions, including the Sahin-Francis Scale of Attitude toward Islam (Sahin & Francis, 2002), the Katz-Francis Scale of Attitude toward Judaism (Francis & Katz, 2007), the Santosh-Francis Scale of Attitude toward Hinduism (Francis, Santosh, Robbins, & Vij, 2008), the Astley-Francis Scale of Attitude toward Theistic Faith (Astley, Francis, & Robbins, 2012), and most recently the Athwal-Francis Scale of Attitude toward Sikhism (Francis, Athwal, & McKenna, 2020).

Sixth, this study introduced a new measure of religious conservatism, the Conservative Christian Belief Scale. This new measure demonstrated satisfactory psychometric properties and illuminated the distinctive function of conservative Christian belief in shaping environmental concern. After the positive effect of religious affect (enhancing environmental concern) had been taken into account, conservative Christian belief contributed additional predictive power (this time depressing environmental concern). In other words, the finding qualifies White's (1967) classic thesis, now placing 'the historical roots for our ecological crisis' not at the feet of the Christian tradition *per se*, but specifically at the feet of a conservative perspective within the Christian tradition. This finding is consistent with Village's (2015) finding that a literal reading of Genesis is associated with lower levels of environmental concern. However, in a future study, it might be helpful to include eschatological attitudes and beliefs alongside those relating to creation, as these would pick up the extent to which concerns and beliefs (both religious and environmental) relating to the future play a part in influencing Christians' perspectives on the environment.

Seventh, this study included an index of self-assigned Christian religious affiliation alongside cognitive, behavioural, and affective indices of religiosity. The multivariate analyses draw attention to two key characteristics of the way in which self-assigned religious affiliation functions in empirical enquiry. First, the bivariate correlation demonstrated a

positive association between self-assigned Christian affiliation and higher levels of environmental concern. In the absence of other religious indicators, self-assigned religious affiliation is acting as a crude proxy measure for personal religiosity. This crude proxy measure, nonetheless, is powerful enough to challenge the authority of White's (1967) thesis. Second, when religious cognition, religious behaviour, and religious affect have been taken into account, self-assigned religious affiliation is seen to function in a very different way. Entered last into the regression model, a negative path emerges between self-assigned Christian affiliation and environmental concern. It is those who self-assign as Christian as a non-religious, secular marker who show lower levels of environmental concern. The problem is that this marker disguises two distinct groups of people (Bruce & Voas, 2004; Francis, 2003).

A strength of the present study is that it drew on the large database generated by the Young People's Values Survey, a survey conducted among over 27,000 13- to 15-year-old students in England and Wales. This strength is nonetheless also the source of two limitations. The first limitation is that the data were gathered over a period of eight years (due to constraints on time and finance) and it is likely that young people's views have been developing and shifting over this period. The second limitation is that the Young People's Values Survey was designed to capture data across a range of fields (see for example, Francis, 2020; Francis, Casson, & McKenna, 2018), with the consequence that the measures employed in the present study were not as rich as could have been the case if the database had focused only on environmental concern. Nonetheless, secure foundations have been laid on which further research among young people can properly build. However, future research would benefit from including questions explicitly referring to the concept of 'climate change', both in terms of attitude and action, that would pick up the most common current language around environmental issues.

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Table 1

Scale properties of all measures

	N items	Alpha	Mean	SD
Junior Eysenck Revised Extraversion Scale	6	.66	4.86	1.41
Junior Eysenck Revised Neuroticism Scale	6	.72	2.88	1.88
Junior Eysenck Revised Psychoticism Scale	6	.57	0.94	1.18
Francis Scale of Attitude toward Christianity	7	.94	18.77	7.12
Conservative Christian Belief Scale	5	.69	10.82	3.79
Scale of Environmental Concern and Behaviour	5	.80	16.14	4.06

Note: N = 23,714

Table 2

Scale items

	r	Agree %
Francis Scale of Attitude toward Christianity (FCAC)		
I know that Jesus helps me	.88	22
I thinking going to church is a waste of time*	.70	35
God helps me to lead a better life	.86	23
God means a lot to me	.88	25
Prayer helps me a lot	.81	20
I know that Jesus is very close to me	.86	20
I think the Bible is out of date*	.59	30
Scale of Environmental Concern and Behaviour (SECB)		
I make a special effort to help save the world's energy resource	.59	28
I make a special effort to recycle	.55	34
I am concerned that we use too much of the earth's resource	.58	52
I am concerned about animals and plants becoming extinct	.54	55
I am concerned about the risk of pollution to the environment	.68	51
Conservative Christian Belief Scale (CCBS)		
The earth is a billion years old*	.38	78
I believe that God made the world in six days of 24 hours	.44	14
The earth is only a few thousand years old	.47	5
I think Christianity is the only true religion	.44	14
I believe evolution created everything over millions of years*	.49	49

Note:

r = correlation between individual items and the sum of the other items within the scale

% = sum of agree and agree strongly responses

* = these items are reverse coded to calculate *r* but not %

N = 23,714

Table 3

Correlation matrix

	SECB	CCBS	FSAC	Prayer	Church	P	N	E	Age	Sex
Christian	.11***	.36***	.57***	.47***	.50***	-.09***	.04***	.02***	.01	.06***
Sex	.02***	.14***	.07***	.06***	.04***	-.23***	.32***	.07***	.01	
Age	-.04***	-.04***	-.04***	-.01	-.01	.03***	.01	.00		
Extraversion (E)	-.13***	.06***	-.02**	-.05***	-.05***	.12***	-.16***			
Neuroticism (N)	.11***	.06***	.06***	.09***	.05***	-.06***				
Psychoticism (P)	-.26***	-.00	-.15***	-.09***	-.10***					
Church	.17***	.39***	.63***	.61***						
Prayer	.18***	.44***	.72***							
FSAC	.25***	.58***								
CCBS	-.08***									

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

N = 23,714

Table 4

Regression models

	r	Model 1 β	Model 2 β	Model 3 β	Model 4 β	Model 5 β	Model 6 β
Personal factors							
Sex	.02***	.02***	-.06***	-.07***	-.07***	-.03***	-.03***
Age	-.04***	-.04***	-.03***	-.03***	-.03***	-.03***	-.03***
Psychological factors							
Extraversion	-.13***		-.08***	-.07***	-.08***	-.06***	-.06***
Neuroticism	.11***		.10***	.09***	.09***	.09***	.09***
Psychoticism	-.26***		-.26***	-.25***	-.23***	-.20***	-.20***
Religious behaviour							
Church	.17***			.07***	.01	.02	.03***
Prayer	.18***			.11***	-.00	.00	.01
Religious affect							
FSAC	.25***				.21***	.37***	.38***
Religious conservatism							
CCBS	-.08***					-.30***	-.29***
Christian affiliation							
Christian	.11***						-.04***
R^2		.002	.090	.114	.132	.187	.188
Δ		.002***	.087***	.025***	.018***	.056***	.001***

Note: *** $p < .001$

N = 23,714