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The effect of religiosity on adolescent risky behaviors

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Silvia Mendolia, Alfredo R. Paloyo, and Ian Walker[1]

The Effect of Religiosity on Adolescent Risky Behaviors

Abstract

We investigate the relationship between religiosity and risky behaviors in adolescence using data from a large and detailed cohort study of 14 year olds that have been followed for seven years. We focus on the effect of the selfreported importance of religion and on the risk of youths having early sexual intercourse, drinking underage, trying cigarettes, trying cannabis, and being involved in fighting at ages 14–17. We use school and individual fixed effects, and we control for a rich set of adolescent, school, and family characteristics, including achievements in standardized test scores at age 11, parental employment, and marital status. We also control for information on personality traits, such as work ethic, self-esteem, and external locus of control. Our results show that individuals with low religiosity are more likely to engage in risky health behaviors. This effect is robust to separate estimations for boys and girls and to the control variables used. The combination of low work ethic, low selfesteem, and low religiosity seems to have particularly detrimental effects.

JEL Classification: I10, I12

Keywords: Health behaviors; religiosity; personality; fixed effects

June 2018

1 Silvia Mendolia, University of Wollongong; Alfredo R. Paloyo, University of Wollongong and RWI Research Network; Ian Walker, Lancaster University. – The data was provided by the UK DataService at the University of Essex and is available from them, subject to permissions. – All correspondence to: Silvia Mendolia, Northfields Ave, Wollongong NSW 2522, Australia, e-mail: smendoli@uow.edu.au

1 Introduction

There is considerable empirical evidence to indicate that the behavioral outcomes of people who hold religious beliefs are different from those who do not.[1] Individuals who tend to score higher on measures of religiosity also tend to score better in a breadth of outcomes such as health and other measures of objective and subjective well-being. The majority of these statistical associations is true for both males and females, and for both adults and adolescents. To the extent that being religious or having personality traits associated with religiosity can generate these outcomes, cultivating these traits can be viewed as a powerful social and personal instrument to influence peoples' lives toward achieving better life outcomes.[2]

Our objective is to estimate the impact of religiosity on teenage propensity to engage in risky health behaviors using a variety of estimation methods. We study the effect of the importance of religion in daily life on the risk of youths, ages 14–17, (i) having first sexual intercourse at a young age, (ii) trying alcohol, (iii) drinking alcohol at least once a month, (iv) trying cigarettes, (v) trying cannabis, and (vi) being involved in fighting. We address the problem of identifying the causal role of religiosity by adopting a fixed-effects regression framework to control for school- or individual-level, time-invariant unobserved heterogeneity. In addition, we examine the role played by personality traits in mitigating or enhancing the impact of religiosity on the likelihood of engaging in risky health behaviors by using a regression-adjustment framework with inverse-probability weights.

This study contributes to the literature on the determinants of adolescent risky health behaviors in several ways. First, we expand the literature on the impact of religiosity by using a measure of intrinsic religiosity (namely, the importance of religion in one's life). Previous works have instead looked at participation in religious activities (e.g., Gruber (2005) and Mellor and Freeborn (2011)), which is a measure of extrinsic religiosity. We take the view that intrinsic religiosity is a better indicator of the role that religion *per se* plays in an individual's decisions and attitudes. It captures the individual beliefs chosen by the youths, rather than behaviors that could potentially be imposed, or at least affected, by parents and society and their respective expectations.[3] Secondly, previous works have focused on the role of the family

[1] See Hungerman (2014) and the references therein, particularly those listed in his first footnote.
[2] We take the same approach as Iannaccone (1998) and much of the literature in this area by remaining silent on the "validity of religious beliefs or authenticity of religious institutions".
[3] One could argue that intrinsic religiosity may be affected by external factors as well, but since it is essentially pivate or hidden, it is more likely that it represents an individual's true feelings about religion.

and the socioeconomic environment,[4] so we differentiate this study by specifically focusing on the role that religiosity and non-cognitive personality traits play. That is, we consider the interaction between different levels of religiosity and personality traits, and how this affects the likelihood of engaging in risky health behaviors. Finally, we use a very rich school-based dataset of English teenagers which includes extensive information on the youths, their families, and their school. This allows us to use school fixed effects to control for time-invariant heterogeneity at that level.

The work addresses an important issue in the UK since the prevalence among British adolescents is higher than in other similar OECD countries for most risky behaviors (although the trends are declining over the last two decades).[5] For example, 33% of 15-year-old girls and 25% of boys report having been drunk at least twice, compared to the EU27 averages of 24% and 27% (OECD 2016). British youths are likely to drink over double the daily recommended amounts (Hale and Viner 2012) and use drugs more frequently than older respondents (Craig and Hirani 2010; NHS Information Centre 2011). Seventeen percent have used cannabis in the last 12 months (UNICEF Office of Research 2013). The use of cannbis by 15–34 year olds in the UK is just below the EU26 average, but the use of cocaine is 220% higher. The use of amphetamines is just above the EU26 average, but the use of ecstacy is more than double the EU26 figure. The UK has one of the highest teenage pregnancy rates of any developed country (ONS 2014). Moreover, young people between 15 and 24 years in the UK have higher rates of sexually transmitted infections (STIs) than older groups (Department of Health 2011; Public Health England 2013). STI rates in the UK are 40% higher than the EU average for chlamydia, almost 100% higher for syphillis, and almost 200% higher for gonorrhoea (OECD 2016). Lastly, over 35% of British children aged 11, 13, and 15 report that they have been involved in a physical fight at least once in the last 12 months (UNICEF Office of Research 2013).

The impact of these behaviors on the costs of a public universal health care system, such as the National Health Service (NHS), is likely to be considerable. In 2006–2007, smoking- and alcohol-related costs on the NHS were roughly a combined GBP 6.6 billion (Scarborough et al. 2011). In England and Wales in 2003/2004, drug use imposed economic and social costs equivalent to GBP 15.4 billion (Gordon et al. 2006). As noted in WHO (2009)

[4] See, for example, Gruber (2000) for an analysis of youth risky health behavior from an economic perspective and Cawley and Ruhm (2011) for an analysis of economic concepts that relate to health behaviors.
[5] While the issue is relevant in general, we highlight a few features of the British population here because of the geographic specificity of our dataset.

and by Cawley and Ruhm (2011), tobacco is responsible for 18% of deaths in high-income countries while alcohol use accounts for a further 2%.

Our results show that the individual propensity to engage in risky behaviors strongly decreases when individuals show both high levels of religiosity and strong work ethic. Low self-esteem also seems to play an important role in increasing the chances of engaging in early sexual intercourse, smoking, and drinking. The results are similar for boys and girls, and they are stable across several empirical specifications of the model. These results indicate that there is potential scope to introduce policies that would encourage a better work ethic. They also imply that there needs to be a deeper understanding of how beliefs in the supernatural generate these positive outcomes.[6]

2 Related literature

Our understanding of the role that religion plays in affecting individuals' choices with respect to risky behaviors is very limited (Fletcher and Kumar 2014). However, if religion or traits associated with religiosity "protect" individuals from risky behaviors (see, e.g., Mellor and Freeborn (2011) and McCullough and Willoughby (2009)), it becomes important to understand the mechanisms through which this effect materializes since this knowledge can be used to reduce the incidence of risky behaviors. For this reason, the present analysis can provide insights into the relationship between religiosity, personality traits, and health-related behavioral outcomes.

A number of hypotheses have been put forward to explain how religiosity could have an independent effect on particular outcomes, especially health-related ones. As McCullough and Willoughby (2009) enumerate: (i) religions prescribe health-promoting behaviors and proscribe risky ones; (ii) religions can provide social support; (iii) religions can socialize children to comply with social norms; (iv) religion can provide an effective coping mechanism for stress; and (v) religion may foster self-regulation and self-control, which, in turn, are associated with improved health outcomes. If we view religions as "social clubs" (as in Hungerman (2014)), the mechanisms posited here imply that the consumption of the religious "club goods" ultimately leads to better health.

Although the hypotheses listed above have obvious intuitive appeal, it is, still entirely possible that the observed empirical relationships between religiosity and positive behavioral

[6] It would also be interesting to know whether these outcomes can be generated in a more secular setting for a more inclusive approach.

outcomes are the result of unobserved factors that drive both. A concrete manifestation of this occurs for people who do not heavily discount benefits that materialize far into the future (and especially beyond the grave): they adhere to religious prescriptions today to reap the promised rewards upon death (Azzi and Ehrenberg 1975). That is, unobserved heterogeneity may be generating a spurious correlation between measures of religiosity and observed behavioral outcomes. As a consequence, estimating the causal effect of religion on such outcomes becomes a more complicated undertaking that renders the use of naïve statistical estimators uninformative about religion's true impact.

We focus on risky health behavior in adolescence because it is a particularly worrying phenomenon. As noted by Gruber (2000), practices such as smoking, drinking, trying drugs, and having sex at a young age have important and long-lasting consequences. Several risky health behaviors may be associated with chronic conditions (e.g., smoking may cause emphysema and chronic obstructive pulmonary disease). Such behaviors are also associated with low educational achievements in adolescence (Sabia and Rees 2009), future morbidity, and premature mortality (Kipping et al. 2012). Risky health behaviors also contribute to the likelihood of committing a crime.[7]

There are substantial bodies of literature in both health and social sciences that investigate the relationship between religiosity and health behaviors (see, e.g., Rew and Wong (2006) for a systematic review of the existing findings), but very few of these studies address the issue of a possible causal relationship between religion and health behaviors and outcomes. Iannacone (1998) introduced an economic framework to analyze religious institutions and adherence to beliefs. Campante and Yanagizawa-Drott (2015) have analyzed the economic effects of religious practices and show that they can affect individual behaviors and beliefs which, in turn, have a negative impact on economic growth but a positive impact on individuals well-being. Other recent studies have continued to investigate the impact of religious affiliation and participation on individual behaviors (Gruber 2005; Gruber and Hungerman 2008; Mellor and Freeborn 2011; Fletcher and Kumar 2014).

The major challenge for this kind of analysis is the identification of a causal connection between religion and individual risky behaviors since observational data do not typically provide researchers with the exogenous variation in religiosity needed to credibly estimate causal impacts. Some of these studies (Gruber 2005; Mellor and Freeborn 2011) identify the

[7] See Cawley and Ruhm (2011) for a review of the findings in these areas.

impact of religious participation by using religious market density (i.e., the proportion of people sharing the same religious belief living in a particular area) as an instrument for religious participation. They show that religious participation significantly decreases the likelihood of engaging in risky behaviors, especially illicit drug use.

These studies rely on the strong assumption that the proportion of people sharing a particular religious affiliation only affects the chances of engaging in risky behaviors through the effect on individual religiosity. However, other transmission channels are conceivable—for instance, peer effects and peer pressure, as well as shared social values and increased control of young people's behaviors from older family friends and relatives living in the same area. Furthermore, people may self-select where to live on the basis of their religious affiliation (and the presence of other people sharing the same values, as well as the possibility of attending religious services) and other unobserved characteristics that might also influence risky health behaviors.

Gruber and Hungerman (2008) exploit a policy-driven change in the opportunity cost of religious participation based on laws that prohibit retail activity on Sundays and show that, when these laws are repealed, religious participation decreases and drug use increases. The underlying assumption is that there are no direct effects of increased retail activity on drug use. Fletcher and Kumar (2014) analyze the impact of religiosity (measured as religious attendance, prayer frequency, and self-reported importance of religion) on risky health behaviors using sibling fixed effects and show that religiosity has a strong protective effect in reducing dependence from addictive substance. However, religiosity is often driven by family characteristics and background, and it is difficult to find data with sufficient variation in religiosity between siblings.

Fruehwirth et al. (2016) study the impact of religiosity on depression in adolescence and show that religiosity clearly protects young people from stressor factors, and, thus, contributes to improve their mental well-being. The protective effect of religiosity is higher than that of other important variables, such as, for example, maternal education. This study uses peers' religiosity as an instrument for individual religiosity, and, therefore, assumes that one's mental health is not directly affected by one's peers' religiosity.[8]

[8] A similar peers-of-peers strategy in the context of education can be found in Mendolia, Paloyo, and Walker (2018). This assumption may be credible in that context, but it would be very hard to use a similar instrument in the context of risky heath behavious, as it is likely that these will be substantially affected by peers' pressure (including peers' religious behaviors).

With respect to the relationship between personality traits and health behaviors and outcomes, this has been widely recognised in studies from psychology and health sciences and has received increasing attention among economists in the recent years. Almlund et al. (2011) summarize results from studies conducted in various disciplines and show that conscientiousness, openness to experience, and agreeableness have a positive effect on health outcomes (see, e.g., Hampson et al. (2007), Gale et al. (2008), Hampson et al. (2010)). However, the major drawback of these studies is that they typically use small or unrepresentative samples (see Roberts et al. (2007) for a review).

Economists have engaged this issue over the last decade, but the economics literature is still thin. The results generally suggest that personality traits have a substantial effect on the probability of engaging in risky health behaviors. In particular, conscientiousness and internal locus of control seem to significantly decrease the incidence of behaviors such as smoking, drinking, and not exercising (Heckman et al. 2006; Chiteji 2010; Cobb-Clark et al. 2014; Mendolia and Walker 2014).

We complement the above literature in several ways. First, our work is the first to look at the impact of religiosity on risky health behaviors that also takes into account personality traits. This is an important addition as both elements have a separate and strong effect on young people's behaviors even though they are correlated with each other. Second, we use a multiple-treatments model which allows us to estimate the effect of various combinations of religiosity and personality traits, shedding some light on the possible transmission channels and the protective effects of multiple characteristics. Third, we take into consideration the risk of selection on unobservables and estimate a model with school fixed effects, which controls for similar characteristics of individuals attending the same school. We posit that school fixed effects will account for much of the unobservable determinants at the individual level. We also test our main results using the variation due to changes in the importance of religion at the individual level to control for time-invariant individual fixed effects.

3 Data

This paper uses data from the first four waves of *Next Steps* (previously known as the Longitudinal Study of Young People in England or LSYPE). The data collection is managed by the Department of Education and covers a wide range of topics, including academic achievements, family relationships, attitudes toward school, family and the labor market, and some more sensitive or challenging issues, such as risky health behaviors (smoking, alcohol

drinking, and drug taking) and personal relationships. Young people included in *Next Steps* were selected to be representative of all young people in England, but the survey also oversampled specific groups—particularly young people from a low socioeconomic background—to achieve externally set targets. The survey started when these adolescents were in year 9 at school in 2004, i.e. at age 13–14. In the first wave, around 15,500 young people from 647 schools were interviewed, including individuals attending state and independent schools. In the first four waves, parents and guardians were also interviewed.[9]

The data were gathered by separate interviews of children and main parent at home in Waves 1-4, mostly in May to August of each year, and thereafter by mixed methods. Our estimation sample includes up to 23,680 observations, depending on outcome and specification, of (waves × children) with non-missing information on personality traits, test scores, and other essential information on the child's birth and family background. The initial response rate was 74%. Thereafter, participants in the panel were nurtured well by the survey team, and as such, the attrition rate was low by the standards of such data—at least, for the first four waves that we rely on here.[10] The records of *Next Steps* children can be linked to the National Pupil Database (NPD), a pupil-level administrative database of all English pupils which contains detailed information on pupil test scores and achievements, as well as school-level characteristics. We use this dataset to provide information about *Next Steps* children's results in test scores as well as school indicators and school characteristics.

Our primary variable of interest is the degree of an individual's religiosity. Youths are asked two sets of questions about religiosity in *Next Steps*. First, they are asked to define their religious group from No religion, Christian, Muslim, Sikh, Buddhist, Hindu, Jewish, or Other religion. Second, they are asked about the importance of religion in their way of life (our measure of intrinsic religiosity) on a scale from 1 (not important at all) to 4 (very important). Christianity is the most common religious affiliation in the estimation sample (almost 48%), followed by Islam (12%), and other religions constitute just over 7% of the sample. Approximately one third of the sample say that they have no religious affiliation. Among those

[9] Schools and students were selected via a two stage probability proportional to size sampling procedure with disproportionate stratification. Schools were the primary sampling units and deprived schools were over-sampled by a factor of 1.5. The second stage sampled students within schools and oversampled individuals from major minority ethnic groups (Indian, Pakistani, Bangladeshi, Black African, Black Caribbean, and Mixed) in order to achieve target issued sample numbers of 1,000 in each group (Department of Education, 2011)

[10] Average characteristics of the observations comprising the estimation sample were not significantly different from the original data in terms of any of their observable characteristics.

who say that religion is very important in their lives, the majority are Muslim (about 53%), followed by Christians (30%), and then by Hindu and Sikh (14%).

We are particularly interested in the impact of intrinsic religiosity in determining risky behaviors—that is, we use this variable to capture the importance of religion in one's life. In our analysis, results from individuals reporting that religion is either "not important at all" or "not very important" are very similar, so these two sub-populations are grouped together in a single category that also includes individuals reporting no religious affiliation. We believe that intrinsic religiosity provides a better measure of individual attitudes rather than either religious denomination or participation in specific religious activities. These latter measures can arguably reflect socially sanctioned activities without capturing whether the individual regards religion *per se* as important. These "external" measures may simply reflect family constraints or parental beliefs rather than an individual's genuine, and possibly privately held, views about religion and how that view should direct his or her life.

Figure 1 shows that the distribution of religiosity is suprisingly stable across age. Between 40 and 45% say they have no religion or religion is not important in their lives. The proportion of youths who declare that religion is very important in their life is around 18% across the age distribution. On the other end of the spectrum, over 40% declare no religious affiliation or say that religion is not important at all in their lives.

FIGURE 1—RELIGIOSITY ACROSS AGE (IN PERCENT)

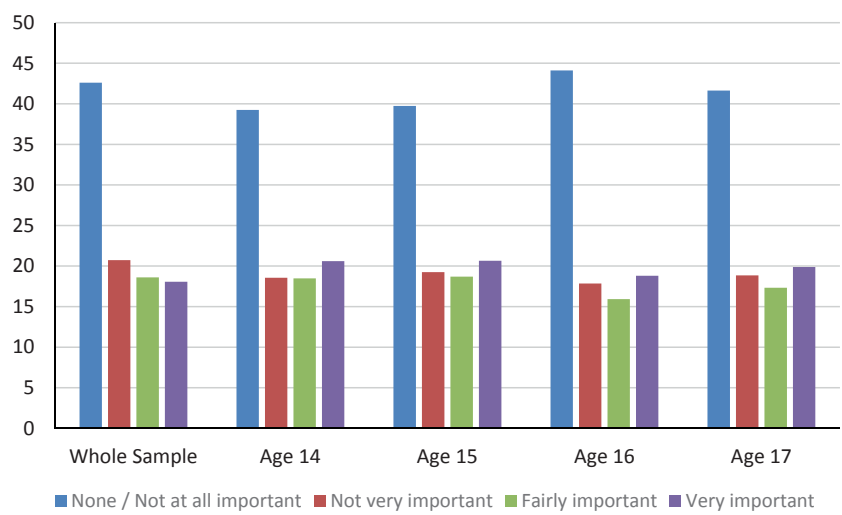


Figure 2 shows the distribution of religiosity by religious affiliation. It is quite remarkable that, among Muslims, over 80% say that religion is very important to them. For Christians, this category constitutes just slightly over 10%. Other religions fall within the 20-to-50% range.

FIGURE 2—RELIGIOSTIY BY RELIGIOUS AFFILIATION (IN PERCENT)

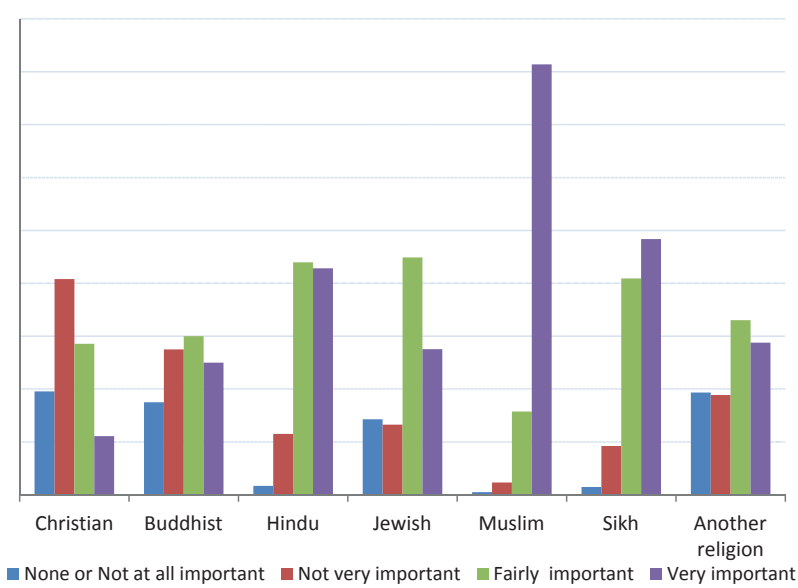


Table 1 presents the average personality traits in the whole estimation sample and by religiosity. Interestingly, individuals who say that religion is very important in their life are more likely to also have high work ethic than the whole-sample average, but at the same time, they are also more likely to have an external locus of control. Self-esteem refers to an individual's perception of her own value. *Next Steps* includes two questions on self-esteem asked at Waves 2 and 4. These questions are distinct from the questions evaluating individuals' mental health through the General Health Questionnaire in *Next Steps*. We follow the literature (see, e.g., Ermisch et al. (2001)) and construct an indicator of low self-esteem in Table 1, along with work ethic and locus of control.

TABLE 1—RELIGIOSITY AND PERSONALITY TRAITS (IN PERCENT)

Religion is: Personality traits	None, or not at all important	Not very important	Fairly important	Very important	Whole Sample
High work ethic	17.83	20.01	26.26	37.10	23.33
Low self-esteem	27.30	24.52	24.75	26.39	23.85
External locus of control	24.55	21.52	20.46	28.38	26.09

Note: Authors' calculations based on *Next Steps*.

To account for the relationship between personality traits and religiosity, we use non-cognitive measures such as attitude toward school work and work ethic as well as measures for self-esteem and one's locus of control.[11] In particular, *Next Steps* includes four questions on working attitudes with respect to school work asked at Wave 2, and we use factor analysis to define an index of work ethic (Mendolia and Walker 2014, 2015). Work ethic and perseverance are all related to conscientiousness, defined as "the tendency to be organised, responsible, and hardworking" (American Psychological Association 2007). Individuals are defined as having high (low) work ethic if they are in the top (bottom) quartile of the distribution of this index (Schurer 2014).

Youths are classified as having low self-esteem if they have placed themselves in the most distressed category for one of the two questions (see Appendix) at least once across the two waves (Mendolia and Walker 2014, 2015). Around 27% of the children in the sample are classified as having low self-esteem using this definition. Similarly, they are defined as having high self-esteem if they have "felt more useful than usual" or that they have "not felt worthless at all" in the recent period. About 25% are classified as having high self-esteem.

Locus of control refers to an individual's perception of her ability to determine life events and has been found to be closely related to neuroticism (the tendency to respond with negative emotions towards threats, frustrations, or losses (Bono and Judge 2003; Almlund et al. 2011)). Individuals with an external locus of control believe that their life is mostly determined by events outside their control; individuals with an internal locus of control believe

[11] *Next Steps* does not include "Big Five personality traits" questions (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) commonly used in similar analyzes (see Almlund et al. 2011).

that their own decisions and behaviors can affect life events. We measure locus of control using responses to six questions and using factor analysis to create indices of internal and external loci of control. Children are coded as having external locus of control if they have a score in the top quartile of the distribution of the external index.

Our outcome measures are the following: whether the adolescent engaged in sexual intercourse; having ever tried alcohol; drinking alcohol at least once a month; having tried cigarettes and cannabis; and having ever been involved in fighting. We focus on early initiation and restrict the sample to behaviors observed at ages 14–17. While all other outcome measures were collected at every wave, information about sexual behavior was collected for the first time in Wave 6 (age 20) when young people were asked how old they were when they first had sexual intercourse. We use this information to generate a binary variable equal to 1 at the age when they declared they firstly engaged in sexual activity and at every wave after that. Our attention is focused on early sexual activity, so we limit our analysis to the first four waves of *Next Steps* (ages 14—17).

Figures 3, 4, and 5 present descriptive statistics of the outcome variables, disaggregated by personality traits, age, religiosity, and religion respectively. In Figure 3, sexual intercourse is similar across these traits, while high work ethic seems to have a protective effect with respect to other risky behaviors, and low self-esteem and external locus of control seem to be associated with higher chances to drink and smoke. In Figure 4, the percentages of adolescents engaging in the nominated risky health behaviors drops steadily as religiosity rises. With the exception of fighting, the group with no religion or little religiosity have at least a seven-fold difference in risky behaviors compared to the group who says that religion is very important. In Figure 5, there is a steady rise in risky behaviors as children age except for fighting.

FIGURE 3—OUTCOMES BY PERSONALITY TRAITS (IN PERCENT)

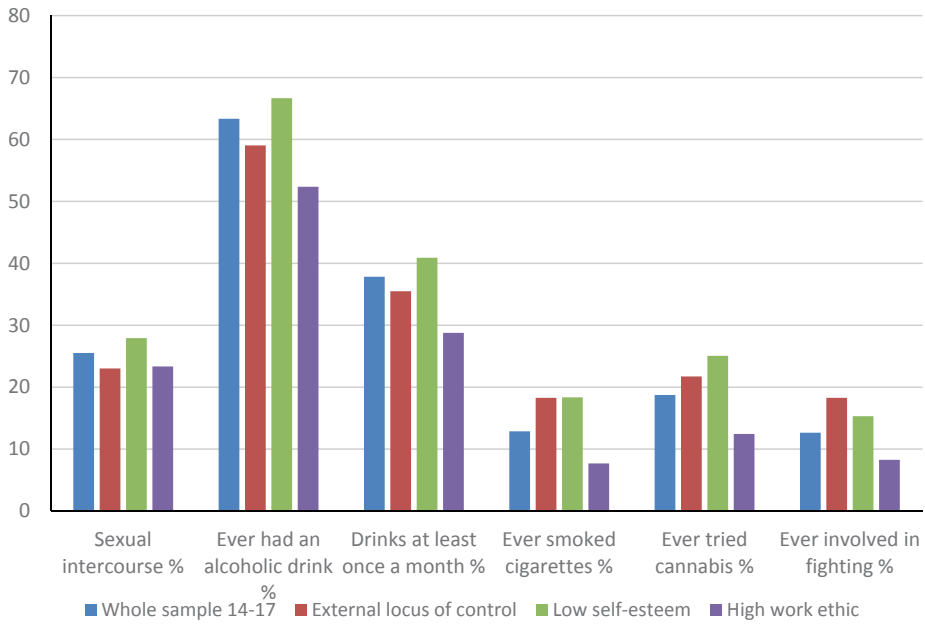


FIGURE 4—OUTCOMES BY RELIGIOSITY (IN PERCENT)

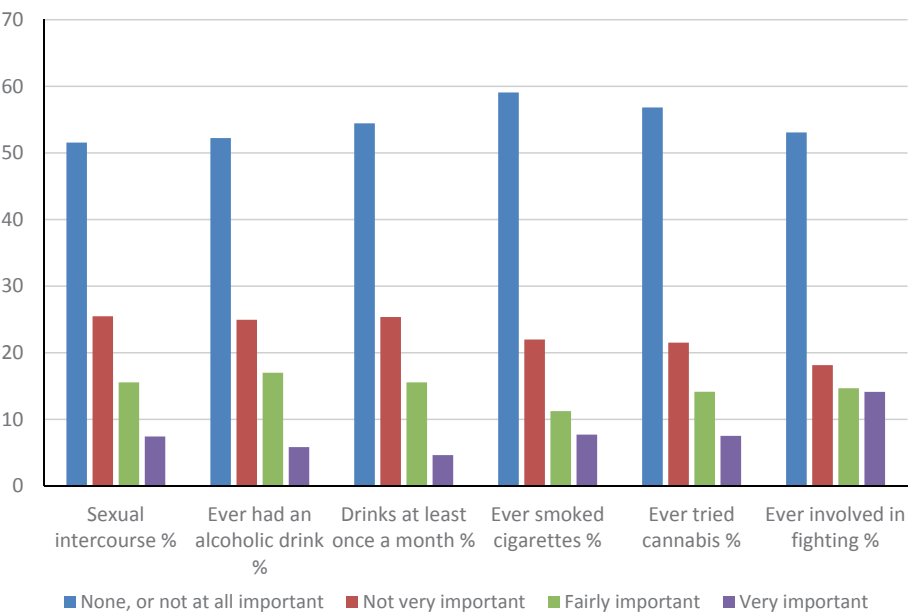
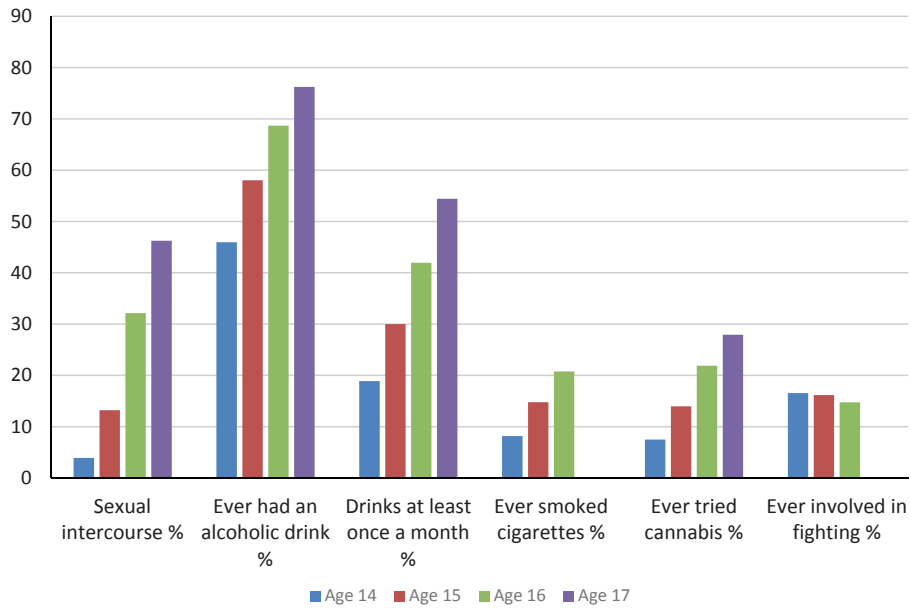


FIGURE 5—OUTCOMES BY AGE (IN PERCENT)



An advantage of *Next Steps* is the richness of the dataset, which allows us to control for a long list of covariates. Our first model includes the individual's age, ethnicity, results in test scores at age 11, maternal education and employment, whether the child lives with a single mother, maternal age at birth, whether English is the first language in the family, whether the child receives any private lessons, indicator variables for the local authority, presence of older siblings, and the Index of Multiple Deprivation (IMD) score, which is a measure derived from area level income, employment, health and disability, education, housing, crime, and living environment. We also extend the model to include household annual income recorded at Wave 1: higher than GBP 31,200; between GBP 11,400 and GBP 31,200; and lower than GBP 11,400 (the reference category).

Table 2 presents descriptive statistics of the these control variables by personality traits and religiosity. Individuals with high work ethic generally come from families with slightly lower level of maternal participation in the labor market, even if the proportion of highly educated mothers and the household annual income distribution are not substantially different from the general sample. They are also more likely to come from an Asian background (in particular Indian, Pakistani, and Bangladeshi), and have a slightly higher IMD score. Individuals with high religiosity show a much lower level of maternal employment than the average in the sample, and they are also more likely to come from families with a low-educated mother. As expected, the number of children in these families is higher than the average and the family income is generally lower.

Most of these youths come from minority backgrounds. They are also less likely to come from families where English is the main language. Interestingly, individuals with low self-esteem are more likely to have an educated mother. The average test scores at age 11 do not seem to vary substantially with personality traits and religiosity, even if individuals with an external locus of control and high religiosity show slightly lower grades than the average in the sample.

TABLE 2—DESCRIPTIVE STATISTICS OF INDEPENDENT VARIABLES, BY PERSONALITY TRAITS AND RELIGIOSITY

	Whole sample	External locus of control	Internal locus of control	Low self-esteem	High self-esteem	High work ethic	Low work ethic	Religion is very important	Religion not at all important (or no relig)
Average KS2 score	27.8	26.0	26.93	27.7	27.61	27.8	27.5	26.6	27.9
	(3.8)	(4.12)	(3.88)	(3.8)	(3.74)	(3.8)	(3.7)	(4.3)	(3.6)
Average IMD score	23.3	27.10	26.75	23.7	24.74	25.4	21.9	34.1	20.9
	(17.1)	(18.1)	(18.03)	(17.1)	(17.88)	(18.0)	(16.5)	(17.8)	(16.1)
Children in the family	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.6	2.0
	(1.0)	(1.2)	(1.2)	(1.1)	(1.1)	(1.1)	(1.0)	(1.4)	(0.9)
Mother has a degree (%)	12.5	8.9	8.5	13.5	12.33	12.3	13.3	9.1	13.2
Mother has other HE (%)	13.3	10.3	11.4	13.7	13.3	11.4	12.3	9.1	13.1
Mother senior high school (%)	13.9	13.0	13.0	13.6	14.5	12.8	15.4	7.1	15.7
Mother junior high school (%)	28.5	24.7	27.0	13.6	26.4	27.8	27.8	16.6	31.9
Mother quals level ≤ 1(%)	8.2	9.9	9.9	8.2	8.1	7.6	9.0	4.1	10.2
Mother has other quals (%)	2.6	3.2	2.8	2.3	2.5	2.5	2.6	3.4	2.1
Mother has no education (%)	20.8	29.8	26.5	21.5	22.8	25.4	19.5	50.4	13.7
Single mother (%)	22.2	26.5	22.5	24.7	21.8	19.2	25.5	15.8	26.9
Mother age ≤ 20 at birth (%)	5.7	8.0	7.5	6.2	5.6	5.9	5.3	6.5	6.6
Black (%)	5.4	5.5	5.9	5.8	6.3	8.2	3.4	14.5	1.2
Asian (%)	15.7	20.0	21.6	15.9	18.5	24.2	9.5	60.8	0.4
Mixed (%)	6.6	7.5	7.4	7.9	6.8	7.4	6.6	8.5	5.3
Mother unemployed (%)	1.4	1.9	1.8	1.8	1.4	1.5	1.5	1.6	1.5
Mother out of labour force (%)	27.7	35.7	34.8	28.9	29.7	31.7	24.5	57.4	20.9
Takes private lessons (%)	12.8	10.7	12.12	14.4	12.7	17.0	11.2	15.8	10.3
English is 1st language (%)	96.3	94.1	94.5	96.6	96.0	94.2	97.7	83.9	99.7
Income < GBP 11,400 (%)	23.6	30.3	28.5	24.9	25.0	24.7	24.1	34.6	22.9
GBP 11,400 < Income < GBP 31,200 (%)	42.8	46.1	45.4	43.6	43.6	43.6	41.6	49.3	41.5
Income > GBP 31,200 (%)	33.6	23.6	26.06	31.5	31.3	31.7	34.2	16.1	35.5

Note: Figures in parentheses are standard deviations. KS2 is a national test score at age 10. IMD is an index of neighbourhood deprivation.

4 Empirical Model

We begin by estimating a simple model using OLS to control for observable confounders:

$$h_{ijt} = \alpha + \beta r_{ijt} + \boldsymbol{\gamma}'\mathbf{p}_{ijt} + \boldsymbol{\delta}'\mathbf{x}_{ijt} + \varepsilon_{ijt}, \quad (1)$$

where h_{ijt} represents a particular risky health behavior for individual i in school j at time t; r_{it} is an individual's reported intrinsic religiosity; $\mathbf{p}_{ijt}$ is a vector of psychological traits (binary indicators for external locus of control, low self-esteem, and high work ethic); $\mathbf{x}_{ijt}$ is a vector of child and family characteristics, including religious denomination, for an individual; and ε_{ijt} is the unobservable determinant of the health behavior in question, which we assume can be decomposed into a school fixed effect and a random component.

As discussed above, OLS is likely to generate biased estimates of the causal impact of religiosity on risky health behaviors. Unfortunately, we are unaware of a natural experiment that would allow us to exploit exogenous variation in religiosity for this particular sample, so it is difficult to explicitly account for nonrandom sorting into high and low levels of religiosity. That said, by including an extended list of control variables, we can make some progress in neutralizing the distortion caused by unobserved heterogeneity that affects both individual traits—non-cognitive personality traits and religiosity—and the likelihood of engaging in risky health behaviors.

Moreover, we examine the role of multiple personality traits and different combinations of personality traits and religiosity using inverse probability weighted regression adjustment (IPWRA) treatment effects estimation based on Imbens and Wooldridge (2009) and its implementation in Cattaneo et al. (2013).[12] Specifically, the estimation is performed in two steps. First, the probability of treatment (in this case, having a trait or a combination of traits) is estimated. Second, a regression with weights provided by the estimated inverse of the probability of treatment is performed (Wooldridge 2010). Averages of predicted risky behaviors for each combinations of traits are then calculated. This treatment-effect model aims to capture the role of different combinations of multiple treatments and is therefore the probabilities are estimated using a multinomial logit specification which allows us to analyze different personality traits individually as well as in combinations of several traits.

The IPWRA estimator has the so-called "double robustness property" (Wooldridge 2007, 2010) in that only one of the two equations in the model must be correctly specified to

[12] These estimates are calculated using the *teffects* routine in Stata (StataCorp 2017).

consistently estimate the parameters of interest. The weights do not bias the regression adjustment estimator if the treatment model is incorrectly specified provided that the outcome model is correct. Similarly, the weights correct the regression adjustment estimator if the treatment model is correctly specified but the outcome model is not.

Estimation by IPWRA relies on the conditional independence (i.e., selection only on observables) assumption in order to identify the effect of religiosity on health risky behaviors. The intuition behind this assumption is that, if we have enough information on the observable differences between youths with and without particular combinations of religiosity and personality traits (the treatments), we can heavily weight treatment observations that have similar observables to untreated individuals and obtain unbiased estimates of the causal relationship between religiosity and health risky behaviors using linear regression (Mendolia and Walker 2015). This interpretation is conditional on the assumption of no selection on unobservables. The essence of IPWRA is that it weights similar observations across treatments highly so as to relly less on the functional form assumption embedded in the regression step.[13]

In the first specification of the treatment-effects model, we consider different levels of intrinsic religiosity as separate treatments and compare individuals with no or very low religiosity to others who declare that religion is fairly or very important in their lives. Furthermore, we focus on youths who do not show any "positive personality traits" (i.e., high work ethic, high self-esteem, and strong religiosity), and compare them with individuals who show different combinations of levels of religiosity and personality traits.

We address the risk of selection on unobservables, and we take into consideration the fact that individuals attending the same school are likely to have common unobserved characteristics that do not vary over time which may influence their propensity to engage in risky behaviors. We do this by including school fixed effects. This allows us to control for common time-invariant unobserved characteristics of children attending the same school. These typically include socioeconomic status not otherwise captured by the control variables

[13] Our findings are therefore conditional on this assumption and should be interpreted accordingly. The credibility of the selection on observables assumption relies on the possibility of capturing all factors that determine health risky behaviors on one side and religiosity and personality traits on the other. *Next Steps* provides a very rich source of information, and we make extensive use of it, controlling for a series of factors related to the individual, the family, and the socioeconomic environment.

in $\mathbf{x}_{ijt}$, environmental factors, as well as school-specific characteristics such as religious denomination, teacher quality, and disciplinary policies.[14]

Information on personality traits is only collected at Wave 2 in *Next Steps*. Consistent with the evidence available (Cobb-Clark and Schurer 2013), we assume that personality traits do not vary for the same individual in the four waves of our sample. In contrast, questions about intrinsic religiosity and religious affiliation are repeated for the first four waves in *Next Steps*. This allows us to exploit "within" (i.e., person-specific) variation in the levels of religiosity between individuals. Recall that individuals in the *Next Steps* are teenagers (age 14–17 in the estimation sample), and it is conceivable that young people are likely to reconsider and reassess important decisions and life values during this critical phase of their lives. For this reason, we run a final sensitivity test and use changes in the levels of intrinsic religiosity within individuals as part of the identification strategy to estimate the impact of religiosity on the likelihood of engaging in risky health behaviors.

Since *Next Steps* is a panel dataset, we can estimate an individual fixed-effects model which allows us to control for time-invariant unobserved heterogeneity. Individual fixed effects take into consideration unobserved individual characteristics that do not vary over time and might have an impact on both religiosity and risky behaviors. A drawback of this model is that all variables that do not vary over time (such as personality traits, age of the mother at birth, IMD score, local authority indicators, and the sex indicator) cannot be included in the analysis. In the case of individual fixed effects, the causal interpretation of β relies on the assumption that the time-dependent error term ε_{ijt} is independent of changes in risky behaviors, conditional on the regressors r_{ijt}, $\mathbf{p}_{ijt}$, and $\mathbf{x}_{ijt}$, and the individual fixed effect. This assumption fails if there are unobserved random shocks that affect both risky behaviors and religiosity. For this reason, we continue to control for a wide set of individual and family characteristics as a sensitivity test of our main findings.[15]

5 Results

Our estimation results are presented in Tables 3–10 We begin by presenting results using OLS, comparing a parsimonious and an extended model (Model 1 and Model 2, respectively) in

[14] The majority of students in the sample attend government schools with no religious affiliation, but the sample also includes a small proportion of Catholic schools (around 7%) and Church of England schools (around 5%). Individuals in the sample come from over 650 schools, and there are, on average, 32 observations from each.

[15] We also ran sensitivity tests including additional covariates in the model, such as maternal disability and individual's health status. The results do not change enough to warrant comment. We also tested whether an indicator for attending a religious school matters, but they results remained very similar to the ones presented below.

Tables 3–8. The extended model accounts for household yearly gross income. Tables 3–8 also includes results from a model with school fixed effects. We then present results from the estimation of the impact of multiple traits and various levels of religiosity using IPWRA estimates (Tables 9–12). Results from the sensitivity test including individual fixed effects are presented in the Appendix. Our main purpose is to show the stability of our main findings across different specifications of the model, and by comparing results obtained with different estimation techniques. Throughout the analysis, we cluster by individual, since we have four observations for each individual.[16]

The results in Tables 3–8 indicate that religiosity significantly decreases chances of engaging in all risky behaviors using the whole sample as well as separately for boys and girls. The results are similar for Models 1 and 2, with and without school fixed effects. For example, looking at the extended model with school fixed effects and using the whole sample, we show that individuals who declare that religion is fairly important or very important in their lives are significantly less likely to engage in sexual activity at ages 14–17 (–8% for fairly important and –16% for very important compared to a mean of 25%); to have tried alcohol (–6% and –14% compared to a mean of 63%); or being regular drinkers (–7% and –9% with a mean of 38%); to have tried cannabis (–6% and –8% with a mean of 19%); or cigarette smoking (–3% and –2% with a mean of 13%); and to be involved in fighting (–2% and –4 % with a mean of 13%).[17]

The most directly comparable analyses to our own is the work by Sinha et al. (2007) who use a national US survey of 2004 adolescents. This study estimates logistic models and show significant effects that, like ours, imply large proportionate reductions in similar risky behaviors, with the exception of engagement in sexual activity. More recently, the Fletcher and Kumar (2014) paper uses discordant siblings in the US Add Health data. They show that the importance of religion on risky behaviors is not signficinatly different when using sibling differences compared to school fixed effects or family fixed effects.

That our OLS and school FE results are quite similar (and robust) is partly due to the richness of the dataset which allows us to control for a many characteristics that determine risky health behaviors. These characteristics at the individual level potentially correlate very well with school-specific characteristics. In a few instances, the results from the models with

[16] We present results from the unweighted analysis. Results estimated using survey weights are very similar and are available on request.
[17] For brevity, the estimated impacts are rounded off to the nearest integer when reporting outside the tables.

school fixed effects are slightly smaller in magnitude, but nevertheless retain statistical significance, indicating that there is enough variation to estimate the effect of interest. While the discussion here emphasizes religion and religiosity effects, we have also explored the effect that including personality traits play. In general, we find that personality traits are important (see Appendix Table A1), but when we drop these controls, we find small and entirely insignificant increases in the effects of religiosity.

Two other results are worth noting: the lack of heterogeneity by gender and the heterogeneity across different religious denominations. In terms of differences by gender, the estimated coefficients are similar in size and significance for boys and girls with only a few exceptions, particularly on the effect of religiosity on smoking. Religiosity seems to be relevant for females only, with the estimate for males being smaller in magnitude and statistically insignificant. In terms of differences across religious affiliation, we find that Muslim, Hindu, and Sikh boys and girls are less likely to engage in risky health behaviors relative to children who do not report any religious affiliation. The magnitude of the effects are particularly large for the likelihood to engage in early sexual activity and underage drinking. Being Christian does not have a statistically significant impact on engaging in risky behaviors.

Our results are consistent with previous findings using US data. In particular, Fletcher and Kumar (2014) show that intrinsic religiosity reduces the use of illicit drugs and addictive substances. They also note that intrinsic religiosity—the importance of religion in one's life—is strongly associated with decreased binge drinking and marijuana use. Gruber (2005) and Mellor and Freeborn (2011) show that religious participation decreases the likelihood of using illicit drugs. Thus, our results support the idea that religiosity reduces risky health behaviors.

TABLE 3—IMPACT OF RELIGIOSITY ON SEXUAL BEHAVIOR

Ever had sexual intercourse	**All sample Model 1**		**All sample Model 2**		**Girls Model 1**		**Girls Model 2**		**Boys Model 1**		**Boys Model 2**	
	OLS	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**
Religion fairly Important	-0.086	-0.086	-0.078	-0.080	-0.058	-0.058	-0.050	-0.056	-0.104	-0.109	-0.098	-0.097
	(0.012)***	(0.010)***	(0.014)***	(0.012)***	(0.017)***	(0.014)***	(0.018)***	(0.016)***	(0.018)***	(0.016)***	(0.020)***	(0.018)***
Religion very Important	-0.157	-0.153	-0.152	-0.157	-0.176	-0.153	-0.171	-0.153	-0.114	-0.119	-0.097	-0.125
	(0.016)***	(0.014)***	(0.019)***	(0.016)***	(0.021)***	(0.019)***	(0.025)***	(0.023)***	(0.024)***	(0.021)***	(0.028)***	(0.025)***
Christian	-0.018	-0.015	-0.020	-0.013	-0.034	-0.040	-0.036	-0.030	-0.009	-0.007	-0.010	-0.005
	(0.011)	(0.009)*	(0.012)*	(0.010)	(0.015)**	(0.012)***	(0.017)**	(0.014)**	(0.015)	(0.013)	(0.017)	(0.014)
Hindu	-0.062	-0.085	-0.044	-0.076	-0.151	-0.146	-0.143	-0.153	-0.013	-0.035	0.009	0.012
	(0.036)*	(0.031)***	(0.041)	(0.036)**	(0.048)***	(0.044)***	(0.059)**	(0.054)***	(0.053)	(0.046)	(0.057)	(0.053)
Muslim	-0.112	-0.123	-0.110	-0.101	-0.188	-0.180	-0.168	-0.143	-0.076	-0.094	-0.115	-0.100
	(0.031)***	(0.027)***	(0.035)***	(0.032)***	(0.041)***	(0.037)***	(0.048)***	(0.046)***	(0.047)	(0.040)**	(0.051)**	(0.048)**
Sikh	-0.070	-0.107	-0.082	-0.119	-0.217	-0.256	-0.251	-0.298	0.037	0.024	0.024	0.007
	(0.038)*	(0.032)***	(0.045)*	(0.039)***	(0.046)***	(0.047)***	(0.056)***	(0.061)***	(0.055)	(0.047)	(0.062)	(0.056)
Another religion	0.014	-0.001	0.011	0.003	-0.009	-0.021	0.017	-0.001	0.029	0.047	0.013	0.074
	(0.038)	(0.031)	(0.045)	(0.035)	(0.053)	(0.041)	(0.060)	(0.046)	(0.056)	(0.049)	(0.065)	(0.057)
N	17,524	17,102	13,923	13,603	8,891	8,684	7,086	6,921	8,633	8,418	6,837	6,682

TABLE 4—IMPACT OF RELIGIOSITY ON TRYING CANNABIS

Ever tried cannabis	**All sample Model 1**		**All sample Model 2**		**Girls Model 1**		**Girls Model 2**		**Boys Model 1**		**Boys Model 2**	
	OLS	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**	**OLS**	**School FE**
Religion fairly Important	-0.052	-0.052	-0.055	-0.055	-0.049	-0.047	-0.063	-0.056	-0.053	-0.054	-0.043	-0.043
	(0.010)***	(0.008)***	(0.011)***	(0.009)***	(0.013)***	(0.011)***	(0.015)***	(0.012)***	(0.014)***	(0.012)***	(0.015)***	(0.013)***
Religion very Important	-0.085	-0.081	-0.083	-0.082	-0.092	-0.086	-0.098	-0.091	-0.072	-0.074	-0.059	-0.069
	(0.012)***	(0.010)***	(0.014)***	(0.012)***	(0.016)***	(0.014)***	(0.019)***	(0.017)***	(0.017)***	(0.016)***	(0.020)***	(0.019)***
Christian	-0.043	-0.040	-0.041	-0.039	-0.037	-0.036	-0.027	-0.028	-0.049	-0.046	-0.058	-0.054
	(0.009)***	(0.007)***	(0.010)***	(0.007)***	(0.013)***	(0.009)***	(0.014)*	(0.011)***	(0.012)***	(0.009)***	(0.013)***	(0.011)***
Hindu	-0.083	-0.082	-0.099	-0.078	-0.068	-0.068	-0.045	-0.044	-0.096	-0.107	-0.148	-0.145
	(0.026)***	(0.023)***	(0.030)***	(0.027)***	(0.035)*	(0.033)**	(0.043)	(0.039)	(0.040)**	(0.034)***	(0.042)***	(0.040)***
Muslim	-0.092	-0.094	-0.077	-0.066	-0.081	-0.091	-0.032	-0.052	-0.107	-0.099	-0.130	-0.089
	(0.021)***	(0.019)***	(0.025)***	(0.022)***	(0.031)***	(0.026)***	(0.036)	(0.032)	(0.028)***	(0.028)***	(0.035)***	(0.033)***
Sikh	-0.067	-0.067	-0.091	-0.080	-0.050	-0.053	-0.033	-0.035	-0.084	-0.076	-0.155	-0.121
	(0.025)***	(0.023)***	(0.029)***	(0.029)***	(0.036)	(0.034)	(0.043)	(0.044)	(0.036)**	(0.033)**	(0.039)***	(0.040)***
Another religion	-0.018	-0.019	-0.018	-0.005	-0.001	-0.015	0.037	0.016	-0.025	-0.034	-0.063	-0.037
	(0.029)	(0.023)	(0.034)	(0.026)	(0.041)	(0.031)	(0.051)	(0.035)	(0.039)	(0.035)	(0.040)	(0.040)
N	23,680	23,145	18,596	18,180	11,745	11,505	9,200	9,008	11,935	11,640	9,396	9,172

Covariates: Mother's education, single mother, age, mother's employment status; imd index, KS2, high work ethic, low self esteem, external locus of control, ethnicity, English as first language, takes private lessons; number of children in the family; mother younger than 20 at birth; presence of older siblings; ethnicity; LA dummies. Model 2 also includes income groups in wave 1 (annual income >GBP 31,200; between GBP 11,400 and 331,200; and < GBP 11,400 omitted). Clustered std errors are in brackets. * indicates that the underlying coefficient is significant at 10% level, ** at 5% and ***1%

TABLE 5—IMPACT OF RELIGIOSITY ON ALCOHOL DRINKING: EVER DRUNK

Ever drunk alcohol	**All sample Model 1**		**All sample Model 2**		**Girls Model 1**		**Girls Model 2**		**Boys Model 1**		**Boys Model 2**	
	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE
Religion fairly Important	-0.068 (0.011)***	-0.065 (0.009)***	-0.068 (0.012)***	-0.060 (0.010)***	-0.048 (0.015)***	-0.047 (0.012)***	-0.047 (0.016)***	-0.039 (0.014)***	-0.083 (0.016)***	-0.077 (0.013)***	-0.084 (0.017)***	-0.068 (0.014)***
Religion very Important	-0.163 (0.015)***	-0.151 (0.011)***	-0.157 (0.018)***	-0.140 (0.013)***	-0.166 (0.021)***	-0.147 (0.016)***	-0.161 (0.025)***	-0.143 (0.019)***	-0.149 (0.022)***	-0.139 (0.017)***	-0.141 (0.025)***	-0.123 (0.020)***
Christian	0.008 (0.008)	0.006 (0.007)	0.009 (0.009)	0.005 (0.008)	0.009 (0.012)	0.015 (0.010)	0.013 (0.013)	0.012 (0.011)	0.004 (0.012)	-0.002 (0.010)	-0.001 (0.013)	-0.007 (0.011)
Hindu	-0.051 (0.034)	-0.043 (0.025)*	-0.051 (0.039)	-0.058 (0.029)**	-0.065 (0.050)	-0.086 (0.036)**	-0.046 (0.056)	-0.104 (0.043)**	-0.041 (0.046)	-0.048 (0.036)	-0.067 (0.053)	-0.091 (0.042)**
Muslim	-0.294 (0.026)***	-0.288 (0.020)***	-0.280 (0.030)***	-0.267 (0.024)***	-0.294 (0.036)***	-0.304 (0.028)***	-0.258 (0.041)***	-0.278 (0.035)***	-0.310 (0.035)***	-0.312 (0.030)***	-0.316 (0.041)***	-0.312 (0.035)***
Sikh	-0.101 (0.033)***	-0.096 (0.025)***	-0.109 (0.039)***	-0.107 (0.030)***	-0.154 (0.048)***	-0.164 (0.037)***	-0.108 (0.058)*	-0.141 (0.048)***	-0.060 (0.045)	-0.063 (0.036)*	-0.114 (0.051)**	-0.118 (0.042)***
Another religion	-0.011 (0.030)	0.004 (0.024)	0.005 (0.035)	-0.001 (0.027)	-0.044 (0.041)	-0.015 (0.033)	0.004 (0.050)	-0.007 (0.038)	0.027 (0.044)	0.017 (0.037)	0.018 (0.050)	-0.006 (0.042)
N	23,431	22,898	18,394	17,980	11,608	11,369	9,090	8,899	11,823	11,529	9,304	9,081

TABLE 6—IMPACT OF RELIGIOSITY ON ALCOHOL DRINKING: DRINKS AT LEAST ONCE A MONTH

Drinks at least once a month	**All sample Model 1**		**All sample Model 2**		**Girls Model 1**		**Girls Model 2**		**Boys Model 1**		**Boys Model 2**	
	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE
Religion fairly Important	-0.061 (0.011)***	-0.065 (0.009)***	-0.064 (0.012)***	-0.068 (0.011)***	-0.047 (0.016)***	-0.062 (0.013)***	-0.055 (0.017)***	-0.068 (0.015)***	-0.071 (0.016)***	-0.070 (0.014)***	-0.067 (0.018)***	-0.067 (0.016)***
Religion very Important	-0.100 (0.014)***	-0.096 (0.012)***	-0.095 (0.016)***	-0.087 (0.015)***	-0.102 (0.019)***	-0.102 (0.018)***	-0.098 (0.021)***	-0.094 (0.022)***	-0.093 (0.020)***	-0.090 (0.018)***	-0.086 (0.024)***	-0.076 (0.022)***
Christian	-0.004 (0.010)	-0.002 (0.008)	-0.006 (0.011)	-0.004 (0.009)	0.001 (0.014)	0.008 (0.012)	0.007 (0.016)	0.011 (0.013)	-0.010 (0.013)	-0.011 (0.011)	-0.021 (0.015)	-0.021 (0.012)*
Hindu	-0.092 (0.026)***	-0.083 (0.027)***	-0.108 (0.029)***	-0.110 (0.032)***	-0.099 (0.037)***	-0.113 (0.040)***	-0.112 (0.042)***	-0.137 (0.049)***	-0.076 (0.037)**	-0.051 (0.039)	-0.113 (0.042)***	-0.102 (0.046)**
Muslim	-0.160 (0.021)***	-0.157 (0.022)***	-0.157 (0.023)***	-0.160 (0.026)***	-0.163 (0.031)***	-0.166 (0.032)***	-0.147 (0.034)***	-0.158 (0.040)***	-0.159 (0.029)***	-0.151 (0.032)***	-0.174 (0.034)***	-0.160 (0.038)***
Sikh	-0.093 (0.026)***	-0.095 (0.028)***	-0.112 (0.030)***	-0.108 (0.034)***	-0.137 (0.036)***	-0.151 (0.042)***	-0.134 (0.042)***	-0.142 (0.054)***	-0.050 (0.037)	-0.045 (0.039)	-0.095 (0.042)**	-0.056 (0.046)
Another religion	-0.015 (0.030)	-0.005 (0.027)	-0.025 (0.034)	-0.015 (0.031)	-0.091 (0.040)**	-0.071 (0.037)*	-0.078 (0.047)*	-0.074 (0.043)*	0.075 (0.046)	0.070 (0.040)*	0.039 (0.051)	0.035 (0.046)
N	22,851	22,327	17,913	17,506	11,273	11,038	8,813	8,625	11,578	11,289	9,100	8,881

Covariates: Mother's education, single mother, age, mother's employment status; imd index, KS2, high work ethic, low self esteem, external locus of control, ethnicity, English as first language, takes private lessons; number of children in the family; mother younger than 20 at birth; presence of older siblings; ethnicity; LA dummies. Model 2 also includes income groups in wave 1 (annual income >GBP 31,200; between GBP 11,400 and 331,200; and < GBP 11,400 omitted). Clustered std errors are in brackets. * indicates that the underlying coefficient is significant at 10% level, ** at 5% and ***1%

TABLE 7—IMPACT OF RELIGIOSITY ON SMOKING

Ever smoked	All sample Model 1		All sample Model 2		Girls Model 1		Girls Model 2		Boys Model 1		Boys Model 2	
	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE
Religion fairly Important	-0.051 (0.009)***	-0.033 (0.008)***	-0.053 (0.010)***	-0.032 (0.009)***	-0.053 (0.014)***	-0.046 (0.013)***	-0.063 (0.015)***	-0.049 (0.015)***	-0.042 (0.011)***	-0.031 (0.010)***	-0.035 (0.012)***	-0.040 (0.013)***
Religion very Important	-0.063 (0.011)***	-0.034 (0.010)***	-0.056 (0.014)***	-0.022 (0.012)*	-0.090 (0.017)***	-0.082 (0.017)***	-0.085 (0.021)***	-0.071 (0.021)***	-0.020 (0.015)	0.000 (0.014)	-0.010 (0.018)	-0.001 (0.018)
Christian	-0.018 (0.009)**	0.007 (0.006)	-0.017 (0.010)*	0.009 (0.007)	-0.019 (0.014)	-0.018 (0.011)*	-0.012 (0.015)	-0.020 (0.012)*	-0.025 (0.011)**	0.003 (0.008)	-0.028 (0.012)**	-0.019 (0.010)*
Hindu	-0.044 (0.022)**	-0.009 (0.023)	-0.065 (0.025)***	-0.018 (0.027)	-0.048 (0.035)	-0.057 (0.039)	-0.062 (0.042)	-0.081 (0.048)*	-0.053 (0.028)*	-0.013 (0.030)	-0.083 (0.030)***	-0.074 (0.038)*
Muslim	-0.055 (0.018)***	-0.011 (0.018)	-0.053 (0.021)**	-0.017 (0.022)	-0.062 (0.028)**	-0.074 (0.031)**	-0.049 (0.033)	-0.069 (0.038)*	-0.065 (0.024)***	-0.008 (0.024)	-0.081 (0.029)***	-0.053 (0.031)*
Sikh	-0.051 (0.023)**	-0.009 (0.023)	-0.070 (0.026)***	-0.012 (0.028)	-0.074 (0.036)**	-0.079 (0.041)*	-0.072 (0.045)	-0.077 (0.052)	-0.056 (0.029)*	-0.005 (0.029)	-0.096 (0.031)***	-0.080 (0.038)**
Another religion	-0.002 (0.026)	0.003 (0.022)	0.010 (0.031)	0.017 (0.025)	0.030 (0.041)	0.021 (0.035)	0.069 (0.050)	0.039 (0.041)	-0.045 (0.031)	-0.021 (0.029)	-0.055 (0.037)	-0.027 (0.037)
N	19,033	18,502	14,936	14,538	9285	9,110	7,269	7,130	9,748	9,448	7,667	7,493

TABLE 8—IMPACT OF RELIGIOSITY ON CHANCES OF BEING INVOLVED IN FIGHTING

Ever fighting	All sample Model 1		All sample Model 2		Girls Model 1		Girls Model 2		Boys Model 1		Boys Model 2	
	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE	OLS	School FE
Religion fairly Important	-0.018 (0.009)**	-0.021 (0.009)**	-0.021 (0.010)**	-0.023 (0.010)**	-0.004 (0.011)	-0.006 (0.011)	-0.002 (0.012)	-0.006 (0.012)	-0.037 (0.013)***	-0.039 (0.014)***	-0.047 (0.015)***	-0.040 (0.016)**
Religion very Important	-0.041 (0.012)***	-0.042 (0.011)***	-0.039 (0.013)***	-0.042 (0.013)***	-0.039 (0.015)***	-0.044 (0.015)***	-0.040 (0.018)**	-0.050 (0.017)***	-0.046 (0.017)***	-0.038 (0.018)**	-0.049 (0.020)**	-0.035 (0.022)
Christian	-0.005 (0.008)	-0.009 (0.007)	-0.003 (0.009)	-0.008 (0.008)	-0.003 (0.010)	-0.004 (0.009)	-0.001 (0.011)	0.003 (0.010)	-0.007 (0.012)	-0.013 (0.011)	-0.003 (0.013)	-0.014 (0.012)
Hindu	-0.038 (0.024)	-0.050 (0.025)*	-0.065 (0.027)**	-0.077 (0.030)***	-0.041 (0.032)	-0.042 (0.033)	-0.057 (0.038)	-0.071 (0.040)*	-0.031 (0.036)	-0.059 (0.040)	-0.068 (0.039)*	-0.105 (0.046)**
Muslim	0.002 (0.021)	-0.009 (0.020)	-0.000 (0.024)	-0.005 (0.024)	-0.007 (0.027)	-0.020 (0.026)	-0.029 (0.030)	-0.039 (0.032)	0.014 (0.032)	-0.005 (0.032)	0.034 (0.037)	0.043 (0.038)
Sikh	-0.002 (0.027)	-0.005 (0.026)	-0.024 (0.031)	-0.011 (0.031)	-0.011 (0.034)	-0.032 (0.034)	-0.012 (0.042)	-0.018 (0.044)	0.009 (0.039)	0.011 (0.039)	-0.031 (0.042)	-0.005 (0.047)
Another religion	0.003 (0.024)	0.015 (0.024)	0.001 (0.027)	0.010 (0.027)	0.010 (0.031)	0.008 (0.030)	0.016 (0.038)	0.005 (0.034)	-0.003 (0.038)	0.024 (0.039)	-0.010 (0.041)	0.027 (0.044)
N	18,252	18,797	14,312	14,768	8,885	9,236	6,945	7,235	9,367	9,561	7,367	7,533

Covariates: Mother's education, single mother, age, mother's employment status; imd index, KS2, high work ethic, low self esteem, external locus of control, ethnicity, English as first language, takes private lessons; number of children in the family; mother younger than 20 at birth; presence of older siblings; ethnicity; LA dummies. Model 2 also includes income groups in wave 1 (annual income >GBP 31,200; between GBP 11,400 and 331,200; and < GBP 11,400 omitted). Clustered std errors are in brackets. * indicates that the underlying coefficient is significant at 10% level, ** at 5% and ***1%

Tables 9 and 10 present results from the estimation of the treatment-effects model, where we combine multiple personality traits and different levels of religiosity. In Table 9, we explore the impact of levels of religiosity. As expected, individuals with high religiosity are substantially less likely to engage in all behaviors. The estimated effects are nontrivial: –6% for fighting and smoking, –14% for regularly drinking alcohol, and –18% for engaging in early sexual activity. Nonetheless, it is striking that these results do not significantly differ from the earlier results in Tables 3–8.

In Table 10, we investigate the combined effect of personality traits and religiosity. When we analyze the combined effect of work ethic, self-esteem, and religiosity, we find that individuals who have the three positive traits are substantially protected while those who have all three negative traits are significantly at risk of initiating all adverse behaviors (results vary from –17% for having been involved in fighting to –27% for having smoked cannabis). The combination of high religiosity and one of the positive traits (high self-esteem or high work ethic) is also quite protective, with estimates ranging from –12 to –25%. These results suggest that religiosity plays a substantial role in preventing adolescents, who might be particularly at risk because of their personality traits, from engaging in risky health behaviors.

In Tables 11 and 12, we go on to compare results obtained with the treatment-effects model with results from an OLS and a seemingly-unrelated regression model using binary variables to define different combinations of religiosity and personality traits. The results from these two specifications are also in line with results from the model estimated with treatment effects in terms of size and significance.

TABLE 9—TREATMENT EFFECTS: IMPACT OF DIFFERENT LEVELS OF RELIGIOSITY

	Had sexual intercourse	Ever drunk alcohol	Drink at least once a month	Ever smoked	Ever tried cannabis	Ever involved in fighting
Religion fairly important	-0.086	-0.094	-0.070	-0.074	-0.074	-0.046
	(0.010)***	(0.009)***	(0.088)***	(0.008)***	(0.008)***	(0.008)***
Religion very important	-0.183	-0.188	-0.136	-0.057	-0.113	-0.061
	(0.016)***	(0.015)***	(0.016)***	(0.014)***	(0.012)***	(0.012)***
N	19,525	25,770	25,269	19,656	26,311	19,837

Omitted group: No religion or religion is not important at all or religion is not very important (omitted). Std errors are in brackets. * indicates that the underlying coefficient is significant at 10% level, ** at 5% and ***1%

TABLE 10—TREATMENT EFFECTS: IMPACT OF COMBINATION OF WORK ETHIC, SELF-ESTEEM AND RELIGIOSITY

	Had sexual intercourse	Ever drunk alcohol	Drinks at least once a month	Ever smoked	Ever tried cannabis	Ever involved in fighting
High self-esteem only	-0.018	-0.046	-0.053	-0.136	-0.152	-0.066
(low work ethic and religiosity)	(0.020)	(0.017)**	(0.019)***	(0.020)***	(0.018)***	(0.022)***
High religiosity only	-0.149	-0.133	-0.090	-0.105	-0.157	-0.099
(low self–esteem and low work ethic)	(0.024)***	(0.021)***	(0.024)***	(0.025)***	(0.022)***	(0.025)***
High religiosity and self-esteem	-0.103	-0.148	-.128	-0.214	-0.2208	-.122
(low work ethic)	(0.020)***	(0.017)***	(0.019)***	(0.020)***	(0.018)***	(0.020)***
High work ethic only	-0.028	-0.063	-.067	-0.126	-0.156	-.077
(low self-esteem and low religiosity)	(0.021)	(0.019)***	(0.021)***	(0.022)***	(0.019)***	(0.023)***
High work ethic and religiosity	-0.169	-0.206	-.189	-0.184	-0.253	-.125
(low self-esteem)	(0.025)***	(0.022)***	(0.023)***	(0.024)***	().021)***	(0.024)
High work ethic and self-esteem	-0.078	-0.105	-.132	-0.192	-0.226	.14
(low religiosity)	(0.019)***	(0.017)***	(0.018)***	(0.020)***	(0.018)***	(0.019)***
High work ethic,	-0.183	-0.235	-.202	-0.236	-0.272	-.177
religiosity and self-esteem	(0.019)***	(0.017)***	(0.018)***	(0.020)***	(0.018)***	(0.019)***
N	19,525	25,983	25,269	19,656	26,311	19,837

Covariates: mother's education, single mother, age, mother's employment status; imd index, KS2, ethnicity; number of children in the family; mother younger than 20 at birth; presence of older siblings;; income groups in wave 1 (HH yearly income >31,200 GBP; HH yearly income between 11,400 GBP and 31,200 GBP; HH yearly income < 11,400 GBP omitted).

Omitted group: No high work ethic, no high self-esteem and no high religiosity. High religiosity: individual declares that religion is fairly or very important for him/her. High work ethic: individuals in the top two quartiles of the work ethic index distriution. High self-esteem: binary variable for low self-esteem is equal to zero. Std errors are in brackets. * indicates that the underlying coefficient is significant at 10% level, ** at 5% and ***1%

TABLE 11—OLS MODEL INCLUDING BINARY VARIABLES FOR DIFFERENT COMBINATIONS OF RELIGIOSITY AND PERSONALITY TRAITS

	Ever sexual intercourse	Ever drunk alcohol	Drinks > once a month	Ever smoked	Ever tried cannabis	Ever involved in fighting
High self-esteem only	-0.060	-0.027	-0.043	-0.110	-0.118	-0.054
(low work ethic and low religiosity)	(0.017)***	(0.011)**	(0.014)***	(0.015)***	(0.015)***	(0.013)***
High religiosity only	-0.159	-0.096	-0.097	-0.110	-0.140	-0.073
(low self–esteem and low work ethic)	(0.026)***	(0.021)***	(0.022)***	(0.022)***	(0.022)***	(0.020)***
High religiosity and self-esteem	-0.130	-0.121	-0.132	-0.184	-0.199	-0.088
(low work ethic)	(0.021)***	(0.015)***	(0.017)***	(0.016)***	(0.017)***	(0.015)***
High work ethic only	-0.045	-0.051	-0.064	-0.112	-0.113	-0.065
(low self-esteem and low religiosity)	(0.022)**	(0.016)***	(0.020)***	(0.020)***	(0.020)***	(0.017)***
High work ethic and religiosity	-0.191	-0.167	-0.186	-0.181	-0.234	-0.093
(low self-esteem)	(0.023)***	(0.020)***	(0.019)***	(0.019)***	(0.018)***	(0.018)***
High work ethic and self-esteem	-0.102	-0.083	-0.128	-0.178	-0.203	-0.114
(low religiosity)	(0.017)***	(0.012)***	(0.015)***	(0.015)***	(0.015)***	(0.013)***
High work ethic,	-0.206	-0.207	-0.194	-0.214	-0.248	-0.150
religiosity and self-esteem	(0.019)***	(0.015)***	(0.016)***	(0.015)***	(0.016)***	(0.014)***

TABLE 12—SUR MODEL ESTIMATES INCLUDING BINARY VARIABLES FOR DIFFERENT COMBINATIONS OF RELIGIOSITY AND PERSONALITY TRAITS

	Had sexual intercourse	Ever drunk alcohol	Drinks > once a month	Ever smoked	Ever tried cannabis	Ever involved in fighting
High self-esteem only	-0.079	-0.049	-0.047	-0.114	-0.124	-0.052
(low work ethic and low religiosity)	(0.013)***	(0.014)***	(0.014)***	(0.011)***	(0.011)***	(0.011)***
High religiosity only	-0.180	-0.132	-0.120	-0.120	-0.175	-0.067
(low self–esteem and low work ethic)	(0.022)***	(0.022)***	(0.023)***	(0.018)***	(0.019)***	(0.018)***
High religiosity and	-0.152	-0.153	-0.154	-0.176	-0.205	-0.069
self-esteem (low work ethic)	(0.017)***	(0.017)***	(0.018)***	(0.014)***	(0.014)***	(0.014)***
High work ethic only	-0.065	-0.068	-0.059	-0.111	-0.123	-0.055
(low self-esteem and low religiosity)	(0.017)***	(0.017)***	(0.018)***	(0.014)***	(0.014)***	(0.014)***
High work ethic and	-0.205	-0.187	-0.195	-0.184	-0.231	-0.085
religiosity (low self-esteem)	(0.020)***	(0.021)***	(0.022)***	(0.017)***	(0.017)***	(0.017)***
High work ethic and self-	-0.120	-0.104	-0.138	-0.178	-0.199	-0.109
esteem (low religiosity)	(0.013)***	(0.014)***	(0.014)***	(0.011)***	(0.011)***	(0.011)***
High work ethic,	-0.210	-0.224	-0.192	-0.209	-0.233	-0.135
religiosity and self-esteem	(0.016)***	(0.016)***	(0.017)***	(0.013)***	(0.013)***	(0.013)***

6. Conclusion

In this paper, we estimate the impact of intrinsic religiosity—one's own valuation of the importance of religion—on the likelihood to engage in a range of risky health behaviors. We use information from adolescents contained in a longitudinal dataset of English teenagers which allows us to control for school-level heterogeneity. In addition, we are able to examine the impact of religiosity while simultaneously controlling for important non-cognitive personality traits, such as having a high work ethic, having low self-esteem, and having an external locus of control. Our results indicate that intrinsic religiosity provides a protective barrier against risky health behaviors, and that this effect is robust to the inclusion of potential confounders and to the estimation method. The finding is also true for boys and girls separately with little differences between the effects, with minor exceptions.

Our study focuses on the intrinsic aspect of religiosity and, therefore, highlights the importance of individual beliefs and personal choices rather than participation in religious activities (i.e., extrinsic religiosity). This aspect of religion is likely to have an important overlap with personality traits such as work ethic, self-esteem, and locus of control. We believe that, given the importance of adolescence as a critical phase of an individual's life, it is essential to include these skills and characteristics in order to get a more nuanced understanding of the mechanisms behind early initiation of risky behaviors. Surprisingly, we found that the effects of religiosity were only slightly reduced when we included controls for personality traits.

There are a number of channels through which religiosity can impact the likelihood to engage in risky health behaviors. It could be through increased social interaction with similar people who share the same set of beliefs. As noted by Gruber (2005), religious institutions could act as "financial and emotional insurer" by providing a support network during difficult phases of an individual's life. Religiosity may also have a separate effect on individual well-being, happiness, and life satisfaction as individuals with high religiosity could be more inclined to have a positive attitude in life. McCullough and Willoughby (2009) suggest that the impact of religiosity can potentially be mediated through a higher degree of self-control, a hypothesis that also plays a strong role in Pirutinsky (2014) and, to a degree, in Freeman (1986).

One way to get a handle of the mediating impact of self-control is to simultaneously estimate the impact of religiosity on risky health behaviors with measures of self-control or, in our

case, non-cognitive personality traits, particularly those that relate to locus of control, self-esteem, and work ethic. Our results are significant in that they demonstrate that religiosity has an independent and direct impact on the likelihood of engaging in risky health behaviors beyond those that are captured by our measures of personality traits. This suggests that there is a role for non-market institutions such as religion (or, more specifically, the values that are emphasized in religion) to play in managing the negative impacts that could arise out of risky health behaviors.

From a policy perspective, there is a potential to focus on positive changes in personality traits (especially work ethic and self-esteem). Educational and religious institutions may also engage in collaborative activities to reduce the probability that adolescents engage in what may be characterized as unsound practices such as underage consumption of alcohol and tobacco. In recent years, social policies in several countries have started to consider personality traits, emotions, and positive behaviors (see, e.g., Conrod et al. (2013); Hallam et al. (2006); Taub (2002)). The evaluations of these programs have shown substantial benefits and improvements in non-cognitive skills. We believe that such programs could benefit their target populations even more if they can, where feasible, collaborate with religious institutions, particularly when the goal is to reduce the burden arising out of risky health behaviors in adolescence.

One may also consider extracting what is essential in religion that creates these positive behavioral outcomes, and form policies around that for a far greater scope which includes adolescents or families who do not profess a religious belief. For instance, having religious beliefs may impact on one's "goal selection, goal pursuit, and goal management" or that it may influence abilities for self-monitoring and self-regulation (McCullough and Willoughby 2009). These skills do not necessarily have to derive from divine revelation, but could form part of a wider foundation on secular morality. In this way, the scope for policy instruments is not limited to those that may be wielded by members and leaders of religious organizations, and it would be more cognizant of and responsive to the increasing secularization of the developed (and large parts of the developing) world.

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Appendix: Questions in *Next Steps*

Locus of control

I can pretty much decide what happens in my life
If someone is not a success in life, it is usually his fault
How well you get in this world is mostly a matter of luck
Even if I do well at school, I will have a hard time
People like me do not have much of a chance
If you work hard at something, you will usually succeed

Possible answers: Strongly agree, Agree, Disagree, Strongly disagree

Work ethic

Doing well at school means a lot to me
At school, I work as hard as I can
Working hard at school now will help me to get on later in life
If you work hard at something, you will usually succeed

Possible answers: Strongly agree, Agree, Disagree, Strongly disagree

Self-esteem

How useful you have felt recently?
How much you have been thinking of yourself as a worthless person recently?

Possible answers: Not at all , No more than usual, Rather more than usual, Much more than usual.

Appendix Tables

Appendix Table A1 presents results for the impact of other independent variables on health risky behaviors. Personality traits play a strong role in determining choices. High work ethic significantly decreases the probabilities of engaging in early sexual intercourse (–4%), drinking (–5%), trying cannabis (–6%), smoking cigarettes (–3%), and fighting (–4%). On the other hand, adolescents with low self-esteem are significantly more likely to drink alcohol (4–5%), smoke cigarettes, and try cannabis (4%). Once we control for religiosity and other personality traits, having an external locus of control only affects one's chances to try cannabis (4%), be a smoker (3%), and being involved in a fight (5%). In all other cases, having an external locus of control does not have an effect on the probability of engaging in risky behaviors. Indeed, in most cases, the estimated coefficients are small and insignificant. These results are consistent with previous studies investigating the relationship between personality and health behaviors (see, e.g., Cobb-Clark et al. (2014) and Mendolia and Walker (2014)). We extend the earlier studies by considering outcomes at a young age and controlling for school fixed effects, as well as a very wide set of individual and family characteristics. As expected, youths with a high level of work ethic are more likely to carefully consider the consequences of their actions and to have a proactive orientation toward the future. Individuals with low self-esteem are more likely to underestimate their own value and, thus, tend to pay less attention to the potential adverse consequences of risky health behaviors.

Results from the sensitivity test analyzing the impact of religiosity in a model incorporating individual fixed effects are presented in the Appendix (Table A3). In practice, this model estimates the impact of changes in the level of religiosity on changes in behaviors. The results confirm the previous findings. Individual religiosity significantly decreases the probability of engaging in early sexual activity (–5%), underage drinking of alcohol (–4%), as well as smoking, and involvement in fights (–2%).

TABLE A1—IMPACT OF OTHER INDEPENDENT VARIABLES IN TABLES 3–8 (SCHOOL FE, MODEL 2)

	Ever had sexual intercourse	**Ever drank Alcohol**	**Drinks at least once a month**	**Ever tried Cannabis**	**Ever Smoked**	**Ever involved in Fighting**
Income >31,200	0.027	0.030	0.042	0.009	-0.001	-0.032
	(0.012)**	(0.010)***	(0.011)***	(0.009)	(0.009)	(0.010)***
11,400 < income < 31,200	0.011	0.004	-0.001	0.008	0.000	-0.020
	(0.011)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)**
Multiple Deprivation Index	0.003	-0.001	-0.006	0.005	0.002	0.024
(standardised)	(0.007)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)***
Male	-0.006	-0.028	0.023	0.035	-0.081	0.082
	(0.008)	(0.007)***	(0.007)***	(0.006)***	(0.006)***	(0.007)***
N. children	-0.005	-0.017	-0.014	-0.016	0.002	-0.006
	(0.004)	(0.003)***	(0.004)***	(0.003)***	(0.003)	(0.003)*
Maternal age at birth<20 y.o.	-0.010	0.008	-0.010	-0.005	-0.022	-0.029
	(0.020)	(0.015)	(0.017)	(0.014)	(0.013)	(0.015)*
High work ethic	-0.041	-0.057	-0.058	-0.052	-0.029	-0.046
	(0.009)***	(0.008)***	(0.008)***	(0.007)***	(0.007)***	(0.008)***
Low self-esteem	0.035	0.042	0.049	0.069	0.042	0.040
	(0.009)***	(0.007)***	(0.008)***	(0.007)***	(0.007)***	(0.007)***
External locus of control	0.007	-0.005	0.014	0.038	0.030	0.053
	(0.010)	(0.008)	(0.009)	(0.007)***	(0.007)***	(0.008)***
Single mother	0.034	0.035	0.028	0.062	0.022	0.021
	(0.010)***	(0.008)***	(0.009)***	(0.007)***	(0.007)***	(0.008)***
Key Stage 2 score	-0.011	0.034	0.036	0.028	-0.025	-0.005
(standardised)	(0.005)**	(0.004)***	(0.005)***	(0.004)***	(0.004)***	(0.004)
Age	0.181	0.094	0.114	0.069	0.032	-0.005
	(0.003)***	(0.003)***	(0.003)***	(0.002)***	(0.003)***	(0.003)
Mother unemployed	0.023	0.003	-0.027	0.049	-0.023	0.038
	(0.032)	(0.026)	(0.029)	(0.024)**	(0.023)	(0.026)
Mother out of Labour Force	-0.029	-0.038	-0.046	-0.007	0.011	-0.008
	(0.011)***	(0.008)***	(0.009)***	(0.008)	(0.008)	(0.008)
Mother's age	-0.005	-0.003	-0.002	-0.003	-0.003	-0.005
	(0.001)***	(0.001)***	(0.001)**	(0.001)***	(0.001)***	(0.001)***
Mother has university degree	-0.005	0.016	0.021	0.037	-0.026	-0.020
	(0.017)	(0.013)	(0.015)	(0.013)***	(0.012)**	(0.014)
Mother has other higher ed	-0.001	0.009	0.024	0.019	-0.018	-0.024
	(0.016)	(0.013)	(0.014)*	(0.012)	(0.011)	(0.013)*
Mother Snr. High graduate	0.034	0.036	0.027	0.022	-0.002	-0.016
	(0.016)**	(0.012)***	(0.014)**	(0.011)*	(0.011)	(0.012)
Mother is Jnr high graduate	0.004	0.023	0.010	0.004	-0.012	-0.012
	(0.014)	(0.011)**	(0.012)	(0.010)	(0.009)	(0.010)
Mother qual level ≤1	0.014	0.027	0.002	0.005	-0.006	0.011
	(0.018)	(0.014)**	(0.015)	(0.013)	(0.012)	(0.013)
Mother has other qual	0.033	0.033	0.030	0.013	0.020	0.004
	(0.027)	(0.021)	(0.023)	(0.019)	(0.019)	(0.021)
Older siblings	0.013	0.011	0.007	0.015	0.004	0.009
	(0.004)***	(0.003)***	(0.004)*	(0.003)***	(0.003)	(0.003)***
Black	-0.018	-0.161	-0.147	-0.016	-0.055	0.035
	(0.024)	(0.018)***	(0.020)***	(0.017)	(0.016)***	(0.018)*
Asian	-0.115	-0.205	-0.115	-0.020	-0.029	0.017
	(0.031)***	(0.023)***	(0.026)***	(0.022)	(0.021)	(0.024)
Mixed ethnicity	-0.027	-0.084	-0.087	0.052	-0.027	0.031
	(0.019)	(0.014)***	(0.016)***	(0.013)***	(0.013)**	(0.014)**
Takes private lessons	-0.017	-0.018	-0.013	-0.007	-0.006	-0.012
	(0.011)	(0.009)*	(0.010)	(0.009)	(0.008)	(0.009)
English 2nd language	-0.105	-0.042	-0.108	-0.028	0.011	0.019
	(0.026)***	(0.020)**	(0.022)***	(0.018)	(0.017)	(0.019)

Note: Std errors are in brackets. * indicates that the underlying coefficient is significant at 10% level, ** at 5% and ***1%

TABLE A2—SCHOOL FE ESTIMATION (MODEL 2) NOT INCLUDING PERSONALITY TRAITS

	Had sexual intercourse	Ever drunk alcohol	Drink at least once a month	Ever smoked	Ever tried cannabis	Ever involved in fighting
Religion fairly important	-0.078	-0.077	-0.072	-0.056	-0.055	-0.034
	(0.010)***	(0.008)***	(0.009)***	(0.008)***	(0.007)***	(0.008)***
Religion very important	-0.159	-0.175	-0.108	-0.063	-0.086	-0.058
	(0.013)***	(0.011)***	(0.012)***	(0.011)***	(0.010)***	(0.011)***
Christian	-0.005	0.008	-0.006	-0.022	-0.036	-0.001
	(0.008)	(0.006)	(0.007)	(0.006)***	(0.006)***	(0.006)
Hindu	-0.066	-0.084	-0.121	-0.068	-0.097	-0.067
	(0.029)**	(0.023)***	(0.025)***	(0.023)***	(0.021)***	(0.024)***
Muslim	-0.110	-0.282	-0.157	-0.058	-0.083	-0.006
	(0.025)***	(0.018)***	(0.020)***	(0.019)***	(0.017)***	(0.019)
Sikh	-0.114	-0.150	-0.115	-0.050	-0.071	-0.017
	(0.032)***	(0.024)***	(0.026)***	(0.024)**	(0.022)***	(0.025)
Another religion	0.033	-0.010	-0.036	0.016	-0.007	0.014
	(0.029)	(0.022)	(0.024)	(0.021)	(0.020)	(0.022)
N	19,663	27,216	26,352	22,368	27,600	22,565

Covariates: mother's education, single mother, age, mother's employment status; imd index, KS2, ethnicity,; number of children in the family; mother younger than 20 at birth; presence of older siblings; ethnicity; income groups in wave 1 (HH yearly income >31,200 GBP; HH yearly income between 11,400 GBP and 31,200 GBP; HH yearly income < 11,400 GBP omitted); private lessons.

TABLE A3—IMPACT OF RELIGIOSITY ON RISKY BEHAVIORS – INDIVIDUAL FIXED EFF

	Ever had sexual intercourse			Ever drank alcohol			
Religion is:	All	Girls	Boys	All	Girls	Boys	A
Fairly important	-0.037	-0.042	-0.030	-0.022	-0.017	-0.027	-0.
	(0.012)***	(0.015)***	(0.017)*	(0.010)**	(0.013)	(0.014)*	(0.0
Very important	-0.041	-0.036	-0.045	-0.042	-0.044	-0.042	-0.
	(0.016)***	(0.022)	(0.024)*	(0.014)***	(0.019)**	(0.020)**	(0.0
N	31,877	16,338	15,539	45,757	22,721	23,036	44,

	Ever Tried Cannabis			Ever smoked			
Religion is:	All	Girls	Boys	All	Girls	Boys	A
Fairly important	0.002	0.001	0.003	-0.018	-0.020	-0.015	-0.
	(0.008)	(0.011)	(0.013)	(0.009)**	(0.013)	(0.012)	(0.0
Very important	-0.005	0.007	-0.018	-0.020	-0.005	-0.032	-0.
	(0.012)	(0.016)	(0.018)	(0.012)*	(0.018)	(0.017)*	(0.0
N	46,336	23,042	23,294	35,767	17,709	17,029	36,

Covariates: Mother's education, individual's religion, single mother, age, mother's education and employment status. Std errors are in brackets. * significant at 10% level, ** at 5% and ***1%