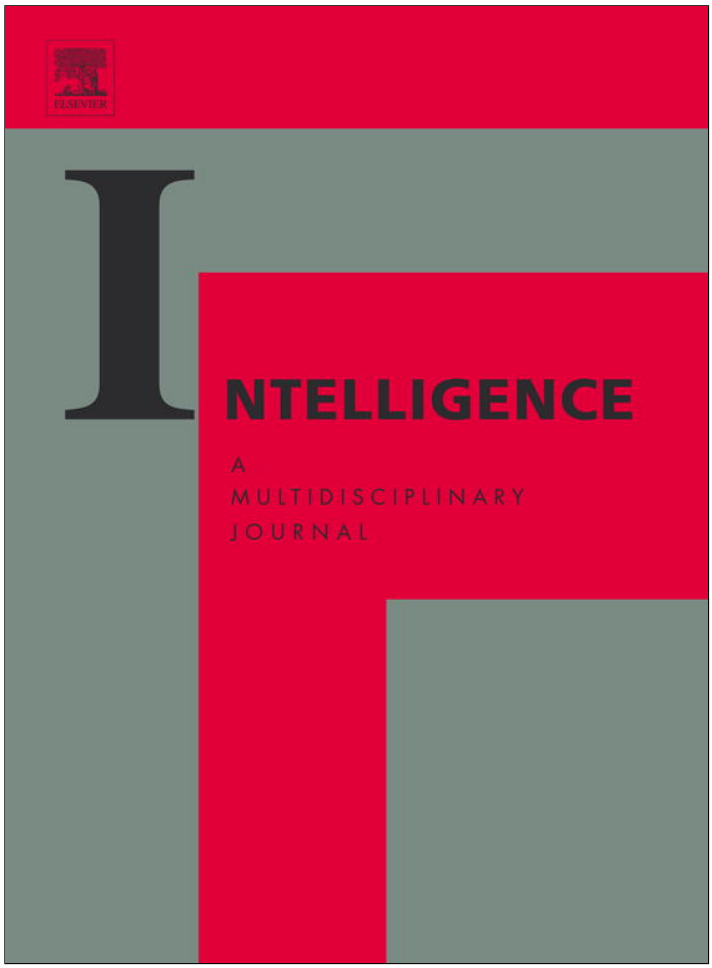

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On intelligence education and religious beliefs ☆

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ABSTRACT

A number of authors have suggested that education mediates the negative effect of intelligence on religiosity. However, there is very little direct evidence for this mediation, and the indirect evidence is contradictory. The results of the current paper suggest that, by and large, education does not mediate the effect of intelligence on religiosity. However, the results also suggest that since education has a positive effect on religiosity when religious background is strong and a negative effect when religious background is weak, and since intelligence has a positive effect on education, the negative effect of intelligence on religiosity is stronger when religious background is strong than when it is weak. We examine this mediated moderation model in two large, nationally representative, databases.

1. Introduction

There is evidence that measures of religiosity are negatively related to intelligence. As early as 1928, Howells (1928) and Sinclair (1928) argued for a negative relationship between intelligence and religiosity. In reviewing the relevant research, Bell (2002) states that of 43 studies reporting correlations between intelligence and religiosity,[1] all but four found a negative correlation. (See Bell, 2002. See also Beckwith, 1986 for similar results). Following the publication of Dawkins' (2006) "The God delusion" there was a resurgence in studies about the relationship between intelligence and religiosity, and two studies that were based on large-scale representative samples documented a negative relationship between the two (Kanazawa, 2010; Lynn, Harvey, & Nyborg, 2009). Two studies also found a negative relationship between intelligence and religiosity on the aggregate level, either by correlating average national intelligence with average national religiosity (Lynn et al., 2009), or by relating the average intelligence of denominations to the strength of their religious beliefs (Nyborg, 2009).

Although the effect of intelligence on religiosity is well established, there is conflicting evidence about the process underlying this effect and, in particular, the role of education in this process. The most plausible hypothesis is that education mediates or, at least partially mediates, the effect of intelligence on religiosity, i.e., that intelligent people are less religious because they obtain more education. The reason for this possible mediation process is rather clear: Intelligence has a strong effect on educational attainment (e.g., Deary, Strand, Smith, & Fernandes, 2007; Neisser et al., 1996) and, in turn, education provides people with the opportunity to seek rational alternatives to religious dogma (see for example, Achenbach & Edelbrock, 1987; Argyle & Beit-Hallahmi, 1975; Dawkins, 2006; Durkheim, 1915, 1964; Lenski, 1963).

Nevertheless, perhaps the only study that allowed for a suitable examination of this mediation hypothesis provides results that are contrary to this hypothesis. In two large nationally representative datasets (the General Social Survey and the National Longitudinal Study of Adolescent Health), and controlling for intelligence as well as various demographic characteristics, Kanazawa (2010), found a significant *positive* relationship between education and religiosity. This

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[1] There is no standard way by which religiosity in general and religious beliefs in particular are operationalized (see, for example, Clayton, 1971; Voas, 2007). Furthermore, there is a variation in the magnitude of the negative correlation between intelligence and religiosity (see, Bertsch & Pesta, 2009). In the current work we use two operationalizations for religious beliefs. One with a more fundamentalist flavor (Study 1) and the other with a more spiritual flavor (Study 2).

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finding is *inconsistent* with the idea that education mediates the negative effect of intelligence on religiosity. In fact, if anything, it suggests that education *reduces* the negative net effect of intelligence on religiosity because, by and large, more intelligent people obtain more education.

Another study that is somewhat relevant to questions regarding a possible mediation effect of education is a recent study by Reeve and Basalik (2011). Hypothesizing that the effect of intelligence on health is mediated by religiosity, they found – unlike Kanazawa (2010) – that on the aggregate (state) level, education does mediate the effect of intelligence on religiosity (their model stated that intelligence → education → religiosity → health). However, there are two limitations to this finding. The first concerns the difficulty of generalizing from aggregate level results to individual level results (the 'ecological fallacy', see Robinson, 1950), and the second concerns the fact that Reeve and Basalik's (2011) study relied on a lean model of religiosity that included only intelligence and education as independent variables with no controls, thus raising the possibility of alternative explanations relating to aggregate level variables that affect intelligence and education, as well as religiosity on the state level (e.g., economic development). In this paper we use data that allow both for an individual level analysis of a possible mediation effect of education and for better inferences about the causal relationships between education and religiosity.

Kanazawa (2010) and Reeve and Basalik (2011) are, to the best of our knowledge, the only studies that provided direct evidence regarding a possible mediation effect of education, since they are the only studies that simultaneously examined the effects of intelligence and education in the same model. There are however numerous studies that examined the relationship between education and religiosity without controlling for intelligence, thus providing indirect evidence for a possible mediation effect of education (see Iannaccone, 1998; Sherkat & Ellison, 1999 for reviews). These studies are problematic because they did not control for intelligence, despite intelligence affecting both education and religiosity. However, they are still relevant to our subject since a *negative* relationship between education and religiosity, in conjunction with the documented negative correlation between intelligence and religiosity and the well known positive correlation between intelligence and education, would support a mediation effect of education.

However, the evidence regarding the relationship between education and religiosity when intelligence is not controlled for is conflicting. On the one hand, most studies in the sociological literature are consistent with a mediation effect of education since they find that the uncontrolled (for intelligence) relationship between education and religiosity is negative. Thus, for example, in one review of this literature, Sherkat and Ellison (1999) state, "Higher levels of education have a negative impact on measures of traditional religious beliefs." (p. 368), and in another review, Johnson (1997) states, "For all the research conducted on the relationship between education and faith over the years, the overall empirical picture is surprisingly uniform… the majority consistently show a modest negative relationship between the two." (p. 233).

On the other hand, additional studies found a negative (uncontrolled for intelligence) relationship between education and religiosity. Thus, in a highly cited review that focused on the economics literature, Iannaccone (1998) states, "In numerous analyses of cross-sectional survey data, rates of religious belief and religious activity tend to increase with education" (p. 1470) (see Ganzach & Gotlibovski, ND for further discussion of these conflicting results). These studies are inconsistent with a mediation effect of education, and suggest that education *reduces* the negative net effect of intelligence on religiosity.

In sum, the evidence about a possible mediation effect of education on the effect of intelligence on religiosity is unclear and conflicting. Furthermore, even the evidence about the net effect of education on religiosity is unclear as some suggests a positive effect and others a negative effect. Thus, a main purpose of this paper is to examine a mediation model of religiosity that includes both intelligence and education. This mediation model is depicted in Fig. 1a. The model suggests that the direct effect of intelligence on religiosity is negative,[2] and on the basis of many previous studies (e.g., Binet, 1905; Deary et al., 2007; Neisser et al., 1996) it states that the effect of intelligence on education is positive. But – since previous findings do not provide clear evidence regarding the effect of education on religiosity when intelligence is controlled for – we leave open the question of what is the sign of the indirect effect of intelligence, the effect mediated by education. The ambiguity regarding the effect of education on religiosity is represented in Fig. 1a by a question mark.

The model of Fig. 1a is a main effects model since it treats the effect of education (and intelligence) on religiosity as independent on family background. However, it is possible that the effect of education on religiosity depends on religious background (e.g., parents' religiosity): Since children and young adults who come from religiously oriented families tend to receive education that is sympathetic to religious beliefs, the education they obtain may have a more positive (or a less negative) effect on their religiosity than those who come from families that are not religiously oriented.

If religious background does indeed moderate the effect of education on religiosity, it is likely that – since intelligence has a strong positive effect on education – the observed effect of intelligence on religiosity will also depend on religious background: It will be more negative when religious background is weak than when it is strong. This is a mediated moderation model of the effect of intelligence on religiosity, a model that suggests that religious background moderates the effect of intelligence on religiosity through its moderation of the effect of education on religiosity.

Fig. 1b depicts this mediated moderation model by adding the moderation effect of religious background on the relationship between education and religiosity to the main effect model of Fig. 1a. The positive sign of this moderation effect represents a pattern in which the stronger the religious background the more positive the effect of education on religiosity.

In sum, our model suggests two moderation hypotheses. It suggests that the effect of education on religiosity depends on

[2] This is consistent with Kanazawa (2010) and with Reeve and Basalik (2011). Although these two studies were inconsistent with regard to the effect of education on religiosity when intelligence is controlled, they were consistent with regard to the effect of intelligence on religiosity when education is controlled for — they both found a negative effect.

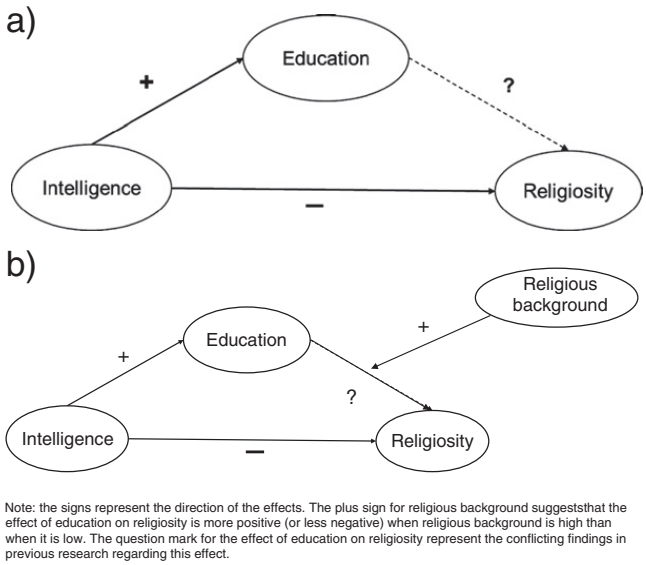

Fig. 1. a: A main effect model for the relationships between intelligence, education and religiosity. b: A mediated moderation model for the relationships between intelligence education and religiosity Note: the signs represent the direction of the effects. The plus sign for religious background suggests that the effect of education on religiosity is more positive (or less negative) when religious background is high than when it is low. The question mark for the effect of education on religiosity represents the conflicting findings in previous research regarding this effect.

religious background; and it suggests that, as a result, the effect of intelligence on religiosity also depends on religious background. Note that these hypotheses suggest that the notion of the influence of intelligence and education on religiosity is somewhat ambiguous since their net effects may depend on the level of religious background. Nevertheless, there is a distinction between the two. Whereas the effect of education may vary not only in magnitude but also in sign, the net effect of intelligence may be more robust because it combines the indirect effect (mediated by education) and the direct effect. If the direct effect is strong, the net effect of intelligence will be negative for all levels of religious background.

Finally, note that although we use a causal terminology, since our analyses rely on cross-sectional data, the causal conclusions derived from our analyses (as well as previous analyses about the relationship between intelligence, education and religiosity) should be viewed as tentative. Nevertheless, it should be noted that we have stronger confidence in the causal direction of the relationship between intelligence and religiosity, which most likely goes from intelligence to religiosity,[3] than in the causal direction of the relationship between education and religiosity, which is more ambiguous. Unlike the causal models underlying most of the research on the relationship between education and religiosity, including those studies of Reeve and Basalik (2011) and Kanazawa (2010), who view education as the cause and religiosity as the effect, a number of authors suggest that the causal direction goes from religiosity to educational attainment (e.g., Bryk, Lee, & Holland, 1993; Darnell & Sherkat, 1997). However, for convenience, in the current paper we discuss this causal relationship in terms of education being the cause and religiosity being the effect. But as we see below, our central substantive conclusions about the *relationship* between education and religiosity when intelligence is controlled for do not depend on the nature of this causal relationship.

2. Study 1: the national longitudinal study of youth

2.1. Method

2.1.1. Participants and procedure

The data were taken from an ongoing longitudinal study, the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97). The NLSY97 is a probability sample of 8984 Americans (with over sampling of Afro-Americans, Hispanics and economically disadvantaged whites) born between 1980 and 1984. About 35% were Catholic, 26% Baptists, 29% other Protestants, and the rest from small denominations and religions. The participants were interviewed annually starting in 1997 and the retention rate in 2008 was 83.7%. Our analyses draw on interviews that were conducted in 1997 in which intelligence and other individual and background characteristics were measured, and on the interviews conducted in 2008 in which religiosity and education were measured. Thus intelligence and other individual and background characteristics were measured when participants were 15 years old on average (with a 13–17 age range), and religiosity and educational attainment were measured when participants were, on average, 26 years old.

2.1.2. Variables and measurement

2.1.2.1. Religiosity. The religiosity of the participants was measured using five dichotomous items (see Moore et al., 1999 for scale development). The items included questions in areas such as religious values or attitudes towards religious writings and prayers (see Appendix A for the full instrument). The items were summed and multiplied by 100 to create a religiosity scale ranging from 0 (weak religiosity) to 100 (strong religiosity). The Cronbach alpha of the religiosity measurements was .71.

[3] Furthermore, in the current paper we use data in which intelligence was measured 11 years prior to the measurement of religiosity.

Table 1
Descriptive statistics and inter-correlations: NLSY97.

	Mean	STD	1	2	3	4	5	6	7	8
1. Religiosity	52.10	33.45	–							
2. Age	25.41	1.42	0.02	–						
3. Sex	1.50	0.50	0.13	0.01	–					
4. Black	0.27	0.44	0.36	0.01	0.01	–				
5. Hispanic	0.19	0.39	−0.01	0.01	0.00	−0.29	–			
6. Religious background	4.22	2.04	0.28	−0.02	−0.01	0.18	0.00	–		
7. Education	13.50	2.70	−0.14	0.02	0.10	−0.13	−0.12	0.05	–	
8. Intelligence	46.43	29.49	−0.30	0.01	0.03	−0.32	−0.16	−0.11	0.58	–

Note: Correlations above .03 (in absolute value) are significant on the .01 level, correlations above .05 are significant on the .001 level.

2.1.2.2. Religious background. Religious background was measured in 1997 by asking a parent of the participant how often she attended church in the last 12 months. Answers ranged from 1 (never) through 4 (about once a month) to 8 (everyday).

2.1.2.3. Intelligence. The measure of intelligence is derived from participants' test scores in the Armed Forces Qualifying Test, a heavily g-loaded intelligence test (Larson, Merritt, & Williams, 1988; Larson & Saccuzzo, 1989). The AFQT is a weighted sum of standardized scores within three months' age groups of four subtests of the Armed Services Vocational Aptitude Battery (arithmetic reasoning, paragraph comprehension, word knowledge and mathematics knowledge), and is expressed as a percentile score on the basis of the US army scoring scheme aimed at achieving nationally representative standard scores. The test was administered in small groups.

2.1.2.4. Age. The age of the participants at 2008 was calculated based on year and month of birth.

2.1.2.5. Education. Education was measured by the number of years of full-time education completed at 2008.

2.1.2.6. Control variables. Three individual characteristics were used as controls: Ethnic background (Black, Hispanic and non-Black, non-Hispanic) age and sex (coded as 1 for males and 2 for females).

2.2. Results and discussion

2.2.1. Main effects models of education, intelligence and religiosity

Table 1 presents descriptive statistics and zero-order correlations of the study variables. The pattern of correlations in this table is consistent with previous research that suggested a negative relationship between intelligence and religiosity, and with many sociological studies that, not controlling for intelligence, found a negative relationship between education and religiosity (e.g., Johnson, 1977; Sherkat & Ellison, 1999). As we see below, when intelligence is controlled for, there is a very weak relationship between education and religiosity.

Model 1 in Table 2 presents the results of a main effect model of the effects of intelligence and education on religiosity controlling for basic individual characteristics (age, sex and ethnic background) as well as for religious background. In this model the coefficient of intelligence is significant, but the coefficient of education is not. Thus, when it comes to the 'typical' American education, education does not seem to have an independent significant effect on religiosity, and does not mediate the negative effect of intelligence on religiosity[4,5].

2.2.2. The moderation role of religious background

We turn now to examine whether the effect of education and intelligence on religiosity depends on religious background. Model 2, which examines the interaction between religious background and education, suggests that religious background moderates the effect of education on religiosity (the interaction is significant). This interaction is plotted in Fig. 2a, which indicates that the null effect of education on religiosity in Model 1 is only a first approximation of the effect of education on religiosity, and it may be the result of education having a positive effect of education on religiosity when religious background is high and a negative effect of education on religiosity when religious background is low.

Model 3 in Table 2, which examines the interaction between religious background and intelligence, suggests that religious background moderates the effect of intelligence on religiosity (the interaction is significant). This interaction is plotted in Fig. 2b, which indicates that although the negative effect of intelligence on religiosity is rather universal, it is stronger among those with weak religious background.

Models 2 and 3 suggest a mediating moderation process underlying the interaction between intelligence and religious background. The relatively weak negative effect of intelligence on religiosity for those who come from a strong religious background is explained by the fact that in this population the basic negative effect of intelligence on religiosity is mitigated by the fact that the more intelligent obtain a more religiously oriented education, which tends to increase religiosity. Similarly, the relatively strong negative effect of intelligence on religiosity for those who come from a weak religious background is explained by the fact that in this population the basic negative

[4] A necessary condition for a mediator, M (education), to mediate the effect of X (intelligence) on Y (religiosity) is that controlling for X, M has a significant effect on Y. This condition does not occur in our model. A formal test of the mediation effect of education (the Sobel test) yielded a non-significant result $Z = 1.8$, $p > .05$.

[5] It should also be noted that our results suggest that when intelligence is controlled for, the effect of education is not significant when education is treated as a dependent variable and religiosity is treated as an independent variable. Thus, no matter what causal model is assumed, our results suggest that, when intelligence is controlled for, the *relationship* between education and religiosity is non-significant.

Table 2
The effect of intelligence and education on religiosity: NLSY97.

	Model 1			Model 2			Model 3			Model 4		
	β	SE	t	β	SE	t	β	SE	t	β	SE	t
Age	0.016	0.012	1.3	0.016	0.012	1.3	0.016	0.012	1.3	0.016	0.012	1.3
Sex	0.124**	0.012	10.4	0.123**	0.012	10.3	0.124**	0.012	10.3	0.123**	0.012	10.3
Black	0.255**	0.014	18.5	0.258**	0.014	18.7	0.259**	0.014	18.7	0.259**	0.014	18.7
Hispanic	0.025	0.013	1.9	0.028	0.013	2.1	0.027	0.013	2.1	0.028	0.013	2.2
Religious background (RB)	0.242**	0.012	19.8	0.244**	0.012	20.1	0.242**	0.012	19.9	0.244**	0.012	20.0
Education	−0.006	0.015	0.4	−0.004	0.016	13.8	−0.006	0.015	0.4	−0.004	0.015	0.3
Intelligence	−0.218**	0.016	13.7	−0.219**	0.015	−0.3	−0.218**	0.016	13.7	−0.218**	0.016	13.8
Education × RB				0.054**	0.012	4.5				0.049**	0.015	3.4
Intelligence × RB							0.036*	0.012	3.0	0.008	0.015	0.6

N = 5432.
** p<.001.
* p<.01.

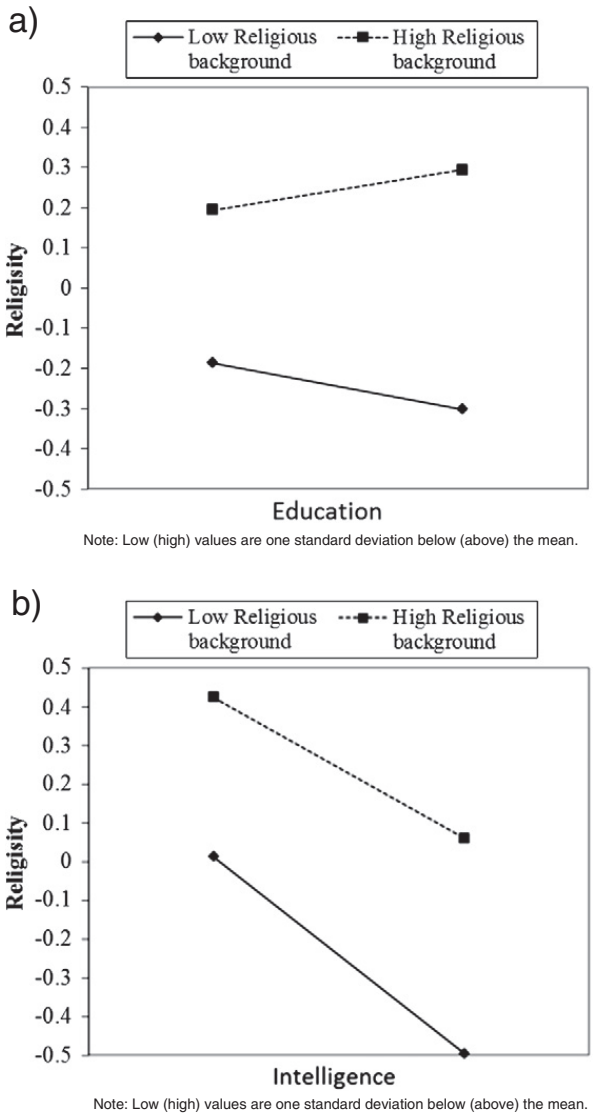

Fig. 2. a: The effect of education on religiosity as a function of religious background: The NLSY97. Note: Low (high) values are one standard deviation below (above) the mean. b: The effect of intelligence on religiosity as a function of religious background: The NLSY97. Note: Low (high) values are one standard deviation below (above) the mean.

effect of intelligence on religiosity is strengthened by the fact that the more intelligent obtain a non-religious education, which decreases religiosity.

Model 4 directly examines this mediated moderation hypothesis by including both the interaction between education and religiosity and the interaction between intelligence and religiosity. The significant interaction between intelligence and religiosity in this model suggests that education mediates the interactive relationship between religious background and religiosity (see, Muller, Judd, & Yzerbyt, 2005), in accordance with our model in Fig. 2b.

3. Study 2: the general social survey

3.1. Method

3.1.1. Participants and procedure

Data were taken from the General Social Survey (1972–2010 Release 2). The General Social Survey (GSS) collects data on demographic characteristics and attitudes of United States residents. The survey is conducted face-to-face with an in-person interview of a randomly selected sample of non-institutionalized adults (18+). The survey was conducted every year from 1972 to 1994 (except in 1979, 1981 and 1992), and every other year since 1994. The survey takes about 90 min to administer. Thus, as of 2010, 28 national samples with 55,087 respondents and 5417 variables had been collected. About 59% of the participants were Protestant, 25% Catholic, about 10% reported of no religious preference, and the rest from small denominations and religions. Our analyses draw on interviews conducted in 1984 and in 1988–1989, where intelligence and religiosity were measured (education and other individual and background characteristics were measured in each of the surveys). Participants were, on average, 43.8 (18–89 age range, *SD*. 17.5) years old.

3.1.2. Variables and measurement

3.1.2.1. Religiosity. Participants' religiosity was measured using the 'How close do you feel to God' item. The scale ranged from 1 (extremely close) to 5 (does not believe).

3.1.2.2. Religious background. Religious background was measured by asking the participants, 'When you were growing up,

how often did your (father or mother) attend religious services?' Answers ranged from 0 (never) through 8 (several times a week).

3.1.2.3. Intelligence. The GSS measures the verbal intelligence of its respondents by a ten-item multiple-choice measure of vocabulary knowledge called Wordsum. Adding up the number of correct answers yields a total test score. Due to the high correlation between verbal intelligence and general intelligence this measure is often used as an indicator of intelligence in GSS research (e.g., Hauser & Huang, 1997; Kanazawa, 2004).

3.1.2.4. Education. Education was measured by the number of years of full-time education completed.

3.1.2.5. Control variables. Three individual characteristics were used as controls: age, sex (coded as 1 for males and 2 for females), and race (Black, Hispanic, and Caucasian as a comparison group).

3.2. Results and discussion

3.2.1. Main effects models of education, intelligence and religiosity

Table 3 presents descriptive statistics and zero-order correlations of the study variables. The table suggests that the pattern of zero-order correlations between the focal variables in the GSS is similar to the pattern in the NLSY97 (Table 1): Intelligence is positively correlated with education and religiosity is negatively correlated both with education and intelligence. However, the correlation between intelligence and religiosity in the GSS is lower than the correlation in the NLSY97, most likely because of the low reliabilities of the one item religiosity measure and the short intelligence test in the GSS.

The results of the main effects model (Model 1 in Table 4) of the effects of intelligence and education on religiosity are also similar to the results of the NLSY97. The coefficient of intelligence is significant, but the coefficient of education is not. Thus, the analysis of the GSS also indicates that on the average, education does not have an independent significant effect on religiosity, and does not mediate the negative effect of intelligence on religiosity ($Z = 0.8$, $p > .7$ for the Sobel test).

3.2.2. The moderation role of religious background

The basic results of the moderation models in the GSS are similar to those of the NLSY97. First, religious background appears to moderate the effect of education on religiosity (the interaction between education and religious background is significant. See Model 2 in Table 4). The interaction is plotted in Fig. 3a, and similar to the interaction in the NLSY97 data it suggests that the effect of education on religiosity is more negative when religious background is strong than when it is weak. Second, religious background seems to moderate the effect of intelligence on religiosity (the interaction between intelligence and religious background is significant. See Model 3). The interaction is plotted in Fig. 3b, and similar to the interaction in the NLSY97 data it suggests that the effect of intelligence on religiosity is more negative when religious background is strong than when it is weak. However, the results of a model that includes both interactions (Model 4) did not allow for establishing a clear pattern of mediated moderation, since both the interaction between education and religious background and in particular the interaction between intelligence and religious background were not significant. We believe that these null effects are due to the low reliabilities of the measures of religiosity and intelligence in the GSS.

4. Conclusions

The results of the two studies do not support the idea that there is a universal pattern by which education mediates the effect of intelligence on religiosity, nor do they support the widely held notion that education leads to apostasy (see for example, Achenbach & Edelbrock, 1987; Argyle & Beit-Hallahmi, 1975; Dawkins, 2006; Durkheim, 1915, 1964; Lenski, 1963). Furthermore, it seems that the negative relationships between educational attainment and religiosity, which were reported in many previous studies that did not control for intelligence, are spurious, and stem from the negative effect of intelligence on religiosity and its positive effect on educational attainment.

In fact, our results even suggest that for those who came from strong religious backgrounds, education had a *positive* effect on religiosity, which leads to a *positive* indirect effect of intelligence, even though the direct effect of intelligence was negative. On the other hand, education had a negative effect for those who came from secular backgrounds. As a result, for these people, intelligence had not only a negative direct effect, but also a negative indirect effect, mediated by education.

The current studies also suggest that the relationship between education and religiosity may vary depending on the research population. It may be positive for a population characterized by a strong religious background and negative for a population characterized by a weak religious background. Thus, one of the reasons for the conflicting findings about the relationship between education and religiosity that

Table 3
Descriptive statistics and inter-correlations: GSS.

	Mean	STD	1	2	3	4	5	6	7	8
1. Religiosity	4.02	0.85	1.00	0.14	0.20	0.12	−0.09	0.22	−0.12	−0.12
2. Age	42.48	16.68	0.14	1.00	0.05	−0.05	0.08	0.05	−0.20	0.04
3. Sex	1.57	0.49	0.20	0.05	1.00	0.05	−0.04	0.03	−0.09	0.02
4. Black	0.11	0.31	0.12	−0.05	0.05	1.00	−0.85	0.09	−0.09	−0.18
5. White	0.86	0.35	−0.09	0.08	−0.04	−0.85	1.00	−0.09	0.08	0.21
6. Religious background	4.76	2.47	0.22	0.05	0.03	0.09	−0.09	1.00	0.06	−0.01
7. Education	12.98	2.91	−0.12	−0.20	−0.09	−0.09	0.08	0.06	1.00	0.49
8. Intelligence	6.09	2.14	−0.12	0.04	0.02	−0.18	0.21	−0.01	0.49	1.00

Note: Correlations above .06 (in absolute value) are significant on the .01 level, correlations above .010 are significant on the .001 level.

Table 4
The effect of intelligence and education on religiosity: GSS.

	Model 1			Model 2			Model 3			Model 4		
	β	SE	t	β	SE	t	β	SE	t	β	SE	t
Age	0.116**	0.019	6.2	0.119**	0.019	6.4	0.119**	0.019	6.3	0.120**	0.019	6.4
Sex	0.179**	0.018	9.9	0.178**	0.018	9.8	0.178**	0.018	9.8	0.177**	0.018	9.8
Black	0.127**	0.035	3.7	0.128**	0.035	3.7	0.131**	0.035	3.8	0.130**	0.035	3.8
White	0.056	0.035	1.6	0.052	0.035	1.5	0.056	0.035	1.6	0.053	0.035	1.5
Religious background (RB)	0.209**	0.018	11.5	0.211**	0.018	11.6	0.208**	0.018	11.4	0.209**	0.018	11.5
Education	−0.043	0.022	1.9	−0.039	0.022	1.8	−0.043	0.022	1.9	−0.040	0.022	1.9
Intelligence	−0.089**	0.021	4.1	−0.091**	0.021	4.2	−0.089**	0.021	4.1	−0.090**	0.021	4.2
Education × RB				0.050*	0.018	2.8				0.033	0.020	1.6
Intelligence × RB							0.054*	0.018	3.0	0.039	0.022	1.9

N = 2707.
** p<.001.
* p<.01.

emerged in previous research may be differences in research populations. Furthermore, since previous research about the relationship between education and religiosity did not control for intelligence, it is possible that – because education is highly correlated with intelligence – controls that are often used in this area of research (e.g., socio-economic status, race) and are correlated with intelligence influenced the observed relationship between education and religiosity. Thus the differences in these observed relationships in previous studies may be associated with the differences in the specific controls used in those studies.

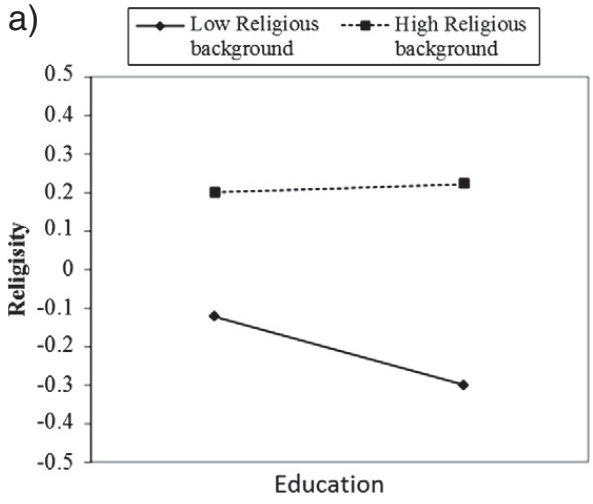

Fig. 3. a: The effect of education on religiosity as a function of religious background: The GSS. Note: Low (high) values are one standard deviation below (above) the mean. b: The effect of intelligence on religiosity as a function of religious background: The GSS. Note: Low (high) values are one standard deviation below (above) the mean.

Our analyses are based on samples of young Americans, and therefore our conclusions are limited to the education delivered by the American educational system, to the religious beliefs of young Americans, and to the religious backgrounds. It is possible that in other cultures and other educational systems, these relationships are different. Yet, although our analyses suggest that the effect of education on religiosity depends on background characteristics, it also suggests that the direct effect of intelligence does not depend on such characteristics. From this perspective, it appears that the negative (direct) effect of intelligence on religiosity, unlike the effect of education, is robust to such characteristics. Finally, our analyses also suggest that although intelligence may have an indirect positive effect on religiosity, the net effect of intelligence on religiosity is negative, since the direct effect is more potent than the indirect effect.

Appendix A. The religiosity instrument of the NLSY97

I do not need religion to have good values (reverse coded).
Religious teachings are to be obeyed exactly as written.
I pray more than once a day.
I often ask God to help me make decisions.
God has nothing to do with what happens to me personally (reverse coded).

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