The heritability of religiousness: An international twin study

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Background

Emerging adulthood is a time of religious change for many people.1-2 A potential explanation is that leaving the environmental influences of the home, which generally occurs during emerging adulthood, allows for the expression of one’s own inherent dispositions.3 Heritability is the proportion of variance in a measured trait that is due to genetic variation; environmentability is the proportion of variance in a population that is due to environmental variation. Nearly always, there is some degree of both environmentality and heritability accounting for the observed phenotypic variation.4 Identical twins (monozygotic twins) share 100% of their genetic makeup, fraternal twins (dizygotic twins) share 50% of their genetic makeup. If monozygotic twins (MZ) resemble each other in religiousness more than dizygotic twins (DZ) resemble each other, we can infer that genetics are a factor in one’s religiousness. In one study, religious affiliation was found to be cultural, but religiousness in terms of practice and attitude was found to be heritable.5 Further, the heritability of religiousness seen to increase with age.6 However, the two studies that found the heritability of religiousness increased with age dealt with limited samples.7 The purpose of the current study is to utilize a more diverse sample in replicating and extending the finding that religiousness is a heritable trait.

Hypotheses

1. Participants will report more religious involvement as children than as adults.
2. In childhood, MZ twins will be about as similar as DZ twins in religiousness, but in adulthood, MZ twins will be more similar than DZ twins in religiousness.
3. Among those who have stayed near their home environment (home transient), there will not be an increase in heritability of religiousness with age comparable to a group of those who have moved away from their home environment.

Method

Administrators of twin-related groups on the internet social utility, Facebook, sent a link to the questionnaire to twin members of these groups upon my request. Participants’ ages ranged from 18 to 54 with an average age of 22.4. A total of 102 individuals responded about themselves and their MZ twin, and 156 individuals responded about themselves and their opposite-sex or same-sex DZ twin. Of the 156 DZ twins, 87 were same-sex twins. When accounting for the respondents and their co-twins, there are data on 518 individuals total. Participants and their twins reside mainly in the United States (321 of 518 individuals), with 197 individuals residing in 20 other countries. Although this study contains data on individuals from many parts of the world, the majority of participants who responded about self and twin’s religious affiliation responded as a Christian denomination (349 of 441 responses). Participants reported on their own and their co-twin’s religious involvement and affiliation during their childhood and adulthood.

Acknowledgements

Dr. April Bleske-Rechek was consulted regularly throughout the completion of this project. This research was sponsored, in part, by University of Wisconsin-Eau Claire Differential Tuition.

Results and Figures

Scale Creation

The 5-item self-reported childhood and adulthood Religiousness Scales had internal consistencies (alpha of .89 (N = 258) and .93 (N = 258), respectively. The Internal Subscale consisted of three items, Importance of Faith in Daily Life, Frequency of Prayer, and Frequency of Reading Religious Text. It had an internal consistency in childhood and adulthood of .84 (N = 258) and .90 (N = 258), respectively. The External Subscale consisted of two items, Frequency of Attending Religious Services and Frequency of Discussing Religious Teachings; it had an internal consistency in childhood and adulthood of .72 (N = 258) and .83 (N = 258), respectively.

Decrease in Religiousness

Supporting Hypothesis 1, religiousness in the current sample measured by the Religiousness Scale decreased from childhood to adulthood (257) = 7.3, p < .001. Scores decreased from childhood to adulthood in both the Internal Scale (z = 0.66 (medium to large effect)) and for the Internal Scale z = 0.24 (a small effect). The effect size for the Religiousness Scale fell in between the two subscales at z = 0.46. Further, the correlation of scores from childhood to adulthood on the Religiousness Scale (z = 0.59) was lower than on the Internal Subscale (z = 0.72, p < 0.006). These results indicate that the External Subscale is more susceptible to change than the Internal Subscale.

Heritability

Heritability was calculated as two times the difference between MZ and DZ correlation coefficients. Heritability estimates (h2) for retrospective and current ratings on the Religiousness Scale were .02 and .26, respectively. Supporting Hypothesis 2. MZ and DZ twins were about as similar in childhood but MZ twins were more similar than DZ twins in adulthood. The correlation coefficients were between .67 and .86 depending on zygosity and whether the rating was retrospective or current. While these correlation coefficients are acceptable, they are not perfect. To be conservative, whenever analyses were run for groups of individuals (as opposed to groups of twins), only the respondents’ data were used.

Although the heritability estimate (h2) for current ratings on the Religiousness Scale was .26 (as shown above in Figure 2), in adulthood, correlation coefficients of MZ twins did not differ from that of DZ twins in the group who never moved from home (Group 1). In the group who moved from home, the heritability estimate was much higher than when examining the groups together, hitting .40 for current ratings, supporting Hypothesis 3. In this group, MZ twins were about as similar as DZ twins in adulthood but MZ twins were significantly more similar than DZ twins. The active gene-environment correlation could explain this phenomenon; the individuals who have moved from their home environment have created their own environments to fit with their genetic predispositions. Both MZ and DZ twins change, but because DZ twins share half the amount of genes, MZ twins change more, and DZ twins become less similar to each other than MZ twins do as their genetic predispositions are realized.

Discussion

The current study replicated and extended patterns found in previous research.1,3 Although participants born outside the United States are less religious in childhood and adulthood, the patterns of religiousness remain the same. The first pattern was the decrease in religiousness from childhood to adulthood. Second, MZ twins were generally not more similar than DZ twins were in childhood, but MZ twins tended to be more similar than DZ twins were in adulthood. In twin pairs with the responding twin never having lived more than 150 miles from home for at least four months, MZ twins were more similar than DZ twins in current responses on the religious scale. However, when the responding twin had lived more than 150 miles from home for four months or more, MZ twins were significantly more similar than DZ twins. The active gene-environment correlation could explain this phenomenon; the individuals who have moved from their home environment have created their own environment to fit with their gene expression.


References