Master Thesis

The Protective Influence of Religious Aspects on Completed Suicide in Countries Worldwide: The Link with Suicide Acceptability, Controlled for Demographic Factors.

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Abstract

Previous research showed a protective influence of religion on suicidality and suicide. However, current studies in the field are primarily individual-based. The present study focused instead on the protective influence of religious values on suicide on a country bases. Three aspects of religion were assessed, namely 'religion and spiritual reflection and commitment', 'unifying interconnectedness' and 'permissiveness' and their relationship with suicide completion and suicide acceptability, controlling for income and age. Data was extracted from the World Values Survey Wave 6, the World Health Organization Mortality Database and the Income Mountain Database, resulting in the investigation of 53 countries. Hypothesis were tested using correlation analysis and multiple linear regression analysis. Correlation analysis showed a negative relationship between 'religion and spiritual reflection and commitment' and 'unifying interconnectedness' and suicide completion and acceptability. And a positive relationship between 'permissiveness' and suicide completion and acceptability. The multiple linear regression analysis partly confirmed the hypothesis, which can be explained through various possibilities. These findings indicate the relevance of individual characteristics rather than a pattern that occurs worldwide and questions the importance of religion. This makes the present study a relevant addition to previous religion and suicide research and reveals the importance of further research to uncover other factors that explain the differences in suicide rates worldwide.

Introduction

Risk factors regarding suicide, in contrast to protective factors, are well known and thoroughly investigated. Understanding protective influences could provide an insight in the mechanisms of suicidality and suicide. These protective influences are important to uncover, since they can be enhanced during clinical practice. According to different studies religion has a protective influence on suicidality and suicide completion (Neeleman & Lewis, 1999; Gearing & Lizardi, 2009; Koenig, King & Carson, 2012; Lawrence, Oquendo & Stanley, 2016; Jongkind, van den Brink, Schaap-Jonker, van der Velde & Braam, 2019). 'Religion involves beliefs, practices and rituals related to the sacred which relates to (mostly) God' (Koenig, 2009; McClintock, Lau & Miller, 2016) and 'is an established tradition that arises out of a community' (Koenig, 2009; Koenig et al., 2012). Suicidality can be defined as the process from suicidal thoughts and ideation up to suicide attempts, where suicide completion entails a successful suicide attempt (Shneidman, 1977). Furthermore, suicide can be defined as ´the self-inflicted intentional act designed to end one's own life´ (Shneidman, 1977).

Several theories explaining the protective influence of religion on suicidality and suicide are: The religious commitment theory or theory of religious salience, The social integration theory and the moral community thesis, with the moral objections (MOS) theory (Durkheim, 1925/1961; Stark, Doyle & Rushing, 1983; Dervic et al., 2004; Gearing & Lizardi, 2009; Stack & Kposowa, 2011; Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019). The religious commitment theory or theory of religious salience indicates that the more committed someone is to their religion and views as though religion is an essential factor in their life, the more religion functions as a protective influence against the development of suicidality and suicide (Gearing & Lizardi, 2009; Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019). The social integration theory indicates that people in an integrated group (for example a church) are at smaller risk to commit suicide, due to more social cohesion (Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019). The moral community thesis indicates that the aggregate level of religion in a group affects an individual's attitudes and behaviors (Durkheim, 1925/1961; Stark et al., 1983; Stack & Kposowa, 2011). If there are more religious people in one community, their religious believes and behaviors are reinforced (Durkheim, 1925/1961; Stark et al., 1983; Stack & Kposowa, 2011). Additionally, non-religious people are more likely to adapt to religious believes and behaviors (Durkheim, 1925/1961; Stark et al., 1983; Stack & Kposowa, 2011). A specific form of the moral community thesis is the moral objections to

suicide (MOS) theory, containing the moral objection 'God forbids suicide' (Dervic et al., 2004; Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019).

Since religion is a comprehensive construct that entails more than just religious denomination (i.e. religion yes/ no), different aspects of religion need to be uncovered (McClintock et al., 2016; Jongkind et al., 2019). McClintock and colleagues (2016) proposed five dimensions of religion and spirituality: (1) religious and spiritual reflection and commitment, (2) contemplative practice, (3) unifying interconnectedness, (4) love and (5) altruism. The forthcoming two factors can be investigated following an approach based on the World Values Survey. The first factor 'religious and spiritual reflection and commitment' entails religiosity and its integration into a person's life, in accordance with the religious commitment theory (Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019), measuring constructs such as belief salience and intrinsic religiosity (McClintock et al., 2016). The third factor 'unifying interconnectedness' entails the connection a person feels with other people and the environment (McClintock et al., 2016), possibly linked to aspects of the social integration theory (Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019). The factors mentioned in the research of McClintock and colleagues (2016) fail to comprehend all aspects of religion, specifically in accordance with the moral objections to suicide theory. Neeleman and colleagues (1997) first suggested the factor 'permissiveness', which indicates amounts of tolerance and is based on the justifiability of certain behaviors, such as homosexuality, euthanasia and suicide. The amount of tolerance, specifically tolerance against suicide (e.g. suicide acceptability) may explain the protective influence of religion on suicide, which is now subsequent to the moral objections to suicide theory (Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019). Thus, the above-mentioned three religious values linked to the different theories, may uncover aspects of religion influencing suicide in countries worldwide. It is proposed that higher levels of 'religious and spiritual reflection and commitment' and 'unifying interconnectedness and lower levels of 'permissiveness' (tolerance) in countries, result in lower levels of completed suicide.

Previous research is mainly individual-based, comparing individuals to one another rather than a country-based study, comparing countries to one another. Wu, Wang & Jia (2015) did perform a country-based meta-analysis of various studies around the world. As expected, and in line with the religious commitment theory (Dervic et al., 2004; Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019), they confirmed the protective influence of religion through religiosity on completed suicide (Wu et al., 2015). Additionally, McClintock, and colleagues (2016) investigated different aspects of spirituality and religion in China, India and

the United States in a country-based study, linking these aspects to mental health issues such as suicidal ideation. This research is more thorough since the researchers investigated multiple factors regarding religion (McClintock et al., 2016). Two of these factors can be linked to the religious commitment theory and the social integration theory. Their research shows that 'religious and spiritual reflection and commitment' is associated with less risk for suicidal ideation in India and the United States, but with higher risk in China. Spirituality and religion are overlapping constructs referring to higher dimensions of existence, where religion refers to the beliefs, rituals, holy texts and traditions (McClintock et al., 2016). Since most research is based on results measuring the construct religion, the present study also focuses primarily on religious values. Additionally, the present study will proceed on previous research by investigating the relationship between religious values linked to all three theories and suicide on country bases, thus comparing countries to one another worldwide.

Previous research investigated the protective influence of religion on suicidality and suicide, but several studies also investigated the association with suicide acceptability (Dervic et al., 2004; Neeleman, Halpern, Leon & Lewis, 1997; Stack, 2015; Stack & Kposowa, 2011). Research investigating the suicide acceptability of religiously affiliated people has shown that religious committed people view suicide as less justifiable and therefore religion functions as a protective influence against suicide (Dervic, Oquendo & Grunebaum, 2004; Neeleman, Halpern, Leon & Lewis, 1997; Stack, 2015; Stack & Kposowa, 2011). Additionally, according to the moral community thesis, people living in highly religious countries find suicide less acceptable (Stack & Kposowa, 2011). This can be explained following the moral objections to suicide (MOS) theory which according to research, may explain the protective influence of religion on suicide better than the social integration theory (Neeleman et al., 1997; Jongkind et al., 2019). Thus, the level of suicide acceptability may be influenced by religious values and is therefore important to investigate. It is proposed that higher religious values in countries, result in lower levels of suicide acceptability.

The relationship between religious values and suicide completion and acceptability, may be influenced by several confounding factors, namely legal objections in countries and demographic factors such as income and age. Legal objections to suicide could influence suicide acceptability as they are often coherent with dominating religions in countries (Mishara & Weisstub, 2016). However, few research is available about the effect of suicide laws on suicide acceptability and suicide rates. Mishara & Weisstub (2016) did investigate countries and their various laws against suicide, finding inconclusive results. Countries with specific laws prohibiting suicide do not all show lower suicide rates. It is unclear whether suicide laws

influence suicide acceptability and suicide rates. Therefore, the countries legal objections to suicide can and will not be investigated as a confounding construct in the present study.

More important confounders include demographic factors such as income and age (Neeleman & Lewis, 1999; Inglehart, 2008). Neeleman and Lewis (1999) emphasize the importance of demographic variation. They indicated that age affects the relationship between religion via religious commitment and suicide rates, even after controlling for socioeconomic confounding (Neeleman & Lewis, 1999). According to their research, most suicides are committed between the age of 30 and 59 (Neeleman & Lewis, 1999). Additionally, an interactive tool created by the Institute for Health Metrics and Evaluation at the University of Washington (2020), shows most suicides in countries around the world are committed between the age of 14 and 50, indicating age influences suicide. Inglehart (2008) investigated age differences in religious values among different generations in countries worldwide. Interestingly, high income Western countries show differences among generations, where the older generations hold more traditional (religious) values than younger generations (Inglehart, 2008). However, low income countries do not show a value shift among different generations (Inglehart, 2008). Neeleman and Lewis (1999) stated that the increase of protective influences of religion on suicide will vary from community to community, since higher income levels were associated with higher suicide rates. In conclusion, age may affect the relationship between religion and suicide via religious commitment, with an apparent stronger relationship for older generations and a higher suicide risk between the ages of 14 and 59 (Neeleman & Lewis, 1999; Inglehart, 2008; University of Washington, 2020). Additionally, the relationship may be influenced by income levels in countries, where higher income levels result in higher suicide rates and changes among generations in religious values (Neeleman & Lewis, 1999; Inglehart, 2008). Therefore, it is proposed that income and age may account for a part of the relationship between religious values and suicide completion and acceptability.

To summarize, religion is found to have a protective influence on suicide completion, according to the social integration theory, the moral community thesis, with the moral objections theory and the religious commitment theory and influences suicide acceptability (Durkheim, 1925/1961; Stark et al., 1983; Dervic et al., 2004; Gearing & Lizardi, 2009; Stack & Kposowa, 2011; Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019).. According to previous research, religion can be divided into different factors, such as 'religious and spiritual reflection and commitment', 'unifying interconnectedness' and 'permissiveness' (Neeleman et al., 1997; McClintock et al., 2016). Additionally, demographic factors may influence the relationship through income and age (Neeleman & Lewis, 1999; Inglehart, 2008).

Conclusions about the effect of legal objections on suicide rates are difficult to state and will not be investigated in the present study (Mishara & Weisstub, 2016).

The aim of the present study is to uncover the protective influence of religious values on suicide completion and suicide acceptability in a country-based study, controlling for income and age. Based on previous research (Neeleman et al., 1997; Wu et al., 2015; McClintock et al., 2016), the following relationships are expected. In accordance with the religious commitment theory and the social integration theory, a negative relationship between 'religious and spiritual reflection and commitment' and 'unifying interconnectedness' and suicide completion and acceptability is expected. In accordance with the moral objections to suicide theory, a positive relationship between 'permissiveness' and suicide completion and acceptability is expected. Specifically, it is expected that the more religiously committed, socially integrated and corresponding with moral objections to suicide people are, the less likely they are to commit suicide and view suicide as acceptable. Furthermore, it is expected that income and age influence the relationship. The proposed hypotheses are summarized schematically in Figure 1.
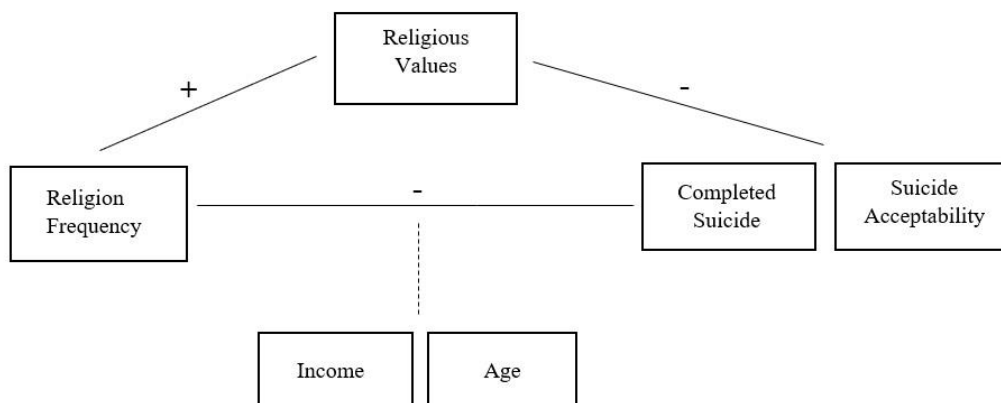

Figure 1. Schematic summary of the hypothesized relations between religious values and suicide completion and acceptability, controlling for income and age.

Methods

Procedure

Data for the religious values, suicide acceptability and control variable age was collected from the World Values Survey Wave 6. Data for completed suicide was collected from the World Health Organization Mortality database. Data for the control variable income was collected from the Income Mountain Database. For the following countries data including all variables was available and therefore analyzed: Algeria, Azerbaijan, Argentina, Australia, Armenia, Brazil, Belarus, Chile, China, Colombia, Cyprus, Ecuador, Egypt, Estonia, Georgia, Germany, Ghana, Haiti, India, Iraq, Japan, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Libya, Malaysia, Mexico, Morocco, New Zealand, Nigeria, Pakistan, Palestine, Peru, Philippines, Poland, Romania, Russia, Rwanda, Singapore, South Africa, South Korea, Sweden, Thailand, Tunisia, Turkey, Ukraine, United States, Uruguay, Uzbekistan, Yemen and Zimbabwe (n = 53).

Datasets

Religious and demographic data

Religious and demographic variables were obtained from wave six (2010-2014) in the World Values Survey database (n = 400.000) (Inglehart, Haerpfer, Moreno, Welzel, Kizilova & Diez-Medrano et al., 2014). The questionnaire used in wave six contains 258 items and was conducted during a face-to-face interview at the respondent's residence. WVS surveys are required to cover all residents (not only citizens) between the ages of 18 and 85 and are completely anonymous. Most countries had to obtain at least 1200 completed interviews to be represented in the dataset. The sampling method can be full probability or a combination of probability and stratified, but the sample must always be representative for all people (>18) living in each country (Inglehart et al., 2014).

During the interview the interviewer reported a few interpretations about the respondent to investigate reliability. The following three questions give an impression of the reliability of the conducted interviews in wave six: V251 Respondent interested during the interview (7% missing): very interested; 53.1%, somewhat interested; 38.1% or not interested; 8.8%; V252 Interview privacy (12.8% missing): no other people around who could follow the interview; 65.8% or other people around who could follow the interview; 34.2% and V255 Was the respondent literate (12.4% missing): literate; 91.7% or illiterate; 8.3% (Inglehart et al., 2014).

Demographic data

The following items were selected for analysis of demographics: V240 Code respondent's sex by observation (Male, score 1; Female, score 2); V241 Year of birth (19..); V242 Meaning you are … years old. The demographic data are presented in Table 1.

Table 1.
Means, Standard Deviations, Minimum and Maximum Scores for the Demographic Data: Respondents Gender, Age and Year of Birth.

Demographics	*M*	*SD*	Min.	Max.	*n*
Gender			1	2	83260
Age	41.52	16.40	16	102	83174
Year of Birth	1970.17	16.52	1913	1999	81031

Religious Denomination

The following item was selected for analysis to determine one's religious denomination: V144 Belong to a religion or religious denomination (No, score 1; Yes Roman Catholic, score 1; Yes, Protestant, score 2; Yes Orthodox, score 3; Yes Jew, score 4; Yes Muslim, score 5; Yes Hindu, score 6; Yes Buddhist, score 7; Yes other …, score 8) (Inglehart et al., 2014). The major religious denominations are presented in Table 2.

Table 2.
Demographic Data: Religious Denomination; Major Religions.

Major Religions	*n*	Percentage (%)
Buddhist	3790	4.5
Christian	616	0.7
Hindu	3693	4.4
Jew	172	0.2
Muslim	18198	21.8

Orthodox	8011	9.6
Protestant	5236	6.3
Roman Catholic	12713	15.3
Total	52429	62.8

Religious values

McClintock and colleagues (2016) performed an exploratory factor analysis to uncover factors regarding spirituality and religion. They found five factors and assigned different measures to each factor, with every measure loading high on only one factor (r > .50). Unfortunately, it is uncertain if these factors are reliable, since the Cronbach's alphas were not stated in the article. The current study investigated two factors based on the research of McClintock and colleagues (2016): 'Religious and spiritual reflection and commitment' and 'unifying interconnectedness'. Few studies focused on different factors of religion and its relation to suicide, especially on country bases. However, research shows that different aspects of religion may be important in explaining its functioning as a protective influence on suicide (McClintock et al., 2016; Jongkind et al., 2019). These studies focus primarily on individual aspects. Therefore, the factors of McClintock and colleagues (2016) will be used to investigate the relationship between religion and suicide on country bases. To ensure that the measured factors in the current study cover all aspects of religion as explained through different theories, another factor is introduced. The factor 'permissiveness' will cover the aspect of the moral objections to suicide in religion (Neeleman et al., 1997). Once again, a reliability analysis for this factor was not stated in the article.

The interview items selected for analysis of the various factors and their factor loadings are presented in Appendix 1, Table 3. The ten items for the factor 'religious and spiritual reflection and commitment' include various measures: V9 Likert scale: Very important, score 1; Not at all important, score 4, V19 Mentioned, score 1; Not mentioned, score 2, V25 Active member church, score 2; Inactive member, score 1; Don't belong, score 0, V79 Likert scale: Very much like me, score 1; Not at all like me, score 6, V147 A religious person, score 1; Not a religious person, score 2; An atheist, score 3, V150 To follow religious norms and ceremonies, score 1; To do good to other people, score 2, V151 To make sense of life after death, score 1; '' life in this world, score 2, V152 Likert scale: Not at all important, score 1; Very important, score 10, V154 Likert scale: Strongly agree, score 1; Strongly disagree, score 4 (Inglehart et

al., 2014). The three items for the factor 'unifying interconnectedness' were all measured with a Likert scale: Very much like me, score 1; Not at all like me, score 6 (Inglehart et al., 2014). The fourteen items for the factor 'permissiveness' were all measured with a Likert scale: Never justifiable, score 1; Always justifiable, score 10 (Inglehart et al., 2014). The items and their measures are described in Codebook Wave six (Inglehart et al., 2014).

A factor analysis and reliability analysis were performed based on the above-mentioned items and their factors, to determine if the items load high on their corresponding factor and low on the other factors. The results of the analysis are presented in Appendix 1, Table 3. As a result of the factor analysis three items were removed showing weak correlations with the factor 'religious and spiritual reflection and commitment', namely V150, V151 and V25. In addition to McClintock and colleagues (2016), the items V145 and V146 were added showing strong correlation with the factor. The three items V74, V74B and V78 linked to the factor 'unifying interconnectedness' all showed medium to high correlations with the factor. As expected, religious denomination showed a weak correlation with 'religious and spiritual reflection and commitment' (McClintock et al., 2016; Jongkind et al., 2019). The 14 items used to measure the factor 'permissiveness' all showed medium to high correlations with the factor. The reliability analysis was performed to compute the Cronbach's Alpha for each factor. The factor 'religious and spiritual reflection and commitment' (9 items), the factor 'unifying interconnectedness' (3 items) and the factor 'permissiveness' (14 items) were all found to be highly reliable. Additionally, item V207 was removed from the factor 'permissiveness' to prevent multicollinearity, since it is also used to measure suicide acceptability. This did not negatively affect the reliability ($\alpha = .882$ versus $\alpha = .885$), since V207 loaded low on the factor.

Completed Suicide and Suicide Acceptability

Suicide rates from countries worldwide were obtained from the World Health Organization (WHO) Mortality Database (World Health Organization, 2020). This database is a collection of mortality data by country, year, age, sex and cause of death (including suicide), as reported by Member State from their civil registration systems. These rates are based on suicides per 100,000 people, are age adjusted and for both sexes. Newest data contains suicide rates from the year 2016, but only from very few countries. Therefore, additional WHO data for the year 2016 was added to the dataset. Suicide acceptability data were obtained from wave six of the World Values Survey database (Inglehart et al., 2014) using item V207 Justifiable: Suicide.

Income

Income levels in countries worldwide were obtained from the Income Mountain Database v1 provided by the Gapminder Foundation (N=194) (Gapminder Foundation, 2020). These income levels entail the gross domestic product per person and are inflation adjusted. This version contains data up to the year 2015. The Gapminder Foundation does provide a second version of the income data, but these datasets are far from precise they stated. The Income Mountain Database is based on the income levels provided by professor Hans Rosling (Gapminder Foundation, 2020). He divided income into four levels: level 1; low income, level 2; lower middle income, level 3; higher middle income and level 4; high income. Most of the world population falls in the middle-income categories. In the present study the gross domestic product per person for each country was used as the control variable income.

Statistical analysis

The statistical analyses for the present study were performed using IBM SPSS Statistics Version 24. First, using Pearson correlation coefficients, bivariate associations between the study variables were analyzed. Second, multiple linear regression analysis using a stepwise method were performed based on all countries combined. Since this is a more exploratory research, investigating which factors influence suicide, a multiple regression with a stepwise method was used (Field, 2013). The following assumptions for the multiple regression analysis were tested: linearity of the model, using scatterplots; independent errors, checking Durbin-Watsons test; homoscedasticity, checking the consistency of variance of the residuals; normal distribution of errors, using plots; uncorrelation of the predictors; no multicollinearity; checking Tolerance; and outliers in the X-space, checking Mahalanobis distance; the Y-space, checking standardized residuals; and the XY-space, checking Cook's distance (Field, 2013). The analysis consisted of six sub-analysis comparing each religious value to completed suicide and suicide acceptability, controlling for income and age. In the first model, one of the religious values was entered. In the second model, one of the religious values, income and age were entered. Additionally, an analysis entering all the variables in one model was performed.

Results

Bivariate correlations between religious values, suicide completion and acceptability and demographic control variables.

The results of the correlation analyses are presented in Table 4. As expected, the factors 'religious and spiritual reflection and commitment' and 'unifying interconnectedness' negatively correlated with completed suicide and suicide acceptability. And, as expected, the factor 'permissiveness' positively correlated with completed suicide and suicide acceptability. Furthermore, all variables were significantly related. The Cronbach's Alpha's for the religious values are presented on the diagonal.

Table 4.

Bivariate Correlations between Religious and Spiritual Reflection and Commitment, Unifying Interconnectedness, Permissiveness, Completed Suicide, Suicide Acceptability, Income and Age and the Cronbach's Alpha's for the Religious Values.

	1	2	3	4	5	6	7
Religious values:							
1. Religious and spiritual reflection and commitment	.775						
2. Unifying interconnectedness	.220**	.726					
3. Permissiveness	.092**	.059**	.885				
Suicide:							
4. Completed suicide	-.188**	-.130**	.013**	1			
5. Suicide acceptability	-.189**	-.102**	.187**	.032**	1		
Demographics:							
6. Income	-.296**	-.090**	-.029**	-.033**	-.127**	1	
7. Age	-.054**	-.007*	.032**	.077**	-.036**	.135**	1

Note. ** *p* < .001, **p* < .01.

Multiple linear regression analysis with religious values, suicide completion and acceptability and demographic control variables for all countries.

A multiple regression was run to predict completed suicide rates and suicide acceptability, based on religious values, controlling for income and age. The results of the multiple regression analysis for 'religious and spiritual reflection and commitment' and suicide completion and acceptability are presented in Table 4. The results of the multiple regression analysis for 'unifying interconnectedness' and suicide completion and acceptability are presented in Table 6. The results of the multiple regression analysis for 'permissiveness' and suicide completion and acceptability are presented in Table 7. The results of the multiple regression analysis for all the religious values and suicide completion and acceptability are presented in Table 8.

Table 5.
Linear Model of Predictors of Suicide Completion and Suicide Acceptability, with 95% Corrected and Accelerated Confidence Intervals Reported in Parentheses. Confidence Intervals and Standard Errors Based on 1000 Bootstrap Samples.

	Suicide completion			Suicide acceptability			
	b	SE B	β	b	SE B	β	p
Step 1							
Constant	15.78 (15.57, 155.98)	0.12		7.12 (7.04, 7.19)	0.04		p = .001
Religious commitment	-1.50 (-1.56, -1.44)	0.03	-.19	0.47 (0.45, 0.49)	0.01	-.17	p = .001
Step 2							
Constant	16.09 (15.83, 16.34)	0.13		7.30 (7.21, 7.40)	0.05		p = .001
Religious commitment	-1.72 (-1.76, -1.66)	0.03	-.22	0.40 (0.38, 0.42)	0.01	-.14	p = .001
Income	0 (0, 0)	0	-.10	0 (0,0)	0	-.09	p = .001
Age	0.83 (0.75, 0.90)	0.04	.081	0.21 (0.18, 0.23)	0.01	.06	p = .001

Note. R^2 = .036 for Step 1; ΔR^2 = .014 for Step 2 (ps < .001) for Suicide Completion. R^2 = .037 for Step 1; ΔR^2 = .010 for Step 2 (ps < .001) for Suicide Acceptability.

Table 6.

Linear Model of Predictors of Suicide Completion and Suicide Acceptability, with 95% Corrected and Accelerated Confidence Intervals Reported in Parentheses. Confidence Intervals and Standard Errors Based on 1000 Bootstrap Samples.

	Suicide completion			Suicide acceptability			
	b	**SE B**	**β**	**b**	**SE B**	**β**	**p**
Step 1							
Constant	13.84 (13.64, 14.03)	0.10		9.09 (9.07, 9.12)	0.01		p = .001
Unifying interconnectedness	-0.76 (-0.80, -0.71)	0.02	-.13	0.16 (0.15, 0.17)	0.01	-.08	p = .001
Step 2							
Constant	13.13 (12.90, 13.36)	0.12		8.07 (8.00, 8.16)	0.04		p = .001
Unifying interconnectedness	-0.78 (-0.82, -0.74)	0.02	-.14	0.17 (015, 0.18)	0.01	-.08	p = .001
Income	0 (0, 0)	0	-.05	0 (0, 0)	0	-.13	p = .001
Age	0.85 (0.78, 0.93)	0.04	.08	0.20 (0.17, 0.23)	0.01	.05	p = .001

Note. $R^2 = .017$ for Step 1; $\Delta R^2 = .009$ for Step 2 (ps < .001) for Suicide Completion. $R^2 = .026$ for Step 1; $\Delta R^2 = .009$ for Step 2 (ps < .001) for Suicide Acceptability.

Table 7.
Linear Model of Predictors of Suicide Completion and Suicide Acceptability, with 95% Corrected and Accelerated Confidence Intervals Reported in Parentheses. Confidence Intervals and Standard Errors Based on 1000 Bootstrap Samples.

	Suicide completion			Suicide acceptability			
	b	**SE B**	**β**	**b**	**SE B**	**β**	**p**
Step 1							
Constant	9.36 (9.24, 9.47)	0.06		6.53 (6.44, 6.62)	0.05		p = .001
Permissiveness	0.80 (0.72, 0.88)	0.04	.08	0.28 (0.27, 0.29)	0.01	.19	p = .001
Step 2							
Constant	10.312 (9.80, 10.34)	0.14		6.66 (6.57, 6.75)	0.05		p = .001
Permissiveness	.86 (0.78, 0.93)	0.04	.08	0.27 (0.26, 0.28)	0.01	.19	p = .001
Income	0 (0, 0)	0	-.04	0 (0, 0)	0 (0. 0)	-.13	p = .001
Age	-0.07 (-0.10, -0.04)	0.02	.02	0.17 (0.14, 0.20)	0.01	.05	p = .001

Note. $R^2 = .006$ for Step 1; $\Delta R^2 = .002$ for Step 2 (ps < .001) for Suicide completion. $R^2 = .037$ for Step 1; $\Delta R^2 = .017$ for Step 2 (ps < .001) for Suicide Acceptability.

Table 8.

Linear Model of Predictors of Suicide Completion and Suicide Acceptability, with 95% Corrected and Accelerated Confidence Intervals Reported in Parentheses. Confidence Intervals and Standard Errors Based on 1000 Bootstrap Samples.

	Suicide completion			Suicide acceptability			
	b	SE B	β	b	SE B	β	p
Step 1							
Constant	18.18 (17.81, 18.55)	0.19		5.01 (4.88, 5.14)	0.07		p = .001
Religious commitment	-1.57 (-1.63, -1.50)	0.03	-.20	0.33 (0.31, 0.35)	0.01	-.12	p = .001
Unifying interconnectedness	-0.60 (-0.64, -0.55)	0.02	-.10	0.11 (0.09, 0.12)	0.01	-.05	p = .001
Permissiveness	-0.01 (-0.02, 0.04)	0.02	0	0.26 (0.25, 0.27)	0.01	.18	p = .001
Income	0 (0. 0)	0	-.12	0 (0, 0)	0	-.09	p = .001
Age	0.84 (0.77, 0.91)	0.04	.08	0.17 (0.15, 0.20)	0.01	.04	p = .001

Note. R^2 = .036 for Step 1; ΔR^2 = .024 for Step 2 (ps < .001) for Suicide completion. R^2 = .050 for Step 1; ΔR^2 = .021 for Step 2 (ps < .001) for Suicide Acceptability.

Discussion

The aim of this study was to examine whether there is a protective influence of religious aspects on suicide completion and suicide acceptability, controlling for income and age. The novelty of the present study was its country-based focus. As expected, results showed a negative and significant relationship between religious values 'religious and spiritual reflection and commitment' and 'unifying interconnectedness' and suicide completion and acceptability, in accordance with the religious commitment theory and the social integration theory (Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019). And, as expected, a positive relationship between 'permissiveness' and suicide completion and acceptability, in accordance with the moral objections to suicide theory (Koenig et al., 2012; Lawrence et al., 2016; Jongkind et al., 2019).

Results of the multiple regression analysis provided some insight in the accuracy of religious values predicting suicide completion and suicide acceptability. As expected, higher levels of 'religious and spiritual reflection and commitment' and 'unifying interconnectedness' predicted lower levels of suicide completion and acceptability. And, as expected, lower levels of 'permissiveness' predicted lower levels of suicide completion and acceptability. Although all results were statistically significant, the explained variances were quite small even after controlling for income and age. This indicates that each religious value can predict merely a small part of suicide completion and suicide acceptability, with 'religious and spiritual reflection and commitment' being the largest predictor for suicide completion and 'permissiveness' for suicide acceptability.

Explanations

Although the results are in line with previous research (Koenig et al., 2012; Wu et al., 2015; Lawrence et al., 2016; McClintock et al., 2016; Jongkind et al., 2019), religious values only accounted for a small part of the variance in suicide completion and suicide acceptability. Therefore, the importance of religion and its functioning as a protective influence on suicide in countries is questioned. However, there are a few possible explanations for the current results. Firstly, the results indicate that the relationship between religion and suicide may be different in countries. As McClintock and colleagues (2016) showed when comparing three countries, the protective influence of religious values on suicide ideation did not occur in China. In the current study all countries were investigated together, and no distinction was made between countries that show a protective influence of religion on suicide and countries that did not. Each

country may have its own factors effecting the relationship between religion and suicide. Moreover, Wu and colleagues (2015) confirmed differences between countries as well. The distributions from the analysis are presented in Appendix 2, Figure 2 through 7, confirming there might be differences among countries. In conclusion, there is not one pattern that occurs worldwide in every country explaining the relationship between religion and suicide.

Secondly, the current sample consists of healthy people rather than people with psychopathology, whereas most previous research is based on the investigation of people with psychopathology, except for McClintock and colleagues (2016). This could indicate that the relationship between religion and its functioning as a protective influence on suicide is stronger for people with psychopathology.

Thirdly, different methods and questionnaires were used in previous research compared to the present study (Wu et al., 2015; McClintock et al., 2016). The World Values Survey and its items were not specifically designed for the current study. However, it does provide a more representative sample of countries as opposed to McClintock and colleagues (2016), who specifically recruited people for a study on suicidality. This could have resulted in the occurrence of a selection bias. A selection bias occurs when 'using nonrandomly selected samples to estimate behavioral relationships' (Heckman, 1979). McClintock and colleagues also investigated the relationship using a different outcome measure, namely suicidal ideation, part of the suicidality process rather than suicide. Possibly this construct has a higher predictability than actual suicide completion. Additionally, previous research is individual-based whereas results of the current study were country-based.

Fourthly, religious denomination was not investigated in the current study. Religious denomination may influence the relationship, since Monotheistic religions (Judaism, Christianity and Islam) reject suicide even more than other religions (Sisask et al., 2010; van den Brink, Schaap & Braam, 2018). As explained through the moral community thesis (Durkheim, 1925/1961; Stark et al., 1983; Stack & Kposowa, 2011), the level of religion in a country affects an individual's attitudes and behaviors. Therefore, the relationship between religion and suicide in countries may be affected through religious denomination, resulting in lower suicide rates and acceptability.

Fifthly, the possibility of a publication bias needs to be taken into consideration. A publication bias means that studies with statistically significant results are more likely to be published than studies showing no significant results (Easterbrook, Gopalan, Berlin & Matthews, 1991). It is possible that previous studies found similar results as the current study, but those studies may have never been published.

Implications

The results of the present study have potentially relevant implications for further research in the context of religion as a protective influence on suicide. A lot of variance in predicting suicide completion and acceptability remained unexplained, which indicates that other variables effect the relationship. A possible variable relevant to investigate in further research is gender, since research shows that especially for men, living in a religious environment provides a protective influence on suicide (Neeleman & Lewis, 1999). The factors investigated in the present study failed to explain the differences in suicide rates in countries worldwide. This suggests that the relationship between religion and suicide varies between countries. The relationship seems to be more affected through individual characteristics and are different for each country, as shown in previous research (Wu et al., 2015; McClintock et al., 2016). Thus, individual characteristics related to religion are possibly more relevant to investigate and enhance in the prevention of suicide. Therefore, in further research it is relevant to investigate each country separately. Due to limited resources this was not possible in the present study. Investigating each country could reveal the direction of the relationship and differences between countries.

In the future of clinical practice, the importance of religion could be emphasized during treatment of suicidality, influencing suicidal thoughts and ideation and eventually preventing suicide attempts. Firstly, it is important to asses the religious values and determine the relevance of each value. Secondly, each religious values needs to be implicated in treatment. For example, during treatment religious commitment and social integration could be enhanced, making the patient feel more connected to their religion, other people and the environment. On the other hand, tolerance of suicide could decrease when the patient feels more connected to their religion and therefore relates more to the moral objections of their religion. Therefore, through the strength of their religion people will less likely commit suicide.

Limitations

Since this study was conducted with limited resources, limited data and time bound, the results must be handled with care. Firstly, due to limited data available, not all countries were included in this study. Therefore, the results of this study are not representative for the entire world. Additionally, not all countries report their suicide data correctly to the World Health Organization, since the stigmatization of suicide is still a serious problem in various countries (Sudak, Maxim & Carpenter, 2008). This could have resulted in lower suicide rates in these

countries. Additionally, these suicide rates are absolute numbers whereas the other variables are based on the World Values Survey, resulting in questionable reliability when comparing these numbers to one another. Also, the factor 'unifying interconnectedness' was based on merely three items. Therefore, these items might not comprehend the entire factor and are not fully representative for the measured construct. Additionally, not all aspects of religion were investigated and not all factors influencing suicide were investigated in this study. Also, even though every country provided a minimum of 1200 interviews, the provided amount of data does differ in each country. Therefore, one country might be better represented in the sample than others.

Secondly, there may be a social desirability bias influencing the results of the World Values Survey, since it was conducted during a face-to-face interview. This bias refers to 'the tendency of research subjects to give socially desirable responses instead of choosing responses that are reflective of their true feelings', especially when investigating sensitive or personal issues (Grimm, 2010). Specifically, in countries where taboos dominate culture, people might want to adapt to their culture and do not respond honestly to the 'justifiable' questions. Thus, the results of this study might not be completely accurate.

Conclusions

Despite the limitations, the present study does add to current religion and suicide literature, focusing on the protective influence of religion on suicide on country bases. Interestingly, religious values only accounted for a small part of suicide completion and suicide acceptability. Therefore, the importance of religion and its functioning as a protective influence on suicide in countries is questionable. Possible explanations are: (1) differences in the direction of the relationship in countries, (2) differences in comparing healthy people and people with psychopathology, (3) differences in methods and questionnaires, (4) that religious denomination was not included (5) that a publication bias might have occurred. Therefore, comparing individual characteristics related to religion are possibly more relevant in the prevention of suicide. Further research investigating the different aspects of religion and other factors influencing the relationship is essential to accurately draw conclusions regarding the protective influence of religion on suicide. In the future of clinical practice, enhancing these religious aspects in treatment could potentially prevent suicide completion and lower suicide acceptability.

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Appendix 1

Table 3.

Factor Analysis and Reliability Analysis for the Religious Values.

Item	Religious and Spiritual Reflection and Commitment	Unifying Interconnectedness	Permissiveness
V9 Importance religion	.693		
V19 Important child qualities: Religious faith	.449		
V25 Active member church or religious organization	-.192		
V144 Belong to a religion or religious denomination	-.030		
V145 How often do you pray?	.722		
V146 How often do you attend religious services?	.479		
V147 Religious person	.656		
V150 Basic meaning of religion	.062		

V151 Basic meaning of religion	.136		
V152 Importance of God in life	-.736		
V154 Only acceptable religion	.414		
V74 Do something for the good of society		.604	
V74B Help people nearby; to care for their well-being		.664	
V78 Looking after the environment; to care for nature		.415	
V198 Justifiable: Claiming government benefits			.547
V199 Justifiable: Avoiding fare on public transport			.600
V200 Justifiable: Stealing property			.770
V201 Justifiable: Cheating on taxed			.763

V202 Justifiable: Accepting a bribe		.771
V203 Justifiable: Homosexuality		.559
V203A Justifiable: Prostitution		.705
V204 Justifiable: Abortion		.634
V205 Justifiable: Divorce		.538
V206 Justifiable: Sex before marriage		.583
V207 Justifiable: Suicide	.290	.285
V207A Justifiable: Euthanasia		.533
V208 Justifiable: For a man to beat his wife		.699
V209 Justifiable: Parents beating children		.538

V210 Justifiable: Violence against other people		.760	
α	.775	.726	.885

Appendix 2

Normal distributions for the religious values and suicide completion and suicide acceptability.
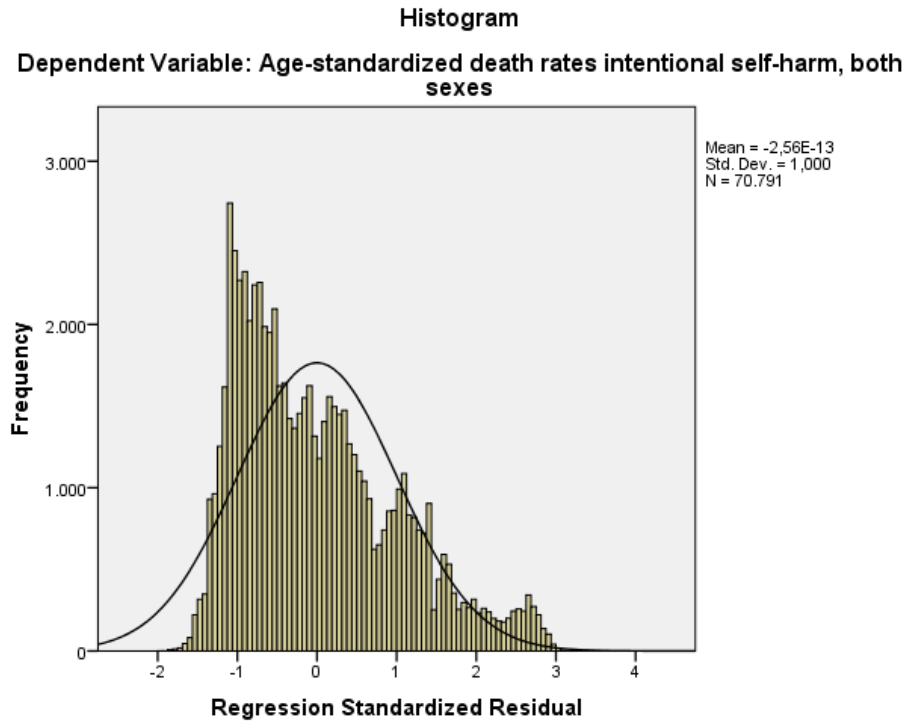
Figure 2. Distribution for the religious value 'religious and spiritual reflection and commitment', controlled for income and age and suicide completion.
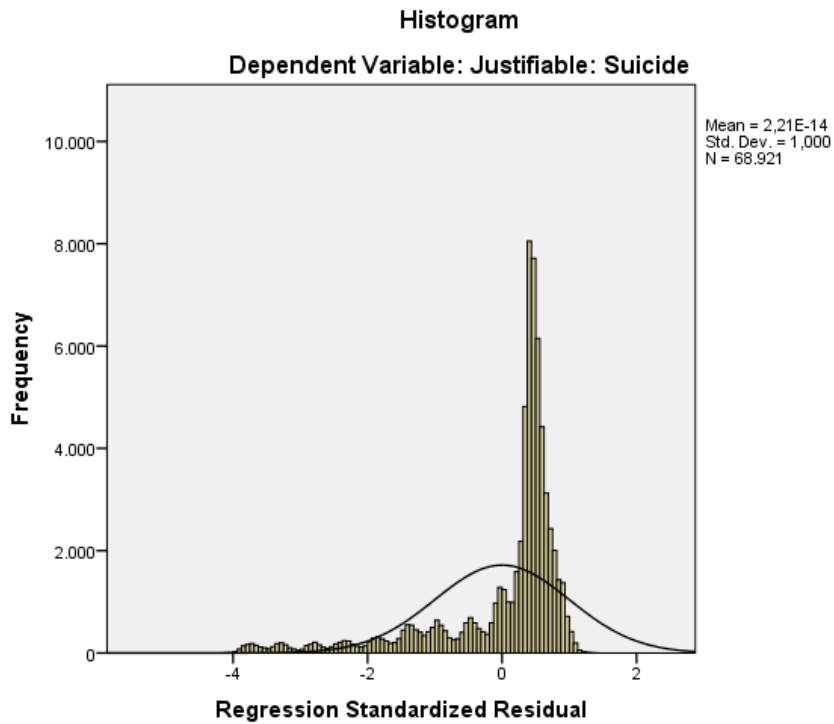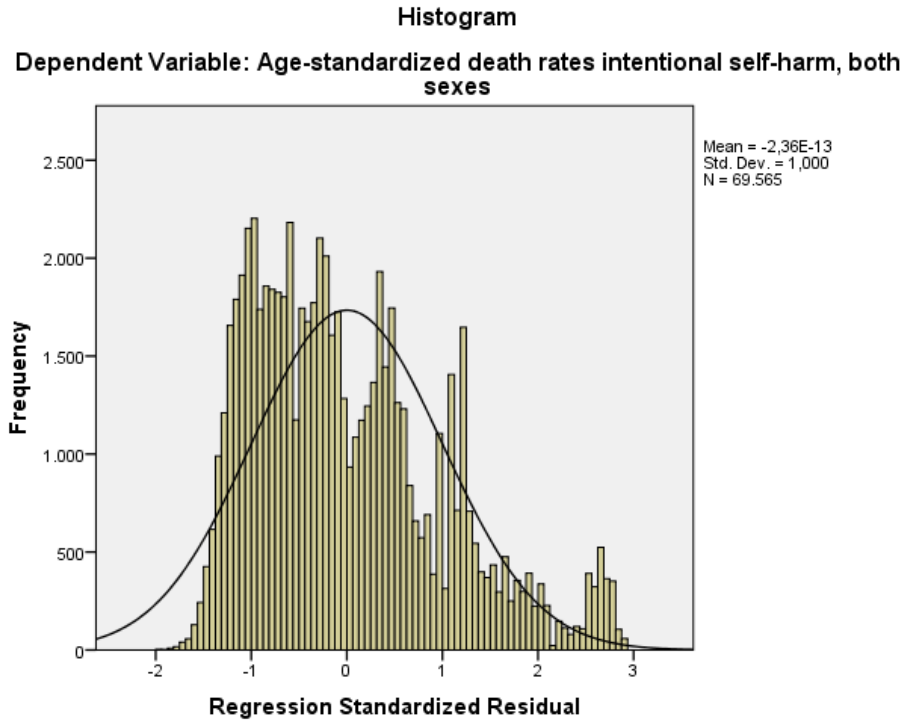

Figure 3. Distribution for the religious value 'religious and spiritual reflection and commitment', controlled for income and age and suicide acceptability.

Figure 4. Distribution for the religious value 'unifying interconnectedness', controlled for income and age and suicide completion.
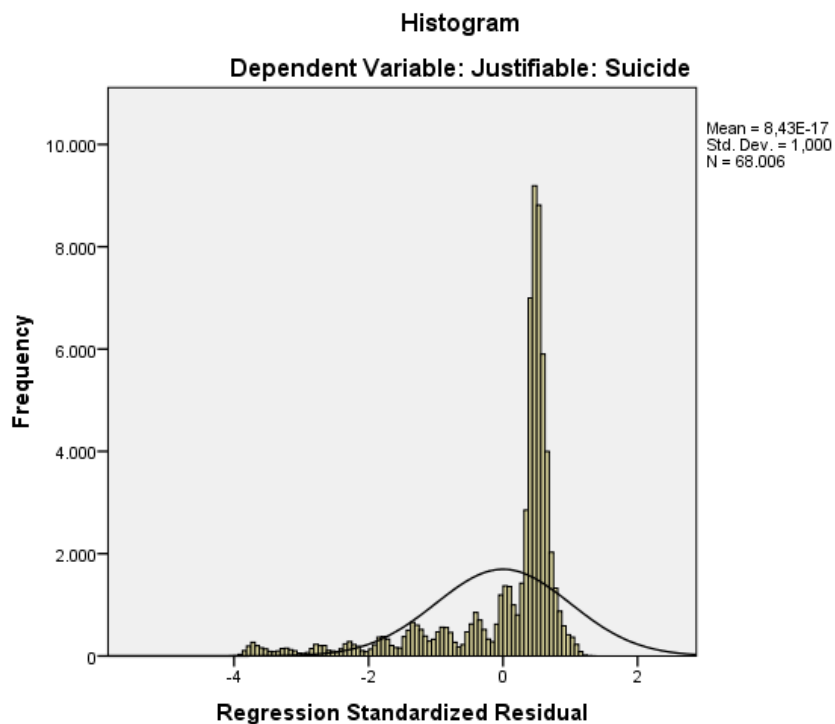

Figure 5. Distribution for the religious value 'unifying interconnectedness', controlled for income and age and suicide acceptability.
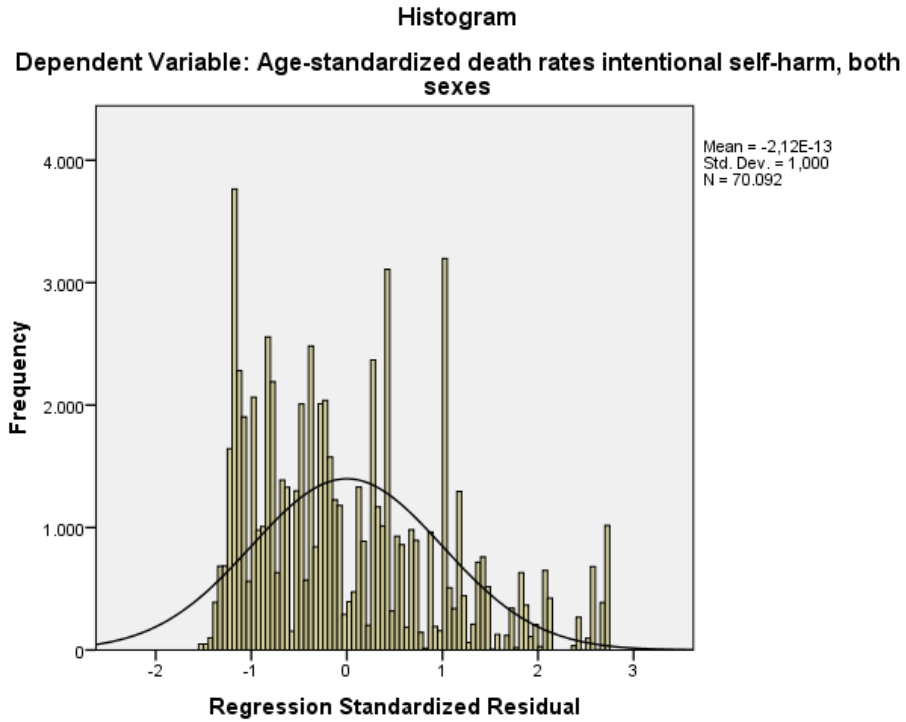
Figure 6. Distribution for the religious value 'permissiveness', controlled for income and age and suicide completion.
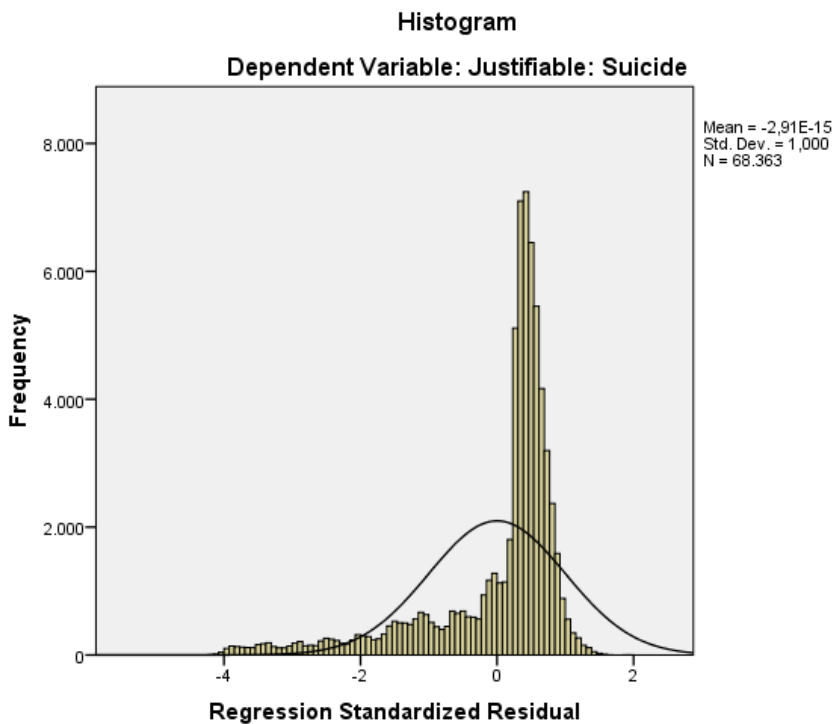

Figure 7. Distribution for the religious value 'permissiveness', controlled for income and age and suicide acceptability.