Spirituality as a mediator between adult depression and anxiety and childhood experiences: A model based on ordered sequences of regressions

Running title: Spirituality as a mediator

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Abstract

Objective: Spirituality has been shown to be associated with various aspects of health. It has also been discussed as an aid in coping with adversities.

Methods: The present investigation examined four dimensions of spirituality – belief in God, mindfulness, quest for meaning and feeling of security – as possible mediators between childhood adversities and adult adaptation. Two samples of n ≈ 500 were examined via internet in a retrospective survey.

Results: Two pathways from childhood to adult adaptation via spirituality were detected, one via mindfulness and one via feeling of security. Both pathways began at maternal love, the opposite of emotional neglect. Childhood abuse or physical neglect was not associated with the development of spirituality. Associations were not only linear in nature, but also displayed interactions.

Conclusions: Dimensions of spirituality mediate in a complex way between childhood experiences and adult adaptation. A belief in God is not always protective, but can also constitute a risk factor. A feeling of security shows the strongest protective effect of the dimensions of spirituality that were explored in this study.

Key words: spirituality and religion, attachment, depression, anxiety, mediator- and moderator effects

INTRODUCTION

Spirituality and religious experiences have been a part of medicine through the ages. In the ancient world, religion, psychology and medicine were intertwined. The Asclepical physicians for example practiced rational medicine, but when this was unsuccessful, the patient was sent to a temple [1]. Psychological factors were also considered, e.g. a disorder could be explained by a disproportion of emotions. This holistic view was abandoned with reconnaissance; "superstitious beliefs" were no longer used as explanations for medical conditions. This has certainly improved our understanding of many disorders, but this has also been at least partly to blame for the loss of some of our understanding of patients. In many patients' views, modern western medicine is regarded as technical and lacking in necessary humanism and spiritual aspects matters for young and old in many circumstances [e.g. 2, 3, 4].

The interrelation between spirituality and religiousness has been subject to intensive discussions [for a summary, see 5]. Beside considerable diversity, there is some agreement about one thing: both should not be used exchangeable [6]. Within the present context, we would suggest to define religiousness to be a part of spirituality. This would not necessarily be the case in other contexts, but given the strong time trend for secularization in many eastern and western societies [7, 8] it seems reasonable for examining effects on mental health to define spirituality as the wide and religiousness as the narrow construct [9].

Spirituality and religious experiences still play a major role for many patients. This is true for life-threatening disorders [where rather the doctors have difficulties to address such issues, 10, 11], but also for many others [12]. Ishida et al. [13] state that every person has the "will" to seek meaning or to achieve purpose in life. Generally, spirituality and religiousness are judged to be positively associated with

indicators of mental health and quality of life [e.g. 14]. However, negative effects can also be observed. In a meta analysis, most studies found a protective effect of religiosity on suicide risk OR = 0.39, but two studies, both conducted in rural china, found religiosity to be a high risk factor [15]. Mohr et al [16] conducted semi structured interviews about spiritual aspects in 89 patients with schizophrenia or schizoaffective disorders. In 85% the religious coping was assessed to be positive, in the remaining 15% it was assessed to be harmful. Rosmarin et al [17] found strong associations between negative religious coping and various baseline psychiatric symptoms, but no single significant association with positive religious coping. To the contrary, in this study positive religious coping was a significant predictor of symptom reduction. Polanco-Roman [18] expected that spirituality would be a protective factor with respect to suicidality or non suicidal self injury, but found no significant associations at all in a large sample of more than 1000 college undergraduates.** With respect to depression, spirituality has been examined as an explanatory variable and as an outcome . Both directions are plausible and show strong associations.

The aim of the present paper is to examine the roles of religiousness and spirituality as possible mediators between childhood adversities and adult adaptation. Therefore, four dimensions of spirituality and religiousness describing the associations between childhood adversities and various indicators of mental health in adulthood were analyzed via ordered series of regressions. Series of regressions are a method of statistical analysis that extend path analysis to include nonlinear effects as well as binary variables in the responses . In particular, we wanted to examine the following three questions:

- Do the four dimensions of spirituality mediate or moderate between childhood adversities and adult adaptation?
- Do abused or physically neglected children report less spirituality than non-abused children?
- What is the role of emotional neglect?

METHODS

Participants

Participants registered at a commercial company to fill out online questionnaires, received an email asking them to take part in the survey. They received a compensation of about € 4,30. The ethic commissions of the University of Düsseldorf and for Rheinland-Pfalz approved the project (Nr. 3063 and 6281). Data collection was performed in January and October 2008 by a professional marketing institute (http://www.linequest.de). On average, participants were about 40 (sample 1) to 45 (sample 2) years old, and about half of them were female (see Table 1). About 48 % in the first sample and 61 % in the second sample were members of one of the German Christian churches. The differences between sample 1 and 2 are likely to be largely an effect of age.

Variables

Primary responses

Two indicators for adaptation in adulthood were chosen as primary responses, one internal, i.e. depressive symptoms, and one interpersonal, sociophobic symptoms. Both were assessed using subscales from the Symptom-Checklist-27-

plus [19]. Example items for depressive symptoms are “feeling blue” or “mind going blank”. Examples for sociophobic symptoms were “feeling others do not like me” or ”feeling of being unwanted”. The SCL-27-plus presents with good internal consistencies and has been proven to generate valid results in a variety of studies [19].

Secondary responses - mediators

The four dimensions of spirituality that serve as possible mediators between childhood adversities and the primary responses were: “belief in God”, “quest for meaning”, “mindfulness” and “feeling of security in the world”. The scale belief in God represents the traditional western concept of spirituality. The items in this questionnaire do not specify which God the participant believes in, i.e. followers of all monotheistic religions are addressed.

The second scale is called “quest for meaning”. This concept is essential for any self-reflecting individual [20]. Within this dimension, human beings find their meaningful existence, and the ability to overcome existential suffering. Batson [21] introduced the quest approach into the field of spirituality research.

“Mindfulness”, the third subscale, describes the conscious perception of others and one’s environment. It is reflected in various eastern religions, particularly in Buddhism [22]. Additionally, it has found some entrance into psychotherapy research [23]. It also addresses the development of equanimity (one of the four divine states in Buddhism), overcoming emotional reactivity and desires and developing friendliness, tolerance, gentleness, placidity and acceptance [24].

The fourth subscale, “feeling of security”, characterizes a feeling of safety and trust and of being at home in the world. In developmental psychology, Erikson [25]

drew a parallel to this scale with his concept of a “sense of basic trust“. With feeling of security, a dimension found entrance into the questionnaire that appears to be conceptually underdeveloped in western culture.

The questionnaire on spirituality is described in detail by Hardt et al [26]. The scales have high internal consistencies (Cronbach's alpha between .78 and .97) in the present samples.

Adverse childhood experiences and demographic background variables

Two indicators for adverse childhood experiences were chosen, one assessing physical abuse and neglect, the other “perceived maternal love” [27]. Abuse was assessed with an index composed of sexual or physical abuse. The two indicators of abuse and the one for neglect were combined in a way that whenever at least one was present, the indicator for childhood abuse was coded “yes”, when none of the three held true, “no”. Additionally, two demographic background variables were included: age and sex. Descriptions of all variables are shown in Table 1.

Statistics

Two samples from an internet survey constitute the basis of the present analysis. For the first subsample, an ordered sequence of regressions was conducted, the second subsample was used for cross-validation. Sequences of regressions constitute an extension of path analysis [28]; they are a test for moderators and mediators [29]. In performing the sequences of regressions, significant explanatory variables were selected for each response. Therefore, first, a model containing all relevant main and quadratic effects was chosen. Within this model, all two-way interactions were tested. The latter was tested with a X^2- or F-test

with 2 degrees of freedom (df) for a squared term and 3 df for an interaction term. The significance level for generating the model was set to alpha = .01 (two-sided). The results obtained by this procedure are displayed in the left-hand columns of Table 2.

The model extracted with this procedure was then tested in the cross-validation sample. Each coefficient was tested in the cross-validation sample to detect a significant difference from zero in the same direction as in the extraction sample by including the additional significant coefficients of the extraction sample. No more tests to add variables were performed at this stage. The significance level for the cross-validation was set to alpha = .05 (one-sided). Results obtained by the cross-validation are displayed in the right-hand columns of Table 2. The analyses was performed using R [30].

Figure 1 gives an overview of the significant associations in the model; Figure 2 displays the types and strengths of the relationships. The latter were derived by graphing the conditional effect of the respective variable(s) when all others were kept in the regression model, i.e. by using the predicted results of the regression formula. The X-axes of the graphs display the full theoretical range of the respective scales; the curves are drawn only for the middle 90% of the observed distributions in this sample in order to avoid over-interpretation in cases of non-linearities.

RESULTS

The primary response “depressive symptoms” (DEP) has five predictors – all four dimensions of spirituality and abuse. The dimensions belief in God and mindfulness display an interactive effect. When mindfulness is high, there is no association between depression and belief in God. When mindfulness is low, belief in

God constitutes a risk factor for depressive symptoms. This means that belief in God has no protective effect on depression in these samples (Figure 1a). A second interactive effect on depression can be found in the dimensions quest for meaning and feeling of security. Security is protective against depression, but the association is more pronounced when quest for meaning is high. Particularly the combination high quest and low security is associated with a high risk for depressive symptoms (Figure 1b). Abuse has a linear association, subjects reporting any form of abuse report higher levels of depressive symptoms than those not reporting any abuse (Figure 1c). All effects explain 37% of the variance of the scale depressive symptoms (see Table 2a).

The second primary response, sociophobic symptoms, has seven significant predictors. Again, the dimensions belief in God and quest for meaning show an interactive effect. When quest for meaning is high, belief in God is a risk factor for sociophobic symptoms, when quest for meaning is low, it is protective. This means that a belief in God only has a buffer effect on sociophobic symptoms when quest for

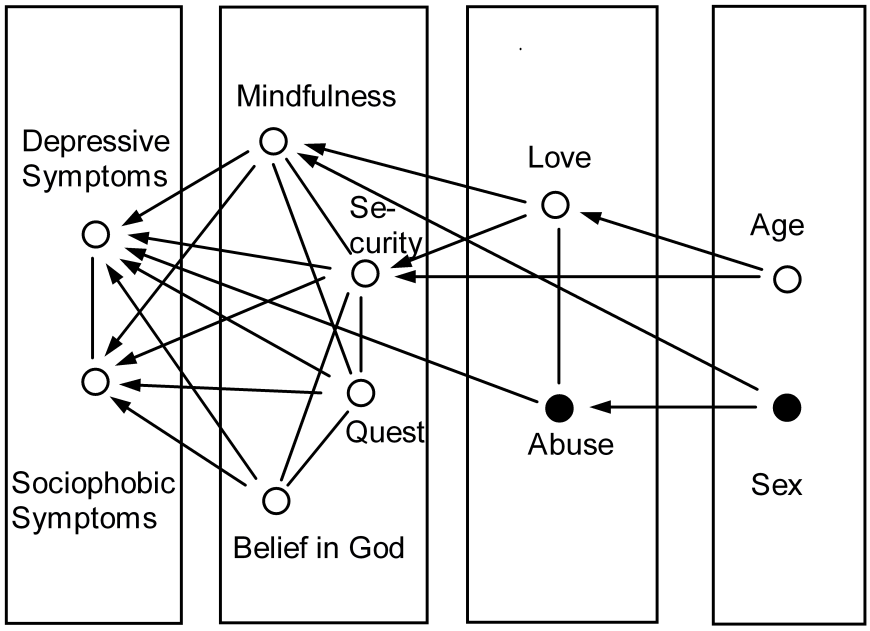

Figure 1: Ordering of the variables and overview of the significant associations

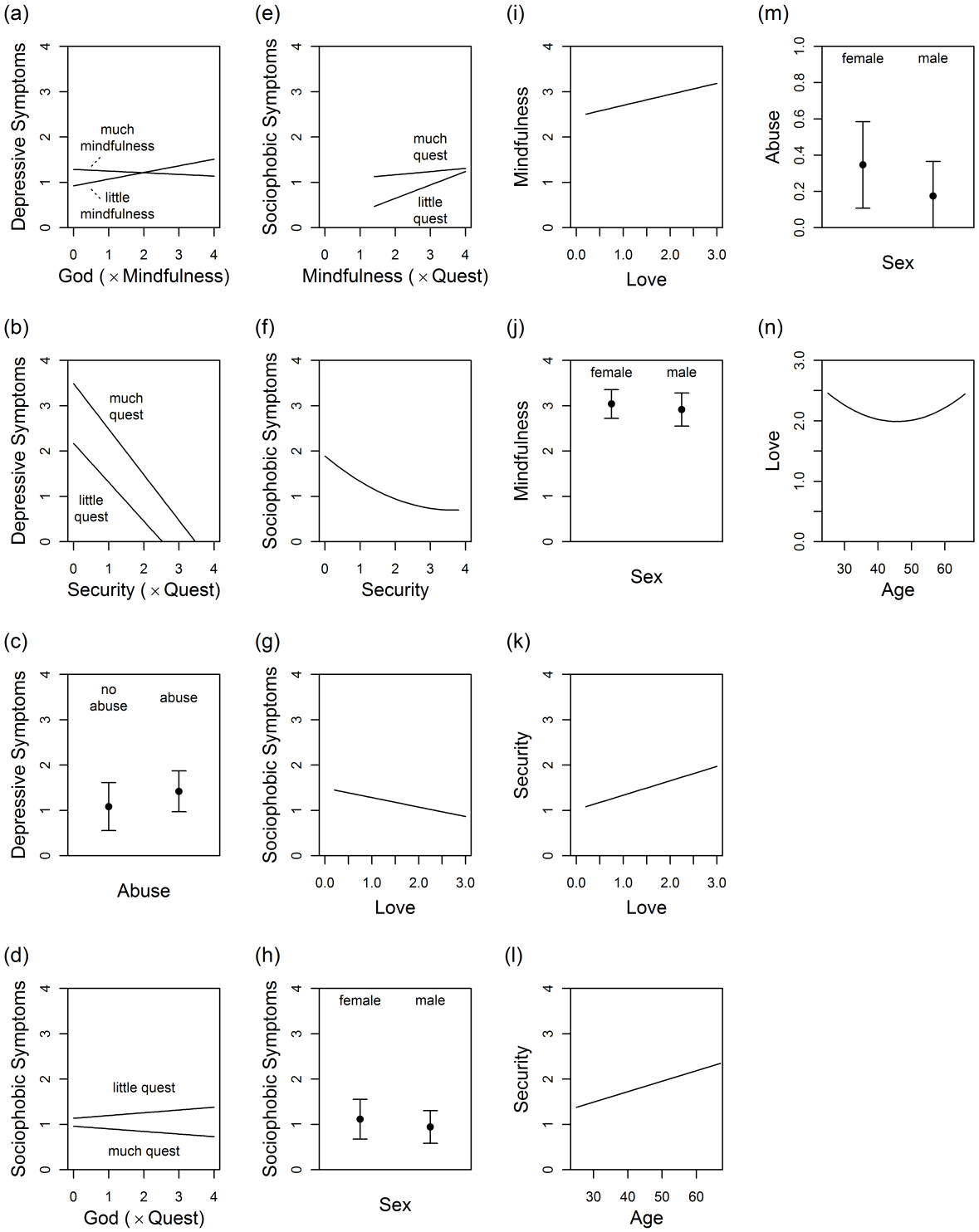

Figure 2: Description of the significant associations.

meaning is high (Figure 1d). Also, the dimensions quest for meaning and mindfulness have an interactive effect on sociophobic symptoms. Subjects reporting

high levels for quest for meaning generally report high sociophobic symptoms regardless of scores for the scale mindfulness. In subjects with low levels regarding quest for meaning, there is a positive association between mindfulness and sociophobic symptoms. Interestingly, subjects with low quest for meaning and low mindfulness display the fewest sociophobic symptoms (Figure 1e). Security is negatively non- linearly associated with sociophobic symptoms, this association is more pronounced in the lower half of the scale (Figure 1f). Perceived maternal love is negatively linearly associated with sociophobic symptoms (Figure 1g). Women report higher levels of sociophobic symptoms than men (Figure 1h). All effects explain 28% of the variance of the scale depressive symptoms (see Table 2a).

The secondary responses, the dimensions of spirituality, have only four predictors. Mindfulness has a linear positive association with maternal love (Figure 1i). Additionally, mindfulness was more often reported by women than men (Figure 1j). Feeling of security was also positively associated with love (Figure 1k). Finally, there was an age effect. The older the subjects were, the more security they reported (Figure 1l). Belief in God and quest for meaning had no predictors.

The tertiary responses, abuse and love, had only two predictors. Love had a curvilinear association with age, lowest values were reported by subjects born in the 1960s (Figure 1m). This effect has been reported elsewhere and was interpreted as an effect of the post war years [31, 32]. Abuse has an association with sex, women report a higher risk of having been abused than men (Figure 1n). Because abuse was a composed score, this is mainly due to the fact that women reported more childhood sexual abuse than men.

The partial correlation between depressive and sociophobic symptoms (given all significant other variables on the right side of Figure 1) was r = .48. The partial

correlation between belief in God and quest for meaning was r = .33, the one between security and mindfulness also r = .33. Mindfulness and belief in God were not correlated, the other dimensions show correlations in the range of .20. Perceived love and abuse were correlated with r = -.17.

DISCUSSION

All four dimensions of spirituality are predictors for depression as well as for sociophobic symptoms. The interaction between mindfulness and belief in God on the internal symptom scale depression was surprising. When mindfulness is low, belief in God is a risk factor for depression. Reviewing the literature one may would rather have expected the opposite – belief in God as a protective factor against depression , however, also religiousness as a risk factor has been reported . Within the present context it has to be noted that firstly the association is only present when mindfulness is low and secondly the associations was estimated given all other significant predictors are in the model. Hence, regarding religiosity and depression one should conclude that the association is complex.

A second pathway towards depression via feeling of security is moderated by quest for meaning. Generally, for all individuals, depressive symptoms and feeling of security are strongly negatively associated. This seems natural, considering that depression is characterized by worry, hopelessness, loss of joy, etc.; which is partially the opposite of a feeling of security. However, individuals reporting high values for quest for meaning not only have more depressive symptoms, but also show a steeper gradient between these and a feeling of security. However, this seems quite plausible because the quest for meaning is naturally high in depressive persons.

In addition, two of the dimensions of spirituality, i.e. mindfulness and quest for meaning, show linear associations to perceived love. The more love was perceived, the higher the values of both dimensions. Hence, these dimensions of spirituality qualify as a mediator between perceived love and depression. It should be noted that both mediators begin at perceived love, not abuse. However, abuse is shown to have a direct effect on depression, meaning that the effects of childhood abuse are still present in adults, though not mediated by spirituality.

With regard to the interpersonal symptom scale, sociophobic symptoms, the present study also shows two pathways where dimensions of spirituality mediate between childhood experiences and adult symptoms, again the mediating dimensions of spirituality are mindfulness and security. One path also has an interactive effect. Individuals who neither care for others (indicated by low values of mindfulness) and who do not look for much meaning in life display the lowest values for sociophobic symptoms. Maybe they can best be characterized as being oriented on facts, i.e. trying to reach their goals without much caring about other persons interests. The second pathway goes from love via security to sociophobic symptoms. It displays a classical mediator effect. The less love there is, the lower the feeling of security is and the higher the risk of developing sociophobic symptoms. The effect is nonlinear and particularly pronounced in the lower half of the scale. The less love experienced in childhood, the higher the level of reported sociophobic symptoms. This seems quite plausible as well. As with depressive symptoms, both mediators start at perceived love, not abuse. This means that the hard indicator is less important in the development of mindfulness and feeling of security than the soft one.

The two interactive effects of belief in God on both primary responses are of particular interest. Belief in God is neither genuinely positively nor negatively

associated with symptoms, but on both scales there are moderating effects. For depressive symptoms, the moderating effect is mindfulness, and for sociophobic symptoms it is quest for meaning. This finding may explain some contradictory results reported in research, where belief in God showed unexpected associations, e.g. Schuurmans-Stekhoven [33]. He found that the associations between various indicators of adaptation were moderated by a single indicator of spirituality – generally in that correlations became higher with increasing spirituality. Schuurmans-Stekhoven's interpretation of his results was that spirituality may bias the associations. We would not go so far. The observed relationships here make sense from the view of the individuals, and should instead be interpreted as an interaction of the various dimensions.

Also of interest are the predictors for the dimensions of spirituality. The feeling of security increases with age. In a cross-sectional study, it is impossible to distinguish between age and cohort effects, hence it would be worthwhile to explore this association further. However, no other aspect of spirituality was associated with age, meaning that the three other dimensions of spirituality are similarly important for subjects of all ages. Perceived love is positively associated with mindfulness and security, meaning that a good relationship with one’s mother constitutes a protective factor for adulthood.

The absence of any association between the indicators abuse/physical neglect and spirituality was surprising – other studies report a negative correlation [e.g. 34]. However, this does not necessarily mean that the dimensions of spirituality are unimportant in abused individuals. If anything, reports from survivors strikingly emphasize their importance [e.g. 35]. It can simply mean that non-abused individuals also develop spiritual thoughts to a similar degree.

The present study has the following limitations. (1) Data were collected via internet. It is not known to what extent an internet sample is representative of the general population. In connection with spirituality, it would be plausible to assume that internet users may be less spiritual and more secular. (2) Childhood adversities were assessed retrospectively. There is an ongoing debate about the validity of such retrospective reports. Some researchers would strictly reject such data [e. g. 36], others have a more moderate view [e. g. 37]. (3) A cross-validated sequence of regressions as utilized here for the statistical analyses will tend to overlook effects. (4) In order to keep the analysis simple, other important factors influencing depression or social anxiety were not included. (5) It is difficult to assess and quantify a construct as complex as spirituality using only a questionnaire [e.g.38].

CONCLUSIONS

Despite these limitations, we believe that the present study offers interesting insight into associations between childhood adversities, spirituality and adult adaptation. The two classical indicators for spirituality in western cultures, belief in God and quest for meaning, did not turn out to become mediators, but rather the two dimensions adapted from eastern religions. Low perceived maternal love turned out to be a risk factor for what mindfulness and feeling of security mediate. None of the dimensions assessed here mediated for physical / sexual abuse or neglect.

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Disclosure

The author declares no conflict of interest.

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Table 1: Variable description

						Extraction sample		Cross-validation	
	Variable	Description	Possible values	Min	Max	Mean	SD	Mean	SD
1	DEP	Depression (lifetime)	0 - 4	0	4	.73	.82	1.09	.99
1	ANX	Sociophobic anxiety	0 - 4	0	4	.86	.82	1.12	.82
2	GOD	Belief in God	0 - 4	0	4	1.24	1.23	1.35	1.31
2	QUEST	Quest for meaning	0 - 4	0	4	1.99	.84	2.12	1.08
2	MIND	Mindfulness	0 - 4	0	4	2.95	.63	2.98	.68
2	SEC	Feeling of security	0 - 4	0	4	1.93	.81	1.71	.93
3	LOVE	Maternal love	0 - 3	0	3	2.31	.74	2.17	.77
3	ABUSE	Abuse/physical neglect	0,1	0	1	.21	.41	.27	.44
4	AGE	Age	≥ 18	18	81	44.82	16.11	39.32	11.20
4	SEX	Sex	0, 1	0	1	.50	.50	.45	.50

Table 2 Significant associations in the construction and cross–validation samples

a) Primary response: DEP, Depression – linear regression

	Starting model (construction sample)			Selected model (cross–validation sample)			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	.81	.24	3.41	- .04	.20	- .21	
GOD	.17	.16	1.02	.67	.14	4.94	
MIND	.16	.09	1.81	.26	.08	3.34	
GOD x MIND	- .15	.05	- 2.71	- .20	.04	- 4.71	
ABUSE	1.26	.38	3.29	.34	.08	4.10	
ABUSE x MIND	- .38	.13	- 2.98				-.86
QUEST	.40	.11	3.77	.61	.08	7.25	
GOD x QUEST	.15	.04	3.78				1.93
SEC	- .78	.16	- 4.83	- .74	.13	- 5.73	
SEC ²	.21	.05	4.55	.14	.04	3.27	
SEC x QUEST	- .19	.05	- 3.42	- .09	.04	- 2.07	
SEX	- .22	.07	- 3.24				-1.16

b) Primary Response: ANX, sociophobic anxiety – linear regression

	Starting model (construction sample)			Selected model (cross-validation sample)			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	.27	.35	.78	.59	.22	2.71	
GOD	-. 22	.09	- 2.44	- .16	.07	- 2.28	
QUEST	.96	.19	5.16	.59	.13	4.62	
GOD x QUEST	.11	.34	3.04	.07	.03	2.62	
MIND	.51	.12	4.24	.48	.08	5.75	
MIND x QUEST	- .28	.06	- 4.52	- .13	.04	- 3.22	
SEC	- .71	.17	- 4.28	- .65	.13	- 5.03	
SEC²	.10	.04	2.28	.09	.04	2.42	
LOVE	.50	.19	2.61	- .21	.04	- 4.77	
LOVE²	- .15	.05	- 2.96				-.79
AGE	- .01	.00	- 3.99				-1.78
SEX	- .21	.07	- 3.15	- .17	.07	- 2.49	

c) Secondary response: GOD, Belief in God – linear regression

	Starting model			Selected model			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	.64	.16	3.98				
AGE	.01	.00	4.01				.67

d) Secondary response: QUEST, Quest for meaning – linear regression

	Starting model			Selected model			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	1.17	0.11	15.52				
AGE	.01	.00	2.71				1.39

e) Secondary response: MIND, mindfulness – linear regression

	Starting model			Selected model			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	2.82	.09	29.45	2.51	.09	27.97	
LOVE	.10	.04	2.62	.24	.04	6.33	
SEX	- .19	.06	- 3.41	- .12	.06	- 2.06	

f) Secondary response: SEC, Feeling of security – linear regression

	Starting model			Selected model			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	1.05	.16	6.75	.11	.19	.58	
LOVE	.16	.05	3.40	.32	.05	6.26	
AGE	.01	.00	5.24	.02	.00	6.64	

g) Tertiary response: LOVE, Maternal love – linear regression

	Starting model			Selected model			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	t-value	Estim. coeff.	Stand. Error	t-value	t-value
Const.	3.16	.28	11.30	4.29	.41	10.54	
AGE	- .04	.01	- 2.86	- .10	.02	- 5.00	
AGE^2	.00	.00	2.62	.00	.00	4.68	

h) Tertiary response: ABUSE, Abuse/physical neglect, logistic regression

	Starting model			Selected model			Excluded variables
Exploratory variable	Estim. coeff.	Stand. Error	z-value	Estim. coeff.	Stand. Error	z-value	z-value
Const.	- 2.09	.36	- 5.78	.35	.03	13.21	
AGE	.02	.00	3.25				.57
SEX	- .61	.23	- 2.71	- .17	.04	- 4.37	