

# Structure Validity of the Religious Schema Scale in Greek

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#### Abstract

The purpose of the present study was to examine structure validity of RSS using in a Greek sample. Participants were 266 individuals (men n = 109, and women n = 157). Their age ranged from 13 to 86 years old (M = 27.03, SD = 16.29). Factor (confirmatory and exploratory) analyses were conducted. Several criteria were used to test the hypotheses factor structures of the RSS. The results of the present study did not support the 15-item 3-factor model, but presented a satisfactory solution regarding the use of the 13-item 3-factor model. Conclusively we could state that RSS is an instrument that presents satisfactory psychometric properties and could be used for Greek people.

Keywords: Religious Schema Scale, Structure validity, Greek sample



# 1. Introduction

According to Streib's (2010) view, the definition of a "religious schema" rests on the key characteristic that a schema links an *experience* with an *interpretation* in such a way as to open up the possibility on transformation of the experience (p. 6). The religious schemata are the distinguishing marks for religious styles (Streib, Hood, & Klein, 2010, p. 154). While religious styles are reported to be related to the life style and habits of people (Bourdieu, 1979), they appear to have a repeated use of specific interpretation patterns for coping with rituals or behavioral structures in religion (Streib, 2010).

The study of religious schemata is rather interesting since it presents us with a cognitive interpretation pattern which a person seeks and prefers in order to cope with everyday issues. Knowing the religious schema can indeed assist the scientific community and especially those dealing with the study of human behavior since it offers prior study on human behavior. McIntosh (1995) supported that\_a schema is a cognitive structure or mental representation containing organized, prior knowledge about a particular domain. Also, through religious schemata possible differences in ways of thinking in individuals carrying various cultural characteristics and religious beliefs may be examined.

Streib, Hood, and Klein appreciated the importance of studying the religious schemata and developed Religious Schema Scale (RSS; Streib et al., 2010). RSS is a new instrument for measuring differences in religious styles and schemata. The development of this scale was based on Fowler's model of faith development (Fowler, 1981). Fowler suggested that the development of religious faith is achieved on six stages (intuitive-projective faith, mythic-literal faith, synthetic-conventional faith, individualized-reflective faith, conjunctive faith, and the rarely attainable and final universalizing faith stage) (Fowler, 1986). Nevertheless, the views of Fowler on stage theory have been heavily criticized (Streib et al., 2010).

Streib et al. (2010) considered the criticism and suggested the reformulation of Fowler's six stages into three basic schemas. These were the ones to design RSS for measuring religious schemata. These schemata are assessed through three subscales: *truth of test and teaching* (ttt), *fairness, tolerance and rational choice* (ftr) and *xenosophia, inter-religious dialox* (xenos).

Structure validity of RSS was ensured through the use of factor analysis (exploratory and confirmatory). Check was done with the use of a sample carrying various cultural characteristics (Americans and Germans). Due to the fact that this scale was recently published there is no relevant bibliography on its validity. The use of RSS in other studies such as for example the present study with a sample carrying a variety of cultural characteristics and languages are expected to enhance even further its validity.

The purpose of the present study is to examine the structure validity of RSS within a Greek sample, while it is expected to find a three dimensional scale.

# 2. Method

# 2.1 Participants

The participants were 266 individuals (men n = 109, and women n = 157). Their age ranged



from 13 to 86 years (M = 27.03, SD = 16.29).

# 2.2 Measurement

The *Religious Schema Scale* (RSS; Streib et al., 2010) consisting of three subscales of 5 items each was used. Standardized back-translation procedures were used to develop a Greek version of the RSS using three independent bilingual translators (Brislin, 1986). The back-translation procedure was repeated iteratively until the original and back-translated English versions of the questionnaire were virtually identical. The RSS uses a 5-point Likert-type format from *strongly agree* to *strongly disagree*. Reliabilities of the three subscales in the current sample are:  $\alpha = .88$  for subscale *truth of texts & teachings (ttt)*,  $\alpha$ = .65 for *fairness, tolerance & rational choice (ftr)* and  $\alpha = .70$  for *xenosophia & inter-religious dialog (xenos)*.

#### 2.3 Procedure

The sample used in this study lived in a city with a population of one million.\_The sample was randomly selected and individuals had similar cultural background and same religious faith (Christian Orthodox). The questionnaire was filled in the absence of researchers. Specifically, the participants were members of several organizations (religious and social) and the questionnaires reached them through other members of these organizations.

#### 2.4 Data Analysis

For the sake of our study the initial thought was to use just CFA techniques to examine the structure of the RSS, as a better technique than the exploratory one (e.g., Blunch, 2008; Brown, 2006; Kline, 2005), but also because of priori knowledge of the number of factors, that is, on the structure linking observed variables to latent factors at the initial stages of the questionnaire development (Stevens, 1996). Nevertheless, considering the up to date findings which presented an unstable behavior on the issue of internal consistency, for example factor *ftr* presented scores of .76, .65, .65, 70, .88, and .86, while factor *xenos* .65, 70, .82, .66, 71, and .61 (Streib, 2011; Streib & Klein, 2012; Streib, Hood, & Klein, 2010, Streib & Klein, 2014, and Watson, Chen, & Morris, 2014, respectively), as well as on the claiming of researchers that CFA cannot be used for exploratory analysis (e.g., Asparouhov & Muthen, 2009; Byrne, 2001; Gorsuch, 1983; MacCallum et al., 1992; Marsh et al., 2011). Both factorial analyses (exploratory and confirmatory) were used on the same sample. Also within the framework of examination of structural validity of RSS interrelations among the items and internal consistency reliability were examined.

# 3. Results

The aim of the present study was to validate the Religious Schema Scale (RSS) on a sample with different cultural backgrounds and language than the ones used in the original study.

# 3.1 Interrelations Among the RSS Items

If two tests are presumed to measure the same construct, a correlation between them is predicted (Cronbach & Meehl, 1955). In the present study the interrelations among the items



(questions) were estimated by factor analysis (Table 1). More specifically, highly significant correlations were found between items of the same construct as well as among other constructs. Most correlations between items of different constructs were lower. However, it should be noted that no significant correlation as well as of lower significance ones, were found between items of subscale fairness, tolerance & rational choice.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.ttt1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.ttt2	.36 <sup>a</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
3.ttt3	.58 <sup>a</sup>	.31 <sup>a</sup>	-	-	-	-	-	-	-	-	-	-	-	-
4.ttt4	.67 <sup>a</sup>	.31 <sup>a</sup>	.61 <sup>a</sup>	-	-	-	-	-	-	-	-	-	-	-
5.ttt5	.58 <sup>a</sup>	.33 <sup>a</sup>	.67 <sup>a</sup>	.68 <sup>a</sup>	-	-	-	-	-	-	-	-	-	-
6.ftr1	.06	.11	.12 <sup>b</sup>	.12	.09	-	-	-	-	-	-	-	-	-
7.ftr2	.19 <sup>a</sup>	.23 <sup>a</sup>	.19 <sup>a</sup>	.22 <sup>a</sup>	.19 <sup>a</sup>	.27 <sup>a</sup>	-	-	-	-	-	-	-	-
8.ftr3	.28 <sup>a</sup>	.19 <sup>b</sup>	.21 <sup>a</sup>	.27 <sup>a</sup>	.24 <sup>a</sup>	.30 <sup>a</sup>	.34 <sup>a</sup>	-	-	-	-	-	-	-
9.ftr4	.26 <sup>a</sup>	.10	.19 <sup>a</sup>	.21 <sup>a</sup>	.21 <sup>a</sup>	.18 <sup>a</sup>	.11	.48 <sup>a</sup>	-	-	-	-	-	-
10.ftr5	.28 <sup>a</sup>	.16 <sup>b</sup>	.27 <sup>a</sup>	.25 <sup>a</sup>	.35 <sup>a</sup>	.18 <sup>a</sup>	.13 <sup>b</sup>	.34 <sup>a</sup>	.34 <sup>a</sup>	-	-	-	-	-
11.xe1	.19 <sup>a</sup>	.25 <sup>a</sup>	.23 <sup>a</sup>	.21 <sup>a</sup>	.19 <sup>a</sup>	.19 <sup>a</sup>	.31 <sup>a</sup>	.18 <sup>a</sup>	.07	.38 <sup>a</sup>	-	-	-	-
12.xe2	11	.03	.01	02	08	.16 <sup>a</sup>	.26 <sup>a</sup>	.27 <sup>a</sup>	.09	.22 <sup>a</sup>	.29 <sup>a</sup>	-	-	-
13.xe3	15	.12	11	08	15 <sup>b</sup>	.16 <sup>b</sup>	.22 <sup>a</sup>	.22 <sup>a</sup>	.09	.21 <sup>a</sup>	.35 <sup>a</sup>	.34 <sup>a</sup>	-	-
14.xe4	.16 <sup>b</sup>	.30 <sup>a</sup>	.24 <sup>a</sup>	.19 <sup>a</sup>	.29 <sup>a</sup>	.03	01	.08	.07	.31 <sup>a</sup>	.34 <sup>a</sup>	.27 <sup>a</sup>	.24 <sup>a</sup>	-
15.xe5	06	.13 <sup>b</sup>	05	08	01	02	.10	02	12	.25 <sup>a</sup>	.34 <sup>a</sup>	.40 <sup>a</sup>	.36 <sup>a</sup>	.43 <sup>a</sup>
NT. 4. a														

Table 1. Correlation matrix for the 15 items of the Religious Schema Scale

Note:  ${}^{a}p < .01, {}^{b}p < .01$ 

# 3.2 Factor Analysis

*Exploratory factor analysis (EFA).* This analysis was used because the correlation between the observed and latent variables was uncertain (Byrne, 2001). RSS is a tool designed to measure three religious matters by the use of three different constructs. Thus, EFA was used to determine the extent to which the item measured (the observed variables) was related to the three latent constructs. Both the Bartlett test of thoroughness ( $x^2(105) = 1281.50$ , p < 0.001) and the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = 0.801) indicated that factor analysis was appropriate for the data (Stevens, 1996). Items loaded with more than .40 were considered as loaded with one factor (Hinkin, 1995). Then, variants multi co-linearity was examined by means of communalities (Harman, 1976). Values that



approached the unity were not considered a threat for the existence of multi co-linearity. The ratio in these cases was 266:15 or 17.7:1, covering the preconditions determined by some factor analysts (e.g., Gorsuch, 1983; Nunnally, 1978). Four factors derived from the analysis. At this point, it should be noted that an item (i.e., it is important to understand others through a sympathetic understanding of their culture and religion) of the factor *ftr* was found to be loaded with two factors simultaneously and was therefore omitted as a problematic item (Agius et al., 2003). Then, factor analyses were recomputed on the 14-item scale. In this analysis a three-factor solution accounted for 55.79% of the total variance. The factor loadings and communalities are presented in Table 2.

Variable		h <sup>2</sup>			
variable	1	2	3	11	
Truth of texts and teachings	α	=.84			
ttt1	.81			.69	
ttt2	.51			.36	
ttt3	.81			.67	
ttt4	.82			.71	
ttt5	.85			.73	
Fairness, tolerance, and rational choice	$\alpha = .61$				
ftr1		.61		.37	
ftr2		.56		.39	
ftr3		.78		.65	
ftr4		.62		.44	
Xenosophia/ inter-religious dialog	$\alpha = .72$				
xenos1			.63	.50	
xenos2			.61	.51	
xenos3			.63	.55	
xenos4			.66	.58	
xenos5			.80	.66	
Percentage of variance explained	27.15	17.41	11.24		
Eingenvalues	55.79				

Table 2. Pattern matrix for the RSS items (with oblique rotation solution), Communalities, and Cronbach's Alpha

Confirmatory factor analysis. A confirmatory factor analysis was applied because there was prior knowledge of the number of factors at the initial stages of the questionnaire



development (Stevens 1996). A three-factor model was postulated (Table 3). The models were tested using confirmatory maximum likelihood (ML) factor analyses parameter estimates in AMOS 17.0. In addition, the variance-covariance matrices were analyzed using latent variable software programs AMOS 17.0. CFAs were applied because of prior knowledge of the number of factors, that is, on the structure linking observed variables to latent factors at the initial stages of the questionnaire development (Stevens, 1996). The ML algorithm was selected because it resulted in accurate fit indexes with ordered-categorical data that violate the assumption of multivariate normality (Hutchinson & Olmos, 1998; Olsson, Foss, Troye, & Howell, 2000). The ML algorithm is also a standard estimation technique with ordered-categorical data (Hoyle & Panter, 1995). The multiple imputation method was used to address the issue of missing data in the present study (Schafer & Graham, 2002). The sample size in the present study was adequate to estimate the various models based on two criteria: (a) the total sample size was larger than 100; and (b) the ratio of the total sample size to the number of freely estimated parameters should be greater than 10:1 and approximating 20:1 (Kline, 2005).

Four measures of model fit are reported:  $x^2$ , goodness-of-fit index (GFI), confirmatory fit index (CFI), and root mean square error of approximation (RMSEA). According to Hu and Bentler (1999), for GFI and CFI a cut-off value close to .90 and the RMSEA  $\leq$  .05 indicates close approximate fit; values between .05 and .08 suggest reasonable error of approximation, .08 and .10 marginal fit, and RMSEA > .10 suggests poor fit (Brown & Cudeck, 1993).

On the first model the indicators of the original three-factor 15-item was examined. The model showed no acceptable indicators of appropriateness ( $x^2(87) = 309.3$ , p < .01, GFI = .87, CFI = .82, and RMSEA = .10). Then the appropriateness of the model produced by EFA in the three-factor 14-item was checked. This model did not consist a good model fit ( $x^2(74) = 249.72$ , p < .001, GFI = .89, CFI = .84 and RMSEA = .10). Examination of the standardized residuals and the Langrange Multiplier test suggested that deleting one item (i.e., although every person deserves respect and fairness, arguments need to be voiced rationally) would result in significant improvements in model fit. CFA without this item resulted in a satisfactory model fit:  $x^2(62) = 198.25$ , p < .001, GFI = .91, CFI = .87 and RMSEA = .09. All parameter estimates showed a marginally good model fit and are presented in Table 3.



Models	x <sup>2</sup>	Df	р	GFI	CFI	RMSEA
Model 1: (original)	309.30	87	.01	.87	.82	.10
Three-factor 15-item						
Model 2: (-ftr5 item)	249.72	74	.01	.89	.84	.10
Three-factor 14-item						
Model 3: (-ftr5 & 2 item)	198.25	62	.01	.91	.87	.09
Three-factor 13-item						

Table 3. Goodness-of-fit indices of models tested

#### 3.3 Internal Consistency

Internal consistency reliability was assessed using Cronbach's alpha and average inter-item correlation. Cronbach's index of internal consistency ranged from 0.61 to 0.84 (see Table 2), with two subscales showing acceptable alpha coefficient ( $\alpha > 0.70$ ; Kline, 2005) and one subscale showing moderately low alpha coefficient ( $0.61 < \alpha < 0.70$ ; Kline, 2005). However, since alpha coefficient is affected by the number of items (Cortina, 1993), it is supported that when the number of items is small, the measure should be considered as reliable (Schmitt, 1996). In the present study, the one factor that exhibited alpha values below the acceptable limit comprised of four items. According to Ntoumanis (2001) and Pallant (2010) the value 0.61 of factor present in this study can be considered as satisfactory since it is comprised of less than ten items (four items).

#### 4. Discussion

This exploratory research examining the factor structure of RSS in a Greek sample supports the 13-item, 3-factor model (*truth of texts and teachings, fairness, tolerance, and rational choice, xenosophia/ inter-religious dialog*). Other hypothesized models of the RSS measure were not supported by the data.

The findings of the initial check of structure validity of RSS showed low or no correlations among items of the subscale fairness, tolerance, and rational choice. Tabachnick and Fidell (2001) claim that correlations exceeding .30 provide enough evidence to indicate that there is enough commonality to justify comprising factors. The subject of short or limited correlation among items of the subscale ftr sets an issue of content validity, i.e. whether the items of this subscale explain the same construct. Also the problem of items of factor ftr is made obvious by the important correlations of ftr2 and ftr5 item with the items of the factor xenos.

The factorial structure of the three-factor, 15-item of the original RSS was not supported by the findings of EFA in the present study. EFA assists the better examination of the entire factor pattern and structure in order not to eliminate important information relevant to the item analysis of a scale something that may happen by the exclusive use of CFA (Thompson, 1997). The findings of EFA showed a four-factor structure where a crossloading item on two factors appeared. When an item loads on more than one factor, this should be removed if the



cross-loading is greater than .40 (Schonrock-Adema, Heijne-Penninga, Van Hell, & Cohen-Schotanus, 2009). The item ftr5 presented loadings of .44 and .57 on two factors and therefore was omitted. On the other hand the findings of the iterative EFA showed a similar factorial structure to the original three-factor 14-item. Once the weak items have been removed, the data should be factored again without the presence of that item for a more refined solution (Pett, Lackey, & Sullivan, 2003). Nevertheless, this analysis presented alarming findings as well. More specifically this finding presented items with low communalities (< .40). If an item has a communality of less than .40, it may either a) not be related to the other items, or b) suggest an additional factor that should be explored (Velicer & Fava, 1998).

Initially, if factor structure of RSS can be replicated in a new study a EFA was used. Since though EFA includes a series of subjective decisions (Byrne, 1989; Jöreskog & Sörbom, 1989; Pedhazur & Schmelkin, 1991), it was considered as appropriate to use CFA for the validation of the original model as well as of those examined in EFA. The findings of CFA did not confirm the factorial structure neither of the original model (three-factor, 15-item), nor of the one produced by the EFA (three-factor, 14-item). Nevertheless, following the check of the standardized residual co-variances matrix and with the omission of the ftr2 item as problematic, it was found a marginal satisfactory for the model three-factor, 13-item. Especially the values of fit indicators GFI and RMSEA were found to be marginally satisfactory. These values were found to be of this level probably due to the sensitivity of the indicators of unspecified factor loading, as presented by EFA in the present study (Hu & Bentler, 1998). On the contrary, the CFI value was below acceptance.

#### 5. Conclusion

Finally and based on the findings of the present study, we may consider that factorial structure of the RSS is multidimensional with three-factors and 13-item. This claim is further supported since model fit statistics are simply guidelines and should not be interpreted as golden rules (Marsh, Hau, & Wen, 2004). It is considered that with the present form of the RSS instrument, it can be used at the Greek population. Another conclusion is the fact that the subscale of fairness, tolerance, and rational choice needs further processing and enhancement by items. In conclusion, the RSS appears to be a valid and reliable instrument.

#### 6. Limitations

The present study shows some limitations. A first limitation was the sample used consisting of just Christian Orthodox individuals. A second limitation was the fact that the factorial structure of the RSS was examined at a large range of ages and not on specific age groups. It is suggested to further examine structure validity between age groups in future studies.

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