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Measuring Student Teachers' Beliefs Regarding Religion in Schools: Piloting and Preliminary Validation of Two Newly Developed Scales

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Abstract

Previous findings on religious beliefs of teachers suggest a relation between individual religiosity and professional thinking and acting of teachers. Evidence beyond faith schools and teachers with Religious Education (RE) as a subject is scarce, suitable measuring instruments are also lacking. Therefore, this paper reports the development and validation of two scales assessing teachers' "Beliefs regarding the appropriate role of religion in the school context" and "Beliefs regarding the appropriate role of individual teachers' religiosity". Data from $N = 348$ German teacher education students were analysed. We examined reliability and validity of both scales by employing correlation analysis, confirmatory factor analysis, analysis of convergent and discriminant validity, measurement invariance analysis and structural equation modelling. For external validation, we examined the extent to which both scales are explained by the Centrality of Religiosity Scale (CRS, Huber and Huber 2012) and RE as a subject studied. Our analyses support the reliability and convergent and discriminant validity of both scales. Moreover, both scales are substantially explained by the CRS while none of them is explained by RE as subject. Thus, the piloted scales may be applied in future studies investigating the role of religiosity regarding the professional thinking and acting of teachers.

Keywords

Religiosity, teacher beliefs, student teachers, validation study

Introduction

Beliefs filter, frame and guide teachers' professional actions (Fives and Buehl 2012). This also applies to religious beliefs that are at the core of many people's identity. As teachers educate children and adolescents of diverse religious and cultural backgrounds, their beliefs regarding religion and its significance for their teaching are of particular relevance; this goes especially, but not only, for teachers of Religious Education (RE). Therefore, the present paper focuses on how to assess (student) teachers' beliefs regarding the appropriate role of religion in the school context and their beliefs regarding the appropriate role of individual teachers' religiosity. These beliefs contribute to both individual teachers' professionalism and to school culture as a whole. In face of a lack of quantitative measurement, instruments in the research field investigating the relationship between school and religion two new belief scales were developed (Pirner and Wamser 2017) that were therefore piloted and validated in the present study as a prerequisite for application to larger samples.

In the following, we will outline and contextualise the relevance of the problem addressed (chap.1) and the related state of research (chap. 2). After that, we will describe the theoretical background of the scale development (chap. 3) and explain the chosen methodological approach (chap. 4). Then we will present the results of an empirical pilot study that provides first evidence on the validity of the developed scales (chap. 5) and finally discuss implications for their further validation and application (chap. 6).

The problem: The professional handling of teachers' own religious beliefs in the context of state schools

Modern democracies are mostly conceptualised as religiously neutral, and state schools are located in this religiously and ideologically neutral context. This does not imply, however, that religions and worldviews may not be allowed to be expressed at school. In some European states (e.g. the UK, Scandinavia, the Netherlands or Germany), the way religion is dealt with in

the school context is characterised by positive freedom of religion that allows and promotes religion in the public space of the school in a fair and balanced way. The German constitutional law describes this as “active neutrality” and the German Constitutional Court has specified it in several judgments².

An adequate dealing with positive religious freedom at schools requires professional teachers (see, e.g., Everington 2016). This goes especially for teachers of RE, which is a denominational subject in German schools (Pirner 2012), but it also goes for teachers with other subjects. All teachers have to find and represent a standpoint regarding the appropriate role of religion in the school context and reflect on the relationship between their religious or worldview beliefs and their professional thinking and acting. Research on teachers’ beliefs in this context is important.

The process of finding such a standpoint and developing respective beliefs can be assumed to start during teacher training. While student teachers may not yet have a fully realistic view of the job demands and while their professional understanding of the role of teachers is still emerging (see, e.g., Malmberg and Hagger 2009), they nevertheless may be assumed to show a comparable variety of views concerning the relationship between religion and school education. For this reason, student teachers may be recruited when it is the aim to pilot and validate self-developed scales on teachers’ beliefs on the role of religion in the school context and on the role of individual teachers’ religiosity – as it is in the present study. It is an important task for all levels of teacher education to raise the awareness of possible relations between teachers’ religious beliefs and their professional thinking, and to promote teachers’ reflexive, professional dealing with their beliefs, thus preventing subconscious, unintentional effects.

State of research

² See for example www.bundesverfassungsgericht.de/entscheidungen/rs20030924_2bvr143602.html

In a recently published comprehensive literature review (Häusler, Pirner, Kröner, and Scheunpflug 2019) we have been able to find 33 relevant research papers that deal with connections between religious and professional beliefs of teachers or student teachers. Most of the studies we analysed confirmed significant relations between the individual religiosity of teachers or student teachers and their profession-related thinking and acting.

However, the vast majority of the studies we found come from the United States, while there is scarce research on the topic in Europe and other countries. A research deficit exists especially when it comes to state schools and teachers without RE as subject. For instance, Francis and Robbins have done valuable research on UK schools, however their work focuses on Religious Education and faith schools and does not include teachers of other subjects in state schools (Francis and Robbins 2010). In Germany, a branch of research deals specifically with the religiosity of RE teachers and its implications for professional practice, but there are no studies on such relations for teachers in general. Even with regard to RE teachers there are no studies on those teachers' more general educational beliefs and their possible relations to religious beliefs (see Häusler, Pirner, Kröner, and Scheunpflug 2019). Thus, further studies on the relation of religious beliefs of both RE and non-RE teachers and their professional beliefs are warranted.

Theoretical background: Measuring teachers' beliefs on religion and religiosity in professional contexts

A major reason for the scarcity of quantitative evidence regarding the relationship between teachers' religious beliefs and their professional beliefs are lacking suitable quantitative scales related to this issue: Most of the extant research has up to now concentrated on qualitative methods or used single-item questions. Moreover, it has largely neglected teachers' reflexivity (Häusler, Pirner, Kröner, and Scheunpflug 2019). Thus, it is the aim of the present study to pilot newly developed scales to measure teacher beliefs regarding the *Relation* between their

Profession and Religion (RPR beliefs, Pirner and Wamser 2017, 115). These are “beliefs of teachers that show what teachers themselves think about possible links between religiosity and teacher professionalism” (Pirner and Wamser 2017, 115). Two prominent facets of RPR beliefs are *beliefs regarding the appropriate role of religion in the school context* (context-related RPR beliefs), and *beliefs regarding the appropriate role of individual teachers’ religiosity* (person-related RPR beliefs).

Based on theoretical deliberations as well as previous research findings from the US context, it seems plausible that highly religious teachers can be expected to be more appreciative of the role of religion or teachers’ religiosity in the school context than teachers with low or no religiosity. Therefore, a measure of religiosity was used for the validation of the two scales. We chose the Centrality of Religiosity Scale (CRS), because it has already been widely used, is well validated and measures religiosity on different dimensions (see S. Huber and O. Huber 2012).³ It is also theoretically plausible as well as evidenced by empirical studies that RE teachers tend to see the role of religion in the school context especially positive; therefore, we chose the study of RE as school subject as a second variable for the validation of the scales.

Research Questions and Hypotheses

The validation of the scales on context- and person-related RPR beliefs is based on four research questions, each of which comes with hypotheses, as outlined below.

Research question 1: Reliability and measurement invariance

Do the scales, as well as the established CRS, prove to be reliable and measurement invariant regarding gender in a sample of teacher education students?

³ “The Centrality of Religiosity Scale (CRS)” by Stephan Huber and Odilo W. Huber (<https://www.mdpi.com/2077-1444/3/3/710>) is licensed under CC-BY 3.0 (<https://creativecommons.org/licenses/by-nc-sa/3.0>).

Hypothesis 1: We expect substantial loadings of scale items on the respective latent factors as well as gender invariance of item intercepts.

Research question 2: Discriminant validity

Do the scales for context- and person-related RPR beliefs as well as religiosity measure distinguishable constructs?

Hypothesis 2: We expect evidence for discriminant validity of the three scales as indicated by the Fornell-Larcker criterion (Fornell and Larcker 1981, 46).

Research question 3: Construct validity

May both context- and person-related RPR beliefs be explained by religiosity as well as RE as a prospective teaching subject?

Hypothesis 3a: The higher the centrality of religiosity of student teachers, the more do they approve of a significant role for religion in the school context (context-related beliefs).

Hypothesis 3b: The higher the centrality of religiosity of student teachers, the more do they approve of a significant role of teachers' individual religiosity in the school context (person-related beliefs).

Hypothesis 3c: Students with RE as a subject are more in favour of a significant role for religion in the school context than those with other subjects.

Hypothesis 3d: Students with RE as a subject are more in favour of a significant role for teachers' individual religiosity in the school context than those with other subjects.

Research question 4: Unique explanatory value of RE as a subject when controlling for religiosity

Do context- and person-related beliefs reflect circumstances accompanying RE as a subject even when religiosity is controlled in the model?

Hypothesis 4: While we expect the explanatory value of RE as subject for the beliefs under scrutiny to shrink when controlling for religiosity, we have no beforehand expectations whether there is a unique explanatory value of RE as a subject.

Method

Sample

We included teacher education students of all school forms and subjects from the universities of Erlangen-Nuremberg and Bamberg, Germany. From April to July 2019 they were invited to take part in the survey by an online questionnaire or by paper-based questionnaires. Two cases had to be removed from the data set due to missing values on all scale variables, remaining a sample of $N = 346$ teacher education students ($n = 259$ female, $n = 83$ male, $n = 4$ diverse).

The participants' age was assessed using an item with the categories *under 20 years* (11.6 %), *20–24 years* (62.9 %), *25–30 years* (17.7 %), and *over 30 years* (7.8 %), with one missing. Concerning religion, 74.4 % ($n = 244$) of students reported to be Christian, 5.4 % ($n = 18$) considered themselves affiliated to other religious groups (Muslim, Jewish, Buddhist, Hinduist, others), 20.1 % ($n = 66$) reported not to belong to any religious group, with 18 missing. As to teaching religion, 83.7 % ($n = 277$) did not study RE as a subject, while 16.3 % ($n = 54$) did.

Instruments

All scales and items are shown in Table 1. They were all used in their original German version; the English translations given are for communicative understanding only.

Response formats for all scales were five-point Likert-type. The anchors for context- and person-related RPR beliefs were (5) fully agree, (4) rather agree, (3) uncertain, (2) rather disagree, (1) fully disagree; for the CRS, the original combination of frequency- and intensity-related formats was retained.

Beliefs regarding the appropriate role of religion in the school context (context-related beliefs)

This scale has been constructed as a combination of curricular (RE), extra-curricular (school services, prayer groups) and institutional (prayer room) aspects of the presence of religion in schools in four items.

Beliefs regarding the appropriate role of teachers' individual religiosity (person-related beliefs)

The four items of this scale encompass both the subjective dimension ("my worldview or religious attitude") and the trans-subjective dimension ("a good teacher should") of judging the relationships between teachers' religiosity and their professional task.

Centrality of Religiosity Scale (CRS)

The CRS taps five dimensions of religiosity: public practice (e.g. "How often do you take part in religious services?"), private practice (e.g. "How often do you pray?"), religious experience (e.g. "How often do you experience situations in which you have the feeling that God or something divine intervenes in your life?"), ideology (e.g. "To what extent do you believe that God, Deities or something divine exists?") and an intellectual dimension (e.g. "How often do you think about religious issues?"). We used the German short version of CRS-5, complemented by selected additional items from the longer versions and resulting in a total religiosity score (S. Huber and O. Huber 2012, 717). The CRS is scored from 1 (not religious) to 5 (highly religious).

Table 1. Item pool, item codes, factor loadings (λ) with standard errors (in parentheses), means and standard deviations (in parentheses) for ‘Beliefs regarding the appropriate role of religion in the school context’, ‘Beliefs regarding the appropriate role of individual teachers’ religiosity’ and ‘Centrality of Religiosity Scale’.

Constructs	Item code	λ (SE)	M (SD)
Beliefs regarding the appropriate role of religion in the school context (context-related beliefs)			
I consider prayer rooms and/or places of silence for pupils and teachers unnecessary. (-)	context1	.46 (.05)	3.59 (1.25)
School celebrations at public schools should not have a religious character. (-)	context2	.59 (.05)	2.93 (1.39)
I think it's good that Religious Education is a proper subject in all public schools.	context3	.70 (.04)	3.52 (1.40)
Extra-curricular voluntary activities such as student prayer groups, Bible reading groups or interreligious discussion groups enrich school life.	context4	.67 (.04)	3.46 (1.24)
Beliefs regarding the appropriate role of individual teachers’ religiosity (person-related beliefs)			
I try to separate my worldview or religious attitude from my thinking and acting as a teacher. (-)	indiv1	.66 (.05)	2.41 (1.19)
I would like to pass on some of my worldview or religious attitudes to my students.	indiv2	.75 (.03)	2.86 (1.18)
I think that a good teacher should not be influenced in his or her professional actions by his or her own worldview or religiosity. (-)	indiv3	.67 (.05)	2.43 (1.27)
I find it good and useful to bring my worldview or religious attitude into my thinking and acting as a teacher.	indiv4	.91 (.03)	2.91 (1.20)
Centrality of Religiosity Scale (CRS)			
How often do you pray? ^a	prayer	.83 (.03)	2.33 (1.37)
How often do you take part in religious services? ^a	service	.76 (.04)	2.67 (1.15)
How often do you meditate? ^c	medi	.11 (.06)	1.88 (1.14)
How often do you think about religious issues? ^a	refl1	.66 (.04)	3.24 (1.12)
How interested are you in learning more about religious topics? ^b	refl2	.64 (.04)	3.18 (1.15)
How often do you experience situations in which you have the feeling that God or something divine wants to communicate or to reveal something to you? ^b	exp1	.66 (.04)	2.51 (1.34)
How often do you experience situations in which you have the feeling that God or something divine intervenes in your life? ^a	exp2	.60 (.04)	2.60 (1.32)
To what extent do you believe that God, Deities or something divine exists? ^a	ideol1	.78 (.03)	2.96 (1.44)
To what extent do you believe in an afterlife – e.g. immortality of the soul, resurrection of the dead or reincarnation? ^b	ideol2	.67 (.04)	2.97 (1.44)

Note. $243 \geq N \geq 346$. (-) reverse coded items.

^afrom CRS-5; ^bfrom CRS-10; ^cfrom CRSi-7 (S. Huber and O. Huber 2012, 717).

$p < .001$ for all factor loadings except for item “How often do you meditate?” (medi) – that item was excluded from the analyses due to a statistically insignificant factor loading.

Procedures

To test the hypotheses stated above, we performed confirmatory factor analyses (hypothesis 1), measurement invariance testing (hypothesis 1), correlation analyses (hypothesis 2), and analysis of discriminant validity according to the Fornell-Larcker criterion (hypothesis 2), analysis of latent correlations (hypotheses 3a to 3d) as well as structural equation modeling (hypothesis 4). All analyses were conducted in R (version 4.1.0) using the lavaan package (Rosseel 2012), except calculating the Fornell-Larcker criterion, which was done in Microsoft Excel. Since the items of all scales deviated slightly from the standard normal distribution (skewness range: -0.65 to 1.31, excessive kurtosis range: -1.33 to 0.92), all calculations were performed using the MLR estimator (with full information maximum likelihood to estimate missing values) due to the robustness of this estimator towards slight or moderate deviation from the normal distribution (see Brown 2015, 346).

Results

Reliability and measurement invariance (hypothesis 1)

To test *hypothesis 1*, Confirmatory Factor Analyses (CFA) were conducted (Table 1). Prior to computing the CFA including all constructs (context-related beliefs, person-related beliefs and religiosity), we conducted separate CFAs for every single construct. To evaluate the model fit of all CFAs conducted, we applied Chi-Square-tests and inspected the Comparative Fit Index (CFI), Tucker-Lewis-Index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR). For the fit indices beyond the Chi-Square test, we used the cut-off values suggested by Hu and Bentler (1999; see also Brown 2015, 74), i.e. $CFI/TLI \geq .95$, $RMSEA \leq .06$, and $SRMR \leq .08$, except for the RMSEA. Here, due to our small sample size, we accepted values up to .08 (see Brown 2015, 87). All subsequently

reported factor loadings are standardised. To identify the factor, we fixed the first indicator for each factor to 1, loadings of all other indicators were freely estimated.

(1) Separate single factor models for each construct

Construct 1: Beliefs regarding the appropriate role of religion in the school context (context-related beliefs). The fit indices suggest a good overall fit ($\chi^2 = 4.92, p = .086, df = 2$; CFI: .983; TLI: .950; RMSEA = .074, 90% C.I. [.000 – .159]; SRMR = .023) of the measurement model. Even though the RMSEA exceeded the aforementioned cut-off value, it was still within an acceptable range due to the small sample size (see Brown 2015, 87). All items showed significant shared variance with the underlying construct (standardised factor loadings range between $.46 \leq \lambda \leq .69$, median = .64).

Construct 2: Beliefs regarding the appropriate role of individual teachers' religiosity (person-related beliefs). As model fit indices TLI and RMSEA turned out to be unsatisfactory ($\chi^2 = 18.05, p < .001, df = 2$; CFI: .947; TLI: .842; RMSEA = .213, 90% C.I. [.130 – .309]; SRMR = .038), we decided to inspect the modification indices for plausible changes in the person-related beliefs model. This suggested modelling a residual correlation between the item 'I try to separate my worldview or religious attitude from my thinking and acting as a teacher' (indiv1) and the item 'I think that a good teacher should not be influenced in his or her professional actions by his or her own worldview or religiosity' (indiv3), amounting to $r = .38 (.08)$. This seems plausible given the similarity of the items. By admitting this residual correlation, the model fit could be improved ($\chi^2 = 0.14, p = .705, df = 1$; CFI: 1.000; TLI: 1.017; RMSEA = .000, 95% C.I. [.000 – .145]; SRMR = .003). Standardised factor loadings range between $.66 \leq \lambda \leq .92$ (median = .70).

Construct 3: Centrality of Religiosity Scale (CRS). In a first step, the item "How often do you meditate?" was excluded from the scale due to a non-substantial and statistically insignificant factor loading ($\lambda = .11 [.06]$); because of an insufficient model fit ($\chi^2 = 358.94, p < .001$,

$df = 20$; CFI: .758; TLI: .661; RMSEA = .232, 90% C.I. [.211 – .253]; SRMR = .081) pairwise residual correlations between the items belonging to the same subdimension as stated in the description of the centrality scale, i.e. refl1 and refl2 (M.I. = 61, $r = .59$ [.06]), exp1 and exp2 (M.I. = 152, $r = .61$ [.05]), as well as ideol1 and ideol2 (M.I. = 157, $r = .45$ [.05]), were modelled. The modified model showed an acceptable fit (CFI: .982; TLI: .970; RMSEA = .069, 90% C.I. [.044 – .095]; SRMR = .034); even though the χ^2 (43.59, $p = .000$, $df = 17$) turned out to be significant, the ratio $\chi^2/df = 2.56$ indicates good model-data fit (according to Schermelleh-Engel, Moosbrugger, and Müller 2003, 33). All standardised factor loadings were substantial ($.62 \leq \lambda \leq .86$, median = .66).

(2) Three-factor model and MIMIC modeling

After conducting CFAs for each single factor, we combined them to a three-factorial CFA, which showed an excellent model fit ($\chi^2 = 141.73$, $p = .002$, $df = 97$; CFI: .982; TLI: .978; RMSEA = .038, 90% C.I. [.023 – .051]; SRMR = .040; see Table 1 for factor loadings and means). The inspection of modification indices showed no substantial cross-factor loadings of the single items. Based on this three-factor model, we conducted MIMIC modeling (CFA with covariates, see Brown 2015, 242) in order to check measurement invariance of indicator intercepts regarding gender. For this, the gender data of the four persons who indicated “diverse” were coded as missing. The inspection of the modification indices showed no signs of violation of measurement invariance regarding indicator intercepts. Beyond that, there were gender differences for all latent factors (religiosity: $r = .17$ [.06], context-related beliefs: $r = .18$ [.06] and person-related beliefs: $r = .10$ [.06]), with higher values for females.

Discriminant validity (hypothesis 2)

In order to test hypothesis 2, we first conducted an analysis of latent correlations between the three factors. All three factors were correlated substantially (person- with context-related beliefs

$r = .53$ [.06]; context-related beliefs with religiosity $r = .87$ [.04], person-related beliefs with religiosity $r = .51$ [.05]). While the correlation of the two factors “religiosity” and “context-related beliefs” exceeded the threshold value of $r = .80$ (see Brown 2015, 116), this was no sign of scales being indicators of the same construct, as indicated by the analysis of discriminant validity in Table 2.

Table 2. Analysis of discriminant validity and reliability of Context-related beliefs, Person-related beliefs and Religiosity.

Construct	ASV	AVE	ASV < AVE	MSV	VIF/Tolerance	ρ_c	$\rho_c \geq .60$
Context-related beliefs	.35	.38	✓	.76	4.29/0.23	.70	✓
Person-related beliefs	.18	.57	✓	.28	1.40/0.71	.80	✓
Religiosity	.34	.50	✓	.76	4.17/0.24	.84	✓

Note. $N = 346$. Context-related beliefs = Beliefs regarding the appropriate role of religion in the school context; person-related beliefs = Beliefs regarding the appropriate role of individual teachers’ religiosity; Religiosity = Centrality of Religiosity Scale; ρ_c = congeneric reliability; AVE = Average Variance Extracted; MSV = Maximum Shared Variance; ASV = Average Shared Variance; VIF = Variance Inflation Factor.

Discriminant validity was verified by checking the Fornell-Larcker criterion (Table 2): The average squared latent correlations of constructs (average shared variance, ASV) must be smaller than the variance explained by the associated indicators (average variance extracted, AVE; $ASV < AVE$, see Fornell and Larcker 1981, 46). All constructs met this criterion. In addition, it was examined whether the maximum shared variance (MSV) was lower than the average variance extracted (AVE, see Hair et al. 2014, 620). This very strict requirement was only partially met in the model by the person-related beliefs. The existence of discriminant validity can nevertheless be assumed, since variance inflation factor (VIF) and tolerance also did not indicate the existence of multicollinearity (see Kline 2016, 71). Discriminant validity is also supported by the comparison of all possible three two-factor models⁴ to the three-factor

⁴ Model 1: Religiosity/context-related beliefs (f1) and person-related beliefs (f2); model 2: Religiosity/person-related beliefs (f1) and context-related beliefs (f2); model 3: person-/context-related beliefs (f1) and Religiosity (f2).

model postulated in hypothesis 2. The change in the model fit was worse in each of the comparisons: $16.76 \leq \text{Satorra-Bentler adjusted } \chi^2\text{-difference} \leq 131.28$, $p \leq .001$, $\Delta df = 2$; $.01 \leq \Delta CFI \leq .11$; $.01 \leq \Delta TLI \leq .13$; $.01 \leq \Delta RMSEA \leq .06$. Even though the differences between the three-factorial model and the two-factorial model 1 are small, they are still incremental according to Morin, Marsh, and Nagengast (2013, 405; $\Delta CFI/\Delta TLI > .01$ or $\Delta RMSEA > .015$). With the statistical significant χ^2 -difference test and the Fornell-Larcker criterion met, the three-factorial model can be considered the more adequate model because it is theoretically grounded, too. In addition to the assessment of discriminant validity, all constructs showed a high congeneric reliability (ρ_c , Omega, “composite reliability”, see Kline 2016, 313-314, measured by $\rho_c \geq .60$, see Hair et al. 2014, 619).

Construct validity (hypothesis 3)

In order to test *hypothesis 3* regarding the relationship between teacher education students' religiosity, their studied subject and their context- and person-related beliefs, we examined the latent correlations as shown in Table 3. All sub-hypotheses could be confirmed. Teacher education students with high scores in religiosity tend to approve of a significant role for religion in school contexts (higher context-related beliefs, hypothesis 3a, $r = .87$) and emphasise the relevance of teachers' personal religious beliefs for their professional activities (higher person-related beliefs, hypothesis 3b, $r = .51$). Compared to student teachers with other subjects, those with RE as a subject show modestly higher approval of a significant role for religion in school contexts (hypothesis 3c, $r = .40$) as well as a higher approval of the relevance of teachers' personal beliefs for their profession (hypothesis 3d, $r = .23$).

Table 3. Latent bivariate correlations (standard errors in parentheses) between Religiosity, religious education (RE) as a subject ‘Beliefs regarding the appropriate role of religion in the school context’ (Context-related beliefs) and ‘Beliefs regarding the appropriate role of individual teachers’ religiosity’ (Person-related beliefs).

	Religiosity	Context-related beliefs	Person-related beliefs
Context-related beliefs	.87 (.04)	-	
Person-related beliefs	.51 (.05)	.53 (.06)	-
RE as a subject	.40 (.05)	.40 (.05)	.23 (.06)

Note. $N = 346$ (259 female, 84 male, 4 diverse). Value ranges of religiosity, context- and person-related beliefs: 1 = fully disagree to 5 = fully agree; value range of subject RE: 0 = person does not study RE, 1 = person studies RE.
 $p < .01$ for all coefficients.

Unique explanatory value of Religious Education as a subject when controlling for religiosity (hypothesis 4)

Hypothesis 4, in which we expected the explanatory value of RE as a subject to shrink when controlling for religiosity, could be confirmed. Religiosity offers a strong explanatory value for both context- and person-related beliefs (see Table 4). In fact, when controlling for religiosity, RE as a subject does not have any notable incremental explanatory value for context- and person-related beliefs.

Table 4. Hierarchical SEMs with Effects (Standard Errors in parentheses) of Religious Education (RE) as a subject on (1) ‘Beliefs regarding the appropriate role of religion in the school context’ (Context-related beliefs), and (2) ‘Beliefs regarding the appropriate role of individual teachers’ religiosity’ (Person-related beliefs) under control of Religiosity.

Criterion	Predictor	Step 1	Step 2
		β (SE)	β (SE)
(1) Context-related beliefs	RE as a subject	.40*** (.04)	.12** (.04)
	Religiosity		.84*** (.04)
	R^2	.16	.73
	ΔR^2		.58
(2) Person-related beliefs	RE as a subject	.23** (.06)	.07 (.06)
	Religiosity		.50** (.06)
	R^2	.05	.25
	ΔR^2		.20

Note. $N = 331$. Value ranges of religiosity, context- and person-related beliefs: 1 = fully disagree to 5 = fully agree; value range of RE as subject: 0 = person does not study RE, 1 = person studies RE. ** $p < .01$, *** $p < .001$.

Discussion

The pilot study on the newly designed scales for “Beliefs regarding the appropriate role of religion in the school context” and “Beliefs regarding the appropriate role of individual teachers’ religiosity in the school context” has been successful. Both scales proved to be reliable instruments and first evidence for their construct validity as measures of context- and person-related beliefs regarding the role of religion and religiosity in the school context was provided. Furthermore, our data also provided some new insights in the measurement model for the established Centrality of Religiosity Scale. As to be expected, this instrument proved to be reliable. As to be expected, in a single-factor model, residual correlations among the items representing the same facet of religiosity should be modelled to achieve a good model fit.

Regarding the scales on context and individual beliefs under scrutiny, by and large, discriminant and convergent validity of both scales and their relationship with the CRS could be confirmed.

In spite of a high correlation between religiosity and the scale regarding context-related beliefs, the three-factor model including these scales plus individual religious beliefs fitted statistically significantly better than the alternative two-factor models fusing any two of the three constructs. Thus, the separability of both constructs under scrutiny can be assumed.

Religious Education as a subject and religiosity explain both person- and context-related beliefs in a theoretically meaningful manner. Beyond scale validation in a narrow perspective, it is also interesting that RE as a subject had merely a negligible unique explanatory value when controlling for religiosity in the regression model. This indicates that beliefs regarding the role of religion at school are more deeply rooted in student teachers' individual religiosity than in their subject (RE or other subjects). Thus, future studies should further explore the effect of religiosity on student teachers' and teachers' beliefs regarding the role of religion at school and should especially differentiate between student teachers and teachers with various subjects. This may contribute to research that is aimed at answering the question to what extent student teachers and teachers are able to reflect on and are competent in relating their own and others' religious beliefs to school and their teaching profession.

Limitations and avenues for further research

The first limitation of our study relates to the relatively small sample. Although sample size was sufficient to check reliability of the scales and to provide first evidence on their validity, further investigations with larger samples are desirable, as they are better suited to investigate construct validity via multiple group models and other more sophisticated analyses. In addition, generalizability of our results beyond student teachers should be scrutinised by replicating our study with a sample of schoolteachers who are already in service. This might provide further insight into existing studies suggesting that views of teacher professionalism may differ between student teachers and experienced teachers (Malmberg and Hagger 2009).

Furthermore, regarding the composition of our sample regarding religious affiliation, the clear majority of respondents were Christian. This leaves open the question of generalizability to other religious affiliations. Note, however, that this skewness in religious composition can be regarded as a consequence of representativeness of our sample for the population of German student teachers. While oversampling of underrepresented religious groups like Muslims or Jews might be considered an option for future investigations, this could yet be difficult due to a low total number of teachers with these religious affiliations in Germany.

Conducting a pilot study regarding the newly developed instruments on person- and context-related beliefs regarding religion at school, we focused on student teachers' religiosity and their school subject as firmly established variables. Future studies may go beyond this by including scales on different profession-related beliefs of student teachers and teachers to examine further links in the nomological network of religious teacher beliefs. These studies may also serve as replication studies regarding the already established correlations. This would provide evidence whether the high correlation between the constructs "religiosity" and "context-related beliefs" is a stable finding that may also be observed in studies with larger and more diverse samples.

Despite inevitable limitations, the scales "Beliefs regarding the appropriate role of religion in the school context" and "Beliefs regarding the appropriate role of individual teachers' religiosity in the school context" proved as reliable and potentially valid measurement instruments and are a suitable starting point for larger-scale studies on religious teacher beliefs (see Penthin et al., forthcoming).

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No potential conflict of interest was reported by the authors.

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Data Availability Statement

The data supporting the findings of this study are available at <https://osf.io/beuvt> (doi: [10.17605/osf.io/beuvt](https://doi.org/10.17605/osf.io/beuvt)).

Ethical Approval of Data Protection

The survey was designed to comply with GDPR and was approved by the data protection officer of the first author's university, RD Norbert Gärtner, norbert.gaertner@fau.de. Participation in the study was voluntary, and informed written consent was obtained for all cases.

Author contributions (according to <https://casrai.org/credit>)

Conceptualization: S.K., M.L.P., and A.S.; Data curation: M.P.; Formal analysis: SK, and M.P.; Funding acquisition: S.K., M.L.P., and A.S.; Investigation: S.K., M.L.P., and A.S.; Methodology: S.K., M.L.P., M.P., and A.S.; Project administration: S.K., M.L.P., and A.S.; Supervision: S.K., M.L.P., and A.S.; Validation: M.P.; Writing – original draft: S.K., M.P., and M.L.P., Writing – review & editing: M.L.P.; M.P.

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