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Religious involvement over time: Assessing measurement invariance of the Religious Involvement scale in Ukraine

Introduction

The Religious Involvement (RI) scale is a measure proposed by sociologists Meuleman and Billiet to assess a single latent variable of religiosity based on three observable indicators: self-assessed religiousness, frequency of non-ceremonial church attendance, and frequency of private prayer (Meuleman & Billiet, 2018). These three questions are part of an international comparative survey questionnaire called European Social Survey (ESS). For over two decades, the project has collected data about a wide range of attitudes and beliefs of the citizens of European countries, aiming to provide a reliable source for comparison. The RI scale is included in the ESS questionnaire's core part that does not change from wave to wave, allowing tracking religious changes within countries over time based on reliable, high quality data.

Ukraine was actively participating in ESS from 2004 to 2012, and after a long 10-year break, has resumed participation in the project[1]. The availability of such data both actualises methodological questions regarding the RI scale, and provides opportunities to explore substantive questions about religious dynamics in Ukraine. After each wave of Russian invasion, parts of the country were occupied, changing the structure of the population under study in all-national surveys. At the same time, since

[1] Recently, ESS ERIC and KSE have reached an agreement about conducting the 11th and 12th waves of the ESS in Ukraine.

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2013 Ukraine has experienced profound socio-political transformations which are often accompanied by the theme of religion. Churches in Ukraine took a proactive position during the Revolution of dignity, with different religious organisations supporting opposite sides of the conflict. The theme of religion was frequently addressed during the 2019 presidential electoral campaign, making the political side of the orthodox churches competition more prominent. The salience of religion in the social life of Ukrainians may affect the comparability of RI scale over time.

This article aims to examine the measurement invariance (MI) of the RI scale over time by using ESS archive data in combination with recently published data of an all-Ukrainian survey that utilised 10th wave ESS questionnaire in the winter of 2022, just before the full-scale invasion. We found that scalar invariance between waves is not achieved, while full metric invariance is only achieved for the period of relative political stability. Practically, this means that a) comparing mean values of the RI scale over time may lead to biased results, and b) comparing correlation and regression coefficients between waves is unbiased only for the period of relative political stability.

Theoretically, these preliminary results suggest that during periods of political crises, the relationship between the social and private aspects of religiosity weakens.

What is measurement invariance?

Measurement invariance (MI) is a property of a scale that means that items of a given scale measure the same construct across different groups in a similar way. Scale non-invariance challenges the comparability of the estimated construct across groups, as well as the assessment of its relationship with other variables within those groups. Are women more religious than men? Have Ukrainians become more religious? Is religiosity related to happiness more in poor countries, rather than developed ones? To answer these questions validly, researchers should ensure that their measure of religiosity "works" in a similar way within each comparison group.

Researchers distinguish at least three types of measurement invariance (Leitgöb et al., 2023; Meitinger et al., 2020):

1) Configural invariance. It assumes that the number of factors and factor loadings patterns are the same across groups. It allows us to make some cross-group comparisons of the signs of correlations and regression coefficients between latent factors and other variables. This is the most basic level of MI. The lack of configural MI indicates that items do not measure the same construct across time.

2) Metric invariance. It is more strict than configural. Metric invariance means that factor loadings should be the same across groups. This allows comparisons of correlations and regression coefficients (their signs and strength) between latent factors and other variables.

3) Scalar invariance. This is a higher level of invariance than metric. It assumes that not only factor loadings but also intercepts/thresholds should be equal between groups. It allows comparisons of latent factor means. Scalar MI is rarely achieved because it requires the exact equality of parameters (Meitinger et al., 2020: p. 346).

Sometimes full measurement invariance for metric and scalar MI is not supported. In these cases, partial metric and scalar invariance is tested. When partial invariance

is established, it allows researchers to compare correlations, regression coefficients, and factor means between groups for partially invariant factors (Putnick & Bornstein, 2016). Partial invariance implies that some latent factor items may be non-invariant, while others should be invariant. However, it is unclear how many items should be invariant if the objective is to reach partial invariance. Some scholars have suggested that the majority of latent variable indicators should be invariant (Putnick & Bornstein, 2016: p. 9). The assessment of partial MI may also be useful in identifying non-invariant items and in making a decision to remove irrelevant indicators from the analysis.

The Religious Involvement scale

Meuleman and Billiet suggested that three questions of the ESS core questionnaire — "How often do you pray?", "How often do you attend religious services?" and "How religious are you?" — measure one latent variable, which they called "Religious involvement"[1] [2]. Although not unambiguously defined, it would be fair to say that religious involvement, when treated as a unidimensional construct, differentiates individuals by the degree of presence of a set of beliefs and practices oriented toward the transcendent in their life (Saroglou, 2011: p. 1321; Voas, 2007: p. 1167). At the same time, motivations and forms of such involvement might significantly vary between religious individuals and cultural settings. Consequently, many researchers treat the RI as a multidimensional construct[3], encompassing beliefs oriented toward transcendent object(s), participation in religious rituals, adherence to ethical principles that religion implies, and belonging to religious community[4] (Billiet, 2002; Himmelfarb, 1975; Saroglou, 2011). Some scholars suggest that the degree of correlations between religiosity dimensions might be an indicator of the standardisation level of religion in society and (de-)institutionalisation processes within it (Billiet, 2002: p. 350)

While studies conclude that the scale reliably measures generally the same construct across European countries which can be meaningfully estimated and compared, correlation between the scale's items have some culturally determined variation (Meuleman & Billiet, 2011; Remizova et al., 2022)[5]. This variation is particularly

[1] Three indicators of RI scale are frequently used by social researchers to build some integral measure of religiosity without consistency in naming (Joshanloo, 2016; Liefbroer & Rijken, 2019; Montgomery & Winter, 2015).

[2] It is important to note that in the broader field of religion studies, one can find that the terms "religious involvement", "religiosity", "religiousness" and "religious commitment" are often used interchangeably explicitly stated in (Gu et al., 2022; Himmelfarb, 1975).

[3] The authors of the scale acknowledge that this latent variable captures only the present degree of religious involvement and ignore the differences in the reasons for (non-)involvement (Meuleman & Billiet, 2011).

[4] There is no general agreement about how many and which dimensions religiosity encompasses, as well as no consistency in their naming.

[5] Our position is that we do not approve of using sources written by citizens of the aggressor state. However, the article focuses on testing the invariance of RI scale - to our knowledge there are no other works dedicated to this topic. At the same time, all authors of the article we cite are affiliated with Western universities. From open sources, we know that Maxim Rudnev publicly support Ukraine and left Russia after the start of full-scale invasion. As for Alisa Remizova, we could not find any non-academic information, but we hope that her position aligns with that of her co-authors.

noticeable in response to the question of the frequency of church attendance, with differences between predominantly Protestant and other European countries.

Upon closer examination, the RI scale questions seem to cover different aspects of religiosity. The question about prayer frequency primarily concerns private devotional practices. In contrast, attending religious services reflects the social and communal aspect of religion (Himmelfarb, 1975). The distinction between communal and private practices has become particularly noticeable with the appearance of the religion privatisation trend in Western countries, where people have become less involved in organised religion, but still preserve faith in God. Meanwhile, the self-assessment of religiosity can be viewed as the indicator of intensity of overall religious identity. This identity can be cultural as well — in Ukraine, there is a sufficiently high share of people who consider themselves to be orthodox, but are not practical believers (Bogdan, 2009).

Previous studies revealed that religious identity, as well as participation in church communities, can be influenced by political factors. For example, Hout and Fischer (2002) found that liberal and moderate Americans were more likely to stop identifying themselves with organised religion, hypothetically as a reaction to the strengthening of the Christian Right in American politics. They do not, however, find that these people are less likely to believe in God. Later, researchers find that under certain circumstances, republican political identity might also reinforce religious one (Margolis, 2022). Verkuyten and Yildiz (2007) conducted three studies among Turkish-Dutch Muslims and found that when people felt more rejected by the dominant 'out' group, they tended to show stronger identification with both the Turkish and Muslim 'own' groups. In addition, when examining different aspects of Muslim identity, they found that social rejection was positively associated with the importance of Muslim identity and political organisation, but had no significant effect on engagement in ritual behaviour. A recent study of the relationship between religiosity and left-right political orientation in Poland found a link only for normative and, with less compelling evidence, communal dimension of religiosity, but not for belief or practices (Błaszczyński, 2024). Adding to this scope of literature, Brik (2018) found that intra-doctrinal competition, between Ukrainian orthodox churches, which applied to different socio-political narratives, has a positive effect on religious affiliation with the Ukrainian Orthodox Church of the Kyiv Patriarchate (UOC KP) and, to a lesser degree, on a frequency of church attendance (but not on self-rated religiosity and prayer frequency).

Drawing on this literature, we suppose that intensification of the nation-building process after the Revolution of Dignity might affect the social dimension of religious involvement, and therefore affect comparability of the scale over time. In 2014, and especially during the presidential electoral campaign in 2019, main Ukrainian religious organisations mutually aligned themselves with one or other political camps. Most of them have used patriotic rhetoric, while there were suspicions that representatives of the Ukrainian Orthodox Church of the Moscow Patriarchate (UOC MP) were cooperating with Russian intelligence and spreading anti-Ukrainian narratives (Salnikova & Savelyev, 2024; Parashchevin, 2022). After the first phase of Russian invasion to Ukraine, the share of respondents, who affiliate themselves with the UOC MP was gradually decreasing, almost diminishing after the full-scale invasion. At the same time, identification with the UOC KP (and later, with the united Orthodox

Church of Ukraine) has only grown (Razumkov Centre, 2018, 2023). We suspect that these changes in religious identity have affected the intensity of religious identification and the frequency of church attendance. However, they have likely not influenced prayer frequency, as this item is less confounded with the social aspect of religiosity.

Methodology

Our analysis used data from all ESS waves where Ukraine participated: in 2005 (the 2nd wave, $N = 2031$), 2006-2007 (the 3rd wave, $N = 2002$), 2009 (the 4th wave, $N = 1845$), 2011 (the 5th wave, $N = 1931$) and 2013 (the 6th wave, $N = 2178$). All of these surveys took place before the 2014 Russian-Ukrainian war. In 2022, just before the full-scale invasion, Kyiv International Institute of Sociology (KIIS) conducted a survey according to the 10th wave ESS methodology ($N = 1531$). So we also used this data in combination with the mentioned ESS waves. All these samples are representative for the population aged 15 years and older. These studies included the RI scale (see Table 1), which we will test for measurement (non-)invariance.

Table 1

The items of RI scale

Item	Question Text
Self-assessment of religiosity	Regardless of whether you belong to a particular religion, how religious would you say you are? (0 = not at all to 10 = very religious)
Frequency of religious services attendance	Apart from special occasions such as weddings and funerals, about how often do you attend religious services currently? (1 = every day to 7 = never). *The scale was reversed, so 1 = never, 7 = every day*
Prayer frequency	Apart from when you are at religious services, how often, if at all, do you pray? (1 = every day to 7 = never). *The scale was reversed, so 1 = never, 7 = every day*

To test for MI, we use multigroup confirmatory factor analysis (MGCFA), which is a standard practice. To assess MI, we look at the 1) chi-square (χ^2) test's significance level. A non-significant chi-square means that the model fits the data, 2) goodness of fit indices such as CFI, TLI, RMSEA. A good model fit is achieved when CFI > .95, RMSEA < .06, SRMR < .08[1] (West et al., 2012).

We are dealing with a three-indicator model that has just been identified. Therefore, global statistics (CFI, RMSEA, SRMR) cannot correctly assess the configural MI and we have to start by testing the metric invariance. The metric model is stricter than the configural one, so if we achieve metric MI (the metric model has a good fit to the data by chi-square and the above-mentioned fit indices), it means that configural invariance is also achieved (Pirralha & Weber, 2020). To assess scalar invariance, we evaluate the model fit by chi-square and the CFI, RMSEA and SRMR with a comparison between

[1] Some scholars use a more flexible approach for estimating model goodness of fit. For instance, they emphasise the chi-square test "not always the final word in assessing fit" and more suitable for small samples (West et al., 2012). Also they can use different thresholds for CFI, RMSEA and SRMR. For satisfactory model fit it is sufficient the CFI > .9, RMSEA, SRMR < .08 (Remizova et al., 2022).

the metric and scalar models. For this comparison, it is typical to use the change in chi-square ($\Delta\chi^2$) for two models. A significant difference in $\Delta\chi^2$ indicates that scalar invariance is not supported. On the other hand, some researchers point out that the change in chi-square is sensitive to large sample sizes, so it makes sense to use other measures as well (Putnick & Bornstein, 2016). Chen (2007) suggested using the change in goodness of fit indices (ΔCFI, ΔRMSEA, ΔSRMR) to test scalar MI and recommended the following cut points: ΔCFI <= –.01, ΔRMSEA <= .015, ΔSRMR <= .010. We will use both the change in chi-square and the change in the above fit indices to test scalar MI.

In this analysis, we will also test for partial metric and scalar invariance. The evaluation of the goodness of fit of these models is the same as for full metric and full scalar invariance, respectively. As previously stated, to assess partial invariance, the majority of indicators should be invariant. In the case of three indicators related to a single construct, we can assume that for partial invariance at least two indicators should be invariant.

In a study conducted by Meuleman and Billiet (Meuleman & Billiet, 2011), the weighted least squares (WLS) estimator was employed for MGCFA. Consequently, this estimator was also selected for use in our analysis. Self-assessment of religiosity was defined as a referent item because we expect it to have the best correlation with the latent variable – with religious involvement. So there is a small chance that this item may be non-invariant (Putnick & Bornstein, 2016). The self-assessment of religiosity was fixed at 1 for the purpose of identifying the model.

We begin with examining Spearman correlations between questions on the RI scale over time (see Appendix 1) and identifying statistically significant differences between the correlations for each pair of time points, utilising the DBM.functions package in R (Moore, 2024; see Appendix 2). To investigate the correlation patterns between RI scale items, we create visualisation with the multidimensional scaling, which involves calculating the distance matrix from Spearman correlations between RI scale questions for each time point. Next, we tested MI with MGCFA, using the lavaan package in R (Rosseel, 2012) for all time points and only for ESS waves, during which Ukraine participated.

Data analysis

The analysis of the correlation patterns between the indicators of the RI scale shows differences in the correlation between the years 2005 and 2022 on the one hand and the ESS waves from the third to the sixth on the other hand (see Figure 1). The left-hand side of the graph shows the time points (the second ESS wave and the 2022 study) with lower Spearman correlations between items. As shown in Appendices 1 and 2, the second wave of the ESS has the lowest correlation between self-assessment of religiosity and frequency of religious services attendance compared to all other time points. The 2005 and 2022 years show lower Spearman correlations between frequency of attending religious services and frequency of prayer compared to the 3rd, 4th and 6th ESS waves. The 2nd wave also has a lower correlation between these variables than the 5th wave. Notably, there are no statistically significant differences in the correlation coefficients between self-assessment of religiosity and frequency of prayer for all time points.

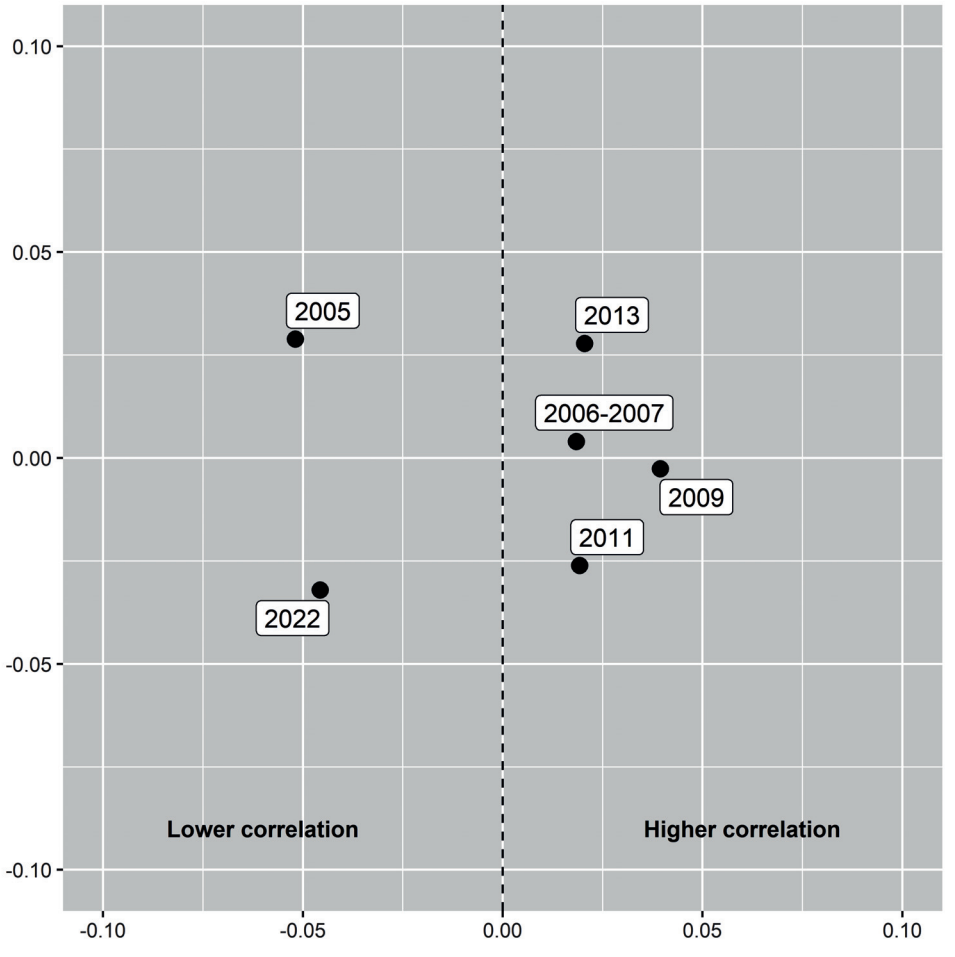

Figure 1. Correlation patterns between RI scale items

The ESS waves from the third to the sixth are shown on the right and they appear to be broadly similar in terms of correlation patterns. However, there is a statistically significant difference between the correlation of the variables self-assessment of religiosity and frequency of religious services attendance for the years 2011 and 2013.

Now, we test the measurement invariance of the RI scale over time. The initial step is to assess MI for all time points. As we can observe from Table 2, the full metric invariance is rejected in accordance with our chosen methodology. Although some fit indices have acceptable values, the chi-square test is statistically significant and also RMSEA exceeds the specified threshold. Therefore, the next step is to examine partial metric invariance. It was found that the factor loading between the latent variable and item "prayer frequency" has the greatest influence on metric invariance. So we estimate this loading freely and evaluate the goodness of fit for the adjusted metric model. However, partial metric invariance is not supported either. Although CFI and SRMR show an acceptable fit, the chi-square test is significant and RMSEA is over than .06.

Table 2

Results of the MI testing for the ESS waves for all time points

Model	χ^2 (df)	CFI	RMSEA (90% CI)	SRMR	Model comp	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔRMSEA	ΔSRMR	Decision
M1: Metric invariance	98.345 (10)**	.986	.071 (.059; .084)	.024	–	–	–	–	–	Reject
M1a: Partial metric invariance	47.647 (5)**	.993	.070 (.053; .089)	.013	–	–	–	–	–	Reject

* $p \leq .05$ ** $p \leq .01$

The next step is to test measurement invariance for only ESS waves, from 2nd to 6th. As previously stated, the political processes in Ukraine that occurred after 2014 may have influenced the religious identity of some individuals, but not the private side of their faith (their relationship with God). Therefore, the study conducted in 2022 may be the reason why there is no metric invariance between all time points. When the 2022 data are excluded, at least partial metric invariance can be achieved. And this assumption is supported by the data.

However, the fit indices do not exceed the specified threshold, the chi-square is statistically significant for the metric model (M1). Therefore, there is no full metric invariance for ESS waves from 2nd to 6th (see Table 3). When the factor loading for indicator "prayer frequency" is freely estimated (as this item has the most influence on metric invariance), partial metric invariance is achieved. The chi-square is non-significant and CFI, RMSEA and SRMR have acceptable values.

Table 3

Results of the MI testing for the ESS waves from 2nd to 6th

Model	χ^2 (df)	CFI	RMSEA (90% CI)	SRMR	Model comp	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔRMSEA	ΔSRMR	Decision
M1: Metric invariance	32.405 (8)**	.996	.041 (.027; .056)	.018	–	–	–	–	–	Reject
M1a: Partial metric invariance	5.644 (4)	1.000	.015 (.000; .041)	.006	–	–	–	–	–	Accept
M2a: Partial scalar invariance	122.905 (12)**	.980	.071 (.060; .083)	.027	M1a	117.261 (8)**	–.02	.056	.021	Reject

* $p \leq .05$ ** $p \leq .01$

The subsequent stage of the investigation will be to test the partial scalar invariance (M2a) using an adjusted metric model. As can be seen, partial scalar invariance is not supported: in the model χ^2 and $\Delta\chi^2$ are statistically significant and changes in the fit

indices are beyond the threshold values. The partial scalar model can be improved by freely estimating the intercept for the item 'self-assessment of religiosity', as this item has the greatest impact on scalar measurement invariance (MI). However, this implies that two items are non-invariant out of a possible three. This is contradictory to the assumption that for partial invariance, the majority of indicators should be invariant. Consequently, it makes sense to stop testing for partial scalar invariance.

If we go back to correlation patterns across time points, we can see that the 2nd wave is different from the ESS waves from 3rd to 6th. We can propose that if the second wave (and the year 2022) is excluded, at least partial metric invariance can be achieved.

Table 4 shows the chi-square non-significant, CFI, RMSEA and SRMR also do not exceed the threshold values. It means that for ESS waves from 3rd to 6th full metric invariance is reached. However, when the metric model is compared with the scalar model, it becomes evident that full scalar invariance cannot be proven. The χ^2 and $\Delta\chi^2$ are statistically significant, ΔRMSEA and ΔSRMR are greater than .015 and .010 respectively. So we will assess the partial scalar invariance. For this we freely estimate an intercept for the item "self-assessment of religiosity" because it has a greatest impact on the invariance of the scalar model. But partial scalar invariance is not supported: the χ^2 and $\Delta\chi^2$ are statistically significant (however, the fit indices and changes in fit indices have acceptable values).

Table 4

Results of the MI testing for the ESS waves from 3nd to 6th

Model	χ^2 (df)	CFI	RMSEA (90% CI)	SRMR	Model comp	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔRMSEA	ΔSRMR	Decision
M2: Metric invariance	9.342 (6)	.999	.018 (.000; .038)	.011	–	–	–	–	–	Accept
M3: Scalar invariance	58.167 (12)**	.989	.046 (.035; .058)	.023	M2	48.824 (6)**	–.01	.029	.012	Reject
M3a: Partial scalar invariance	20.993 (9)**	.997	.027 (.012; .043)	.014	M2	11.651 (3)**	–.002	.01	.003	Reject

* $p \leq .05$ ** $p \leq .01$

As mentioned above, after the Russian invasion in 2014 some Ukrainian territories were occupied, which contributed to the changes in the population structure. This may be the reason why there is no metric invariance between all time points. If we exclude the fully or partially occupied regions of Ukraine (Autonomous Republic of Crimea, Donetsk and Luhansk oblasts), it can be supposed that at least partial metric invariance could be achieved. However, this assumption is not confirmed.

As can be observed from Table 5, the full metric invariance is rejected. Although CFI and SRMR have acceptable values, the chi-square test is statistically significant and RMSEA exceeds the specified threshold. Examining partial metric invariance, we freely estimate loading of item "Frequency of religious services attendance" which has

the greatest influence on invariance of the metric model. However, partial metric invariance is not supported: the chi-square test is significant, and RMSEA is greater than .06.

Table 5

Results of the MI testing for the ESS waves for all time points (excluding Autonomous Republic of Crimea, Donetsk and Luhansk oblasts)

Model	χ^2 (df)	CFI	RMSEA (90% CI)	SRMR	Model comp	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔRMSEA	ΔSRMR	Decision
M1: Metric invariance	99.108 (10)**	.982	.079 (.065; .093)	.026	–	–	–	–	–	Reject
M1a: Partial metric invariance	59.196 (5)**	.989	.087 (.068; .107)	.018	–	–	–	–	–	Reject

* $p \leq .05$ ** $p \leq .01$

Discussion

Our study extends the research conducted by Meuleman and Billiet (2011) and Remizova et al. (2022), who have extensively discussed the comparability of the RI scale across different cultural contexts using multigroup confirmatory factor analysis (MGCFA). While their research included Ukraine as part of broader cross-national comparisons, our study focuses specifically on Ukraine. Notably, our study includes data from a wave conducted after the start of the Russian invasion, a period not covered in previous studies. We confirmed that the items of the scale measured a single latent construct in each wave. However, metric invariance was only achieved for the waves that cover the period from 2006 to 2012, while scalar invariance was not achieved at all. This suggests two key implications: a) comparing the mean values of the RI scale over time may result in biased outcomes, and b) comparisons of correlation and regression coefficients between waves are only unbiased for period between two Ukrainian revolutions.

It is important to note, however, that using a more flexible approach to testing measurement invariance might lead to different interpretations. For instance, one might not take into account χ^2 and $\Delta\chi^2$ appealing to its sensitivity to sample size and use only fit indices for model estimating. In this case, partial scalar invariance for ESS waves from 3rd to 6th and full metric invariance for ESS waves from 2 to 6 can be accepted.

Our findings contribute to the ongoing discourse on the relationship between religiosity and political dynamics. Specifically, our results support the arguments made by Błaszczyński (2024) that certain aspects of religiosity, particularly those related to communal and normative dimensions, are more susceptible to political influences. In line with our expectations, the correlation between praying and the other two items became weaker in the last survey, making the RI scale significantly less

comparable with previous waves. Noticeably, the second wave of the ESS also appeared to be non-comparable. The start of the fields for this wave took place nearly after the end of the Orange Revolution and the Victor Yushchenko inauguration. These presidential elections are considered to be the first case of intensive exploitation of region-based socio-cultural cleavages in campaigning, which served as a basis for future polarisation. In this context, we attribute our findings to the observation that during times of political crises, the connection between the social and private dimensions of religiosity becomes weaker.

Ukraine has renewed its participation in the ESS, so future studies can continue to examine changes in the RI scale and confirm or question our suggestions. Future scholars might also want to use more sophisticated methods for analysis, utilising, for example, SEM models, to make more solid statements about the nature of the changes in correlations between scale items.

Limitation

Like any other study, our research has several limitations. Although we clearly stated assumptions about the reasons for the lack of comparability of the RI scale, our research design does not prove causal relationships. We do not have any assumption about possible effects, so we did not control for errors that might have occured due to the measurement procedures (for example, the month and mode of data collection, the language of questionnaire, etc), as well as shifts in the population's characteristics. Additionally, we did not examine alternative explanations for the non-invariance of the scale in 2022. For example, the start of the war might have increased the need for reassurance, which led to participation in rituals without changes in intensity of religious identity, while fear of contagion and governmental restrictions during the COVID-19 pandemic are likely affected the frequency of church attendance in the country, weakening the relationship with other variables.

APPENDICES

Appendix 1

Spearman Correlation Between Items of the Religious Involvement Scale Over Time

Year	Self-assessment of religiosity & Frequency of religious services attendance	Self-assessment of religiosity & Prayer frequency	Frequency of religious services attendance & Prayer frequency
2005	**0,535**	0,646	**0,593**
2006-2007	0,597	0,661	0,635
2009	0,614	0,634	0,648
2011	0,621	0,646	0,618
2013	0,579	0,645	0,651
2022	0,587	0,642	**0,562**

Appendix 2

Significant Differences in Spearman Correlation of Religious Involvement Scale Items by Year

Variables	Comparison	*p*-value
Self-assessment of religiosity & Frequency of religious services attendance	2006-2007 vs. **2005**	4,03E-03
Self-assessment of religiosity & Frequency of religious services attendance	2009 vs. **2005**	3,04E-04
Self-assessment of religiosity & Frequency of religious services attendance	2011 vs. **2005**	5,62E-05
Self-assessment of religiosity & Frequency of religious services attendance	2013 vs. **2005**	4,17E-02
Self-assessment of religiosity & Frequency of religious services attendance	2022 vs. **2005**	2,61E-02
Self-assessment of religiosity & Frequency of religious services attendance	*2011 vs. 2013*	3,62E-02
Frequency of religious services attendance & Prayer frequency	2006-2007 vs. **2005**	4,38E-02
Frequency of religious services attendance & Prayer frequency	2009 vs. **2005**	8,17E-03
Frequency of religious services attendance & Prayer frequency	2013 vs. **2005**	3,55E-03
Frequency of religious services attendance & Prayer frequency	2006-2007 vs. **2022**	1,26E-03
Frequency of religious services attendance & Prayer frequency	2009 vs. **2022**	1,51E-04
Frequency of religious services attendance & Prayer frequency	2011 vs. **2022**	1,58E-02
Frequency of religious services attendance & Prayer frequency	2013 vs. **2022**	4,51E-05

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ДАНІЇЛ КАРАКАЙ, РУСЛАНА МОСКОТІНА

Релігійна залученість у часі: оцінка інваріантності вимірювання шкали релігійної залученості в Україні

У цьому дослідженні розглядається інваріантність вимірювання шкали релігійної залученості (RI scale) в Україні. Використовуючи дані Європейського соціального дослідження (ESS) та всеукраїнського опитування, проведеного безпосередньо перед повномасштабним російським вторгненням у 2022 році, ми надаємо детальний аналіз шкали в українському контексті.

Попередні дослідження з використанням конфірматорного факторного аналізу еквівалентності в різних групах (MGCFA) мали на меті порівняння країн, однак не фокусувалися на аналізі динаміки релігійності в Україні, особливо після Революції Гідності.

Ми використали MGCFA для перевірки інваріантності шкали релігійної залученості для всіх хвиль ESS, у яких брала участь Україна, а також для опитування 2022 року. З'ясовано, що метрична інваріантність шкали для всіх опитувань не підтверджується. Перевірка інваріантності шкали для всіх часових проміжків, але без урахування окупованих територій показала аналогічні результати. Часткова метрична інваріантність спостерігалася для хвиль ESS з 2004 по 2013 рік. Повна метрична інваріантність була підтверджена лише для 2006-2013 років, а скалярної інваріантності досягнути не вдалося в жодному з випадків. Крім цього, опитування, проведені у 2004 році та після 2014 року, мали дещо відмінні патерни кореляцій між складовими шкали порівняно з іншими хвилями ESS.

Ми припускаємо, що політична динаміка вплинула на соціальні аспекти релігійності в Україні; тож важливо враховувати політичний контекст при оцінюванні релігійної залученості. Наші попередні результати підкреслюють важливість соціально-політичних чинників у вимірюванні та інтерпретації релігійності.

Ключові слова: *інваріантність вимірювання; шкала релігійної залученості; MGCFA; релігійна трансформація; лонґітюдні дані*

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Religious involvement over time: Assessing measurement invariance of the Religious Involvement scale in Ukraine

This study examines the measurement invariance of the Religious Involvement Scale (RI scale) in Ukraine. Using data from the European Social Survey (ESS) and a nationwide survey conducted just before the full-scale Russian invasion in 2022, we provide a detailed analysis of the RI scale in the Ukrainian context.

Previous research using multigroup confirmatory factor analysis (MGCFA) across countries lacked a focused analysis on Ukraine, especially after the Revolution of Dignity.

We used MGCFA to test the RI scale across different ESS waves and the 2022 Ukrainian survey. The metric invariance of the scale across all time points was not confirmed. We also tested results excluding data from occupied territories and found similar patterns. Partial metric invariance was observed for the period from 2004 to 2013. Our findings indicate that full metric invariance was only achieved for 2006-2013, with scalar invariance not achieved. In addition, the surveys conducted in 2004 and after 2014 had somewhat different patterns of correlations between scale components compared to other waves of the ESS.

We suggest that political dynamics have influenced the social aspects of religiosity in Ukraine; therefore, it is important to consider the political context when assessing religious involvement. Our preliminary findings highlight the importance of socio-political factors in measuring and interpreting religiosity.

Keywords: *measurement invariance; religious involvement scale; MGCFA; religious transformation; longitudinal data*