Methodology

Development and Validation of SERR Scale for Detecting Extremism and Religious Radicalism

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ABSTRACT

Background: In line with the growing religious, political and social violence around the world, this study evaluates the psychometric properties of a new scale for Detecting Extremism and Religious Radicalism (SERR), a self-report measure of extremism and religious radicalism. **Method:** Factor analyses, validity and reliability data were collected using a sample of 1985 participants from 58 different cities around Spain who self-identified as actively practicing their religion. **Results:** Statistical analyses of SERR scores yielded acceptable internal consistency scores ($\omega > .74$) and confirmed key factors associated with radicalism and extremism. The structure of the scale was confirmed as two-dimensional ($\chi^2_{(64)}= 361.22$, $p < .001$, CFI = 0.976, TLI = 0.970, RMSEA (90% CI) = 0.089 (0.080 - 0.098), SRMR = 0.064). Scores for the extremism dimension correlated significantly and positively with scores for the same factor on the Activism and Radicalism Intention Scales ($r = .32$, $p < .001$, $n = 139$). **Conclusions:** The SERR demonstrates adequate reliability and validity for evaluating the degree of extremism and radicalism in Christian/Catholic and Muslim believers.

Desarrollo y Validación de la Escala SERR para la Detección del Extremismo y Radicalismo Religioso

RESUMEN

Antecedentes: en consonancia con la creciente violencia religiosa, política y social en todo el mundo, este estudio evalúa las propiedades psicométricas de la escala para la detección del extremismo y el radicalismo religioso (SERR), una medida de autoinforme del extremismo y el radicalismo religioso. **Método:** los análisis factoriales y las evidencias de validez y fiabilidad se recopilaron utilizando una muestra de 1.985 participantes de 58 ciudades distintas de España que se identificaron a sí mismos como practicantes activos de su religión. **Resultados:** los análisis estadísticos de las puntuaciones SERR arrojaron puntuaciones de consistencia interna aceptables ($\omega > .74$) y confirmaron los factores clave asociados con el radicalismo y el extremismo. La estructura de la escala se confirmó como bidimensional ($\chi^2_{(64)} = 361.22$, $p < .001$, CFI = 0.976, TLI = 0.970, RMSEA (90% CI) = 0.089 (0.080 - 0.098), SRMR = 0.064). Las puntuaciones de la dimensión de extremismo se correlacionaron significativa y positivamente con las puntuaciones del mismo factor en la Escala de Intención de Activismo y Radicalismo ($r = 0,32$, $p < 0.001$, $n = 139$). **Conclusiones:** los autores concluyen que el SERR muestra una fiabilidad y validez adecuada.

The 9/11 attacks accelerated the study of terrorism in academia (Jackson, 2012; Phillips, 2021; Silke, 2004). This quantitative growth has not involved a qualitative increase in understanding the psychological aspects of extremism (Schuurman, 2020). Some researchers have pointed out important shortcomings, such as less attention paid to the study of radicalization processes (Schuurman, 2019) and negative effects such as increased suspicion of Muslims (Shaheed, 2021), as well as a growth in the perception of stigmatization (Murphy et al., 2020).

Risk assessment of radicalization has traditionally been based on intuition combined with personal and informal experience (Schultz et al., 2021). Faced with the need for objectivity, valuation methods have been developed although two methods seem to provide better assessments (Silke, 2014).

The first method is associated with the Structured Professional Judgment (SPJ) and provides guidance to professionals to structure their judgments about risk and generate a holistic assessment that integrates information from different sources (Lloyd, 2019). These types of instruments usually integrate information obtained through interviews, specialized tests and information from third parties. The best known SPJs include the original version of the Violent Extremism Risk Assessment (VERA; Pressman, 2009) and its revision (VERA-2R; Pressman, 2014; Pressman & Flockton, 2012); the Extremism Risk Guidelines 22+ (ERG22 +; Lloyd, 2016; Lloyd & Dean, 2015); and the Historical-Clinical-Risk management-20 (HCR-20; Douglas & Reeves, 2010). For a review of these tools and others, see Lloyd (2019) or van der Heide et al., (2019).

The second method utilizes specific tools, relies on self-report surveys and is most frequently used in the academic world. Its main utility is in obtaining primary data provided by the target individuals. These data support analyses contrasting the relationship between different factors and radicalization and are further useful in experimental designs that provide evidence regarding causality (Braddock, 2020). Among the self-report tools that exist in the literature, we find the Questionnaire on the Risk of Islamic Radicalization in Young People (Moyano, 2011), the Support for Political Violence Scale and the Self-Sacrifice Scale (Bélanger et al., 2014, 2019) and the Willing to Fight and Die for the Group Scale (Swann et al., 2009). Ozer and Bertelsen (2018) have developed the Extremism Scale (ES) and the Proviolence and Illegal Acts in Relation to Extremism Scale (PIARES), aimed at evaluating different aspects of violent radicalization. One of the most used measures is the Activism and Radicalism Intention Scales (ARIS), to evaluate activism and radicalism (Moskalenko & McCauley 2009).

Measurement of extremism is challenging due to the partial disconnection between violent attitudes and behaviors, for which reason the literature has highlighted problems associated with use of currently available evaluation tools. In a systematic review Scarcella et al. (2016) have identified four instruments for operational use by professionals, seventeen tools developed as research measures, and nine inventories that have not been generated from a study. After evaluating the psychometric properties of these instruments, the authors concluded that the quality and psychometric properties were weak and that there was significant room for improvement. In addition, they highlighted their limitations in terms of lack of transparency. Likewise, when these tools are applied to different religious groups, bias is commonly problematic (Cohen et al., 2017). These problems are accentuated in some contexts, such as Spanish, where most instruments are adapted (and sometimes only translated) from other instruments developed in different contexts.

Given the methodological limitations of instruments of radicalization as well as the lack of research on the subject, the present study describes the development of the SERR, a self-report scale for the evaluation of radicalization and religious extremism, based on the guidelines given by Muñiz and Fonseca-Pedrero (2019). The development of an instrument specifically created in the Spanish context will allow for more precise evaluations that will make it possible to move forward with new studies that delimit the particularities of this context.

Specific research objectives are to: (1) develop a new scale for opinion and detection of radicalism, extremism, and authoritarianism; (2) analyze the psychometric properties of the scale; (3) explore and confirm the factor structure of the scale; (4) confirm the invariance of the scale between different groups; (5) obtain evidence of the validity and reliability of the measurement instrument; and to (6) compare differences in nationality, gender and religion as factors that potentially contribute to inclusion based on different sociodemographic variables.

In the case of validity, a positive relationship is hypothesized between the constructs assessed by the instrument and the intention of radicalism. Other constructs related to personality and different sociodemographic characteristics are also introduced and will be examined in an exploratory way.

Method

Participants

Participation in the study was voluntary. Participants completed the questionnaires independently in paper or online. Sampling was incidental by convenience due to accessibility (Gil-Escudero & Martínez-Arias, 2001). Data was collected from 1,985 participants from 58 Spanish cities and 15 autonomous communities. The percentage of missing values was calculated. Results indicated it was less than 5% of the responses in all of the items. Missing values were replaced by the median indicated by the sample item. Multivariate anomalous data were detected by calculating the Mahalanobis distance with a cut-off point of $p \leq$ .001 (Tabachnick & Fidell, 2001). After eliminating 49 abnormal response patterns and those with other religious affiliations who were not Christian, Muslim or without religion, the final sample size for data analyses was 1,854 participants between 17 and 90 years old (Mage = 29.95, SD = 12.88; 61.06% women and 38.94% men). Of the total respondents, 962 participants responded on paper and 892 did so via computer format.

Instruments

Sociodemographic Questionnaire

The sociodemographic questionnaire was designed as an ad hoc measure to collect additional information about participant characteristics, such as gender, age, education, salary, occupation, belief, and religion.

Scale for Detecting Extremism and Religious Radicalism (SERR)

The SERR is based on the review article carried out by Scarcella et al. (2016). Of the five factors proposed by the authors, only three were selected for their viability: radicalism, extremism, and authoritarianism. Therefore, the SERR attempts to overcome the limitations found by Scarcella et al. (2016) in the scales analyzed by creating new items associated with the aforementioned constructs.

For the present research, radicalism is understood as the process by which an individual comes to adopt increasingly extreme political, social or religious ideals and aspirations, which reject or undermine contemporary expressions of freedom of choice. The concept, extremism, is defined as active opposition to fundamental values such as democracy, the rule of law, individual freedom, mutual respect and tolerance of different faiths and beliefs. Finally, authoritarianism is conceptualized as unconditional submission to authority, as opposition to individual freedom of thought and action.

In order to develop a new scale based on the selected constructs, a list of 40 items was created based on the definitions provided by Scarcella et al. (2016). Two psychology professors with expertise on social psychology and psychometrics assessed the writing of the items. Subsequently, three experts in terrorism and religious radicalism evaluated the adequacy of each item in each of the three factors using a Likert-type scale, from 0 (*Not at all agree*) to 5 (*Totally agree*). The items with a score higher than 4 were selected to form part of the scale, which had a total of 29 items.

An initial pilot study to test reliability of the scores and explore factor structure was conducted by administering the SERR to a sample of 705 participants. The exploratory factor analysis and the Cronbach's Alpha of the extracted factors (i.e., radicalism, extremism, authoritarianism), indicated low internal consistency for the authoritarianism, and for which reason it was removed. Table 1 gives an overview of a second version of the SERR designed, consisting of 15 items grouped around two constructs: religious extremism with 6 items (α = .81) and radicalism with 9 items (α = .67).

Activism and Radicalism Intention Scale (ARIS)

The intentions of using violent or non-violent means to achieve political goal was assessed using the Activism and Radicalism Intentions Scale (ARIS) developed by Moskalenko and McCauley (2009) and translated and adapted into Spanish by Trujillo et al. (2016). This scale was selected to test the validity given its wide use in research and its good psychometric properties. Four items on the ARIS measure activism, or legal and non-violent political action (α = .89) while the other four measure the intention of radicalism, illegal and violent political action (α = .84). A Likert-type scale was used from 1 (*Not at all agree*) to 7 (*Totally agree*). Higher scores indicate greater intentions for activism or radicalism. The scale also includes a previous group positioning indicator (i.e., country, religious group, political party, or social movement) from which the participant has to choose the most important one and answer the items with this group in mind.

Overall Personality Assessment Scales (OPERAS)

Overall Personality Assessment Scale (OPERAS) developed by Vigil-Colet et al. (2013) was also selected to test the validity. It evaluates the personality traits according to the Big Five factor model (Costa & McCrae, 1992). The questionnaire is made up of 40 items. Each item consists of a phrase that describes typical situations that subjects may experience in daily life. All items are rated on a 5-point Likert-type scale, from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Each factor: extraversion and emotional stability (α = .86), conscientiousness (α = .77), agreeableness (α = .71) and openness (α = .81) is formed by 7 items. The OPERAS shows acceptable psychometric properties.

Table 1.
The Second Version of the SERR.

Item	Religious extremism	Radicalism
1	Abortion is murder [El aborto es un asesinato]	
2	I am a faithful practitioner of my religion [Soy un fiel practicante de mi religión]	
3	Spanish laws should respect all religious traditions [Las leyes españolas deben respetar todas las tradiciones religiosas]	
4	Premarital sex should be forbidden [El sexo prematrimonial debería estar prohibido]	
5	There are so many lies about the attack on the Twin Towers in New York [Hay muchas mentiras sobre el ataque a las Torres Gemelas de Nueva York]	
6	A person dies only when God wills [Una persona sólo se muere cuando Dios quiere]	
7		Gay pride parades should be banned [Los desfiles del orgullo gay deberían estar prohibidos]
8		All illegal immigrants must be returned to their country of origin [Todos los inmigrantes ilegales deben de ser devueltos a su país de origen]
9		My partner´s jealousy is a sign that she/he loves me [Los celos de mi pareja son una señal de que me quiere]
10		Climate change is a lie [El cambio climático es una mentira]
11		Rape does not exist within marriage [La violación no existe dentro del matrimonio]
12		Homosexuality is a disease [La homosexualidad es una enfermedad]
13		I am willing to make great sacrifices for my religious beliefs [Estoy dispuesto a hacer grandes sacrificios por mis creencias religiosas]
14		Religion is more important than individual freedom [La religión es más importante que la libertad individual]
15		Sometimes using force is unavoidable in order to defend your faith and religion [A veces, el uso de la fuerza es inevitable para defender tu fe y tu religión]

Note: Spanish version between brackets

Procedure

Data collection was carried out between March 2019 and January 2020 for both paper and online versions. In October 2020, the online version of the questionnaire was created and distributed using a snowball format due to the restrictions of COVID-19. Beginning February 2021 through June 2021, data collection resumed in all available formats. Informed consent was provided in all versions. Participation was anonymous and voluntary. Participants under 17 years of age, those not residing in Spain, and those whose religious affiliation was not Christian, Muslim, or without religion were excluded. The research has been approved by the Ethics Committee of the Official College of Psychology of Melilla, Spain (1649/2021).

Data analysis

To achieve the objectives, the participant responses were randomly divided into subsamples to perform different analyses. Sociodemographic data for each subsample are included in Table 2.

Sample 1. The responses of 612 (33%) participants (388 women) between 17 and 90 years old were randomly selected (M_{age} = 29.79, SD = 12.72). This sample was used to verify the structure of the instrument and thus analyze the psychometric properties of the scale, an Exploratory Factor Analysis (EFA) was developed, with a classical parallel analysis (Timmerman & Lorenzo Seva, 2011). The Weighted Least Squares estimator was used to extract the factors based on the polychoric correlation matrix (Ferrando & Lorenzo-Seva, 2014) using an oblique rotation, promax, since a correlation between factors is expected. Then, analyses were carried out to obtain evidence of the external validity of the instrument (statistical contrasts through different sociodemographic variables). Finally, internal consistency was calculated being considered as an indicator of reliability.

Sample 2. A stratified randomized 593 (32%) participants (345 women) between 17 and 81 years were selected (M_{age} = 30.28, SD = 12.61). It aimed to test the factor structure of the questionnaire using the model obtained previously. The Confirmatory Factor Analysis (CFA) was implemented through the JASP program and, as in the EFA, the analysis was carried out based on polychoric correlation matrices. The parameters were estimated with the Weighted Least Squares Mean and Variance Adjusted method (WLSMV) using the following fit indices: comparative fit index (CFI), Tucker-Lewis index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR), reported in the bibliography as adequate for ordinal data (Abad et al., 2011; Byrne, 2012).

Table 2.
Sociodemographic Characteristics of Participants.

	Sample 1 (n = 612)	Sample 2 (n = 593)	Sample 3 (n = 546)		Sample 4 (n =1854)
Religion (%)			Christian	Muslim	
Christian	39.54	36.63	(n = 257)		39.59
Muslim	44.61	44.52		(n = 289)	44.55
Non-religious	15.85	15.85			15.86
Age (M, SD)	29.79 (12.72)	30.28 (12.61)	33.30 (15.10)	27.84 (10.01)	29.95 (12.88)
Belief (%)					
Believers	78.95	80.10	85.49	97.54	79.17
Atheists	21.05	19.90	14.51	2.46	20.83
Reference group (%)					
Religious	26.99	33.22	19.33	68.33	19.33
Cultural	23.14	23.44	27.00	12.33	27.00
Profession	16.45	14.00	24.67	9.33	24.67
Country	13.95	15.51	14.67	5.33	14.67
Sexual orientation	2.63	1.85	1.33	1.00	1.33
Political party	2.57	1.68	1.33	0.33	1.33
Other	11.05	10.29	11.67	3.00	11.67
Level of Education (%)					
Postgraduate	0.16	0.50	-	0.69	0.32
College Degree	33.17	30.57	42.02	25.61	32.97
Bachiller 4	21.40	23.98	21.79	19.72	22.72
ESO 3	16.50	18.24	14.79	24.91	17.65
FPII 2	13.40	10.62	9.34	9.69	11.17
FPI 1	6.54	6.58	5.06	5.88	6.10
Primary School	5.72	5.91	5.06	6.92	5.56
No schooling	3.10	3.54	1.95	7.26	3.51
Employment Status (%)					
Employed	44.12	45.87	50.97	41.18	44.51
Student	39.38	35.24	35.02	38.06	38.71
Unemployed	15.03	17.20	11.28	20.07	15.59
Retired	0.82	1.18	2.72	0.69	1.19
Economic Status (%)					
High	6.86	7.25	11.37	3.53	7.07
Medium	26.14	26.81	28.24	22.62	25.79
Low	20.26	21.59	21.96	23.32	21.30
No income	45.43	42.33	38.43	50.53	45.84

1 FPI: first degree Vocational Education and Training (VET)
2 FPII: second degree VET
3 ESO: secondary KS3
4 Bachiller: secondary KS4·

The fit was considered satisfactory if CFI and TLI ≥ 0.90 and RMSEA and SRMR ≤ 0.08 (Abad et al., 2011; Brown, 2015; Byrne, 2012). The upper limit of the 90% confidence interval of the RMSEA should also not exceed the value 0.08 (Hu & Bentler, 1999).

Sample 3. For this study, the two most important religions in Spain were selected: Christianity and Islam. An invariance analysis was performed between two religious groups with the sample of 546 people that belong to the Christian religions (n = 257; 156 women between 18 and 90 years old; M_{age} = 33.30, SD = 15.10) and Muslim (n = 289; 172 women between 17 and 76 years old; M_{age} = 27.84, SD = 10.01) as well as to corroborate that the differences between groups are due to substantive changes in the construct and not to differences in the psychometric properties (Reise et al., 1993; Cheung & Rensvold, 2002). From the model corroborated in the previous studies an incremental model was estimated in which restrictions were added to the estimated parameters to show the configural, metric and scalar invariance between the groups by religious affiliation. To check if the invariance was fulfilled, the changes in the Comparative Fit Index (CFI) were checked, establishing that these had to be less than .01 for the invariance (Kline, 2016; Cheung, & Rensvold, 2002).

Sample 4. Finally, a study was carried out to obtain evidence of the validity of the scale using the total sample (N = 1854) from whom 1132 were women between 17 and 90 years old (M_{age} = 29.95, SD = 12.88).

The relationship of the sociodemographic variables gender, level of education attained and belief, salary, occupation and group were explored using an Analysis of Variance (ANOVA). The ANOVA effect size was estimated using partial η^2, its interpretation criteria were (Cárdenas Castro & Arancibia Martini, 2014): a) ≈ 0.01 as small, b) ≈ 0.06 as medium and c) ≈ 0.14 as large. For the post-hoc contrast, the Scheffé test was used where the effect size was valued using Cohen's d index, interpreting (Cohen, 1988): a) ≈ .20 as small, b) ≈ .50 as moderate and c) ≈ .80 as large. Likewise, the relationship of the items in the questionnaire with age and with the scores of the dimensions of the intentions of activism and radicalism (ARIS) and the OPERAS was assessed. In this case, the non-parametric Spearman coefficient was used (Badii et al., 2014). Statistical analyzes were performed using JASP 0.14, FACTOR (Lorenzo-Seva y Ferrando, 2006) and SPSS 25.

Results

Descriptive analysis of the items

First, the multivariate normality of the purified data was explored using the Mardia (1970) index. Taking into account the indications of different authors (Catena et al., 2003; Lord & Novick, 1968; Martínez-Arias, 1995; Nunnally & Bernstein, 1995), the descriptive statistics of the items and the reliability of the scores were calculated as shown in Table 3.

Exploratory factor analysis

It was verified that the properties of the data were adequate to perform the EFA. The KMO index (KMO = 0.82) and Bartlett's test of sphericity was significant ($\chi^2_{(105)}$ = 6586.95; p < .001) indicating that the analysis was feasible. The optimal implementation of parallel analysis showed a bi-factor structure that explain 61.78% of the total variance (extremism 14.83% and radicalism 46.94%). Therefore, a bi-factor structure was imposed, eliminating the items with the highest standardized residuals in consecutive analyses. After cleaning, the KMO index was 0.82 and Bartlett's sphericity test was again significant ($\chi^2_{(78)}$ = 6446.04; p < .001). 13 items were preserved.

Next, a first order EFA was developed on the total subsample 1 (n = 612). The multiple criterion to maintain the items was the following: SD ≥ 1, a corrected item-total r ≥ 0.32. Based on these criteria, items 3 and 5 were eliminated as they presented very low values and item 4 was kept for reasons of theoretical interest and because non-compliance with the indicated criteria was not very extreme in their case, therefore that, items 1, 2, 4, and from 6 to 15 were considered adequate (see Table 3). The internal consistency of the instrument items, considered as an indicator of reliability was calculated using the alpha of Cronbach and McDonald's omega was .89 and .88 respectively for the total scale. For the extremism factor (α = .71) and (ω = .72); while in the radicalism factor, (α = .92) and (ω = .91). These internal consistency indicators, interpreted as a whole, show an acceptable reliability of the scores. Table 3 reports the skewness and kurtosis indices of each item, the factor load and the communality.

Table 3.
Mean (M), Standard deviation (SD), corrected item-total correlation (CITC), Cronbach's alpha and McDonald's omega if item (AE) is removed, skewness, kurtosis and communality EFA.

Item	*M*	*SD*	*CITC*	Cronbach's α	McDonald's ω	Skewness	Kurtosis	Extremism	Radicalism	h2
1	2.58	1.57	0.30	0.88	0.87	0.39	-1.38		.63	0.60
2	3.07	1.57	0.34	0.88	0.87	-0.14	-1.50		.72	0.60
4	2.02	1.39	0.28	0.88	0.87	1.02	-0.34		.49	0.49
6	2.96	1.70	0.39	0.88	0.87	0.02	-1.69		.77	0.67
7	2.54	1.58	0.62	0.87	0.85	0.45	-1.31	.69		0.56
8	2.60	1.51	0.46	0.88	0.86	0.38	-1.31	.54		0.45
9	2.70	1.65	0.66	0.87	0.85	0.31	-1.53	.79		0.69
10	2.56	1.74	0.67	0.87	0.84	0.45	-1.58	.78		0.67
11	2.52	1.75	0.71	0.87	0.84	0.50	-1.55	.81		0.75
12	2.47	1.69	0.76	0.87	0.87	0.54	-1.44	.88		0.77
13	2.76	1.71	0.71	0.87	0.84	0.23	-1.65	.76		0.70
14	2.54	1.68	0.75	0.87	0.87	0.47	-1.48	.87		0.75
15	2.65	1.68	0.68	0.87	0.85	0.34	-1.56	.80		0.71

The first factor explained 13.50% of the total variance and corresponded, theoretically, to the Extremism dimension. The second factor represented 41.50% of the total variance and corresponded to the Radicalism dimension. The correlation between both factors was significant ($r = .45$, $p > .001$). All items showed a saturation greater than 0.40.

Confirmatory factor analysis

To study the dimensional structure of the scale, a CFA is performed using the model obtained in sample 2. To analyze the construct validity of the factorial type of the Spanish version of this instrument, a bifactorial model was fitted with the thirteen items of the previous model using the robust estimation of WLSMV (weighted least squares with robust standard errors) and assuming multivariate normality distribution. As can be seen in Table 4, the results for the second randomized sample of 593 participants without replacement, different from the one used in the EFA, the skewness and kurtosis values were less than two in all items. In general, these indicators suggest that there are no serious deviations from normality.

For a better evaluation of the model parameters and taking into account the recommendations of several authors (Arbuckle, 2014; Brown, 2015; Ferrando & Anguiano-Carrasco, 2010), various indices were considered simultaneously. Specifically, in addition to the χ^2 statistic and its associated level of probability, other complementary fit indices were taken into account, the χ^2/gl ratio, CFI (Comparative Fit Index), TLI (Tucker-Lewis Index), RMSEA (error of root mean square approximation) and SRMR (Standardized Root Mean Square Residual).

After testing the two-dimensional structure and observing the results, the two factors underlying the test were significantly related to each other ($r = 0.25$, $p < .001$). Furthermore, as it can be seen in Figure 1, with the exception of the extremism items, they obtained relatively high factor loadings (standardized regression coefficients).

The results of applying the resulting goodness of fit statistics in this model were the following: $\chi^2(64) = 361.22$, p < .001, CFI = 0.976, TLI = 0.970, RMSEA (90% CI) = 0.089 (0.080 - 0.098), SRMR = 0.064. Although the RMSEA values slightly exceeded the cutoff value, following Shi and Maydeu-Olivares (2020), who recommend using the SRMR estimator instead because it is more robust, it can be concluded that this model shows an admissible fit (Ferrando & Anguiano-Carrasco, 2010; Ruiz et al., 2010).

Therefore, it is assumed that the questionnaire shows a relatively clear tendency towards two-dimensionality. It should be noted that all the parameters indicated in Figure 1 (factor loadings, correlation between factors and measurement errors of the items) are significant for $p < .001$. The internal consistency of both factors was calculated ($n = 1,854$) where the extremism factor presented ($\alpha = .71$) and ($\omega = .72$), while the radicalism factor ($\alpha = .93$) and ($\omega = .91$).
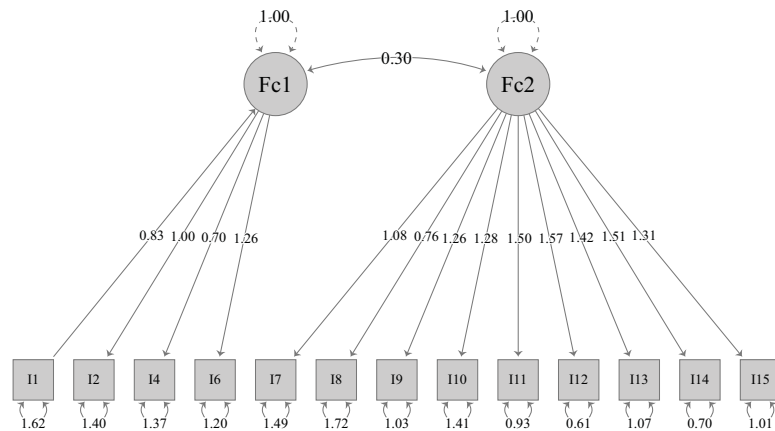
Figure 1.
The graph of the structure resulting from the CFA of the opinion questionnaire

Table 4.
Mean (M), Standard deviation (SD), corrected item-total correlation (CITC), Cronbach's alpha if item (AE) is removed, skewness, kurtosis, loading factor and communality CFA.

Item	M	SD	CITC	Cronbach α	McDonald's ω	Skewness	Kurtosis	Extremism	Radicalism	h2
1	2.65	1.55	0.30	0.89	0.88	0.31	-1.41	.53		0.49
2	3.03	1.57	0.27	0.89	0.88	-0.10	-1.52	.62		0.60
4	2.02	1.37	0.29	0.89	0.88	1.02	-0.33	.48		0.43
6	2.93	1.67	0.35	0.89	0.88	0.05	-1.65	.66		0.63
7	2.75	1.62	0.64	0.88	0.86	0.25	-1.50		.67	0.53
8	2.80	1.54	0.48	0.89	0.87	0.20	-1.43		.50	0.33
9	2.78	1.63	069	0.87	0.86	0.22	-1.56		.76	0.66
10	2.70	1.74	0.69	0.87	0.86	0.31	-1.66		.76	0.66
11	2.70	1.78	0.76	0.87	0.86	0.31	-1.70		.85	0.73
12	2.68	1.73	0.79	0.87	0.87	0.33	-1.62		.91	0.78
13	2.91	1.73	0.74	0.87	0.86	0.09	-1.71		.80	0.66
14	2.73	1.71	0.78	0.87	0.88	0.28	-1.62		.89	0.76
15	2.72	1.67	0.72	0.87	0.86	0.26	-1.59		.78	0.68

Invariance measurement

By verifying the configurational invariance, the appropriate fit statistics were obtained: ($\chi^2_{(128)}$ = 408.88, p < .001, CFI = 0.970, TLI = 0.963, RMSEA (90% CI) = 0.090 (0.080–0.100), SRMR = 0.075) by using the sample 3. It can be said that the association pattern of the items in each of the theorized factors was similar in the three samples. To test the metric invariance, we imposed on the model the equivalence between groups of the factor loads of the items ($\chi^2_{(139)}$ = 475.25, p < .001, CFI = 0.964, TLI = 0.960, RMSEA (90% CI) = 0.094 (0.085-0.104), SRMR = 0.083). Taking into account that the reduction in the adjustment levels was less and that the ΔCFI <.01 (Kline, 2016; Cheung & Rensvold, 2002), we can assume that the factor loadings of the items associated with each factor are equivalent between groups.

To check the scalar invariance, the intercepts of the items were restricted to be equivalent ($\chi^2_{(150)}$ = 485.84, p < .001, CFI = 0.964, TLI = 0.963, RMSEA (90% CI) = 0.091 (0.082–0.100), SRMR = 0.079). Again, the change in the adjustment levels was minimal and the ΔCFI < .01, therefore, the intercepts of the items were equivalent in both groups. The internal consistency of both factors was calculated. Taking into account the total sample 3, the extremism factor (α = .55) and (ω =.56), while the radicalism factor (α = .92) and (ω = .90). For the sample of Christians, in the extremism factor (α = .50) and (ω = .52); while in the radicalism factor (α = .93) and (ω = .93). In the sample of Muslims, in the extremism factor (α = .44) and (ω = .46), and in the radicalism factor (α = .90) and (ω = .86).

Differences in sociodemographic data

In order to investigate whether the proposed scale is useful to differentiate the levels of extremism and radicalism of people with different sociodemographic profiles, a series of statistical contrasts were performed considering the arithmetic means of the extremism and radicalism subscales as dependent variables

and taking as independent variables, through their different levels in sample 4 (see Table 5), sex, age, identity group considered of greatest interest, educational level and employment status. Table 5 shows the results of these analyzes.

Relationship with other variables

In order to obtain evidence of validity, Pearson's bivariate correlations were calculated between the two factors of the SERR and the two factors of the scale of activism and radicalism intentions, and the personality factors of the OPERAS test. Extremism and radicalism correlated positively (r = .28, p < .001, N = 1854) on the contrary, extremism correlated negatively with the intention of activism (r = -.19, p < .001, n = 604) and with the intention of radicalism (r = -.08, p = .043, n = 604); while radicalism presented a negative correlation with the intention of activism (r = -.20, p < .001, n = 604) and positive with the intention of radicalism (r = .02, p = .671, n = 604), although the latter is not significant. Since the activism and radicalism intentions scales work with a positioning group, the correlations were recalculated only for those participants who had chosen the religious group as the most important and, therefore, responded to the items on these scales thinking about their religious group. In this case, extremism did not show a significant correlation with the intention of activism (r = -.08, p = .334, n = 139) but with the intention of radicalism (r = .18, p = .034, n = 139); while radicalism did not show a significant correlation with the intention of activism (r = -.07, p = .400, n = 139) but with the intention of radicalism (r = .32, p < .001, n = 139). In the case of personality factors, extremism showed significant positive correlations with emotional stability (r = .18, p = .020, n = 169) and negative with agreeableness (r = -.21, p = .006, n = 169) and openness (r = -.49, p < .001, n = 169). On the other hand, radicalism correlated negatively with agreeableness (r = -.20, p = .009, n = 169) and openness (r = -.54, p < .001, n = 169). The internal consistency of both factors was calculated taking the entire sample as a reference (N = 1854), the extremism factor (α = .73) and (ω = .74), while the radicalism factor (α = .93) and (ω = .91).

Table 5.
Results of the comparisons of means, analysis of variance and post-hoc analysis considering as independent variables some characteristics of the positioning of the participants and as dependent variables the intention of extremism and radicalism.

		Extremism		Radicalism	
		M (SD) n	Statistical	M (SD) n	Statistical
Gender	Man	2.74 (1.16) 719	t(1844) = 3.20, p = .001, d = 0.15	2.81 (1.20) 719	t(1844) = 3.38, p < .001, d = 0.16
	Woman	2.57 (1.14) 1142		2.59 (1.42) 1142	
Age	Under 30 years old	2.48 (1.14) 1185	t(1852) = 8.01, p < .001, d = 0.39	2.57 (1.41) 1185	t(1852) = 4.34, p < .001, d = 0.21
	30 years old or over	2.91 (1.12) 669		2.85 (1.19) 669	
Education	No schooling	3.33 (1.00) 65	F(7,1845) = 28.81, p < .001, η²p = .10	3.27 (0.97) 65	F(7,1845) = 14.84, p < .001, η²p = .05
	Primary school	3.35 (1.09) 103		2.95 (1.07) 103	
	ESO	3.04 (1.06) 327		2.99 (1.08) 327	
	FPI	2.82 (1.01) 113		3.20 (1.20) 113	
	BCH	2.47 (1.13) 421		2.64 (1.39) 421	
	FPII	2.67 (1.16) 207		2.70 (1.44) 207	
	College Degree	2.27 (1.09) 611		2.32 (1.40) 611	
	Postgraduate	4.08 (0.56) 6		1.63 (0.64) 6	

Table 5.
Results of the comparisons of means, analysis of variance and post-hoc analysis considering as independent variables some characteristics of the positioning of the participants and as dependent variables the intention of extremism and radicalism (Continuation).

Employment situation	Employed a	2.75 (1.10) 822	F(3,1843) = 44.57, p < .001, η²p = .07	2.95 (1.29) 822	F(3,1843) = 53.63, p < .001, η²p = .08
	Unemployed b	3.13 (1.06) 288		3.07 (1.10) 288	
	Student c	2.29 (1.15) 715		2.20 (1.36) 715	
	Retired or other	2.86 (0.83) 22		2.81 (0.75) 22	
Identity group	Country	2.53 (0.92) 248	F(6,1842) = 119.51, p < .001, η²p = .28	3.15 (1.16) 248	F(6,1842) = 16.93, p < .001, η²p = .05
	Political party	2.00 (0.78) 32		2.76 (1.46) 32	
	Religion	4.45 (0.96) 633		2.88 (1.16) 633	
	Culture	2.26 (1.07) 409		2.35 (1.37) 409	
	Profession	2.05 (0.92) 288		2.61 (1.49) 288	
	Sexual orientation	1.83 (1.05) 46		1.92 (1.08) 46	
	Other	2.05 (1.02) 193		2.35 (1.34) 193	
Beliefs	Believer	2.97 (1.02) 1456	t(1837) = 29.53, p < .001, d = 1.70	2.85 (1.27) 1456	t(1837) = 10.97, p < .001, d = 0.63
	Atheist	1.36 (0.60) 383		2.03 (1.39) 383	

1 FPI: first degree Vocational Education and Training (VET)
2 FPII: second degree VET
3 ESO: secondary KS3
4 Bachiller: secondary KS4

Discussion

In this study we set out to develop and validate a new tool to assess radicalism and religious extremism. The results indicate that the SERR has adequate psychometric properties that allow it to present itself as a new instrument for measuring extremism and religious radicalism in believers of the denominations: Catholic Christian and Muslim.

The data provided shows strong evidence of the reliability of the scores, with a McDonald's omega of .88 for the total questionnaire and .72 and .92 for the extremism and radicalism factors, respectively. However, it should be noted that the reliability of the extremism factor obtained unacceptable values in some of the subsamples, so the results of this factor should be interpreted with caution in future studies that include the scale.

According to scientific standards for psychological assessment tests, the measurement instrument also showed evidence of validity based on the content of the test, its internal structure and the relationships with other variables (American Psychological Association et al., 2014). Its validity began with the careful selection of the items and their subsequent evaluation by experts. Later, through the EFA and CFA of the internal structure of the questionnaire, the existence of two dimensions was supported: radicalism and extremism. These two factors were shown to be sufficient to account for the 61.78% variance of the data of the surveyed participants, both factors presenting a good fit and adequate internal consistency. Likewise, the invariance analyses confirmed the equivalence of the measurements obtained by the instrument with samples of Christians and Muslims.

In turn, another evidence of the validity of the questionnaire was the positive and significant correlation found between the radicalism factor of the SERR and the Spanish adaptation of Trujillo et al. (2016) of the Activism and Radicalism Intentions Scale (Moskalenko & McCauley, 2009) for believing participants ($r = .32$, $p < .001$, $n = 139$). In addition, men, less educated, and unemployed had higher levels of radicalization, which is in line with the common characteristics of radicalized individuals in Europe (Roy, 2017).

Thanks to the use of subsamples for the analysis of the metric qualities of the questionnaire, dividing the data analysis into four studies using randomly selected subsamples, the quality of the inference of the results obtained has been improved (Fachamps & Labonne, 2017), through a lower probability that the relevant hypotheses will remain untested.

The development and validation of the SERR is a step forward in the study of attitudes towards the process of radicalization and extremism, since through the evaluation of the personality of part of the sample, it allows researchers to propose future working hypotheses. As noted, extremism showed significant positive correlations with emotional stability and negative correlations with agreeableness and openness. Radicalism negatively correlated with agreeableness and openness. Thus, pathways are opened for the development and contrast of hypotheses related to the expansion of knowledge about their conceptualization, their prevalence and the possible existence of personality factors that can influence the appearance, increase or decrease of these attitudes (Corner et al., 2021). This would lead to improving prevention and intervention strategies. The present research paves the way for studying the relationship between personality variables and religious radicalism.

With respect to other instruments, except for the Questionnaire on the Risk of Islamic Radicalization in Young People (Moyano, 2011), this is one of the few instruments developed entirely in Spanish and which has been created in a transparent process. Moreover, the psychometric properties are adequate and, unlike most instruments, it yields similar measures for both Christians and Muslims. With these characteristics, the SERR addresses and overcomes the limitations pointed out by Scarcella and colleague (2016).

Some limitations have been detected in the questionnaire's validation process. The most important of which is that the intentionality of the evaluator in using the SERR is easily detectable by the evaluated. The mere reading of some of its items can predispose to falsify the responses of the participants. However, this is an inherent limitation of all self-reports and could be remedied by incorporating a sincerity scale, so it is recommended to be used in conjunction with a social desirability scale, such as the

Spanish adaptation of the scale of Crowne and Marlowe (1960) adapted by Ferrando and Chico (2000). Another limitation is found in the method used in part of the sampling. The collection of data by computers, online or via the Internet, reduces the degree of generalization of the study due to self-selection bias. This induces those more motivated to participate (Topolovec-Vranic & Natarajan, 2016). It cannot be forgotten, however, that this method enabled obtaining a sample for the study during confinement due to the COVID19 pandemic.

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