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Development and psychometric validation of the Fresco Experience Scale: a multidimensional measure of sacred-image engagement

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Abstract

Background

Sacred images are encountered in ways that combine perceptual, affective, interpretive, and identity-related processes, yet no validated multidimensional instrument is available for assessing engagement with Orthodox church frescoes. This study developed and evaluated the Fresco Experience Scale (FES), a measure of sacred-image engagement.

Methods

In a psychometric validation study, 778 adults from Serbia (*M age* = 27.97, *SD* = 11.63) completed the 36-item FES and measures of aesthetic engagement, religiosity, daily spiritual experiences, national identification, and dispositional traits. Ordinal confirmatory factor analyses using WLSMV estimation compared a unidimensional model, a correlated six-factor model, and a higher-order model. Reliability, construct validity, measurement invariance across gender and religious affiliation, and two abbreviated forms (FES-30 and FES-24) were also examined.

Results

The correlated six-factor model, comprising Visual-Aesthetic, Emotional, Cognitive, Communicative, Spiritual-Transformative, and Sociocultural facets, showed adequate fit and outperformed a unidimensional alternative. A higher-order model fit acceptably but somewhat less well. Subscale reliability was high. FES facets correlated positively with aesthetic engagement, religiosity, and national identification, and more weakly with daily spiritual experiences, supporting an object- and context-specific interpretation of the construct. Measurement invariance was supported across gender, whereas across religious affiliation only configural and partial metric invariance were established, precluding mean-level comparisons. Both short forms retained the six-factor structure, with the FES-24 showing the most promising balance of brevity and psychometric performance.

Conclusions

The FES provides a reliable and theoretically interpretable multidimensional measure of sacred-image engagement. Findings support the use of facet scores for profiling differentiated modes of engagement, while a total score may serve as a global summary index. Current evidence is strongest for Orthodox or Orthodox-proximal settings.

Background

Sacred frescoes in the Eastern Orthodox tradition are far more than artistic decoration. They form an integral part of sacred space, carrying theological meaning, ritual function, and communal memory. Unlike museum artworks, they are encountered in liturgical settings where aesthetic, emotional, and spiritual responses intertwine [1–3]. Rather than being approached as autonomous visual objects, frescoes are typically embedded in a worship environment in which seeing is shaped by ritual sequence, collective expectation, and inherited modes of interpretation. Yet, despite increasing scholarly attention to religious art, we are not aware of a validated multidimensional instrument specifically designed to capture characteristic engagement with Orthodox church frescoes.

In Orthodox churches, frescoes are embedded in a liturgical–communal environment—architecture, lighting, chanting, incense, and prescribed bodily postures—that structures attention, appraisal, and meaning–making. This context provides culturally learned scripts for perception and interpretation. Sacred images organise “ways of seeing” and can evoke a felt sense of spiritual presence through material and performative mediation [4, 5]. Psychologically, these cues may amplify absorption, guide cognitive appraisal towards tradition–consistent meanings, and foster experiences of address, belonging, and identity. They do so not only because of what is visually depicted, but because of how the image is encountered: within a socially shared, symbolically dense, and ritually framed setting. Qualitative work on sacred art likewise suggests that viewers often describe such encounters as layered experiences in which perceptual attention, symbolic understanding, and religious significance are closely intertwined [6].

These layered qualities of the sacred–image encounter — simultaneously perceptual, affective, symbolic, and social — resist reduction to a single dimension of religiosity or aesthetic appreciation. Capturing them adequately calls for a measurement framework that is both theoretically specific and empirically grounded. More broadly, the development of a psychometrically robust measure of fresco engagement contributes to the growing psychological study of religion as materially and ritually mediated. This perspective treats religion not solely as a matter of beliefs or general dispositions, but also as something enacted and sustained through spaces, objects, images, gestures, and repeated practices. Sacred environments are not passive backdrops to inner experience. Rather, they help organise what is noticed, how it is interpreted, and what kind of significance is inferred from it. In this sense, Orthodox frescoes provide a useful context for examining how religious meaning is scaffolded by visual form within a shared ritual ecology. This view is compatible with approaches that emphasise spiritual ties to place and the role of sacred environments in structuring attachment, belonging, and religiously meaningful experience [7]. Developing a fresco–specific instrument therefore enables research that moves beyond global religiosity scores to test how specific features of sacred visual environments—symbolic content, ritual framing, and perceived presence—relate to well–being, identity, and meaning–making. At present, however, this domain cannot be studied adequately with existing instruments, because it falls between general measures of aesthetic response and broad measures of religiosity or spirituality.

The present study models fresco experience as a multidimensional pattern that integrates perceptual–aesthetic, cognitive, communicative, emotional, spiritual–transformative, and sociocultural components

[8]. This framing reflects the assumption that sacred-image encounters in liturgical settings are unlikely to be reducible either to generic aesthetic appreciation or to general religiosity. A multidimensional model is therefore better suited than a unidimensional one to the psychological complexity of these encounters.

We conceptualise fresco experience as typical (recalled) engagement—how individuals generally remember and describe moments in which frescoes capture attention, elicit emotion, prompt reflection, or evoke spiritually or culturally framed meaning. Contemporary models of aesthetic engagement describe layered processes of perception, evaluation, and interpretation [9–11], while classical accounts emphasise absorption and emotional resonance [12]. In sacred settings, these processes are shaped by theological symbolism, ritual framing, and collective memory, making “aesthetic” and “religious” responses difficult to separate cleanly [1, 3]. Focusing on recalled typical experience is therefore theoretically appropriate for capturing relatively stable patterns of engagement formed through repeated encounters in church contexts.

No existing measure captures, in a single brief instrument, the joint contribution of aesthetic engagement, image–mediated address or presence, and sociocultural meaning within a liturgical context. General aesthetic scales focus on secular art and omit sacred presence [12, 13]. Religiosity and spirituality scales assess general orientation rather than responses to specific visual encounters [14, 15]. Museum–based instruments lack ecological validity for church settings shaped by ritual and communal framing [16, 10]. These gaps motivated the development of the Fresco Experience Scale (FES), tailored specifically to Orthodox fresco encounters.

Construct Clarification

The FES targets recalled engagement patterns based on accumulated church encounters rather than momentary reactions to a single viewing episode. Respondents report how they usually or generally experience frescoes, aggregating across visits. The scale is not a measure of general religiosity or spirituality, but of object–focused responses evoked specifically by frescoes in liturgical contexts. Religiosity may covary with FES scores, yet the construct remains experience–proximal and context–specific. This distinction also implies a predictable validity pattern: fresco engagement should relate positively to conceptually proximal criteria such as aesthetic engagement, religiosity, and identity-related meaning, while showing weaker and more selective associations with broader dispositional traits.

This dispositional approach offers three advantages. First, it enables the study of relatively stable individual differences in religious–aesthetic engagement. Second, it is more feasible and ethically appropriate than in situ assessment during worship, where prompts or device–based sampling could disrupt religious practice and alter the attentional stance under study. Third, it supports concise instruments suitable for survey research and multi–instrument batteries. Although retrospective reports involve memory reconstruction, dispositional measurement is well established in empirical aesthetics and the psychology of religion [17–19]. In the present context, asking about “usual” or “general”

experience is especially appropriate because Orthodox frescoes are often encountered repeatedly within relatively stable iconographic and ritual environments.

Six–Dimensional Structure

We conceptualise fresco experience as a multidimensional pattern comprising six interrelated facets [8]. Three dimensions capture core components of aesthetic processing. Visual–Aesthetic reflects attention to formal visual features (e.g., colour, composition, technique) and evaluative appreciation [9, 10]. Emotional reflects affective responses elicited by frescoes (e.g., calm, awe, reverence, sadness) consistent with appraisal–based perspectives on aesthetic emotion [19, 11]. Cognitive reflects interpretive engagement and elaboration (e.g., iconographic, theological, or historical meaning–making), corresponding to meaning–oriented stages in contemporary models of art experience [9, 10].

Three dimensions capture religion– and heritage–linked modes of engagement. Communicative reflects the phenomenological sense that images convey messages, values, or forms of address (e.g., feeling "spoken to" or drawn into a silent dialogue), a feature frequently noted in accounts of religious symbols and image–mediated meaning [5, 3, 4, 20]. Whereas Cognitive concerns interpretive elaboration (what the fresco depicts and signifies), Communicative captures the experienced directionality of meaning (feeling addressed, accompanied, or drawn into dialogue), which can occur even without explicit iconographic analysis. Spiritual–Transformative reflects experiences construed as spiritually significant (e.g., sensed sacred presence, contemplative absorption, perceived renewal or reorientation), aligning with approaches that treat spiritual experience as meaning–laden and potentially transformative [21, 22]. Sociocultural reflects identity– and heritage–related meanings (e.g., belonging, continuity, stewardship), consistent with perspectives on religion as culturally transmitted representation and collective attachment [23, 24]. This dimension is consistent with work on religion as a carrier of cultural memory and collective identity, and on religious places as foci of attachment and belonging. Because these dimensions describe coordinated aspects of a single class of encounters, they are expected to show moderate–to–strong intercorrelations while retaining discriminant content coverage (see Table 1 for brief definitions and illustrative item stems).

Table 1
FES Dimensions: Brief Definitions and Example Item Stems

Dimension	Brief definition	Example item stem
Visual–Aesthetic	Attention to formal visual qualities and aesthetic appreciation/pleasure	"The composition of the frescoes creates a sense of harmony and order."
Emotional	Affect elicited by frescoes (e.g., calm, awe, sorrow)	"Viewing the frescoes awakens a range of emotions in me."
Cognitive	Interpretation and meaning-making (iconography/theology/history)	"The frescoes encourage me to reconsider the meaning of certain religious symbols."
Communicative	Sense of being addressed; frescoes convey messages/values/presence	"When looking at the frescoes, I have the impression of taking part in a kind of silent dialogue."
Spiritual–Transformative	Sacred presence and spiritually meaningful impact/renewal/shift	"After observing the frescoes, I feel an inner change in the way I experience the world."
Sociocultural	Heritage/identity/belonging/continuity and custodial meaning	"The frescoes play an important role in preserving our community's identity."

Note. Example stems are taken from the final FES item set (see Appendix S1 for the full scale).

The six facets proposed here are not assumed to be uniquely Orthodox in a strict sense. Rather, the Orthodox fresco context is treated as a particularly rich case in which more general psychological processes—visual attention, affective resonance, interpretive elaboration, perceived address, spiritually framed appraisal, and identity-related meaning—are activated and organised within a stable liturgical and cultural setting. On this view, the present scale is grounded in a specific tradition while also speaking to a broader psychology of sacred-image engagement. This distinction is important for the present validation, because the aim is not only to describe a specific Orthodox practice context, but also to operationalise a psychologically broader form of sacred-image engagement within a clearly defined cultural setting. At the same time, the present validation is specific to Orthodox fresco encounters, and any broader application of the model to other sacred-image traditions should be treated as a question for future empirical testing rather than as an assumption.

Development of the FES

The FES was developed through iterative mixed–methods work involving literature synthesis, qualitative interviews and visual–response tasks with Orthodox participants, pilot testing, and exploratory factor analysis that supported the six–factor structure (see Supplementary Appendix S2 and Figure S1). An exploratory phase with an independent sample informed item reduction and model refinement, resulting

in the final 36–item version (FES), comprising six items per component and rated on a seven–point Likert scale. To enhance applicability in time–constrained settings, two abbreviated forms—FES–30 and FES–24—were also constructed, each preserving the core factorial structure and content balance.

Aims and Hypotheses

The present study aimed to provide a psychometric evaluation of the Fresco Experience Scale (FES). Specifically, the internal structure of the FES was tested using ordinal CFA, and internal consistency reliability was evaluated for each facet. Construct validity was examined within a theoretically specified nomological network by relating FES facets to aesthetic engagement, religiosity/spirituality indicators, and national identification, alongside divergent associations with broad personality and dispositional measures. In addition, the performance of two abbreviated forms (FES–30 and FES–24) was evaluated in terms of structure, reliability, and validity.

Based on the theoretical model and prior development work, a correlated six-factor model was expected to show acceptable fit, with items loading on their designated facets, and a higher-order model was also expected to fit acceptably. Subscales were expected to demonstrate good internal consistency (α and ω ≥ .70). To evaluate construct validity, external variables were selected to represent both conceptually proximal and more distal criteria. General aesthetic engagement was included as the closest non-religious comparator, because sacred-image engagement was expected to share variance with aesthetic attention, affective response, and interpretive elaboration. Religiosity and daily spiritual experience were included as religion-relevant criteria, with stronger associations expected for religiosity than for everyday spirituality because the FES was designed to capture object- and context-specific engagement rather than broad spiritual disposition. National identification was included because frescoes may function as symbols of continuity, heritage, and collective belonging, particularly within the Sociocultural facet. Broad dispositional variables (Extraversion, Neuroticism, Narcissism, and Need for Closure) were included as divergent criteria, for which weaker and more selective associations were expected. In addition, the six-factor model was formally compared with a unidimensional alternative, and measurement invariance was examined across gender and religious affiliation (Orthodox vs. non-Orthodox) to clarify score comparability. Scalar invariance was expected across gender, whereas configural plus partial metric invariance was expected across religious affiliation.

Method

Item Development

The Fresco Experience Scale (FES) was developed through an iterative mixed–methods programme integrating theory–driven item generation, qualitative refinement in an Orthodox fresco context, and quantitative psychometric evaluation. Initial item generation drew on Csikszentmihalyi and Robinson's aesthetic–experience framework [12], which distinguishes perceptual, emotional, cognitive, and

communicative modes of art engagement, and was extended to capture religion– and heritage–linked meaning. A synthesis of theoretical and empirical literature on aesthetic, religious, and cultural dimensions of art experience informed an initial item pool covering domains considered especially relevant to sacred–image encounters, including spiritual–transformative impact and sociocultural significance.

Qualitative work was used to refine the construct space and strengthen ecological validity. This phase included 90 participants: 13 semi–structured interviews, 32 online open–ended surveys, and 45 respondents who completed a visual–response task based on nine medieval Serbian frescoes spanning major iconographic themes. The qualitative material supported three key refinements. First, perceptual and evaluative–aesthetic content proved empirically difficult to separate and was therefore consolidated into a single Visual–Aesthetic facet. Second, spiritual experiences were frequently described in terms of enduring personal change, which motivated the combined Spiritual–Transformative facet. Third, sociocultural meanings, including heritage, continuity, and collective identity, emerged clearly enough to justify a distinct Sociocultural facet. The final framework therefore comprised six facets: Visual–Aesthetic, Emotional, Cognitive, Communicative, Spiritual–Transformative, and Sociocultural.

A pilot pool of 68 items (10–13 per facet) was then administered to an independent sample of 425 participants recruited online and at monastery sites during January–February 2025. Exploratory factor analysis supported the intended six–factor structure, after which a final 36–item version (six items per facet) was assembled to balance psychometric strength and content coverage. Full details of the qualitative procedures, coding, exploratory analyses, and item–selection diagnostics are reported in the online supplement (Appendices S1–S2).

Participants

The final analytic sample comprised 778 adults from Serbia (M = 27.97, SD = 11.63, range 18–66), retained from an initial N = 941 after pre–specified data–quality screening (see below). Participants were recruited using convenience sampling. One subsample consisted of psychology students who received partial course credit, whereas the remainder were recruited through social media and word–of–mouth.

The study was conducted in accordance with the Declaration of Helsinki and received approval from the institutional ethics committee (Decision No. 2099, 27 November 2024). All participants provided electronic informed consent. The sample was predominantly female (78.7%). Most participants identified as Orthodox Christian (76.1%), with a sizeable non–Orthodox subgroup (n = 186, 23.9%), composed predominantly of Muslims (19.9% of the total sample), with small numbers of atheists/agnostics (2.2%), Catholics (0.1%), and others. Most non-Orthodox participants were Muslim, so comparisons by religious affiliation in the present study largely reflect an Orthodox–Muslim contrast within this regional context. This should be considered when interpreting affiliation-based analyses. Additional demographic information is provided in the supplement (Table S1a-S1f). Because a substantial part of the sample came from contexts in which Orthodox heritage and national identity may

be especially salient, caution is warranted when generalising findings involving the Sociocultural facet beyond this setting.

Measures

Fresco Experience Scale (FES). The core analytic instrument comprised 36 items assessing six facets: Visual–Aesthetic, Emotional, Cognitive, Communicative, Spiritual–Transformative, and Sociocultural (six items per facet). Items were rated on a 7–point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Facet scores were computed as the mean of the corresponding six items, thereby retaining the original 1–7 metric, with higher values indicating stronger endorsement of the facet. In addition to the six facet scores, an overall FES total score was computed as the mean of all 36 core items. The total score was treated as a reliable global summary index, motivated by bifactor evidence for a strong general factor, whereas facet scores remained the primary basis for theory-driven interpretation, differential profiling, and hypothesis testing.

To preserve content coverage during development, six additional reserve items (one per facet) were administered, but all primary analyses used the final 36–item set. Reserve items were excluded from scoring and model estimation. The full item set, instructions, and scoring procedures are provided in the supplement (Appendix S1).

Short forms. Two abbreviated forms were also evaluated: the FES–30 (five items per facet) and the FES–24 (four items per facet). Items were selected to preserve content balance and minimise redundancy, with priority given to high standardised loadings and favourable local–dependence indicators. Because item selection and psychometric evaluation of the short forms were conducted within the same sample, fit indices and reliability estimates for FES–30 and FES–24 may be somewhat optimistically biased. Short–form results should therefore be treated as preliminary; independent replication in a held–out or new sample is required before these forms can be recommended for routine use. Selection criteria and item lists are reported in the supplement (Table S2).

External measures. To evaluate construct validity, participants completed both conceptually proximal criteria and broader divergent measures. Proximal criteria included a brief Religiosity scale adapted from the Strayhorn Religiousness Scale [25] (12 items; scored as the mean of z-standardised items because of non-identical response formats), the Daily Spiritual Experience Scale (DSES) [15, 18] (15 items; mean score), the Aesthetic Experience Questionnaire (AEQ) [13] (22 items; mean score), and the National Identity Scale (NAIT) [26] (27 items; mean score). Religiosity and DSES were included to examine relations with broader religious and spiritual orientation, AEQ served as the closest non-religious comparator of aesthetic engagement, and NAIT was included because frescoes may function as symbols of heritage, continuity, and collective belonging. Divergent criteria included the Extraversion and Neuroticism subscales of the BFI-44 [27], the Narcissism subscale of the SD3 [28], and the Need for Closure Scale-15 [29], which were selected as broader dispositional measures expected to show weaker and more selective associations with fresco engagement. All external measures were scored as mean

composites following published instructions. Full descriptions and citations for these instruments are provided in the supplement.

All instruments were administered in Serbian. For measures without established Serbian versions in this study (DSES and AEQ), a forward–backward translation procedure was applied. Two independent bilingual translators first translated the items into Serbian, after which the translations were reconciled by the research team. A third bilingual expert then back–translated the reconciled versions into English, and discrepancies were resolved through discussion to ensure conceptual equivalence and clarity.

Procedure

Data were collected online using Google Forms. After viewing an information sheet, participants provided electronic informed consent. Eligibility screening required (a) age 18 years or older and (b) self–reported in situ exposure to frescoes on more than one occasion. No specific fresco stimuli were presented during the survey. Instead, participants were instructed to respond on the basis of their typical (recalled) experiences of viewing frescoes in church settings.

Questionnaires were administered in a fixed order: demographics, FES, religiosity, DSES, AEQ, NAIT, BFI–44 subscales, SD3 narcissism, and NFCS–15. Median completion time was approximately 24 minutes. Eight directed–response attention checks were embedded throughout the battery.

Analytic Strategy

Data quality screening

To identify insufficient–effort responding, a pre–specified multi–criterion rule combined performance on eight attention checks with a longstring index capturing invariant responding across the 42 FES–related items (36 core items plus 6 reserve items). The primary rule (at least 5 of 8 attention checks correct; longstring < 12) retained 778 of 941 respondents (82.7%). A more lenient sensitivity rule (at least 4 of 8 correct; longstring < 14) retained 825 respondents (87.7%). Substantive conclusions were unchanged across these thresholds; the full retention breakdown and subgroup comparisons are reported in Supplementary Table S1a-S1f.

Measurement model testing

The internal structure of the FES was evaluated using ordinal confirmatory factor analysis, treating items as ordered–categorical indicators and estimating models with WLSMV on the basis of polychoric correlations. Model identification followed a marker–indicator approach. Three theoretically motivated models were estimated: (a) a unidimensional model, (b) a correlated six–factor model, and (c) a higher–order model in which the six first–order factors loaded on a general factor. Model fit was evaluated using the chi–square statistic, the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square

Error of Approximation (RMSEA) with 90% confidence intervals, and the Standardised Root Mean Square Residual (SRMR), with interpretation guided by conventional fit criteria.

Reliability and construct validity

Internal consistency was evaluated using Cronbach's alpha and McDonald's omega. Convergent validity was examined through standardised factor loadings and Average Variance Extracted (AVE) and Composite Reliability (CR) computed from standardised CFA solutions. Discriminant validity was assessed using Fornell–Larcker comparisons and the heterotrait–monotrait ratio (HTMT). HTMT values below .85 were treated as evidence of discriminant validity, whereas values approaching .90 were interpreted more cautiously [30, 31]. External validity was examined through correlations between observed facet composites and theoretically related measures, including DSES, AEQ, religiosity, and national identification, as well as divergent measures such as Extraversion, Neuroticism, Narcissism, and Need for Closure. Additional computational details, diagnostics, and complete correlation tables are reported in the Supplementary Materials.

Measurement invariance

Measurement invariance was examined using multi-group ordinal CFA with WLSMV across gender and religious affiliation (Orthodox vs. non–Orthodox). Configural, metric (equal loadings), and threshold/scalar (equal thresholds) levels were tested. Nested models were compared using DIFFTEST together with changes in approximate fit indices. When full metric invariance was not supported, partial metric invariance was pursued by freeing a small number of non–invariant loadings on the basis of theory and local misfit diagnostics. Latent mean comparisons were interpreted only where threshold/scalar invariance was supported.

Sensitivity analyses and software

Primary analyses were conducted in Mplus 9.0. To assess robustness across software implementations, the correlated six-factor model was re-estimated in *R* 4.4.1 using *lavaan* 0.6–19 with WLSMV and THETA parameterisation. Because fit statistics for WLSMV models with ordered-categorical indicators can differ across software implementations, this check was treated as a test of substantive robustness rather than as an expectation of numerically identical global fit indices. Additional sensitivity checks, including alternative WLSMV parameterisations and category-collapsing diagnostics, are reported in the online supplement. Further analytic details, including model syntax, are also provided there.

Results

Descriptive statistics and correlations

Facet scores showed adequate dispersion (*SDs* = 1.11–1.71), with means ranging from 4.77 to 5.93. Internal consistency was high across facets (α = .88–.95; ω = .88–.96), and convergent validity indices were strong (AVE = .59–.78; CR = .90–.96; Table 2). For completeness, the 36–item total score also

showed very high reliability and is reported as a reliable global summary index alongside facet-level results.

Table 2
Descriptive Statistics and Reliability for FES Subscales (*N* = 778)

Factor	*M*	*SD*	*α* [95% CI]	*ω* [95% CI]	AVE	CR	Range
Visual–Aesthetic	5.89	1.11	.877 [.863,.890]	.880 [.867,.893]	.636	.912	1.67–7
Emotional	4.89	1.61	.937 [.930,.943]	.938 [.931,.944]	.732	.943	1–7
Cognitive	4.93	1.40	.882 [.869,.894]	.885 [.873,.898]	.592	.896	1–7
Communicative	5.48	1.31	.903 [.892,.913]	.902 [.892,.913]	.675	.926	1–7
Spiritual–Transformative	4.77	1.71	.954 [.949,.959]	.955 [.950,.960]	.778	.955	1–7
Sociocultural	5.93	1.26	.912 [.902,.921]	.914 [.904,.923]	.708	.935	1.17–7
FES Total (36 items)	5.32	1.20	.980 [.978,.982]	.981 [.979,.983]	/	/	1.44–6.92

Note. AVE = Average Variance Extracted; CR = Composite Reliability. AVE and CR are reported for the six latent facets; they are not reported for the observed total-score composite.

Ceiling/floor effects. Floor endorsement was uniformly low (0.0–9.9%). Ceiling endorsement was substantial for Visual–Aesthetic and especially Sociocultural (full scale: 42.4% and 50.1%, respectively); in FES–24, Communicative also showed elevated ceiling endorsement (35.7%). These concentrations likely reduced discrimination among highly engaged respondents and may have attenuated associations at the upper end of the score range. Full diagnostics are reported in the Supplement (Table S5).

Descriptive statistics for external validation measures are reported in Supplementary Table S6.

Confirmatory factor analysis and model comparison

Using ordinal CFA with WLSMV estimation, we compared a unidimensional model, a correlated six–factor model, and a higher–order model (Table 3). The unidimensional model fit poorly, whereas the correlated six-factor model showed adequate fit and clearly outperformed the unidimensional alternative. The higher-order model fit acceptably but was incrementally weaker. Accordingly, the correlated six-factor solution was retained as the primary measurement model for subsequent analyses. Although RMSEA (.082) slightly exceeded the conventional .08 threshold, the overall fit profile, particularly CFI and TLI, supported retention of the correlated six-factor model.

All standardised loadings were positive and significant (*ps* < .001) across facets (overall range: *λ* = .67–.93; Supplementary Table S7), and interfactor correlations were moderate to high (approximately *r* = .63–.89; Supplementary Table S8). Robustness checks broadly supported this interpretation. A six-factor ESEM solution showed excellent fit and reduced factor correlations, and bifactor indices indicated a substantial general component of overall fresco engagement (*ECV* = .72; *ωH* = .93; *PUC* = .86; Supplementary Table S14). These results support treating the total score as a reliable global summary index, while retaining facet scores as the primary basis for theory-driven interpretation and profiling.

Table 3
Model Fit for Competing CFA Structures

Model	χ^2	df	CFI	TLI	RMSEA [90% CI]	SRMR
Unidimensional	8,079.77	594	.883	.876	.127 [.125, .130]	.084
Six correlated factors	3,574.47	579	.953	.949	.082 [.079, .084]	.050
Higher-order	4,186.11	588	.944	.940	.089 [.086, .091]	.059
Bifactor CFA	4,087.42	564	.945	.939	.090 [.087, .092]	.057
ESEM (geomin, 6 factors)	1,345.94	429	.986	.979	.052 [.049, .056]	.022

Note. All chi-square values are significant at p < .001. Because WLSMV estimation with ordered-categorical indicators does not ensure that these competing models are nested in a way that permits straightforward χ^2 difference testing, model comparisons were evaluated primarily using approximate global fit indices (CFI, TLI, RMSEA, SRMR) and theoretical interpretability.

Re-estimation of the correlated six-factor model in R using *lavaan* yielded the same substantive conclusions as the primary Mplus analysis, despite small differences in absolute fit indices attributable to software implementation (Supplementary Appendix S8).

Discriminant validity

Discriminant validity was evaluated using Fornell–Larcker comparisons (AVE vs. squared interfactor correlations) and HTMT. Most factor pairs met conventional criteria (see Supplementary Table S9). The closest pair was Emotional and Spiritual–Transformative (*r* = .89), which showed substantial empirical proximity. For this pair, the Fornell–Larcker criterion was not met and HTMT reached .902 (Supplementary Table S9), indicating meaningful overlap even though the two facets remained distinguishable at the latent level. Communicative and Cognitive also showed elevated proximity (r = .80; HTMT = .80). To formally test whether the Emotional and Spiritual–Transformative facets were empirically separable, we estimated a constrained five–factor model in which all items from the Emotional and Spiritual–Transformative facets were constrained to load on a single latent factor and

compared it with the primary six–factor correlated model using the WLSMV DIFFTEST procedure. The six–factor model fit significantly better than the merged five–factor alternative, DIFFTEST $\Delta\chi^2(5) = 207.58$, $p < .001$, supporting the retention of Emotional and Spiritual–Transformative as closely related but empirically distinguishable latent factors.

Supplementary analyses further examined whether Emotional and Spiritual–Transformative differed in their external correlates. In the full sample, their zero-order association patterns were broadly similar, but simultaneous regression analyses suggested partial differentiation: Emotional showed a relatively stronger unique association with aesthetic engagement, whereas Spiritual–Transformative showed relatively stronger unique associations with national identification and daily spiritual experience. This pattern was somewhat clearer in the Orthodox subsample. Taken together, these analyses support retaining Emotional and Spiritual–Transformative as closely related but only partially differentiated facets, while also indicating that the distinction should be interpreted cautiously given their substantial shared variance (Supplementary Tables S10a–S10f).

Short–form model comparison

We evaluated two content–balanced short forms: FES–30 (five items per facet) and FES–24 (four items per facet). Both short forms displayed model fit comparable to, and in some indices better than, the full scale (Table 4). The FES–24 showed the most favourable overall fit profile (RMSEA = .079, 90% CI [.075, .083]; SRMR = .037), consistent with greater parsimony. Reliability and convergent–validity indices also remained robust across forms (see Supplementary Table S3). However, because item selection and psychometric evaluation of the short forms were conducted within the same sample, these results should be interpreted as preliminary and may reflect some degree of overfitting. Item composition and additional diagnostics are reported in the Supplementary Materials.

Table 4
Global Model Fit for Full and Short Forms (FES, FES-30, FES-24)

Model	χ^2	*df*	CFI	TLI	RMSEA [90% CI]	SRMR
FES	3,574.47	579	.953	.949	.082 [.079, .084]	.050
FES-30	2,509.22	390	.962	.958	.084 [.080, .087]	.045
FES-24	1,380.16	237	.975	.971	.079 [.075, .083]	.037

Note. All χ^2 values are significant at $p < .001$.

External validity

Convergent criteria. Zero-order correlations were broadly consistent with the theoretically specified nomological network (Table 5). Across the full sample, facets were positively associated with religiosity, national identification (NAIT), and general aesthetic engagement (AEQ), with the largest effects typically observed for Cognitive, Communicative, and Spiritual–Transformative. Associations with daily spiritual experience (DSES) were positive but small across facets in the full sample (*rs* = .11–.18), consistent with

a distinction between broad everyday spirituality and fresco-specific engagement. Within the Orthodox subsample, however, Emotional and Spiritual–Transformative showed somewhat stronger associations with DSES (*rs* = .26 and .29, respectively), suggesting that among Orthodox respondents, fresco engagement — particularly its affective and spiritually construed dimensions — shows greater convergence with general spiritual orientation.

Table 5
Correlations of FES Subscales and FES total score with Convergent

FES factor	Religiosity		NAIT		AEQ		DSES	
	All	Orthodox	All	Orthodox	All	Orthodox	All	Orthodox
Visual–Aesthetic	.12	.14	.24	.26	.33	.35	.11	.16
Emotional	.28	.41	.31	.34	.36	.40	.16	.26
Cognitive	.23	.28	.29	.34	.51	.51	.14	.19
Communicative	.20	.24	.29	.35	.40	.46	.15	.19
Spiritual–Transformative	.28	.43	.33	.42	.34	.41	.18	.29
Sociocultural	.13	.16	.28	.31	.28	.30	.13	.18
FES Total (36 items)	.25	.34	.34	.41	.43	.49	.17	.26

Note. "All" = full sample; "Orthodox" = Orthodox subsample. Exact *Ns* for each coefficient and the full correlation matrices (including divergent measures), together with *p* values and Holm-adjusted p values, are reported in Supplementary Tables S10a–S10f. Between-group differences in correlations (Orthodox vs non-Orthodox) are reported in Supplementary Table S11. All coefficients shown in this table are significant at $p < .01$.

Divergent validity. Correlations with Extraversion, Neuroticism, Narcissism, and Need for Closure were predominantly small in the full sample ($|r| < .15$), supporting divergent validity. In the Orthodox subgroup, the most consistent divergent–validity pattern was observed for Need for Closure, which showed small–to–moderate positive associations across facets (rs = .16–.27), whereas associations with Narcissism remained negligible. Small negative associations with Neuroticism were also observed for several facets. Full matrices with confidence intervals and Holm–adjusted significance tests are provided in Supplementary Tables S10a–S10f.

Between–group correlation differences. Fisher's *z* tests suggested that the most consistent between-group differences involved NAIT and, to a lesser extent, religiosity, with several associations stronger among Orthodox than non-Orthodox participants (Supplementary Table S11).

Measurement invariance

Measurement invariance was tested using multi–group ordinal CFA (WLSMV) across gender (male vs. female; *N* = 778) and religious affiliation (Orthodox vs. non–Orthodox; *N* = 770), sequentially evaluating configural, metric, and threshold/scalar models (Table 6). For gender, metric invariance was supported (DIFFTEST *p* = .107) and the threshold/scalar step was borderline by DIFFTEST (*p* = .056) but showed improved approximate fit (ΔCFI = + .007; ΔRMSEA = − .012), supporting comparisons of latent means and structural relations across gender.

Table 6

Measurement Invariance Testing Across Gender and Religious Affiliation

Grouping variable	Model	χ^2	*df*	RMSEA [90% CI]	CFI	TLI	SRMR	DIFFTEST $\Delta\chi^2$ (Δdf), p
Gender	A1 Configural	3669.599	1158	.075 [.072, .077]	.959	.956	.053	—
	A2 Metric	3028.455	1188	.063 [.060, .066]	.970	.968	.055	39.905 (30), *p* = .107
	A3 Scalar	2825.324	1403	.051 [.048, .054]	.977	.979	.055	248.926 (215), *p* = .056
Religion	B1 Configural	3537.767	1158	.073 [.070, .076]	.947	.942	.059	—
	B2 Metric (partial)	3164.928	1178	.066 [.063, .069]	.956	.953	.060	29.759 (20), *p* = .074
	B3 Threshold/scalar (thresholds equal)	7431.175	1340	.109 [.106, .111]	.864	.872	.066	2845.209 (161), *p* < .001

Note. N_{Gender} = 778; $N_{Religion}$ = 770. Nested comparisons use the DIFFTEST procedure in Mplus. For ordered-categorical indicators, “scalar” invariance refers to equality of item thresholds (i.e., threshold/scalar invariance).

For religious affiliation, configural invariance was supported and partial metric invariance was achieved by freeing nine loadings (27/36 invariant; DIFFTEST *p* = .074), permitting comparison of structural relations. However, threshold/scalar invariance was strongly rejected, $\Delta\chi^2(161) = 2{,}845.21$, $p < .001$, with poor global fit, so latent mean comparisons by religious affiliation were not interpreted. Accordingly, the present data support affiliation–based comparisons of structural relations, but not mean–level comparisons, and only within the specific Orthodox–non–Orthodox contrast represented in this sample.

Sensitivity analyses (alternative parameterisation, practical fit–change decision rules, category collapsing, and nearby partial–metric specifications) did not alter these conclusions and are reported in

Supplementary Appendix S4.

Discussion

The Fresco Experience Scale (FES) was developed to assess typical (recalled) engagement with Orthodox church frescoes and to distinguish facets of that engagement beyond global liking. In ordinal CFA, a six correlated–factors model showed good fit (CFI = .953, TLI = .949, RMSEA = .082, SRMR = .050) and clearly outperformed a unidimensional alternative. A higher–order model fit acceptably but was incrementally weaker, supporting a coherent overarching construct with interpretable facet–level specificity.

Conceptually, the six facets offer a structured account of how people engage with frescoes, not merely how much they like them. Visual–Aesthetic indexes attention to formal and sensory qualities; Emotional reflects affective resonance; Cognitive captures interpretation and meaning–making; Communicative isolates an interactional stance (the sense that imagery "addresses" the viewer or conveys a message); Spiritual–Transformative reflects experiences construed as sacred, contemplative, or personally changing; and Sociocultural reflects connections to tradition, heritage, and identity. Psychometrically, loadings were consistently strong, and inter–factor correlations were moderate–to–high (up to r = .89). This pattern fits an integrated sacred–image encounter in which components co–occur but are not interchangeable. At the same time, the strongest association—particularly between Emotional and Spiritual–Transformative—highlights a common measurement reality in sacred–image contexts: affective resonance and spiritually construed significance may be tightly coupled in lived experience.

Phenomenologically, however, Emotional and Spiritual–Transformative are not conceptually interchangeable. Emotional captures the affective tone of the encounter—calm, awe, sorrow, or reverence—without presupposing any attribution of sacred significance. Spiritual–Transformative, by contrast, concerns the meaning-laden interpretation of the encounter: the sense that something sacred has been encountered, that one's perspective has shifted, or that the experience carries personal consequence beyond the moment of viewing. These processes can co-occur in liturgical settings, which helps explain their strong association, but they need not coincide in every case. Supplementary analyses provided provisional empirical support for this distinction. In the full sample, the two facets showed broadly similar zero-order external profiles, but regression analyses controlling for shared variance suggested partial differentiation: Emotional was more closely tied to general aesthetic engagement, whereas Spiritual–Transformative was more strongly linked to national identification and daily spiritual experience. This pattern was somewhat clearer in the Orthodox subsample. Taken together, these results support retaining Emotional and Spiritual–Transformative as closely related but only partially differentiated facets, while also indicating that the distinction should be interpreted cautiously given their substantial shared variance.

Alternative-structure checks help clarify how this overlap should be interpreted. The ESEM results suggest that some of the high interfactor correlations may reflect the inflation that can arise under strict

CFA simple-structure constraints when conceptually adjacent facets share content. At the same time, bifactor indices indicate a substantial general component of overall fresco engagement, supporting the use of a total score when a global summary is needed. However, because the six-facet framework offers greater theoretical specificity and interpretive resolution, facet scores remain the primary basis for profiling and hypothesis testing.

The findings also have methodological implications for individual-differences research and group comparisons. For gender, invariance was supported at a level sufficient for latent mean comparisons. For religious identification (Orthodox vs. non-Orthodox), however, threshold/scalar invariance was not supported, indicating that mean-level comparisons would be confounded by non-equivalent thresholds and some non-invariant loadings. This conclusion was robust across sensitivity checks. Accordingly, affiliation-based work should be restricted to comparisons of structural relations under partial metric invariance. An important caveat is that the non-Orthodox subsample consisted almost entirely of Muslim participants, so the observed non-equivalence reflects a specific Orthodox–Muslim comparison within this regional context, where religious affiliation co-varies with broader cultural and socio-political meaning. The present non-invariance finding should therefore not be generalised to religious affiliation in a broad or denomination-neutral sense.

An applied contribution of the present work is the preliminary evaluation of two abbreviated instruments. Both the FES–30 and FES–24 retained the intended six–factor structure and showed fit comparable to—and in some indices better than—the full scale. Reliability and convergent validity also remained robust across forms (e.g., ω typically ≥ .85; α ≥ .82), suggesting that item reduction may have removed some redundancy without collapsing the construct space. This is practically relevant because respondent burden is a known threat to response quality in multi–instrument survey designs. At the same time, these short–form results should be interpreted cautiously: item selection and psychometric evaluation were conducted within the same sample, so some degree of overfitting is possible. Accordingly, the FES-24 is best viewed at present as a provisional brief-form candidate in this sample, pending independent cross-validation.

Theoretical implications

The present validation advances theory on sacred–art engagement in three related ways. First, the six–facet structure supports the view that domain–general components of aesthetic experience extend to sacred heritage but are not sufficient on their own. Visual–Aesthetic, Emotional, and Cognitive map onto widely used accounts emphasising perceptual attention, affective response, and meaning–making. At the same time, Communicative, Spiritual–Transformative, and Sociocultural capture modes of engagement that are especially salient when images operate as religious media embedded in ritual space and collective tradition—experiencing the image as addressing the viewer, construing the encounter as spiritually consequential, and linking the artwork to heritage and identity. This pattern is consistent with perspectives in the psychology of religion that treat religious experience as assembled from general psychological capacities that are culturally elaborated within particular traditions.

Second, the pattern of relations among the six facets suggests that sacred-art engagement is phenomenologically integrated rather than fragmented into isolated responses. In practice, attention to formal qualities, affective resonance, interpretive elaboration, sensed address, spiritually construed significance, and sociocultural belonging may unfold as coordinated aspects of the same encounter. The value of the six-facet framework lies not in claiming that these components are independent in lived experience, but in showing that they remain distinguishable enough to support more precise psychological description and hypothesis testing.

Third, the external validity pattern supports an object–focused, context–sensitive account of sacred–art experience. FES facets related more strongly to conceptually proximal criteria (aesthetic engagement, religiosity, and national identification) than to daily spiritual experiences in the full sample, suggesting that the scale captures a situated form of engagement anchored in material culture and interpretive frameworks. Within the Orthodox subsample, however, the affective and spiritually construed facets showed somewhat stronger convergence with everyday spiritual orientation, suggesting a context-specific alignment between fresco engagement and daily spirituality that may be attenuated in more religiously heterogeneous samples. The stronger overall associations within the Orthodox subsample further imply that culturally learned meanings and group identification modulate the consequences and correlates of the same aesthetic object.

Practical implications

The FES provides a practical framework for studying Orthodox fresco encounters as a multidimensional experience rather than reducing responses to global liking or perceived beauty. The facets allow researchers and practitioners to specify which components are affected by contextual manipulations and interventions (e.g., guided interpretation, educational programmes, curated narratives, or community heritage initiatives), and to test whether changes occur primarily in visual–aesthetic attention, affective resonance, interpretative meaning–making, perceived “dialogue” with imagery, spiritually framed transformation, or sociocultural/identity–related connection.

The preliminarily supported short forms—particularly the FES–24—may increase feasibility for large–scale online and field research where fatigue can compromise data quality. By retaining the intended six–facet structure while reducing administration time, they appear promising for inclusion in broader survey batteries. However, because item selection and evaluation were conducted within the same sample, these brief forms require independent replication before they can be recommended for routine standalone use.

The invariance findings guide responsible comparative use. Because latent mean comparisons were supported across gender but not across religious identification (Orthodox vs non–Orthodox), gender–based analyses may include mean–level inferences, whereas affiliation–based work should avoid interpreting mean differences and instead focus on within–group profiles and on comparisons of structural relations (e.g., whether associations with religiosity or national identification differ by group).

Limitations and future directions

Several limitations qualify interpretation and generalisability. First, notable ceiling concentrations—especially for Visual–Aesthetic and Sociocultural, and in the FES–24 also for Communicative—likely reduced discrimination among highly engaged respondents and may have attenuated associations at the upper end of the score range. This issue appears particularly relevant for Sociocultural, where endorsement may partly reflect normative valuation of religious heritage in the present context. Future iterations could improve sensitivity by introducing items with higher thresholds (i.e., rarer, less normatively endorsed, or more demanding experiences) and/or evaluating alternative response formats.

Second, the sample composition limits external validity. Although measurement invariance supported comparability across gender, the over–representation of women and younger, highly educated respondents constrains the generalisability of mean levels and some external associations. Replication with more balanced sampling across age, gender, and education would strengthen the robustness of descriptive norms and validity estimates.

Third, the present evidence is specific to a context in which Orthodox heritage is salient and does not automatically generalise to other denominations, countries, or sacred-image traditions. This limitation is especially important when considering cross-religious interpretation. Although the FES showed configural and partial metric invariance across religious affiliation, threshold/scalar invariance was not supported, which precludes meaningful latent mean comparisons between Orthodox and non-Orthodox participants in the present data. Moreover, the non-Orthodox group consisted almost entirely of Muslim participants, so the observed non-equivalence reflects a specific Orthodox–Muslim comparison within a Serbian regional context in which religion, ethnicity, heritage, and socio-political meaning are partly intertwined. The present findings should therefore not be interpreted as evidence about “religious affiliation” in any broad or denomination-neutral sense. Rather, they indicate that the FES currently has its strongest validation in Orthodox or Orthodox-proximal settings, and that broader cross-denominational use will require new validation studies in samples that separate confessional, cultural, ethnic, and socio-political variation more clearly.

Fourth, the high association between Emotional and Spiritual–Transformative indicates only partial discriminant separation between these facets in the present data. This does not undermine multidimensionality, given the superior fit relative to simpler models, but it does suggest a tightly coupled experiential cluster. Future item development could sharpen this distinction by introducing content that more clearly separates immediate affective response during the encounter from reflective transformation attributed to it. Multi–method validation—for instance, combining self–report with think–aloud protocols or experience–sampling data collected in situ—would further clarify the conditions under which these two responses converge or diverge.

Another limitation is that the questionnaires were administered in a fixed order rather than counterbalanced. This may have introduced context or carryover effects in the observed external correlations, so the nomological pattern should be interpreted as informative but not entirely order-free.

Finally, the validity evidence remains constrained by design and method. All measures were self–report and collected in a single session, raising the possibility of common method variance and socially desirable responding, while the retrospective “typical experience” format may also involve memory–based reconstruction. Future work should extend validation to behavioural and longitudinal criteria (e.g., in situ engagement, revisit intentions, heritage–support behaviour), evaluate test–retest reliability, and incorporate multi–method indicators where feasible.

Conclusions

The present study provides evidence that the FES is a psychometrically sound and theoretically interpretable measure of typical (recalled) engagement with Orthodox church frescoes. Results supported a six-facet structure spanning Visual–Aesthetic attention, Emotional resonance, Cognitive meaning-making, Communicative address, Spiritual–Transformative impact, and Sociocultural connection. Although alternative-structure analyses indicated a substantial general component, supporting the use of a total score as a summary index, facet scores remain primary for theory-driven profiling. Future research should refine items showing ceiling concentration, independently cross-validate the brief forms, extend validation to behavioural and longitudinal outcomes, and test the scale in broader cultural and denominational contexts.

Abbreviations

AEQ
Aesthetic Experience Questionnaire
AVE
Average Variance Extracted
CFA
Confirmatory Factor Analysis
CFI
Comparative Fit Index
CR
Composite Reliability
DSES
Daily Spiritual Experience Scale
EFA
Exploratory Factor Analysis
ESEM
Exploratory Structural Equation Modelling
FES
Fresco Experience Scale
HTMT
Heterotrait–Monotrait Ratio

NAIT
National Identity Scale
NFCS-15
Need for Closure Scale–15
OSF
Open Science Framework
RMSEA
Root Mean Square Error of Approximation
SD3
Short Dark Triad
SRMR
Standardised Root Mean Square Residual
TLI
Tucker–Lewis Index
WLSMV
Weighted Least Squares Mean and Variance Adjusted

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki and received approval from the Ethics Committee of the Faculty of Philosophy, University of Priština in Mitrovica (Decision No. 2099, 27 November 2024). Electronic informed consent was obtained from all participants prior to participation.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

IS conceived the study, designed the research, coordinated data collection, performed the statistical analyses, and drafted the manuscript. TTJ contributed to study design, data collection, and manuscript revision. AD contributed to the theoretical framing and interpretation of the findings from the perspective of art history and critically revised the manuscript for important intellectual content. IK contributed to the theoretical framing and interpretation of the findings from the perspective of religious and cultural context and critically revised the manuscript for important intellectual content. JRM contributed to the interpretation of the findings from the perspective of language, culture, and heritage and critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets, analysis code, study materials, and online supplement supporting the conclusions of this article are publicly available in the OSF repository: https://doi.org/10.17605/OSF.IO/9P56B

References

1. Belting H. Likeness and presence: a history of the image before the era of art. Chicago: University of Chicago Press; 1994.
2. Freedberg D. The power of images: studies in the history and theory of response. Chicago: University of Chicago Press; 1989.
3. Morgan D. Visual piety: a history and theory of popular religious images. Berkeley: University of California Press; 1998.
4. Morgan D. The sacred gaze: religious visual culture in theory and practice. Berkeley: University of California Press; 2005.
5. Meyer B. Mediating absence—effecting spiritual presence: pictures and the Christian imagination. Soc Res. 2011;78(4):1029–56. https://doi.org/10.1353/sor.2011.0021.
6. Lang J, Stamatopoulou D, Cupchik GC. A qualitative inquiry into the experience of sacred art among Eastern and Western Christians in Canada. Arch Psychol Relig. 2020;42(3):317–34. https://doi.org/10.1177/0084672420933357.

7. Counted V, Zock H. Place spirituality: an attachment perspective. Arch Psychol Relig. 2019;41(1):12–25. https://doi.org/10.1177/0084672419833448.
8. Dimitrijević A, Todić Jakšić T, Stojilović I. Transcendent and aesthetic experience of religious art in Eastern Orthodox Christianity: iconography, ritual, and psychology. Collect Papers Fac Philos Univ Priština. 2025;55(3):267–83. https://doi.org/10.5937/zrffp55-57571.
9. Leder H, Belke B, Oeberst A, Augustin D. A model of aesthetic appreciation and aesthetic judgments. Br J Psychol. 2004;95(4):489–508. https://doi.org/10.1348/0007126042369811.
10. Pelowski M, Markey PS, Forster M, Gerger G, Leder H. Move me, astonish me… delight my eyes and brain: the Vienna Integrated Model of top-down and bottom-up processes in art perception (VIMAP) and corresponding affective, evaluative, and neurophysiological correlates. Phys Life Rev. 2017;21:80–125. https://doi.org/10.1016/j.plrev.2017.02.003.
11. Silvia PJ. What is interesting? Exploring the appraisal structure of interest. Emotion. 2005;5(1):89–102. https://doi.org/10.1037/1528-3542.5.1.89.
12. Csikszentmihalyi M, Robinson RE. The art of seeing: an interpretation of the aesthetic encounter. Malibu: J Paul Getty Museum; 1990.
13. Wanzer DL, Finley KP, Zarian S, Cortez N. Experiencing flow while viewing art: development of the Aesthetic Experience Questionnaire. Psychol Aesthet Creat Arts. 2020;14(1):113–24. https://doi.org/10.1037/aca0000203.
14. Hill PC, Hood RW, editors. Measures of religiosity. Birmingham: Religious Education; 1999.
15. Underwood LG. The Daily Spiritual Experience Scale: overview and results. Religions. 2011;2(1):29–50. https://doi.org/10.3390/rel2010029.
16. Brieber D, Nadal M, Leder H, Rosenberg R. Art in time and space: context modulates the relation between art experience and viewing time. PLoS ONE. 2014;9(6):e99019. https://doi.org/10.1371/journal.pone.0099019.
17. Piedmont RL. Does spirituality represent the sixth factor of personality? Spiritual transcendence and the five-factor model. J Pers. 1999;67(6):985–1013. https://doi.org/10.1111/1467-6494.00080.
18. Underwood LG, Teresi JA. The Daily Spiritual Experience Scale: development, theoretical description, reliability, exploratory factor analysis, and preliminary construct validity using health-related data. Ann Behav Med. 2002;24(1):22–33. https://doi.org/10.1207/S15324796ABM2401_04.
19. Schindler I, Hosoya G, Menninghaus W, Beermann U, Wagner V, Eid M, et al. Measuring aesthetic emotions: a review of the literature and a new assessment tool. PLoS ONE. 2017;12(6):e0178899. https://doi.org/10.1371/journal.pone.0178899.
20. Ouspensky L. Theology of the icon. Volume 1. Crestwood: St Vladimir's Seminary; 1992.
21. Paloutzian RF, Park CL, editors. Handbook of the psychology of religion and spirituality. New York: Guilford Press; 2005.
22. Pargament KI. Spiritually integrated psychotherapy: understanding and addressing the sacred. New York: Guilford Press; 2007.

23. Assmann J. Religion and cultural memory: ten studies. Stanford: Stanford University Press; 2006.
24. Mazumdar S, Mazumdar S. Religion and place attachment: a study of sacred places. J Environ Psychol. 2004;24(3):385–97. https://doi.org/10.1016/j.jenvp.2004.08.005.
25. Strayhorn JM, Weidman CS, Larson DB. A measure of religiousness, and its relation to parent and child mental health variables. J Community Psychol. 1990;18(1):34–43. https://doi.org/10.1002/1520-6629(199001)18:1%3C34:. :AID-JCOP2290180105>3.0.CO;2-M.
26. Čorkalo D, Kamenov Ž. National identity and social distance: does in-group loyalty lead to out-group hostility? Rev Psychol. 2003;10(2):85–94.
27. John OP, Donahue EM, Kentle RL. The Big Five Inventory—Versions 4a and 54. Berkeley: University of California, Berkeley, Institute of Personality and Social Research; 1991.
28. Jones DN, Paulhus DL. Introducing the Short Dark Triad (SD3): a brief measure of dark personality traits. Assessment. 2014;21(1):28–41. https://doi.org/10.1177/1073191113514105.
29. Roets A, Van Hiel A. Item selection and validation of a brief, 15-item version of the Need for Closure Scale. Pers Individ Dif. 2011;50(1):90–4. https://doi.org/10.1016/j.paid.2010.09.004.
30. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci. 2015;43(1):115–35. https://doi.org/10.1007/s11747-014-0403-8.
31. Kline RB. Principles and practice of structural equation modeling. 4th ed. New York: Guilford Press; 2016.

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