

“Feeling unseen”: Generation and psychometric validation of a scale assessing sense of absence

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ABSTRACT

Background: Online addictive behaviors are common among adolescents and may reflect efforts to cope with inner emptiness, loneliness, or emotional pain. These behaviors suggest a deeper form of emotional disconnection that existing constructs do not fully capture. To address this gap, the present study developed the Sense of Absence Scale (SoAS), a measure designed to assess adolescents’ experiences of inner void, relational invisibility, and reduced engagement in daily life. **Method:** Participants included 1,555 non-clinical adolescents aged 14–18 years. Psychometric analyses included Exploratory Graph Analysis (EGA), Confirmatory Factor Analysis (CFA), and Item Response Theory (IRT). Additionally, we examined correlations between the SoAS and several external self-report measures assessing loneliness, hope, suicidal ideation, and online addictive behaviors to consider convergent and nomological validity. **Results:** EGA indicated a stable item structure, which was confirmed by the CFA ($\chi^2(77) = 588.35, p < .01, CFI = .96, TLI = .95, RMSEA = .050$). IRT analyses showed strong discrimination and high reliability ($\alpha \approx .97$). The seven point response format provided the best fit. Convergent validity was high within SoAS items and moderately strong with emptiness. Higher SoAS scores were strongly related to emptiness and mental pain, moderately associated with suicidal ideation, loneliness, and online addictive behaviors, and negatively related to hope and self-compassion. **Conclusions:** The SoAS has psychometric support among a general population of adolescents. Future studies should examine its functioning in clinical populations and its potential in intervention development.

KEYWORDS

emptiness, psychological distress, online addictive behaviors, adolescence

INTRODUCTION

Adolescent addictions span behavioral domains, typically reflecting intertwined biological, psychological, and social processes rather than isolated phenomena. Across global and national contexts, adolescence represents a developmental window in which vulnerability to addiction peaks (Chambers, Taylor, & Potenza, 2003). The ongoing maturation of regulatory systems may heighten adolescents’ sensitivity to reinforcement and social influence (McGrath et al., 2023).

Consequently, behaviors that initially appear exploratory may become entrenched patterns that shape emotional, cognitive, and interpersonal functioning (Meier, Moeller, Riemer-Peltz, & Robinson, 2012; Schulte & Hser, 2013; Zellers, Iacono, McGue, & Vrieze, 2022). Online addictive behaviors may involve digital forms of engagement such as internet gaming, social network use, and smartphone reliance (Baggio et al., 2022; Fineberg et al., 2022;

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Flayelle et al., 2023). Each form may have specific social affordances, with gaming offering mastery and escape (Petry et al., 2014; Tsui & Cheng, 2021), social media recognition and inclusion (Kuss & Griffiths, 2011; Shannon, Bush, Villeneuve, Hellemans, & Guimond, 2022), and smartphones immediate access to stimulation and validation (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015; Sohn, Rees, Wildridge, Kalk, & Carter, 2019).

Behavioral addictions have been theorized to share common processes including dysregulated reward and control systems, difficulties in affect regulation, and reliance on external sources for stability, meaning, and social connection (Grant, Potenza, Weinstein, & Gorelick, 2010). Such putatively shared mechanisms may explain why different addictions often co-occur within individuals. Speculatively, for some adolescents, specific online behaviors may reflect broader tendencies to manage feelings of internal absence, loneliness, or emotional pain through external engagement. Understanding better specific relationships among internal states and addictive behaviors in part prompted the motivation to develop a scale assessing sense of absence (SoA) as a construct.

Sense of absence

Defining SoA has arguably been a philosophical and psychological challenge. Philosophers have debated whether absence should be understood through perceptual, meta-cognitive, or cognitive frameworks, each potentially offering partial views of how the mind registers what is not present (Gow, 2021). From psychoanalytic and developmental perspectives, absence has been proposed to contribute importantly to shaping the self. Freud (1925) viewed the mind as defending against the pain of loss by altering representations of what is missing. Winnicott (1971) and Fairbairn (1944) described how maternal unavailability may foster psychic emptiness, and Bowlby (1973) extended this to propose that inconsistent caregiving may lead to anxiety, vigilance, or avoidance in relationships. Such early adaptations may persist into adolescence and adulthood, potentially influencing emotion regulation and interpersonal functioning (Collins & Allard, 2004; Smith, Murphy, & Coats, 1999). From a developmental perspective, SoA may represent a subjective experience of emptiness (Van Gordon, Shonin, & Griffiths, 2017), mental pain (Blasco-Fontecilla et al., 2016), and loneliness (Tras, 2019; Mestre-Bach et al., 2025; Wu, Feng, & Zhang, 2024), possibly born from unfulfilled relational needs and sustained by disrupted internal representations of connection. When the capacity to internalize comfort and continuity is weakened, adolescents may depend on external means of regulation. In theory, online addictive behaviors may function as compensatory strategies, offering temporary relief from the experiences captured by SoA.

Addictive behaviors may be considered through proposed theoretical frameworks like the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2019, 2025). This model proposes that behavioral

addictions arise from the interaction between predisposing factors, affective and cognitive responses to triggers, and poor executive control. Within this framework, SoA may be conceptualized as a theoretically plausible proximal factor potentially contributing to affective distress and cognitive biases associated with behavioral addictions. To investigate SoA, developing and validating a scale is important. In this process, it would be important to consider its relationship not only to addictive behaviors but also to theoretically related and distinct constructs.

Despite SoA's theoretical relevance, no validated instrument currently measures the construct. Developing such a tool is therefore timely and relevant for better conceptualizing how experiences of inner void and emotional disconnection may relate to patterns of online engagement. The present study aimed to develop and validate a measure of SoA to support future empirical work on its potential relationships with behavioral addictions.

The current study

Although considerable research has examined factors related to addictions, fewer have focused on features theoretically particularly relevant to the current digital technology environment. The present study introduces the SoA as such a construct and develops a validated scale to assess it. SoA aims to capture adolescents' experiences of inner void, emotional disconnection, and diminished presence, states that often accompany online addictive behaviors. This perspective conceptually frames addiction not only as excessive engagement but also as a possible attempt to regulate what feels missing.

Because no validated instrument currently measures SoA, this study developed a 14-item scale capturing its proposed core dimensions. Establishing such a tool advances theoretical understanding of SoA and ultimately may inform the creation of targeted, developmentally sensitive interventions. Ultimately, it is hoped that the scale can help researchers and clinicians identify and quantify emotional disconnection that may underlie adolescent engagement in addictive behaviors.

METHOD

Participants

The study included 1,555 Israeli adolescents from the general community, comprising 650 males (42 percent), 896 females (58 percent), and 9 participants (0.6 percent) who did not report their sex. Participants ranged in age from 14 to 18 years ($M = 16.27$, $SD = 1.29$) and were enrolled in eighth ($n = 80$, 5.2 percent), ninth ($n = 204$, 13 percent), tenth ($n = 379$, 25 percent), eleventh ($n = 320$, 21 percent), or twelfth grades ($n = 550$, 36 percent), with 22 participants not reporting their grade level. Most participants identified as Israeli (96 percent) and Hebrew-speaking ($n = 1,390$, 89 percent). Socioeconomic status was assessed using the original four-point response options: "very good," "good,"

“bad,” and “very bad.” In this sample, 592 adolescents (38 percent) rated their status as very good, 906 (58 percent) as good, 45 (2.9 percent) as bad, and 9 (0.6 percent) as very bad. These categories can be interpreted along a high to low socioeconomic continuum. Regarding religious affiliation, 818 participants (53 percent) identified as religious, 311 (20 percent) as traditional, 317 (20 percent) as secular, and 104 (6.4 percent) as ultra-Orthodox.

Procedure

Participants were informed that the study aimed to explore emotional and psychological experiences among Israeli adolescents from diverse demographic backgrounds, including sex (male and female), level of religiosity (secular and religious), and geographic regions (north, south, east, and central Israel). All study measures were administered online via the Qualtrics survey platform, facilitated by trained research assistants. Parents of interested adolescents received detailed information by phone or email and were requested to provide written parental consent electronically prior to participation. Following parental approval, adolescents received an anonymized link to the survey. Questionnaires appeared in randomized order to reduce potential response biases, and all items were presented in Hebrew. Upon completion of the questionnaires, participants underwent an online debriefing and were thanked for their involvement.

Measures

Sense of absence scale (SoAS). To construct the SoAS, we first consulted five clinical psychologists and psychiatrists specializing in adolescent treatment, asking them to define the construct of “sense of absence” and identify its core components. Their definitions consistently highlighted three themes: emptiness, loneliness, and psychological pain. Following expert review for clarity, relevance, and representativeness of each item within the content domain, three items were removed because experts judged them as either redundant or insufficiently aligned with the core construct. This process aligns with recommended multi-stage content validation procedures (Almanasreh, Moles, & Chen, 2019) in which items are retained only when experts agree they adequately reflect the intended domain (e.g., considering relevance, clarity, and representativeness). After this step, 15 items remained. We then conducted cognitive interviews with ten adolescents, following best practices in scale development (Willis, 2005). These interviews combined verbal probing, in which participants paraphrased items and explained their interpretations, with think-aloud techniques that encouraged participants to articulate their thought processes as they responded. This procedure provided insights into item clarity, interpretation, and cultural relevance in the Israeli context. Based on this feedback, one additional item was removed due to frequent misunderstanding, resulting in a final scale of 14 items. The SoAS items were rated on a 7-point Likert scale ranging from (1) *do not agree* to (7) *agree very much*, with

higher scores indicating a stronger SoA. Our procedure followed established guidelines for questionnaire development (Boateng, Neilands, Frongillo, Melgar-Quinonez, & Young, 2018; DeVellis & Thorpe, 2021), ensuring conceptual grounding, cultural sensitivity, and methodological rigor (Table 1).

Data analysis

Analyses were conducted on data from 1,555 participants. Overall, 8.38% of the data was missing. Preliminary examinations indicated that missingness was consistent with a Missing At Random mechanism; therefore, missing data were handled using multiple imputation procedures (see [Supplementary Materials](#) for details). To examine the factorial structure of the Sense of Absence Scale (SoAS), we first employed Exploratory Graph Analysis (EGA). This network-based approach was used to identify the underlying dimensional structure of the scale and to evaluate item clustering. EGA was selected because of its robustness in detecting factor structures in the presence of correlated dimensions and modest item loadings. The stability of the identified structure was assessed using bootstrap procedures. To further validate the factor structure, we subsequently conducted Confirmatory Factor Analysis (CFA) within a structural equation modeling framework. Item functioning and measurement precision were then evaluated using Item Response Theory (IRT) analyses with a graded response model appropriate for Likert type items. These analyses examined item discrimination and threshold parameters, as well as overall test information, to assess how effectively the SoAS captured variation across levels of the latent construct. Alternative response category structures were explored to optimize model fit and interpretability. To assess convergent, discriminant, and nomological validity, we conducted Multi Trait Multi Method (MTMM) analyses, complemented by correlation analyses between the SoAS and theoretically relevant constructs, including measures of behavioral addictions, meaning in life, emptiness, mental pain, suicidality, loneliness, hope, self-compassion, and basic psychological needs. Given non-normal distributions, non-parametric correlation coefficients were used. Finally, measurement invariance of the SoAS was examined across gender and religious groups using multi group confirmatory factor analysis. A hierarchical sequence of increasingly restrictive models was tested, including configural, metric, scalar, and stricter levels of invariance. Model comparisons were evaluated using changes in practical fit indices. Establishing invariance allowed for meaningful comparisons of latent means across groups.

Additional technical details regarding missing data diagnostics, imputation procedures, EGA implementation, IRT model comparisons, and sensitivity analyses are provided in the [Supplementary Materials](#).

Ethics

Ethical approval for the research protocol was obtained from the Institutional Review Board (IRB).

Table 1. Questionnaires used in the current study

Characteristic	Questionnaire to be used	Brief description	Example of an item	Reliability alpha	Reliability omega
Online Addictive Behaviors					
Gaming	Internet Gaming Disorder (IGDS9-SF; Pontes & Griffiths, 2015)	9 items that evaluate the severity of IGD and its adverse effects over a 12-month period	Do you feel more irritability, anxiety or even sadness when you try to either reduce or stop your gaming activity?	0.88	0.89
Smartphone	Problematic smartphone use (short version SAS -SV; Kwon, Kim, Cho, & Yang, 2013)	10-item smartphone addiction scale (SAS-short version) was used to assess the extent of smartphone addiction	missing planned work due to smartphone use	0.86	0.89
Social Networks	Problematic Social Networks Use (PSNU; Van Den Eijnden, Lemmens, & Valkenburg, 2016)	9 items that evaluate the severity of PSNU and its adverse effects over a 12-month period	Do you regularly find that you can't think of anything else but the moment that you will be able to use social media again?	0.88	0.91
Sense of Absence and Theoretically Related Emotional Constructs					
Loneliness	Loneliness Scale (UCLA; Russell, 1996)	20-item self-rated instrument that measures one's feelings of loneliness and social isolation	There is no one I can turn to	0.90	0.93
Emptiness	Multidimensional Sense of Emptiness Scale (MSES; Ermis-Demirtas, Smith, & Watson, 2022)	13-item multidimensional measure encompassing aspects of emptiness, including a sense of inner emptiness, meaninglessness, absence of relatedness, and spiritual emptiness	I feel I do not belong to any group around me	0.94	0.95
Mental Pain	The Orbach and Mikulincer Mental Pain Scale (OMMP-8; Casanova et al., 2021)	8 items measuring experience of irreversibility, emotional flooding, and narcissistic wounds	I am rejected by everybody	0.87	0.93
Protective or Motivational Factors					
Satisfaction and Frustration	Basic Psychological Needs Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015)	24-item measure to assess the satisfaction and frustration of each need	I feel capable at what I do	0.72–0.83	0.74–0.84
Meaning in Life	Meaning in Life Questionnaire–MLQ; Steger, Frazier, Oishi, & Kaler, 2006)	10-item measure designed to measure presence of meaning and search for meaning	I am always looking to find my life's purpose	0.83	–
Hope	The Hope Scale (Snyder et al., 1996)	6 items: agency items measure successful determination toward personal goals; pathways items assess cognitive appraisals of the ability to overcome obstacles and achieve goals	At the present time, I am energetically pursuing my goals	0.91	0.93

(continued)

Table 1. Continued

Characteristic	Questionnaire to be used	Brief description	Example of an item	Reliability alpha	Reliability omega
Self-Compassion	The Self-Compassion Scale (SCS; Neff, 2003)	26-item measure of self-compassion experiences: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification	I'm kind to myself when I'm experiencing suffering	0.85	–
Suicidality and Psychological Risk					
Suicidality	P4- Suicidality Screener (Dube, Kroenke, Bair, Theobald, & Williams, 2010)	4-item brief measure for assessing suicide risk by asking about four key factors: past suicide attempts, a plan for suicide, the probability of completing suicide, and preventive factors that may reduce the likelihood of self-harm	Have you ever attempted to harm yourself in the past?	0.63	–

RESULTS

Exploratory Graph Analysis (EGA)

The initial EGA of the SoAS indicated that the factorial structure comprised one factor. When estimating the

stability of the EGA by bootstrapping with 5,000 resampling cycles, the analysis indicated exceptionally high structure and item stability, with all cycles supporting a unidimensional structure and 100% stability of all items. The EGA is presented in Fig. 1, and network loadings are in Table 2. The network loadings indicate that all items except

Sense of Absence

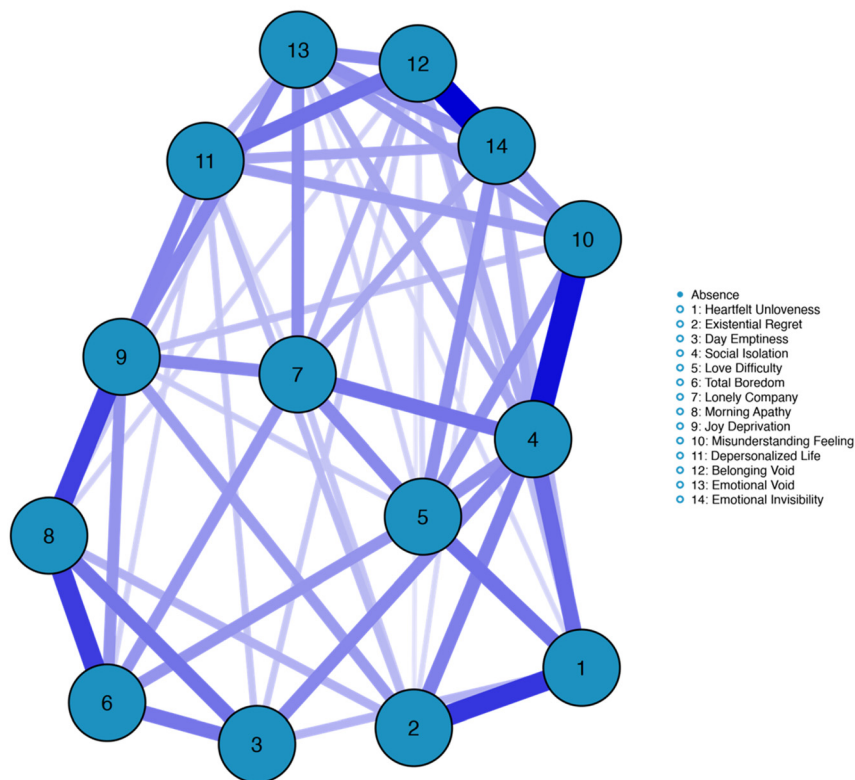


Fig. 1. Exploratory Graph Analysis (EGA) of the Sense of Absence (SoA) scale. Blue paths represent positive associations between nodes (i.e., items); the color intensity, length, and width of the paths reflect the strength of the edges (i.e., associations)

Table 2. EGA network loadings scores

Item	Labels	Network loadings
1	0.40	My heart aches, because it seems that no one truly loves me
2	0.42	Sometimes I think it would have been better if I didn't exist at all
3	0.31	At the end of the day, I feel like I've wasted another day for nothing
4	0.59	I feel alone in the world, as if no one understands me
5	0.46	It's hard for me to feel loved or to love others, even though I try
6	0.37	Almost nothing interests me, everything seems boring
7	0.46	Even when I'm with family and friends, I still feel lonely
8	0.42	It's hard for me to get up in the morning because I can't find a good reason
9	0.50	I struggle to remember the last time I truly felt happy or full of life
10	0.42	It's hard for me to find someone who truly understands me
11	0.45	I feel like I'm watching my life from the outside, unable to truly participate
12	0.55	I feel like I don't belong anywhere, and it hurts
13	0.48	There's a hole in my heart that I can't fill, no matter what I do
14	0.51	I feel transparent, as if no one really sees me

Note. Network loadings are interpreted as follows: 0.15 indicates a small effect, 0.25 indicates a moderate effect, and 0.35 indicates a large effect.

item 3 – “At the end of the day, I feel like I've wasted another day for nothing” had strong associations with the latent factor (i.e., network loading > .35), whereas item 3 had only a moderate-to-strong association (0.31). A CFA that was used to corroborate the EGA solution verified the factorial structure, $\chi^2_{(77)} = 588.35$, $p < .01$, strong $CFI = .96$, strong $TLI = .95$, $RMSEA = .050$ (90% confidence interval [CI] of .047, .053), $SRMR_{bentler} = .029$ (see Fig. 2).

Item response theory (IRT) analysis

We fitted a graded-response model (GRM, 2-parameter) to the 14 Likert items (7 response categories). Results are presented in Figs 3 and 4 and Table 3.

Discrimination. All items exceeded the recommended .70 benchmark; eleven items were >2.0, and four exceeded 3.0. Items 12 (“I feel like I don't belong anywhere, and it hurts”) and 4 (“I feel alone in the world, as if no one understands me”) were the most diagnostic, sharply distinguishing respondents that differed by even half a standard deviation on the latent SoA construct (θ).

Difficulty. Thresholds (b_1 – b_6) span $-0.90 \leq b \leq 2.88$, giving the scale coverage from approximately one standard deviation below the mean to roughly +3 SD. Items such as

3 (“At the end of the day, I feel like I've wasted another day for nothing”; $b_1 = -0.90$) were endorsed even by people low on θ , whereas item 6 (“Almost nothing interests me, everything seems boring”; $b_6 = 2.88$) and 2 (“Sometimes I think it would have been better if I didn't exist at all”; $b_6 = 2.59$) required very high θ — perhaps especially informative for respondents who endorse higher levels of absence-related experiences.

Test information. The TIF peaked at $\theta \approx 1.2$ with $I(\theta) = 31.4$, translating to an empirical reliability of $\alpha \approx .97$ and a standard error of ≈ 0.18 .

High precision ($SE < 0.32$; reliability > .90) was maintained from $\theta \approx -0.20$ to 2.8. Beyond +3 SD information fell rapidly, suggesting future work might add very “difficult” items to sharpen measurement among the most distressed respondents.

Global and item fit. The overall fit was high: $M2_{(7)} = 26.1$, $RMSEA = .033$, Standardized Root Mean Square Residual ($SRMSR$) = .038, $CFI = .992$, $TLI = .976$. Per-item fit diagnostics (ΔAIC , ΔBIC , $RMSEA_{item} \leq .05$). These measures suggest that removing any single item worsens model fit, supporting retention of all 14 items.

Response-category optimization. Collapsing to five categories reduced AIC/BIC (parsimony benefit) but produced a ten-fold rise in misfit ($M2 = 262.7$, $RMSEA = .10$). The seven-point format, therefore, balances granularity with superior model fit and was retained in the final instrument.

Taken together, data suggest that the SoAS offers a psychometrically strong, single-factor measure capable of assessing adolescents' experiences of inner void, relational invisibility, and reduced engagement in daily life across a continuum of severity, with maximal accuracy in the higher range of the latent feature.

Multi-trait multimethod analysis for appraising convergence and nomological validity

The results of the MTMM analysis are summarized in Fig. 5. Across the MTMM matrix, item-level correlations with the latent SoA factor followed a clear gradient. The 14 target items correlated most strongly with their own construct ($r = .62$ – $.82$, $Mean = .74$), evidencing strong convergent validity. Emptiness items showed moderately high—but reliably lower—associations ($r = .52$ – $.76$, $Mean = .65$), supporting theoretical relatedness yet empirical distinctiveness. Hope items were negatively related, ranging from $r = -.37$ to $-.20$ ($Mean = -.29$), while Suicidal Ideation items displayed small-to-moderate positive links ($r = .05$ – $.42$, $M = .33$). This stepped pattern—highest for absence, intermediate for emptiness, modest for hope and suicidal ideation—suggests that the SoAS captures a unique but conceptually coherent dimension, distinct from both positive states (hope) and other negative states (emptiness, suicidal ideation).

Pattern of associations between sense of absence and theoretically related constructs

Consistent with theoretical expectations, higher scores on the SoAS co-occurred most strongly with other indicators of psychological distress (Fig. 6). Emptiness and mental pain

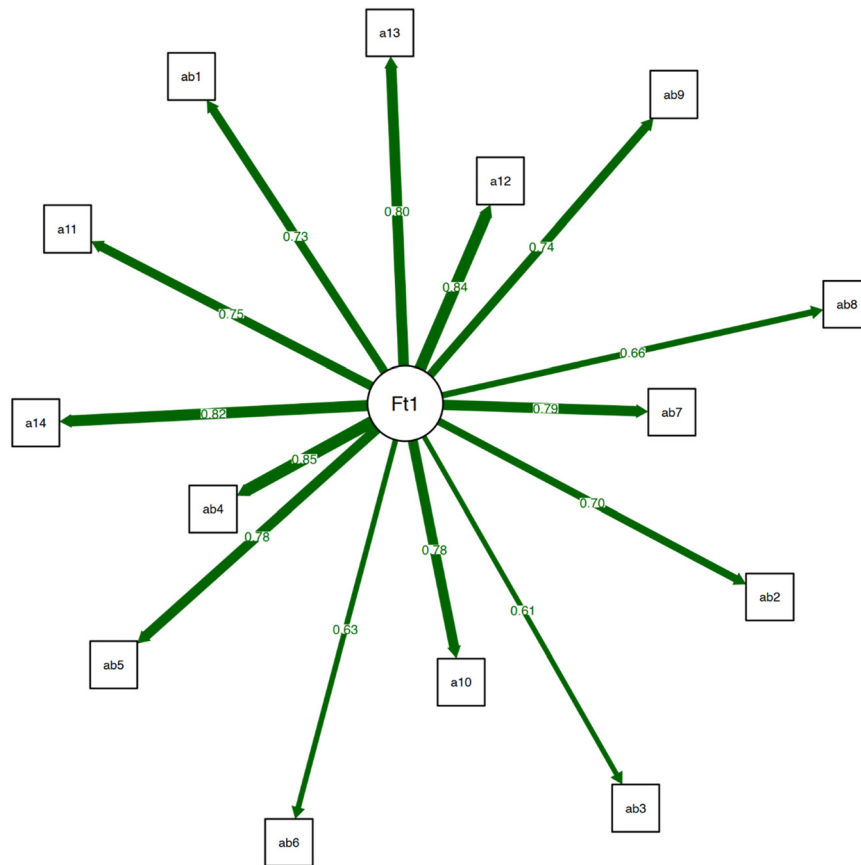


Fig. 2. Confirmatory Factor Analysis (CFA) of the Sense of Absence Scale (SoAS). Values represent factor loadings. Values above 0.70 reflect high loading, values above 0.50 (items 3, 6, and 8) reflect a good loading

showed particularly pronounced positive associations, suggesting that feeling “absent” is tightly intertwined with affective concerns and a subjective sense of inner void. The strength of these correlations — $r = .77$ with emptiness, $r = .65$ with mental pain, $r = .35$ with suicidal ideation, and $r = .33$ with loneliness — corresponds to shared variances (R^2) of approximately 59, 42, 12, and 11%, respectively. Thus, while the SoAS shares meaningful variance with constructs reflecting affective distress, a substantial proportion of unexplained variance (41–89%) suggests that the SoAS captures aspects of experience not fully accounted for by other distress-related constructs, suggesting meaningful distinctiveness beyond general affective symptoms. This pattern supports conceptual overlap within a broader affective matrix, yet maintains nomological validity by revealing unique psychological content beyond general distress. More modest positive correlations emerged with behavioral dysregulation indices, including problematic use of social networks, smartphone use, and online gaming. These associations are consistent with the possibility that an experiential void captured by the SoAS may co-occur with higher levels of engagement in various online activities, though causal inferences cannot be drawn from the current data. In contrast, protective resources displayed negative relations: greater hope, self-compassion and satisfaction of autonomy, relatedness, and competence needs were each

associated with lower AoAS scores, whereas frustration exhibited positive correlations. Collectively, this pattern positions the SoA construct as associated to varying degrees with affective distress, motivational challenges, and maladaptive coping indicators, while remaining distinguishable from positive psychological assets.

Measurement invariance across gender

Measurement invariance testing revealed that the SoAS demonstrated full measurement invariance across gender groups. The configural model showed high fit indices ($\chi^2(154) = 242.06$, $p < .001$, CFI = .972, TLI = .967, RMSEA = .062, SRMR = .035), indicating that the same factor structure was appropriate for both boys and girls.

When factor loadings were constrained to equality across gender groups in the metric invariance model, the model continued to fit well ($\chi^2(167) = 262.72$, $p < .001$, CFI = .970, TLI = .968, RMSEA = .061, SRMR = .048). The change in fit indices was minimal ($\Delta\text{CFI} = -.002$, $\Delta\text{RMSEA} = -.001$), falling well within acceptable thresholds, indicating that the items relate to their respective factors similarly for both boys and girls. This finding suggests that a one-unit change in the latent SoA construct corresponds to the same amount of change in the observed item responses for both gender groups.

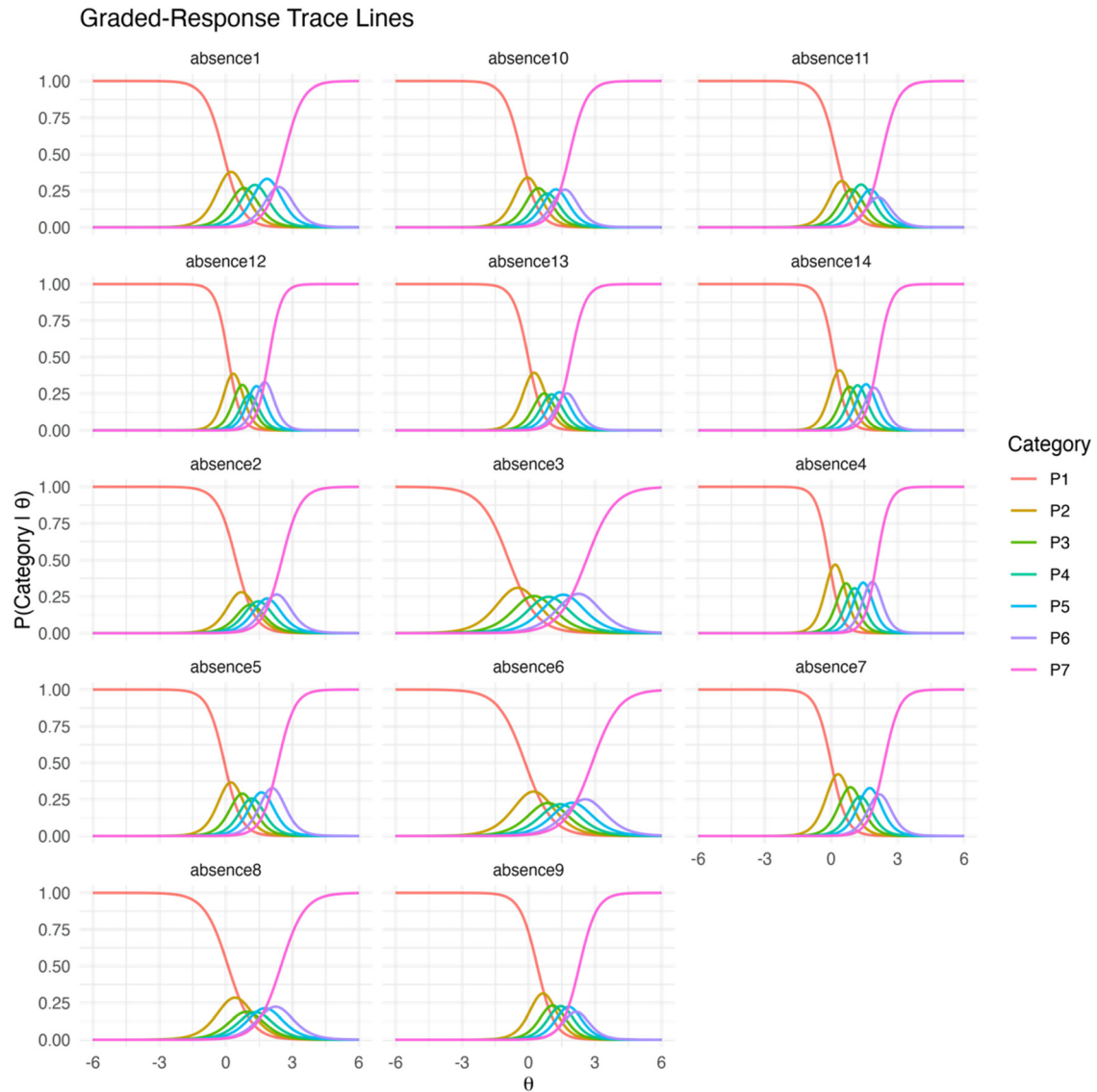


Fig. 3. Graded-response trace lines for the 14 SoAS items. Each panel displays the category-response curves for one item, plotting the probability of selecting each of the seven Likert options (P1 = “strongly disagree” through P7 = “strongly agree”) as a function of the latent trait θ . The orderly progression of peaks—from red (P1) on the far left to magenta (P7) on the far right—illustrates well-separated, monotonically increasing thresholds, indicating that higher response categories are endorsed only at higher levels of felt absence. The steepness of the intermediate curves reflects high discrimination parameters, while the clustering of category peaks between $\theta \approx -1$ and $+3$ shows that the scale is most informative within the mild-to-severe range of the construct

Full scalar invariance was supported, with acceptable fit indices ($\chi^2(180) = 288.89, p < .001, CFI = .967, TLI = .967, RMSEA = .061, SRMR = .050$) and minimal deterioration in fit ($\Delta CFI = -.003, \Delta RMSEA = .000$). This demonstrates that boys and girls use the response scale similarly and interpret the item content equivalently, allowing for meaningful comparisons of latent mean scores between the two groups. The establishment of scalar invariance is particularly important as it provides the psychometric foundation necessary for comparing observed mean scores across gender groups.

The strict invariance model, which additionally constrained residual variances across groups, was also supported ($\chi^2(194) = 302.61, p < .001, CFI = .966, TLI = .968,$

$RMSEA = .061, SRMR = .051; \Delta CFI = -.001, \Delta RMSEA = .000$). This indicates equivalent measurement precision across gender groups, meaning that the scale measures SoA with the same level of accuracy for both boys and girls. The unique variance in each item that is not explained by the latent factor is equivalent across groups.

Both latent variance invariance ($\chi^2(195) = 303.39, CFI = .966, RMSEA = .060; \Delta CFI = .000, \Delta RMSEA = -.001$) and latent means invariance ($\chi^2(196) = 304.77, CFI = .966, RMSEA = .060; \Delta CFI = .000, \Delta RMSEA = .000$) were achieved, with virtually no change in model fit. This represents the highest level of measurement invariance, indicating that the construct of SoA is measured virtually identically across gender groups at every level of the

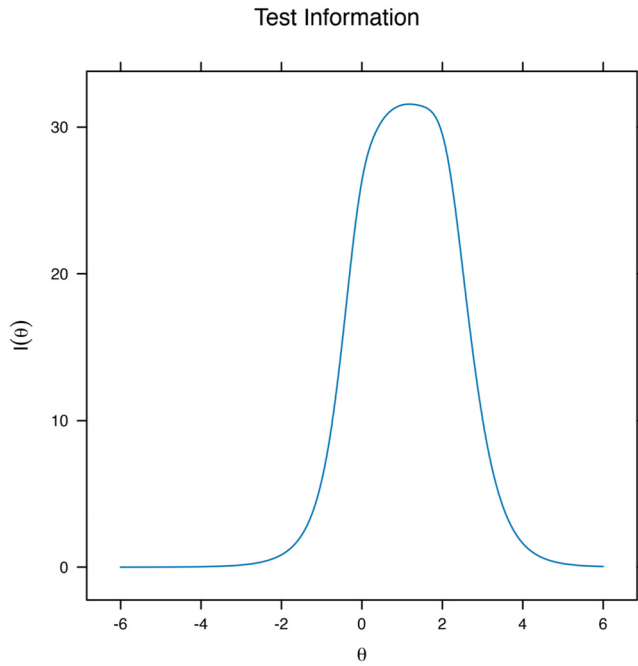


Fig. 4. Test-Information-Function for the SoAS. The curve shows the amount of measurement information, $I(\theta)$, provided by the 14-item scale across the latent trait continuum (θ). Information peaks at $\theta \approx 1.2$, reaching about 3.1, which corresponds to a marginal reliability of $\approx .97$ ($SE \approx 0.18$). High precision ($SE < 0.32$; reliability $> .90$) is maintained between roughly $\theta = -0.2$ and 2.8 , indicating that the instrument is most sensitive to mild-to-moderate levels of perceived absence and loneliness. Information drops sharply beyond $+3$ SD, suggesting the need for additional “harder” items if finer discrimination is required among individuals with extremely elevated trait levels

measurement process. The achievement of latent variance invariance suggests that the variability in SoA is comparable

between boys and girls, while latent means invariance indicates that after accounting for measurement parameters, the average levels of SoA can be meaningfully compared.

Measurement invariance across religious groups

Measurement invariance testing across three religious groups also demonstrated full measurement invariance. The configural model showed good fit ($\chi^2(231) = 361.54$, $p < .001$, CFI = .960, TLI = .953, RMSEA = .073, SRMR = .040), confirming that the same factor structure was appropriate across secular, traditional, and religious participants. This baseline model establishes that the theoretical structure of the SoA construct is understood and manifested similarly across individuals from different religious backgrounds.

When factor loadings were constrained to equality in the metric invariance model, the model maintained adequate fit ($\chi^2(257) = 408.99$, $p < .001$, CFI = .955, TLI = .952, RMSEA = .074, SRMR = .074). Although the change in CFI ($\Delta CFI = -.005$) was at the conventional threshold, and $\Delta RMSEA = .001$ was minimal, both remained within acceptable limits according to the criteria established by Cheung and Rensvold (2002), supporting metric invariance across religious groups. This finding indicates that the relationship between the latent construct and the observed items is equivalent across secular, traditional, and religious individuals, meaning that each item contributes to the overall SoAS score in the same way regardless of religious background.

Full scalar invariance was supported ($\chi^2(283) = 458.88$, $p < .001$, CFI = .950, TLI = .952, RMSEA = .075, SRMR = .077), with $\Delta CFI = -.005$ and $\Delta RMSEA = .001$, both within acceptable thresholds. This indicates that secular, traditional, and religious participants interpret the item content and use the response scale equivalently,

Table 3. Item Response Theory (IRT) values

Item	<i>a</i>	<i>b</i> 1	<i>b</i> 2	<i>b</i> 3	<i>b</i> 4	<i>b</i> 5	<i>b</i> 6	<i>h</i> 2	AIC	BIC	Item <i>M</i> 2	Item RMSEA	Δ AIC	Δ BIC
1	2.36	-0.10	0.59	1.06	1.58	2.17	2.67	0.66	81471.75	82029.77	48.79	0.04	858.77	870.39
2	2.30	0.46	0.96	1.30	1.69	2.11	2.59	0.65	81736.68	82294.70	32.25	0.03	593.84	605.46
3	1.57	-0.90	-0.09	0.58	1.24	1.93	2.67	0.46	80906.61	81464.64	32.95	0.03	1423.90	1435.53
4	3.45	-0.13	0.47	0.88	1.25	1.66	2.08	0.81	81479.06	82037.09	53.55	0.04	851.45	863.08
5	2.59	-0.07	0.52	0.99	1.39	1.86	2.36	0.70	81491.62	82049.65	65.74	0.05	838.89	850.52
6	1.67	-0.15	0.60	1.16	1.69	2.26	2.88	0.49	81425.19	81983.22	35.70	0.03	905.32	916.95
7	2.83	-0.01	0.64	1.12	1.52	2.00	2.41	0.73	81605.03	82163.05	42.50	0.04	725.49	737.11
8	1.87	0.09	0.74	1.16	1.57	2.05	2.56	0.55	81538.82	82096.85	38.29	0.04	791.69	803.32
9	2.53	0.40	0.92	1.30	1.67	2.04	2.34	0.69	81742.10	82300.13	36.28	0.04	588.41	600.04
10	2.57	-0.33	0.22	0.66	1.02	1.44	1.86	0.70	81226.03	81784.06	21.68	0.02	1104.48	1116.11
11	2.64	0.23	0.73	1.14	1.59	1.98	2.31	0.71	81577.91	82135.94	12.14	0.01	752.60	764.23
12	3.51	0.10	0.56	0.94	1.21	1.57	1.96	0.81	81511.04	82069.07	23.83	0.03	819.47	831.10
13	3.00	-0.03	0.53	0.88	1.21	1.58	1.92	0.76	81458.04	82016.07	37.25	0.04	872.47	884.10
14	3.38	0.12	0.64	1.01	1.38	1.77	2.14	0.80	81579.91	82137.93	19.42	0.02	750.60	762.23

Note. SoAS item parameters and fit indices produced by the graded-response IRT model. *a* = Discrimination reflecting slope parameter; *b*1–*b*6 = ordered category thresholds (higher values indicate greater endorsement difficulty); *h*2 = communality/factor loading squared; AIC & BIC = information criteria for the single-item mis-specification test; Item *M*2 and Item RMSEA = per-item fit statistics; Δ AIC & Δ BIC = change in information criteria when the item is removed (positive values indicate poorer fit without the item).

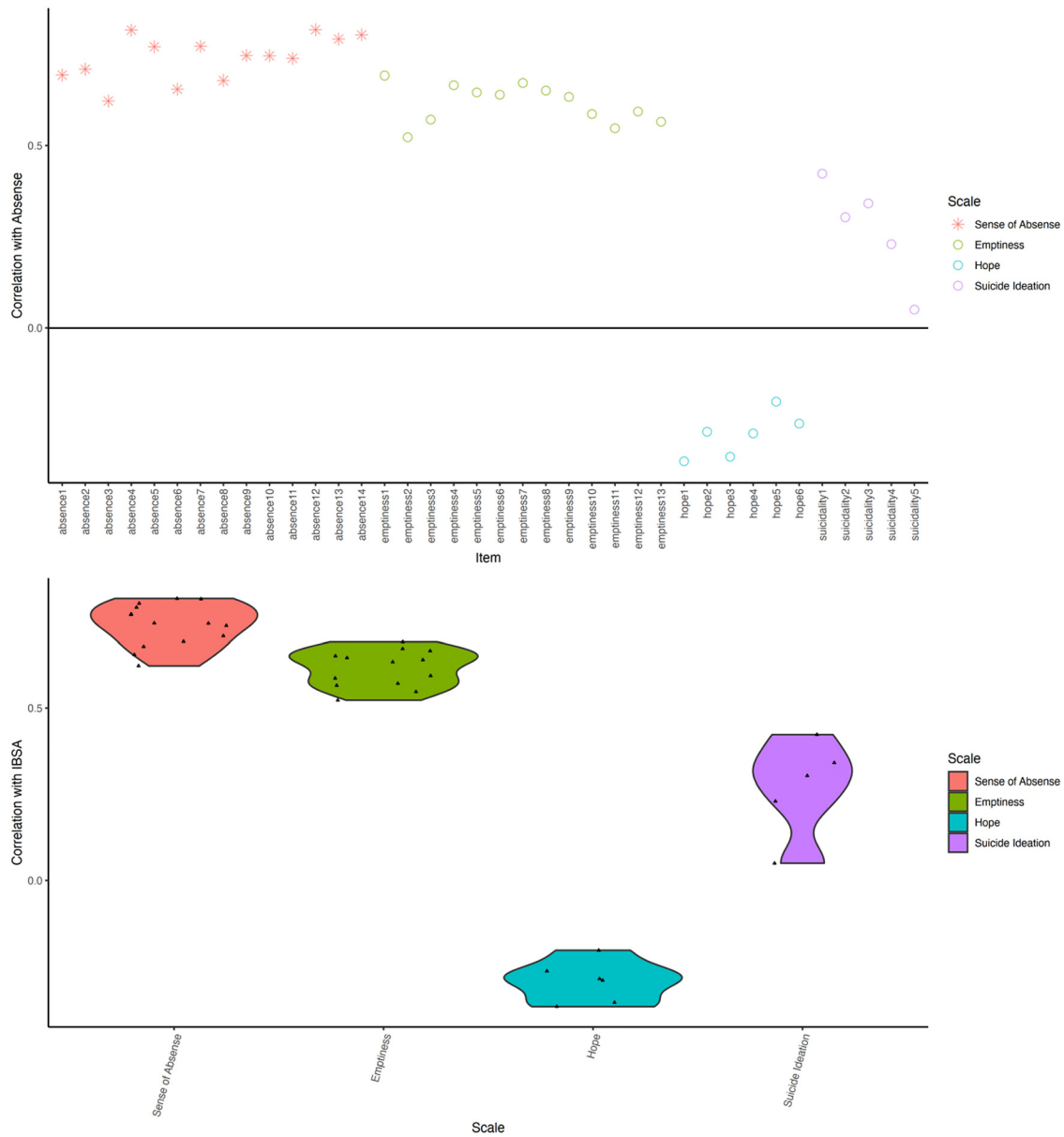


Fig. 5. Multi-trait–multi-method evidence for convergent and nomological validity of the SoAS. *Upper panel:* Item-wise correlations with the latent Sense of Absence factor are plotted for four constructs. *Red asterisks* (SoAS items) cluster highest ($r \approx .62-.82$, $M \approx .74$), indicating strong convergent validity. *Green circles* (Emptiness) form a mid-level band ($r \approx .52-.76$, $M \approx .65$), reflecting related but distinct content. *Blue-cyan circles* (Hope) appear below the zero line, confirming negative associations ($r \approx -.37$ to $-.20$, $M \approx -.29$). *Purple circles* (Suicidal-Ideation) sit modestly above zero ($r \approx .05-.42$, $M \approx .33$). *Lower panel:* Violin plots summarise these item distributions by construct: the red, left-most violin is highest and narrowest; the green violin is slightly lower; the cyan violin hovers just below zero; and the purple violin is low–mid and widest, mirroring the dispersion of the suicide-ideation items. The distinct, non-overlapping density peaks illustrate clear convergent validity for the SoAS and satisfactory nomological validity from both positive states (Hope) and alternative negative states (Emptiness, Suicidal Ideation)

enabling meaningful latent mean comparisons across these groups. The achievement of scalar invariance provides empirical justification for comparing mean levels of SoA across religious groups, as it ensures that differences in observed scores reflect true differences in the underlying construct rather than differences in how the scale functions.

The strict invariance model was supported ($\chi^2(311) = 480.01$, $p < .001$, CFI = .949, TLI = .955, RMSEA = .072, SRMR = .076), with minimal change in fit

($\Delta CFI = -.001$, $\Delta RMSEA = -.003$). Notably, the RMSEA improved slightly at this level, suggesting good model fit with constrained residual variances. This improvement in RMSEA, while the CFI remained stable, provides additional evidence that the measurement error variance is truly equivalent across the three religious groups, indicating that the scale measures with equal precision regardless of religious background.

Both latent variance invariance ($\chi^2(313) = 486.82$, CFI = .947, RMSEA = .073; $\Delta CFI = -.002$,

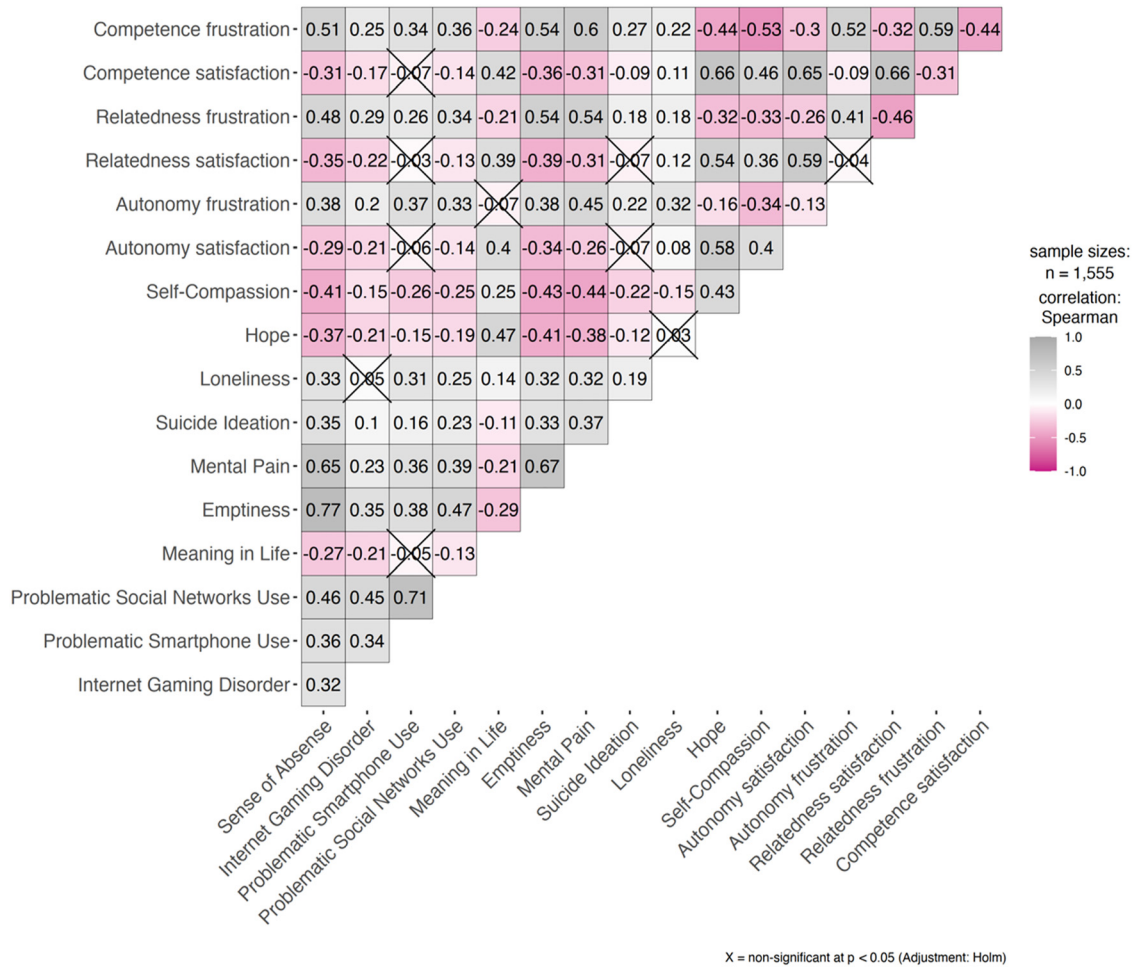


Fig. 6. Heatmap with Spearman Rho correlations between SoA and the other study measures

$\Delta RMSEA = .001$) and latent means invariance ($\chi^2(315) = 489.46$, $CFI = .947$, $RMSEA = .072$; $\Delta CFI = .000$, $\Delta RMSEA = -.001$) were achieved, with all changes in fit indices within acceptable limits. This indicates complete measurement equivalence across all three religious groups at every level of the measurement hierarchy. The establishment of latent variance and means invariance demonstrates that not only is the scale measuring the same construct in the same way across religious groups, but also that the variability and central tendency of the construct can be meaningfully compared.

DISCUSSION

The SoAS was created to measure experiences of inner “missingness,” relational invisibility, and challenges in participating in life. Psychometrically, the SoAS demonstrated a clear structure and strong psychometric properties. Conceptually, some overlap with similar constructs was expected and observed. The SoAS related strongly to emptiness and moderately to mental pain, with smaller links to suicidal ideation and loneliness; importantly, more than 40% of the variance remained unique to SoAS, suggesting

that it exists within a broader distress network but also captures content not captured sufficiently by emptiness, psychache, loneliness, or depressive-anhedonic states.

What does this distinctive content involve? While emptiness measures often focus on internal hollowness and meaninglessness, SoA may capture more fully relational invisibility, a feeling of being present but unseen or unrecognized. This aligns with emerging evidence on “anti-mattering” as a separate potential risk factor beyond loneliness (Tonini, Benucci, Flett, Fioravanti, & Casale, 2025). Additionally, SoA stresses existential detachment from participation: adolescents describe “watching life from the outside” and difficulties engaging when others are present. This focus on participatory failure is related to, but distinct from, anhedonia’s loss of pleasure; it refers to difficulties connecting being in relationships, and performing daily roles (Romer, 2025). Lastly, an SoA may reflect disrupted self-continuity and vitality, often expressed as an effort but failure to feel loved or to love others, phenomena that go beyond the passive suffering described in psychache accounts (Orbach, Mikulincer, Gilboa-Schechtman, & Sirota, 2003).

Importantly, SoA is also not a proxy for attachment insecurity. Attachment styles reflect trait-like expectations about others and the self; in contrast, SoA focuses on often

fleeting, immediate experiences of feeling unseen and difficulties participating in the here and now. Speculatively, this may align with evidence suggesting that addiction and insecure bonding involve dopaminergic and oxytocinergic systems, but the lived experience of absence, feeling transparent despite proximity and failing to “enter” shared meaning, offers a conceptual lens for interpreting why higher levels of absence-related experiences may co-occur with greater engagement in addictive online activities (Machin & Dunbar, 2011). In summary, SoA relates to affective-relational distress but emphasizes a relational-existential signature that is theoretically relevant to understanding patterns of addictive engagement and may reflect a vulnerability associated with such behaviors (Khantzian, 1997).

Although the present findings are psychometric in nature, they suggest several potential implications for future assessment and intervention research. First, including SoAS in adolescent evaluations may help identify youths whose distress revolves around relational invisibility and participatory detachment, a risk profile that standard emptiness or loneliness screens might overlook. Second, interventions may benefit from going beyond targeting mood symptom reduction to focusing on restoring social bonds and participation: practices that enhance reliable recognition (“being seen” and mattering), support authentic role-based engagement (school, family, peer groups), and rebuild meaning and a sense of future self-continuity. Such approaches align with evidence suggesting that adolescent isolation heightens addiction risk while social belonging and identity offer protection (Best, Bliuc, Iqbal, Upton, & Hodgkins, 2018). Third, treatment planning may consider testing whether substituting relational and participatory regulators, group modalities, attachment-informed family work, and structured prosocial activities to shift bonding circuits away from stress-related habits may help people with addictive disorders (Khantzian, 1997). In prevention, school-based programs that foster belonging and visibility may help prevent the shift from social absence to compensatory addictive behaviors during adolescence (Tonini et al., 2025).

Although the SoAS exhibits strong psychometric properties suggesting promising uses, limitations should be acknowledged. One limitation concerns the very high internal consistency ($\alpha \approx .97$) observed in the IRT analysis. While this reflects excellent reliability, it may also indicate partial item redundancy, as several items appear semantically overlapping and capture similar emotional tones of emptiness or disconnection. Future research could therefore explore and test a shortened version of the SoAS that preserves its psychometric strength while increasing efficiency and reducing respondent burden. Another limitation is that the current version of the scale may be overly broad, failing to specify clearly from whom or what adolescents feel absent—such as parents, friends, or teachers—potentially reducing its precision in capturing nuanced relational experiences. Future research should consider incorporating more targeted items that address specific relational sources of the SoA. Additionally, the absence of a universally accepted

definition for SoA complicates both the operationalization of the construct and the interpretation of results, highlighting the need for further theoretical clarification and consensus-building. Furthermore, the cross-sectional research design employed limits the capacity to draw causal conclusions regarding associations between SoA and related psychological outcomes. Longitudinal investigations are required to better understand how accumulated SoA experiences might influence adolescents’ mental health trajectories, relational patterns, and overall psychological well-being over time. Another notable limitation is the lack of established cutoff points distinguishing clinical from non-clinical levels of SoA, underscoring the need for additional studies aimed at determining such thresholds. A methodological limitation of the present study concerns the validation process. Both the EGA and the CFA were conducted within the same sample. Although this approach is common in initial scale development and validation studies, it may limit the robustness and generalizability of the identified factor structure. Future research should aim to replicate the CFA using an independent sample to cross-validate the factorial solution and further strengthen the evidence for the construct validity of the SoAS. Finally, the exclusive focus on adolescents aged 14–18 years raises questions regarding the generalizability of the findings to younger or older age groups. Similarly, other individual differences (e.g., sex) and jurisdictional and cultural considerations (e.g., outside of Israel) warrant examination in future studies. Subsequent research should aim to validate and adapt the SoAS for diverse developmental stages and groups to ensure broader applicability and more comprehensive utility in clinical and research contexts.

CONCLUSION

The present study developed and validated the SoAS as a reliable and theoretically grounded measure of adolescents’ experiences of inner emptiness, relational invisibility, and existential detachment. In providing strong psychometric evidence, the study provides a foundation for examining how the SoAS may enhance understanding of adolescent distress by framing the SoA construct as a distinctive relational-existential experience rather than purely an affective concern. The SoA construct suggests how adolescents may feel unseen and disconnected even when others are present, a state that has been linked to behaviors such as substance use or excessive/problematic digital engagement. The SoAS represents a research tool that may enrich research into emotional disconnection and self-continuity during adolescence. Future research should consider expanding its validation to clinical and longitudinal settings, determining predictive and diagnostic thresholds, and improving its relational specificity; for example, distinguishing absence from parents, peers, or broader social groups. Ultimately, by operationalizing the lived experience of psychological absence, the SoAS may help inform future prevention and intervention research that go beyond symptom relief to examine whether interventions that target recognition,

belonging, and social participation are relevant for adolescents reporting elevated SoA.

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Conflict of interest: The authors declare no conflicts of interest. Prof. Potenza discloses that he has consulted for and advised Boehringer Ingelheim and Neurofinity; been involved in a patent application with Yale University and Novartis; received research support from the Mohegan Sun Casino and the Connecticut Council on Problem Gambling; consulted for or advised legal, non-profit, healthcare and gambling entities on issues related to impulse control, internet use and addictive behaviors; performed grant reviews; edited journals/journal sections; given academic lectures in grand rounds, CME events, and other clinical/scientific venues; and generated books or chapters for publishers of mental health texts. Prof. Potenza is an associate editor of the Journal of Behavioral Addictions. Prof. Efrati reports no disclosures.

SUPPLEMENTARY DATA

Supplementary data to this article can be found online at <https://doi.org/10.1556/2006.2025.00373>.

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