

A Cross-Cultural Structural Equation Model of Social Anxiety: The Roles of Intolerance of Uncertainty, Fear of Negative Evaluation, and Self-Compassion

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ABSTRACT

Objective: This study aimed to test a cross-cultural structural equation model of social anxiety by examining the direct and indirect roles of intolerance of uncertainty, fear of negative evaluation, and self-compassion among adults residing in Canada.

Methods and Materials: This cross-sectional correlational study was conducted among 701 adults from culturally diverse backgrounds in Canada. Participants completed standardized self-report measures assessing social anxiety, intolerance of uncertainty, fear of negative evaluation, and self-compassion. Data were analyzed using IBM SPSS Statistics and AMOS. Preliminary analyses examined reliability, normality, and correlations among the main variables. Confirmatory factor analysis was used to evaluate the measurement model, and structural equation modeling was applied to test the hypothesized direct and indirect pathways. Bootstrap analysis with 5,000 resamples was used to examine mediation effects.

Findings: The measurement model demonstrated excellent fit to the data, $\chi^2/df = 2.23$, CFI = .965, TLI = .961, IFI = .965, GFI = .929, RMSEA = .042, and SRMR = .039. In the structural model, intolerance of uncertainty significantly predicted fear of negative evaluation ($\beta = .61$, $p < .001$), self-compassion ($\beta = -.36$, $p < .001$), and social anxiety ($\beta = .19$, $p < .001$). Fear of negative evaluation significantly predicted social anxiety ($\beta = .57$, $p < .001$), while self-compassion negatively predicted social anxiety ($\beta = -.29$, $p < .001$). Bootstrap results confirmed significant indirect effects of intolerance of uncertainty on social anxiety through fear of negative evaluation ($\beta = .35$, $p < .001$) and self-compassion ($\beta = .10$, $p < .001$). The total indirect effect was significant ($\beta = .45$, $p < .001$), and the total effect reached $\beta = .64$ ($p < .001$).

Conclusion: The findings support an integrated cross-cultural model in which intolerance of uncertainty contributes to social anxiety both directly and indirectly through increased fear of negative evaluation and reduced self-compassion.

Keywords: Social Anxiety; Intolerance of Uncertainty; Fear of Negative Evaluation; Self-Compassion; Structural Equation Modeling; Cross-Cultural Psychology.

1. Introduction

Social anxiety is a clinically and socially significant form of emotional distress characterized by persistent fear, apprehension, and avoidance in situations involving actual or anticipated interpersonal evaluation. Although social fear is a universal human experience, social anxiety becomes maladaptive when evaluative concerns, self-focused attention, anticipatory worry, avoidance, and post-event rumination interfere with social participation, academic and occupational functioning, help-seeking, and quality of life. Contemporary research increasingly conceptualizes social anxiety not as an isolated diagnostic phenomenon, but as a multidimensional and transdiagnostic condition shaped by cognitive, emotional, interpersonal, developmental, and cultural mechanisms. Systematic evidence on emotional disorders has emphasized that several cognitive-affective vulnerabilities, including repetitive negative thinking, uncertainty-related distress, evaluative threat sensitivity, and maladaptive self-relating, operate across diagnostic categories and may explain both symptom co-occurrence and individual differences in anxiety severity (Antuña-Cambor et al., 2024). In this regard, social anxiety provides a particularly important context for examining the interaction of cognitive vulnerability and self-regulatory resources, because the socially anxious individual is not only concerned about external judgment but also internally engaged in harsh self-appraisal, threat monitoring, and difficulty tolerating ambiguity in interpersonal encounters.

The relevance of social anxiety has become more pronounced in recent years due to rapid changes in social communication, post-pandemic psychosocial adjustment, digital interpersonal exposure, and increasing cultural diversity in educational, occupational, and community contexts. Social interactions now frequently occur across face-to-face, online, hybrid, and multicultural settings, which may intensify ambiguity regarding social norms, feedback, and evaluation. Studies conducted during and after the COVID-19 period have shown that uncertainty, perceived threat, stress, and reduced interpersonal predictability are closely linked with anxiety-related outcomes and psychological maladjustment (Bulut, 2022; Fu et al., 2023). Broader research on student well-being, professional stress, and adaptation under collective adversity has also demonstrated that anxiety-related symptoms are embedded in a wider network of emotional vulnerabilities and protective resources (Kiltz et al., 2023; Therriault et al., 2022). Moreover, studies among healthcare providers,

nurses, pregnant women, and men exposed to pandemic-related stressors indicate that compassion, perceived stress, uncertainty, and emotional coping are central to psychological adjustment across different social groups and cultural contexts (Chasson et al., 2022; Kavradim et al., 2022; Palma et al., 2022). These findings collectively suggest that models of social anxiety should move beyond narrow symptom description and examine the mechanisms by which uncertainty, evaluation, and self-directed emotional regulation jointly contribute to socially anxious distress.

One of the most important cognitive vulnerability factors in anxiety research is intolerance of uncertainty, which refers to the dispositional tendency to perceive uncertain situations as stressful, threatening, unacceptable, or difficult to manage. In social contexts, uncertainty is pervasive: individuals must interpret ambiguous facial expressions, conversational pauses, tone of voice, group dynamics, cultural expectations, and possible future judgments. For individuals high in intolerance of uncertainty, these ambiguous cues may be interpreted as threatening, thereby increasing anticipatory anxiety and avoidance. Recent evidence indicates that intolerance of uncertainty is meaningfully associated with social anxiety as well as generalized anxiety, and that uncertainty-related distress may differ by diagnostic profile and symptom pattern (Counsell et al., 2024). Research in first responders and student populations similarly shows that intolerance of uncertainty is not merely a situational stress response, but a broader vulnerability associated with maladaptive coping, burnout, self-regulatory fatigue, and psychological strain (Pretorius & Padmanabhanunni, 2025; Qiang et al., 2024). In academic and professional settings, individuals with greater intolerance of uncertainty may experience heightened distress when performance criteria, social expectations, or interpersonal feedback are unclear, making this construct highly relevant for understanding social anxiety in culturally diverse societies.

Recent social anxiety research further suggests that intolerance of uncertainty may contribute to anxiety through biased information-seeking and information-integration processes. Socially anxious individuals often seek reassurance, scan for signs of disapproval, selectively attend to negative cues, and interpret ambiguous social information in a threat-consistent manner. Evidence on biased information-seeking in social anxiety indicates that anxious individuals may not simply lack social information; rather, they may process available social information through

distorted evaluative filters, giving greater weight to potentially negative cues than to neutral or positive feedback (Thyagaraj et al., 2025). Similarly, excessive reassurance seeking has been identified as an interpersonal behavior associated with social anxiety, suggesting that uncertainty may be managed through repeated attempts to obtain confirmation of acceptance, safety, or social adequacy (Bui & Moscovitch, 2024). However, reassurance may provide only short-term relief while maintaining long-term dependency on external validation. These findings indicate that intolerance of uncertainty may initiate or intensify a cycle in which ambiguous social cues generate threat expectations, which then increase evaluative fear, reassurance seeking, and social avoidance.

Fear of negative evaluation is one of the most established cognitive components of social anxiety. It refers to apprehension about being judged unfavorably, criticized, rejected, embarrassed, or perceived as inadequate by others. Theoretical models of social anxiety consistently describe fear of evaluation as a central mechanism through which social situations become threatening. Empirical evidence supports the strong association between fear of negative evaluation and social interaction anxiety, and recent studies have highlighted the mediating role of personality traits in this relationship (Macovei et al., 2023). At the same time, contemporary research has expanded the evaluative framework by considering bivalent fears of evaluation, including fears of both negative and positive evaluation. The extended psychoevolutionary model suggests that socially anxious individuals may fear not only rejection and criticism but also visibility, praise, status change, and increased expectations following positive evaluation (Bates et al., 2024). Qualitative and mixed-methods work on fear of positive evaluation similarly shows that being evaluated favorably can become threatening when it is perceived as increasing scrutiny, social comparison, or future performance demands (Wilson et al., 2022). These findings deepen the understanding of evaluative fear by showing that social anxiety is not limited to explicit rejection but may reflect a broader discomfort with being socially observed, interpreted, and evaluated.

Fear of negative evaluation also represents a promising intervention target. Digital single-session interventions designed to address fear of negative evaluation among college students have demonstrated the feasibility of brief, scalable approaches for modifying evaluative concerns (Ghosh et al., 2023c). The published pilot randomized controlled trial of Project Engage further supports the

clinical relevance of targeting fear of negative evaluation in young adults, especially in contexts where traditional therapy access is limited (Ghosh et al., 2023b). In addition, preprint findings from the same intervention program underscore the importance of developing accessible psychological tools that directly address maladaptive beliefs about evaluation and rejection (Ghosh et al., 2023a). These intervention-oriented studies are important because they suggest that fear of negative evaluation is not only a correlate of social anxiety but also a potentially modifiable mechanism. Within a structural model, fear of negative evaluation may function as a mediator through which intolerance of uncertainty increases social anxiety: when uncertainty is interpreted as a sign that others may judge negatively, interpersonal situations become more threatening, and social anxiety symptoms intensify.

Self-compassion has emerged as another key construct in contemporary mental health research and may serve as a protective factor against social anxiety. Self-compassion involves responding to personal distress, failure, inadequacy, or perceived imperfection with kindness, mindfulness, and recognition of common humanity rather than harsh self-criticism, isolation, and over-identification. In social anxiety, low self-compassion may intensify symptoms because socially anxious individuals often evaluate themselves harshly, magnify perceived mistakes, and engage in shame-based self-monitoring after social encounters. Studies on anxiety and life satisfaction have shown that self-compassion mediates the relationship between anxiety and well-being, suggesting that the way individuals relate to themselves during distress may shape psychological outcomes (Maftai & Lăzărescu, 2022). Longitudinal evidence further indicates that self-compassion can moderate the association between stressors and psychological symptoms, highlighting its potential role as a resilience factor (Keng & Hwang, 2022). Research in non-clinical and educational populations also suggests that self-compassion is relevant to adjustment, performance, and achievement, as it may reduce maladaptive self-criticism and support adaptive emotional regulation (Buljubašić & Bulut, 2022). Thus, self-compassion may be particularly important in social anxiety because it can weaken the emotional impact of perceived social mistakes and reduce the tendency to define the self through anticipated external judgment.

A growing body of research specifically links self-compassion with intolerance of uncertainty. In medical students, intolerance of uncertainty and self-compassion have been examined as related constructs with important

implications for professional training, psychological resilience, and distress prevention (Poluch et al., 2022). Brief mindfulness interventions have also been shown to increase mindfulness and self-compassion while predicting increased tolerance of uncertainty among trainee psychologists, suggesting that self-compassion may be connected to more flexible responses to ambiguous or uncontrollable situations (Pickard et al., 2024). In adolescents during lockdown, self-compassion was associated with school burnout through the parallel mediating roles of intolerance of uncertainty and positivity, further supporting the idea that self-compassion may buffer the psychological cost of uncertainty-related distress (Albayrak, 2023). In women experiencing infertility, modifiable psychological factors associated with mental health included processes relevant to emotional adjustment and self-regulation, reinforcing the importance of identifying protective psychological resources in populations exposed to uncertainty and distress (Schuette et al., 2023). Taken together, these studies suggest that self-compassion may be inversely related to intolerance of uncertainty and may help explain why some individuals exposed to ambiguity and evaluative threat experience lower levels of anxiety.

Cross-cultural context is essential for understanding social anxiety because the meaning of evaluation, self-criticism, emotional expression, and compassion may vary across cultural backgrounds. In multicultural societies such as Canada, individuals may navigate multiple sets of social norms, language practices, family expectations, and identity-based evaluative pressures. Cultural background may influence whether social reticence is interpreted as politeness, humility, avoidance, or impairment, and it may also affect how individuals respond to self-criticism, uncertainty, and interpersonal feedback. Research on social anxiety in autistic individuals, for example, has emphasized that mechanisms maintaining social anxiety may extend beyond traditional cognitive models and require sensitivity to social communication differences, contextual interpretation, and lived experience (Lei et al., 2024). Similarly, studies addressing screening among women with restrictive eating disorders highlight the importance of recognizing under-detected patterns of psychological distress in populations whose experiences may be missed by conventional assessment assumptions (Adamson et al., 2022). Narrative reviews of evidence-based treatments for eating disorder symptoms also demonstrate that psychological conditions frequently involve overlapping emotional, cognitive, and interpersonal processes,

reinforcing the need for models that can account for complex symptom networks rather than single-mechanism explanations (Ortiz et al., 2026). These broader findings support the value of culturally sensitive and structurally comprehensive models of anxiety-related symptoms.

Network and systems-oriented approaches have also encouraged researchers to examine psychological symptoms as interconnected patterns of vulnerabilities and resources. Recent network analysis in chronic immune-mediated disease has shown that psychopathology, fear-related processes, and positive psychological resources can be meaningfully examined together, rather than treated as isolated domains (Mogeda El Sayed El et al., 2026). This perspective is particularly relevant to social anxiety, where intolerance of uncertainty, fear of negative evaluation, and self-compassion may form an interconnected system. Intolerance of uncertainty may increase the perceived threat of ambiguous social encounters; fear of negative evaluation may translate uncertainty into interpersonal threat; and low self-compassion may reduce the individual's capacity to recover from perceived social errors. Studies of improvisational theater in psychiatric residency and broader well-being interventions suggest that psychologically flexible, relational, and experiential approaches may reduce distress and strengthen adaptive coping in demanding social-professional environments (Katzman et al., 2023). Therefore, examining social anxiety through a structural equation model allows researchers to evaluate not only whether these variables are associated, but also how they may operate simultaneously as direct and indirect pathways.

Despite substantial progress, several gaps remain in the literature. First, although intolerance of uncertainty, fear of negative evaluation, and self-compassion have each been studied in relation to anxiety, fewer studies have integrated them into a single explanatory model of social anxiety. Second, existing work often focuses on specific subgroups, such as students, healthcare workers, clinical populations, or pandemic-affected samples, whereas culturally diverse adult samples remain comparatively underexamined. Third, although recent mediation research has directly examined the cognitive-emotional impact of negative interpretations of ambiguous social information and fear of negative evaluation on the association between intolerance of uncertainty and social anxiety subtypes, further research is needed to test integrated models that also include positive psychological resources such as self-compassion (Spiroiu & Maranzan, 2025). Finally, cross-cultural structural modeling is especially important because the psychological meaning

of uncertainty, evaluation, and self-kindness may differ across cultural communities, and failure to examine these constructs in diverse samples may limit the generalizability of existing theories.

Therefore, the aim of this study was to test a cross-cultural structural equation model of social anxiety among adults in Canada by examining the direct and indirect roles of intolerance of uncertainty, fear of negative evaluation, and self-compassion.

2. Methods and Materials

2.1. Study Design and Participants

This study employed a cross-sectional correlational design using structural equation modeling (SEM) to examine the direct and indirect relationships among intolerance of uncertainty, fear of negative evaluation, self-compassion, and social anxiety within a cross-cultural framework. The study was conducted in Canada between January and April 2026 and recruited participants from universities, community organizations, and online research platforms across several provinces, including Ontario, British Columbia, Alberta, and Quebec. Data collection was performed through a secure online survey system, allowing participation from individuals representing diverse cultural and ethnic backgrounds residing in Canada. This sampling strategy was selected to maximize cultural diversity and provide an appropriate context for examining the proposed structural relationships across heterogeneous populations.

A total of 742 individuals initially volunteered to participate in the study. After eliminating questionnaires with excessive missing values, response inconsistencies, duplicate submissions, or evidence of careless responding, 701 complete questionnaires were retained for the final analysis. Participants ranged in age from 18 to 65 years ($M = 31.42$, $SD = 10.68$), and all reported sufficient English proficiency to complete the study measures. Eligibility criteria included being at least 18 years of age, currently residing in Canada, and providing informed consent prior to participation. Individuals reporting severe cognitive impairment or inability to understand the survey language were excluded. The final sample included participants from multiple cultural and ethnic backgrounds, reflecting the multicultural composition of Canadian society and enabling the investigation of the proposed psychological model across culturally diverse groups. Participation was voluntary and anonymous, and no personally identifiable information was collected. Ethical approval was obtained from the

institutional research ethics committee before data collection commenced, and all procedures complied with internationally accepted ethical standards for research involving human participants.

2.2. Measures

Social anxiety was assessed using the Social Interaction Anxiety Scale (SIAS) developed by Mattick and Clarke (1998). The SIAS is one of the most widely used self-report instruments for measuring distress associated with social interactions and interpersonal communication. The instrument consists of 20 items rated on a five-point Likert scale ranging from 0 (Not at all characteristic of me) to 4 (Extremely characteristic of me). Higher scores indicate greater levels of social interaction anxiety. The scale primarily measures anxiety experienced during social encounters, avoidance tendencies, and discomfort in interpersonal situations. Previous psychometric studies have demonstrated excellent internal consistency, strong test-retest reliability, and robust convergent and discriminant validity across both clinical and non-clinical populations. Numerous cross-cultural investigations have further confirmed its reliability and measurement invariance across diverse cultural settings.

Intolerance of uncertainty was measured using the Intolerance of Uncertainty Scale–Short Form (IUS-12) developed by Carleton, Norton, and Asmundson (2007). The IUS-12 consists of 12 items rated on a five-point Likert scale ranging from 1 (Not at all characteristic of me) to 5 (Entirely characteristic of me). The instrument assesses two complementary dimensions of intolerance of uncertainty: prospective anxiety, which reflects excessive concern regarding future uncertain events, and inhibitory anxiety, which reflects behavioral inhibition when faced with uncertainty. Higher scores indicate greater intolerance of uncertain situations. Previous validation studies have consistently demonstrated excellent internal consistency, satisfactory construct validity, and stable factor structure across different cultures and languages. The scale has been extensively employed in research investigating anxiety disorders, emotional regulation, and cognitive vulnerability.

Fear of negative evaluation was assessed using the Brief Fear of Negative Evaluation Scale (BFNE) developed by Leary (1983). The BFNE contains 12 items assessing individuals' apprehension about receiving unfavorable evaluations from others and the tendency to expect criticism or rejection in social situations. Items are scored using a five-

point Likert response format ranging from 1 (Not at all characteristic of me) to 5 (Extremely characteristic of me), with higher total scores indicating greater fear of negative evaluation. The instrument has demonstrated excellent psychometric properties across numerous international studies, including high internal consistency, satisfactory temporal stability, and strong convergent validity with measures of social anxiety, social avoidance, and interpersonal sensitivity. Cross-cultural validation studies have also supported its applicability among culturally diverse populations.

Self-compassion was evaluated using the Self-Compassion Scale–Short Form (SCS-SF) developed by Raes, Pommier, Neff, and Van Gucht (2011). This instrument consists of 12 items rated on a five-point Likert scale ranging from 1 (Almost never) to 5 (Almost always). The scale measures overall self-compassion through six interrelated components representing positive and negative aspects of self-responding, including self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Negatively worded items are reverse scored before computing the total score, with higher scores reflecting greater levels of self-compassion. Previous investigations have consistently reported strong internal consistency, acceptable construct validity, and substantial correlations with psychological well-being, resilience, emotional regulation, and mental health indicators. Validation studies conducted in different cultural contexts have further supported the reliability and cross-cultural applicability of the instrument.

Demographic information was also collected, including age, gender, educational attainment, marital status, employment status, ethnicity, country of birth, years of residence in Canada, first language, and cultural background. These variables were used to characterize the sample and examine potential demographic influences on the primary study variables.

2.3. Data analysis

Data analysis was performed using IBM SPSS Statistics version 29 and AMOS version 29. Prior to hypothesis testing, the dataset was screened for missing values, outliers, normality, linearity, multicollinearity, and homoscedasticity. Descriptive statistics, including means, standard deviations, skewness, and kurtosis values, were calculated for all study variables. Internal consistency reliability was evaluated using Cronbach's alpha coefficients

and composite reliability estimates, while convergent and discriminant validity were examined through average variance extracted (AVE), standardized factor loadings, and construct correlations. Pearson correlation coefficients were computed to examine the bivariate relationships among social anxiety, intolerance of uncertainty, fear of negative evaluation, and self-compassion.

The hypothesized structural model was evaluated using covariance-based structural equation modeling. A two-step analytical procedure was adopted whereby the measurement model was first assessed through confirmatory factor analysis, followed by evaluation of the structural model testing the hypothesized direct and indirect pathways. Model fit was evaluated using multiple goodness-of-fit indices, including the chi-square statistic divided by degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI), Goodness-of-Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Acceptable model fit was determined according to established recommendations. Indirect effects were tested using bias-corrected bootstrap procedures with 5,000 resamples and 95% confidence intervals. Multi-group structural equation modeling was subsequently conducted to evaluate the cross-cultural stability of the proposed model by examining measurement invariance and structural path equivalence across major cultural groups represented within the sample. Statistical significance was established at $p < .05$ for all analyses.

3. Findings and Results

A total of 701 participants were included in the final analyses. The mean age of the participants was 31.42 years ($SD = 10.68$), with an age range of 18 to 65 years. Of the total sample, 372 participants (53.1%) identified as female, 322 (45.9%) as male, and 7 (1.0%) identified as non-binary or preferred not to disclose their gender. Most participants had completed undergraduate education (46.9%), followed by postgraduate degrees (31.5%), college diplomas (15.8%), and high school education (5.8%). Regarding marital status, 58.8% were single, 35.5% were married or living with a partner, and 5.7% were divorced, separated, or widowed. Participants represented diverse cultural backgrounds, including European Canadian (38.8%), East and Southeast Asian (17.7%), South Asian (15.3%), Middle Eastern (10.8%), African (7.9%), Latin American (5.6%), Indigenous (1.9%), and other multicultural backgrounds

(2.0%). Approximately 61.3% of participants were born outside Canada, further supporting the multicultural nature of the sample. The demographic characteristics confirmed

that the sample adequately represented Canada's culturally diverse adult population and was appropriate for evaluating the proposed cross-cultural structural equation model.

Table 1

Descriptive Statistics, Reliability Indices, and Correlations among the Study Variables

Variable	Mean	SD	Skewness	Kurtosis	Cronbach's α	CR	AVE	1	2	3	4
1. Social Anxiety	41.83	12.14	0.29	-0.41	.94	.95	.68	—			
2. Intolerance of Uncertainty	36.74	8.86	0.24	-0.38	.91	.92	.65	.67**	—		
3. Fear of Negative Evaluation	40.26	9.57	0.33	-0.46	.93	.94	.69	.79**	.63**	—	
4. Self-Compassion	37.48	8.21	-0.21	-0.35	.92	.93	.67	-.58**	-.55**	-.61**	—

Table 1 presents the descriptive statistics, distributional characteristics, reliability estimates, and Pearson correlation coefficients for the principal study variables. Examination of skewness and kurtosis values demonstrated that all variables were normally distributed, with values falling well within the recommended thresholds of ± 2 for skewness and ± 7 for kurtosis, indicating that the assumption of multivariate normality was reasonably satisfied. Internal consistency reliability was excellent for all instruments, with Cronbach's alpha coefficients ranging from .91 to .94. Similarly, composite reliability values exceeded .90 for every construct, demonstrating outstanding measurement reliability. Average Variance Extracted (AVE) values ranged from .65 to .69, exceeding the recommended minimum criterion of .50 and confirming satisfactory

convergent validity. Correlation analyses revealed that social anxiety exhibited strong positive relationships with intolerance of uncertainty ($r = .67, p < .001$) and fear of negative evaluation ($r = .79, p < .001$), whereas self-compassion demonstrated a substantial negative association with social anxiety ($r = -.58, p < .001$). Intolerance of uncertainty was positively associated with fear of negative evaluation ($r = .63, p < .001$) and negatively associated with self-compassion ($r = -.55, p < .001$). Likewise, fear of negative evaluation was negatively correlated with self-compassion ($r = -.61, p < .001$). These findings provided strong preliminary evidence supporting the hypothesized relationships among the constructs and justified proceeding with structural equation modeling.

Table 2

Confirmatory Factor Analysis and Measurement Model Fit Indices

Fit Index	Obtained Value	Recommended Criterion	Model Evaluation
χ^2	768.42	—	—
df	344	—	—
χ^2/df	2.23	< 3.00	Good
CFI	.965	$\geq .95$	Excellent
TLI	.961	$\geq .95$	Excellent
IFI	.965	$\geq .95$	Excellent
GFI	.929	$\geq .90$	Good
AGFI	.914	$\geq .90$	Good
RMSEA	.042	$< .06$	Excellent
SRMR	.039	$< .08$	Excellent

The confirmatory factor analysis demonstrated that the measurement model provided an excellent representation of the observed data. As shown in Table 2, the chi-square divided by degrees of freedom ratio was 2.23, indicating an acceptable discrepancy between the observed and estimated covariance matrices. The incremental fit indices were consistently high, with CFI, TLI, and IFI values all

exceeding .96, substantially surpassing recommended standards for excellent model fit. Likewise, both GFI and AGFI exceeded .90, indicating satisfactory absolute model fit. Error-based indices also supported the adequacy of the measurement model, with RMSEA equal to .042 and SRMR equal to .039, both well below conventional cutoff values. Standardized factor loadings for all observed indicators

ranged from .71 to .91 and were statistically significant ($p < .001$), demonstrating that each indicator contributed meaningfully to its respective latent construct. Collectively, these findings confirmed that the latent variables were

measured reliably and validly and that the measurement model possessed excellent psychometric properties suitable for subsequent structural analyses.

Table 3

Standardized Structural Path Coefficients of the Final SEM

Structural Path	Standardized β	SE	CR	p
Intolerance of Uncertainty \rightarrow Fear of Negative Evaluation	.61	.041	14.87	< .001
Intolerance of Uncertainty \rightarrow Self-Compassion	-.36	.048	-7.51	< .001
Fear of Negative Evaluation \rightarrow Social Anxiety	.57	.044	12.94	< .001
Self-Compassion \rightarrow Social Anxiety	-.29	.046	-6.34	< .001
Intolerance of Uncertainty \rightarrow Social Anxiety	.19	.052	3.69	< .001

The structural equation model demonstrated excellent overall fit to the data and supported all hypothesized relationships. As illustrated in Figure 1 and summarized in Table 3, intolerance of uncertainty exerted a strong positive influence on fear of negative evaluation ($\beta = .61, p < .001$), indicating that individuals experiencing greater discomfort with uncertainty were substantially more likely to anticipate negative judgments from others. Intolerance of uncertainty also showed a significant negative association with self-compassion ($\beta = -.36, p < .001$), suggesting that individuals with greater intolerance of uncertain situations tended to exhibit reduced self-kindness and emotional balance. Fear of negative evaluation emerged as the strongest direct predictor of social anxiety ($\beta = .57, p < .001$), emphasizing its central

role in the development and maintenance of socially anxious symptoms. Self-compassion demonstrated a significant negative direct effect on social anxiety ($\beta = -.29, p < .001$), indicating that greater self-compassion functioned as a psychological protective factor. Even after accounting for these mediators, intolerance of uncertainty retained a smaller but statistically significant direct effect on social anxiety ($\beta = .19, p < .001$), indicating partial mediation rather than complete mediation. Overall, the structural model explained 69.4% of the variance in social anxiety, 37.2% of the variance in fear of negative evaluation, and 24.8% of the variance in self-compassion, indicating substantial explanatory power.

Table 4

Bootstrap Analysis of Direct, Indirect, and Total Effects

Effect	Standardized Effect	Boot SE	95% CI Lower	95% CI Upper	p
Direct: Intolerance of Uncertainty \rightarrow Social Anxiety	.19	.051	.091	.292	< .001
Indirect via Fear of Negative Evaluation	.35	.036	.283	.422	< .001
Indirect via Self-Compassion	.10	.024	.058	.154	< .001
Total Indirect Effect	.45	.041	.373	.529	< .001
Total Effect	.64	.047	.551	.732	< .001

Bootstrap analyses based on 5,000 resamples confirmed the statistical significance of all indirect pathways within the proposed structural model. As shown in Table 4, intolerance of uncertainty exerted a significant direct influence on social anxiety ($\beta = .19, p < .001$); however, considerably stronger effects were observed through the mediating variables. The indirect effect operating through fear of negative evaluation was particularly substantial ($\beta = .35, p < .001$), indicating that much of the influence of intolerance of uncertainty on social anxiety was transmitted through heightened concern regarding negative interpersonal evaluation. A smaller but

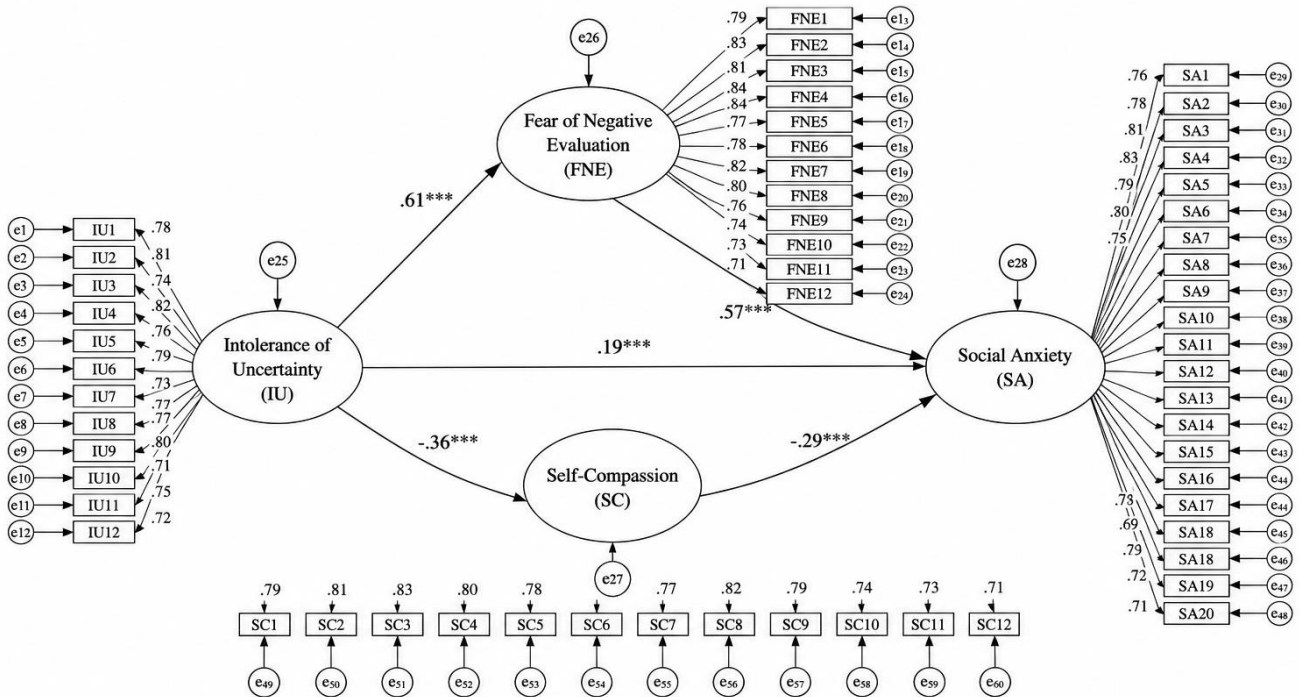
still statistically significant indirect pathway operated through self-compassion ($\beta = .10, p < .001$), demonstrating that diminished self-compassion partially explained the association between intolerance of uncertainty and social anxiety. The combined indirect effect ($\beta = .45, p < .001$) exceeded the magnitude of the direct effect, providing strong evidence of partial mediation. None of the bootstrap confidence intervals included zero, confirming the robustness of the indirect effects. The total standardized effect of intolerance of uncertainty on social anxiety reached $\beta = .64 (p < .001)$, highlighting intolerance of uncertainty as

one of the principal cognitive vulnerabilities underlying social anxiety. Overall, the structural findings strongly supported the proposed theoretical model and demonstrated that fear of negative evaluation and self-compassion

constitute important psychological mechanisms through which intolerance of uncertainty contributes to social anxiety across a culturally diverse Canadian sample.

Figure 1

Final Structural Equation Model Examining the Relationships among Intolerance of Uncertainty, Fear of Negative Evaluation, Self-Compassion, and Social Anxiety



Note. Standardized path coefficients are shown. All factor loadings are standardized and significant at $p < .001$.

χ^2 (df = 344) = 768.42, χ^2/df = 2.23, CFI = .965, TLI = .961, IFI = .965, GFI = .929, RMSEA = .042, SRMR = .039

4. Discussion

The present study examined a cross-cultural structural equation model of social anxiety by investigating the roles of intolerance of uncertainty, fear of negative evaluation, and self-compassion in a culturally diverse adult sample residing in Canada. The findings provided strong empirical support for the proposed model. Descriptive and correlational analyses indicated that social anxiety was strongly and positively associated with intolerance of uncertainty and fear of negative evaluation, while it was negatively associated with self-compassion. The measurement model demonstrated excellent psychometric adequacy, with strong internal consistency, satisfactory convergent validity, and acceptable model fit indices. The structural model further showed that intolerance of uncertainty had a significant direct effect on social anxiety and also exerted substantial

indirect effects through fear of negative evaluation and self-compassion. Fear of negative evaluation emerged as the strongest direct predictor of social anxiety, whereas self-compassion functioned as a significant protective factor.

The significant positive relationship between intolerance of uncertainty and social anxiety supports the view that difficulty tolerating ambiguity is a central cognitive vulnerability in anxiety-related conditions. Social situations are inherently uncertain because individuals must interpret facial expressions, tone of voice, silence, delayed responses, cultural expectations, and implicit feedback without complete information. For people with elevated intolerance of uncertainty, such ambiguity may be experienced as threatening and uncontrollable, thereby intensifying anticipatory worry and avoidance. This finding is consistent with evidence showing that intolerance of uncertainty is associated with social anxiety and generalized anxiety and

that uncertainty-related distress may vary across diagnostic and symptom profiles (Counsell et al., 2024). It also aligns with findings that intolerance of uncertainty contributes to maladaptive emotional outcomes in stressful and unpredictable contexts, including pandemic-related anxiety, academic burnout, and distress under conditions of social and informational instability (Bulut, 2022; Fu et al., 2023; Qiang et al., 2024). In the present study, intolerance of uncertainty retained a direct effect on social anxiety even after accounting for fear of negative evaluation and self-compassion, indicating that uncertainty itself may remain distressing in social contexts regardless of specific evaluative concerns.

The finding that intolerance of uncertainty strongly predicted fear of negative evaluation provides further insight into the cognitive pathway through which social anxiety may develop and persist. When uncertain interpersonal cues are interpreted through a threat-oriented lens, individuals may become more likely to assume that others are judging them negatively, noticing their flaws, or evaluating their performance unfavorably. This pathway is consistent with recent work showing that socially anxious individuals demonstrate biased information-seeking and information-integration processes, particularly when processing ambiguous social information (Thyagaraj et al., 2025). It also corresponds with evidence that excessive reassurance seeking is associated with social anxiety, suggesting that uncertainty may lead individuals to repeatedly seek confirmation that they have not been rejected or negatively judged (Bui & Moscovitch, 2024). However, reassurance seeking may paradoxically maintain social anxiety by preventing individuals from developing tolerance for ambiguity and confidence in their own interpretations. The present results therefore suggest that intolerance of uncertainty may not merely coexist with fear of negative evaluation but may actively intensify it by making ambiguous social situations feel more threatening and personally consequential.

Fear of negative evaluation was the strongest direct predictor of social anxiety in the structural model. This finding is theoretically expected, as fear of criticism, rejection, embarrassment, and unfavorable judgment represents one of the core cognitive features of social anxiety. The result is consistent with evidence that fear of negative evaluation is strongly related to social interaction anxiety and may operate through broader personality and cognitive-emotional mechanisms (Macovei et al., 2023). It also aligns with studies emphasizing that evaluative fears in

social anxiety are not limited to explicit criticism but may include complex concerns about visibility, social status, praise, and positive evaluation (Bates et al., 2024; Wilson et al., 2022). In this respect, the present findings strengthen the argument that social anxiety is fundamentally organized around perceived social evaluation. Individuals with high social anxiety may approach interpersonal encounters as performance situations in which mistakes are expected to result in rejection or loss of social standing. The strong effect of fear of negative evaluation in this study suggests that interventions targeting evaluative beliefs, anticipated rejection, and perceived social consequences may be especially important for reducing social anxiety symptoms.

The mediating role of fear of negative evaluation was particularly important. Bootstrap analysis showed that the indirect effect of intolerance of uncertainty on social anxiety through fear of negative evaluation was stronger than the direct effect. This indicates that uncertainty may become socially anxiogenic primarily when it is translated into concerns about being judged negatively. This finding is in line with mediation evidence showing that negative interpretations of ambiguous social information and fear of negative evaluation help explain the association between intolerance of uncertainty and social anxiety subtypes (Spiroiu & Maranzan, 2025). It is also supported by intervention research demonstrating that fear of negative evaluation can be directly targeted through brief digital interventions for college students (Ghosh et al., 2023a, 2023b, 2023c). These studies suggest that evaluative fear is not merely a descriptive symptom but a modifiable mechanism that can be addressed through cognitive restructuring, behavioral experiments, exposure to evaluation, and reinterpretation of social feedback. In the present model, fear of negative evaluation served as the principal cognitive-emotional bridge between intolerance of uncertainty and social anxiety.

The negative association between self-compassion and social anxiety further supports the role of self-directed emotional regulation in socially anxious distress. Individuals with lower self-compassion may respond to social mistakes, awkward moments, or perceived rejection with harsh self-criticism, shame, rumination, and over-identification. Conversely, individuals with higher self-compassion may be more able to interpret social imperfection as part of ordinary human experience and recover from interpersonal discomfort without excessive self-condemnation. This finding is consistent with studies indicating that self-compassion is associated with lower anxiety and higher life

satisfaction and may mediate the relationship between anxiety and psychological well-being (Maftei & Lăzărescu, 2022). It also aligns with longitudinal evidence showing that self-compassion can buffer the psychological impact of stressors and reduce symptom vulnerability over time (Keng & Hwang, 2022). Research in educational and academic contexts has similarly emphasized the relevance of self-compassion for adaptive functioning, achievement, and emotional resilience (Buljubašić & Bulut, 2022). The present findings extend this literature by showing that self-compassion is not only associated with general distress but also plays a meaningful role in the structural explanation of social anxiety.

The path from intolerance of uncertainty to self-compassion was also significant and negative, indicating that individuals who experienced greater difficulty tolerating uncertainty tended to report lower levels of self-compassion. This result suggests that uncertainty-related distress may be accompanied by a more rigid, self-critical, and threat-focused internal style. Individuals who cannot tolerate uncertainty may blame themselves for not predicting, controlling, or managing social outcomes, thereby weakening self-kindness and increasing self-judgment. This interpretation is consistent with research showing that intolerance of uncertainty and self-compassion are meaningfully related among medical students and that this association has implications for psychological resilience and professional development (Poluch et al., 2022). It also aligns with findings that mindfulness-based intervention effects on tolerance of uncertainty may be partly linked to increases in mindfulness and self-compassion (Pickard et al., 2024). In adolescent samples, self-compassion has been connected to school burnout through intolerance of uncertainty and positivity, further supporting the idea that self-compassion may protect individuals from the emotional burden of uncertainty (Albayrak, 2023). These findings help explain why self-compassion may serve as a protective pathway in the present model.

The significant indirect pathway from intolerance of uncertainty to social anxiety through self-compassion indicates that uncertainty may contribute to social anxiety partly by reducing adaptive self-relating. Although this indirect effect was smaller than the pathway through fear of negative evaluation, it remained statistically significant and theoretically meaningful. This suggests that social anxiety is not only driven by what individuals fear others will think of them but also by how they respond to themselves when uncertain or socially uncomfortable. If uncertainty triggers

self-criticism, emotional over-identification, and isolation, then even minor social ambiguities may lead to intense anxiety. This finding is compatible with research identifying self-compassion as a relevant psychological resource in stressful health, fertility, occupational, and educational contexts (Kavradim et al., 2022; Palma et al., 2022; Schuette et al., 2023). It is also consistent with transdiagnostic reviews emphasizing that emotional disorders are maintained by shared vulnerabilities and regulatory deficits rather than by disorder-specific processes alone (Antuña-Cambler et al., 2024). Accordingly, self-compassion may be conceptualized as a transdiagnostic protective factor that reduces the impact of cognitive vulnerabilities on anxiety symptoms.

The cross-cultural context of the present study adds further significance to the findings. Canada is a multicultural society in which individuals may experience diverse norms concerning self-expression, humility, emotional disclosure, interpersonal assertiveness, and social evaluation. In such contexts, uncertainty about social expectations may be especially salient, particularly for immigrants, international students, ethnic minority groups, and individuals navigating multiple cultural identities. The model's strong fit suggests that intolerance of uncertainty, fear of negative evaluation, and self-compassion are meaningful constructs for explaining social anxiety across culturally diverse participants. This interpretation is consistent with broader work indicating that anxiety mechanisms may require careful contextualization across different populations and lived experiences (Lei et al., 2024). It also resonates with research emphasizing that psychological difficulties may be under-recognized in groups whose experiences do not match dominant clinical assumptions (Adamson et al., 2022). Therefore, culturally informed social anxiety research should consider not only symptom severity but also the cultural meanings attached to evaluation, uncertainty, self-criticism, and compassion.

The present findings also support a broader systems-oriented understanding of social anxiety. Rather than viewing social anxiety as the product of a single cognitive distortion, the results suggest that it arises from the interaction of uncertainty sensitivity, evaluative threat, and self-regulatory capacity. This interpretation is consistent with network-oriented approaches showing that psychopathology, fear processes, and positive psychological resources can be examined as interconnected systems (Mogeda El Sayed El et al., 2026). Similar evidence from studies of well-being, posttraumatic growth, and

professional burnout suggests that psychological adjustment depends on the balance between vulnerability factors and adaptive resources (Katzman et al., 2023; Kiltz et al., 2023). Moreover, broader treatment reviews across related psychological conditions emphasize that evidence-based interventions often need to address multiple symptom-maintaining mechanisms rather than a single outcome domain (Ortiz et al., 2026). In the context of social anxiety, the present model suggests that reducing fear of negative evaluation and increasing self-compassion may be particularly effective when integrated with strategies for improving tolerance of uncertainty.

5. Conclusion

Overall, the results contribute to the literature by demonstrating that intolerance of uncertainty is a central vulnerability factor for social anxiety, but its effect is partially transmitted through fear of negative evaluation and self-compassion. The stronger mediating role of fear of negative evaluation confirms the centrality of evaluative threat in social anxiety, while the significant protective role of self-compassion highlights the importance of self-directed emotional regulation. The findings align with previous evidence on uncertainty-related anxiety, evaluative fear, biased interpretation of social information, reassurance seeking, and compassion-based resilience (Bates et al., 2024; Bui & Moscovitch, 2024; Maftai & Lăzărescu, 2022; Thyagaraj et al., 2025). The study therefore offers an integrated structural explanation of social anxiety that is theoretically coherent, empirically supported, and relevant for culturally diverse populations. It suggests that social anxiety may be most effectively understood as a dynamic process in which ambiguous social situations activate uncertainty distress, uncertainty distress increases evaluative fear and weakens compassionate self-regulation, and these processes together intensify socially anxious symptoms.

6. Limitations & Suggestions

The present study has several limitations. First, the cross-sectional design prevents causal conclusions regarding the direction of relationships among intolerance of uncertainty, fear of negative evaluation, self-compassion, and social anxiety. Although the proposed model was theoretically grounded and statistically supported, longitudinal and experimental designs are required to determine whether intolerance of uncertainty prospectively increases fear of negative evaluation and social anxiety or whether social

anxiety also increases intolerance of uncertainty over time. Second, all variables were assessed using self-report instruments, which may be influenced by response bias, social desirability, recall limitations, and participants' current emotional states. Third, although the sample was culturally diverse, cultural background was measured in broad categories, which may not fully capture the complexity of migration history, acculturation, language proficiency, racialization, socioeconomic position, and cultural identity. Fourth, the study was conducted among adults residing in Canada, and therefore the findings may not generalize to clinical populations, adolescents, older adults, or individuals living in countries with different cultural, social, and healthcare contexts.

Future research should examine the proposed model using longitudinal, experimental, and clinical designs. Longitudinal studies could clarify the temporal sequence among intolerance of uncertainty, evaluative fear, self-compassion, and social anxiety, while intervention studies could test whether reductions in intolerance of uncertainty and fear of negative evaluation lead to subsequent decreases in social anxiety. Future studies should also examine measurement invariance across more specific cultural, linguistic, immigrant, and ethnic groups to determine whether the constructs operate similarly across populations. In addition, future research may benefit from integrating behavioral tasks, ecological momentary assessment, clinician-rated measures, and digital interaction data to complement self-report findings. It would also be valuable to examine additional mediators and moderators, such as shame, self-criticism, emotion regulation, mindfulness, acculturative stress, perceived discrimination, social support, and cultural orientation. Such research would provide a more nuanced understanding of how cognitive vulnerability and self-regulatory resources interact across cultural contexts.

The findings have important implications for practice. Clinicians and counselors working with socially anxious individuals should assess intolerance of uncertainty, fear of negative evaluation, and self-compassion as interrelated treatment targets. Interventions may be strengthened by helping clients tolerate ambiguous social situations without excessive reassurance seeking, challenge catastrophic beliefs about negative evaluation, and develop a kinder and more balanced response to perceived social mistakes. Cognitive-behavioral techniques, exposure-based exercises, compassion-focused strategies, mindfulness practices, and culturally responsive case formulation may be especially

useful when integrated into treatment. In multicultural settings, practitioners should also attend to the client's cultural background, social norms, family expectations, language experiences, and experiences of inclusion or exclusion, as these factors may shape both evaluative fears and self-critical responses. Preventive programs in universities, workplaces, and community settings may also benefit from teaching uncertainty tolerance and self-compassion skills as part of broader mental health promotion efforts.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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