SOCIAL PRESENCE AS A FULL MEDIATOR BETWEEN ONLINE INTERACTION AND SATISFACTION: A STRUCTURAL EQUATION MODELING APPROACH

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ABSTRACT

A mediation model was developed and tested through structural equation modeling, explicating the relationships among student interaction, social presence (perceiving others as "real" in an online environment), and student satisfaction with online learning in counselor education, with a national sample of 378 participants enrolled in U.S. counseling programs. This mediation model rendered an explanation for how student interaction related to student satisfaction through social presence. To be specific, social presence fully mediated the relationship between student interaction and student satisfaction: (a) there was a statistically significant positive relationship between student interaction and social presence ($\beta = .492$, $p < .001$); (b) there was a significant relationship between social presence and student satisfaction ($\beta = .712$, $p < .001$); and (c) there was a significant relationship between student interaction and student satisfaction ($\beta = .301$, $p < .001$), but this relationship became nonsignificant and substantially reduced in magnitude ($\beta = -.049$, $p = .283$) when social presence was added to the model, indicating a full mediation model effect. Implications for online counselor education, telesupervision, and future research are provided.

Keywords: *social presence, student interaction, student satisfaction, online counselor education, full mediation*

INTRODUCTION

In accordance with the rapidly developed technology applied to higher education, online teaching and learning, including both distance education and the widely adopted emergency remote instruction mode during the COVID-19 pandemic, has gained increasing popularity in counselor education across the United States (Li & Su, 2021). The opportunity for instructor-student interactions and student-to-student interactions is key to building an engaged online learning community (Wasik et al., 2019), particularly given the highly interpersonal nature of the counseling profession, which becomes more salient in those skills-based, experiential, or clinical classes (Christian et al., 2021). Naturally, it seems intuitive to draw a direct connection between perceived student interaction and student satisfaction with online learning, especially when this relationship was substantiated by some literature in the broader educational context (e.g., Arbaugh & Rau, 2007; Sher, 2009). These significant associations appeared to indicate that student interaction directly relates to student satisfaction in online learning. And yet, emerging literature evidenced that the relationship between student interaction and satisfaction may be more complex than has been conceptualized. For example, social presence was found to be a full mediator between human-to-human interactivity and satisfaction, and a partial mediator between human-to-text interactivity and satisfaction, in digital social reading (Li et al., 2021). However, whether this mediating effect applies to the context of online counselor education remains to be investigated. The present

study examines the hypothetical mediating role of social presence between student interaction and student satisfaction with online learning using a large, national sample of counselor trainees.

LITERATURE REVIEW

Student Interaction and Satisfaction with Online Learning

Interactivity is a multidimensional entity (Li et al., 2021). While some scholars approach it as a total construct in online learning (e.g., Gray & DiLoreto, 2016), others dissect it into different dimensions. For instance, Muzammil et al. (2020) conceptualized interactions in online learning from three aspects—student interactions with other students, student interactions with tutors/teachers, and student interactions with content. Given the highly interpersonal nature of counselor education, student interaction with other students was specifically targeted in the present study.

Regardless of its form, student interaction is deemed an important component of satisfaction and persistence for online learners (Croxton, 2014). Despite the intuitive appeal of the positive correlation between student interaction and student satisfaction with online learning, there have been mixed findings about the statistical significance of such a relationship. For instance, Sher (2009) found student-instructor interaction and student-student interaction to be significant contributors to student satisfaction with a sample of students across multiple academic disciplines. But student interaction did not significantly impact student satisfaction in Gray and DiLoreto's (2016) study with graduate students from an online educational leadership program or Kuo et al.'s (2013) study of undergraduate and graduate students enrolled in summer online courses across multiple disciplines in the College of Education at a university. Moreover, Arbaugh and Rau (2007) reported a negative correlation between learner-learner interaction and delivery medium satisfaction in online courses of an MBA program. What added further complications to the mixed findings about the relationship between the two was that the recent literature captured a more nuanced mechanism that explained how student interaction related to their satisfaction with online learning. For example, Muzammil et al. (2020) found that when economics students became more interactive in online learning, their engagement level increased as well, which ultimately led to more student satisfaction. But the mediating role of student engagement between student interaction and satisfaction was not supported by Gray and DiLoreto's (2016) study.

Specifically in the context of counselor education, the association between student interaction and their satisfaction with online learning is understudied. Sheperis et al. (2020) identified a clear takeaway through informal interviews that the more students interacted with each other and with faculty both in and outside the class, the more fulfilling their experience was with online education. In Snow et al.'s (2018) study of 31 online counselor educators, "fostering student engagement" was the most popular answer to two open-ended questions (best practices in online counselor education and lessons learned from online counselor education). Correspondingly, they recommended online counselor training models that provide students with more opportunities to engage each other in a consistent and effective pattern of positive interactions. What is not clear is whether student interaction relates to their satisfaction with online counselor education in a similar fashion to that identified in broader educational contexts. Regardless of commonality or uniqueness, it warrants a systematic examination.

Social Presence in Online Learning

Counseling is a person-to-person experience (Benshoff & Gibbons, 2011), so training counselors online is often perceived as not intuitively appealing as in-person training. Such contrast becomes more striking when training transpires in an asynchronous manner where course participants cannot see and interact with one another in real time (Benshoff & Gibbons, 2011). As such, being able to feel "real" and make oneself perceived by others as "real" inevitably relates to one's online learning experience, which brings scholarly attention to social presence. Benshoff and Gibbons (2011) underlined that "students must feel they can be 'real' people in the virtual classroom" (p. 25). In a recent meta-analysis, Richardson et al. (2017) drew upon various definitions of social presence and abstracted the commonality across them—social presence "is the ability to perceive others in an online environment" (p. 403). While the original research base of social presence can be dated back further, Short et al. (1976) coined and defined the

term *social presence* as "the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions" (p. 65). In this study, Kreijns et al.'s (2020) measure was adopted to examine the first part of Short et al.'s (1976) definition, namely, "the psychological phenomenon that the other is perceived as 'real' in the communication; the subjective feeling of being with other salient social actors in a mediated space" (Kreijns et al., 2020, p. 199).

Despite the critical role of social presence in online learning, this concept has not been adequately studied when applied to the highly interpersonal counseling profession. Both Benshoff and Gibbons (2011) and Holmes et al. (2020) discussed social presence within the community of inquiry (CoI) framework wherein "social presence lays the groundwork for higher level discourse; and the structure, organization, and leadership associated with teaching presence creates the environment where cognitive presence can be developed" (Garrison & Arbaugh, 2007, p. 163). For example, to help build a level of social presence in an online group counseling course, Benshoff and Gibbons (2011) suggested that instructors (a) provide on-campus training to help students feel comfortable and equip them with technology; (b) invite students to reflect on their own professional experiences and model the use of humor, restatement, encouragement, and positive reinforcement throughout the course; and (c) encourage students to connect with their peers and instructors in class, use names liberally, and be mindful of the timing for socializing in class (e.g., beginning, end, and break). Holmes et al. (2020) empirically examined the construct of social presence in their study. Specifically, they found that in-person counselor trainees reported significantly higher perceptions of social presence than their online counterparts, although the perceived level of social presence was not associated with learning outcomes. But their study only included master's level counselor trainees, and those students self-selected into one of the two learning formats (on-campus or online) across four didactic courses from the same program. To expand understanding of this construct, a larger, more representative sample across the nation is warranted.

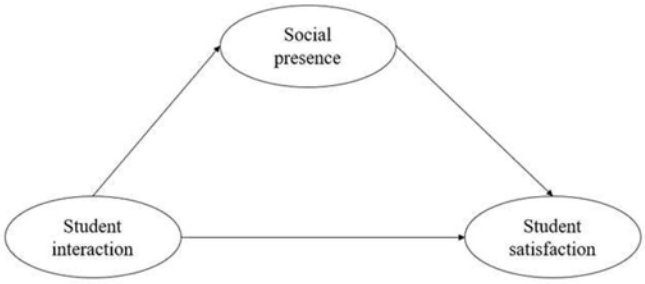
In spite of a scant body of counseling literature concerning social presence, this construct has been extensively discussed in other fields, such as distance education (e.g., Gunawardena & Zittle, 1997; Tu & McIsaac, 2002) and human-computer interaction (e.g., Bente et al., 2008; Li et al., 2021). For instance, Dunlap and Lowenthal (2009) recommended the use of Twitter to encourage free-flowing, just-in-time interactions and discussed how these interactions can enhance social presence in online courses. Gunawardena and Zittle (1997) identified social presence as a predictor of student satisfaction within a computer-mediated conferencing environment. The positive correlation between social presence and student satisfaction was also corroborated by Akyol and Garrison's (2008) study of graduate students in an online course. As Richardson et al.'s (2017) meta-analysis concluded, a moderately large positive average correlation existed between social presence and satisfaction ($r = 0.56$, $k = 26$) across contexts, disciplinary areas, and measures of social presence. These studies support the conceptual model of this study where interaction in online learning may affect one's perceived sense of the "realness" of others (social presence), which may ultimately lead to one's satisfaction.

The Mediating Role of Social Presence

In addition to the bivariate correlations identified between the three variables (student interaction, social presence, and student satisfaction), further speculations about how they related to one another emerged in recent works. For example, in Li et al.'s (2021) study of digital social reading, social presence fully mediated the relationship between human-to-human interactivity and satisfaction, whereas it partially mediated the relationship between human-to-text interactivity and satisfaction. But whether this underlying mechanism functions in the same manner in online counselor education remains unknown. According to Gunawardena and Zittle (1997), "Interactivity is a quality (potential) that may be realized by some or remain an unfulfilled option for others. When it is realized and when participants notice it, there is 'social presence'" (pp. 10–11). Although interactivity was sometimes conceptualized as a dimension of social presence (e.g., Tu & McIsaac, 2002), it takes an additional step to make interactivity realized or enter one's awareness (Gunawardena & Zittle, 1997). As such, social presence is postulated as a mediator of, rather than a precursor to,

student interaction in the proposed model of this study (see the path diagram in Figure 1). Taken together, it is hypothesized that social presence mediates the relationship between student interaction and student satisfaction with online learning in counselor education.

Figure 1.
Mediation Model Depicting Direct and Mediated Relationships



METHOD

Participants

Participants in this study were a subset of a larger national sample (Li, 2022). They completed all the key measures used in this study. Of the 378 participants, 325 (85.98%) self-identified as female, 45 (11.90%) self-identified as male, six (1.59%) indicated other (e.g., nonbinary, transgender), and two (.53%) preferred not to answer. In this diverse sample, 267 (70.63%) were White, 35 (9.26%) Hispanic or Latino/a, 25 (6.61%) Black or African American, 20 (5.29%) Asian, 19 (5.03%) two or more races, 11 (2.91%) other, and one (.26%) preferring not to answer. More than half (n = 228, 60.32%) were in the age range of 20–29 years old, 82 (21.69%) were 30–39, and 68 (17.99%) were 40 years or older. Most counselor trainees (n = 331, 87.57%) were at the master's level and 47 (12.43%) were doctoral level students. Within this sample, half (n = 189, 50.00%) were from face-to-face programs, 176 (46.56%) from online programs, with 13 (3.44%) indicating other types of programs (e.g., hybrid).

Procedure

Upon the university Institutional Review Board (IRB) approval, I employed multiple means to recruit participants: (a) emailing all the Council for Accreditation of Counseling and Related Educational Programs (CACREP) liaisons of more than 800 counseling programs for recruitment distribution, and (b) posting recruitment announcements via professional networks, including COUNSGRADS Listserv, American Counseling Association (ACA) Connect, CESNET-L, and DIVERSEGRAD-L. According to the inclusion criteria, eligible participants should be at least 18 years old, enrolled in a counseling program (e.g., mental health counseling, school counseling, counselor education and supervision) in the United States at the time of the study, and have had online learning experience (either through online programs or remote learning due to COVID-19). Over the two months of recruitment, 384 participants completed all the key measures used in this study via Qualtrics, but only 378 were included in the eventual sample due to six extreme scores. The estimated response rate was less than 1%.

MEASURES

Demographic Questionnaire

The Demographic Questionnaire is placed at the beginning of the online survey to collect basic information about participants, including gender, race/ethnicity, age, training level, and program type.

Distance Education Learning Environments Survey

The Distance Education Learning Environments Survey (DELES; Walker, 2020) is used to measure the psychosocial learning environment in postsecondary distance education. The DELES includes a total of seven scales with 42 items. The first six (34 items) are psychosocial scales that measure the online learning environment, which include *instructor support* (eight items), *student interaction and collaboration* (six items), *personal relevance* (seven items), *authentic learning* (five items), *active learning* (three items), and *student autonomy* (five items). The last is an *enjoyment* scale with eight items measuring students' affective traits. Each item in DELES is measured on a Likert scale of 1–5 (*never*, *seldom*, *sometimes*, *often*, *always*). Participants' scores for each scale were calculated and interpreted separately, without being combined to form a single score, per the manual scoring key (Walker, 2020). Notably, of these seven scales, only *student interaction and collaboration* (shortened to *student interaction* as a latent predictor) and *enjoyment* (referred to as *satisfaction* as a latent outcome) were included in the proposed model of this study. A sample item of student interaction is, "In this class,

I work with others." A sample item of student satisfaction is, "Distance education is stimulating." (Note to the two sample items: Reproduction by special permission of the Publisher, Mind Garden, Inc., www.mindgarden.com from the Distance Education Learning Environments Survey by Scott L. Walker. Copyright © 2020 by Scott L. Walker. Further Reproduction is prohibited without the Publisher's written consent.) In the original study (Walker, 2020; Walker & Fraser, 2005), the Cronbach's alpha was .94 for student interaction and collaboration, and .95 for enjoyment. Similarly, in this study, the Cronbach's alpha was .913 for student interaction and collaboration and .951 for enjoyment.

Social Presence Measure

The Social Presence Measure (SPM; Kreijns et al., 2020) is used to study the extent to which the other person is perceived as physical "real" in mediated communication (e.g., text, audio, and video). Specific to the present study, it was used to measure the degree to which other students are perceived as "real" in the online learning environment. The SPM encompasses two dimensions of social presence: *awareness of others* and *proximity to others*. The first was measured by 15 items and the latter by12 items. Each item was rated on a 5-point Likert scale (1 = *totally disagree*, 5 = *totally agree*). A sample item for the awareness of others is, "In this learning environment, I only can get a glimpse of my fellow students." A sample item for the proximity to others is, "In this learning environment, I feel that I can see my fellow students right in the eyes." In the original study, the Cronbach's alphas were .92 and .94 for each dimension, respectively. In the current study, the Cronbach's alpha was .895 for awareness of others and .948 for proximity to others. Per the measure developers' request (via personal correspondence), the Likert scale scores of the SPM were converted to Rasch Person measures. Accordingly, the two dimensions (awareness of others and proximity to others) were conceptualized as the two indicators of the latent construct (social presence).

Data Analysis

An a priori power analysis was conducted to determine the required sample size for the present study, which includes three latent variables and 21 observed variables (including five covariates). With an anticipated medium effect size of .3, a desired statistical power level of .8, and an alpha error rate of .05, the minimum sample size to detect effect would be 119. The eventual sample size of the current study ($N = 378$) meets this requirement.

The structural equation modeling (SEM) analysis was conducted by following five logical, sequential steps (Bollen & Long, 1993; Crockett, 2012) using SPSS Amos 29—an SEM computer tool. First, a theoretical model where three latent variables of interest (student interaction, social presence, and student satisfaction) and the relationships among them were specified based on the literature (see the path diagram in Figure 1). Second, both a measurement model and a structural model were identified. The measurement model included three latent constructs: student interaction, which had six indicators; social presence, which had two indicators after the Rasch transformation per the measure developers' guide (Kreijns et al., 2020); and student satisfaction, which had eight indicators. To establish a structural model, both the recursive rule and the *t* rule (Bollen, 1989) were examined and passed. Specifically, the structural model in this study was recursive, which is supported by both a visual inspection of the model's path diagram (see Figure 1) where all relationships specified in the model are unidirectional (Crockett, 2012) as well as the Amos analysis output. To pass the *t* rule, structural models have more "known" pieces of information than "unknown" pieces to find unique solutions (Crockett, 2012). In this study, there were 21 observed variables and 66 distinct parameters to be estimated. Accordingly, the number of "knowns" was 231 by following the equation $p(p + 1)/2$, where p denotes the number of observed variables (Crockett, 2012), which exceeds the number of the unknowns (parameters to be estimated; overidentified). Therefore, the structural model was identified. In the third step of model estimation, the maximum likelihood (ML) fitting function was performed through SPSS Amos 29 to generate the theoretical covariance matrix $\sum$, and minimize the differences between $\sum$ and the observed covariance matrix S (Crockett, 2012). In the fourth step of model testing, both the measurement and structural models were analyzed to determine the global fit of the entire model and the fit of individual model parameters, and multiple fit indices were used to determine the extent to which

the theoretical model fits the sample data (Crockett, 2012). The last step involved model modification where an alternative model was tested and compared for a better fit.

RESULTS

There were a total of 41 missing values across the three scales (41 items total, with six for student interaction, 27 for social presence, and eight for student satisfaction) among the 384 participants who responded to both the DELES and the SPM, accounting for only .27% of the possible 15,744 values. Furthermore, the Little's test suggested that these values were missing completely at random (MCAR; $\chi^2 = 746.069$, $df = 780$, $p = .804$). Missing values were replaced through regression imputation in SPSS Amos 29. The assumption of multivariate normality was made by spotting the P-P plot (Field, 2017) where the values of each variable fell closely on the diagonal of the plot. The fact that all items had skewness and kurtosis values within the range of −1 to +1 further confirmed the assumption of approximate normality. The assumptions of linearity and homoscedasticity were made based on the *zpred vs. zresid* plot that exhibited no systematic relationship between what came out of the model (the predicted values) and the errors in the model (Field, 2017). Since participants independently worked on the study survey, the assumption of independence was made. The Mahalanobis distance test suggested six multivariate outliers (both $p1 < .001$ and $p2 < .001$) that were excluded from further analysis, which led to an ultimate sample size of 378 respondents in this study. The means, standard deviations, and correlations among all

Table 1.
The Correlation Matrix With Means and Standard Deviations for Observed Continuous Variables

	Mean	SD	IN09	IN10	IN11	IN12	IN13	IN14	SA35	SA36	SA37	SA38	SA39	SA40	SA41	SA42	AW	PR	Age
IN09	3.746	1.116	--																
IN10	3.495	1.143	.614***	--															
IN11	3.894	0.998	.600***	.655***	--														
IN12	3.889	1.032	.618***	.614***	.833***	--													
IN13	3.691	1.141	.786***	.555***	.707***	.750***	--												
IN14	3.540	1.266	.755***	.435***	.482***	.521***	.726***	--											
SA35	2.952	1.096	.320***	.370***	.373***	.394***	.338***	.244***	--										
SA36	2.503	1.217	.233***	.276***	.236***	.268***	.248***	.166**	.736***	--									
SA37	2.566	1.086	.246***	.284***	.283***	.324***	.268***	.177***	.791***	.757***	--								
SA38	3.336	1.161	.232***	.308***	.278***	.323***	.261***	.180***	.715***	.668***	.726***	--							
SA39	2.820	1.251	.220***	.239***	.212***	.272***	.245***	.177***	.758***	.851***	.815***	.763***	--						
SA40	2.675	1.254	.244***	.272***	.256***	.290***	.276***	.178***	.753***	.844***	.805***	.744***	.898***	--					
SA41	2.143	1.270	.203***	.275***	.213***	.241***	.197***	.125*	.628***	.820***	.695***	.604***	.784***	.795***	--				
SA42	3.661	1.049	.368***	.361***	.422***	.433***	.393***	.322***	.611***	.510***	.562***	.619***	.546***	.557***	.443***	--			
AW	0.642	1.252	.392***	.361***	.399***	.392***	.401***	.358***	.605***	.570***	.584***	.571***	.582***	.584***	.509***	.512***	--		
PR	-0.320	2.783	.378***	.334***	.369***	.387***	.406***	.315***	.622***	.604***	.600***	.560***	.615***	.619***	.577***	.479***	.802***	--	
Age	30.830	9.306	-0.043	.116*	-0.001	-0.020	-0.070	-0.035	.229***	.229***	.180***	.186***	.212***	.195***	.230***	0.048	.139**	0.096	--

Note: $N = 378$.
*$p < .05$, **$p < .01$, ***$p < .001$
AW = Awareness of others; IN = Interaction; PR = Proximity to others; SA = Satisfaction; SD = Standard Deviation

observed continuous variables (also including age as one of the covariates) were computed through SPSS Statistics 29.0 and are presented in Table 1.

Test of the Measurement Model

Prior to testing the structural model, the measurement model was examined first. A confirmatory factor analysis (CFA) was performed to determine whether the 16 observed variables measured the three hypothesized latent constructs (six indicators for student interaction, two for social presence, and eight for student satisfaction). It is worth noting that the error terms for two conceptually related indicators of student interaction were correlated to account for the variance that is not explained by the factor in the model. Despite a significant value using the chi-square test, $\chi 2 = 466.548$ ($df = 100$, $p < .001$), which is easily seen in a relatively large sample (Crockett, 2012), several other model fit indices were considered as well. For instance, the root mean square error of approximation (RMSEA) = .099, the standardized root mean square residual (SRMR) = .073, the relative fit index (RFI) = .903, and comparative fit index (CFI) = .935. While the RMSEA value was close to Arbuckle's (2021) suggested cutoff of .10, the other indices marked an acceptable or good fit. The factor loadings of the 16 items fell between .613 and .943, with the majority (68.75%) above .80. Taken together, the measurement model was considered acceptable.

Test of the Structural Model

Next, the hypothesized mediation model, in which social presence mediates the relationship between student interaction and student satisfaction, was tested. In view of the significant contribution of age and program type to student satisfaction in an earlier study (Li, 2022), age, program type (face-to-face, online, and other were dummy-coded), and gender (female, male, and other were dummy-coded) were included as covariates. Figure 2 provides a visual representation of this structural model with key standardized regression weights marked, and Table 2 lists more detailed path coefficients (standardized direct effects, standardized indirect effects, and standardized total effects) and significance levels. To determine the extent to which the structural model was supported by the sample data, multiple model fit indices were used to assess both the overall, global fit of the entire model, as well as the fit of

Table 2.

Standardized Direct Effects, Standardized Indirect Effects, and Standardized Total Effects of the Mediation Model

Path	Standardized direct effect	*p*	Standardized indirect effect	*p*	Standardized total effect	*p*
Online-SP	0.207*	0.047	0	...	0.207*	0.047
F2F-SP	0.05	0.638	0	...	0.05	0.633
Male-SP	0.147	0.233	0	...	0.147	0.226
Female-SP	0.197	0.103	0	...	0.197	0.103
Age-SP	0.136*	0.015	0	...	0.136*	0.015
IN-SP	0.492***	0	0	...	0.492***	0
SA-SP	0		0	...	0	...
Online-SA	-0.05	0.627	0.148*	0.049	0.098	0.422
F2F-SA	-0.22*	0.037	0.036	0.631	-0.184	0.147
Male-SA	-0.047	0.462	0.105	0.228	0.058	0.634
Female-SA	-0.053	0.394	0.14	0.102	0.087	0.431
Age-SA	0.115**	0.004	0.097*	0.014	0.212***	0
IN-SA	-0.049	0.283	0.35***	0	0.301***	0
SP-SA	0.712***	0	0	...	0.712***	0

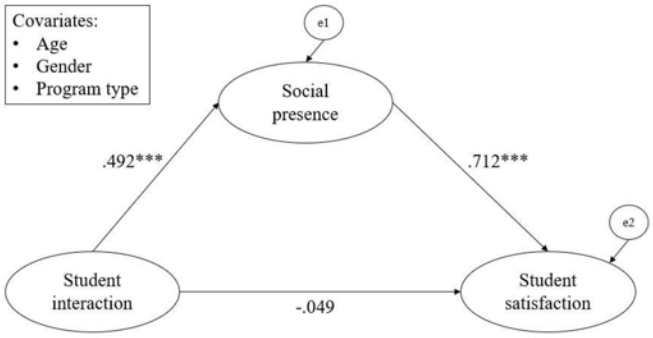
Note: $N = 378$.

*$p < .05$, **$p < .01$, ***$p < .001$

F2F = Face-to-face; IN = Interaction; SA = Satisfaction; SP = Social Presence

individual model parameters. Specifically, $\chi 2$ = 565.443 (df = 165, p < .001), RMSEA = .080, SRMR = .0595, RFI = .901, and CFI = .943. In spite of a significant chi-square value that could be a result of a relatively large sample size (Crockett, 2012) in the present study, the ratio of the chi-square to the degrees of freedom (3:1) still indicated a reasonable model fit (Marsh & Hocevar, 1985). The RMSEA, SRMR, RFI, and CFI values suggested an acceptable or reasonable fit of the structural model (Arbuckle, 2021). Collectively, the structural model was considered reasonable.

Figure 2.
Mediation Model With Key Standardized Path Coefficients

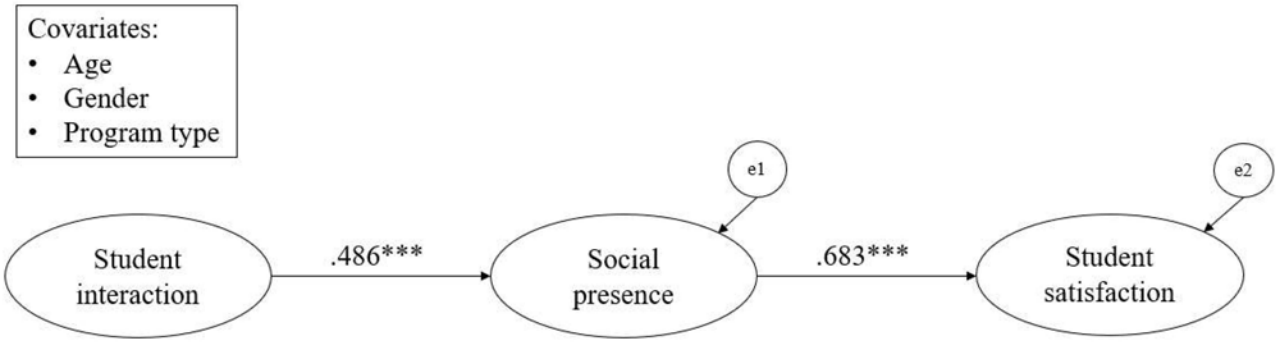


Note. N = 378.
*p < .05, **p < .01, ***p < .001

The bootstrapping procedures were performed using SPSS Amos 29 to generate 5,000 bootstrap samples from the original data, which were run with a bias-corrected percentile (BCP) method. To put these values in context, there was a significant positive relationship between student interaction and social presence (β = .492, BCP CI [.394, .577], p < .001). Thus, as students perceived more interactions, their perceived social presence increased as well. This social presence, in turn, contributed to students' higher levels of satisfaction with online learning (β = .712, BCP CI [.632, .789], p < .001). In other words, as perceived social presence increased, so did student satisfaction. However, student interaction was not significantly associated with student satisfaction (β = −.049, BCP CI [−.147, .041], p = .283), which contrasted with the significant standardized total effect of interaction on satisfaction (β = .301, BCP CI [.199, .397], p < .001) when social presence was not included in the model. In addition, the standardized indirect effect was significant at .350 (BCP CI [.273, .436], p < .001). It is then concluded that social presence provides an explanation for how student interaction and student satisfaction are related. More specifically, the relationship between student interaction and student satisfaction was fully mediated by social presence; in other words, the significant relationship between student interaction and student satisfaction became statistically nonsignificant when the mediator, social presence, was introduced to the model (Rucker et al., 2011).

As additional information, all variables (the predictor, the mediator, and all covariates) included in this mediation model collectively explained 54.41% (p < .001) of the variance in student satisfaction based on the mediation analysis using SPSS PROCESS v.4.0. This suggests a

Figure 3.
Alternative Model With Key Standardized Path Coefficients



Note. N = 378.
*p < .05, **p < .01, ***p < .001

large effect size (f^2 = 1.19) according to Cohen's (1988) conventions.

Test of an Alternative Model

In view of the full mediation effect, an SEM analysis was also performed on a more parsimonious model (Figure 3) to determine whether it would yield a better fit to the empirical data than the original structural model. In this alternative model, student interaction was the predictor variable with a direct effect on social presence (the mediator), which fully explains the relationship between student interaction and student satisfaction (the outcome variable, predicted by the predictor variable, the mediator, and a series of covariates). Specifically, $\chi 2$ = 566.553 (df = 166, $p < .001$), RMSEA = .080, SRMR = .0576, RFI = .902, and CFI = .943. While both models fit the sample data and were comparable considering the fit indices, the alternative model was more parsimonious, evidenced by a slightly higher parsimony goodness-of-fit index (PNFI) of .729 compared to .725 in the initial model (Meyers et al., 2006).

Overall, the results of this study confirmed the a priori hypothesis that social presence mediates the relationship between student interaction and student satisfaction with online learning.

DISCUSSION

The results of this study further validate the complexity of the relationship between student interaction and their satisfaction with online learning, as identified in the broad education literature (Arbaugh & Rau, 2007; Gray & DiLoreto, 2016; Kuo et al., 2013; Muzammil et al., 2020; Sher, 2009), and contextualize this relationship within the counselor education context. Despite a significant positive association between student interaction and satisfaction in a simple model with no other variables included in the current study, the previously significant relationship between the two became nonsignificant when social presence was introduced to the mediation model. Thus, social presence provides an explanation for how student interaction and student satisfaction are related in online counselor education. When counselor trainees perceived a higher level of interaction with peers, they were more likely to perceive others as real; this augmented level of social presence, in turn, contributed to a higher level of satisfaction with online learning. As Gunawardena and Zittle (1997) implied, interactivity is a quality of or potential for social presence only when it is realized and noticed.

Social presence suggests one's ability to perceive others in an online environment (Richardson et al., 2017) so that one can be a "real" person in a virtual classroom (Benshoff & Gibbons, 2011). In this study, social presence explained almost half (R^2 = 49.0%, adjusted R^2 = 48.8%, $p < .001$) of the variance in counselor trainees' satisfaction, and the two were positively correlated (r = .700, $p < .001$) based on the SPSS Statistics 29.0 output. These findings echo Richardson et al.'s (2017) meta-analysis that there is a moderately large positive average correlation between social presence and satisfaction (r = 0.56, k = 26) across contexts, disciplinary areas, and measures of social presence. Specific to the counseling field, Holmes et al. (2020) compared counselor trainees' perceptions of social presence in the classroom across two learning modalities. Specifically, they found that on-campus learners had significantly higher perceptions of social presence than their online counterparts, although the perceived level of social presence was not significantly correlated with learning outcomes. The results of the present study fill this gap by examining whether and how perceived social presence relates to learning satisfaction among counselor trainees.

Implications for Counselor Education and Clinical Supervision

Although some activities or assignments were designed to increase online interactions, they may not necessarily be conducive to enhancing social presence. For instance, discussion boards are commonly adopted to facilitate online interactions. But when poorly designed, they may inadvertently keep students busy but not lead to productive learning as originally hoped. As a counselor trainee voiced in a qualitative study (Li, 2024, in press), a discussion board fails to function as a true discussion if it consists only of an initial statement and a single response, without any further interaction or continuation of the conversation. Some possible ways to make interactions on discussion boards more "real" include (a) asking developmentally appropriate questions that students can relate to; (b) asking intentional questions that help students synthesize their readings; (c) setting clear expectations about

commenting on questions and responding to others' comments; and (d) modeling professional discourse by responding to students' comments to increase instructors' social presence.

In view of social presence as a potential antecedent to student satisfaction in online learning, counselor educators should be mindful of the social presence that students perceive, as it sets the foundation for higher-level discourse (Garrison & Arbaugh, 2007). The practices recommended by Benshoff and Gibbons (2011) for an online group counseling course, such as providing technology training, engaging students in reflections, modeling supportive communication, and fostering connections through well-timed social interactions, can be applied to other online teaching contexts. Counselor educators should also further explore how to use technology within online courses to meet the needs of students with disabilities (Kauffman, 2015) and enhance their perceived level of social presence to increase their learning satisfaction and outcomes.

Although clinical supervision was not separated from online learning as a stand-alone entity independently examined in this study, perceiving others as real is also of paramount importance. Clinical supervision often entails self-disclosure, which is more likely to occur in an environment that is perceived as safe. When supervisees do not perceive others (e.g., instructors, peers) as real, they may choose not to share or share less when needed. For example, in Miller and Gibson's (2004) study of supervision by videoconference with rural probationary psychologists, there were common references to detachment where the relationship felt impersonal, and there was a lack of warmth, social cues, shared activities, and a sense of degraded social presence. However, an appreciable number of trainees also observed that a personal relationship did develop through videoconferencing (Miller & Gibson, 2004). The results indicated that more social cues can sometimes hinder discussion of sensitive and emotionally laden issues (Miller & Gibson, 2004). Additionally, some trainees felt freer to discuss emotional issues via videoconferencing than face-to-face because they felt protected by the medium (Miller & Gibson, 2004). While social presence has not been adequately discussed in the counseling supervision literature, it has begun to draw scholars' attention in other health professions, such as psychology (e.g., Miller & Gibson, 2004) and nursing (e.g., Molin et al., 2021). Molin et al. (2021) suggested ways to promote social presence in the context of online tutoring—"providing online spaces, structured activities that encourage and support interaction, discussions about social presence, and an established commitment to interaction" (p. 9).

Limitations and Future Research

Emerging research (e.g., Gray & DiLoreto, 2016; Muzammil et al., 2020) suggests the mediating role of student engagement between student interaction and satisfaction with online learning. Including this construct in future models may further elucidate the intricate mechanism by which student interaction relates to satisfaction.

This study is not exempted from limitations that may be addressed in future research to extend this line of inquiry. First, social presence consists of "the salience of the other in a mediated communication and the consequent salience of their interpersonal interactions" (Short et al., 1976, p. 65). Only the first component of social presence—the salience of other students in a computer-mediated learning environment—was measured in the present study. A measure that also includes the second component may be incorporated in future studies, given that counseling is a person-to-person experience (Benshoff & Gibbons, 2011).

Second, Richardson et al.'s (2017) meta-analysis suggests that the strength of the positive correlation between social presence and satisfaction is moderated by the course length, discipline area, and scale used to measure social presence. Relevant information may be collected in future research to detect any nuances embedded within these relationships.

Third, while both instruments used in this study exhibit robust psychometric properties, they were validated on a wide range of students (including those from different countries and areas of study), which differs from the participants in the present study, who are exclusively enrolled in U.S. counseling programs. Despite the shared medium of an online learning environment, a myriad of factors could have contributed to students' diverse learning experiences and outcomes—especially when this learning environment spans different

countries and cultures. Readers should remain mindful of these cross-cultural and discipline-related nuances that may influence the findings of this study and the subsequent implications they draw for their own relevant research or online education practices.

Particularly noteworthy is the profoundly interpersonal nature of counselor training, making it imperative to either select, if available, or develop suitable measures that are validated for the specific student population. Furthermore, it is essential to note that students' self-reported satisfaction represents only one facet of the learning experience. Other dimensions (e.g., students' academic, clinical, professional, and personal dispositions) could also be measured through various evaluation methods (e.g., instructors' observations, supervisors' ratings, students' self-reflections) to provide a more comprehensive understanding of students' online learning and development.

CONCLUSION

Grounded in a national sample of counselor trainees in the United States, the present study evidenced that the relationship between student interaction and student satisfaction was fully mediated by social presence in online learning. In other words, as counselor trainees perceived more interactions in online learning, their perceived social presence was stronger as well; this enhanced social presence, in turn, contributed to students' higher levels of satisfaction with online learning. This study not only corroborates emerging findings in the broader literature that the relationship between student interaction and satisfaction could be more complex than previously conceptualized, but it also highlights the need for further exploration of social presence in online counselor education and clinical supervision.

AUTHOR NOTE

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