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Journal of Personality Assessment

ISSN: 0022-3891 (Print) 1532-7752 (Online) Journal homepage: https://www.tandfonline.com/loi/hjpa20

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To cite this article: Christina A. Brook & Teena Willoughby (2019) Shyness and Social Anxiety Assessed Through Self-Report: What Are We Measuring?, Journal of Personality Assessment, 101:1, 54-63, DOI: 10.1080/00223891.2017.1388808

To link to this article: https://doi.org/10.1080/00223891.2017.1388808

Published online: 10 Nov 2017.

JOURNAL OF PERSONALITY ASSESSMENT
2019, VOL. 101, NO. 1, 54–63
https://doi.org/10.1080/00223891.2017.1388808

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Shyness and Social Anxiety Assessed Through Self-Report: What Are We Measuring?

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ABSTRACT

The distinction between shyness and social anxiety remains unclear in the literature. In an attempt to shed further light on this issue, our research evaluated whether shyness and social anxiety were the same construct underlying various measurement scales. Participants ($N = 801$, $M_{age} = 36.21$, range = 18–74, female = 53.10%) responded to 10 questionnaires assessing either shyness or social anxiety. Evidence indicated that the scales were highly correlated and loaded onto 1 factor. Confirmatory factor analysis corroborated this finding. A second exploratory factor analysis revealed that all the shyness and social anxiety items best loaded together onto 3 factors: one corresponding to fear of negative evaluation, embarrassment, self-consciousness, scrutiny, authority, interaction anxiety, and shyness (71.0%); a second comprised of primarily interaction anxiety and shyness (17.7%); and a third associated with performance anxiety (7.5%). All scales were similarly discriminated from sociability. Overall, the constructs of shyness and social anxiety were not differentiated from each other. Researchers should carefully consider what items are included in shyness and social anxiety scales if these constructs are to be distinguished from one another.

ARTICLE HISTORY
Received 19 November 2016
Revised 10 September 2017

There is considerable interest in understanding the relation between shyness and social anxiety, not only because of its implication for prevention and treatment programs, but also because of its relevance to research investigations. Despite efforts to reconcile these concepts, there is a lack of clarity surrounding the issue. Some researchers believe that shyness can be distinguished from social anxiety (Dalrymple & Zimmerman, 2013; Heiser, Turner, Beidel, & Roberson-Nay, 2009), although others consider some shyness and social anxiety scales to be interchangeable (Hopko, Stowell, Jones, Armento, & Cheek, 2005; Jones, Briggs, & Smith, 1986). To add to the confusion, there is an expanding array of measurement instruments that have been developed over the years to assess each construct (Herbert, Rheingold, & Brandsma, 2010; Jones et al., 1986). Although distinct research traditions and discrete definitions infer that shyness and social anxiety are different entities, the language describing these constructs is almost indistinguishable. This lack of clarity suggests that there is room for further investigation into this issue by examining the operationalization of the shyness and social anxiety concepts, most particularly in the form of survey instruments.

Theoretical considerations

Almost 50 years ago, the relation between social anxiety and shyness was conceptualized through the theory of (public) self-consciousness, the idea that one directs focused attention to the effect that one's social self has on others (Fenigstein, Scheier, & Buss, 1975). It was proposed in the theory that social anxiety was a higher order construct composed of four related but distinct lower order self-conscious emotions, including embarrassment, shame, shyness, and audience anxiety (Buss, 1980). All of these negative emotions were thought to be linked to acute public self-consciousness and occurred primarily in social contexts.

More recently, a number of other theoretical perspectives have been put forward to explain the association between shyness and social anxiety. The first of these proposed that shyness and social anxiety were completely separate behaviors given that shyness was a characteristic of personality and temperament, and social anxiety was a *Diagnostic and Statistical Manual of Mental Disorders* (5th ed. [*DSM–5*]; American Psychiatric Association, 2013) diagnosable condition (Heiser, Turner, & Beidel, 2003). A second hypothesis speculated that these two constructs characterized essentially identical experiences because on the surface they pertained to the same features of social fears and avoidance behavior (Heiser et al., 2003). Yet another hypothesis suggested that shyness and social anxiety were overlapping because they shared many characteristics but that shyness was the broader, more heterogeneous construct (Heiser et al., 2009); note that this is a conflicting perspective from the theory of self-consciousness that proposed social anxiety was the broader construct (Buss, 1980). Within this overlapping framework, shyness and social anxiety were assumed to differ qualitatively with respect to some of their characteristics (e.g., a subset of shy individuals did not report any social fears such as going to parties or eating in public). Another closely related hypothesis presented shyness as an underlying constitutional temperament characteristic that might lead to social anxiety (Rapee & Coplan, 2010), although

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the authors suggested that this hypothesis should be interpreted with some caution given the lack of research identifying the features that distinguish between shyness and social anxiety. Finally, a hypothesis that has curried some favor in the literature was the proposal that shyness and social anxiety existed on a severity continuum across the general population (Chavira, Stein, & Malcarne, 2002; McNeil, 2010), from "no fearfulness or anxiety" at one end of the spectrum to "extreme fearfulness or anxiety" at the other end of the spectrum. According to this latter hypothesis, shyness and social anxiety only differ by degree such that the symptoms associated with social anxiety were more severe, with social anxiety disorder at the more extreme end, than those associated with shyness. Overall, of the five hypotheses that were considered to carry some influence in clarifying the relationship between shyness and social anxiety, only the last three have received modest empirical support (Heiser et al., 2009; Rapee & Coplan, 2010).

In their review of the conceptual relations between anxiety and fearful temperament, Rapee and Coplan (2010) concluded that the features of shyness and social anxiety were extremely difficult to disentangle. To add to this conclusion, we hypothesize that perhaps the difficulty in distinguishing between these two constructs might be due simply to their operationalization. The different shyness and social anxiety scales might not be measuring distinct psychological concepts, but rather for the most part, characteristics that are shared.

Concern with the measurement of the construct of shyness or social anxiety is not new (Leary, 1983). Leary addressed this issue in a seminal paper discussing the difficulties in studying social anxiety (which he referred to as social anxiousness) because of its close relation to other constructs, such as shyness. He suggested that all self-report measures from that time were confounding the subjective affective and cognitive experience of social anxiety with the behaviors of social anxiety. His argument centered on evidence that indicated overt behavioral signs of inner distress did not necessarily accompany all cognitive and affective experiences. Alternatively, some awkward and avoidant behavior in social interactions were found to be introverted behavior and not accompanied by social anxiety. Thus, Leary (1983) constructed two scales that specifically measured only the subjective affective and cognitive reactions to social situations, one linked to social interactions with others and a second in which no social response was required in the presence of an audience: the Interaction Anxiety Scale (IAS) and the Audience Anxiety Scale (AAS), respectively. However, the IAS with purely subjective affective and cognitive items was still highly correlated in some instances with other shyness and social anxiety scales that included affective and behavioral measures. Further, there was correlational evidence to suggest that the AAS might be capturing a somewhat different subjective affective and cognitive experience. Ultimately, Leary's (1983) findings did not point to differences between social anxiety and shyness scales per se but instead to differences in the operationalization of social anxiety that distinguished interaction fears from scrutiny fears.

Despite the work of Leary (1983), both shyness and social anxiety researchers have taken the position that their construct should be measured from a multidimensional perspective, namely, by assessing affective, cognitive, behavioral, physiological, and in some cases, performance components (Alden & Crozier, 2005; Crozier & Alden, 2001; Leary & Kowalski, 1995). More specifically, both shyness and social anxiety self-report questionnaires have focused on one or more aspects of subjective feelings (e.g., nervousness or anxiousness), avoidance and inhibited behavior (e.g., reticence or awkwardness), experiencing apprehensive thoughts (e.g., self-consciousness or worry), and somatic symptoms (e.g., sweating or blushing). In the shyness literature, this multidimensional perspective was encapsulated in the three-component model of shyness, in which the variety of characteristics associated with shyness were organized into the three dimensions of affect, cognition, and (observable) behavior (Cheek & Krasnoperova, 1999). In a similar fashion, in reviewing 10 measures of social anxiety and related constructs, Leary (1991) emphasized the importance of distinguishing between the cognitive, affective, and behavioral characteristics of social anxiety. Indeed, support for the multidimensional perspective came from intercorrelations among the three components that were found to be moderate, for both shyness and social anxiety scales (Leary, 1991). This commonality in construct measurement through a multidimensional perspective (the affective component of nervousness, the behavioral component of awkwardness, or the cognitive component of self-consciousness, etc.) implied that there was a close relationship between shyness and social anxiety.

Investigations into the psychometric properties of shyness and social anxiety measures

Limited research has compared the dimensional aspects or psychometric properties (i.e., convergence and divergence) of shyness scales with social anxiety scales. Indeed, what little investigation there has been comes from earlier work not expressly focused on this purpose (Hopko et al., 2005; Jones et al., 1986). However, indirect evidence from these studies indicated that the scales measuring the shyness and social anxiety constructs were unusually similar, if not in fact the same. For instance, Jones et al. (1986)), in their paper on the conceptualization and measurement of shyness, reported that the Cheek and Buss Shyness Scale (CBS; Cheek & Buss, 1981), IAS (Leary, 1983), Morris Shyness Scale (MS; Morris, 1984), Social Reticence Scale (SRS; Jones et al., 1986), and Social Avoidance Distress Scale (SADS; Watson & Friend, 1969) were essentially interchangeable as based on their strong correlations with one another ($r_{average} = .77$), but were less highly correlated with other measures (i.e., social anxiety, $r_{average} = .54$), such as with the Fear of Negative Evaluation scale (FNE; Watson & Friend, 1969) and the AAS (Leary, 1983). In explanation, they argued that the difference in focus between the shyness and social anxiety questionnaires (i.e., interaction fears as compared to scrutiny fears, similar to Leary's findings in 1983) dictated the greater strength of the correlations between the shyness measures as compared to between the shyness and social anxiety measures. However, their interpretation of the results was confounded by the inclusion of the IAS and SADS among the "shyness" scales. Both measures were conceptually developed as social anxiety scales (Leary, 1983; Watson & Friend, 1969).

Jones et al. (1986) also examined the factor structure of the five shyness scale items (i.e., from the CBS, IAS, MS, SRS, and SADS; 88 items total) to evaluate possible multidimensionality

within the shyness construct. Based on eigenvalues of greater than one, three factors were identified: social avoidance and distress, social facility, and fear of high status of others. Despite evidence for a three-factor solution, the authors proposed that likely only one dimension represented the shyness construct because there was a substantial overlap in item wording and a large proportion of the items loaded onto one factor. This finding also offered preliminary support for the convergence of shyness and social anxiety self-report scales given that two of their "shyness" scales were originally conceptualized as social anxiety (i.e., IAS and SADS).

A second group of researchers partially replicated and extended the work of Jones et al. (1986) in their investigation on the psychometric properties (i.e., convergent and discriminant validity) of the revised Cheek and Buss Scale (RCBS; Hopko et al., 2005). A comparison of the RCBS (Cheek, 1983) with the FNE (Watson & Friend, 1969), the SRS (Jones et al., 1986), the Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS; Mattick & Clarke, 1998) revealed moderately high mean scale intercorrelations. The researchers concluded that some of the shyness scales could be substituted for social anxiety scales, although they asserted that the two were not uniform experiences because the correlations between the RCBS and various social anxiety scales were not equivalent (e.g., .84 with the SIAS as compared to .56 with the SPS). However, there was no evidence from this research to indicate that the social anxiety scales were statistically equivalent to one other and that shyness scales were equivalent to other shyness scales. Instead, the inference to be drawn was that shyness and social anxiety scales were difficult to disentangle, suggesting they might be measuring the same underlying construct.

Finally, a third group published results supporting the idea that shyness and social anxiety might be very similar if not indistinguishable constructs at the "measurement level" (Anderson & Harvey, 1988). Although the purpose of the Anderson and Harvey paper was more general in nature by focusing on constructs beyond shyness and social anxiety, their results are relevant to the discussion on the relation between shyness and social anxiety. Indeed, their brief report on identifying the common underlying factors of "problems in living," including the four scales of depression, loneliness, shyness, and social anxiety, found that the best model fit was with a three-factor model combining shyness and social anxiety scales into one lower order factor. The authors concluded that at the "measurement level," but not necessarily at the "conceptual level," shyness and social anxiety were not distinct.

Overall, previous work relating to this area of research was largely restricted to establishing the psychometric properties of shyness scales rather than addressing the issues of commonality or discrimination between shyness and social anxiety scales (Hopko et al., 2005; Jones et al., 1986). In addition, there is a gap in the literature with respect to assessing more recently developed measures. Thus, the purpose of this study was to provide an extensive comparison of shyness and social anxiety questionnaires and analyze the relation between the two constructs through not only the traditional analysis of intercorrelations (i.e., convergent and discriminant validity), but also through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Given that there appears to be much in common between these measures, particularly because there is a commonality to their creation through the use of both clinical and nonclinical populations, interview and questionnaire formats, and an overall underlying similarity in their multidimensionality (Alden & Crozier, 2005; Henderson, Gilbert, & Zimbardo, 2014; Tulbure, Szentagotai, Dobrean, & David, 2012), we hypothesized that in many situations, the measurement of shyness and social anxiety through different self-report questionnaires likely is assessing essentially one underlying construct.

Methods

Participants

Participants were enlisted from the crowdsourcing Web site MTurk (i.e., Mechanical Turk) to complete a survey on shyness and social anxiety. The mean age for the participants was 36.21 (SD = 11.09, range = 18–74, female = 53.10%). Qualifications for participation included an approval rate of 98% by past requesters (i.e., researchers using MTurk to recruit participants), previous completion of approved human intelligence tasks (HITs) greater or equal to 500 (tasks completed in the past that were not rejected by a requester), and being located in the United States. Verification of survey completion was through a unique code assigned to each participant at the end of the survey that was posted on Qualtrics (a Web site hosted by an Internet software company that enables users to collect research data online). If the unique code pasted back on MTurk corresponded to the one assigned on Qualtrics, participants were paid US$3.00 for an average of less than 30 minutes of participation. To ensure we used unique participants, a custom script was inserted into the HIT on the MTurk Web site. Approval for the study was obtained from the university ethics board prior to survey administration and participants provided consent prior to online participation.

Assessments

Participants first answered several questions on demographic information about their age, sex, education, employment, birthplace, and ethnic background. Second, they responded to 10 questionnaires that assessed the constructs of shyness and social anxiety (Table 1). The scales selected for the online survey were the expanded revision of the Cheek and Buss Shyness Scale (ERCBS; Cheek & Melichor, 1985), the shy subscale of the Early Adolescent Temperament Questionnaire revised (TEMP; Ellis & Rothbart, 2001), the Children's Shyness Questionnaire (CSQ; Crozier, 1995), the Henderson/Zimbardo Shyness Questionnaire (SHYQ; Bortnik, Henderson, & Zimbardo, 2002), the Social Anxiety Scale for Adolescents (SASA; La Greca & Lopez, 1998), the Social Phobia Inventory (SPIN; Connor et al., 2000), the IAS (Leary, 1983), the AAS (Leary, 1983), the SPS (Mattick & Clarke, 1998), and the SIAS (Mattick & Clarke, 1998). It should be noted that in the CSQ, single words were changed in several questions to more accurately reflect adult scenarios (i.e., girl/boy was changed to opposite sex). The choice of questionnaire was based on three criteria: well established in the literature; evaluated different populations (i.e.,

Table 1. Study scales and descriptive statistics.

Scale	No. items	Likert response and item example	*M*	*SD*	Skew	Kurtosis	α
ERCBS	20	1 = *strongly disagree* to 5 = *strongly agree* (e.g., "I am socially somewhat awkward")	3.29	.991	−.482	−.611	.961
TEMP	4	1 = *almost always untrue* to 5 = *almost always true* (e.g., "I am shy")	3.49	1.178	−.572	−.752	.914
CSQ	26	1 = *no*, 2 = *don't know*, 3 = *yes* (e.g., "Do you blush a lot?")	2.27	.546	−.661	−.736	.953
SHYQ	35	1 = *not at all* to 5 = *extremely* (e.g., "I am afraid of looking foolish in social situations")	2.89	.854	.056	−.913	.966
SASA	18	1 = *not at all* to 5 = *all the time* (e.g., "I worry about being teased")	2.63	.979	.160	−.839	.961
SPIN	17	1 = *not at all* to 5 = *extremely* (e.g., "I avoid going to parties")	2.73	1.024	.062	−.964	.964
IAS	15	1 = *not at all* to 5 = *extremely* (e.g., "In general, I am a shy person")	3.27	1.004	−.361	−.779	.961
AAS	12	1 = *not at all* to 5 = *extremely* (e.g., "I usually get nervous when I speak in front of a group")	3.63	1.175	−.558	−.879	.974
SPS	20	1 = *not at all* to 5 = *extremely* (e.g., "I can feel conspicuous standing in a queue")	2.35	.991	.471	−.709	.971
SIAS	19	1 = *not at all* to 5 = *extremely* (e.g., "I am tense mixing in a group")	2.82	1.059	−.023	−1.043	.973
EAS	4	1 = *almost always untrue* to 5 = *almost always true* (e.g., "I like to be with people")	2.71	.958	.316	−.496	.820
ATQ	5	1 = *almost always untrue* to 5 = *almost always true* (e.g., "I usually like to talk a lot")	2.63	.954	.336	−.438	.819

Note. $N = 801$. ERCBS = Expanded Revision of the Cheek and Buss Shyness Scale; TEMP = shy subscale of the Early Adolescent Temperament Questionnaire Revised; CSQ = Children's Shyness Questionnaire; SHYQ = Henderson−Zimbardo Shyness Questionnaire; SASA = Social Anxiety Scale for Adolescents; SPIN = Social Phobia Inventory; IAS = Interaction Anxiety Scale; AAS = Audience Anxiety Scale; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale; EAS = Emotionality, Activity and Sociability Adult Temperament, sociability subscale only; ATQ = Adult Temperament Questionnaire; No. = number. Higher scores indicate more of the construct. In all scales one extra response was included, *prefer not to say*.

clinical, nonclinical); and assessed children, adolescents, or adults to reflect shyness or social anxiety questionnaires across the life span. Last, for an assessment of the comparable discrimination of shyness and social anxiety scales from a third construct, we also included two sociability subscales, one from the EAS Temperament Survey for adults (Buss & Plomin, 1984) and the other from the Adult Temperament Questionnaire (ATQ; Evans & Rothbart, 2007).

Missing data

Missing data (a total of 18.7%) occurred for two reasons. First, item nonresponse resulted in missing data of 0.3%. A further 18.4% of the data were missing because some of the data were collected using an intentional planned missing design. We created three different versions of the survey for 299 out of the 801 participants (37%) to assess whether there was participant response bias from answering too many similar items (Little & Rhemtulla, 2013). The three versions each contained the complete ERCBS, TEMP, SASA, EAS, and ATQ scales (approximately one quarter of the total items) and the remaining seven measures were equally divided among Versions 1, 2, and 3. The rest of the participants ($n = 502$ or 63%) responded to the 10 scales in their entirety. The assumption of missing at random holds for planned missing designs, allowing for the use of the expectation maximization (EM) imputation method to handle missingness (Schafer & Graham, 2002). EM is an iterative maximum-likelihood (ML) procedure in which a cycle of calculating means and covariances followed by data imputation is repeated until a stable set of estimated missing values is reached (Little, Jorgensen, Lang, & Moore, 2014). Consequently, missing data were imputed using EM with all study measures included in the analysis, thus avoiding the biased parameter estimates that can occur with pairwise, listwise, or mean substitution (Schafer & Graham, 2002).

Plan of analysis

First, participants ($N = 801$) were divided into two random samples in SPSS 22. Next, to reveal the best dimensional solution for all 10 scales, an EFA was computed on the first random sample ($n = 387$) using ML extraction and geomin rotation. EFA was used instead of principal components analysis as we were investigating the unique associations among the shyness and social anxiety scales instead of simply deriving a smaller number of components. Evaluation of the best solution was based on a combination of the parallel analysis technique to determine the optimal number of factors to retain (i.e., we looked at only the number of eigenvalues from the sample data that were greater than the parallel eigenvalues generated from random data matrices); number of values above the point of inflection in the scree plot; loadings > .400; amount of additional variance in the solution accounted for by successive eigenvalues; and theory (Courtney, 2013; Field, 2013). In the case of theory, we searched for factors associated with the self-consciousness theory including the theoretical concepts of audience anxiety, embarrassment, shame, and shyness (Buss, 1980). In addition, we looked for patterns that aligned with the components of affect (i.e., nervousness, shy), cognition (e.g., worry, fear of negative evaluation), behavior (e.g., awkward, uncomfortable), physiology (e.g., blushing), or performance. Finally, we searched for factor patterns relating to the theoretical constructs underlying each of the 10 scales (e.g., fear of negative evaluation, avoidance and distress associated with the SASA or interaction anxiety as foundational to the IAS and SIAS).

To further explore the relation among the 10 scales, a CFA was conducted on the second random sample ($n = 414$). Specifically, we investigated a two-factor model in which the shyness scales were loaded onto the first latent factor and the social anxiety scales were loaded onto a second latent factor. A correlation was specified between the shyness and social anxiety latent variables. To investigate the relation between the shyness and social anxiety scales, a comparison was made between a model in which the correlation between the shy and social anxiety latent variables was constrained to be one and a second model in which the correlation was left free to vary between the shy and social anxiety latent variables. Based on conventional practice, the two models (where one model was nested under the second unconstrained model) were compared using the Satorra–Bentler chi-square difference test (Kline, 2011; Satorra & Bentler, 2010). A second EFA was run using ML extraction

and geomin rotation to determine the dimensionality of all scale items and the best solution was determined using the same criteria as earlier ($N = 801$).

We also tested for the discriminant validity of the shyness and social anxiety scales relative to two sociability scales, the EAS and ATQ ($N = 801$); evaluation of discriminant validity was based on the magnitude and direction of the correlations. Both the EFAs and the CFA were computed using M*plus* 7.2 (Muthén & Muthén, 1998–2015).

Results

Demographic characteristics

Data on education indicated that on average the participants had "completed a college/apprenticeship diploma and/or technical diploma." The majority of participants were employed full-time (64.5%) and a minority reported that they were either unemployed (14.6%), working part-time (12.9%), retired (3.4%) or "other" (4.6%). Most of the sample reported being born in the United States (96.5%), and the remaining participants were primarily born in Canada (0.4%), China (0.4%), India (0.4%), and Poland (0.2%). The participants also indicated whether their family belonged to a culture or ethnic background other than the culture associated with their birthplace (14.9% of the sample); among the diverse ethnic groups identified, the most common were Latin American (3.0%), African (1.4%), Chinese (1.4%), and German (1.3%).

Preliminary and primary analyses

Descriptive statistics for the study variables are shown in Table 1. The skewness and kurtosis values were within the range of ±2. All social anxiety scale reliabilities were > .914 and the two sociability scale reliabilities were > .820 (Tabachnick & Fidell, 2007).

Convergent validity of shyness and social anxiety scales

The means for the shyness and social anxiety scales were moderately highly to highly correlated (Table 2), indicating that all 10 scales were measuring a significant and sizable amount of common variance. The results of the EFA (using standardized mean scores to take into account the scalar differences that existed among the 10 different questionnaires) were consistent with this finding. One factor best represented the data because only one sample eigenvalue (8.094) was found to be greater than the parallel eigenvalues (1.332), and the next highest sample eigenvalue (0.580) was well below the second parallel eigenvalue (1.179). Moreover, the two-factor loading did not divide the scales into shyness and social anxiety factors. All loadings for the one-factor solution were > .800 (Table 3). The CFA results also supported a one-factor model (Table 4). A Satorra–Bentler chi-square difference test indicated there was a significant difference between the constrained and unconstrained models indicating that the unconstrained model was the better fit, $\chi^2(1) = 4.177$, $p < .05$. However, the almost perfect positive correlation (.991) between the latent factors in the unconstrained model suggested there was an extremely close one-to-one correspondence between the two models and between the shyness and social anxiety latent factors. In sum, the correlations, the EFA, and the CFA findings indicated that the shyness and social anxiety scales were broadly measuring a common construct.

We also conducted an EFA on all items from the 10 scales ($N = 801$). Results indicated that eight sample eigenvalues (90.637, 11.297, 4.678, 3.581, 3.095, 2.594, 2.416, 2.014, 1.727) were higher than the parallel eigenvalues (2.152, 2.103, 2.064, 2.033, 2.003, 1.977, 1.952, 1.929, 1.906), respectively. However, several factors from the eight-factor solution were not interpretable (i.e., a handful of reversed items loaded together on a single factor, one factor contained a few cross-loaded items from the SASA scale, and another factor loaded four items of authority—from differing shyness and social anxiety scales—but not all items of authority, and this factor subsequently disappeared in the remaining seven factor solutions). Consequently, we continued to investigate the two-, three-, four-, and five-factor solutions. We discounted the five-factor solution because no items loaded onto one of the factors. Among the remaining factor solutions, the optimal solution was determined to be either the three- or four-factor solution for the following

Table 2. Scale correlations for random samples, $n = 387$ and $n = 414$.

	1	2	3	4	5	6	7	8	9	10	11	12
1. ERCBS	—	.887	.850	.833	.837	.842	.900	.698	.729	.887	−.626	−.700
2. TEMP	.863	—	.841	.730	.741	.737	.854	.678	.618	.794	−.595	−.689
3. CSQ	.840	.838	—	.783	.736	.773	.848	.748	.696	.827	−.551	−.641
4. SHYQ	.815	.721	.758	—	.837	.840	.841	.666	.808	.903	−.552	−.560
5. SASA	.794	.694	.684	.823	—	.871	.785	.592	.759	.837	−.467	−.496
6. SPIN	.843	.764	.777	.859	.810	—	.817	.690	.818	.857	−.517	−.555
7. IAS	.899	.850	.842	.837	.760	.859	—	.746	.722	.891	−.588	−.657
8. AAS	.759	.720	.790	.687	.588	.726	.804	—	.616	.708	−.429	−.472
9. SPS	.729	.635	.714	.800	.739	.827	.735	.644	—	.840	−.436	−.462
10. SIAS	.894	.806	.821	.883	.796	.879	.899	.752	.832	—	−.584	−.628
11. EAS	−.572	−.552	−.534	−.465	−.413	−.490	−.594	−.531	−.401	−.544	—	.833
12. ATQ	−.706	−.703	−.692	−.572	−.494	−.611	−.728	−.676	−.498	−.677	.793	—

Note. ERCBS = Expanded Revision of the Cheek and Buss Shyness Scale; TEMP = shy subscale of the Early Adolescent Temperament Questionnaire Revised; CSQ = Children's Shyness Questionnaire; SHYQ = Henderson–Zimbardo Shyness Questionnaire; SASA = Social Anxiety Scale for Adolescents; SPIN = Social Phobia Inventory; IAS = Interaction Anxiety Scale; AAS = Audience Anxiety Scale; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale; EAS = Emotionality, Activity and Sociability Adult Temperament, sociability subscale only; ATQ = Adult Temperament Questionnaire. Below the diagonal are correlations for the random sample $n = 387$ and above the diagonal are correlations for the random sample $n = 414$. $p < .01$ for all correlations.

Table 3. Exploratory factor analysis standardized regression coefficients for one-factor solution.

Scale	Factor loading
Shyness	
ERCBS	.938
TEMP	.867
CSQ	.878
SHYQ	.901
Social anxiety	
SASA	.836
SPIN	.918
IAS	.945
AAS	.806
SPS	.829
SIAS	.955

Note. $n = 387$. ERCBS = Expanded Revision of the Cheek and Buss Shyness Scale; TEMP = shy subscale of the Early Adolescent Temperament Questionnaire Revised; CSQ = Children's Shyness Questionnaire; SHYQ = Henderson–Zimbardo Shyness Questionnaire; SASA = Social Anxiety Scale–Adolescents; SPIN = Social Phobia Inventory; IAS = Interaction Anxiety Scale; AAS = Audience Anxiety Scale; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale. $p < .05$ for all loadings.

reasons: First, the point of index in the scree plot indicated either a three- or four-factor model best fit the data; second, the value difference between successive sample eigenvalues was very small after the third eigenvalue (see earlier)—very little variability was accounted for after the third or fourth factor; third, items loading < .400 increased more than fourfold between the third and fourth factor solution (3.8% to 17.2%, respectively), and last, none of the factors in the three- or four-factor solutions were distinguishable based on the components of affect, cognition, behavior, or physiology, or on theoretical concepts such as embarrassment, shame, or fearfulness—one exception to this was a performance factor.

For both the three- and four-factor solutions, items that tapped into anxiety or fear of negative evaluation, embarrassment, self-consciousness, social interactions, being shy, scrutiny, and authority loaded onto the first factor (approximately 71.0% and 41.4% of the items, respectively), and items that pertained almost exclusively to anxiety or fear of social interactions and being shy loaded onto the second factor (approximately 17.7% and 16.1% of the items, respectively). Items that related solely to an anxiety or fear of performance clustered onto the third factor (7.5% and 8.1% of the items, respectively). In the four-factor solution, items that loaded onto the fourth factor were not distinguishable from those that loaded onto either the first or second factor. It also was not clear that the EFA captured the intended theoretical constructs underlying each scale. For instance, varying IAS items (i.e., focusing on interaction anxiety) loaded across all the factors except on the performance factor. Thus, based on the criteria set out to determine the number of factors that represented the underlying relations among the 186 items, we concluded that the three-factor solution best fit the data given a higher proportion of items loaded overall, little variability was accounted for by the additional factor, and the interpretation of the factors did not differ between the two solutions (Table 5).

Table 4. Confirmatory factor analysis standardized coefficients for the two-factor nested models.

Scale	Constrained	Unconstrained
Shyness		
ERCBS	.943 (.006)	.949 (.007)
TEMP	.867 (.013)	.877 (.013)
CSQ	.885 (.011)	.890 (.011)
SHYQ	.913 (.009)	.907 (.010)
Social anxiety		
SASA	.881 (.012)	.882 (.012)
SPIN	.903 (.010)	.905 (.010)
IAS	.934 (.007)	.933 (.007)
AAS	.757 (.022)	.756 (.022)
SPS	.826 (.016)	.830 (.016)
SIAS	.953 (.005)	.954 (.005)
r between factors	1.00	.991

Note. $n = 414$. ERCBS = Expanded Revision of the Cheek and Buss Shyness Scale; TEMP = shy subscale of the Early Adolescent Temperament Questionnaire Revised; CSQ = Children's Shyness Questionnaire; SHYQ = Henderson–Zimbardo Shyness Questionnaire; SASA = Social Anxiety Scale–Adolescents; SPIN = Social Phobia Inventory; IAS = Interaction Anxiety Scale; AAS = Audience Anxiety Scale; SPS = Social Phobia Scale; SIAS = Social Interaction Anxiety Scale. Standard errors for the estimates are in parentheses. $p < .001$ for all standardized estimates.

Table 5. Sample items from the item-based exploratory factor analysis three-factor solution.

Factor	Sample item
1	SASA (cognition): "I'm afraid that others will not like me."
	SIAS (cognition): "I feel I'll say something embarrassing when talking."
	CSQ (affect): "I feel nervous when I am with important people."
	SHYQ (affect): "I am afraid of looking foolish in social situations."
	IAS (behavior): "I usually feel uncomfortable when I am in a group of people I don't know."
	SPIN (behavior): "I avoid going to parties."
	SPS (physiology): "I fear I may blush when I am with other people."
	ERCBS (physiology): "Sometimes being introduced to new people makes me feel physically upset, e.g., heat rash."
2	SHYQ (cognition): "If someone is critical of me I am likely to assume that they are having a bad day." (R)
	SIAS (cognition): "I find it easy to think of things to talk about." (R)
	TEMP (affect): "I am shy."
	SASA (affect): "I feel shy around people I don't know."
	RCBS (behavior): "I am socially somewhat awkward."
	IAS (behavior): "I am usually at ease when speaking to a member of the opposite sex." (R)
3	AAS (performance/cognition): "My thoughts become jumbled when I speak before an audience."
	AAS (performance/affect): "I usually get nervous when I speak in front of a group."
	AAS (performance/behavior): "I would feel awkward and tense if I knew someone was filming me with a movie camera."

Note. SASA = Social Anxiety Scale–Adolescents; SIAS = Social Interaction Anxiety Scale; CSQ = Children's Shyness Questionnaire; SHYQ = Henderson–Zimbardo Shyness Questionnaire; IAS = Interaction Anxiety Scale; SPIN = Social Phobia Inventory; SPS = Social Phobia Scale; ERCBS = Expanded Revision of the Cheek and Buss Shyness Scale; TEMP = shy subscale of the Early Adolescent Temperament Questionnaire Revised; AAS = Audience Anxiety Scale; (R) = reversed items.

Discriminant validity of shyness and social anxiety scales

The correlations between the shyness and social anxiety scales with the EAS and ATQ sociability subscales were negative and moderately strong, indicating that their associations with the sociability subscales were comparable (Table 2; $r_{\text{shyness.EAS.range}} = -.465$ to $-.626$, $r_{\text{shyness.ATQ.range}} = -.560$ to $-.706$, $r_{\text{social.anxiety.}}$

$_{EAS.range}$ = −.401 to −.594, and $r_{social.anxiety.ATQ.range}$ = −.462 to −.728).

Discussion

In this study we hypothesized that different self-report scales of shyness and social anxiety were measuring one general underlying construct. Our findings provided evidence in support of this hypothesis through several different analyses. First, all 10 scales were moderately highly to highly correlated with one another. Second, the results from an EFA were consistent with this finding; a one-factor solution was best supported by the data. Third, the evidence from the CFA indicated that when the two latent variables of shyness and social anxiety were left free to vary, they were almost perfectly correlated (.991), suggesting that they were identical factors. Finally, an EFA revealed three things: First, the vast majority of scale items related to an anxiety or fear of negative evaluation, embarrassment, self-consciousness, social interaction, being shy, scrutiny, and authority loaded onto one principal factor. Second, relatively few items of anxiety or fear of social interaction and being shy loaded onto a second factor. Finally, only items associated with an anxiety or fear of performance clustered onto a third factor.

These results were consistent with but extend previous research that indicated shyness scales appeared to be interchangeable with some social anxiety scales based on intercorrelations (Hopko et al., 2005; Jones et al., 1986). Indeed, our evidence suggested that the shyness and social anxiety scales were likely measuring the same construct. In the EFA on the 10 scale items, our finding of three factors was more in line with the *DSM–5* generalized social anxiety disorder and the performance-only subtype (referred to as a specifier in the *DSM–5*) as compared to the three factors of social avoidance and distress, social facility, and fear of high status of others found by Jones et al. (1986)). Specifically, our first factor included the majority of items from our 10 scales and represented an extensive array of affective, behavioral, cognitive, and physiological characteristics not captured by Jones et al.'s (1986) primary factor of "social avoidance and distress," which pertained to only behavioral and affective characteristics. Our factor contained a variety of fears and anxieties related to social interaction, being shy, embarrassment, shame, fear of negative evaluation, avoidance, distress, fear of scrutiny, and self-consciousness, among other well-known characteristics. Considerably fewer items loaded onto our second factor and it only contained some remaining items related to interaction anxiety and being shy. Last, the third factor was composed of performance items from the AAS and was consistent with the performance-only subtype in the *DSM–5*, indicating that the social anxiety performance construct was differentiated from a general construct measured by the other shyness and social anxiety scales. Indeed, the correlations between the AAS and the other nine scales were among the lowest scale intercorrelations (between .588–.804). Broadly, our investigation pulled together the shyness and social anxiety scales at the item and mean level while identifying a performance anxiety component as somewhat distinct from a general shyness or social anxiety element, as referenced in the *DSM–5*.

The investigation into the discriminant validity of the shyness and social anxiety scales with respect to sociability was consistent with our hypothesis that shyness and social anxiety were the same construct underlying various measurement scales. The shyness and social anxiety scales appeared to be similarly correlated (strength and direction) with the EAS and ATQ sociability subscales.

We consider several explanations for our findings that the concepts of shyness and social anxiety appear to be the same construct as measured in this study. First, shyness and social anxiety were studied originally as distinct domains due to historical traditions, but more recent developments in these research areas suggest that this assumption should be reconsidered. More specifically, research on shyness evolved out of a social and developmental perspective with a focus on temperament origins, a strong basis in everyday lay language, and assessment through self-attribution. The social anxiety concept developed within a theoretical and developmental approach that was studied in nonclinical populations; researchers recognized that distressful social relationships and social evaluative concerns were detrimental to behavioral outcomes and might be possible determinants of psychopathology or clinical concerns. Social anxiety disorder, the clinical or psychopathological manifestation of social anxiety, emerged within medical spheres with an emphasis on refining criteria for diagnosis and determining the most effective treatment options for clinical populations. Over time, cross-fertilization occurred between the clinical and nonclinical streams of research. Clinical interviews were partially replaced with shorter self-report questionnaire formats derived from the *DSM* criteria for social anxiety disorder and subsequently tested on college and university participants and the general population (Connor et al., 2000). At the same time, the social anxiety construct and associated scales were examined in the clinical setting and found to be instructive and useful in the screening of social anxiety disorder by self-report (Tulbure et al., 2012). Furthermore, research emanating from the Stanford Shyness Clinic tended to pathologize shyness—treating it more like a disorder—by bringing it into the clinical realm (Henderson et al., 2014; Zimbardo, 1977). The traditional boundaries existing between the shyness and social anxiety research domains were not maintained over time and, thus, likely these fields of study were influential with respect to each other in the development of self-report measures.

Second, the mutual nature of the shyness and social anxiety scales could be exemplified by their shared multidimensional basis (i.e., affective, behavioral, cognitive, physiological, and occasionally performance dimensions), which was foundational to scale development in the two traditional research domains (i.e., shyness, social anxiety). Despite the potential for meaningful variability in dimensionality to distinguish between the shyness and social anxiety scales, our evidence indicated that the scales assessing one or two dimensions (e.g., TEMP scale, which only measured the affective and behavioral dimensions of shyness) were highly correlated with other shyness and social anxiety scales that used a multidimensional approach (e.g., SASA, SPIN, or SHYQ), suggesting that differences in multidimensionality are not the way to distinguish between the constructs of shyness and social anxiety. Our findings support the work of Cheek and Watson, who found 43% of shy women reported only one component of shyness, such as affect, cognition, or

behavior, with behavior by far being the most subscribed component (Cheek & Watson, 1989). Subsequently, although a three-component model of shyness implies that all three components are critical to an understanding of shyness overall, dimensionality is more likely important to identifying individual differences in the shyness condition and not in identifying the condition itself; indeed, the intercorrelations among the three components were low to moderate at best in Cheek and Krasnoperova's (1999) study.

One notable exception to the lack of specificity in dimensions distinguishing between shyness and social anxiety scales was our finding of a separate performance-only factor. All of the AAS items loaded exclusively onto one factor and appeared to represent a distinct facet of social anxiety that was separate from shyness and other social anxiety characteristics. Moreover, this result was consistent with the self-consciousness theory that proposed audience anxiety was one of four distinct lower order constructs, alongside embarrassment, shame, and shyness, under the higher order construct of social anxiety (Buss, 1980).

Third, the so-called jingle/jangle fallacy (Block, 1995) warns researchers not to assume that two similarly labeled scales measure the same construct, or inversely, that two dissimilarly labeled scales measure different constructs. In the broader sense, the fallacy warns of interpreting labels at face value rather than investigating their operationalization for a more precise understanding of the explicit relation between their conceptualization and measurement. In the case of shyness and social anxiety, the literature suggests that these two constructs are to be considered theoretically distinct but closely related and an implicit assumption is that their measurement should be equally distinct but related. Yet the constructs measured in this study were statistically equivalent and it was impossible to separate the scales into two distinct groups based on their label or name.

Fourth, and closely related to the previous point, Fiske (1971) argued that theory and measurement must be interdependent so that one does not take precedence over the other. Furthermore, he believed that the nature of any psychological concept would be impossible to understand if it were not distinguishable from other closely related concepts. Shyness and social anxiety might be a case in point. The items measuring the constructs of shyness and social anxiety exhibit a robust family resemblance across the two research domains and a closer look into their operationalization reveals strong similarities. For instance, the terms *shy* and *anxiety* are found across most self-report measures of shyness and social anxiety and how we use shy in our everyday language could be permeated with many different meanings that also might be associated with anxiety (Block, 1995; Fiske, 1971), such as nervousness when meeting new people or being quiet in a group discussion. Thus, answering the question "I am shy" might mean different things to different people, including being socially anxious. Furthermore, according to the self-consciousness theory, embarrassment is considered conceptually distinct from shyness, as both are hypothesized to be distinct lower order constructs of social anxiety, yet embarrassment also is found in shyness scales rather than only in social anxiety scales. Further, despite there being a commonality among embarrassment, social anxiety, and shyness with respect to an underlying concern with interpersonal evaluation, their distinct states are recognizable (Miller, 2009) and need to be considered when distinguishing between these different emotions. Thus, the shared wording of items between shyness and social anxiety scales such as "embarrassment" likely explains, in part, our evidence for one underlying construct.

In summary, it becomes increasingly apparent that item choice in survey construction must be considered carefully from a conceptual point of view. Researchers should have a clear idea of what they are including in a measure (or not including) and it should be based on an unambiguous conceptual definition centered on the unique qualities of that concept (Fiske, 1971). Otherwise we are likely to continue creating confusion between closely related concepts and their associated constructs. Our research suggests that shyness and social anxiety might exemplify this particular concern.

Strengths and limitations

Our research goes beyond previous investigations to include a more comprehensive set of shyness scales (Bortnik et al., 2002; Crozier, 1995; Ellis & Rothbart, 2001) and newer social anxiety scales developed from the more recent *DSM* criteria for diagnosing the closely related social anxiety disorder (Connor et al., 2000; Mattick & Clarke, 1998). We also investigated associations between our scales over and above looking at intercorrelations with respect to convergent and discriminant validity; we used EFA, confirmed our findings with CFA, and also examined the relation between all the scale items with another EFA. Broadly, the results showed that the shyness and social anxiety self-report scales appeared to be measuring a single underlying construct.

Nonetheless, there are several issues we did not address in this study. First, our intention was to look only at the two constructs of shyness and social anxiety as measured by self-report. Our study did not involve redefining the concepts of social anxiety and shyness as one or presenting the definitive understanding of the relation between these two domains of research. The intent was to investigate whether a variety of frequently used scales in the literature tapped into two distinct domains or whether they measured essentially one underlying construct. Further to this point, to better assess the construct validity of both shyness and social anxiety, we recognize that the multitrait–multimethod approach of Campbell and Fiske (1959) would better capture both the unique and common characteristics of shyness and social anxiety (Campbell & Fiske, 1959). Future studies might consider conducting observational, psychophysiological, or longitudinal studies to determine if the domains of shyness and social anxiety can be differentiated from one another.

Second, our findings were based on one sample over a very large age range. Future work investigating differences in shyness and social anxiety might consider using different samples, more circumscribed age ranges, and a developmental perspective. Indeed, developmental processes might be pertinent to understanding the common underlying basis to shyness and social anxiety, particularly because research

links childhood behavioral inhibition to later shyness (Henderson et al., 2014) and social anxiety (Clauss & Blackford, 2012).

Third, the terminology used in the measurement of shyness as compared to social anxiety is almost indistinguishable. A necessary next step is to see if these two domains of research can be differentiated from one another through the study of their root causes. The medical analogy of headaches reflects this dilemma well. Headaches are associated with many different illnesses but the underlying cause is varied. Until we can identify the similarities in (e.g., are they both temperament attributes) and distinguish between (e.g., is one more closely linked to development) the origins of these behaviors, it could be that the exact relation between shyness and social anxiety will remain undetermined at both the measurement and conceptual level.

Conclusions

In this study we examined the question of whether shyness and social anxiety are operationalized as the same construct. Although there is a strong basis in everyday language and theory to assume that shyness might be a milder nonproblematic behavior, the implication from our research is that the underlying measures of shyness are very closely associated with the underlying measures of social anxiety. Future research in these two areas might benefit from a more interdisciplinary collaboration, such as between personality and clinical fields, to identify the unique aspects of shyness and social anxiety that distinguish them from each other, rather than focusing on their shared characteristics. In the short term, we propose that investigators should consider whether shyness and social anxiety, as currently measured by self-report in the literature, are two concepts seemingly operationalized as the same construct.

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