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Testing the Cognitive Content-Specificity Hypothesis of Social Anxiety and Depression: An Application of Structural Equation Modeling

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The present research examined three key issues of the cognitive content-specificity hypothesis of social anxiety and depression using structural equation modeling (SEM) approach. First, using confirmatory factor analyses on data from a sample of 507 undergraduate students, we found that both positive and negative self-statements factors of the modified Social Interaction Self-Statement Test were empirically differentiated from those of the Automatic Thoughts Questionnaire-Positive and the Automatic Thoughts Questionnaire. Next, SEM was used to analyze data from a subsample of 489 students to identify unique and common cognitive contents that contribute to social anxiety or depressive symptoms and then to evaluate their magnitudes simultaneously. Both positive and negative social interaction self-statements were unique to social anxiety symptoms. However, negative depressive self-statement was specific to depressive symptoms, whereas positive affect self-statement was common to the symptoms of social anxiety and depression. Furthermore, the effects of unique components of self-statements seemed stronger than that of common component on the symptoms of social anxiety and depression. In conclusion, these findings provide general support for the cognitive content-specificity hypothesis of social anxiety and depression.

KEY WORDS: cognitive content-specificity; social anxiety; depression; self-statements; structural equation modeling.

Cognitive theories have emphasized the importance of cognitions in the development, maintenance, and treatment of emotional disorders including social anxiety and depression (i.e., Beck, 1967; Beck, Emery, & Greenberg, 1985; D. M. Clark & Wells, 1995). In particular, the cognitive content-specificity hypothesis, a component of Beck's cognitive theory, states that psychopathological symptoms can be distinguished on the basis of their unique cognitive contents (Beck, 1976;

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D. A. Clark & Beck, 1989). The term *cognition* as used herein should be understood to indicate cognitive products such as automatic thoughts or self-statements, as distinct from other sorts of cognition such as cognitive structure or operations (Ingram & Kendall, 1986, 1987). Over the years a number of studies have examined the cognitive content-specificity hypothesis of anxiety and depression (see Beck & Perkins, 2001, for a review). A recent meta-analysis indicated that cognitive content-specificity did exist for depressive cognitive contents but not for anxiety cognitions (Beck & Perkins, 2001).

Two theoretical explanations for the observed lack of specificity for anxiety cognitions seem plausible. First, cognitive contents may differ depending on whether anxiety symptoms are specific versus more generalized (Beck & Perkins, 2001; Kendall & Ingram, 1989). In other words, better specificity may emerge when a more specific form of anxiety is evaluated (Ingram, Kendall, Smith, Donnell, & Ronan, 1987). The investigations attempting to isolate subsets of anxiety cognitions or to measure specific anxiety cognitions/symptoms demonstrated the specific link between anxiety cognitions and anxiety symptoms. For example, Bruch, Mattia, Heimberg, and Holt (1993) found that positive cognitions as measured by the positive subscale of the Social Interaction Self-Statement Test (SISST; Glass, Merluzzi, Biever, & Larsen, 1982) were inversely related to social anxiety symptoms more strongly than to depressive symptoms. In addition, the social anxiety group reported significantly fewer positive thoughts relevant to heterosocial interaction than either the depressed or the control groups who did not differ from each other. Woody, Taylor, McLean, and Koch (1998) showed that panic cognitions correlated significantly with panic or agoraphobic symptoms but not with depressive symptoms. Furthermore, in contrast to general anxiety-relevant cognitions, panic cognitions successfully discriminated the clients with panic disorder from those with major depressive disorder. These findings indicate the need to consider potential cognitive differences in the kind of anxiety symptoms under investigation as well as to use measures that represent specific and prototypical cognitions associated with a specific form of anxiety in order to examine the specificity of anxiety cognitions more appropriately (Kendall & Ingram, 1989).

Second, cognitive variables may be distinguished as either common or unique to anxiety or depression, according to so-called "a cognitive component model of psychopathology" (Ingram & Kendall, 1987; Kendall & Ingram, 1987). This model is similar to L. A. Clark and Watson's (1991) tripartite model of depression and anxiety, in which the symptoms of depression and anxiety consist of general (nonspecific) distress, specific depression, and specific anxiety symptoms. However, there is one major difference between these two models: the former seeks to examine the cognitive components of anxiety and depression, whereas the latter focuses on the mood components of the two psychopathological states. The questions about the uniqueness or specificity of the cognitive contents for each psychopathology have important implications for cognitive theories concerning the causality, course, and alleviation of emotional disorders. Finding specific cognitive contents that are differentially linked to particular psychopathological states would support not only the notion that such contents are important in these conditions but also that they are potentially helpful in identifying the critical roles of cognitive variables in the cause,

course, and treatment of these different psychopathological states (Ingram et al., 1987). A recent meta-analysis indicated that depressive cognitions are relatively unique to depressive symptoms whereas anxious cognitive contents are common to depression and anxiety (Beck & Perkins, 2001). Hence, research on the cognitive content-specificity hypothesis need to consider cognitive contents unique to certain psychopathological symptoms as well as those that appear to be common to two or more kinds of psychopathological states (Ingram & Kendall, 1987).

In the light of the above-mentioned explanations, the present research attempted to test the cognitive content-specificity hypothesis of social anxiety and depression more appropriately. Based on cognitive theory and research (Beck et al., 1985; Clark & Wells, 1995; Foa, Franklin, Perry, & Herbert, 1996; Ingram & Kendall, 1987; Rapee & Heimberg, 1997; Turk, Lerner, Heimberg, & Rapee, 2001), cognitive contents in social anxiety contain themes of anticipated rejection, disapproval, and embarrassment, involving an overestimation of negative social evaluation and an underestimation of one's social competence or acceptability to others. In contrast, cognitive contents in depression include themes of loss, deprivation, personal worthlessness, incompetence, failure, and pessimism (Beck, Rush, Shaw, & Emery, 1979).

More specifically, we examined three key issues of the cognitive content-specificity hypothesis of social anxiety and depression. The first one is whether socially anxious self-statements can be empirically differentiated from depressive self-statements. There are widely used assessment tools to measure cognitive self-statements associated with social anxiety or depression. The SISST (Glass et al., 1982) is widely used to assess negative and positive thought contents relevant to heterosocial interaction. The Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980) and Automatic Thoughts Questionnaire-Positive (ATQ-P; Ingram & Wisnicki, 1988) are two widely used measures of negative and positive self-statements related to depression, respectively.

In previous studies, factor analyses have been performed on the SISST items, the ATQ items, and the ATQ-P items separately (Cho, Kim, & Won, 1997; Glass et al., 1982; Hollon & Kendall, 1980; Hong & Cho, 1999; Ingram & Wisnicki, 1988; Kwon & Yoon, 1994; Osman, Markway, & Osman, 1992; Sahin & Sahin, 1992). However, it has not been investigated yet whether the assessment tools measure distinct cognitive contents of social anxiety and depression or if they tap similar underlying constructs. This issue could be solved by conducting a single factor analysis of the combined version of the SISST, ATQ, and ATQ-P (cf., Safren et al., 2000).

The second issue is what the unique and common components of thoughts contributing to socially anxious or depressive symptoms are. And the last one is which of the two components contributes more to each psychopathological state. Currently, only a few comparative studies were conducted to evaluate the issue of the specificity of cognitive contents in social anxiety and depression (Bruch et al., 1993; Epkins, 1996; Ingram, 1989a, 1989b; Sanz & Avia, 1994). All of these studies have employed a methodological strategy of comparing cognitive contents in socially anxious and/or depressed subjects. This methodology enables us to evaluate the group differences in terms of the cognitive contents relevant to social anxiety and depression. However, it is not helpful in identifying the unique and common

cognitive contents that contribute to socially anxious and depressive symptoms as well as in evaluating their magnitudes simultaneously. These issues could be determined by employing structural equation modeling (SEM) approach.

In this vein, the present article consists of the two parts in which the three key issues of the cognitive content-specificity hypothesis of social anxiety and depression were examined using SEM procedures.[4] In the first part, confirmatory factor analysis (CFA) was conducted in order to determine whether socially anxious and depressive self-statements factors could be distinguished. CFA is considered as the most powerful method to investigate such a question for several reasons (Feldman, 1993; Floyd & Widaman, 1995). First, CFA is most effective in assessing whether a hypothesized measurement model adequately fits the data. Second, CFA is theory-driven and imposes substantive constraints on the solution. Finally, using CFA, different measurement models resulting from competing hypotheses can be compared directly with one another.

In the second part, SEM procedures were used to identify unique and common cognitive contents that contribute to socially anxious or depressive symptoms as well as to evaluate their magnitudes simultaneously. With regard to these two issues, SEM has two advantages over analysis of variance or multiple regression analysis (Hoyle, 1991; Hoyle & Smith, 1994). First, SEM can evaluate the magnitude of relations among psychological constructs while controlling for measurement error associated with fallible indicators of theoretical constructs. Second, it can estimate and evaluate multiple equations (i.e., unique and common paths) simultaneously in a single structural model.

METHOD

Participants

Five-hundred and seven introductory psychology students (285 men, 222 women) from a large private university in Korea completed cognitive assessment measures and received course credit for their participation. They ranged in age from 18 to 35 years with a mean of 20.24 ($SD = 2.11$). A subsample of 489 students (275 men, 214 women) completed measures of social anxiety and depression in addition to the cognitive assessment measures. They ranged in age from 18 to 35 years with a mean of 20.21 ($SD = 2.07$).

Measures

The Automatic Thoughts Questionnaire (ATQ)

The ATQ (Hollon & Kendall, 1980) is a 30-item self-report inventory that measures negative self-statements related to depression. Participants were asked to rate on a 5-point Likert scale how frequently each thought or a very similar thought had

[4]Structural equation model consists of two complementary models: the measurement model, of which factor analysis is an example, and the structural model, which concerns relations among independent and dependent variables and of which multiple regression analysis is an example (Hoyle & Smith, 1994).

occurred over the past week. There is ample evidence of the ATQ's reliability and validity (i.e., Hollon & Kendall, 1980). Kwon and Yoon (1994) reported Cronbach's alpha of .93 for the Korean version of the ATQ used in this study. The K-ATQ was found to correlate significantly with depressive symptoms and to discriminate undergraduates with high depression from those with low depression.

The Automatic Thoughts Questionnaire-Positive (ATQ-P)

The ATQ-P (Ingram & Wisnicki, 1988) is a 30-item self-report inventory that assesses the frequency of positive self-statements reflecting positive affect theorized to be inversely associated with depression. It is identical in format with the ATQ. Ingram & Wisnicki (1988) have provided evidence for the scale's reliability and validity. Kwon and Yoon (1994) reported Cronbach's alpha of .95 for the Korean version of the ATQ-P used in this study. The questionnaire was found to correlate significantly with depressive symptoms and to discriminate undergraduates with high depression from those with low depression.

The Social Interaction Self-Statement Test (SISST)

The SISST (Glass et al., 1982) is a 30-item questionnaire that consists of 15 positive and 15 negative self-statements. The questionnaire was originally designed to test self-statements generated during a heterosexual role-play interaction. The SISST has been evaluated using several different sets of instructions and there is good evidence for its reliability and validity (Glass & Arnkoff, 1994, 1997).

For the purposes of this study, some aspects of the original version were modified. First, references to a heterosexual role-play interaction were deleted so that its format could be comparable to that of the ATQ. Subjects were asked to rate on a 5-point Likert scale how frequently they experienced each thought or a similar thought before, during, or after the interaction that they were engaged in over the past week (e.g., Bruch et al., 1993). Second, because four of the original SISST items were judged to reflect anxious mood rather than cognition (Cho, 1999), they were replaced with similar but more clearly cognitive contents. The new items included were "I won't be able to think of anything to say in the middle of the conversation (Item 1)," "Now that I'm beginning to feel more at ease, I can concentrate on the conversation better (Item 4)," "I'm carrying the conversation well with no worries or fears (Item 6)," and "I'll make a terrible mistake (Item 7)." These items were derived from dysfunctional thought records of social phobia clients that were collected during cognitive-behavioral treatment (Cho & Kim, 1999; Cho, Won, & Pyo, 2000) and were consistent with the cognitive model of social phobia (D. M. Clark & Wells, 1995; Rapee & Heimberg, 1997).

Exploratory factor analysis for another sample of college students ($n = 283$) demonstrated that the modified SISST has two factors, corresponding to its positive and negative subscales (Cho, 2002). Because two positive self-statement items (Item 12, 30) did not load on the corresponding factor clearly, they were not included in the analyses of the present research. Cronbach's alpha was considered adequate for both the modified SISST-P ($\alpha = .79$) and SISST-N ($\alpha = .78$).

The Beck Depression Inventory (BDI)

The BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck et al., 1979) is a commonly used 21-item self-report scale to assess depressive symptoms during the past week. Its psychometric characteristics have been extensively validated (Beck, Steer, & Garbin, 1988; Steer & Beck, 1988). For the Korean version of the BDI used in this study, Lee and Song (1991) reported Cronbach's alphas of .85 and .86 with depressive patients and college students, respectively, and a test-retest reliability of .75 ($p < .001$) over 2 weeks with college students. The K-BDI was found to correlate significantly with the other measures of depressive symptoms in both clinical and nonclinical samples.

The recent findings consistently yielded strong support for the hypothesized second-order three-factor structure of the BDI for several Korean as well as Western samples (Byrne & Baron, 1993; Byrne, Baron, & Balev, 1998; Byrne, Baron, & Campbell, 1993; Byrne, Baron, Larsson, & Melin, 1995, 1996; Cho & Kim, 2002; Kim et al., 2002). They suggest that the BDI represents one second-order factor of Depression that is considered to influence the first-order factors of Negative Attitude (Factor 1), Performance Difficulty (Factor 2), and Somatic Elements (Factor 3). Items 1, 2, 3, 5, 6, 7, 8, 9, 10, and 14 loaded on Factor 1, Items 4, 11, 12, 13, 15, 17, and 20 on Factor 2, and Items 16, 18, 19, and 21 on Factor 3.

The Social Avoidance and Distress Scale (SADS)

The SADS (Watson & Friend, 1969) is a 28-item self-report inventory designed to assess social distress and social avoidance. Items are scored true or false. The SADS has been used extensively as a measure of social anxiety in both college students and clinical samples. This scale has been shown to have good internal consistency, acceptable stability, and good convergent validity as well as sensitivity to change due to treatment except its discriminant validity (see D. B. Clark et al., 1997; McNeil, Ries, & Turk, 1995).

The Korean version of the SADS used in this study differs from the original version in several aspects (Cho, 1999). First, the original SADS which measures social anxiety as a situation-specific trait anxiety was deemed not suitable for assessing social anxiety as a state, considering that this study aimed to identify cognitive contents that contribute to psychopathological symptoms. In this regard, the original instruction of Watson and Friend (1969) was changed to make a comparable format to the BDI. In the Korean version of the SADS, subjects were asked to report the severity of social distress and the frequency of social avoidance during the past week. This time frame is equal to those of the three cognitive measures as well as the BDI used in the present research. In addition, 14 time adverbs were deleted from the items and one ("seldom") was replaced with other negative adverb ("not"). Second, the items were reordered in the K-SADS according as the items correspond to social distress or social avoidance subscales. The first 14 items correspond to social distress subscale, and the 14 next items correspond to social avoidance subscale. Third, instead of the true–false format, each item was rated on a 5-point Likert scale, which might prevent the skewed distribution (Leary, 1991).

Cho and Won (1999) reported Cronbach's alpha of .92 and a test–retest reliability of .85 ($p < .001$) over 2 weeks for the Korean version of the SADS used in this study. The K-SADS was found to correlate significantly with the measures of cognitive and affective aspects of social anxiety (Cho, 1999; Cho & Won, 1999). It demonstrated sensitivity to change following cognitive and cognitive-behavioral treatments (Cho & Kim, 1999; Cho et al., 2000). Exploratory factor analyses for another sample of college students ($n = 590$) demonstrated that the K-SADS has three factors, each labeled as "social avoidance" (Factor 1), "social comfort" (Factor 2), and "social anxiety" (Factor 3), respectively (Cho, 2002). Items 15, 17, 18, 19, 21, 22, 23, 25, 27, and 28 loaded on Factor 1, Items 1, 3, 4, 7, 9, 10, 13, 20, and 26 on Factor 2, and Items 2, 5, 6, 8, 11, 12, and 14 on Factor 3.[5] However, Item 16 failed to have a salient loading on any factor and Item 24 loaded on two factors similarly. Thus, Items 16 and 24 were not included for any factor subscale scores in the current research.

Measurement Models for Socially Anxious and Depressive Self-Statements Factors

For confirmatory factor analysis, four measurement models were specified depending on whether the cognitive assessment tools measure distinct cognitive contents or tap similar underlying constructs.

MM 1—In this model,[6] six positive indicators of the modified SISST and the ATQ-P loaded on positive thoughts factor and six negative indicators of the modified SISST and the ATQ loaded on negative thoughts factor. Positive thoughts and negative thoughts factors are viewed as general (nonspecific) cognition factors common to both social anxiety and depression. They each parallel two broad, general higher-order affect factors—positive affect and negative affect—which comprise narrower factors of specific and distinct affects in a hierarchical model of affect (Watson & Clark, 1992; Watson & Tellegen, 1985). Jolly and Kramer (1994) demonstrated that Watson and colleagues' hierarchical model of emotional states could be extended to cognitions. MM 1 focuses on the upper level of the hierarchical model reflecting the valence of specific cognitions, but not the lower level reflecting the specific content of cognitions. In addition, based on the assertion that the negative and positive emotions are relatively independent of each other (e.g., Watson, Clark, & Tellegen, 1988), it was hypothesized that the two general cognition factors would not be correlated. Accordingly, a zero constraint was imposed on the correlation between the two factors of MM 1.

MM 2—This model was identical to MM 1 except that the correlation between the two factors was freely estimated. It was based on the findings that positive self-statements factor was significantly correlated with negative cognition factor (e.g., Hong & Cho, 1999; Safren et al., 2000).

[5]Based on the item numbers of the original SADS, Items 2, 4, 9, 13, 18, 19, 21, 24, 26, and 27 loaded on Factor 1, Items 1, 3, 6, 7, 12, 15, 17, 25, and 28 on Factor 2, and Items 5, 10, 11, 14, 16, 20, and 23 on Factor 3.

[6]To discriminate between measurement and structural models, the former has been abbreviated to MM and the latter to SM.

MM 3—In this model, 3 positive and 3 negative indicators of each cognitive assessment measure loaded on distinct respective factors. This model was based on the cognitive content-specificity hypothesis of social anxiety and depression. Zero constraints were imposed on the correlations among the four factors.

MM 4—This model was identical to MM 3 except that the correlations among the four factors were freely estimated. It was based not only on the cognitive content-specificity hypothesis but also on the findings that there were at least moderate correlations among positive and negative self-statements relevant to social anxiety or depression (e.g., Bruch et al., 1993).

Structural Models for the Cognitive Content-Specificity Hypothesis of Social Anxiety and Depression

For SEM, three structural models were specified to test the cognitive content-specificity hypothesis of social anxiety and depression.

SM 1—It was hypothesized that socially anxious or depressive self-statements would be uniquely associated with the corresponding symptoms and not with the others, based on the cognitive content-specificity hypothesis of social anxiety and depression. In this model, there are no cognitive contents to be commonly associated with symptoms of social anxiety and depression.

SM 2—It was hypothesized that socially anxious or depressive self-statements would be commonly associated with both social anxiety and depression. In this model, there are no cognitive contents to be uniquely associated with socially anxious and depressive symptoms. This model parallels a nonspecific or unitary syndrome position, in which anxiety and depression are viewed as variants of the same disorder whose differences are more quantitative than qualitative in nature (e.g., Lipman, 1982; Stavrakaki & Vargo, 1986).

SM 3—It was hypothesized that a direct path from depression-relevant positive self-statements to social anxiety symptoms would be added to SM 1. This model was based on the findings that the correlation between the ATQ-P and the SADS was stronger than or similar to the correlation between the ATQ-P and the BDI (Bruch et al., 1993; Ingram & Wisnicki, 1988), suggesting that the positive self-statements as assessed by the ATQ-P should be considered as cognitive contents not specific to depressive symptoms.

Statistical Analyses

To examine whether the modified SISST, the ATQ, and the ATQ-P would assess distinct cognitive contents of social anxiety and depression, confirmatory factor analyses were conducted with composite indicators (item parcels) instead of individual items from the three measures combined. Given the large number ($N = 88$) of items in the three measures, many parameters should be estimated when individual items are subjected to CFA. Estimating many parameters in a limited sample increases the potential of estimation error (see Bentler & Chou, 1987; Marsh, 1994). Thus, the use of parcels may be beneficial because it results in the estimation of fewer parameters. In CFA, factor loadings and measurement error variances need

to be estimated only for each parcel rather than for each item. By reducing the number of parameters, more stable parameter estimates can be obtained (Bagozzi & Edwards, 1998; Kishton & Widaman, 1994). Items were combined randomly to form three indicators for each latent variable of the modified SISST and each of the two ATQs.[7] Each indicator score was the mean of the item scores. The 12 newly created indicators served as the measured variables in the CFA models. When a factor consists of items believed to be unidimensional, the random allocation of items to item parcels is a reasonable approach for creating at least three indicator scores for SEM approach (S. Hong, personal communication, 2001).

To evaluate the various structural models, SEM was used with composite indicators (item parcels) from the modified SISST and the ATQs as well as each factor subscale of the modified SADS and the BDI. Three indicators for each latent variable of the modified SISST and each of the two ATQs were created in the same way as in the measurement models for CFAs and served as the measured variables in the models for SEM. For the modified SADS and the BDI, three factor subscales of each questionnaire were entered in SEM.

Maximum likelihood was used as the estimation procedure in AMOS (Analysis of Moment Structures), Version 4.0 (Arbuckle & Wothke, 1999). We evaluated several factor models using the standard chi-square (χ^2) test, the Tucker–Lewis Index (TLI), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the Bayes information criterion (BIC), and the consistent Akaike information criterion (CAIC). For the TLI and CFI, values of .90 or above indicate a good fit of a proposed model (Schumacker & Lomax, 1996). Values of the RMSEA of .05 or smaller indicate a close fit, values in vicinity of .08 indicate a fair fit, and values of .10 and larger indicate a poor fit (Browne & Cudeck, 1993). Lower values in the BIC or CAIC used widely for comparisons of models in terms of parsimony indicate more parsimonious model (Read & Cressie, 1988). Chi-square difference tests were used for comparing nested models. Goodness of fit of any individual model parameter was determined by examining its critical ratio, a statistic comparable with a *t*-statistic with infinite degrees of freedom. In all cases, covariance matrices were used for estimation.

RESULTS

Can Socially Anxious Self-Statements Be Empirically Differentiated From Depressive Self-Statements?

The means, standard deviations, and correlations for the composite indicators derived from the modified SISST, the ATQ, and the ATQ-P were calculated.[8] According to the model fit guidelines, MM 4 produced a close fit to the data, whereas the other measurement models demonstrated poor or inadequate fit (see Table I). Both BIC and CAIC values indicated that MM 4 was the most parsimonious model.

[7] A desirable measurement model is one in which each factor or latent variable is uniquely and adequately represented by three or more indicators (Hoyle & Smith, 1994).

[8] A copy of the correlation tables can be obtained from the first author.

Table I. Fit Values for Alternative Measurement Models

Model	χ^2	*df*	TLI	CFI	RMSEA 90% CI)	BIC	CAIC
MM 1	1545.090	54	.689	.746	.234 (.224–.244)	1754.212	1718.574
MM 2	1458.454	53	.702	.760	.229 (.219–.239)	1676.289	1639.167
MM 3	546.389	54	.897	.916	.134 (.124–.145)	755.511	719.873
MM 4	86.537	48	.991	.993	.040 (.026–.053)	347.939	303.392

Note. MM: measurement model; TLI: the Tucker–Lewis Index; CFI : the comparative fit index; RMSEA: the root mean square error of approximation; BIC: the Bayes information criterion; CAIC: the consistent Akaike information criterion.

The path diagram of MM 4 with standardized parameter estimates is provided in Fig. 1. In this model, the four factors corresponded to positive and negative subscales of the modified SISST or the ATQs, respectively, and the factor loadings were all significant ($p < .05$). The R^2 values ranged from a low of .647 for the SP2 to a high of .903 for the AP3, indicating that these measures were all valid indicators of self-statements factors.

In MM 4, the positive factor scores of each questionnaire were correlated moderately, as were negative factor scores of each test. However, the correlation between positive and negative self-statements of the SISST was not significant, while the two factors of the ATQs moderately correlated with each other.

The CFAs provided evidence that both positive and negative self-statements of the modified SISST were empirically differentiated from those of the ATQs. In other words, these analyses indicated that the assessment tools largely assessed distinct cognitive contents, although the factors with the same valence underlying the questionnaires as well as the two factors of the ATQs were shown to correlate

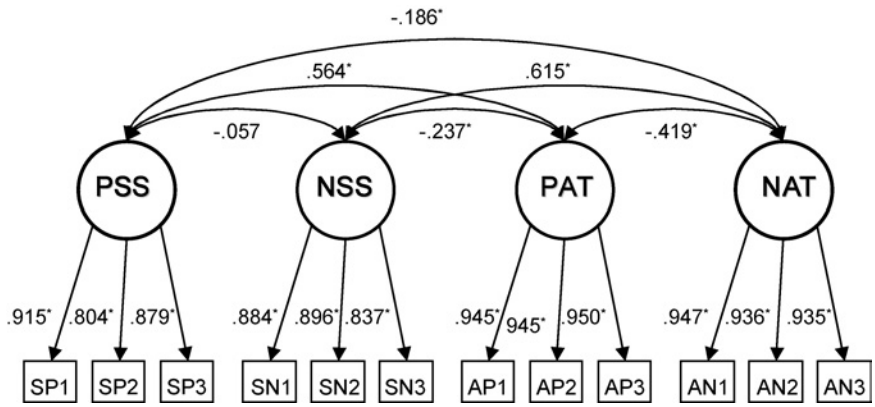

Fig. 1. The path diagram of MM 4 with standardized parameter estimates. For readability, error variances are not included. PSS: Positive social interaction self-statement factor; NSS: Negative social interaction self-statement factor; PAT: Positive automatic thoughts factor; NAT: Negative automatic thoughts factor; SP: Positive subscale of the modified Social Interaction Self-Statement Test; SN: Negative subscale of the modified Social Interaction Self-Statement Test; AP: the Automatic Thoughts Questionnaire-Positive; AN: the Automatic Thoughts Questionnaire. $^*p < .05$.

Table II. Fit Values for Alternative Structural Models

Model	χ^2	*df*	TLI	CFI	RMSEA (90% CI)	BIC	CAIC
SM 1	395.445	125	.955	.963	.067(.059–.074)	813.251	726.293
SM 2	358.443	121	.959	.968	.063(.056–.071)	812.580	718.061
SM 3	364.646	124	.960	.967	.063(.056–.071)	791.535	702.687

Note. SM: structural model; TLI: the Tucker–Lewis Index; CFI: the comparative fit index; RMSEA: the root mean square error of approximation; BIC: the Bayes information criterion; CAIC: the consistent Akaike information criterion.

moderately with each other. Thus, the findings suggest that the tools would be helpful in identifying the unique and common self-statements associated with self-reported symptoms of social anxiety or depression using SEM approach.

Which of the Three Structural Models is the Best-Fitting to the Data?

The means, standard deviations, and correlations for the measured variables derived from the modified SISST, the ATQs, the modified SADS, and the BDI were obtained.[9] Table II presents fit values for three structural models. All three models fit the observed data adequately. For further comparisons between the three models, chi-square difference tests were used.

The results of the three chi-square difference tests are summarized in Table III. Despite the finding that all fit indices for the models were similar, the direct comparisons favored SM 3 in both cases. Furthermore, both BIC and CAIC values indicated that SM 3 was the most parsimonious model. Thus, SM 3 provided the best fit to the data. In this model, positive and negative social interaction or negative depressive self-statements were hypothesized to be specifically associated with the corresponding symptoms. In addition, positive affect self-statement was hypothesized to be commonly related to socially anxious and depressive symptoms.

What Are the Unique and Common Components of Thoughts Associated with the Symptoms of Social anxiety or Depression?

Figure 2 displays the standardized path coefficients and factor correlations of SM 3. In this model, positive and negative social interaction self-statements were significantly associated with social anxiety symptoms as was positive affect

Table III. Results of Chi-Square Difference Tests

Comparison	Chi-square difference	*df* difference	The preferred model
SM 1 vs. SM 2***	37.002	4	SM 2
SM 3 vs. SM 2	6.203	3	SM 3
SM 1 vs. SM 3***	30.799	1	SM 3

Note. SM: structural model.
***$p < .001$.

[9]A copy of the correlation tables can be obtained from the first author.

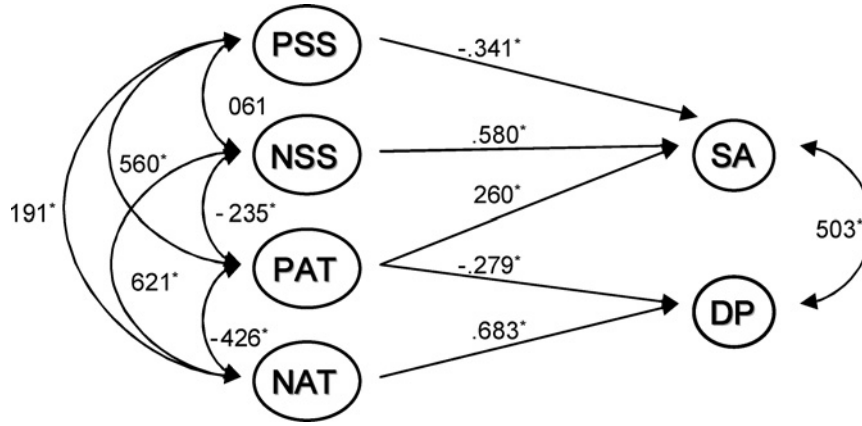

Fig. 2. The path diagram of SM 3 with standardized parameter estimates. For readability, factor loadings and error variances are not included. PSS: Positive social interaction self-statement factor; NSS: Negative social interaction self-statement factor; PAT: Positive automatic thoughts factor; NAT: Negative automatic thoughts factor, SA: Social anxiety symptoms factor, DP: Depressive symptoms factor. $^{*}p < .05$.

self-statement. Positive and negative self-statements relevant to depression were significantly predictive of depressive symptoms. Thus, both positive and negative social interaction self-statements were unique to social anxiety symptoms. Negative depressive self-statement was the only factor to be uniquely associated with depressive symptoms. On the other hand, positive affect self-statement was common to the symptoms of social anxiety and depression.

In SM 3, the factor loadings and factor correlations of the three cognitive assessment measures were almost equal to those in MM 4, a measurement model for CFAs. All of them were significant, with the exception of the correlation between positive and negative self-statements of the modified SISST. The three factor loadings of the SADS were all significant ($p < .05$), as were the three factor loadings of the BDI. The R^2 values ranged from a low of .540 for the Factor 2 of the SADS (SA2) to a high of .617 for the Factor 1 of the SADS (SA1), indicating that the three factor subscales were all good indicators of social anxiety symptoms. The R^2 values ranged from a low of .120 for the Factor 3 of the BDI (DP3) to a high of .732 for the Factor 1 of the BDI (DP1), indicating that the three factor subscales were all valid indicators of depressive symptoms, even though the DP3 subscale included a relatively large variance that was distinct from depressive symptoms.

Which Component Contributes to the Symptoms of Social Anxiety and Depression More?

The standardized path coefficients from the unique and common components of self-statements to the symptoms of social anxiety and depression in Figure 2 indicate their relative effects in SM 3. On the basis of the path coefficients, the effects of the unique components of self-statements on the symptoms of social anxiety

seemed stronger than that of positive affect self-statement, the common component. Likewise, negative depressive self-statement, the unique component, appeared to contribute about twice as much to depressive symptoms as positive affect self-statement, the common component, did. The unique and common components of self-statements were comparably responsible to the symptoms of social anxiety and depression ($R^2 = 71.5$ and 70.6%, respectively).

In addition, it appears from the parameter estimates in Figure 2 that negative self-statements contributed more to depressive symptom than positive self-statements, whereas negative self-statements seemed to contribute nearly as much to social anxiety symptoms as positive self-statements.

DISCUSSION

The present research examined the three key issues of the cognitive content-specificity hypothesis of social anxiety and depression using SEM procedures. First, CFA was conducted on composite indicators derived from the three cognitive assessment measures in order to determine whether self-statements could be empirically differentiated based on socially anxious or depressive contents. In the CFA, both positive and negative self-statements factors of the modified SISST were empirically differentiated from those of the ATQs, although the factors with the same valence underlying the assessment measures as well as the two factors of the ATQs moderately correlated with each other. These findings provided evidence for good discriminant validity of the assessment tools as well as the first premise of the cognitive content-specificity hypothesis.

According to the cognitive content-specificity hypothesis, cognitions in social anxiety are characterized by overestimation of probability and cost of negative social evaluation and underestimation of one's social competence or acceptability to others (Beck et al., 1985; D. M. Clark & Wells, 1995; Foa et al., 1996; Ingram & Kendall, 1987; Rapee & Heimberg, 1997; Turk et al., 2001), whereas depressive cognitions are characterized by a more general self-dissatisfaction and negative attitudes about the world and the future (Beck et al., 1979). In fact, the thought contents as assessed by the SISST reflect positive anticipation, rational coping, self-efficacy of social exchange, fear of negative social evaluation, and self-depreciation relative to one's social competence or acceptability to others (Cho et al., 1997; Hong & Cho, 1999; Glass et al., 1982). The cognitive contents as measured by the ATQ-P contain positive self-evaluation, future expectations, daily functioning, and positive evaluation on interpersonal ability (Ingram & Wisnicki, 1988; Kwon & Yoon, 1994). The cognitive contents as assessed by the ATQ reflect negative self-concept and expectation, perceptions of personal maladjustment and desire for change, and helplessness (Hollon & Kendall, 1980; Kwon & Yoon, 1994). Thus, the results of the CFA support the first premise of the cognitive content-specificity hypothesis.

The second issue was to identify the unique and common cognitive components that contribute to socially anxious or depressive symptoms. The third one was to examine which of their magnitudes is stronger, using SEM procedures. Of the four kinds of self-statements, both positive and negative social interaction

self-statements were the cognitive contents to be uniquely associated with the symptoms of social anxiety, whereas only negative depressive self-statement was the thought content specific to depressive symptoms. Positive depressive self-statement was the cognitive content to be commonly associated with the symptoms of social anxiety and depression. These findings indicated that cognitive content-specificity did exist for positive and negative social interaction self-statements as well as for negative depressive self-statement. However, this was not the case for positive affect self-statements that shared almost equal variance with the symptoms of social anxiety and depression. The observed lack of specificity for positive affect self-statements as measured by the ATQ-P was also reported in the previous studies comparing the correlations between the ATQ-P and the SADS and the BDI (Bruch et al., 1993; Ingram & Wisnicki, 1988) as well as other studies that compared purely depressed subjects to purely socially anxious subjects on the ATQ-P score (Bruch et al., 1993; Ingram, 1989a). Furthermore, it would appear that the symptoms of social anxiety or depression are more strongly influenced by their unique cognitive contents than by their common cognitive contents. Therefore, in line with the cognitive content-specificity hypothesis, the present findings using SEM procedures suggest that socially anxious and depressive symptoms can be distinguished on the basis of their unique cognitive contents.

In addition, negative self-statements appeared to contribute much more to depressive symptoms than positive self-statements, whereas negative self-statements seemed to contribute nearly as much to social anxiety symptoms as positive self-statements. The results indicated that the presence of negative thoughts is more important than the absence of positive cognitions in depressive symptoms. However, this appeared to be not the case for social anxiety symptoms.

In the current research, the correlation between positive and negative self-statements factors of the modified SISST was not significant. As for this relationship, previous studies reported conflicting findings. In some studies (e.g., Bruch et al., 1993; Cho et al., 1997; Dodge, Hope, Heimberg, & Becker, 1988; Hong & Cho, 1999), the correlation between the factor scales was significant, but not in other studies (e.g., Osman et al., 1992). The relation between the SISST positive and negative may be influenced by sample characteristics and variation in item content. The exact nature of these influences has yet to be clarified.

Several limitations of the present studies deserve comments. First, while the findings of this research using SEM approach appear to be generally consistent with cognitive causal theories (e.g., Beck, 1976), it is difficult to examine the causal role of cognitive factors in the symptoms of social anxiety and depression with cross-sectional data. To test the causal relationship appropriately, longitudinal or experimental studies are needed. Second, the samples in the two studies consisted of non-treatment seeking college students in Korea. Future studies with different samples from other cultures should examine the cognitive content-specificity hypothesis of social anxiety and depression to provide evidence for the generalizability of these findings. Furthermore, replication with clinical samples may help determine if the specific self-statement factors are associated with the diagnoses of social anxiety or depression. Third, all the instruments were self-report inventories. Replication with other methods of assessing cognitive self-statements and psychopathological

symptoms is needed. In addition, to measure the symptoms of social anxiety and depression, older scales, the SADS and the original BDI, were used. It remains to be seen whether our findings would generalize to the newer scales, namely, the Social Phobia and Anxiety Inventory (SPAI; Turner, Beidel, Dancu, & Stanley, 1989) and the BDI–Second Edition (BDI–II; Beck, Steer, & Brown, 1996). The SPAI, for example, is less saturated with negative affectivity than the SADS (e.g., Peters, 2000), and so the results probably would generalize to the newer measures.

Limitations notwithstanding, the present results provide general support for the cognitive content-specificity hypothesis of social anxiety and depression. Moreover, we suggest that the research methodology used in the present research may serve as a useful guideline for further research to examine the cognitive content-specificity hypothesis of different psychopathology.

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