

Attachment in Individuals With Social Anxiety Disorder: The Relationship Among Adult Attachment Styles, Social Anxiety, and Depression

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Despite their apparent implications for social functioning, adult attachment styles have never been specifically explored among persons with social anxiety disorder. In the current study, a cluster analysis of the Revised Adult Attachment Scale (N. L. Collins, 1996) revealed that 118 patients with social anxiety were best represented by anxious and secure attachment style clusters. Members of the anxious attachment cluster exhibited more severe social anxiety and avoidance, greater depression, greater impairment, and lower life satisfaction than members of the secure attachment cluster. This pattern was replicated in a separate sample of 56 patients and compared with the pattern found in 36 control participants. Social anxiety mediated the association between attachment insecurity and depression. Findings are discussed in the context of their relevance to the etiology, maintenance, and cognitive-behavioral treatment of social anxiety disorder.

Social anxiety disorder is characterized by an intense fear of embarrassment or humiliation in social and performance situations (American Psychiatric Association, 1994) and is frequently associated with compromised social functioning and limited social

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support networks (e.g., Davidson, Hughes, George, & Blazer, 1993). An examination of more than 8,000 community respondents to the National Comorbidity Survey (NCS) revealed a 13.3% lifetime prevalence of the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev., *DSM-III-R*; American Psychiatric Association, 1987) social anxiety disorder (Kessler et al., 1994). Affected individuals have difficulty forming and maintaining romantic relationships, and they are less likely to marry than individuals without social anxiety disorder (Schneier et al., 1994; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992; Turner, Beidel, Dancu, & Keys, 1986). Furthermore, single individuals with social anxiety disorder demonstrate greater social avoidance and are more likely to be diagnosed with avoidant personality disorder, mood disorders, or both than are their married counterparts, demonstrating a link between severity of social anxiety disorder and impaired relationship functioning (Hart, Turk, Heimberg, & Liebowitz, 1999). A consideration of the relationship impairments demonstrated by persons with social anxiety disorder within the context of attachment theory may provide a useful framework for conceptualizing the etiology and maintenance of this highly prevalent and impairing disorder.

Attachment theory proposes three general tenets about how individuals develop and maintain patterns of social interaction and emotion regulation (Bowlby, 1973; Shaver & Clark, 1994). First, infants are born with a system of behaviors, the goal of which is to maintain contact with significant caregivers who provide protection from a potentially dangerous world. Second, the accessibility and responsivity of others to one's attachment needs foster the development of expectations that are carried forward into new relationships. Third, experiences with significant others are internalized into a set of working models of others' dependability and of the worthiness of the self as a lovable person that can be generalized to new relationships. Bowlby (1973) asserted that these internalized interpersonal working models account for the stability of attachment styles across the life span and for subsequent relational cognitions and behaviors in adulthood.

A central assumption of the attachment literature is that an individual's attachment system operates "from the cradle to the grave" (Bowlby, 1979, p. 129). Beginning with Hazan and Shaver (1987), a number of researchers have sought to substantiate this assumption by studying adult attachment styles in close peer-romantic relationships. As in early research on attachment styles in infancy and childhood, studies of adult attachment have adopted a tripartite typology of secure, avoidant, and anxious-preoccupied attachment styles, considered to be functionally equivalent to Ainsworth's (Ainsworth, Blehar, Waters, & Wall, 1978) original categories of infant attachment. The most widely recognized measure of adult attachment is the Adult Attachment Interview (George, Kaplan, & Main, 1996), a semistructured interview that probes for general descriptions of relationships, specific supportive or contradicting memories, and descriptions of current relationships with parents. However, this interview is lengthy and demands a significant investment of resources to become trained in its administration. Ever since Hazan and Shaver's demonstration that it is possible to use a self-report questionnaire to measure adolescent and adult attachment orientations, other variants and extensions of their categorical measure have been proposed. Research on self-reported adult attachment examining the nature and quality of romantic relationships has shown that these attachment orientations are associated with relationship adjustment, with differing responses to conflict, and with differences in the seeking and giving of support (Collins, 1996; Collins & Read, 1990; Hazan & Shaver, 1987; Levy & Davis, 1988).

Adult attachment styles reflect expectations about whether significant others are emotionally available under stressful circumstances (Hazan & Shaver, 1987). Secure adults consider themselves as worthy of the concern, care, and affection of others; perceive significant others as being accessible, reliable, trustworthy, and well-intentioned; and tend to have relationships characterized by intimacy and trust. Adults with an avoidant attachment style tend to deny their own emotional needs for attachment and perceive others as untrustworthy, thereby limiting their capacity for developing truly intimate relationships. Adults with anxious-preoccupied attachment styles have negative working models of themselves and positive models of significant others, such that their relationships are characterized by worry about abandonment, hypervigilance, and jealousy (Bartholomew & Horowitz, 1991; Hazan & Shaver, 1987; Levy & Davis, 1988; Simpson, 1990).

Bowlby's (1973, 1979) attachment theory was developed through observations of clinical populations, and researchers have suggested that deficiencies in social bonds may lead to psychiatric morbidity. However, there has been little work that has applied attachment theory to specific clinical disorders or treatment strategies (Fonagy et al., 1996). A small number of studies have examined social bonds and attachment in depressed populations. Following the course of clinical depression in women, G. Brown and Harris (1978) found that an intimate relationship was likely to be protective against depressive illness in the presence of severe adversity. Hammen and her colleagues (Davila, Hammen, Burge, Daley, & Paley, 1996; Hammen et al., 1995) have also reported that insecure attachment predicted greater pathology following stressful life events. In psychotherapy, insecure attachment has been associated with less treatment compliance, greater rejection of treatment providers, and less self-disclosure among patients with affective disorders (Dozier, 1990).

Using the adult attachment scale developed by Hazan and Shaver (1987), Michelson, Kessler, and Shaver (1997) found social anxiety disorder to be negatively related to a secure attachment style and positively related to avoidant and anxious styles in the NCS epidemiological sample. Thus, an investigation into the relationship between attachment styles and social anxiety in a clinical sample is warranted. The phenomenological experience of social anxiety disorder, as evidenced by both research and clinical observation, suggests a convergence between this disorder and difficulties in the areas of trust, the perceived

dependability of others, and self-esteem that characterize adult attachment in close relationships.

Does Social Anxiety Mediate the Relationship Between Adult Attachment and Depression?

There is a robust relationship between social anxiety disorder and depression. In the NCS, more than one person in three (34.2%) with a lifetime diagnosis of social anxiety disorder also had a history of mood disorders, compared with 14.5% of individuals without social anxiety disorder (Kessler, Stang, Wittchen, Stein, & Walters, 1999). The onset of social anxiety disorder also preceded the onset of depression in about 70% of comorbid cases in both the NCS (Kessler et al., 1999) and the Epidemiological Catchment Area Study (Schneier et al., 1992). In clinical samples of patients with social anxiety, rates of lifetime diagnoses of mood disorders range from 11% to 70%, with most reports converging at around 40% (T. A. Brown & Barlow, 1992; Stein, Tancer, Gelerner, Vittone, & Uhde, 1990; Van Ameringen, Mancini, Stylian, & Donison, 1991).

Adult attachment and social anxiety were also related in the NCS (Michelson et al., 1997). Although there is not yet an empirical basis for the relationship between attachment and social anxiety in clinical samples, there is strong empirical evidence linking attachment to depression (see the review by Dozier, Stovall, & Albus, 1999). Whisman and McGarvey (1995) speculated that an observed relationship between retrospective perceived attachment to a caregiver and dysphoria may be partially mediated by social factors, such as the number and quality of interpersonal relationships and social supports. If the relationship of insecure attachment to social anxiety can be presently demonstrated in a clinical sample, then the possibility that social anxiety mediates the relationship between attachment and depression can be examined. A mediational relationship might exist if, for example, insecure attachment predisposes the person to experience social anxiety and social anxiety increases the probability of depression, as might happen when persons with social anxiety find that they are unable to achieve important interpersonal goals.

The Present Study

The present study extends attachment theory to a clinical population of individuals with social anxiety disorder. Collins's (1996) Revised Adult Attachment Scale (RAAS) was used as the primary instrument because it is the only multi-item dimensional measure that can yield in adults the kind of attachment typol-

ogy identified by Ainsworth et al. (1978). A cluster analysis was performed on RAAS scores to investigate whether there are discrete attachment styles within social anxiety disorder and what the nature of these styles might be. *Cluster analysis* describes a group of statistical procedures that can be used to sort individuals into relatively homogeneous subgroups based on their degree of similarity to one another on a set of variables. Unlike latent class analysis, cluster analysis does not test specific a posterior assumptions about the distribution of latent variables (Lazarsfeld & Henry, 1968). Although we did not expect any specific pattern of clusters, the presence of the anxious-preoccupied attachment style was hypothesized based on the nature of social anxiety concerns.

Following cluster resolution, mean differences between the resulting groups were then examined for potential differences on measures of the severity of social anxiety disorder, depression, and functional impairment and life satisfaction. Cross-validation with a second, independent clinical sample was conducted to corroborate the classification of attachment styles. We also explored the link between attachment styles and depressive symptoms within the sample of patients with social anxiety. By using multivariate mediational analyses (Baron & Kenny, 1986), we examined the hypothesis that social anxiety mediates the statistical relationship between adult attachment style and depressive symptoms in this clinical population.

Method

Participants

The primary clinical sample consisted of 118 patients (age: $M = 32.43$ years, $SD = 10.37$; 58.6% male and 41.4% female) who sought treatment at the Center for Stress and Anxiety Disorders of the University at Albany, State University of New York ($n = 20$) or the Adult Anxiety Clinic of Temple University in Philadelphia ($n = 98$) for interpersonal or performance anxiety. All patients met *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994) criteria for a principal diagnosis of social anxiety disorder as assessed by the Anxiety Disorders Interview Schedule for *DSM-IV*: Lifetime Version (ADIS-IV-L; DiNardo, Brown, & Barlow, 1994). The ADIS-IV-L assesses current and lifetime anxiety disorders and includes modules for mood disorders, substance abuse and dependence, and disorders that overlap with anxiety disorders in terms of presenting symptoms (e.g., hypochondriasis). In addition, there are screening

questions for other major disorders (e.g., psychosis). The ADIS-IV-L demonstrated excellent reliability ($k = .77$) for the diagnosis of social anxiety disorder in a sample of 362 patients with anxiety disorders who received two independent interviews (T. A. Brown, Di Nardo, Lehman, & Campbell, 2001). Potential participants with comorbid diagnoses of bipolar disorder, psychotic disorders, organic mental disorders, or active substance dependence in the past 3 months were excluded.

The clinical replication sample consisted of 56 patients (age: $M = 33.66$ years, $SD = 9.55$; 60.3% male and 39.7% female) who sought treatment for interpersonal or performance anxiety at the Anxiety Disorders Clinic of the New York State Psychiatric Institute. All patients met *DSM-IV* criteria for a principal diagnosis of social anxiety disorder as assessed by the Structured Clinical Interview for the *DSM-IV* Axis I Disorders—patient edition (SCID—I/P; First, Spitzer, Gibbon, & Williams, 1996). In addition to the exclusion criteria described for the primary sample, the replication sample also excluded patients with a comorbid diagnosis of current major depressive disorder.

Thirty-six nonclinical control participants (age: $M = 32.66$ years, $SD = 10.68$; 52.8% male and 47.2% female) were recruited from the Philadelphia community through media advertisements. Potential participants were initially screened in a telephone interview that asked about current and past psychological problems and treatment. Control participants were matched with the primary clinical sample on age, gender, and race and could not meet criteria for any current Axis I disorder as assessed by the ADIS-IV-L.

Measures and Procedure

Patients in both clinical samples completed self-report questionnaire measures as part of their initial assessment. An independent assessor also interviewed the subset of patients who ultimately received treatment (Albany–Philadelphia, $n = 84$; New York, $n = 56$). Control participants completed questionnaire measures when they came to the clinic for the ADIS-IV-L interview. Patients completed all measures presented below. Control participants did not complete the Fear Questionnaire or the measures of functional impairment or life satisfaction. With the exception of the Liebowitz Social Anxiety Scale (LSAS), independent clinician assessments of social anxiety, depression, and personality disorder were not administered to the control participants. Control participants received \$40 for their involvement in the study.

Adult attachment. Collins's (1996) RAAS is a slightly modified version of the Adult Attachment Scale originally developed by Collins and Read (1990) for the assessment of Hazan and Shaver's (1987) three attachment styles (secure, avoidant, and anxious–ambivalent) in the context of romantic relationships. Collins and Read's factor analysis of their scale in an undergraduate sample revealed three dimensions. The Close dimension refers to the extent to which an individual is comfortable with closeness and intimacy (e.g., "I find it relatively easy to get close to people"). The Depend dimension refers to the extent to which an individual feels he or she is able to trust and depend on others (e.g., "I know that people will be there when I need them"). The Anxiety dimension refers to the extent to which an individual is fearful about being abandoned or unloved in relationships (e.g., "I often worry that romantic partners don't really love me"). Each of the 18 statements is rated on a 5-point scale from 1 (*Not at all characteristic of me*) to 5 (*Very characteristic of me*). Scores for each six-item dimension of adult attachment also range from 1 to 5 after averaging across items. The scales have been shown to have adequate internal consistency (alphas ranging from .69 to .75) and temporal stability over a 2-month period (rs ranging from .52 to .71). Validity of the scales was shown in the initial sample through association with Hazan and Shaver's measure of attachment and theoretically predicted relations with attitudes toward the self and others and characteristics of current romantic relationships. In the current study sample, Cronbach's alpha for Close, Depend, and Anxiety was .84, .76, and .90, respectively.

Social anxiety. The LSAS (Liebowitz, 1987) is a clinician-administered scale that evaluates fear and avoidance of 11 social interaction (e.g., going to a party) and 13 performance (e.g., acting, performing, or giving a talk in front of an audience) situations. The Total Fear scale (the sum of all 24 fear ratings) was the LSAS index used in the current study. Fear is rated on a 4-point Likert-type scale (0 = *none*, 1 = *mild–tolerable*, 2 = *moderate–distressing*, 3 = *severe–disturbing*). The LSAS–Total Fear scale has demonstrated good internal consistency, with a Cronbach's alpha of .92 (Heimberg et al., 1999). With regard to its validity, the LSAS–Total Fear scale correlates positively with patient-rated measures of social anxiety (Cox, Ross, Swinson, & Direnfeld, 1998; Heimberg et al., 1999) and correlates more highly with other measures of social anxiety than with measures of depression among patients with social anxiety disorder (Fresco et al., 2001; Heimberg et al., 1999).

The Social Phobia subscale of the Fear Questionnaire (FO-Social; Marks & Mathews, 1979) is a five-item self-report measure that assesses fear-motivated avoidance of being observed and talking to authorities (e.g., "speaking or acting in front of an audience"). Items are rated on a 9-point Likert-type scale (0 = *would not avoid it*, 8 = *always avoid it*). The FQ-Social has demonstrated adequate 1-week retest reliability ($r = .82$; Marks & Mathews, 1979) and adequate internal consistency ($\alpha = .74$) among patients with anxiety disorders (Oei, Moylan, & Evans, 1991). It is also highly correlated with other measures of social anxiety disorder (Osman, Gutierrez, Barrios, Kopper, & Chiros, 1998), and patients with social anxiety disorder score higher on the FQ-Social than patients with panic disorder, agoraphobia, or generalized anxiety disorder (Cox, Swinson, & Shaw, 1991; Oei et al., 1991).

The Social Interaction Anxiety Scale (SIAS)¹ and Social Phobia Scale (SPS) are commonly used companion self-report measures designed to assess fear of interacting in dyads and groups (e.g., "I am nervous mixing with people I don't know well") and fear of being scrutinized by others (e.g., "I worry I might do something to attract the attention of other people"), respectively (Mattick & Clarke, 1998). The SIAS and SPS demonstrated adequate retest reliability among patients with social anxiety disorder over 12 weeks (r_s ranging from .66 to .93; Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mattick & Clarke, 1998). Excellent internal consistency has been reported for both scales among patients with social anxiety disorder and individuals in nonclinical samples, with Cronbach's alphas ranging from .87 to .94 for the SPS and from .86 to .94 for the SIAS (Heimberg et al., 1992; Mattick & Clarke, 1998). The SIAS has been found to be more strongly related to other measures of social interaction anxiety, whereas the SPS has been shown to be more strongly related to measures of observation-performance anxiety (E. J. Brown et al., 1997; Heimberg et al., 1992). The two scales also discriminate individuals with social anxiety disorder from persons with other anxiety disorders as well as from individuals in nonclinical samples (E. J. Brown et al., 1997; Heimberg et al., 1992; Mattick & Clarke, 1998).

The Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983) measures the self-reported trait of concern about the evaluation of others' (e.g., "I am afraid that others will not approve of me"). The BFNE contains 12 items rated using a 5-point Likert-type format (1 = *not at all characteristic of me*, 5 =

extremely characteristic of me). It is based on and correlates highly ($r = .96$) with the original 30-item Fear of Negative Evaluation Scale (FNE; Watson & Friend, 1969). The BFNE has a retest reliability of .75 and an internal consistency of .90 within a college sample (Leary, 1983). The original FNE has been widely used in clinical samples. It is positively correlated with patient-rated and clinician-rated measures of social anxiety disorder (e.g., Heimberg et al., 1992, 1999), and patients with social anxiety disorder score higher on the FNE than patients with other anxiety disorders and nonpatient controls (Stopa & Clark, 1993).

The Interpersonal Sensitivity Measure (IPSM; Boyce & Parker, 1989) assesses self-reported excessive sensitivity to the behavior and feelings of others, social feedback, and perceived or actual criticism (e.g., "I worry about hurting the feelings of other people"). The IPSM contains 36 items and uses a 4-point Likert-type format (1 = *very unlike me*, 4 = *very like me*). It demonstrates good internal consistency (alphas ranging from .85 to .86) and retest reliability ($r = .70$) in nonclinical samples and correlates highly with ratings from clinical interviews of interpersonal sensitivity ($r = .72$) among patients with depression.

Avoidant personality disorder. Avoidant personality disorder (APD) was determined using the International Personality Disorder Examination—Avoidant Personality Disorder Module (IPDE-APD; Loranger, 1995). Although there are limited data on the psychometrics of the IPDE-APD, versions of the APD module (Loranger, 1988) using *DSM-III-R* criteria have demonstrated excellent interrater reliability ($ks = .82-.91$; E. J. Brown, Heimberg, & Juster, 1995; Loranger et al., 1994) and 6-month retest reliability ($r = .78$; Loranger et al., 1994).

Depressive symptoms. The 21-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) is a clinician-administered assessment of the cognitive, behavioral, and somatic symptoms associated with depression. HRSD items are rated by the clinician using 3-point (e.g., 0 = *no difficulty falling asleep*, 2 = *complains of nightly difficulty falling asleep*) to 5-point (e.g., 0 = *normal speech and thought*, 4 = *extreme thought and motor retardation—complete stupor*) scales. The HRSD demon-

¹ Of the two versions of the Social Interaction Anxiety Scale that are available, this study used the 20-item version.

strates good interrater reliability ($r = .90$) and internal consistency (alphas ranging from .45 to .94; Hedlund & Vieweg, 1979) and correlates moderately with other measures of depression in patients with social anxiety disorder (Coles, Gibb, & Heimberg, 2001).

The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) is a widely used self-report measure assessing cognitive, affective, behavioral, and somatic symptoms of depression (e.g., sadness, loss of interest, sleep disturbance). The BDI contains 21 items rated on a 4-point Likert-type scale (0 = *denial of symptom*, 3 = *strong endorsement of symptom*). A meta-analysis of 25 years of research using the BDI (Beck, Steer, & Garbin, 1988) revealed high internal consistency for clinical samples (alphas ranging from .76 to .95). The BDI has good concurrent validity with other self-report and clinician-administered measures of depression. A recent examination of the BDI among patients with social anxiety disorder suggests good internal consistency ($\alpha = .89$) and 1-month retest reliability ($r = .84$) as well as good concurrent validity with clinician-administered measures of depression (Coles et al., 2001). The BDI also discriminates between social anxiety disorder patients with and without a comorbid mood disorder (Coles et al., 2001).

Functional impairment and life satisfaction. The Liebowitz Self-Rated Disability Scale (Schneier et al., 1994) is an 11-item questionnaire (0 = *no impairment*, 3 = *severe impairment*) that assesses impairment in a variety of domains (e.g., substance use, mood regulation, work, romantic relationships, activities of daily living). It demonstrates high internal consistency ($\alpha = .92$) and high concurrent validity with other measures of impairment among patients with social anxiety disorder (r 's range from .56 to .73) and discriminates between patients with social anxiety disorder and nonpatient controls (Schneier et al., 1994).

The *Disability Profile* (DP; Schneier et al., 1994) is an eight-item clinician-rated scale that assesses impairment (0 = *no impairment*, 4 = *severe impairment*) in several life domains (e.g., work, romantic relationships, activities of daily living). The DP has been shown to have high internal consistency ($\alpha = .90$) and good concurrent validity with other measures of impairment (r 's range from .56 to .79) and can discriminate between patients with social anxiety disorder and nonpatient controls (Schneier et al., 1994).

The *Quality of Life Inventory* (QOLI; Frisch, 1994) is a 16-item scale that assesses satisfaction in mul-

tiple-life domain (e.g., health, work, relationships; Frisch, 1994). Individuals rate satisfaction with each domain (+3 = *very satisfied*, -3 = *very dissatisfied*) and the importance of each domain to the individual's happiness (0 = *not at all important*, 2 = *very important*). The QOLI demonstrates good internal consistency among nonclinical and clinical samples (alphas ranging from .77 to .89) and a 2–3 week retest reliability ranging from .80 to .91 (Frisch, Cornell, Villanueva, & Retzlaff, 1992). It also demonstrates high concurrent validity with other measures of subjective well-being and is negatively correlated with measures of general psychopathology, depression, and anxiety. Furthermore, the QOLI is inversely associated with social interaction anxiety, depression, and functional impairment among people with social anxiety disorder (Safren, Heimberg, Brown, & Holle, 1997).

Results

Preliminary Analyses

Sample characteristics. There were no differences between patients with social anxiety disorder from the Albany and Philadelphia sites in terms of age, $t(116) = 0.81$, ns; gender ratio, $\chi^2(1, N = 115) = 0.50$, ns; race, $\chi^2(2, N = 116) = 1.96$, ns; marital status, $\chi^2(1, N = 118) = 0.64$, ns; or level of education, $\chi^2(3, N = 118) = 2.10$, ns. These analyses indicated that these two subgroups were comparable in terms of demographic characteristics, and, therefore, they were merged to comprise the primary clinical sample.

In addition, as shown in Table 1, there were no differences between the primary clinical sample of patients with social anxiety disorder and the nonclinical control group in terms of age, $t(152) = 0.04$, ns; gender ratio, $\chi^2(1, N = 151) = 0.43$, ns; race, $\chi^2(2, N = 152) = 4.98$, ns; marital status, $\chi^2(1, N = 154) = 3.59$, ns; or level of education, $\chi^2(3, N = 154) = 7.77$, ns. These analyses indicated that the two groups were comparable in terms of demographic characteristics.

Finally, comparisons between the primary clinical sample and the replication sample showed that the groups failed to differ in age, $t(170) = -0.41$, ns; gender ratio, $\chi^2(1, N = 171) = 0.001$, ns; or marital status, $\chi^2(1, N = 171) = 0.11$, ns. However, these two groups differed in terms of race, $\chi^2(2, N = 172) = 27.97$, $p < .001$, with the replication sample including fewer Caucasian patients and more African American patients and patients classified as other

Table 1
Demographic Characteristics of Patients With Social Anxiety and Control Participants

Characteristic	Primary clinical sample (n = 118)				Replication clinical sample (n = 56)				Control sample (n = 36)			
	M	SD	n	%	M	SD	n	%	M	SD	n	%
Age	32.73	10.13			33.39	9.04			32.66	10.68		
Gender												
Female	47	40.9			23	41.1			17	47.2		
Male	68	59.1			33	58.9			19	52.8		
Marital status												
Currently married	22	18.6			11	20.8			2	5.6		
Single–never married	96	81.4			42	79.2			34	94.4		
Race–ethnicity												
Caucasian	91	78.4			22	39.3			22	61.1		
African American	15	12.9			14	25.0			10	27.8		
Other	10	8.6			20	35.7			4	11.1		
Education												
Any high school	8	6.8			21	37.5			7	19.4		
Some college	45	38.1			14	25.0			7	19.4		
College	38	32.2			10	17.9			14	38.9		
Graduate school	27	22.9			9	16.1			8	22.2		

Note. The number of participants in each group varies across characteristics because of missing data. Percentages do not always sum to 100 because of rounding.

(e.g., Asian–Pacific Islander, Native American, or Hispanic) than the primary sample. The clinical groups also differed in level of education, $\chi^2(4, N = 174) = 31.34, p < .001$, with the replication sample including fewer patients who had completed college than the primary sample. Thus, the replication sample was more ethnically diverse and socioeconomically disadvantaged than the primary clinical sample.

Clinical-control differences. We conducted two one-way multivariate analyses of variance (MANOVAs), with sample membership as the independent variable, for pretreatment scores on common measures of social anxiety and attachment, respectively. The overall MANOVAs for the social anxiety indices, Wilks's $\lambda = 0.36, F(10, 322) = 21.71, p < .001$, and attachment subscales, Wilks's $\lambda = 0.75, F(6, 410) = 10.64, p < .001$, yielded significant effects for sample. As shown in Table 2, Bonferroni-adjusted one-way analyses of variance (ANOVAs) followed by Newman–Kuels tests were used for post hoc comparisons between samples. Participants in the primary clinical sample and the replication sample were more socially anxious across all measures and had higher scores on the Anxiety subscale and lower scores on both the Depend and Close subscales of the RAAS than the nonclinical sample but did not differ from each other. An additional one-way ANOVA revealed that the samples differed on depressive symptoms (BDI), $F(2, 203) = 31.35, p < .001$. Newman–

Kuels tests again showed that the primary clinical and replication samples were more depressed than the nonclinical sample but did not differ from each other. Thus, despite a modest degree of demographic difference, the replication group appears quite appropriate for analyses of external validity, as it did not differ on any clinical or attachment measures from the primary clinical group.

Cluster Analysis Procedure

To investigate the distribution of attachment styles among patients with social anxiety, the RAAS subscale scores were clustered according to the CLUSTER procedure in SPSS 9.0 (SPSS, 1998), using Ward's (1963) minimum variance method with a squared Euclidean distance metric to represent the dissimilarity between each pair of cases. Ward's technique is an agglomerative hierarchical cluster analysis procedure that joins groups of cases together whose scores produce minimum increases in the within-cluster sum of squares (Everitt, 1980). For practical reasons, only cluster solutions in the range of 2 to 6 were considered, and only clusters of sufficient size (more than 10) were retained (Morral, Iguchi, Belding, & Lamb, 1997).

Determination of the final cluster solution was based on several conventional criteria. We first visually examined the agglomeration schedule for sudden jumps in the within-cluster sum of squares, indicating

Table 2
Comparison of Samples on Measures of Social Anxiety, Depression, and Attachment

Symptom	Primary clinical sample		Replication clinical sample		Control sample		F
	M	SD	M	SD	M	SD	
Social anxiety							
Brief Fear of Negative Evaluation Scale	46.65 _a	9.38	45.04 _a	10.50	26.35 _b	4.85	63.76***
Interpersonal Sensitivity Measure	103.21 _a	14.64	101.38 _a	17.40	74.74 _b	13.90	44.11***
Liebowitz Social Anxiety Scale—Total Fear	37.57 _a	9.68	40.21 _a	14.30	6.38 _b	4.99	123.63***
Social Interaction Anxiety Scale	50.31 _a	14.12	50.51 _a	14.88	11.41 _b	9.42	111.86***
Social Phobia Scale	31.33 _a	14.42	33.60 _a	17.41	4.62 _b	6.11	51.15***
Depression							
Beck Depression Inventory	12.57 _a	8.71	13.98 _a	8.78	1.53 _b	1.90	31.35***
Attachment subscales							
RAAS—Close	2.71 _a	.99	2.69 _a	.93	3.80 _b	.91	19.40***
RAAS—Depend	2.64 _a	.86	2.58 _a	.80	3.00 _b	.75	3.26*
RAAS—Anxiety	3.15 _a	1.14	3.23 _a	1.06	1.84 _b	.85	23.51***

Note. Means in the same row with different subscripts differ at $p < .05$ according to Newman-Keuls post hoc comparisons. RAAS = Revised Adult Attachment Scale.

* $p < .05$. *** $p < .001$.

when fairly homogeneous clusters are being merged (Hair, Anderson, Tatham, & Black, 1995). Because the largest increases were observed in going from two clusters to one cluster, the two-cluster solution was selected for our data. Next, to further validate the optimum number of clusters, we applied an objective formula developed by Mojena (1977; Rule 1).² This rule also uses the within-cluster sum of squares to determine when further partitioning should not be undertaken. This stopping rule also supported a two-cluster solution.

The robustness of the different cluster solutions was next assessed by using the specified means of each cluster produced by Ward's (1963) method as initial centers in a subsequent nonhierarchical K -means cluster analysis (QUICK CLUSTER; SPSS, 1998). This method uses an iterative procedure wherein patients are repeatedly reassigned to different clusters on the basis of their smallest Euclidean distance to each subsequent cluster mean. The results of the Ward's and K -means method were then compared using a kappa coefficient, which assesses the chance corrected agreement of the two solutions (Cohen, 1960; Overall, Gibson, & Novy, 1993). The degree of agreement between the two procedures serves as an objective measure of the stability of the cluster solution (Hartigan, 1975; Milligan, 1980). The two-cluster solution showed excellent agreement ($\kappa = .93$).

The reliability of the two-cluster solution was assessed by examination of the replication sample. With the cluster analytic procedures described above, a

two-cluster solution again emerged from examination of the agglomeration schedule and application of Mojena's (1977) Rule 1. This two-cluster solution also showed high agreement of individual patient classification between Ward's (1963) method and the nonhierarchical cluster analysis ($\kappa = .82$).

On the basis of an examination of the cluster means of the RAAS subscales for the primary clinical sample, the first cluster was labeled anxious-preoccupied ($n = 73$, 61.9%) and the second cluster was labeled secure ($n = 45$, 38.1%). The replication sample exhibited a similar pattern of scores and distribution to clusters (anxious-preoccupied, $n = 32$, 57.1%; secure, $n = 24$, 42.9%). According to Collins and Read (1990), a person with anxious-preoccupied attachment may be somewhat comfortable with closeness but less confident that others will be available and extremely worried about being abandoned or unloved. In contrast, a securely attached individual is likely to be very comfortable with closeness, able to depend on others, and unconcerned about abandon-

² Mojena's (1977) Rule 1 is defined as follows: $x_{j+1} > \mu + k\sigma$, where x is the value of the agglomeration coefficient, x_{j+1} is the value of the coefficient at stage $j + 1$ of the clustering process, μ is the overall mean, k is the standard deviate, and σ is the overall standard deviation. Mojena found that values of k in the range of 2.75 to 3.50 give the best overall results. The value used for k in this study was 3.0.

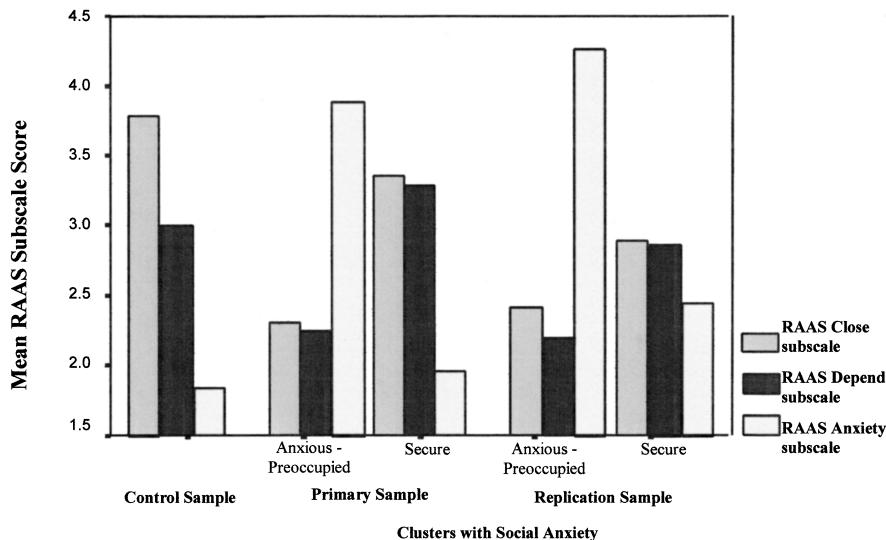


Figure 1. Mean Revised Adult Attachment Scale (RAAS) subscale scores for the control group and the cluster analyzed groups with social anxiety.

ment. Figure 1 shows the attachment profiles (RAAS subscale scores) for each of the clusters in the two patient groups and for the control group (which was not subjected to cluster analysis because of its smaller number of participants).³

Demographic Characteristics

The following analyses were conducted on the primary clinical sample alone. Chi-square analyses failed to reveal differences among clusters for gender, $\chi^2(1, N = 118) = 2.46, ns$; race, $\chi^2(2, N = 116) = 4.80, ns$; level of education, $\chi^2(3, N = 118) = 4.07, ns$; or employment status, $\chi^2(2, N = 118) = 0.54, ns$. Clusters differed in marital status, $\chi^2(1, N = 110) = 9.59, p = .002$, with more patients being single or divorced in the anxious cluster (89.9%) than the secure cluster (65.9%). Clusters also differed in living situation, $\chi^2(1, N = 108) = 16.80, p < .001$, with more patients living alone or with their parents in the anxious cluster (66.7%) than the secure cluster (25.6%). A *t* test failed to reveal any differences between clusters in age, $t(116) = -0.62, ns$.

Diagnostic Classification

Clusters differed in subtype of social anxiety disorder, $\chi^2(1, N = 112) = 12.78, p < .001$, with more patients classified as having generalized social anxiety disorder in the anxious cluster (92.9%) than in the secure cluster (66.7%). Clusters also differed on the likelihood of an APD diagnosis, $\chi^2(1, N = 84) = 12.27, p < .001$, with more patients diagnosed as hav-

ing probable or definite APD in the anxious cluster (57.7%) than in the secure cluster (18.8%).

Symptom Severity

MANOVAs were performed for the social anxiety disorder indices, Wilks's $\lambda = 0.68, F(6, 74) = 5.82, p < .001$; depression measures, Wilks's $\lambda = 0.901, F(2, 68) = 3.76, p = .03$; and measures of functional impairment, Wilks's $\lambda = 0.57, F(3, 65) = 16.67, p < .001$. Table 3 shows that patients identified with an anxious-preoccupied style of attachment demonstrated significantly more social fear and avoidance, were more depressed and more impaired by their disorder, and experienced less satisfaction and enjoyment of life than those who were securely attached. Follow-up univariate ANOVAs (see Table 3) were significant for all measures except the clinician-assessed HRSD. The clusters also differed on the frequency of a comorbid mood disorder diagnosis, that required $\chi^2(1, N = 118) = 13.85, p < .001$, with a larger percentage of patients in the anxious cluster having a comorbid depressive disorder (57.5%) than patients in the secure cluster (24.4%).

Cross-Validation

All of the above analyses were repeated with the replication sample. The same pattern of results was

³ The graph of mean subscale scores for the nonhierarchical solution was visually similar to that of the hierarchical solution and is available from Richard G. Heimberg.

Table 3
Comparison of Attachment Clusters on Measures of Social Anxiety, Depression, and Functional Impairment

Symptom	Cluster				
	Anxious-preoccupied (n = 73)		Secure (n = 45)		F
	M	SD	M	SD	
Social anxiety					
Brief Fear of Negative Evaluation Scale	49.16	8.54	42.00	9.05	11.627**
Fear Questionnaire—Social Phobia	22.22	6.91	18.50	5.94	5.99*
Interpersonal Sensitivity Measure	108.69	11.86	93.87	14.55	24.44***
Liebowitz Social Anxiety Scale—Total Fear	40.12	8.36	32.73	10.01	12.49**
Social Interaction Anxiety Scale	55.80	10.84	40.93	14.47	27.02***
Social Phobia Scale	33.78	14.87	26.97	13.09	4.26*
Depression					
Beck Depression Inventory	13.58	8.81	8.15	6.25	7.62**
Hamilton Rating Scale for Depression	8.18	7.23	5.31	7.64	2.49
Functional impairment					
Liebowitz Disability Scale	10.61	4.44	5.64	4.17	20.90***
Disability Profile	24.86	6.78	14.96	10.37	22.97***
Quality of Life Inventory	-0.56	1.38	1.51	1.18	39.90***

* p < .05. ** p < .01. *** p < .001.

obtained for all demographic, social anxiety, depression, and functional impairment measures. In contrast, however, clusters in the replication sample did not differ in the frequency with which they received a diagnosis of APD, $\chi^2(1, N = 56) = 2.17, ns$, or the generalized subtype of social anxiety disorder, $\chi^2(1, N = 56) = 0.67, ns$. Data on comorbid mood disorders were not available for the replication sample.

Mediation Analyses

To evaluate our hypothesis that attachment styles influence depressive symptoms through social anxiety, we conducted mediational analyses. As recommended by Baron and Kenny (1986), each mediation analysis estimated three regression equations. First, severity of social anxiety was regressed onto attachment style. Second, severity of depression was regressed onto attachment style. And third, depression was regressed onto both attachment style and social anxiety. Full mediation is established if attachment style is significantly related to social anxiety (the potential mediator) in the first equation and to depression in the second equation and if social anxiety, but not attachment style, is related to depression in the third equation. Partial mediation is established if the magnitude of the relationship between attachment and

depression is reduced but not removed in the third equation.

As shown in Table 4, attachment style (anxious = 1, secure = 2) was significantly related to the several measures of the severity of social anxiety. Attachment style was also significantly related to depressive symptoms as assessed by the BDI. As shown in Table 5, the relationship between anxious attachment and depression was no longer significant after four of the six social anxiety measures were each entered into the respective regression equation, and the magnitude of the relationship was reduced in all cases. These results suggest that the significant relationship between attachment style and depression was mediated by severity of social anxiety.⁴

⁴ Given that these are cross-sectional analyses, we also conducted the competing mediation model to see whether depressive symptoms significantly mediated the relationship between attachment style and social anxiety. We found significant mediation in only two of these six regression analyses, and the average magnitude in reduction of β was substantially smaller than found for our hypothesized model. This offers additional support for the notion that social anxiety mediates the relationship between attachment style and depressive symptoms. A detailed description of these analyses is available from Richard G. Heimberg.

Table 4
Summary of Simultaneous Regression Analyses With Attachment Style as the Predictor Variable and Social Anxiety or Depression as the Criterion Measure

Outcome variable	R ²	B	SEB	β
Beck Depression Inventory	.10	-5.61	1.58	-.32**
Brief Fear of Negative Evaluation Scale	.17	-7.64	1.54	-.42***
Fear Questionnaire—Social Phobia subscale	.07	-4.08	1.40	-.26**
Interpersonal Sensitivity Measure	.24	-15.55	2.63	-.49***
Liebowitz Social Anxiety Scale—Total Fear	.15	-7.71	2.05	-.39***
Social Interaction Anxiety Scale	.22	-14.36	2.50	-.47***
Social Phobia Scale	.06	-7.59	2.75	-.25**

** p < .01. *** p < .001.

Discussion

Previous research suggests that patients with social anxiety disorder often experience difficulties forming close interpersonal relationships. Attachment theory provides a coherent framework for conceptualizing the etiology and maintenance of some cases of this disorder through an examination of the cognitive-emotional systems involved in social anxiety. In the present study, two reliable clusters of patients with social anxiety disorder were identified on the basis of their scores on a measure of adult attachment. The anxious-preoccupied group reported less comfort in close relationships, less willingness to trust others or to depend on them, and greater anxiety at the prospect of rejection or abandonment than the nonclinical control sample. The secure cluster had an attachment profile similar to that exhibited by nonclinical controls, suggesting that some patients with social anxiety are capable of feeling safe and comfortable in adult romantic relationships.

The anxious-preoccupied group included a larger percentage of individuals who were either single or divorced and a larger percentage of individuals living alone or with their parents than did the secure cluster. Furthermore, these patients reported more distress and impairment, greater social interaction fear, greater fear of negative evaluation, greater avoidance of feared situations, greater fear of being scrutinized by others in the course of everyday activities, greater functional impairment, and a lower quality of life than patients in the secure cluster. These findings are consistent with the findings of Hart et al. (1999), who reported that single patients with social anxiety disorder experienced more severe social anxiety and depression than married patients with social anxiety disorder. These results demonstrate that attachment style is an important predictor of how individuals with social anxiety disorder operate in social relationships and construe their social world.

These findings accord well with the theoretical bases of insecure attachment: "Through their eyes the

Table 5
Summary of Separate Mediational Regression Analyses With Depressive Symptoms (Beck Depression Inventory) as the Criterion Variable

Predictor variable	R ²	B	SEB	β
Brief Fear of Negative Evaluation Scale	.07	.32	.09	.33***
Attachment Style		-3.09	1.67	-.17
Fear Questionnaire—Social Phobia subscale	.28	.51	.10	.44***
Attachment Style		-3.39	1.48	-.19*
Interpersonal Sensitivity Measure	.13	.119	.06	.22*
Attachment Style		-3.46	1.77	-.20
Liebowitz Social Anxiety Scale—Total Fear	.19	.29	.09	.35**
Attachment Style		-2.61	1.84	-.16
Social Interaction Anxiety Scale	.17	.17	.06	.30**
Attachment Style		-3.09	1.74	-.17
Social Phobia Scale	.21	.20	.05	.34***
Attachment Style		-4.10	1.54	-.23**

* p < .05. ** p < .01. *** p < .001.

world is seen as comfortless and unpredictable; and they respond either by shrinking from it or by doing battle with it" (Bowlby, 1973, p. 208). This "shrinking" away from the social world can be seen in the often-too-successful attempts at social avoidance and isolation on the part of persons with social anxiety, which limit both experience and the development of coping skills. By avoiding social interaction, these patients defend against the potential threats inherent in intimate relationships and in the awareness of emotional experiences (Mikulincer & Orbach, 1995). Conversely, individuals with social anxiety also often "do battle" with the social world. Psychobiological theorists have conceptualized social anxiety disorder as an excessive activation of a defense survival system and an underutilization of a safety survival system (Trower & Gilbert, 1989). When this defense system is activated under threat of either real or imagined abandonment, an individual in a subordinate position will engage in submissive responding so that he or she may remain in proximity to the dominant other (Cloitre & Shear, 1995). In attachment terms, the person becomes hypervigilant, is very sensitive to loss or threat, and may cling or aggressively demand reassurance. Thus, individuals with social anxiety disorder are preoccupied with the likelihood of occurrence of negative social events (Foa, Franklin, Perry, & Herbert, 1996) and assume that others are inherently critical and will evaluate them negatively (Leary, Kowalski, & Campbell, 1988). These cognitions are consistent with an anxious attachment orientation, in which the internal working model is activated whenever relationship-relevant events are experienced, shaping the way individuals construct their social reality (Collins & Read, 1990).

Attachment, Social Anxiety, and Depression

In general, the current findings may be interpreted in line with Collins and Read's (1990) contention that working models of attachment influence both affect and cognition in social relationships. As expected, we also found that an anxious working model of attachment was directly associated with severity of social anxiety and indirectly associated with depression. Specifically, symptoms associated with social anxiety mediated the relationship between attachment styles and depression. The assumption underlying our mediational analyses was that social anxiety disorder may be antecedent to depression within a sample of persons with social anxiety disorder. The impaired schema of insecurely attached patients may increase the severity of social anxiety, and social anxiety may

block the path to rewarding social experiences, which, in turn, increases the probability of depressive reactions, a pathway to depression often discussed by Lewinsohn and colleagues (e.g., Lewinsohn & Hoberman, 1982). Our findings are also in line with the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989), in which a negative cognitive style, consisting of the tendency to make negative inferences about the causes, consequences, and self-implications of stressful life events, is hypothesized to be a distal contributory cause of many of the symptoms of depression. Persons with social anxiety disorder with an anxious attachment style have negative beliefs about the self and the dependability and trustworthiness of others, which may affect functioning and predispose the person to feelings of hopelessness and, ultimately, to depression. Future research into the specificity of depressive symptoms associated with social anxiety may shed light on the viability of this pathway.

Secure Attachment in Social Anxiety Disorder

One potentially important finding of the current study is the cluster of patients with social anxiety disorder who demonstrated a pattern of secure attachment and did not differ from the nonclinical sample in their patterns of adult attachment. As reviewed, these patients appeared to be less anxious and less impaired than patients with an anxious attachment style and were also less depressed. The appearance of this cluster in both the primary and replication samples suggests that attachment difficulties (at least of the type assessed by the RAAS) do not represent the only pathway to the development of social anxiety. Certainly, the reported development of social anxiety sometime later in an individual's life speaks to the notion that early threats to relationship security cannot account for all morbidity. Future investigations might examine the relative contribution of biological markers, temperamental predispositions such as behavioral inhibition to the unfamiliar, and environmental events in the development of social anxiety and in the propensity for the development of depression pursuant to social anxiety. Secure attachment may be a manifestation of more globally constructive coping strategies or a reflection of an involvement in an ongoing rewarding relationship (Mikulincer, 1998) and may confer on the individual a degree of protection against the most broadly impairing variations of social anxiety. Securely attached patients with social anxiety disorder may be more likely to demonstrate more delimited social or performance fears, a suggestion that is sup-

ported by the smaller percentage of patients with the generalized subtype of social anxiety disorder or with an Axis II diagnosis of APD in the primary clinical sample (but see the *Limitations* section below). Although not assessed in this article, secure attachment may also predict greater treatment response and less likelihood of relapse in cognitive-behavioral therapy (CBT) for social anxiety disorder than other attachment styles.

Limitations

Several limitations of our data should be noted. First, the cross-sectional nature of these data does not provide a sufficient test of the etiological significance of attachment styles for social anxiety or of the mediational role of social anxiety in the attachment-depression relationship. More research is needed to assess the relative temporal ordering of the development of attachment styles, social anxiety disorder, and depression, as well as the contribution of other contextual variables to the development of interpersonal and intrapersonal adjustment difficulties in persons with social anxiety disorder.

Second, in the primary clinical sample, the anxious-preoccupied cluster was composed of a greater percentage of patients with a diagnosis of generalized social anxiety disorder, APD, or both. This finding is consistent with the increased treatment-seeking behavior demonstrated by persons who are more severely impaired by their social fears (Wittchen, Stein, & Kessler, 1999). However, we failed to replicate this finding in cross-validation. A parsimonious explanation for this discrepancy is that the replication sample consisted only of patients who accepted randomization into a trial of the efficacy of monoamine oxidase inhibitors for social anxiety disorder and were perhaps the most impaired in a wider range of feared situations. Indeed, 49 of 56 patients (87.5%) in the replication sample were classified into the generalized subtype of social anxiety disorder. This "ceiling effect" may account for the failure to find differences among clusters in the percentage of patients with the generalized subtype or who met criteria for APD in the replication sample.

Third, attachment can be construed in many ways and measured in many more. In this study, we considered only adult attachment measured with Collins's (1996) RAAS. A more broad-based assessment of attachment difficulties should further delineate their relationship to social anxiety disorder and depression.

Implications

The present study has several implications for the primary prevention and treatment of social anxiety. According to Bowlby (1979), an individual's working model of oneself, or representation of self in relation to others, is the result of past experience in attachment relationships. Assessment of early attachment orientations may help identify those at particularly high risk for developing social anxiety and subsequent depression. In addition to the targeting of attachment cognitions or styles by intervening in the early parent-child relationship, a consideration of working models of attachment may inform psychologists' efforts to increase the efficacy of CBT, as well as predicting treatment response.

Attachment patterns tend to be stable in 70% and unstable in 30% of adults (Baldwin & Fehr, 1995; Fuller & Fincham, 1995; Scharfe & Bartholomew, 1994). As CBT seek to treat social anxiety disorder by modifying the patient's mental representation of the self as seen by others (Rapee & Heimberg, 1997), the therapeutic relationship may provide a strong, positive interpersonal experience. Supportive relationships in the context of a therapeutic alliance can alter patients' expectations and anxiety regarding rejection and abandonment. Another important avenue of exploration for patients with social anxiety may be to attempt to facilitate shifts in attachment patterns through improving the relationship satisfaction of patients who do have significant others. In particular, practitioners of couples therapy may attempt to disconfirm negative working models by reprocessing emotional experiences and setting interactional tasks to shape emotionally engaged interactions (Johnson & Whiffen, 1999).

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