Social rank and affiliation in social anxiety disorder

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ABSTRACT

The present study examined the interpersonal lives of individuals with social anxiety disorder (SAD). According to evolutionary and interpersonal theories, we construed the interpersonal world using the social rank and the affiliation psychological systems. Two studies assessed measures of social rank, affiliation, social anxiety and depression among a population of treatment-seeking individuals with SAD. In study 1, individuals with SAD without major depressive disorder (MDD; $n = 42$) were compared to healthy controls ($n = 47$). In study 2, individuals with SAD and MDD ($n = 45$) were compared to individuals with other anxiety disorders and MDD ($n = 31$). Results indicated that SAD was related to perceiving oneself as having low social rank, being inferior, and behaving submissively, as well as to low perceived intimacy and closeness among peer relations, friendships and romantic relations. SAD was distinctly associated with these perceptions above and beyond the symptomatic (study 1) and the syndrome-level (study 2) effects of depression. These findings were further supported by a path analysis of the SAD participants from both studies. Our findings highlight the need to address both social rank and affiliation issues in the assessment and treatment of SAD.

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Social anxiety disorder (SAD) is a common and debilitating psychiatric disorder with an estimated lifetime prevalence rate of 12.1% (Kessler et al., 2005). Individuals with SAD fear and avoid social interactions (e.g., talking to a stranger or peer, going to a party) and performance situations (e.g., giving a speech). These difficulties in interpersonal interactions result in significant impairment in many facets of daily functioning, including friendships, romantic relationships, work, and studies (e.g., Alden & Taylor, 2004).

Several theoretical perspectives converge in suggesting that two main systems govern interpersonal relatedness — one of social rank, power and dominance, and one of affiliation, reciprocity and intimacy (Alden, Wiggins, & Pincus, 1990; Gilbert & Trower, 2001; Trower & Gilbert, 1989). These two main systems constitute the axes that form the interpersonal circumplex, a widely accepted conceptualization of interpersonal space (e.g., Gurtman, 1991). The goal of the social rank system is to monitor the social hierarchy in order to successfully compete for a dominant position which allows access to more resources. Importantly, among humans, dominant positions can be positions of high status and power to distribute punishment and reward (e.g., a boss), but can also be positions of high social desirability and attractiveness (e.g., a celebrity — Gilbert & Trower, 2001). Recent findings from social neuroscience show that distinct neural systems are involved in the recognition and experience of social hierarchy (Chiao, 2010; Sapolsky, 2005). The goal of the affiliation system is to find others with whom one can connect and cooperate. In the present study we adopt this multi-dimensional view of the social world and use it as a framework to examine impairments in social functioning among individuals with social anxiety disorder (SAD).

Trower and Gilbert's (1989) evolutionary model suggests that whereas all individuals utilize both the social rank and the affiliation systems, individuals with SAD tend to over-utilize the social rank system and under-utilize the affiliation system (Trower & Gilbert, 1989). In other words, individuals with SAD may tend to view interpersonal situations from a competitive, rather than an affiliative perspective.

The over-utilization of the social rank system can cause individuals with SAD to view themselves as inferior, inadequate, undesirable and unattractive socially (e.g., Hope, Sigler, Penn, & Meier, 1998; Leary & Kowalski, 1995), and as lacking the ability to successfully compete with dominant, socially attractive others. These perceptions might lead to the adaptation of submissive

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behaviors (e.g., reduced eye-contact), in order to avoid conflict and decrease possible punishments from dominant others. An additional strategy is overall avoidance of interpersonal contact, which also reduces the probability of punishment, rejection, and put-down (albeit reducing any rewards as well).

There are several studies that support this view of SAD. Consistent with the over-utilization of social rank system, socially anxious individuals have been found to view social interactions as more competitive compared to non-anxious individuals (Hope et al., 1998), and to constantly monitor for signals of social threat (Gilboa-Schechtman, Foa, & Amir, 1999). In addition, socially anxious individuals tend to view themselves as incapable of adequately competing with others (Hope et al., 1998) and to engage in negative social comparisons in which the self is viewed as inferior (Antony, Rowa, Liss, Swallow, & Swinson, 2005). In fact, among socially anxious individuals, negative social comparisons were strongly related to social anxiety, above and beyond the influence of attachment (Aderka, Weisman, Shahar, & Gilboa-Schechtman, 2009). Finally, socially anxious individuals exhibited more submissive behaviors (Heerey & Kring, 2007) and fewer dominant behaviors (Walters & Hope, 1998) compared to non-socially anxious individuals.

Consistent with the under-utilization of the affiliation system, individuals with SAD have been found to experience a wide range of interpersonal difficulties (for a review see Alden & Taylor, 2004). Specifically, individuals with SAD report reduced quality of romantic relations, and less emotional expression, self-disclosure, and intimacy within these relationships compared to non-anxious individuals (Sparrevohn & Rapee, 2009). Similarly, Alden and Wallace (1995) found that both neutral observers and conversational partners rated individuals with SAD as being less warm and interested compared to individuals without SAD in a "getting acquainted" task. Individuals with SAD were also found to exhibit lower rates of self-disclosure during conversations, which can lead to rejection by others (e.g., Papsdorf & Alden, 1998). To sum, there is ample evidence suggesting that individuals with SAD do not utilize the affiliation system as do non-anxious individuals.

The social rank and affiliation systems have also been linked to depression (Gilbert, 2006). Irons and Gilbert (2005) found that among adolescents both attachment measures (affiliation) and social rank measures are associated with depressive symptoms (Irons & Gilbert, 2005). Moreover, social rank measures mediated the relationship between attachment and depressive symptoms among insecurely attached adolescents (Irons & Gilbert, 2005). Similarly, compared with their non-depressed counterparts, depressed individuals reported engaging in more negative social comparisons, perceiving themselves as inferior, and displaying more submissive behaviors (Gilbert, Allan, & Trent, 1995). Finally, depression is associated with a multitude of interpersonal/affiliation problems (e.g., Joiner & Coyne, 1999). Given the high comorbidity between SAD and depression, it is not clear if impaired social cognition and social behavior in SAD are a result of social anxiety, depression, or both. In the present study we sought to examine whether social rank and affiliation perceptions were related to SAD above and beyond the effect of depression.

The present paper reports on 2 studies which examined social rank and affiliation perceptions among individuals with SAD. In study 1 we compared individuals with SAD and without major depressive disorder (MDD) to healthy controls (with no AXIS-I disorders) controlling for levels of depression statistically. In study 2 we compared individuals with comorbid SAD and MDD to individuals with other anxiety disorders and MDD (thus controlling for MDD using the study design). To assess the social rank

perceptions we used measures of social comparison and submissive behavior. To best capture multiple aspects of interpersonal relations, we assessed affiliation perceptions using measures that tap romantic relations, non-romantic friendships, and peer relations. In doing so, we assessed measures of social rank, affiliation, social anxiety and depression among a clinical SAD population within a unified design.

In both studies we hypothesized that individuals from the SAD group would evince greater perceived inferiority and greater use of submissive behaviors compared to the control group. In addition, we hypothesized that individuals from the SAD group would evince more impaired interpersonal relations with friends, romantic partners and peers compared to the control group. Finally, we expected that these perceptions would be related to social anxiety over and above concomitant depressive symptoms, general anxiety symptoms, or a diagnosis of MDD.

Study 1

Method

Participants

Participants in study 1 comprised two groups: individuals who sought treatment for social anxiety disorder (SAD group; $n = 42$), and individuals from the community who did not seek treatment (control group; $n = 47$). Participation was voluntary and no compensation was given to individuals who agreed to take part in the study. Participants were excluded from the SAD group if they (a) received a diagnosis of schizophrenia; (b) received a diagnosis of MDD; (c) received a diagnosis of substance dependence; or (d) had insufficient knowledge of the Hebrew language. We excluded individuals with comorbid depression because depression has been previously associated with both the social rank and affiliation systems. As we were interested in the effect of SAD per se, comorbid MDD would have confounded our results. Exclusion criteria for the control group included the presence of any AXIS-I disorder or a lack of proficiency in Hebrew.

Table 1 presents demographic and clinical data for the participants in this study. In addition to the primary diagnosis of SAD, individuals in the SAD group had additional AXIS-I diagnoses: 13 had generalized anxiety disorder, 2 had panic disorder, 8 had obsessive-compulsive disorder, and 1 had posttraumatic stress disorder.

Procedure

Participants in the SAD group sought treatment at a large public clinic in Israel. As part of the routine intake procedure, participants were interviewed using the structured clinical interview for DSM-IV AXIS-I disorders (SCID; First, Spitzer, Gibbon, & Williams, 1996). Interviewers were three M.A. level clinical psychologists experienced in the administration of the SCID. All three interviewers received training prior to the study from the third author of the present study, a senior clinical psychologist. All diagnoses were subsequently examined and approved by the third author. Following the SCID, participants were approached by a research assistant, who invited them to take part in the study about interpersonal relationships. If participants agreed, they filled out informed consent forms and self-report measures. A total of 46 individuals were approached at the clinic and of these, 42 (91.3%) agreed to participate.

Participants in the control group were individuals recruited from the community. Participants underwent the SCID and completed the self-report measures. Of the 60 individuals contacted for participation 47 (70%) agreed to take part in the study.

Table 1
Demographic and clinical data for study 1.

Variable	Total ($n = 89$)	SAD group ($n = 42$)	Control group ($n = 47$)	Statistic	p
Age	30.0 (7.8)	30.5 (6.2)	29.5 (8.9)	$F_{(1,87)} = 0.4$	0.53
Gender (% female)	58.4	54.8	61.7	$\chi^2_{(1)} = 0.44$	0.51
Marital status				$\chi^2_{(2)} = 3.61$	0.16
% Single	70.8	76.2	66.0		
% Married	22.5	14.3	29.8		
% Divorced	6.7	9.5	4.3		
Occupational status				$\chi^2_{(2)} = 1.50$	0.47
Working	50.6	57.1	44.7		
Studying	37.1	31.0	42.6		
Neither	12.4	11.9	12.8		
Years of education	14.4 (2.2)	13.8 (2.1)	14.9 (2.1)	$F_{(1,87)} = 5.3$	<0.05
LSAS	45.5 (28.7)	67.4 (23.8)	26.0 (15.6)	$F_{(1,87)} = 96.1$	<0.001
BDI	5.7 (4.9)	8.3 (5.2)	3.4 (3.1)	$F_{(1,87)} = 29.5$	<0.001
STAI-T	40.8 (11.0)	48.5 (9.6)	33.9 (6.9)	$F_{(1,87)} = 68.8$	<0.001
Social rank					
SBS	1.59 (0.81)	2.07 (0.79)	1.17 (0.56)	$F_{(1,79)} = 8.4$[a]	<0.01
SCS	70.43 (16.09)	60.14 (15.76)	79.62 (9.55)	$F_{(1,79)} = 12.4$[a]	<0.01
Affiliation					
Attachment anxiety	3.67 (1.32)	4.37 (1.20)	3.04 (1.11)	$F_{(1,79)} = 2.3$[a]	0.13
Attachment avoidance	3.63 (1.23)	4.29 (1.22)	3.05 (0.91)	$F_{(1,79)} = 7.4$[a]	<0.01
FCI	4.66 (0.92)	4.36 (1.08)	4.93 (0.64)	$F_{(1,79)} = 4.7$[a]	<0.05
RSQ	3.77 (0.59)	3.42 (0.54)	4.10 (0.44)	$F_{(1,79)} = 7.8$[a]	<0.01

Note. SAD = social anxiety disorder, LSAS = Liebowitz Social Anxiety Scale, BDI = Beck Depression Inventory, STAI-T = State-Trait Anxiety Inventory, Trait Subscale, SBS = Submissive Behavior Scale, SCS = Social Comparison Scale, FCI = Friendship Closeness Inventory, RSQ = Rejection Sensitivity Questionnaire.
[a] For the social rank and affiliation measures we conducted a MANCOVA statistically controlling for BDI and STAI-T.

Measures

The Liebowitz Social Anxiety Scale − Self-Report version (LSAS-SR; Liebowitz, 1987). The LSAS-SR is comprised of 24-items that assess levels of anxiety and avoidance in social or performance situations using a 0−3 scale. The LSAS-SR has been shown to have high internal consistency, strong convergent and discriminant validity, and high test−retest reliability (Baker, Heinrichs, Kim, & Hofmann, 2002). In the present study we obtained a Cronbach's α of .92 for the anxiety subscale and .97 for the avoidance subscale.

The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979). The BDI is a 21-item self-report measure tapping cognitive, behavioral and affective facets of depression. The BDI has high validity and reliability scores (Beck, Steer, & Garbin, 1988). In the present study we obtained a Cronbach's α of .89 for this measure.

The State-Trait Anxiety Inventory (STAI; Spielberger, 1983). The STAI is a self-report measure of both state (current) and trait (general) anxiety. Both the state and trait subscales consist of 20 items each that are rated on a 4-point Likert scale. The STAI has demonstrated good internal consistency, test−retest reliability and convergent and discriminant validity (Spielberger, 1989). In the present study we used only the trait subscale of the STAI and obtained a Cronbach's α of .92.

The Experiences in Close Relationships Scale (ECR; Brennan, Clark, & Shaver, 1998). The ECR is a self-report questionnaire that measures adult attachment to romantic partners. The ECR is comprised of 36 items and provides scores on two dimensions of attachment: anxiety and avoidance. All items are statements concerning feelings and experiences in romantic relationships in general, and participants are asked to indicate their agreement with each statement using a 7-point scale ranging from 1 = disagree strongly to 7 = agree strongly. In the present study we obtained a reliability coefficient (Cronbach's α) of .89 for this scale.

The Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996). The RSQ measures individuals' tendency to anxiously expect, readily perceive, and overreact to rejection using 18 items. Each item depicts a social interaction with friends, family, or acquaintances, in which the individual asks others for acceptance, support, or help. After reading each item, responders rate their anxiety regarding these interactions, and their expectations of acceptance or rejection. The RSQ has high internal reliability (0.83) and test−retest reliability (0.83) (Downey & Feldman, 1996). In the present study we obtained a Cronbach's α of .89 for this measure.

The Friendship Closeness Inventory (FCI; Polimeni, Hardie, & Buzwell, 2002). The FCI measures closeness in men's and women's same-sex friendships. The FCI is divided into three distinguishable yet related subscales: Emotional Closeness, Behavioral Closeness, and Cognitive Closeness. The FCI has high internal consistency: 0.91 for the emotional closeness, 0.93 for behavioral closeness, 0.87 for cognitive closeness, and 0.94 for the total score. In the present study we obtained a Cronbach's α of .91 for the total score.

The Submissive Behavior Scale (SBS; Gilbert & Allan, 1994). The SBS measures submissive behavior associated with low social rank. This self-report measure includes 16 statements regarding submissive behavior, and individuals are asked to rate the frequency in which they exhibit these behaviors on a 0−4 Likert scale (0 = never, 4 = always). For example, "I agree that I'm wrong even if I know I'm right". The SBS has been found to have high reliability and validity scores both in clinical and non-clinical populations (Gilbert et al., 1995). In the present study we obtained a Cronbach's α of .91 for this measure.

The Social Comparison Scale (SCS; Allan & Gilbert, 1995). The SCS measures perceived social rank compared to others. This self-report measure includes 11 statements beginning with "In relationship to others I generally feel…" followed by a 10-point Likert scale anchored with polarities such as inferior−superior, incompetent−competent,

weaker–stronger, unconfident–more confident. Low scores on this measure indicate low perceived social status and rank. The SCS has been found to be internally consistent (Cronbach's $\alpha = .91$) and test–retest reliability over four months was 0.84 (Allan & Gilbert, 1995). In the present study we obtained a Cronbach's α of .92 for this measure.

Results and discussion

We conducted a MANCOVA to examine differences between the two groups on social rank and affiliation measures. The independent variable was Group, a between-subjects variable with 2 levels (SAD Group vs. Control Group). Covariates in all analyses included BDI, and STAI-T scores.[1] Dependent variables in the MANCOVA were social rank measures: SBS and SCS, and affiliation measures: attachment anxiety, attachment avoidance, FCI, and RSQ.

We found a significant Group effect for both social rank measures as well as for all affiliation measures except attachment anxiety (Table 1). Thus, congruent with our hypothesis we found that individuals in the SAD group reported more submissive behavior, lower perceived social rank, greater attachment avoidance with romantic partners, less closeness to friends, and greater rejection sensitivity, compared to individuals in the control group, above and beyond the effects of depression and general anxiety. Results also indicated that the BDI was significantly associated with the SBS ($F_{(1,79)} = 4.61$, $p < 0.05$), attachment avoidance ($F_{(1,79)} = 9.57$, $p < 0.01$) and the RSQ ($F_{(1,79)} = 6.04$, $p < 0.05$). STAI-T was significantly associated with attachment anxiety ($F_{(1,79)} = 10.67$, $p < 0.01$), and the RSQ ($F_{(1,79)} = 6.54$, $p < 0.05$). Combined, these results support the unique association of SAD with both the social rank and affiliation systems.

Study 2

The purpose of study 2 was to extend our examination of impaired social rank and affiliation in SAD in two ways. First, in study 1 we excluded individuals who had comorbid MDD. However, since MDD and SAD are highly comorbid, the sample in study 1 may not be fully representative of the population of individuals with SAD. In addition, since MDD has been found to be associated with lower perceived social rank and with affiliation problems it remained possible that SAD will not have an additional effect beyond the effect of comorbid MDD. To test this we used the same measures and compared individuals with SAD and comorbid MDD to individuals with other anxiety disorders and comorbid MDD. This provides a more rigorous test for our hypothesis, as it is examined beyond the effects of comorbid MDD. Second, in study 1 we did not control for additional anxiety disorders. Although we statistically controlled STAI scores in the analyses, this does not fully eliminate the possibility the additional anxiety disorders present in the SAD group (but not the control group) were responsible for the results of study 1. Therefore, in study 2 we compared a group of individuals with SAD to a group of individuals with other anxiety disorders. This allowed us to examine the specific effect of SAD beyond the effect of other anxiety disorders. Since our assumption was that social rank and affiliation perceptions would be distinctly related to SAD, we hypothesized that individuals with comorbid SAD and MDD would have lower perceived social rank and poorer quality of affiliative relationships compared to individuals with other anxiety disorders and MDD.

Method

Participants

Participants in study 2 comprised two groups: individuals who sought treatment for SAD and were diagnosed with comorbid MDD (SAD-D group; $n = 45$), and individuals who sought treatment for other anxiety disorders and were diagnosed with comorbid MDD (ANX-D group; $n = 31$). Participants were excluded from this study if they (a) received a diagnosis of schizophrenia; (b) received a diagnosis of substance dependence; or (c) had insufficient proficiency in Hebrew.

Table 2 presents demographic and clinical data for the participants in study 2. Additional AXIS-I diagnoses for the SAD-D group included: generalized anxiety disorder ($n = 11$), panic disorder ($n = 3$), obsessive-compulsive disorder ($n = 11$), posttraumatic stress disorder ($n = 3$), and specific phobia ($n = 18$). Additional AXIS-I diagnoses in the ANX-D group included: generalized anxiety disorder ($n = 14$), panic disorder ($n = 17$), obsessive-compulsive disorder ($n = 14$), posttraumatic stress disorder ($n = 1$), and specific phobia ($n = 16$). Overall, the number of diagnoses did not differ between the SAD-D group ($M = 3.22$, $SD = 1.13$) and the ANX-D group ($M = 2.97$, $SD = 1.25$) [$F_{(1,74)} = 0.86$, $p = 0.36$, n.s.].

Procedure

Procedure was similar to that of the SAD group in study 1. For the SAD-D group, 50 individuals were approached and 45 (90%) agreed to participate. For the ANX-D group 40 individuals were approached and 31 agreed to participate (77.5%).

Measures

Measures in study 2 were identical to those in study 1.

Results and discussion

We conducted a MANOVA to examine differences between the two groups on social rank and affiliation measures. The independent variable in all analyses was Group, a between-subjects variable with 2 levels (SAD-D Group vs. ANX-D Group).[2] The dependent variables were social rank measures: SBS and SCS, and affiliation measures: attachment anxiety, attachment avoidance, FCI, and RSQ.

We found a significant Group effect for both social rank measures as well as for attachment avoidance and the RSQ (Table 2). Thus, congruent with our hypothesis we found that individuals in the SAD-D group reported more submissive behavior, lower perceived social rank, greater attachment avoidance with romantic partners, and greater rejection sensitivity compared to individuals in the ANX-D group. These results provide partial support for the hypothesis that individuals with SAD would perceive the quality of their affiliative relationships as lower compared to individuals without SAD. The results fully support the hypothesis that individuals with SAD would perceive their social rank as lower and would perceive their behavior as more submissive, compared to individuals without SAD, above and beyond the effects of comorbid MDD and anxiety disorders.

Structural equation model among individuals with SAD

To explore the relations between social rank, affiliation, social anxiety and depression among individuals with SAD simultaneously within a unified framework we conducted a structural equation modeling (SEM) analysis. We combined individuals with

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[1] We first ran the analysis with years of education as an additional covariate. However, as this variable was unrelated to the dependent measures we report the analysis with only BDI and STAI-T as covariates.

[2] We first ran the analysis with age, marital status, and occupational status as additional covariates. However, as these variables were unrelated to the dependent measures we report the analysis with no covariates.

Table 2
Demographic and clinical data for study 2.

Variable	Total ($n = 76$)	SAD-D group ($n = 45$)	ANX-D group ($n = 31$)	Statistic	p
Age	30.7 (8.7)	28.6 (5.7)	33.7 (11.2)	$F_{(1,74)} = 6.9$	<0.05
Gender (% female)	44.7	40.0	51.6	$\chi^2_{(1)} = 1.0$	0.32
Marital status				$\chi^2_{(2)} = 13.4$	<0.01
% Single	71.1	86.7	48.4		
% Married	27.6	13.3	48.4		
% Divorced	1.3	0.0	3.2		
Occupational status				$\chi^2_{(2)} = 7.2$	<0.05
Working	46.1	33.3	64.5		
Studying	28.9	35.6	19.4		
Neither	25.0	31.1	16.1		
Years of education	13.9 (2.2)	14.0 (2.0)	13.7 (2.5)	$F_{(1,74)} = 0.2$	0.64
LSAS	60.3 (30.2)	79.7 (19.4)	32.2 (18.5)	$F_{(1,74)} = 114.4$	<0.001
BDI	19.7 (8.6)	20.9 (9.9)	18.0 (6.1)	$F_{(1,74)} = 2.1$	0.15
STAI-T	57.0 (8.7)	58.4 (7.9)	54.8 (9.5)	$F_{(1,74)} = 3.2$	0.08
Social rank					
SBS	1.95 (0.79)	2.25 (0.75)	1.48 (0.63)	$F_{(1,73)} = 20.6$[a]	<0.001
SCS	56.25 (20.75)	46.27 (16.84)	71.83 (15.97)	$F_{(1,73)} = 41.9$[a]	<0.001
Affiliation					
Attachment anxiety	4.64 (0.96)	4.64 (0.82)	4.64 (1.15)	$F_{(1,73)} = 0.1$[a]	0.74
Attachment avoidance	4.03 (1.17)	4.55 (1.02)	3.22 (0.90)	$F_{(1,73)} = 32.5$[a]	<0.001
FCI	4.33 (0.98)	4.19 (0.90)	4.59 (1.09)	$F_{(1,73)} = 2.9$[a]	0.09
RSQ	3.23 (0.90)	3.03 (0.87)	3.58 (0.87)	$F_{(1,73)} = 7.2$[a]	<0.01

Note. SAD-D = social anxiety disorder and comorbid major depressive disorder, A-D = anxiety disorder other than social anxiety disorder and comorbid major depressive disorder, LSAS = Liebowitz Social Anxiety Scale, BDI = Beck Depression Inventory, STAI-T = State-Trait Anxiety Inventory, Trait Subscale, SBS = Submissive Behavior Scale, SCS = Social Comparison Scale, FCI = Friendship Closeness Inventory, RSQ = Rejection Sensitivity Questionnaire.

[a] All social rank and affiliation measures were included in a single MANOVA.

SAD from Study 1 and Study 2 ($n = 87$) and examined a model in which attachment anxiety and attachment avoidance (affiliation measures), as well as SBS and SCS (social rank measures) were all predictors, LSAS (social anxiety) was the mediator, and BDI (depression) was the outcome. We did not include additional affiliation measures and did not estimate a latent model due to the small sample size (see Tabachnick & Fidell, 2004). We chose attachment measures to represent affiliation because they have been previously used to assess affiliation among individuals with depression (Irons & Gilbert, 2005) and SAD (Eng, Heimberg, Hart, Schneier, & Liebowitz, 2001). Social rank measures were predictors in the model based on previous research linking them with both social anxiety and depression (Gilbert, 2000; Gilbert, Allan, Brough, Melley, & Miles, 2002). Finally, we used social anxiety as the mediator and depression as the outcome based on research and theory suggesting that social anxiety leads to subsequent depression (e.g., Chartier, Walker, & Stein, 2003; Joiner, 1997; Moscovitch, Hofmann, Suvak, & In-Albon, 2005; Stein et al., 2001).

We used the maximum likelihood (ML) procedure and assessed model fit using the following indices: the χ^2/df index, the non-normed fit index (NNFI; Bentler & Bonnet, 1980; values over 0.90 suggest an adequate model fit), the comparative fit index (CFI; Bentler, 1990; values over 0.90 suggest an adequate model fit), and the root mean square of approximation (RMSEA; values under 0.08 suggest an adequate model fit). According to Bentler and Moojaart (1989) we omitted statistically insignificant parameters in order to arrive at the most parsimonious model.

We began by assessing a saturated model in which all four predictors were correlated, all predictors effected LSAS (the mediator), and all predictors affected BDI (the outcome). As this was a saturated model, fit indices could not be computed but estimates of regression weights and correlations were obtained. We removed insignificant parameters which included the effect of attachment anxiety on BDI, attachment avoidance on BDI, SBS on BDI, and SCS on BDI (all $ps > 0.05$). Thus, the resulting model had 4 degrees of freedom. This model evinced an excellent fit with the data ($\chi^2 = 5.04$, df = 4, $p = 0.28$; χ^2/df = 1.26; NNFI = 0.95; CFI = 0.99; RMSEA = 0.05) and all remaining regression weights were significant (all $ps < 0.05$). Correlations between the study variables among individuals with SAD are presented in Table 3 and the final model is presented in Fig. 1.

General discussion

The present study examined the interpersonal lives of individuals with SAD. According to evolutionary and interpersonal theories, we construed the interpersonal world using two psychological systems: the social rank system and the affiliation system. SAD was distinctly associated with specific perceptions regarding the social rank and affiliation systems, above and beyond the effects of depression and general anxiety (in study 1) and above and beyond comorbid MDD and the presence of other anxiety disorders (in study 2). SAD was related to perceiving oneself as having low social rank, being inferior, and behaving submissively, as well as to low perceived intimacy and closeness among peer relations, friendships and romantic relations.

The over-utilization of the social rank system is related to viewing the world in hierarchical terms, and the self as being low on the hierarchical chain (Gilbert & Trower, 2001; Trower & Gilbert, 1989). Extending our previous research examining non-clinical populations (Aderka et al., 2009) we found that individuals with clinical levels of SAD perceive their behavior as submissive and themselves as low on the social hierarchy. Our findings are also congruent with the results reported by Antony et al. (2005) who found that individuals with SAD are more likely to engage in negative and less likely to engage in positive social comparisons. Finally, similar to our findings, Hope et al. (1998) found that socially anxious individuals perceive their behavior as submissive, and so do neutral observers (Heerey & Kring, 2007).

Table 3
Correlations between study variables among individuals with SAD ($n = 87$).

Variable	1	2	3	4	5	6	7	8	10	11
1. ECR – attachment anxiety	—									
2. ECR – attachment avoidance	.21*	—								
3. FCI	−.16	−.50***	—							
4. RSQ – rejection anxiety	.50***	.36**	−.19	—						
5. RSQ – positive probability	−.26*	−.40***	.25*	−.40***	—					
6. SBS	.18	.24*	.09	.48***	−.25*	—				
7. SCS	−.34**	−.49***	.23*	−.51***	.56***	−.45***	—			
8. BDI	.29**	.29**	−.04	.43**	−.33**	.30**	−.44***	—		
9. STAI-T	.47***	.19	−.04	.49***	−.38***	.33**	−.47***	.67***	—	
10. LSAS	.39***	.49***	−.18	.55***	−.38***	.50***	−.55***	.39***	.50***	—

Note. ECR = Experiences in Close Relationships Scale, FCI = Friendship Closeness Inventory, RSQ = Rejection Sensitivity Questionnaire, SBS = Submissive Behavior Questionnaire, SCS = Social Comparison Scale, BDI = Beck Depression Inventory, STAI-T = State-Trait Anxiety Inventory, Trait Subscale, LSAS = Liebowitz Social Anxiety Scale. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

In the present study we found that individuals with SAD reported impairment in a broad range of interpersonal relationships such as peer relations, friendships, and romantic relations. This is congruent with previous research regarding interpersonal relations in SAD (e.g., Sparrevohn & Rapee, 2009). Significantly, in both studies and in the path analysis, we found that such impairment was not due solely to the effects of concomitant depression or general anxiety.

Attachment anxiety and avoidance were significantly associated with social anxiety in the path analysis. The association between attachment anxiety and social anxiety is consistent with a previous path analysis that indicated that anxious attachment style was significantly associated with SAD (Eng et al., 2001). However, individuals with SAD did not report higher levels of attachment anxiety compared to those without SAD above and beyond depression and general anxiety. Thus, attachment anxiety may be primarily associated with the general anxiety and depression that usually accompany SAD but not with SAD per se. Future studies can use experimental designs to manipulate attachment anxiety while measuring its affect on depression and social anxiety. This could complement the research using self-report measures.

Addressing both the social rank and the affiliation systems has the potential to improve outcome for current treatments. Our findings suggest that treatment for SAD should address not only social rank, but affiliation issues as well. Current treatments include techniques that focus on negative self-perception such as video-feedback (Harvey, Clark, Ehlers, & Rapee, 2000), and submissive behaviors which can be construed as safety behaviors (Clark & Wells, 1995). Given the importance of social rank perceptions in SAD, these treatments may be extended to address this sensitivity more broadly, by working to reduce the frequency and intensity of shame and humiliation emotions (e.g., Gilbert, 2000; Wild, Hackmann, & Clark, 2008). In addition, affiliation issues have received less attention in treatments for SAD. Addressing affiliation issues such as sharing and self-disclosure can help achieve intimacy and closeness with others (e.g., Alden & Bieling, 1998) and reduce social anxiety. This is especially important as interpersonal problems have been previously found to predict treatment outcome among individuals with avoidant personality disorder (Alden & Capreol, 1993). Indeed, interpersonally focused treatments, which focus on issues of affiliation, have been recently found to be effective in the treatment of SAD (e.g., Lipsitz et al., 2008).

Limitations of the present study include the sole reliance on self-report measures. Use of behavioral measures and implicit measures to examine both systems would have enriched our findings. In addition, our study was cross-sectional and did not use longitudinal assessment. Consequently, the path analysis we conducted cannot be taken to indicate causal relations and alternate models with different directions of influence can be equally likely to describe the data. Future studies can use longitudinal designs to establish temporal relations between social rank and affiliation indices on the one hand, and social anxiety and depression on the
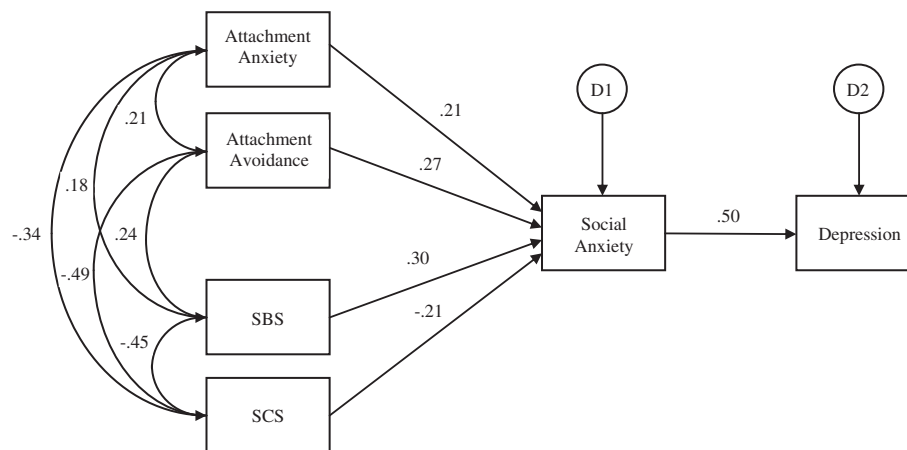

Fig. 1. Final SEM model. *Note.* Numbers on straight arrows represent standardized regression weights (β) and pertain to statistically significant parameters. Numbers on arced arrows represent correlations. D = 'Disturbance' represents a portion of the variance of an endogenic variable that is not explained by incoming arrows. D1 represents the portion of variance of social anxiety that is not explained by social rank or affiliation measures. D2 represents the portion of variance of depression that is not explained by social anxiety. SBS = Submissive Behavior Scale, SCS = Social Comparison Scale.

other. Despite these limitations, we believe the examination of social rank and affiliation within a unified framework provides an important direction for deepening the understanding of the interpersonal impairment in SAD.

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