

Distinguishing Healthy Adults From People With Social Anxiety Disorder: Evidence for the Value of Experiential Avoidance and Positive Emotions in Everyday Social Interactions

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Despite the increased attention that researchers have paid to social anxiety disorder (SAD), compared with other anxiety and mood disorders, relatively little is known about the emotional and social factors that distinguish individuals who meet diagnostic criteria from those who do not. In this study, participants with and without a diagnosis of SAD (generalized subtype) described their daily face-to-face social interactions for 2 weeks using handheld computers. We hypothesized that, compared with healthy controls, individuals diagnosed with SAD would experience fewer positive emotions, rely more on experiential avoidance (of anxiety), and have greater self-control depletion (feeling mentally and physically exhausted after socializing), after accounting for social anxiety, negative emotions, and feelings of belonging during social interactions. We found that compared with healthy controls, individuals with SAD experienced weaker positive emotions and greater experiential avoidance, but there were no differences in self-control depletion between groups. Moreover, the differences we found could not be attributed to comorbid anxiety or depressive disorders. Our results suggest that negative emotions alone do not fully distinguish normal from pathological social anxiety, and that assessing social anxiety disorder should include impairments in positive emotional experiences and dysfunctional emotion regulation (in the form of experiential avoidance) in social situations.

Keywords: social anxiety disorder, experiential avoidance, positive emotions, experience sampling

Social anxiety disorder (SAD) is characterized by a persistent fear of scrutiny by others due to the belief that such scrutiny will lead to negative evaluation and rejection (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010). Researchers have compared people with SAD and those without a diagnosis based on self-reported negative emotions (e.g., Watson, Clark, & Carey, 1988), physiological correlates of fear (e.g., Beidel, Turner, & Dancu, 1985; Hofmann, Newman, Ehlers, & Roth, 1995), and avoidant behavior during laboratory social interactions (e.g., Chen, Ehlers, Clark, & Mansell, 2002; Heuer, Rinck, & Becker, 2007). This research, along with expert judgment and clinical observation, led to the existing diagnostic criteria for SAD (e.g., American Psychiatric Association, 2000).

Most researchers distinguish the socially relevant anxious states of those with SAD from those without a diagnosis based upon the intensity, frequency, and duration of anxiety symptoms (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mennin et al., 2002). Compared with those without SAD, people with SAD are anxious more often, and these feelings are stronger and last longer when they occur. Nevertheless, these criteria do not take into account recent research about SAD, and clinicians who rely on the existing criteria may not identify some individuals with the disorder. Accurate diagnostic criteria are essential to identifying, classifying, and treating individuals with SAD. In this article we present evidence that suggests that the current criteria need to be expanded.

Positive Emotions

Although anxiety disorders have been linked with high negative affect, SAD is the only anxiety disorder associated with low levels of positive affect (Brown, 2007; Watson et al., 1988). Compared with their nonanxious peers, people with SAD expect positive events to be less likely to occur (Gilboa-Schechtman, Franklin, & Foa, 2000), and, in fact, studies with nonclinical samples in everyday life have shown that excessive social anxiety is associated with a lower frequency of positive life events (Farmer & Kashdan, 2012; Kashdan et al., 2011; Kashdan & Steger, 2006). A recent meta-analysis found that the inverse relationship between SAD and positive emotions could not be explained by the comorbidity

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between depression and SAD (Kashdan, 2007). Despite evidence that low levels of positive emotions characterize the experiences of people with SAD, researchers have yet to examine whether positive emotions during the course of everyday life offer incremental validity in distinguishing individuals with and without diagnoses of SAD above and beyond more traditional constructs.

Experiential Avoidance

Distinct from the experience of social anxiety is the regulation of this emotional experience (Gross, Sheppes, & Urry, 2011). Emotion regulation refers to attempts to alter the onset or experience of an emotion, or to modify the outward expression of an emotion (Cisler, Olatunji, Feldner, & Forsyth, 2010). When avoidance of an anxiety provoking situation is impossible, people with SAD may engage in *experiential avoidance*, as defined by efforts to escape, avoid, alter, or conceal undesirable emotions and thoughts (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Despite evidence that experiential avoidance may be an important change mechanism in the treatment of SAD (Dalrymple & Herbert, 2007), few studies have investigated the role of experiential avoidance in SAD.

Research on constructs related to experiential avoidance supports the contribution of this emotion regulation strategy to impaired well-being. For example, experience-sampling studies have found people with elevated social anxiety to be more likely to make attempts to conceal emotions (Farmer & Kashdan, 2012) and to experience the fewest positive experiences on days when they engage in this emotion regulation strategy (Kashdan & Steger, 2006). Furthermore, some theorists view the concealment of anxiety as a safety behavior that aims to minimize contact with unpleasant experiences during social interactions (Voncken, Alden, & Bögels, 2006). When people with SAD rely on such safety behaviors, they inadvertently contribute to the maintenance of their social anxiety symptoms (Wells et al., 1995). Research is mixed as to whether experiential avoidance decreases (Sloan, 2004) or increases (Feldner, Zvolensky, Eifert, & Spira, 2003) physiological arousal. Nevertheless, attempts to avoid or conceal anxious thoughts and feelings in social situations hinder emotional processing (particularly of disconfirmatory evidence), and, consequently, prevent habituation to unpleasant situations (Butler et al., 2003). Theorists have suggested that the transition from normative to pathological social anxiety in the form of SAD occurs when people are unwilling to experience naturally occurring anxious feelings, and their efforts to manage anxiety are ineffective or counterproductive (Herbert & Cardaciotto, 2005; Kashdan, Weeks, & Savostyanova, 2011).

Expanding the Conceptualization of SAD: Experiential Avoidance, Self-Control Depletion, and Positive Emotions

Experimental studies have shown that experiential avoidance increases cognitive load during stressful tasks (Hayes et al., 1996). Rigid attempts to avoid anxious thoughts and feelings reduce attention to competing reward cues in one's immediate environment (Gross & John, 2003). There is reason to expect these problems to be particularly pronounced in people with SAD, because they are more likely to view themselves as undesirable

and inferior to interaction partners (Kashdan & Savostyanova, 2011). Indeed, the prospect of having undesirable characteristics exposed for scrutiny by other people may initiate anxiety and self-conscious thoughts and feelings (Moscovitch, 2009). In the hope of protecting themselves from evaluation and reducing any additional unpleasant thoughts and feelings, people with SAD attempt to conceal any perceived deficiencies (Moscovitch & Huyder, 2011) and avoid the expression of intense emotions that might draw public exposure (Heimberg et al., 2010; Hofmann, 2007).

Engaging in cognitively demanding situations may lead to *self-control depletion*, as defined by the exhaustion of a person's capacity to regulate attention, energy, and tolerance of distress (Finkel et al., 2006; Vohs, Baumeister, & Ciarocco, 2005). People have a limited amount of energy, attention, and self-control at any given time (Baumeister, 2002), and the effort exerted by people with SAD to manage the impressions they make on other people during social interactions (Clark & Wells, 1995; Heimberg et al., 2010) may drain these resources (Vohs et al., 2005). In turn, people who have exhausted their self-regulatory resources are likely to make decisions based on immediate rewards, such as the temporary relief of escaping from an anxiety-provoking situation (Baumeister & Vohs, 2007). In such a state, people with SAD may be less able to respond to potentially rewarding social cues and less likely to make progress toward desired goals, such as satisfying their need to belong and achieving a sense of meaning in life (Mallott, Maner, DeWall, & Schmidt, 2009; Stillman et al., 2009). In effect, people with SAD not only view social situations as particularly stressful but may also suffer from the additional stress and exhaustion that result from relying on the counterproductive strategy of experiential avoidance.

A growing body of research indicates that experiential avoidance is associated with excessive social anxiety and that this emotion regulation strategy might account for the deficits in positive emotions and rewarding social experiences linked to excessive social anxiety (Kashdan, Barrios, Forsyth, & Steger, 2006; Kashdan & Breen, 2008; Kashdan & Steger, 2006; Rodebaugh & Heimberg, 2008; Rodebaugh & Shumaker, 2012). Furthermore, devoting finite effort and energy to alleviate momentary discomfort through experiential avoidance might not only interfere with enjoyment of social interactions but also contribute to self-control depletion, and consequently steal time and effort from other pleasurable and meaningful life pursuits. We incorporated this perspective on pathological social anxiety, spanning experiential avoidance, self-control depletion, and positive emotions into a study of how to identify individuals with SAD using a dynamic, ecologically valid methodology.

The Present Study

The primary goal of the present study was to determine if positive emotions, experiential avoidance, and/or self-control depletion aid in classifying individuals as meeting diagnostic criteria for the generalized subtype of SAD. Nongeneralized SAD (when feared situations are limited to public speaking or performing in front of other people) fails to encompass the interpersonal dynamics of interest that generate positive emotions (Hughes et al., 2006). We collected data from adults diagnosed as having the generalized subtype of SAD and a healthy comparison group,

matched on several demographic characteristics. With these two groups, we assessed the types of events expected to be problematic for people with SAD—social interactions during the course of daily life. Instead of relying on retrospective reporting in surveys or interviews, we collected event-contingent data with an experience-sampling approach. Participants recorded face-to-face social interactions that lasted at least 10 minutes using hand-held electronic diaries over the course of 2 weeks. Experience sampling provided a tool to examine social events and experiences in their natural, spontaneous context by minimizing the amount of time between the actual event and the recall of the event to lessen the influence of information processing biases (Reis & Gable, 2000).

This study aimed to empirically test recent theoretical models of SAD (Cisler et al., 2010; Heimberg et al., 2010; Kashdan et al., 2011; Moscovitch, 2009), and to improve our understanding of the factors responsible for the shift from normative anxiety in social situations to the experiences of people with a SAD diagnosis. Our primary hypothesis was that low positive emotions, an overreliance on experiential avoidance, and self-control depletion in the context of everyday social interactions, would distinguish individuals with SAD from a healthy comparison group above and beyond the more widely studied constructs of negative emotions, social anxiety, and feelings of belonging. To examine the specificity of these relationships, we controlled for the presence of depressive disorders or other comorbid anxiety conditions.

Method

Participants

Our initial sample consisted of 84 participants (52 women) from Northern Virginia. Forty-one participants were diagnosed with Social Anxiety Disorder (SAD), generalized subtype, and 43 (51%) were a healthy control group with no psychiatric disorders. We matched groups on gender, race, marital status, and age (see Procedures). Participants with SAD were not selected if they only met criteria for the nongeneralized subtype, had a psychotic disorder, or qualified for a substance use disorder, but other comorbidities were allowed. All participants were native English speakers. Nine participants were excluded from analyses because they did not provide daily social interaction data. This led to 38 participants with generalized SAD diagnoses (25 women) and 38 healthy controls (24 women). Excluded participants did not significantly differ from included participants on study variables. Sample details are reported in Table 1. Notably, 15 of the 38 SAD participants had no comorbidities, and eight were receiving treatment, but these variables did not predict experience-sampling, trait, or compliance measures ($ps > .10$).

Procedure

We recruited participants via flyers and online community advertisements. Following this, we conducted a phone screen with potential participants following an informed consent procedure. Trained research assistants used a structured questionnaire to assess for social anxiety, generalized anxiety disorder, depression, suicidality, and psychotic symptoms. We provided referrals as needed following lethality assessments. Potential participants with

evidence of generalized social anxiety fears were retained for further assessment.

Participants provided informed consent and completed demographic and personality questionnaires and then clinical psychology doctoral students administered the *Structured Clinical Interview for DSM-IV Axis I Disorders* (SCID; First, Spitzer, Gibbon, & Williams, 2002) to assess for anxiety, mood, substance use, eating, and psychotic disorders. The SCID was supplemented with the SAD module of the *Anxiety Disorders Interview Schedule for DSM-IV: Lifetime Version* (Di Nardo, Brown, & Barlow, 1994). To be eligible for the generalized SAD group, this condition had to be the principal or most severe diagnosis. Interrater reliability for SAD diagnoses was calculated, resulting in excellent agreement (Cohen's $\kappa = .87$). Upon recruiting a participant with SAD, we used demographic information (race/ethnicity, gender, and age within 8 years) to find a comparable healthy control match. We did this by using targeted advertisements as necessary. This matching system was successful for 82% of our sample, and the final groups did not differ significantly on these variables (see Table 1).

To provide experience-sampling data, we gave participants hand-held computers (Palm Pilot Z22), programmed using the Purdue Momentary Assessment Tool (PMAT; Weiss, Beal, Lucy, & MacDermid, 2004). Participants received a 1.5-hr introductory session, including practice with self-initiated recording of every face-to-face social interaction lasting at least 10 minutes. We defined a social interaction as “any situation involving you and one or more other people in which the behavior of each person is affected by the behaviors of the others.” We instructed participants to complete the records as soon as possible after each interaction. Research assistants described what did (e.g., conversation) and did not (e.g., quietly watching a movie) qualify as social interactions, and discussed survey items until participants felt comfortable with the procedure. Definitions and procedures were based on 35 years of daily diary research (Nezlek, 2012).

Two days into data collection, we contacted participants to troubleshoot. Following this, we sent multiple reminder e-mails each week to emphasize compliance, confidentiality, and data coding details (i.e., time-and-date stamped entries), and we debriefed participants at the end of the 2-week assessment period. To maximize compliance, participants received a minimum payment of \$165 and could earn up to \$50 in bonus money. The entire study consisted of three parts—social interaction records, end of day records, and random prompts—with only the first being relevant to this study. Participants received 50¢ for each completed random prompt record and end-of-day record, plus \$10 for each uninterrupted calendar week. Additionally, each end-of-day assessment included a reminder about social interaction entries. Moreover, we kept all measures brief to maintain participant motivation and maximize responses—a strategy that does not sacrifice reliability or validity (e.g., Nezlek, 2012).

Trait Measures

Social Interaction Anxiety Scale. This 20-item scale (SIAS; Mattick & Clarke, 1998) measured fear and avoidance of social interactions due to concerns about being scrutinized by other people. Participants responded to items using a 5-point Likert scale ranging from 0 (*not at all characteristic of me*) to 4 (*extremely characteristic of me*), with higher scores representing greater so-

Table 1
Demographic and Diagnostic Information by Participant Group

Variable	Group		Difference test
	Control ^a	SAD ^a	
Diagnosis	0.0%		
Social anxiety disorder	0.0%	100%	
Major depressive disorder	0.0%	21.1%	
Dysthymia	0.0%	13.2%	
Panic disorder	2.6%	5.3%	
Post traumatic stress disorder	0.0%	13.2%	
Generalized anxiety disorder	0.0%	5.3%	
Obsessive-compulsive disorder	5.3%	5.3%	
Specific phobia		28.9%	
Age (<i>M</i> , <i>SD</i>)	29.39 (10.29)	27.29 (6.03)	$t(74) = 1.09, p = .280$
Gender (% women)	65.8%	63.2%	$\chi^2(1) = 0.06, p = .811$
Race-Ethnicity			$\chi^2(5) = 2.89, p = .717$
African American	28.9%	18.4%	
Asian/Asian American	2.6%	5.3%	
Caucasian/White	52.6%	50.0%	
Hispanic/Latino	7.9%	13.2%	
Middle Eastern	0.0%	2.6%	
Other	7.9%	10.5%	
Education			$\chi^2(4) = 3.65, p = .455$
High school or less	2.6%	13.2%	
Some college	36.8%	28.9%	
Associate's degree	5.3%	7.9%	
Bachelor's degree	36.8%	28.9%	
At least some graduate level	18.4%	21.1%	
Family income			$\chi^2(3) = 4.38, p = .223$
<\$15,000	10.5%	15.8%	
\$15,000–\$49,999	26.3%	44.7%	
\$50,000–\$79,999	26.3%	18.4%	
>\$80,000	36.8%	21.1%	
Relationship status			$\chi^2(4) = 4.05, p = .400$
Single	65.8%	63.2%	
Cohabiting	21.1%	13.2%	
Married	10.5%	10.5%	
Divorced/Separated	0.0%	7.9%	
Other	2.6%	5.3%	
On psychoactive medications	2.6%	21.1%	$\chi^2(1) = 6.18, p = .013$

Note. SAD = Social Anxiety Disorder.

^a $n = 38$.

cial anxiety. This scale demonstrated strong reliability and validity across clinical and community samples (Brown et al., 1997; Heimberg et al., 1992). We removed three reverse scored items, which have been shown to slightly reduce reliability and validity (Rodebaugh et al., 2011; Rodebaugh, Woods, & Heimberg, 2007). In our sample, reliability was identical using the 17- and 20-item versions ($\alpha = .94$), with a .997 ($p < .001$) correlation between the two versions. We used the 17-item SIAS-Straightforward (SIAS-S) scores for subsequent analyses; however, results were virtually identical when including reverse-score items.

The SAD group had greater social anxiety ($M = 43.44, SD = 8.91$) than healthy controls ($M = 8.70, SD = 6.31$), $t(74) = 19.60, p < .001, d = 4.56$. The means for our SAD group were commensurate with clients in treatment for SAD ($M = 43.93, SD = 11.84$; Rodebaugh et al., 2011). We also compared our SAD sample with established norms on the 20-item SIAS. Of our SAD sample, 97.4% of participants scored above the optimal cut-off score of 34 (in terms of sensitivity and specificity) for distinguishing people with SAD from a healthy community comparison group (Brown et al., 1997).

Beck Depression Inventory-II. Severity of depressive symptoms was assessed using this 21-item questionnaire (BDI-II; Beck, Steer, & Brown, 1996). Participants responded to items on a scale from 0 to 3 to reflect their experiences over a 2-week period, with higher scores representing greater depressive symptoms. Our sample had acceptable internal reliability ($\alpha = .94$). The SAD group had significantly greater BDI-II scores than healthy controls, $M = 16.71, SD = 10.59$ vs. $M = 2.87, SD = 3.06$; $t(74) = 7.74, p < .001, d = 1.80$.

Acceptance and Action Questionnaire-II. This 7-item scale (AAQ-II; Bond et al., 2011) assessed experiential avoidance, or the inability to accept aversive internal experiences and pursue important life goals despite the presence of these experiences. Participants used a 7-point scale from 1 (*never true*) to 7 (*always true*) with higher scores reflecting a greater tendency to avoid unpleasant experiences. This scale has strong reliability and validity across clinical and community samples (Bond et al., 2011). Prior work has shown that experiential avoidance as measured by the AAQ-II is related to but distinct from anxiety sensitivity, contributing unique variance to the prediction of anticipatory anxiety and

functional impairment in clients with anxiety disorders (Kämpfe et al., 2012). Our sample had acceptable internal reliability ($\alpha = .92$). The SAD group had significantly greater scores on the AAQ-II than healthy controls ($M = 24.38, SD = 5.29$ vs. $M = 11.76, SD = 3.33; t(73) = 12.39, p < .001, d = 2.90$).¹

Experience-Sampling Social Interaction Measures

Social anxiety. To assess social anxiety during interactions, participants answered three items (from Kashdan & Steger, 2006): “I worried about what other people thought of me,” “I was afraid that others did not approve of me,” and “I was worried that I would say or do the wrong things.” Participants used a 5-point response scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). All social interaction measures used this response scale.

Experiential avoidance. Experiential avoidance during interactions were measured with four items: “How upset and bothered were you about anxiety-related feelings or thoughts?”, “How much did you try to hide and/or conceal your anxiety from others?”, “How much did you try to control your anxiety-related feelings or thoughts?”, and “To what degree did you give up saying or doing what you like (or mattered to you) in order to control and manage anxiety?”

Emotions. Participants rated how much eight emotional adjectives described them “right now” during social interactions. Negative emotions were *anxious/nervous, angry, sad, and sluggish*. Positive emotions were *content, relaxed, enthusiastic, and joyful*.

Feelings of belonging. How much people felt their need to belong was satisfied during interactions was measured with two items: “I felt close and connected to others during the interaction” and “I felt accepted by others during the interaction.”

Self-control depletion. Mental and physical resource depletion during interactions were measured with two items: “I feel mentally exhausted” and “Right now, it would take a lot of effort for me to concentrate on something” (from Ciarocco, Twenge, Muraven, & Tice, 2010).

Participant Compliance

Participants described an average of 9.83 social interactions ($SD = 4.63$), over 11.45 days ($SD = 4.80$). There were no significant differences between the SAD and control groups on number of social interactions ($M = 10.11, SD = 5.41$ vs. $M = 9.55, SD = 3.79; t(74) = 0.52, p = .606, d = 0.12$) and days the diary was maintained ($M = 11.45, SD = 4.83$ vs. $M = 11.45, SD = 4.84; t(74) = 0.00, p > .99, d = 0.00$). Furthermore, we used time stamps of social interaction entries to ensure that participants did not enter multiple social interactions in one sitting. All but two entries (99.7%) were more than 25 minutes after the prior entry.²

Results

The social interaction diary data comprised a hierarchically nested data set, with observations (interactions) nested within persons. Accordingly, the data were analyzed with a series of multilevel models using HLM 6.08 (Raudenbush, Bryk, Cheong, & Congdon, 2000). Our analyses followed guidelines and procedures described by Nezlek (2011, pp. 9–34).

Daily Measures: Descriptive Data, Reliability, and Validity

We examined the reliability of experience-sampling measures with three-level unconditional models with items nested within interactions, and interactions nested within people. In the model equations below, there were i items nested within j interactions nested with k participants. In such an analysis, the reliability of the Level 1 intercept is the functional equivalent of an interaction level Cronbach’s alpha, adjusted for differences among interactions and among people.

$$\text{Item Level 1: } Y_{ijk} = \pi_{0jk} + c_{ijk}$$

$$\text{Interaction Level 2: } \pi_{0jk} = \beta_{00k} + r_{0jk}$$

$$\text{Person Level 3: } \beta_{00k} = \gamma_{000} + u_{00k}$$

Each of the social interaction measures had acceptable reliability (see Table 2). We computed social interaction measures as the mean response to the items for each scale. All HLM analyses presented below had interactions nested ($n = 742$) within persons ($n = 76$). Table 2 also contains the basic multilevel descriptive statistics of each measure: mean, standard error, and two variance estimates: between- and within-person.

To evaluate the validity of our two primary experience-sampling measures (social anxiety and experiential avoidance), we examined relationships between the participants’ interaction scores and scores on corresponding trait measures (Nezlek, 2007). For example, we modeled social anxiety during social interactions as a function of the SIAS-S:

$$\beta_{0j} = \gamma_0 + \gamma_1 (\text{SIAS-S}) + u_j$$

We estimated validity by comparing the between-person variance of social anxiety in the unconditional model (0.65) with the residual between-person variance from the model above (0.29). This 55% reduction in variance corresponds to a correlation of .74 (square root of .55), $B = .03, SE = .004, t(74) = 8.20, p < .001$. As evidence of divergent validity, when we included the SIAS-S and the BDI-II as predictors in the same model, the experience-sampling measure of social anxiety was positively related to the SIAS-S, $B = .02, SE = .01, t(73) = 4.36, p < .001$, but not the BDI-II, $B = .02, SE = .01, t(73) = 1.51, p = .135$.

For our interaction level measure of experiential avoidance, the AAQ-II was used as a trait predictor. The between-person variance of experiential avoidance from the unconditional model was 0.46. The residual variance after including the AAQ-II was 0.21—a reduction of 56%, corresponding to a correlation of .75, $B = .07, SE = .01, t(73) = 8.77, p < .001$. When we included the AAQ-II and SAD diagnostic status as person level predictors in the same model, the AAQ-II remained significantly related to the experience-sampling measure of experiential avoidance, $B = .04, SE = .01, t(72) = 2.66, p = .010$, after controlling for the effect of SAD diagnosis, $B = .25, SE = .11, t(72) = 2.17, p = .033$.

¹ One participant in the SAD group had missing data for the AAQ-II due to a technical malfunction.

² These two social interaction entries were completed within 10 minutes of the prior entry and represented a change in activity during an elongated social interaction (i.e., within instruction parameters).

These data provide support for the construct specificity for our experience-sampling measure of experiential avoidance.³ Notably, our measure is specific to experiential avoidance during social interactions, although the trait measure is not restricted to a particular context.

Differences Between SAD and Control Group in Social Interaction Experiences

We examined relationships between SAD diagnostic status and our social interaction measures with two-level models. Social interaction measures were the dependent measures at Level 1 (in separate models), and SAD diagnostic status was a predictor at Level 2. SAD was contrast-coded (1 = SAD, -1 = Control) and entered uncentered in the following model:

$$\begin{aligned} \text{Interaction Level 1: } Y_{ij} &= \beta_{0j} + r_{ij} \\ \text{Person Level 2: } \beta_{0j} &= \gamma_{00} + \gamma_{01}(\text{SAD}) + u_{0j} \end{aligned}$$

Initially, we included the number of social interactions a person described as a Level 2 covariate. Including this variable did not influence the findings, which was not surprising, given that SAD and number of interactions were unrelated. Thus, this covariate was removed.

As summarized in Table 3, the SAD group reported more social anxiety, negative emotion, experiential avoidance, and self-control depletion in social interactions compared with the control group. The SAD group also reported less positive emotion and feelings of belonging.

To address construct specificity, we conducted additional analyses controlling for the presence of comorbid mood and anxiety disorders. We created contrast-coded variables to reflect whether participants met diagnostic criteria for any other anxiety disorder or mood disorder. We then entered these two variables, uncentered, as additional Level 2 predictors.

For all outcomes, the SAD effects controlling for comorbid conditions were similar to the effects found without these covariates—as before, all SAD effects were significant at $p < .001$. Controlling for mood and anxiety disorder comorbidity, SAD remained directly related to our experience-sampling measures of social anxiety ($B = .51$, $SE = .10$, $t(72) = 5.03$, $p < .001$), negative emotions ($B = .21$, $SE = .05$, $t(72) = 3.76$, $p = .001$), experiential avoidance ($B = .49$, $SE = .08$, $t(72) = 5.94$, $p < .001$), and self-control depletion ($B = .37$, $SE = .10$, $t(72) = 3.74$, $p = .001$), and inversely related to positive emotions ($B = -.50$,

Table 2
Multilevel Descriptive Statistics for Social Interaction Measures

Measure	<i>M</i> (<i>SE</i>)	Variance			Reliability
		Within	Between	ICC	
Social anxiety	1.81 (.10)	.63	.65	.50	.84
Negative emotions	1.55 (.05)	.25	.17	.41	.85
Positive emotions	2.87 (.09)	.62	.55	.31	.87
Belonging	3.56 (.08)	.95	.42	.47	.78
Experiential avoidance	1.72 (.08)	.55	.46	.45	.87
Self-control depletion	1.70 (.08)	.67	.43	.40	.83

Note. Intraclass correlation coefficients (ICC) represent the proportion of between-person variance to total variance.

Table 3
Differences Between Social Anxiety Disorder (SAD) and Healthy Control Groups for Social Interaction Measures

Measure	<i>b</i>	<i>SE</i>	<i>t</i>	Estimated means (<i>SE</i>)	
				Control	SAD
Social anxiety	.51	.08	6.71	1.30 (.11)	2.32 (.11)
Negative emotions	.24	.04	5.76	1.30 (.06)	1.79 (.06)
Positive emotions	-.53	.07	-8.09	3.41 (.09)	2.34 (.09)
Belonging	-.41	.07	-5.95	3.97 (.10)	3.15 (.10)
Experiential avoidance	.48	.06	8.11	1.23 (.09)	2.19 (.09)
Self-control depletion	.37	.07	5.32	1.32 (.10)	2.06 (.10)

Note. Differences and estimated means were computed with two-level HLM models, where SAD predicted each outcome measure separately. All *t*-ratios have 74 *df* and were significantly different from 0 at $p < .001$.

$SE = .08$, $t(72) = -6.61$, $p < .001$) and feelings of belonging ($B = -.38$, $SE = .08$, $t(72) = -4.76$, $p < .001$). In contrast, anxiety disorder comorbidity was not significantly related to any social interaction measure ($ps > .25$), and comorbid depressive disorders were significant only in the prediction of negative emotions ($B = .41$, $SE = .13$, $t(72) = 3.11$, $p = .003$), positive emotions ($B = -.59$, $SE = .17$, $t(72) = -3.51$, $p = .001$), and feelings of belonging ($B = -.58$, $SE = .23$, $t(72) = -2.58$, $p = .012$). These results support the specificity of SAD in relation to social interaction measures of social anxiety and experiential avoidance.

Added Value of Experiential Avoidance, Self-Control Depletion, and Positive Emotions in Predicting SAD Diagnosis

Multilevel analyses. Following preliminary analyses, we examined our primary question about the added value of experiential avoidance, self-control depletion, and positive emotions during social interactions to understand SAD diagnoses. Would relationships between these variables and SAD diagnosis remain after controlling for variance attributable to more commonly used measures of social anxiety, negative emotions, and feelings of belonging? To answer this question, we first conducted a series of multilevel analyses with experiential avoidance, self-control depletion, and positive emotions as dependent measures. We included SAD diagnosis as a Level 2 predictor and the following as simultaneous Level 1 predictors: social anxiety, negative emotions, and feelings of belonging. Social anxiety, negative emotions, and feelings of belonging were grand-mean centered to control for individual differences (Nezlek, 2011, pp. 13–18).

Controlling for social anxiety, negative emotions, and feelings of belonging in social interactions, the relationship between SAD diagnosis and experiential avoidance remained significant ($B = .11$, $SE = .04$, $t(74) = 3.19$, $p = .003$), as did the relationship between SAD and positive emotions ($B = -.26$, $SE = .05$, $t(74) = -4.84$, $p < .001$), but the relationship between SAD and self-

³ Supporting the validity of the experience-sampling measure of experiential avoidance, the AAQ-II was a significant predictor, $B = .04$, $t = 2.71$, $p = .009$, even after accounting for the variance attributable to the SIAS-S, $B = .02$, $t = 2.56$, $p = .013$.

Table 4
Hierarchical Logistic Regression Analyses Predicting Social Anxiety Disorder (SAD) Diagnostic Status From Social Interaction Measures

Predictor	<i>B</i>	<i>SE</i>	Wald	<i>P</i>	<i>OR</i>	95% CI	<i>R</i> ²
Step One							.605
Social anxiety	1.61	0.73	4.82	.028	5.00	[1.19, 21.04]	
Negative emotions	0.81	1.11	0.53	.466	2.24	[0.26, 19.70]	
Belonging	-1.86	0.62	9.03	.003	0.16	[0.05, 0.52]	
Step Two							.772
Social anxiety	0.41	0.96	0.19	.666	1.51	[0.23, 9.82]	
Negative emotions	-4.62	2.24	4.23	.040	0.01	[0.00, 0.80]	
Belonging	-0.60	0.79	0.57	.451	0.55	[0.12, 2.60]	
Self-control depletion	-0.63	1.07	0.35	.556	0.53	[0.07, 4.36]	
Experiential avoidance	5.10	1.92	7.07	.008	163.85	[3.82, 7036.34]	
Positive emotions	-3.51	1.27	7.69	.006	0.03	[0.003, 0.36]	

Note. *SE* = standard error; *OR* = odds ratio; CI = confidence interval. Bolded terms reflect a significant contribution to the prediction model. For the full model, 92.1% of participants with SAD were correctly classified (sensitivity) and 86.8% of participants without SAD were correctly classified (specificity).

control depletion was no longer statistically significant ($B = .05$, $SE = .03$, $t(74) = 1.41$, $p = .16$). These results suggest that the association of SAD with greater experiential avoidance and less positive emotions in everyday social interactions could not be explained by variance attributable to social anxiety, negative emotions, and feelings of belonging in social interactions.

Classification analysis. We supplemented the prior multi-level analyses with a classification analysis. Following previous work on diagnostic classification (e.g., Nock & Kessler, 2006), we used hierarchical logistical regression to determine if experiential avoidance, positive emotions, and self-control depletion improve the accuracy of predicting SAD diagnoses beyond the contributions of social anxiety, negative emotions, and feelings of belonging. To conduct these analyses, we aggregated within-person social interaction measures into between-person variables. At Step One, we included social anxiety, negative emotions, and feelings of belonging during social interactions as predictors of SAD diagnosis. At Step Two, we added experiential avoidance, positive emotions, and self-control depletion during social interactions as predictors.

As reported in Table 4, at Step One, we found evidence that both social anxiety and feelings of belongingness during daily social interactions were significant predictors of SAD diagnostic category ($R^2 = .61$). Specifically, greater social anxiety and less belonging during daily social interactions helped to distinguish participants with SAD from our healthy comparison group. This finding provides additional support for the validity of our experience-sampling measure of social anxiety. At Step One of the model, with experience-sampling measures of social anxiety, negative emotions, and belonging as predictors, 81.6% of participants with SAD were correctly classified (sensitivity) and 84.2% of participants without SAD were correctly classified (specificity).

At Step Two, experiential avoidance and positive emotions during social interactions predicted SAD diagnostic status above and beyond the constructs in the prior step, with a 17% incremental improvement in variance explained ($R^2 = .77$). As shown in Table 4, greater experiential avoidance and less positive emotions during social interactions added to the prediction of SAD diagnoses beyond the contributions of the more routinely assessed constructs. Self-control depletion did not significantly add to the prediction of

SAD diagnosis and neither social anxiety nor feeling of belonging remained significant. Negative emotions emerged as a significant predictor in the final model, though in the opposite direction. Providing additional support, upon inclusion of comorbid depressive and anxiety conditions as additional predictors, experiential avoidance ($B = 7.63$, $SE = 3.00$, Wald = 6.45, $p = .01$, $OR = 2057$) and positive emotions ($B = -3.68$, $SE = 1.69$, Wald = 4.77, $p = .029$, $OR = 0.03$) continued to predict SAD diagnostic status.⁴

In sum, the odds of having SAD increased more than 163 times with every one-point increase in the average level of experiential avoidance reported in social interactions. The odds increased more than 33 times with every one-point decrease in the average positive emotions reported. As for the predictive value of our model, we found evidence of high sensitivity (classifying 92.1% of individuals with SAD) and specificity (classifying 86.8% of individuals from the healthy control group). We found evidence for a strong classification model where 89.5% of our cases were correctly classified (68 out of 76). This represents an 11% improvement in sensitivity and a 3% increase in specificity over a model with only social anxiety, negative emotions, and belonging as predictors.

Discussion

The results of this experience-sampling study support theories suggesting that, in addition to elevated anxiety in social interactions, other characteristics distinguish the social experiences of individuals with SAD. These characteristics include diminished positive emotions (Kashdan, 2007; Watson et al., 1988) and experiential avoidance, involving attempts to alter, avoid, or conceal anxious thoughts and feelings (Herbert & Cardaciotto, 2005; Kash-

⁴ We ran separate logistic regression models for each discrete negative and positive emotion, respectively. The only negative emotion item that was statistically significant after including the Step Two predictors was anger, $B = -3.19$, $SE = 1.32$, Wald = 5.86, $p = .015$, $OR = .041$. For positive emotions, significant predictors included relaxed, $B = -1.75$, $SE = .83$, Wald = 4.51, $p = .034$, $OR = .174$, content, $B = -1.78$, $SE = .82$, Wald = 4.78, $p = .029$, $OR = .168$, and enthusiasm, $B = -1.88$, $SE = .66$, Wald = 8.07, $p = .005$, $OR = .153$, with joy showing a trend effect, $B = -1.11$, $SE = .61$, Wald = 3.32, $p = .069$, $OR = .330$.

dan et al., 2006). We found that individuals with SAD, compared with healthy controls, could be differentiated by their attenuated positive emotions and increased reliance on experiential avoidance during social interactions in daily life. These relationships remained after controlling for the variance attributable to more routinely studied constructs of negative emotions, social anxiety, and feelings of belonging and after accounting for the presence of depressive disorders and comorbid anxiety conditions.

In prior attempts to distinguish individuals with and without SAD, researchers relied on a narrow band of predictors. Nearly all published studies on the classification of SAD have focused on how well trait measures of social anxiety are able to identify SAD when present (e.g., Mennin et al., 2002). In this study, we extended recent research linking social anxiety to emotion regulation difficulties and diminished/impaired positive experiences (for reviews, see Kashdan et al., 2011; Watson & Naragon-Gainey, 2010). By using a community sample of healthy adults and adults who met diagnostic criteria for SAD, we provided evidence that experiential avoidance and a dearth of positive emotions during social encounters offer improved predictive validity for SAD diagnosis beyond anxiety during naturalistic social interactions.

To our knowledge, this was the first study to examine if experiences during naturally occurring social interactions can distinguish people with and without SAD. Prior work on social anxiety and both experiential avoidance and positive emotions has been primarily limited to cross-sectional (Brown, Chorpita, & Barlow, 1998; Kashdan et al., 2006; Watson et al., 1988) or two-wave (Kashdan & Breen, 2008) designs in which people aggregated experiences across time and context using traditional global questionnaires. A small number of studies supplemented these approaches by examining how people with SAD respond in a laboratory setting (Mallott et al., 2009; Taylor & Amir, 2012; Wallace & Alden, 1997). Using event-contingent experience-sampling methods with a carefully diagnosed sample, we were able to show that the types of feelings, beliefs, and behaviors people with SAD report on questionnaires, during interviews, or in laboratory observations also occur in real-world settings.

By asking participants to rate experiences as soon as possible following each social interaction lasting over 10 minutes, our approach circumvents some of the recall bias and distortion associated with retrospective reports, allowing for greater ecological validity over methods that rely on aggregated remembered experiences or artificial contexts (Csikszentmihalyi & Larson, 1987; Scollon, Kim-Prieto, & Diener, 2003). For a dynamic, contextualized approach, we asked participants to report on their experiences over the course of several weeks with electronic diaries, and all entries were time-and-date stamped. This procedure ensured that participants reported on their social interactions and associated experiences over a range of social encounters, not merely recalling a number of interactions on a single assessment occasion.

Within-person effects (with experience-sampling approaches) and between-person effects (with item-correlations among trait measures) are conceptually distinct (e.g., Affleck, Zautra, Tennen, & Armeli, 1999). As evidence of this, we found that social anxiety in the context of everyday social interactions significantly distinguished individuals with and without SAD diagnoses, but this effect did not hold after the inclusion of positive emotions, experiential avoidance, and self-control depletion into analytic models. One explanation for this result is that the intensity/frequency of

social anxiety is less critical to pathology than the unwillingness to remain in contact with unwanted anxious thoughts and emotions (i.e., experiential avoidance). These results are consistent with laboratory studies showing that shy participants without SAD experience levels of social anxiety during conversations with strangers as people with SAD (Heiser, Turner, Beidel, & Roberson-Nay, 2009). Other researchers have shown that positivity impairments in daily life only occur when people with high trait social anxiety both experience high social anxiety and tend to suppress these anxious reactions on the same day (Kashdan & Steger, 2006), suggesting that functional impairment hinges on the co-occurrence of anxiety and experiential avoidance.

Our finding that experiential avoidance outperformed social anxiety in distinguishing people with SAD demonstrates that social anxiety is more than just a collection of self-reported distress. Notably, the very large odds ratio for experiential avoidance ($OR = 163.85$) as a predictor of diagnostic status is a function of the near absence of experiential avoidance in the healthy control group. This is likely due to the healthy control group generating and regulating emotions differently in everyday social interactions compared with the SAD group. Further research might examine the use of different emotion regulation strategies during social interactions to better understand this effect.

Prior research has shown that people with SAD tend to suppress the expression of both negative emotions (Erwin, Heimberg, Schneier, & Liebowitz, 2003) and positive emotions (Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Other studies suggest that people with SAD are more likely to act in an unassertive, submissive manner (Hopko, McNeil, Zvolensky, & Eifert, 2002). Based on these findings, we suspect that healthy adults in the community may differ from people with SAD in their willingness to have emotionally charged conversations. This would explain our seemingly unusual finding that after accounting for experiential avoidance, people with SAD could be distinguished from healthy controls by the presence of *less* negative emotions in their everyday social interactions. Given that people with SAD fear the possibility of having their perceived deficiencies scrutinized and believe that visible anxiety is a sign of weakness, then experiential avoidance (of negative thoughts and feelings) appears to be a useful self-protection strategy. Concealing the expression of perceived deficiencies becomes a safeguard against the feared consequences linked to SAD (Alden & Taylor, 2011). The unfortunate by-product of experiential avoidance is that this biased allocation of attention limits access to rewards, as shown by the deficient generation of positive emotions in the present study (extending prior work on positivity deficits; Kashdan et al., 2011).

Separating the generation of emotions from emotion regulation is important when contemplating the design of future studies on moment-to-moment dynamic processes that contribute to the development and maintenance of SAD. We chose to use experience sampling to best capture naturalistic experiences while maintaining some level of measurement control. Despite these efforts, our experience-sampling procedure might have missed crucial information about how people with SAD navigate their social world. First, although we assessed experiential avoidance, we did not inquire about specific safety behaviors to minimize contact with experiences (e.g., fidgeting, averting eye contact). These and other microlevel processes in everyday contexts may provide additional insights into the phenomenology of SAD. Second, people with

SAD tend to avoid the very situations that invoke anxiety for them. We did not gather data about social opportunities that were avoided or interactions that ended quickly. The broader tendency to avoid discomfort may explain in part why we found such a large effect for experiential avoidance within social interactions. Similarly, the intentional avoidance of particularly anxiety-provoking situations that would be mentally exhausting might explain why we did not find a significant effect of self-control depletion in classifying people with SAD.

Refined methodologies can evaluate the extent to which people with SAD avoid/escape social activities and unwanted distress in everyday life as it naturally unfolds. Future studies can explicitly ask about briefer interactions (e.g., where someone escapes within seconds of contact with another person), use of e-mail and texting to avoid face-to-face encounters, and other tactics to prevent feared interactions (e.g., taking different routes to a destination to avoid people). Nevertheless, people with emotional disorders such as SAD are often unaware of the extent of their behavioral avoidance and monitoring may change behavior patterns.

Although our naturalistic data collection process had many benefits, there are limitations worthy of future correction. First, social interaction episodes involve at least two people, but we only collected data from a single person. Future studies should consider dyadic data collection for behavioral assessment reports (e.g., capturing a lack of responsiveness to another person's self-disclosure). Second, our participants sometimes recorded social interactions after they occurred, leading to a degree of retrospective interpretation. The screening of time and date stamps addressed some of these concerns, but future research ought to ensure that participants enter data as close as possible to the triggering events (e.g., by using participants' own mobile phones for ease of data entry). Third, we did not test other relevant theoretical models (e.g., estimates of the probability and cost of social blunders, rumination, and fear of positive evaluation) due to response burden concerns. Future work can expand the current findings with innovative experimental, longitudinal, and intervention designs.

Our findings support an expanding conceptualization of SAD where both negative and positive emotional reactions to social events, and an overreliance on attempts to avoid anxious thoughts and feelings during social events help differentiate individuals with SAD from healthy adults in the community. Clinicians might consider expanding the explicit target of interventions for SAD to include the reduction of experiential avoidance and increase of positive experiences (Alden & Taylor, 2011; Dalrymple & Herbert, 2007).

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In the article “Psychometric considerations in using error-related brain activity as a biomarker in psychotic disorders” by Dan Foti, Roman Kotov, and Greg Hajcak (*Journal of Abnormal Psychology*, Vol. 122, No. 2, pp. 520–531. doi:10.1037/a0032618), the URL for supplemental material was missing.

Supplemental material for this article is available at: <http://dx.doi.org/10.1037/a0032618.supp>. The online version of this article has been corrected.

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