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Attentional control mediates the effect of social anxiety on positive affect[☆]

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Abstract

The goal of the present studies was to examine whether attentional control, a self-regulatory attentional mechanism, mediates the effect of social anxiety on positive affect. We tested this mediation in two studies using undergraduate students selected to represent a broad range of severity of social anxiety. Self-report assessments of social anxiety, attentional control, and positive affect were collected in a cross-sectional design (Study 1) and in a longitudinal design with three assessment points (Study 2). Results of both studies supported the hypothesized mediational model. Specifically, social anxiety was inversely related to attentional control, which itself positively predicted positive affect. This mediation remained significant even when statistically controlling for the effects of depression. Additionally, the hypothesized model provided superior model fit to theoretically-grounded equivalent models in both studies. Implications of these findings for understanding diminished positive affect in social anxiety are discussed.

Keywords

Social anxiety; Attention; Attentional control; Positive affect

1. Introduction

Although the wealth of research on social anxiety concerns the distress and impairment associated with and caused by excessive social anxiety, accumulating evidence suggests that social anxiety is also associated with diminished positive, healthy functioning (for a review, see Kashdan, Weeks, & Savostyanova, 2011). Given that the absence of psychological distress is not necessarily equivalent to psychological health and that research supports the distinction between positive and negative affect as two negatively correlated yet independent factors (e.g., Diener, Larsen, Levine, & Emmons, 1985; Watson, Gamez, & Simms, 2005), it is important to understand the mechanisms through which social anxiety leads to reduced positive affective states. Such knowledge has the ability to inform treatment innovations that

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target the enhancement of the psychological health and well-being of individuals with excessive social anxiety.

Whereas the study of low positive affectivity in depression has flourished, research on positive affectivity in the anxiety disorders has lagged. Recently, however, studies have shown associations between social anxiety and low positive affect. For example, individuals with social anxiety disorder (SAD) estimate positive events to be less likely to occur and anticipate experiencing more frequent and negative reactions to positive social events than non-anxious individuals (Gilboa-Schechtman, Franklin, & Foa, 2000). Other evidence comes from the finding that, despite improvement, post-treatment quality of life among individuals with SAD fails to reach the normal range (Eng, Coles, Heimberg, & Safren, 2001, 2005; Safren, Heimberg, Brown, & Holle, 1997). Elevated trait social anxiety in nonclinical samples has also exhibited a relationship with reduced positive affect and fewer positive events in everyday life (e.g., Kashdan, 2002; Kashdan & Steger, 2006).

Further evidence supports the notion that the relationship between social anxiety and reduced positive affect cannot be attributed entirely to co-occurring depressive symptoms. For example, SAD has been associated with diminished positive affect after statistically controlling for the contribution of depressive symptoms (Brown, Chorpita, & Barlow, 1998). Similarly, in a study of the tripartite model of anxiety and depression in individuals with SAD, social anxiety was more closely related to the low positive affect factor of the model than the physiological hyperarousal factor (Hughes et al., 2006). A recent meta-analysis also supported the finding of reduced positive affect across the social anxiety spectrum after statistically accounting for the variance contributed by depressive symptoms (Kashdan, 2007).

Given that the finding of reduced positive affect in social anxiety persists after conservatively controlling for depressive symptoms (i.e., the shared variance between these two highly related constructs is removed; Kashdan, 2007; Miller & Chapman, 2001), several explanations have been offered to understand this finding. Although individual differences exist in how people respond to positive affect, many people use strategies to enhance and sustain positive affective states. However, social anxiety has been associated with fear of positive emotions (Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Thus, it is not surprising that individuals with SAD exhibit tendencies to down-regulate its experience and expression. Specifically, socially anxious individuals exhibit lower expression of positive emotions than do non-anxious individuals (Turk et al., 2005) and do not exploit opportunities to pursue activities that could generate positive affect (Kashdan & Steger, 2006). Social anxiety is also associated with dampening of positive affect and reduced tendencies to savor positive affect (Eisner, Johnson, & Carver, 2009).

Evidence also supports the notion that social anxiety is associated with fears of positive evaluation, an outcome that psychologically healthy individuals would likely conceptualize as a positive affect enhancing experience. The core feature of SAD is typically described as the fear of negative evaluation by others. In contrast, fear of positive evaluation is defined as “the sense of dread associated with being evaluated favorably and publicly, which necessitates a direct social comparison of the self to others and therefore causes an

individual to feel conspicuous and ‘in the spotlight’” (Weeks, Jakatdar, & Heimberg, 2010, p. 69; see also Weeks, Heimberg, & Rodebaugh, 2008; Weeks, Heimberg, Rodebaugh, & Norton, 2008). This perspective is in line with evidence that socially anxious individuals worry that positive evaluation of their performance raises the social standards by which they will be evaluated in the future, although they do not believe that their typical performance will change for the better (Alden, Mellings, & Laposa, 2004; Wallace & Alden, 1995, 1997). As a result, they predict that positive evaluation by others will ultimately result in failure. Nevertheless, fear of positive evaluation contributes unique variance to the prediction of social anxiety and thus does not appear to be only a delayed expression of the fear of negative evaluation (Weeks, Heimberg, & Rodebaugh, 2008; Weeks, Heimberg, Rodebaugh, & Norton, 2008).

Despite an increase in the evidence for the tendency of socially anxious individuals to fear and avoid positive emotional experiences, including positive evaluation by others, there remains a gap in the literature concerning the mechanisms through which social anxiety leads to diminished positive affect. Therefore, the aim of the present studies was to examine a potential mediational variable, namely attentional control, in the relationship between social anxiety and diminished positive affect.

Attention is a complex collection of cognitive mechanisms, one of which is executive attention (e.g., Fan & Posner, 2004; Posner & Petersen, 1990; Posner & Rothbart, 2007). Executive attention refers to various mechanisms involved in the monitoring and resolving of conflict among cognitions, emotions, and behavioral responses (Posner & Rothbart, 2007). Attentional control is a somewhat newer construct that is purported to be one such mechanism in the executive system. Attentional control refers to a general capacity to effortfully regulate attention (i.e., voluntarily focus or shift attention) in comparison to less voluntary, reactive dimensions of attention (Derryberry & Rothbart, 1988). There is emerging evidence that social anxiety is associated with reduced attentional control, even after partialling out other negative emotions such as depression and state anxiety (Moriya & Tanno, 2008).

At least two lines of research converge to describe how attentional control may mediate the effect of social anxiety on positive affect. Though the two literatures emphasize different aspects of the sequelae of reduced attentional control, both conceptualize the depletion of self-regulatory resources as a factor contributing to diminished positive affect. Attentional control has been conceptualized as a subcomponent process of the self-regulation system (e.g., Rueda, Posner, & Rothbart, 2004). The first line of support comes from research demonstrating that reduced self-regulatory processing can negatively impact interpersonal behavior, thereby decreasing the likelihood of positive social experiences (for review, see Kashdan, 2007). Given that (1) people have a limited supply of self-regulatory resources (e.g., Muraven & Baumeister, 2000), (2) social activity is ubiquitous in the lives of socially anxious individuals, and (3) concerns of those with excessive social anxiety occur prior to, during, and following social interactions, these resources become depleted. A series of studies by Vohs, Baumeister, and Ciarocco (2005) shows that depleted self-regulatory functioning can negatively affect one’s ability to effectively engage in impression management. Moreover, Vohs et al. found that effortful impression management impairs

self control in successive demanding tasks. Kashdan (2007; Kashdan et al., 2011) proposes that there exists a paradox in social anxiety in which excessive attempts to make a positive impression, appear and feel less anxious, and avoid rejection deplete the self-control resources necessary to effectively prevent socially undesirable behaviors (e.g., inappropriately self-disclosing intimate details, being unresponsive to the feelings and interests of social interaction partners; e.g., Gross, 1998; Vohs et al., 2005). The outcome of this paradox is that the likelihood of a positive interpersonal outcome is decreased. This outcome, taken together with the finding that the most distinguishing characteristic of very happy people is the existence of satisfying social interactions and relationships (Diener & Seligman, 2002; Myers & Diener, 1995), highlights the eventual outcome of reduced positive affect in social anxiety.

A second line of converging evidence to explain how attentional control may mediate the effect of social anxiety on positive affect comes from the information processing literature. In contrast to non-anxious individuals, socially anxious individuals preferentially allocate their attention to social threat information in the environment (e.g., Asmundson & Stein, 1994; Mogg, Philippot, & Bradley, 2004; Pishyar, Harris, & Menzies, 2004). Evidence also suggests that this bias toward negative information may be accompanied by a bias *away* from positive information (e.g., Chen, Ehlers, Clark, & Mansell, 2002; Mansell, Clark, Ehlers, & Chen, 1999; Pishyar et al., 2004; see also Perowne & Mansell, 2002; Veljaca & Rapee, 1998). In addition, the tendency to allocate attention away from positive social stimuli mediates the effect of social anxiety on change in state anxiety in response to a social stressor, implicating the role of diminished processing of positive social information in the persistence of social anxiety (Taylor, Bomyea, & Amir, 2010). Preferential biases toward threat have received some empirical support as a causal factor in the maintenance of excessive social anxiety (e.g., Amir et al., 2009). In contrast, attending to positive information serves as a protective factor against stress (Joormann, Talbot, & Gotlib, 2007) and may promote adaptive emotion regulation under conditions of high stress (Lee & Telch, 2008). Moreover, Taylor, Bomyea, and Amir (2011) provide initial support for the notion that training of attention toward positive information may heighten positive emotional reactivity, thus implying a causal relationship between attention toward positive information and positive affectivity.

As noted above, the attentional control system is part of the executive system that carries out more voluntary attentional functions as opposed to the more reactive, stimulus-driven attentional system (Derryberry & Rothbart, 1988). In anxiety, impairment in the attentional control system is purported to lead to an increase in the influence of the stimulus-driven attentional system and a decrease in the influence of the goal-directed attentional system, contributing to the capture of attentional resources by threat-relevant stimuli (Eysenck, Derakshan, Santos, & Calvo, 2007). Such capture may combine with risk for anxiety, for example in the form of negative affectivity and neuroticism (Lonigan & Phillips, 2001) or parental factors such as modeling of fear (for review, see Hadwin, Garner, & Perez-Olivas, 2006; Volbrecht & Goldsmith, 2010), to lead to the development of excessive anxiety. Although these theories concern only the role of preferential allocation of attention to threat, they underscore the important point that anxious individuals are *not* exhibiting preferential

attention to positive information when the voluntary control system is impaired. Thus, it is proposed here that diminished attentional control may lead to diminished positive affect in anxious individuals in that the encoding of positive affective experiences is reduced or fails.

2. Study 1

Social anxiety has been associated with diminished positive affect, yet little is known about mechanisms mediating this relationship. Diminished attentional control is a candidate mediator because it may detrimentally affect interpersonal behavior and relationships and/or lead to a reduction in the capture of attention by positive social information in the environment in favor of socially threatening information. Therefore, it was hypothesized that attentional control would mediate the effect of social anxiety on positive affect, such that social anxiety would inversely predict attentional control which itself would positively predict positive affect.

In this study, the proposed mediational path was tested using a cross-sectional design. We used a partially latent structural regression model. Social anxiety, modeled as a latent construct represented by three self-report measures, was hypothesized to predict state positive affect, modeled as a manifest variable, indirectly through attentional control, modeled as a latent construct represented by the two empirically-supported subscales of a self-report measure of attentional control. Two equivalent models were also tested. In the first competing model, positive affect served as a mediator of the effect of social anxiety on attentional control. Justification for this model comes from a long line of research that shows positive affect broadens the scope of attention, enabling more flexibility in attentional functioning (for a review, see Fredrickson, 2001). A second competing model was included in which social anxiety was modeled to predict attentional control and positive affect and the latter two variables were modeled to correlate. Given that previous studies have shown relationships between social anxiety and (1) positive affect and (2) attentional control, such a model provided a stricter test of the current hypothesized mediational path given that the model does not impose structure on the relationship between the two outcome variables. A further purpose of the current study was to examine whether the hypothesized mediation of the effect of social anxiety on positive affect by attentional control exists after controlling for depressive symptoms. Such a conservative test would provide robust evidence for the strength of the unique relationship between reduced positive affect and social anxiety.

2.1. Method

2.1.1. Participants—Participants were 112 individuals (74% female) drawn from a pool of undergraduate students at Temple University (mean age = 20.28, $SD = 2.89$; mean years of education = 12.91, $SD = 2.75$). The sample was racially and ethnically diverse (59% Caucasian or white, 15% African-American or black, 18% Asian, 3% Hispanic, 5% Other). Participants completed a battery of questionnaires administered through the university's online research participation website and were subsequently invited to participate in a study at the Adult Anxiety Clinic of Temple University. Individuals who scored high on a measure of social interaction anxiety included in this online battery were over-sampled as we anticipated a positively skewed distribution of social anxiety scores and wanted to ensure adequate sample size across the range of social anxiety. See Table 1. Participants were not

excluded on the basis of any demographic or other characteristics. Additional data for the current analyses were collected as part of a battery of questionnaires administered prior to the experimental procedures of a larger study examining visual mental imagery processes in social anxiety. Participants received course credit for participation in both portions of the study (i.e., online questionnaires, in-person experiment).

2.1.2. Measures

2.1.2.1. Social interaction anxiety scale and social phobia scale: The Social Interaction Anxiety Scale (SIAS) and Social Phobia Scale (SPS; Mattick & Clarke, 1998) are companion scales designed to measure fears of social interactions and public scrutiny, respectively. Each questionnaire consists of 20 Likert-format items rated from 0 (*not at all characteristic or true of me*) to 4 (*extremely characteristic or true of me*). The SIAS-S and SPS have been widely used in the assessment of social anxiety and have evidenced good reliability and validity in a number of studies (e.g., Brown et al., 1997; Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006; Safren, Turk, & Heimberg, 1998). Rodebaugh, Woods, and Heimberg (2007) have reported that the straightforward items of the SIAS are more valid indicators of social interaction anxiety than the reverse-scored items and therefore suggest utilizing only the 17 straightforward items (SIAS-S) to calculate the total score. In the current sample, internal consistency of the SIAS-S ($\alpha = .95$) and SPS ($\alpha = .93$) was excellent.

2.1.2.2. Personal report of communication apprehension: The Personal Report of Communication Apprehension scale (PRCA; McCroskey, 1982) is a 24-item measure employing a 1 (*strongly agree*) to 5 (*strongly disagree*) Likert-type scale to measure fear of a variety of communication situations, including public, small group, meeting, and one-on-one social interactions. To ease interpretation of the models, prior to summing, the items were reverse scored so that higher ratings indicated more communication apprehension. An example item from the PRCA is “I am tense and nervous while participating in group discussions.” The PRCA has been found to predict anxiety, avoidance and withdrawal in public speaking situations (Beatty, 1987; Beatty, Balfantz, & Kuwabara, 1989) and has demonstrated excellent internal consistency in a sample of undergraduate students ($\alpha = .90$; Shumaker & Rodebaugh, 2009). In the current sample, internal consistency of the PRCA was excellent ($\alpha = .97$).

2.1.2.3. Attentional control scale: The Attentional Control Scale (ACS; Derryberry & Reed, 2002) is a 20-item self-report questionnaire designed to assess one’s ability to (a) focus attention, (b) shift attention between tasks, and (c) flexibly control thought. A total score is calculated by summing the items, with higher scores indicating better attentional control. Conversely, lower scores indicate difficulty in employing attentional control. An example item from the ACS is “When concentrating, I can focus my attention so that I become unaware of what’s going on in the room around me.” Although originally designed to assess three constructs related to attentional control, namely focusing, shifting, and flexibility, a total score of all items is most typically used. However, results from a study of the factor structure of the ACS in Icelandic adults supported a two-factor structure, with one item (item 9) not loading well on either factor (Ólafsson et al., 2011). A confirmatory factor

analysis in a sample of 8–18 year-old Dutch children and adolescents also supported the two-factor structure (Verstraeten, Vasey, Claes, & Bijttebier, 2010). In the present study, we followed Ólafsson et al. and computed two scores by summing items 1–8 and 12 for the focusing subscale (ACS-Focusing) and items 10, 11, and 13–20 for the shifting subscale (ACS-Shifting). In Ólafsson et al., internal consistency was good for the focusing factor ($\alpha = .82$) and adequate for the shifting factor ($\alpha = .68$; Ólafsson et al., 2011). Internal consistency of both factors was good in the current sample (ACS-Focusing $\alpha = .79$; ACS-Shifting $\alpha = .82$).

2.1.2.4. Positive and negative affect schedule: The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used to assess state levels of positive affect. On the PANAS, the respondent is presented a list of 20 words that describe different feelings or emotions. Half of the words represent negative affect states (e.g., distressed, ashamed, jittery) and half represent positive affect states (e.g., interested, proud, inspired). Participants are asked to indicate the extent to which they feel each emotion on a Likert-type scale from 1 (*Very slightly or not at all*) to 5 (*Extremely*). Positive and negative affect are predominantly defined by the activation of positively and negatively valenced affects, respectively (Watson, Wiese, Vaidya, & Tellegen, 1999). The PANAS can be administered with various instructional sets reflecting different time frames (e.g., state versus trait versions); for the current study, participants responded to items based on how they felt in the moment. For the present analyses, only the total score for the positive affect items was used (i.e., PANAS-PA). The PANAS has demonstrated good reliability in medical rehabilitation patients (Ostir, Smith, Smith, & Ottenbacher, 2005) and non-clinical samples (Crawford & Henry, 2004). In the current sample, internal consistency of the PANAS-PA was excellent ($\alpha = .90$).

2.1.2.5. Beck Depression Inventory–II: The Beck Depression Inventory–II (BDI-II; Beck, Steer, Ball, & Ranieri, 1996) is a 21-item self-report instrument intended to assess the existence and severity of symptoms of depression. Participants rate the severity of each symptom over the past two weeks on a scale of 0–3, with higher scores indicating greater severity. A total score on the BDI-II is created by summing the scores of the 21 items. The BDI-II has been used extensively and has demonstrated excellent internal consistency among college students ($\alpha = .90$; Storch, Roberti, & Roth, 2004), as it did in the current sample ($\alpha = .91$).

2.1.3. Procedure—Data for the current analyses were collected (1) online through Temple University's research participation website and (2) in-person at the Adult Anxiety Clinic of Temple. Prior to completing each portion of the study, participants provided informed consent. Participants first completed the online questionnaires (i.e., PRCA, ACS) and were then invited via email to participate in an experiment conducted in the clinic. Upon arrival at the clinic, participants completed a battery of self-report questionnaires that were administered on computer, including the SIAS, SPS, and the BDI-II, followed by the state version of the PANAS administered on paper. Following completion of the questionnaires, participants completed an experiment, not described herein, aimed at investigating the

relationship between mental imagery perspective and changes in positive and negative affect.

2.1.4. Analysis strategy—A measurement confirmatory factor analysis (CFA) model and a series of structural regression models of the above scaled scores were tested using maximum likelihood estimation with AMOS 6.0 software (Arbuckle, 1995). First, the measurement CFA model was tested in which the SIAS-S, SPS, and PRCA total scores served as indicators of the social anxiety factor and the ACS-Focusing and ACS-Shifting subscale total scores served as indicators of the attentional control factor. The social anxiety factor and attentional control factor were modeled to correlate. The unstandardized factor loadings of the SIAS-S and ACS-Focusing indicators were fixed to 1.0 to scale the social anxiety and attentional control factors, respectively.

A series of structural regression models were then tested. Factors were indicated by the same measured variables as in the CFA measurement model and all constrained loadings from the CFA measurement model remained constrained in the structural regression models. In the first structural regression model, depicted in Fig. 1, attentional control served as a mediator of the relationship between social anxiety and state positive affect. In the second model, state positive affect served as a mediator of the relationship between social anxiety and attentional control. In the third model, social anxiety was modeled to predict attentional control and state positive affect, with the latter two variables correlated with one another.

To evaluate overall fit of the models tested, we used the following fit indices: model chi-square, Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR). The Akaike Information Criterion (AIC; Akaike, 1987) and Bayesian Information Criterion (BIC; Schwarz, 1978) were used to compare the competing models. Multiple indices were selected because they provide different information for evaluating model fit and, used together, provide a more conservative and reliable evaluation (e.g., Kline, 2011). Chi-square values should not be significant. CFI values range from 0 to 1, with values of .95 or higher indicative of a good fitting model (Hu & Bentler, 1999). SRMR values less than .08 are generally considered to represent a good fit (Hu & Bentler, 1999). The AIC and BIC are not standardized and not interpreted for a given model but can be compared across models estimated from the same data set. The model with the smaller AIC or BIC is to be preferred. Moreover, the BIC applies a heavier penalty for the number of parameters in the model compared to the AIC, thereby favoring the more parsimonious model.

The current study employed a bootstrapping method (with $n = 2000$ bootstrap resamples) to assess indirect effects (Preacher & Hayes, 2008). Point estimates and 95% confidence intervals were estimated for the indirect effects. Two types of confidence intervals were calculated (i.e., percentile and bias-corrected). As a stringent test of our hypotheses, we considered point estimates of indirect effects significant when zero was not contained in either confidence interval.

2.2. Results

Table 1 presents descriptive statistics for the measured variables, including both the total and subscale scores of the ACS. Prior to analysis, data were screened for violation of

statistical assumptions. Given that 74% of the sample was female, we sought to demonstrate gender invariance in the covariance matrices. Because small sample size precluded the use of multiple groups analysis, we used Box's M test, which suggested that gender differences in the observed effects were unlikely, Box's $M = 33.83$, $F(21, 10,947.46) = 1.47$, $p = .08$. Multivariate normality was assessed using the joint multivariate kurtosis value provided by AMOS (kurtosis = 13.09, critical ratio = 6.81), with results suggesting non-normal data. Although parameter estimates and most model fit indices are robust to nonnormality given maximum likelihood estimation and a sample size greater than 100 (Lei & Lomax, 2005), we chose to account for multivariate nonnormality by using the Bollen-Stine bootstrap chi-square and computing bootstrapped parameter estimates with estimates from a maximum-likelihood procedure provided within AMOS (Nevitt & Hancock, 2001). The bootstrapping method and criteria for statistical significance were identical to that described above for tests of indirect effects.

The amount and distribution of missing data were tested by running a series of independent samples t -tests on each of the six observed variables comparing those with a missing value on each of the other five variables to those not missing the value. All t -tests were non-significant, indicating a high probability that missing data were missing at random. Within AMOS, missing data is easily handled using full information maximum likelihood (FIML) estimation. However, AMOS does not provide the Bollen-Stine bootstrap chi-square or bootstrapped parameter estimates if FIML is used. Therefore, below we present results of the models tested based on individuals who were not missing values on any of the observed variables. Approximately 7% of the cases were missing a value on at least one of the primary variables and therefore dropped. Results based on FIML estimates, using the full sample, and not correcting for multivariate non-normality, were consistent with the results presented below.

2.2.1. CFA measurement model—Table 2 presents zero-order correlations among the measured variables. All correlations were in the expected direction and all were significant except for the correlation between the SPS and the PANAS-PA. Results of the CFA measurement model, in which social anxiety and attentional control factors were indicated by three and two measured variables, respectively, and allowed to correlate, supported the two-factor model. All estimated unstandardized factor loadings were significant, p 's $< .002$. Standardized factor loadings were high for the social anxiety factor, SIAS: 0.91, SPS: 0.76, PRCA: 0.82, and moderate for the attentional control factor, ACS-Focusing: 0.61, ACS-Shifting: 0.86. As can be expected, the residual error variances were significant, p 's $< .01$, except for the SIAS-S indicator, $p = .07$, and ACS-Shifting indicator, $p = .36$. There remained a significant amount (61.6%) of unexplained variance in the ACS-Focusing indicator. The social anxiety and attentional control factor were moderately negatively correlated, $r = -.61$. Overall model fit was fair. The model chi-square test with Bollen-Stine bootstrap was significant, $\chi^2_M(4) = 12.27$, $p = .02$, suggesting poor model fit, but the CFI and SRMR indicated good model fit, CFI = .96, SRMR = .05.

2.2.2. Structural regression models

2.2.2.1. Model 1: Attentional control as a mediator of the effect of social anxiety on

positive affect: Model fit statistics for the three structural regression models are presented in Table 3. For model 1, in which attentional control served as a mediator of the relationship between social anxiety and positive affect, the model chi-square test with Bollen-Stine bootstrap was not significant, $\chi^2(8) = 13.79$, $p = .22$, in support of good model fit. Similarly, the CFI and SRMR indicated good overall model fit, CFI = .98, SRMR = .05. The AIC value was 39.79 and the BIC value was 74.17.

Table 4 presents mean estimates for the structural regression model. All unstandardized factor loadings were significant, p 's < .002. Standardized factor loadings for the social anxiety and attentional control latent factors remained relatively equivalent to the loadings in the measurement CFA model. As can be expected, the residual error variances were also significant, p 's < .01, except for the ACS-Shifting indicator, $p = .13$. More than 60% of the variance in the ACS-Focusing indicator, attentional control latent factor, and positive affect manifest variable remained unexplained.

Social anxiety negatively predicted attentional control, $\beta = -.57$, $p < .001$, and attentional control positively predicted state positive affect, $\beta = .47$, $p < .001$. The indirect effect of social anxiety on positive affect was also significantly different from zero, $\beta = -.27$, percentile method 95% CI [-.43, -.11], bias-corrected percentile method 95% CI [-.44, -.12].

To probe whether the direct effect of social anxiety on positive affect remained after accounting for the indirect effect, we conducted a supplementary analysis in which we added a direct path from the social anxiety factor to the positive affect manifest variable. Results suggested good overall model fit with this additional path [$\chi^2(7) = 13.78$, $p = .06$; CFI = .97; SRMR = .05], but the model did not provide superior fit compared with the model without the direct path, $\chi^2_D(1) = 0.02$, $p = .89$. In addition, the direct effect was not significant, $\beta = -.02$, $p = .90$.

2.2.2.2. Model 2: Positive affect as a mediator of the effect of social anxiety on

attentional control: For model 2, in which positive affect served as a mediator of the relationship between social anxiety and attentional control, the model chi-square test with Bollen-Stine bootstrap was significant, $\chi^2(8) = 33.55$, $p < .001$. Thus, the exact-fit hypothesis was rejected. The CFI and SRMR both indicated poor model fit. In addition, the AIC value of 59.55 and BIC value of 93.93 are greater than the AIC and BIC values for model 1, which suggests that model 1 is preferable to model 2. Due to poor overall model fit, we did not further assess factor loadings, direct effects, or indirect effects of model 2.

2.2.2.3. Model 3: Social anxiety as a predictor of attentional control and positive affect:

For model 3, social anxiety was modeled to predict attentional control and positive affect, and the latter two variables were modeled to correlate. Results indicate good overall model fit. The model chi-square test with Bollen-Stine bootstrap was not significant, $\chi^2(7) = 13.77$, $p = .18$, and the CFI and SRMR both indicated good overall model fit, CFI = .97, SRMR = .05.

The AIC and BIC values for model 3 were greater than those for model 1 and less than those for model 2, suggesting intermediate model fit. As compared with the hypothesized model, this model provided only slightly inferior model fit. Standardized factor loadings were similar to model 1, with strong loadings for the social anxiety factor, SIAS: 0.92, SPS: 0.79, PRCA: 0.79, and attentional control factor, ACS-Focusing: 0.57, ACS-Shifting: 0.89. The direct effect of social anxiety on attentional control was also similarly negative and significant, $\beta = -.57, p = .02$. The direct effect of social anxiety on positive affect was significant and negative, $\beta = -.28, p = .01$, and attentional control and positive affect were significantly positively correlated, $r = .39, p < .001$.

2.2.2.4. Comparison of models after controlling for depression: Additional analyses were conducted to examine the study hypotheses after statistically controlling for the effects of depression. Depressive symptoms, as measured with the BDI-II, were modeled to predict each of the latent factors and the manifest positive affect variable, in tests of all three models. Results were consistent with those presented above. Models 1 and 3 provided adequate overall fit. Both models had a significant model chi-square [model 1: $\chi^2(11) = 21.47, p = .03$; model 3: $\chi^2(10) = 21.09, p = .02$], which suggests poor model fit, but the remaining fit indices indicated good model fit [model 1: CFI = .96, SRMR = .05; model 3: CFI = .96, SRMR = .05]. Results for model 2 indicated poor overall model fit, $\chi^2(11) = 37.03, p < .001$, CFI = .90, SRMR = .12. In comparing model fit, results were again consistent with those reported above: model 1 provided best overall model fit, AIC = 55.47, BIC = 100.43, closely followed by model 3, AIC = 57.09, BIC = 104.68, followed by model 2, AIC = 71.03, BIC = 115.99.

For model 1, controlling for depressive symptoms, factor loadings were high for the social anxiety factor (i.e., $>.80$) and adequate for the attentional control factor (i.e., $>.56$). Path coefficients were similar to those within the model not including depression as a covariate. Specifically, social anxiety was significantly negatively associated with attentional control, $\beta = -.50, p = .04$, attentional control was significantly positively associated with positive affect, $\beta = .38, p = .01$, and the indirect effect of social anxiety on positive affect remained significant, $\beta = -.19, p = .04$, percentile method 95% CI $[-.43, -.11]$, bias-corrected percentile method 95% CI $[-.44, -.12]$.

2.3. Discussion

Accumulating evidence suggests that social anxiety is associated with diminished positive affect, yet little research to date has examined the mechanisms through which this relationship occurs. The results of the present structural regression analyses indicate that the inverse relationship between social anxiety and positive affect is mediated in part by attentional control. Specifically, in an unselected sample, a latent social anxiety factor negatively predicted an attentional control latent factor, which itself positively predicted state positive affect. Moreover, this mediation was robust after statistically controlling for the effects of depressive symptoms, suggesting specificity of this mediational path to social anxiety.

The aforementioned mediational model was compared to two theoretically-grounded equivalent models. In the first comparison model, state positive affect served as the mediator in the relationship between the latent social anxiety factor and latent attentional control factor. This model was grounded in the extensive literature demonstrating the beneficial effects of positive affective states on attentional broadening and flexibility (Fredrickson, 2001). Overall fit of this comparison model was poor, and comparison statistics suggested the hypothesized model was preferable to this comparison model. A second comparison model displayed moderate to good overall model fit, but it was inferior to the hypothesized model when comparing fit statistics. In this second comparison model, social anxiety was modeled to predict positive affect and attentional control and the latter two variables were allowed to correlate. Comparison of the hypothesized model with this final model allowed for a stricter test of relationships among the three constructs, given that the two outcome variables were permitted to be related but no structure was imposed on the relationship.

Among the strengths of this study were the statistical approach, specificity of the findings, and comparison to theoretically-grounded equivalent models. Specifically, we used a partially latent structural regression model. Use of latent constructs for social anxiety and attentional control effectively removed measurement error associated with these constructs. In addition, structural equation modeling of the mediational path allowed for a test of the overall model fit, rather than simply examining the significance of the constituent paths. A second strength is the specificity of the finding to social anxiety. Because depression is defined in part by anhedonia and depression and social anxiety are highly related, we statistically controlled for depressive symptoms in additional analyses. This is a conservative approach and only appropriate if the variance that remains after covarying out depressive symptoms continues to represent good construct validity for social anxiety (Miller & Chapman, 2001). Even after partialling out the variance due to depressive symptoms, the hypothesized model achieved good overall fit and the indirect path from social anxiety to positive affect was significant.

Despite these strengths, Study 1 has several limitations. Sample size was small, though arguably adequate, for structural equation modeling analyses. Data were also collected in a cross-sectional design, which precludes the assertion of causality.

3. Study 2

In Study 2 we sought to replicate and extend the results of Study 1 by using a longitudinal design with three assessment points. Social anxiety, attentional control, and positive affect were assessed via self-report questionnaires and analyzed using univariate regression analyses. The proposed mediational model was again compared to the theoretically-grounded equivalent mediational model in which positive affect served as the mediator and attentional control the outcome. Positive affect and attentional control were both measured at the second and third assessment points, thus allowing for examination of temporal precedence in both the proposed and comparison model. In this second study, we also sought to examine whether the proposed mediation was stronger for social interaction versus social performance anxiety given previous findings differentiating their relationships to positive affect (Hughes et al., 2006).

3.1. Method

3.1.1. Participants—Participants were 50¹ undergraduate students from Temple University who took part in a longitudinal study of the effects of attention bias and attentional control on the development of social anxiety disorder during first year in college. Participants were included if they were entering their first year of college immediately after having graduated high school. Eligible participants were required to score in either the low (i.e., 22–31, the 5th–25th percentile) or high (i.e., 40–49, the 60th–85th percentile) range on a measure of fear of negative evaluation, the Brief Fear of Negative Evaluation Scale (BFNE; Leary, 1983), described below. Because one of the purposes of the larger study of attention bias and attentional control was to predict a diagnosis of SAD at the end of the first year in college, the high and low BFNE groups were matched at screening on trait anxiety so that psychiatric status was not confounded with BFNE group. Trait anxiety was assessed with the trait form of the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), which assesses both trait anxiety and depression symptoms (Bieling, Antony, & Swinson, 1998). For inclusion, participants were also required to be fluent in English, right-handed, and have normal or corrected vision.

Participants were excluded if they met diagnostic criteria for SAD as determined by the appropriate module of the Anxiety Disorders Interview Schedule for DSM-IV (Brown, DiNardo, & Barlow, 1994). Additional exclusion criteria included (1) current use of psychotropic or other medications known to influence neuroendocrine responding, (2) history of epilepsy or head trauma, (3) history of psychiatric hospitalization, (4) current or past use of psychotropic medications for anxiety or depression, and (5) current or past psychotherapy, consisting of five or more sessions focused primarily on the treatment of anxiety and/or depression. Participants were not excluded on the basis of any demographic variables. The sample was young, primarily female, and in their first year of college (mean age = 19.04, $SD = 0.20$; 74% female). The sample was also predominantly Caucasian (72% Caucasian or white, 8% African-American or black, 12% Asian, 2% Hispanic, 2% Native Hawaiian or Pacific Islander, 4% Other). Participants were given the option to receive partial course credit or compensation of \$10 per hour of participation for all portions of the study.

3.1.2. Measures—The SIAS-S, SPS, ACS, and BDI-II are described in Section 2.1.2. Internal consistency was adequate for the SIAS-S ($\alpha = .91$), SPS ($\alpha = .87$), Time 2 ACS ($\alpha = .84$), Time 3 ACS ($\alpha = .87$), and BDI-II ($\alpha = .83$).

3.1.2.1. Brief fear of negative evaluation scale (BFNE): The 12-item BFNE (Leary, 1983) assesses the degree to which people experience apprehension at the prospect of being evaluated negatively, using a 5-point Likert-type rating scale. The BFNE was used in the current study as a screener for participants at high and low risk for developing SAD. Internal consistency was high ($\alpha = .87$).

¹A total of 75 participants initiated the larger study. Two of these participants met diagnostic criteria for SAD at the Time 1 assessment so were excluded from further participation. Of the remaining 73, 53 participated in the Time 2 assessment and 53 participated in the Time 3 assessment. A total of 51 individuals participated in all three assessment points. One of these participants did not complete the PANAS-X at Time 3 and was dropped from the current analyses.

3.1.2.2. State-Trait Anxiety Inventory–Trait form (STAI-T): The STAI-T (Spielberger et al., 1983) is a 20-item scale designed to assess general levels of anxiety. Items are in Likert-type format and are scored on a scale ranging from 1 (*Almost Never*) to 4 (*Almost Always*). The STAI-T was used in the present study to match participants in the high and low BFNE groups to reduce the likelihood that the high BFNE group would be more vulnerable to the development of SAD due to general psychiatric status. This screening procedure resulted in two groups of participants that matched one another on general measures of anxiety and depression. The STAI-T has demonstrated adequate psychometric properties (Spielberger et al., 1983). Internal consistency in the current sample was also adequate ($\alpha = .83$).

3.1.2.3. Positive and Negative Affect Schedule–expanded form (PANAS-X): The PANAS-X (Watson & Clark, 1994) is an expanded version of the PANAS. The PANAS-X assesses the two original higher order scales, in addition to 11 specific affects. Participants were instructed to rate each of the 60 affect items to “the extent you have felt this way during the past few weeks.” For the present analyses, we computed the general positive affect total score by summing responses for the 10 items of that scale, which are identical to those from the original PANAS-PA scale (i.e., active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong). Internal consistency was high for both Time 2 and Time 3 (α 's = .89).

3.1.3. Procedure

3.1.3.1. Screening: During the summer prior to matriculation, incoming freshmen were invited via email to complete an online survey, which consisted of the BFNE, STAI-T, and items assessing other inclusion/exclusion criteria. Participants provided informed consent stating that they may be contacted to participate in future portions of the study. Participants who satisfied selection criteria were invited via email to complete a diagnostic interview for SAD at the laboratory.

3.1.3.2. Time 1: The Time 1 assessment occurred during the first month of the fall semester. At time of participation, the experimenter reviewed the consent form with each participant and answered any questions. Participants then completed a diagnostic interview for SAD. Those meeting diagnostic criteria were compensated for their time and excluded from the remainder of the study. Remaining participants completed several computerized measures of attentional processing, not included in the current analyses, followed by a battery of self-report questionnaires, including those in the current analyses. Experimenters remained blind to participant BFNE group for the duration of the study.

3.1.3.3. Time 2: Approximately 3–4 months after Time 1, participants were invited via email to return to the laboratory to participate in the second assessment. Participants completed a video-taped speech task followed by a battery of self-report questionnaires assessing anxiety, depression, attentional control, and positive affect.

3.1.3.4. Time 3: Approximately 6–7 months after Time 1, during the spring semester, participants were invited to return to the laboratory to participate in the final assessment.

Participants first completed the same video-taped speech task, followed by the same battery of self-report measures as Time 2, and finally the diagnostic interview for SAD.

3.1.4. Analysis strategy—We used simple mediation to test the hypothesized and comparison models. Participants in the high and low BFNE groups were analyzed together given that (1) they were matched on trait anxiety and depression and (2) total sample distributions of the SIAS-S and SPS did not violate normality (including the assumption of being unimodal). In the hypothesized model, Time 1 social anxiety (X) was modeled to influence Time 3 positive affect (Y) directly as well as indirectly through the single mediator variable, Time 2 attentional control (M). In the comparison model, Time 1 social anxiety (X) was modeled to influence Time 3 attentional control (Y) directly as well as indirectly through the single mediator, Time 2 positive affect (M). Two sets of analyses were conducted to examine these relationships with either social interaction anxiety (SIAS-S) or fear of public scrutiny (SPS) as the predictor.

We used a two-step process to determine mediation. First, we followed Baron and Kenny's (1986) steps for the demonstration of mediation, in which relationships must be shown between X and Y , X and M , and M and Y . In a final regression, M is included as a covariate in regressing Y on X . Full mediation is inferred if X no longer achieves significance in predicting Y , whereas partial mediation is inferred if the effect of X on Y is reduced considerably but still achieves statistical significance. If partial or full mediation was demonstrated, we examined the percentile based bootstrap confidence intervals (with $N = 10,000$ resamples) (see Preacher & Hayes, 2004, 2008). Statistical significance was determined at the $p < .05$ level if the 95% confidence interval of the indirect effect point estimate did not contain zero. Bootstrapping is preferred to the Sobel test because it makes fewer assumptions about the shape of the sampling distribution of the indirect effect and is more powerful (e.g., MacKinnon, Lockwood, & Williams, 2004).

Analyses were conducted using Hayes' (2012) SPSS PROCESS macro, Model 4. With the PROCESS macro, a single command produces estimates of direct and indirect effects using ordinary least squares (OLS) regression, in addition to percentile-based bootstrap confidence intervals for indirect effects. In the PROCESS macro, the direct and indirect effects of X are derived from two linear models, one estimating M from X and a second estimating Y from both X and M (see e.g., Baron & Kenny, 1986; Preacher & Hayes, 2004).

4. Results

Table 4 presents descriptive statistics for the measured variables. Prior to analysis, data were screened for violation of statistical assumptions.

4.1.1. Hypothesized model

4.1.1.1. Social interaction anxiety as predictor: Examination of Time 2 attentional control as a mediator of the relationship between Time 1 social interaction anxiety and Time 3 positive affect revealed evidence of full mediation. All of the initial Baron and Kenny steps were fulfilled. When attentional control was included in the regression predicting positive affect, the effect of social interaction anxiety was reduced by 41.9% and became

nonsignificant (see Table 5). Bootstrapping procedures confirmed that the indirect effect of social interaction anxiety on positive affect via attentional control was significant, 95% CI $[-.29, -.04]$. An additional analysis controlling for Time 1 depression reduced the relationship between Time 1 social interaction anxiety and Time 3 positive affect, $coeff = -.09$, $t(48) = 0.88$, $p = .38$. However, the indirect effect of social interaction anxiety on positive affect remained significant, 95% CI $[-.20, -.01]$ (Table 6).

4.1.1.2. Public scrutiny fear as predictor: With Time 1 public scrutiny fear as the predictor, the Baron and Kenny steps were not quite satisfied. Time 1 scrutiny fear predicted lower Time 2 attentional control, $coeff = -.35$, $t(48) = 2.79$, $p < .01$. However, the association between Time 1 scrutiny fear and Time 3 positive affect was not significant, $coeff = -.24$, $t(47) = 1.94$, $p > .05$, thus we did not proceed to examining the effect of Time 2 attentional control as a covariate.

4.1.2. Comparison model

4.1.2.1. Social interaction anxiety as predictor: In the first step of evaluating Time 2 positive affect as a mediator of the relationship between Time 1 social interaction anxiety and Time 3 attentional control, not all Baron and Kenny steps were fulfilled. Time 1 social interaction anxiety predicted lower Time 3 attentional control, $coeff = -.41$, $t(48) = 3.70$, $p < .001$; however, it did not significantly predict Time 2 positive affect, $coeff = -.20$, $t(48) = 1.72$, $p > .05$. In addition, when Time 2 positive affect was included as a covariate, the effect of Time 1 social interaction anxiety on Time 3 attentional control remained significant, $coeff = -.36$, $t(47) = 3.24$, $p < .01$.

4.1.2.2. Public scrutiny fear as predictor: Results with Time 1 scrutiny fear as predictor were similar to those for social interaction anxiety. Time 1 scrutiny fear predicted lower Time 3 attentional control, $coeff = -.41$, $t(48) = 3.20$, $p < .01$. As with social interaction anxiety, Time 1 scrutiny fear did not significantly predict Time 2 positive affect, $coeff = -.14$, $t(48) = 1.11$, $p = .27$.

5. Discussion

Results of Study 2 largely replicated the findings of Study 1 using a longitudinal design with three assessment points. Specifically, in a sample of first-year undergraduate students with high and low levels of fear of negative evaluation, regression analyses indicated that Time 1 social interaction anxiety negatively predicted attentional control assessed 3–4 months later, which itself positively predicted positive affect assessed approximately 3–4 months after that. As was the case in Study 1, this mediation remained significant after statistically controlling for the effects of Time 1 depressive symptoms, providing further support for the specificity of this mediational path to social anxiety. A second set of analyses examined public scrutiny fear as the predictor. Although the expected relationship between Time 1 scrutiny fear and Time 2 attentional control was observed, the negative relationship between Time 1 scrutiny fear and Time 3 positive affect did not achieve significance. Therefore, because the direct effect was not significant, we could not examine the indirect effect of attentional control.

A theoretically-grounded equivalent model was also tested in which Time 2 positive affect served as the mediator in the relationship between Time 1 social anxiety and Time 3 attentional control. Results of these analyses suggested that neither Time 1 social interaction anxiety nor Time 1 scrutiny fear predicted Time 2 positive affect, thus precluding the examination of mediation. These results support the conclusions of Study 1 which preferred the mediation of the effect of social anxiety on positive affect via attentional control to the comparison mediation model.

6. General discussion

In a series of two studies, attentional control mediated the relationship between social anxiety and reduced positive affect, first in a cross-sectional design with the use of partially latent structural equation modeling (Study 1) and then in a longitudinal design with three assessment points (Study 2). In both studies, the mediated relationship between social anxiety and positive affect via attentional control remained significant after statistically controlling for depressive symptoms. In addition, in Study 2, the proposed mediation held for social interaction anxiety as predictor but not for scrutiny fear as predictor, suggesting a stronger mediational path for social interaction anxiety. This final finding is consistent with a study of the tripartite model of anxiety and depression in individuals with SAD. Hughes et al. (2006) reported that, when controlling for general distress, social interaction anxiety was more strongly associated with the low positive affect factor whereas performance anxiety was more strongly related to the physiological hyperarousal factor. Consistent with this finding, the current results provide further evidence for the diversity of symptoms subsumed under SAD.

The converging findings support emerging theoretical accounts that attempt to explain the relationship between social anxiety and diminished positive affect. At least two lines of research provide support for the supposition that poor attentional control mediates this relationship. In both accounts, the cognitive, emotional, and physiological effects of social anxiety lead to reductions in the limited capacity self-regulatory systems. Kashdan (2007) specifically proposes that reductions in self-regulatory functioning, including the attentional system, may have detrimental effects on interpersonal functioning, which may reduce the quality of social interactions, which are an important factor in generating and maintaining positive affectivity. In a second line of research, namely the information processing approach, anxiety is purported to reduce the influence of the goal-directed, executive attentional system. Attentional control is conceptualized herein and elsewhere as a sub-process of the executive attentional system involved in the effortful shifting and focusing of attention. This reduction in effortful control of attention is purported to be accompanied by an increase in the influence of the stimulus-driven attentional system (e.g., Eysenck et al., 2007). The result is that attention is more easily captured by threat-relevant information in the environment, a phenomenon that has recently been shown to be causally involved in maintenance of excessive anxiety (e.g., Amir et al., 2009). Moreover, preferential allocation of attention to social threat in social anxiety appears to be coupled with biased attention away from positive stimuli (e.g., Chen et al., 2002; Pishyar et al., 2004). This latter finding suggests that impairment of the attentional control system may contribute to diminished positive affect via interruption of the encoding of positive information.

Future research on mediational variables in the relationship between social anxiety and diminished positive affect would benefit from examining longer longitudinal intervals and larger sample sizes than those in our Study 2. Future research would also benefit from the use of experimental procedures in which attentional control is manipulated and its effect on positive affect measured. The results of our studies also speak largely to unselected individuals. Some high BFNE group participants in Study 2 met diagnostic criteria for SAD by the Time 3 assessment; however, there were too few individuals with SAD to compare mediational paths in this subsample to the other participants. Therefore, replication in a sample of individuals with SAD is necessary. However, some evidence suggests that the current findings may hold for clinical samples, given that the findings of diminished positive affect has been shown across the spectrum of social anxiety symptoms, with findings more robust in clinical samples (Kashdan, 2007). Another limitation is the use of self-report measures. Future research would likely benefit from the use of behavioral assessments, for example, to test the hypothesis that the relationship between reduced attentional control and diminished positive affect is mediated by interpersonal behavior. Also, attentional control is one construct for which there are multiple computerized tasks that may provide more fine-grained assessments than self-report.

Findings in the extant literature on diminished positive affect and fewer positive experiences in social anxiety suggest that the focus of research on social anxiety be expanded to include the realm of positive psychological functioning. In the present study, attentional control, a self-regulatory construct that is involved in an array of cognitive, emotional, and behavioral processes, mediated the relationship between social anxiety and diminished positive affect. By reaching a better understanding of the mechanisms through which social anxiety leads to reduced positive affect, we may be able to inform psychosocial interventions to better target specific pathways to enhance the healthy psychological functioning of individuals with social anxiety disorder.

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Fig. 1.

Partially latent structural regression model of attentional control as a mediator of the effect of social anxiety on positive affect (SIAS-S = Social Interaction Anxiety Scale Straightforward Item Total; SPS = Social Phobia Scale; PRCA = Personal Report of Communication Apprehension; ACS = Attentional Control Scale; PANAS-PA = Positive and Negative Affect Schedule, Positive Affect subscale).

Table 1

Descriptive statistics for the measured variables in Study 1.

Variable	N	Mean	SD	Skewness	Kurtosis
SIAS-S	112	17.06	13.30	0.78	-0.26
SPS	112	13.95	12.39	1.39	1.72
PRCA	110	63.04	18.70	-0.11	-0.39
ACS total score	106	51.29	8.00	0.46	0.12
ACS-Focusing subscale	107	23.22	4.89	0.00	-0.14
ACS-Shifting subscale	108	26.02	4.44	0.56	0.42
PANAS-PA	110	29.10	8.17	-0.11	-0.37
BDI-II	112	8.91	8.39	1.76	5.68

Note. SIAS-S—Social Interaction Anxiety Scale, straightforward item total; SPS—Social Phobia Scale; PRCA—Personal Report of Communication Apprehension; ACS—Attentional Control Scale; PANAS-PA—Positive and Negative Affect Schedule, Positive Affect Total; BDI-II—Beck Depression Inventory-II.

Table 2

Zero-order correlations among the measured variables in Study 1.

	SIAS-S	SPS	PRCA	ACS-Focus	ACS-Shift	PANAS-PA
SIAS-S						
SPS	.73***					
PRCA	.71***	.60***				
ACS-Focus	-.29**	-.32**	-.40***			
ACS-Shift	-.45***	-.31**	-.50***	.51***		
PANAS-PA	-.25*	-.18	-.28**	.20*	.43***	
BDI-II	.45***	.46***	.31**	-.30**	-.31**	-.35***

Note. SIAS-S—Social Interaction Anxiety Scale, straightforward item total; SPS—Social Phobia Scale; PRCA—Personal Report of Communication Apprehension; ACS-Focus—Focusing Subscale of the Attentional Control Scale; ACS-Shift—Shifting Subscale of the Attentional Control Scale; PANAS-PA—positive item total of the Positive and Negative Affect Schedule.

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

Table 3

Fit statistics for three structural regression models explaining the association between social anxiety, attentional control, and positive affect.

Index	Model 1	Model 2	Model 3
χ^2_M	13.79	33.55 **	13.77
df _M	8	8	7
SRMR	.05	.17	.05
CFI	.98	.89	.97
AIC	39.79	59.55	41.77
BIC	74.17	93.93	78.79

Note. Model 1—Attentional control as a mediator of the relationship between social anxiety and positive affect; Model 2—Positive affect as a mediator of the relationship between social anxiety and attentional control; Model 3—Social anxiety predicting attentional control and positive affect, with attentional control and positive affect allowed to correlate; χ^2_M —Model chi-square; df_M = degrees of freedom for model chi-square; SRMR—Standardized Root Mean Square Residual; CFI—Comparative Fit Index; AIC—Akaike Information Criterion; BIC—Bayesian Information Criterion;

*
 $p < .05$;

**
 $p < .01$;

 $p < .001$.

Table 4

Maximum likelihood estimates with bootstrapped standard errors for the structural regression model of attentional control mediating the effect of social anxiety on positive affect.

Parameter	Unstandardized	SE	Standardized
<i>Factor loadings</i>			
<i>Social anxiety factor</i>			
SIAS-S	1.00 ^a	—	.92
SPS	.81***	.10	.79
PRCA	1.22***	.21	.79
<i>Attentional control factor</i>			
ACS-Focusing	1.00 ^a	—	.57
ACS-Shifting	1.46***	.47	.89
<i>Direct effects</i>			
Social Anxiety→Attentional Control	-.13*	.05	-.57
Attentional Control→Positive Affect	1.39***	.42	.47
<i>Indirect effects</i>			
Social Anxiety→Positive Affect	-.18*	.07	-.27
<i>Measurement error variances</i>			
SIAS-S	27.79**	10.51	.16
SPS	57.06***	10.34	.38
PRCA	130.42***	23.59	.38
ACS-Focusing	15.11***	2.50	.68
ACS-Shifting	4.24	2.77	.22
<i>Disturbance variances</i>			
Social Anxiety	142.41***	25.36	1.00
Attentional Control	4.83**	1.77	.67
Positive Affect	49.19***	7.45	.78

Note. SE—bootstrapped standard errors; SIAS-S—Social Interaction Anxiety Scale, straightforward item total; SPS—Social Phobia Scale; PRCA—Personal Report of Communication Apprehension; ACS-Focusing—Focusing Subscale of the Attentional Control Scale; ACS-Shifting—Shifting Subscale of the Attentional Control Scale; Positive Affect—positive items of the Positive and Negative Affect Schedule. Standardized estimates for measurement errors and disturbance variances are proportions of unexplained variance.

^aNot tested for statistical significance.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Descriptive statistics for the measured variables ($N = 50$) in Study 2.

Variable	Mean	SD	Skewness	Kurtosis
BFNE (screener)	22.70	6.71	−0.48	−1.10
STAI-T (screener)	41.88	7.34	−0.01	−1.18
Time 1 SIAS-S	19.06	9.83	0.16	−0.93
Time 1 SPS	14.78	8.84	0.58	−0.54
Time 2 ACS	52.08	8.27	0.17	−0.31
Time 3 ACS	51.30	8.55	0.28	1.15
Time 2 PANAS-X PA	29.76	8.04	0.47	0.11
Time 3 PANAS-X PA	28.12	7.81	0.41	−0.16
Time 1 BDI-II	7.80	5.47	0.59	−0.42

Note. BFNE—Brief Fear of Negative Evaluation Scale; STAI-T—State-Trait Anxiety Inventory, Trait Form; SIAS-S—Social Interaction Anxiety Scale, straightforward item total; SPS—Social Phobia Scale; ACS—Attentional Control Scale total score; PANAS-X PA—Positive and Negative Affect Schedule, Extended Form, General Positive Affect Total; BDI-II—Beck Depression Inventory-II.

Table 6

OLS regression results for simple mediation with social interaction anxiety as a predictor of positive affect in Study 2.

Model	Coeff	SE	t	p	R ²	F	p
$X \rightarrow Y$					.15	8.38	.01
Constant	33.97	2.27	14.98	<.001			
SIAS-S	-.31	.11	2.90	.006			
$X \rightarrow M$					.21	12.57	<.001
Constant	59.38	2.31	25.67	<.001			
SIAS-S	-.38	.11	3.54	<.001			
$X \rightarrow Y(M)$					.25	7.69	.001
Constant	14.23	8.27	1.72	.09			
T1 SIAS-S	-.18	.11	1.59	.12			
T2 ACS	.33	.13	2.47	.02			

Note. X = Time 1 social interaction anxiety; Y = Time 2 attentional control; SIAS-S = Social Interaction Anxiety Scale Straightforward Item Total; ACS = Attentional Control Scale.