



Published in final edited form as:

Clin Psychol (New York). 2000 March ; 7(1): 3–16.

Treatment of Social Phobia: Potential Mediators and Moderators

Stefan G. Hofmann, Ph.D.

Department of Psychology, Boston University

Abstract

Although the efficacy of numerous psychosocial interventions for social phobia has been clearly demonstrated, little is known about the mediators and moderators of treatment change. Three potential mediators are discussed that are derived from prominent psychological theories: negative cognitive appraisal (estimated social costs), perceived self-efficacy (perceived social skills), and perceived emotional control. Furthermore, the generalized subtype of social phobia and the additional diagnosis of avoidant personality disorder are considered as potential treatment moderators.

Keywords

Social phobia; Mediators; Moderators; Avoidant Personality Disorders; Subtypes; Emotion theory

Treatment of Social Phobia: Potential Mediators and Moderators of Change

Recent data from the National Comorbidity Survey indicate that social phobia is the third most common mental disorder with a lifetime prevalence of 13.3% (Kessler et al., 1994). Some individuals report an onset of their social phobia in early childhood or their mid-teens, while others seem to develop the disorder after a stressful or humiliating experience (American Psychiatric Association, 1994). The disorder often follows a chronic course (Amies, Gelder, & Shaw, 1983; Marks, 1970; Öst, 1987), and results in substantial impairments in vocational and social functioning (Davidson, Hughes, George, & Blazer, 1993; Liebowitz, Gorman, Fyer, & Klein, 1985; Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992; Schneier et al., 1994; Stein, Walker, & Forde, 1996) leading to significant direct and indirect costs to the nation in medical resources used for care, treatment, rehabilitation, and reduced or lost productivity (Hofmann & Barlow, 1999).

Fortunately, a number of effective treatments are available to those who are suffering from this debilitating disorder, including cognitive techniques, exposure treatments, and social skills training (e.g., Heimberg et al., 1990; Heimberg, Salzman, Holt, & Blendell, 1993; Mattick & Peters, 1988; Turner, Beidel, Cooley, Woody, & Messer, 1994; Turner, Beidel, & Cooley-Quille, 1995). Of those interventions, group cognitive behavior therapy for social phobia (Heimberg et al., 1990; Mattick & Peters, 1988) has been included into a list of empirically validated treatments by the Division 12 Task Force on Promotion and Dissemination of Psychological Procedures of the American Psychological Association (Chambless et al., 1996). However, all published treatment outcome studies on social phobia have been based on cross-sectional assessments which simply demonstrate good maintenance of gains *on average* following such interventions. Little is known about the course of each individual's symptoms following treatment completion. For example, Brown and Barlow (1995) found that only 27% of panic patients who completed an 11 week course of CBT met criteria for high endstate functioning at both 3 and 24 months after completing 11 weeks of CBT, although on

the average 40% of subjects met criteria for high endstate functioning at 3 months posttreatment and 57% at 24 months posttreatment. It is therefore possible that social phobic patients show a similar fluctuating posttreatment course.

Furthermore, very little is known about the actual active treatment ingredients. Exposure, cognitive intervention, and social skills training are frequently applied techniques, although different treatment protocols greatly vary in their emphasis of these components. This raises important questions about the mechanism of action (i.e., the mediators) and the predictors of treatment outcome (i.e., the moderators).

Mediators of change are those characteristics of the individual that are changed by the treatment and that, in turn, produce the observable treatment effects. A mediator is “the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest” (Baron & Kenney, 1986, p. 1173). For a variable to be a mediator, it must therefore covary with variables indicating therapeutic change, and, if the variable is unique to a given treatment modality, it must also evidence relative specificity of change (Hollon, Evans, & DeRubeis, 1990). Moderators of change, on the other hand, are variables that are predictive of treatment outcome and that affect the degree of association between predictor and criterion variable. Baron and Kenny (1986) define a moderator as a “variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable” (p. 1174).

The goal of the present article is to identify and critically discuss a number of potential mediators and moderators of change in the treatment of social phobia. I will discuss three potential mediators that are derived from some of the most influential theoretical models in clinical psychology, each placing a different emphasis on the cognitive, behavioral, and physiological aspect of anxiety (Lang, 1993). These models include the cognitive-behavioral view of anxiety, the self-efficacy theory, and models of psychopathology emphasizing the importance of perceived emotional control. The three mediators that are based on these models include: (1) negative cognitive appraisal (estimated social costs); (2) perceived self-efficacy (perceived social skills); and (3) perceived emotional control¹. Moreover, I will discuss the generalized social phobia subtype and the additional diagnosis of avoidant personality disorder (APD) as potential moderators of change in the treatment of social phobia. Following a critical review of literature, I will discuss the validity of these variables and the scientific value of the underlying psychological theories.

Mediators of Change

Negative Cognitive Appraisal (Estimated Social Costs)

One of the most popular mediation hypotheses is that certain changes in cognitive schemata account for therapeutic changes. This has mainly been studied in depression (Evans & Hollon, 1988; Barber, & DeRubeis, 1989; Hollon et al., 1990; Whisman, 1993). Similarly, researchers in anxiety disorders believe that effective psychotherapy either directly modifies the patient’s irrational beliefs, or deactivates them while making other schemata available (e.g., Clark, 1986). According to this model, social phobics believe that they are in danger of behaving in an inept and unacceptable fashion, and that such behavior would have disastrous consequences in terms of loss of status, loss of worth, and rejection (Clark & Wells, 1995; Rapee & Heimberg, 1997). This model would explain why, once a situation is perceived as holding the potential

¹Given the number of alternative theoretical views in clinical science, limiting the discussion to these three mediators is necessarily arbitrary and incomplete. Nevertheless, it may provide us with a theoretical framework to clarify the mechanism of action of psychosocial treatments which could further improve the efficacy and effectiveness of treatment for social phobia and other disorders.

for social evaluation, social phobic individuals become preoccupied with negative thoughts about themselves and the way other people perceive them.

Consistent with this model are the results from studies showing that socially anxious individuals believe that negative social events are more likely to occur than positive social events (Luckock & Salkovskis, 1988). Moreover, socially anxious people are typically preoccupied with negative self-evaluative thoughts during feared social situations (Stopa & Clark, 1993), and they show a decrease in self-focused attention after effective psychosocial treatment (Hofmann, in press; Wells & Papageorgiou, 1998; Woody, Chambless, & Glass, 1996). Socially phobic individuals tend to overestimate the visibility of their anxiety relative to the report of observers (Alden & Wallace, 1995; Bruch, Gorsky, Collins, & Berger, 1989; Clark & Arkowitz, 1975; McEwan & Devin, 1983), and assume that most people are inherently critical of others and are likely to evaluate them negatively (Leary, Kowalski, & Campbell, 1988). Furthermore, the belief system of socially anxious individuals appears to magnify the competitive aspects of interpersonal relationships but minimizes the cooperative, supportive aspects of them (Trower & Gilbert, 1989).

According to this model, therapeutic mediation occurs by changing patients' mental representation of the self in a more positive direction (Rapee & Heimberg, 1997), and by changing their beliefs that behaving in an inept and unacceptable fashion in a social situation will have disastrous consequences in terms of loss of status, loss of worth, and rejection (Clark & Wells, 1995). Similarly, a model proposed by Foa and Kozak (1986) suggests that treatment change is mediated by a reduction in the exaggerated probabilities and cost associated with the feared consequences. The model further states that, if the individual's fear structure is completely activated, exposure in the absence of negative consequences would alter the exaggerated probability estimates of harm typical to anxiety patients. Habituation of anxiety during exposure would then reduce inflated estimated cost if the person attributes the decline of his/her anxiety to characteristics of the social situation (e.g., "If I am not anxious, the situation cannot be so bad"). If during repeated role plays mild criticism ceases to evoke physiological arousal, then being criticized is no longer perceived by the patient as disastrous. The model predicts that exaggerated cost would be more likely to underlie social anxiety than elevated probability estimation for negative events.²

In an attempt to test Foa and Kozak's mediation hypothesis of change in the treatment of social phobia, Foa, Franklin, Perry and Herbert (1996) treated 15 generalized social phobic individuals with a modified version of Heimberg's CBGT (Heimberg et al., 1990). Before and after treatment, all patients and 15 nonanxious controls filled out the experimenter developed Probability/Cost Questionnaire (PCQ). The results were consistent with Foa and Kozak's hypothesis that social phobic subjects would exhibit specific judgmental biases for the costs of negative social events. Patients evidenced socially relevant judgmental biases prior to treatment which were attenuated following treatment. A decrease in both estimated costs and overestimation of the probability of negative social events was highly associated with posttreatment level of symptom severity. The relationship between estimated costs and posttreatment scores remained strong after controlling for change in estimated probabilities ($r = .76$). However, the partial correlation between social probability and posttreatment scores was considerably smaller when controlling for estimated costs ($r = .27$). Furthermore, appraisals of cost and probability of negative social events were highly correlated ($r = .74$), suggesting that estimated costs, as measured with the PCQ, were the best single predictor for treatment outcome based on Foa and Kozak's mediation model.

²Previous studies measured "probability estimation for negative events" by asking subjects to estimate the frequency of occurrence of a series of events, whereas "estimated social cost" was measured by having subjects rate how distressing it would be if the negative event would actually occur (e.g., Butler & Mathews, 1983; McNally & Foa, 1987; Foa et al., 1996).

This mediation model further predicts that cognitive therapy plus exposure should be superior to pure exposure therapy because cognitive interventions are aimed at changing dysfunctional cognitions directly and systematically (Butler, 1985; Butler, Cullington, Munby, Amies, & Gelder, 1984; Heimberg & Juster, 1995; Stopa & Clark, 1993; Clark & Wells, 1995). For example, Clark and Wells (1995) stated:

“The model [...] helps explain the relative ineffectiveness of exposure alone as a treatment for social phobia (Butler et al., 1984). In particular, it suggests that exposure often fails to lead to substantial cognitive change because patients are not really processing what is happening in the social situation, are engaging in safety behaviors that prevent disconfirmation, and are using their own impression of themselves as the main evidence for the idea that other people are negatively evaluating them” (p. 86).

This assumption, however, is not clearly supported by other studies. A number of review articles and meta-analyses showed that cognitive-behavioral treatment is not more effective than exposure therapy, which does not specifically address negative cognitive appraisals and probability overestimation (Feske & Chambless, 1995; Gould, Buckminster, Pollack, Otto, & Yap, 1997; Heimberg & Juster, 1995; Taylor, 1996; Turner, Cooley-Quille, & Beidel, 1996). For example, the meta-analysis by Gould and colleagues (1997) showed that exposure interventions yielded the largest effect size, whether alone ($ES = .89$) or in combination with cognitive restructuring ($ES = .80$). Similar results were reported by Feske and Chambless (1995) who also found no evidence of differential dropout or relapse rates between the two treatment modalities. Another meta-analysis by Taylor (1996) compared the effect sizes of cognitive treatments, exposure treatments, CBT, social skills training, placebo treatments, and waitlist control groups. The results showed that the effect size of the waitlist control group was significantly smaller than effect sizes of the different treatment conditions at post treatment. Only combined cognitive restructuring/exposure treatments produced effect sizes that were significantly larger than placebo controls. However, the effect sizes of the different treatment conditions did not differ significantly from one another.

To my knowledge, the literature reports seven controlled clinical studies in which investigators directly compared cognitive-behavior therapy (CBT) to exposure without explicit cognitive interventions (Butler et al., 1984; Emmelkamp, Mersch, Vissia, & van der Helm, 1985; Hope, Heimberg, & Bruch, 1995; Mattick & Peters, 1988; Mattick, Peters, & Clarke, 1989; Scholing & Emmelkamp, 1993a,b). In only two of the trials did the effects of CBT exceed those of exposure alone (Butler et al., 1984; Mattick & Peters, 1988). Moreover, a dismantling study conducted by Hope and colleagues (1995) suggested that exposure is more important than cognitive intervention in the treatment of social phobia. This study randomly assigned 40 individuals with social phobia to either Heimberg's CBGT group, an exposure condition without cognitive intervention, or a waitlist control group. As expected, individuals in both active treatments improved more than those in the wait-list control group. However, participants who received CBGT did not improve more than those who received exposure without cognitive intervention. In fact, individuals in the exposure-only condition improved even more than those who received CBGT on some measures.

However, some of these studies have to be interpreted with caution because of methodological limitations or other issues which question the external validity of the results. For example, Hope et al (1995) reported that CBGT was far less effective than in previous controlled trials, possibly due to disruptions in group processes caused by frequent treatment drop-outs. Emmelkamp et al. (1985) excluded any behavioral techniques from the cognitive interventions, and the study by Gelernter et al. (1991) combined exposure with a pill placebo.³

In summary, the literature suggests that both CBT and exposure are effective treatments for social phobia, and that there is no clear advantage of CBT over exposure alone. Both treatment

modalities seem to produce very similar pre/post and pre/follow-up effects for self-report measures of social phobia, cognitive symptoms, and depressed/anxious mood with no evidence of differential dropout or relapse rates. However, no firm conclusions can be drawn due to a number of methodological problems with the existing treatment outcome studies of social phobia. For example, exposure treatment and cognitive therapy are difficult to conduct in isolation. Unexpected positive experiences during exposure to fearful social situations inevitably changes the patient's beliefs and attitudes about a situation even without explicit cognitive-restructuring techniques. Furthermore, it is methodologically difficult to control for the number of treatment sessions and the amount of exposure the patient receives, especially if both therapies are conducted within the same amount of time. By adding cognitive techniques to an exposure-based intervention, less time is available for exposure as compared to "pure" exposure therapy. This problem has typically not been adequately addressed. A notable exception is the study by Glass et al. (1976) which compared different training programs for girl-shy male undergraduate and graduate students. The study included a "response-acquisition training" (consisting of role plays and coaching) a "cognitive self-statement modification training" (similar to cognitive therapy), and a combination of both training programs. In addition to a waiting-list control group, two enhanced-treatment groups (enhanced response acquisition and enhanced cognitive self-statement modification) were used to control for the longer training time of the combined-treatment group. The results showed a significant treatment effect but no length of treatment effect. Subjects who received cognitive self-statement modification showed better performance in role play situations and made more phone calls than individuals from the other groups. These effects were maintained at a 6 months follow up. Although these results are difficult to directly compare with contemporary treatment outcome studies on social phobia, the design used by Glass et al. could serve as a model for future research.

Perceived Self-Efficacy (Perceived Social Skills)

It has been suggested that increasing one's sense of competence in mastering a feared situation (i.e., perceived self-efficacy) is the single result of all successful anxiety reduction techniques (Bandura, 1977, 1983, 1984). Earlier versions of Bandura's theory assume that performance capabilities can be predicted independently from the person's anxiety state. For example, Bandura wrote:

"Perceived self-efficacy does not include anxiety in either the definition or the measuring device. Self-efficacy scales ask people to judge their performance capabilities and not if they can perform nonanxiously" (Bandura, 1984, p. 238).

This rather narrow definition of the self-efficacy theory has been criticized for a number of reasons. Borkovec (1978), for example, pointed out that self-efficacy is more likely to be a reflection of a behavioral change mechanism than to be the mediator of such change. Furthermore, performance capabilities alone often play little or no role in many anxiety disorders (Barlow, 1988). In fact, most social phobic people seem to possess the adequate social skills but are inhibited when it comes to applying them in social situations (Juster, Heimberg, & Holt, 1996). As a result of these and other criticisms, subsequent versions of the theory conceptualized self-efficacy more generally as a perceived ability to manage potential threats which also increases the sense of predictability and controllability of anxiety-provoking events (Bandura, 1986).

³One of the reviewers pointed out that the best-controlled studies seem to show a slight advantage in favor of the combined treatment. Moreover, this reviewer suggested that cognitive techniques may reduce the amount of time necessary for exposure which, however, has not been studied systematically.

Numerous studies have provided some evidence for perceived self-efficacy (in its broader definition) as a potential mediator of exposure therapy. For example, Williams and colleagues (Williams, Dooseman, & Kleifield, 1984; Williams, Kinney, & Falbo, 1989; Williams, Turner, & Peer, 1985) presented data suggesting that perceived self-efficacy predicts therapeutic outcome more accurately than arousal during treatment, anticipated danger, or perceived danger in specific phobia and agoraphobia. In addition, Williams et al. (1989) found that perceived self-efficacy was the most accurate predictor of therapeutic change regardless of whether the phobia was targeted or not. Williams et al. interpreted their findings as supporting evidence for the view that agoraphobia is maintained by low perceptions of self-efficacy, and agoraphobic dysfunctions are alleviated by raising people's perception of self-efficacy.

The perception of one's social skills and abilities appears to be an important component of perceived self-efficacy in social phobia. Although it remains uncertain whether socially anxious individuals are in fact deficient in any of their social skills (Halford & Foddy, 1982; Hofmann, Gerlach, Wender, & Roth, 1997; Stopa and Clark, 1993; Clark & Arkowitz, 1975; Glasgow & Arkowitz, 1975; Rapee & Lim, 1992), they do tend to appraise their own performance in social situations more negatively than nonanxious individuals, even when actual differences in performance are accounted for (Alden & Wallace, 1995; Glasgow & Arkowitz, 1975; Rapee & Lim, 1992; Stopa & Clark, 1993). Possibly as a result of this, socially anxious individuals frequently doubt their ability to create desired impressions on others (Wallace & Alden, 1995), and they expect their performance to fall short of other people's expectations of them (Alden & Wallace, 1991; Wallace & Alden, 1991, 1997). Therefore, it has been suggested that social anxiety arises in social situations when people desire to make a particular impression on others but doubt that they will be able to do so (Leary & Kowalski, 1995). If, as a result of treatment, patients perceive their social skills as improved, or as better than they originally thought, social situations would then appear less threatening and dangerous due to an increased sense of control over the situation. Consequently, patients become more confident and less fearful of future social situations following psychosocial intervention if treatment enhances the patient's perceived social skills to manage social threat. This would explain the findings by Newman and colleagues which showed that after exposure therapy, patients showed less anxiety and rated themselves as better speakers, although they did not objectively show better social performance than individuals from a waitlist control group (Newman, Hofmann, Trabert, Roth, & Taylor, 1994).

Although these studies provide some indirect evidence for the validity of perceived self-efficacy, and in particular for perceived social skills, as a potential mediator of treatment change, no attempt has been made to directly test the predictions of this model. Strong corroborating data for this model would come from well-controlled studies showing that treatment changes in perceived social skills are related to changes in social anxiety independent of the person's actual social skills or any other variables. In addition, it still remains uncertain whether there are, in fact, subgroups of social phobic individuals who lack social skills. Although social skills training seems to be effective in reducing social anxiety (Stravynski, Marks, & Yule, 1982; Stravynski, Grey, & Elie, 1987), there is no clear evidence to suggest that it is more effective than exposure therapy or cognitive-behavior therapy for any social phobia subgroup, including those who were judged to have poor social skills (Wlazlo, Schroeder-Hartwig, Hand, Kaiser, & Münchau, 1990; Mersch, Emmelkamp, Bögels, & van der Sleen, 1989; Mersch, Emmelkamp, & Lips, 1991).

Perceived Emotional Control

Emotional disorders are frequently associated with a perception of a lack of control over aversive events (Alloy, Abramson, & Viscusi, 1981; Barlow, 1988; 1991; Lang, 1985), which can result in subjective, behavioral, and physiological distress (Geer, Davison, & Gatchel,

1970; Glass & Singer, 1970; Sanderson, Rapee, & Barlow, 1989). Furthermore, it has been demonstrated that repeated experience with uncontrollable aversive events can lead to pathological emotional states, such as anxiety and depression (Abramson, Seligman, & Teasdale, 1978; Barlow, 1988, 1991; Mineka, 1985). Therefore, it has been suggested that the degree to which people view events as within their control may be a fundamental mediator of psychopathology and treatment (e.g., Rotter, 1966; 1975). Similarly, Barlow (1988, 1991) suggested that the unexpected experience of bursts of emotions may lead to anxiety disorders in vulnerable individuals because they view their own emotions or bodily reactions as out of control. In the case of panic disorder, for example, vulnerable individuals may unexpectedly experience a brief and intense burst of fear and subsequently develop anxiety over the possibility of the reoccurrence of this response in an uncontrollable manner. Moreover, Barlow (1988) hypothesized that all anxiety disorders share a lack of perceived control over negative emotional and bodily reactions.

Consistent with this hypothesis are the findings from studies suggesting that patients with social phobia perceive a lack of internal control (Leung & Heimberg, 1996) and believe that events are controllable only by people other than themselves (Cloitre, Heimberg, Liebowitz, & Gitow, 1992). Furthermore, panic attacks seem to play an important role in phobic individuals, including those suffering from specific phobias and social phobia (Craske, 1991; Ehlers, Hofmann, Herda, & Roth, 1994; Himle, Crystal, Curtis, & Fluent, 1991; Hofmann, Ehlers, & Roth, 1995; McNally & Steketee, 1985). For example, the study by Hofmann and colleagues showed that people who are afraid of public speaking attributed their fear more often to “panic attacks” (defined as a sudden rush of intense fear without apparent reason) than to traumatic events or indirect conditioning events (Hofmann et al., 1995). Although all subjects of this study met diagnostic criteria for social phobia, they regarded panic attacks as more important for their speech anxiety than their fear of negative evaluation by others (which is considered the core feature of social phobia). However, the study’s focus on public speaking anxious individuals limits the generalizability of the findings to other individuals with social phobia.

In summary, there is some evidence in the literature to suggest that perceived emotional control might mediate the effects of treatment for social phobia. Intense anxiety (panic attacks) in social situations might be associated with perceived loss of emotional control which could be an important maintaining factor of the disorder. However, the role of panic attacks, perceived emotional control, and its relationship to treatment is largely unexplored. Situational, interpersonal, and cognitive variables are probably important additional factors in this relationship. For example, it might be possible that repeated exposure under the guidance of a therapist enhances the patient’s perception of emotional control during social threat and thereby also reduces his or her social anxiety. However, it is uncertain whether the same mechanism is responsible for the treatment effects of other psychosocial interventions, such as cognitive therapy or social skills training. Furthermore, it is unclear why other therapeutic approaches, such as relaxation exercise, breathing techniques, or biofeedback, which should also enhance perceived emotional control, are much less effective for treating social phobia than exposure-based interventions (e.g., Turner et al., 1996).

Moderator Variables

Very little is known about potential moderators of change in the treatment of social phobia. Traditionally, psychotherapy research has focused primarily on the therapeutic alliance (e.g., Burns & Nolen-Hoeksema, 1992), adherence and competence to the treatment protocol (e.g., DeRubeis et al., 1990), and client characteristics, such as sociodemographic variables and diagnostic data (e.g., Whisman, 1993).

Similarly, social phobia treatment outcome seems to be moderated by treatment expectancy (Chambless, Tran, & Glass, 1997; Safren et al., 1997), homework compliance (Leung & Heimberg, 1996; Edelman & Chambless, 1995), and depression (Chambless, Tran, & Glass, 1997). However, most studies on treatment moderators of social phobia have focused on the social phobia subtypes and the additional diagnosis of avoidant personality disorder (APD) as potential predictors of poor social phobia treatment outcome (Alden & Capreol, 1993; Alden, 1989; Brown, Heimberg, & Juster, 1995; Feske, Perry, Chambless, Renneberg, & Goldstein, 1996; Hofmann, Newman, Becker, et al., 1995; Heimberg, Holt, Schneier, Spitzer, & Liebowitz, 1993; Hope, Herbert, & White, 1995; Renneberg, Goldstein, Phillips, & Chambless, 1990; Turner, 1987; Turner, Beidel, & Long, 1992). Much of this research was stimulated by the subtype specifier which was added to the diagnostic criteria for social phobia in the DSM-III-R (APA, 1987) and the DSM-IV (APA, 1994). This criterion states: “specify generalized type if the phobic situation includes most social situations, and also consider the additional diagnosis of Avoidant Personality Disorder” (APA, 1987; p. 243).

A review of the literature showed that approximately 60% of generalized social phobics also receive a diagnosis of APD compared with about 20% of non-generalized social phobics (Heimberg, 1996; Schneier, Spitzer, Gibbon, Fyer, & Liebowitz, 1991). Differences between these diagnostic subgroups have been found in self-report measures (Herbert, Hope, & Bellack, 1992; Hofmann & Roth, 1996; Holt, Heimberg, & Hope, 1992; Turner, Beidel, & Townsley, 1992), clinician-administered measures (Brown, Heimberg, & Juster, 1995; Holt et al., 1992a), age and mode of onset (Brown et al., 1995; Mannuzza et al., 1995; Stemmerger, Turner, Beidel, & Calhoun, 1995), psychophysiological response during exposure (Heimberg, Hope, Dodge, & Becker, 1990; Hofmann, Newman, Ehlers, & Roth, 1995; Levin et al., 1995), and cognitive interference during exposure to feared stimuli (Hofmann, Gerlach, Wender, & Roth, 1997; McNeil et al., 1995). In summary, these studies suggest that the generalized subtype of social phobia and the additional diagnosis of APD identify the more severe cases of social phobia.

Some studies suggest that the presence of a generalized subtype of social phobia and/or the highly overlapping additional Axis II diagnosis of APD (or a significant feature of it) complicates treatment and may dictate alternative approaches (e.g., Feske et al., 1996; Turner et al., 1994; Chambless, Tran, & Glass, 1997). For example, Feske et al. (1996) studied 42 individuals with a generalized subtype of social phobia who underwent a behavioral group treatment for social phobia. A large percentage of them (72.9%) met criteria for APD. Although patients with APD improved significantly with treatment, they continued to report more severe impairment on all outcome measures at posttest and 3-month follow up as compared to those without APD. Similar findings were reported by Turner (1987) who investigated the effect of cognitive behavioral treatment on 13 patients with social phobia with and without a personality disorder as determined with the MMPI. Patients without a personality disorder improved significantly more than those with a personality disorder, and this pattern remained evident 1 year after treatment.

In contrast, other studies did not find APD to be predictive of poor treatment outcome (Brown, et al., 1995; Hofmann, Newman, Becker, et al., 1995; Hope, Herbert, et al., 1995). For example, in the study by Hofmann and colleagues (1995), 8 speech anxious individuals with APD and 8 speech anxious individuals without APD received exposure treatment for their public speaking anxiety. All subjects met criteria for social phobia, and only individuals with APD met criteria for the generalized subtype. Treatment resulted in the same degree of improvement when controlling for differences in social phobia severity at the pre-treatment assessment.

Similar results were reported by Hope, Herbert, and colleagues (1995) who treated 23 social phobic individuals using Heimberg’s cognitive behavioral group treatment for social phobia

(CBGT; Heimberg et al., 1990). Fourteen individuals met criteria for APD. The results showed that, although social phobics with APD were more socially anxious than phobics without APD at pretreatment and posttreatment assessment, both groups made similar improvement. Interestingly, both groups improved on social skill measures although the treatment did not include explicit training in social skills.

Consistent findings were also reported by Brown and colleagues (1995) who reported the same degree of improvement in social phobics with and without APD after Heimberg's CBGT. Almost half (47%) of the phobics with APD (8 of 17) no longer met criteria for APD after treatment. Furthermore, significantly more patients with nongeneralized social phobia (15 of 19, 79%) were classified as positive treatment responders than patients with generalized social phobia and APD (7/17, 41%) and generalized social phobia without APD (9/19, 47%). Similarly, Hope, Herbert, and colleagues (1995) found that, despite improving, individuals with a generalized subtype remained more impaired after treatment. Brown and colleagues therefore concluded that "response to cognitive behavioral group treatment appeared to be more a function of subtype of social phobia than of APD diagnosis" (p. 482). In contrast, Turner et al. (1992) reported no substantial differences between generalized social phobic individuals (n = 9) and "specific" social phobic individuals (n = 11) in their fear reduction during intensive exposure therapy (flooding).

Discussion

Although the treatment outcome literature reports encouraging results on the efficacy of various forms of psychosocial treatments for social phobia, little is known about the underlying mechanism of action of treatment change. Studies on mediators of change in social phobia are rare. Most of the (few) research studies have focused on cognitive appraisal as a potential mediator of change. However, a critical review of the literature raises the question whether changes in cognitive appraisal are in fact the primary mediating variables. Therefore, two other alternative mediation models were discussed. Although these models were derived from two prominent psychological theories (i.e., the self-efficacy theory, and models that are emphasizing the importance of perceived emotional control), they have been little discussed in the social phobia literature. According to these models, social phobia treatment might be mediated by perceived self-efficacy (perceived social skills) or perceived emotional control, respectively. Each of the three mediators under consideration places a different emphasis on the cognitive, behavioral, and physiological aspect of social anxiety.

Investigating the value of these mediators will also require an evaluation of the respective theories themselves. This issue can only be addressed briefly because a full discussion of this complex question would go far beyond the scope of this article. Generally speaking, the scientific value of a theory can be determined by the hypotheses that are deduced from it (Popper, 1992). Hypotheses are predictive statements about an outcome that we would expect to be true if our theory (and other assumptions) were correct (Meehl, 1987). The value of a theory is high if its hypotheses possess high informative content, high predictive power, and if they withstand critical testing (Popper, 1992). In contrast, the value of a theory is low if no clear hypotheses can be derived from it, or if the theory is un-testable because any experimental outcome can be explained by the theory.

Unfortunately, the scientific value of the underlying theories is difficult to estimate because they lead to very similar predictions. Furthermore, some of these theories underwent substantial modifications since their original formulations by incorporating aspects from other theoretical views. For example, the earlier conceptualization of the self-efficacy theory assumes that performance capabilities can be predicted independently from the person's anxiety state. In contrast, the contemporary formulation of the theory includes perceived predictability and

perceived controllability of the emotional response during fear-provoking social situations in its definition which overlaps with the perceived emotional control models.

Furthermore, all three models emphasize the importance of cognitive variables. However, it remains unclear what the nature of these cognitive variables is. Is it the perception of danger in social situations, the perception of one's social skills to master the situation, or is it the perception of control over one's anxiety response in social situations that primarily mediates treatment change? For future research, it would therefore be helpful to reformulate the hypothesized mediational models in order to avoid overlap in the conceptualization and measurement of the potential mediators. Although this might oversimplify the competing mediational models (and therefore limit the ability to scientifically evaluate the underlying theories), it would allow researchers to directly test the hypothesized potential mediators against one another and to study the relationship between them.

Based on the current literature, it seems unlikely that any one of the three mediators produce full mediation. Full mediation exists if the relationship between two variables A and C disappears when controlling for the mediating variable B (e.g., Baron & Kenny, 1986). In partial mediation, a variable A has both a direct effect on C and an indirect effect on C through B (James & Brett, 1984). Furthermore, it is uncertain whether these mediators are unique to a given treatment modality in which case there must be evidence for relative specificity of change (i.e., mediational specificity).

In addition to these three mediators, this article also discussed two potential moderators of change. The two variables that were considered out of the large universe of possible treatment predictors included the generalized subtype of social phobia and the additional diagnosis of APD which are two highly co-morbid conditions. The presence of these moderators does not seem to be an impediment for using current psychosocial treatments. However, some studies reported that social phobic individuals who meet criteria for APD or the generalized subtype do not improve as much as those who do not meet these criteria. In contrast, other studies found no difference in the degree of improvement between these social phobia subgroups. The inconsistent findings in the literature may be partly due to the small sample size in some of the studies, differences in the operational definition of generalized subtype, and the assessment procedures of APD.

Moreover, it remains uncertain to what degree the potential moderators interact with different mediator variables. For example, a recent study by Tran and Chambless (1995) reported that generalized social phobics with APD were rated as less skillful when giving a speech and during a conversation than individuals who did not meet criteria for the generalized subtype of social phobia and APD. Therefore, it might be possible that psychosocial interventions affect the individual's perceived social skills differently depending on the presence or absence of the generalized subtype and APD. Similar considerations also apply for other potential mediators. Thus, investigating mediators without considering the effects of moderator variables (and vice versa) would disregard the possible interaction effects between them which has also been referred to as "mediated moderation" and "moderated mediation" (Baron & Kinney, 1986).

In summary, the question about the validity of the mediators and moderators of change that were discussed in this article remain unanswered and further research is sorely needed. Well-designed and systematic dismantling studies in combination with appropriate assessment instruments and statistical techniques would provide valuable information to clarify some of these issues. Moreover, the search for potential moderators needs to be expanded beyond the limits of the DSM-IV to include other variables, such as personality characteristics (e.g., Aron & Aron, 1997) and temperamental factors (e.g., Kagan, 1994). Mediators and moderators of change are typically studied by using analyses of variance, regression models, and structural

equation models (Baron & Kenny, 1986; Holmbeck, 1997; Judd & Kenny, 1981). These statistical procedures allow the experimenter to study the causal direction of the mediating effects (Smith, 1982), to differentiate full from partial mediation (Holmbeck, 1997; Sobel, 1982), and to test a combined mediation/moderation model (Baron & Kenny, 1986). Identifying the primary mediators and moderators of change would not only lead to further improvement in our psychosocial interventions, but it would also provide us with a better understanding about the psychopathology of social phobia.

References

- Abramson LY, Seligman ME, Teasdale JD. Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology* 1978;87:49–74. [PubMed: 649856]
- Alden LE. Short-term structured treatment for avoidant personality disorder. *Journal of Consulting and Clinical Psychology* 1989;57:756–764. [PubMed: 2600246]
- Alden LE, Capreol MJ. Avoidant personality disorder: Interpersonal problems as predictors of treatment response. *Behavior Therapy* 1993;24:357–376.
- Alden LE, Wallace ST. Social phobia and social appraisal in successful and unsuccessful social interactions. *Behaviour Research and Therapy* 1995;33:497–505. [PubMed: 7598670]
- Alloy LB, Abramson LY, Viscusi D. Induced mood and the illusion of control. *Journal of Personality and Social Psychology* 1981;41:1129–1140.
- American Psychiatric Association (1987). *Diagnostic and Statistical Manual for Mental Disorders (3rd edition-Revised)*. Washington, D.C.: Author.
- American Psychiatric Association (1994). *Diagnostic and Statistical Manual for Mental Disorders (4th edition)*. Washington, D.C.: Author.
- Amies PL, Gelder MG, Shaw PM. Social phobia: A comparative clinical study. *British Journal of Psychiatry* 1983;142:174–179. [PubMed: 6839072]
- Aron EN, Aron A. Sensory-processing sensitivity and its relation to introversion and emotionality. *Journal of Personality and Social Psychology* 1997;73:345–368. [PubMed: 9248053]
- Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review* 1977;84:191–215. [PubMed: 847061]
- Bandura A. Self-efficacy determinants of anticipated fears and calamities. *Journal of Personality and Social Psychology* 1983;45:464–469.
- Bandura A. Recycling misconceptions of perceived self-efficacy. *Cognitive Therapy and Research* 1984;8:231–255.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Barber JP, DeRubeis RJ. On second thought: Where the action is in cognitive therapy for depression. *Cognitive Therapy and Research* 1989;13:441–457.
- Barlow, D. H. (1988). *Anxiety and its disorders*. New York: Guilford Press.
- Barlow, D. H. (1991). The nature of anxiety: Anxiety, depression, and emotional disorders. In R. M. Rapee & D. H. Barlow (Eds.), *Chronic anxiety: Generalized anxiety disorder and mixed anxiety depression* (pp. 1–28). New York: Guilford Press.
- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 1986;51:1173–1182. [PubMed: 3806354]
- Borkovec TD. Self-efficacy: Cause or reflection of behavioural change? *Advances in Behaviour Research and Therapy* 1978;1:177–193.
- Brown TA, Barlow DH. Long-term outcome of cognitive-behavioral treatment of panic disorder: Clinical predictors and alternative strategies for assessment. *Journal of Consulting and Clinical Psychology* 1995;63:754–765. [PubMed: 7593868]
- Brown EJ, Heimberg RG, Juster HR. Social phobia subtype and avoidant personality disorder: Effect on severity of social phobia, impairment, and outcome of cognitive behavioral treatment. *Behavior Therapy* 1995;26:467–489.

- Bruch MA, Gorsky JM, Collins TM, Berger PA. Shyness and sociability reexamined: A multicomponent analysis. *Journal of Personality and Social Psychology* 1989;57:904–915.
- Burns DD, Nolen-Hoeksema S. Therapeutic empathy and recovery from depression in cognitive-behavioral therapy: A structural equation model. *Journal of Consulting and Clinical Psychology* 1992;60:441–449. [PubMed: 1619098]
- Butler G. Exposure and treatment of social phobia: Some instructive difficulties. *Behaviour Research and Therapy* 1985;23:651–657. [PubMed: 4074278]
- Butler G, Cullington A, Munby M, Amies P, Gelder M. Exposure and anxiety management in the treatment of social phobia. *Journal of Consulting and Clinical Psychology* 1984;52:642–650. [PubMed: 6147366]
- Butler G, Mathews A. Cognitive processes in anxiety. *Advances in Behaviour Research and Therapy* 1983;5:51–62.
- Chambless DL, Tran GQ, Glass CR. Predictors of response to cognitive-behavioral group therapy for social phobia. *Journal of Anxiety Disorders* 1997;11:221–240. [PubMed: 9220298]
- Chambless DL, Sanderson WC, Shoham V, Johnson SB, Pope KS, Crits-Christoph P, Baker M, Johnson B, Woody SR, Sue S, Beutler L, Williams DA, McCurry S. An update on empirically validated therapies. *The Clinical Psychologist* 1996;49 (2):5–18.
- Clark DM. A cognitive approach to panic. *Behaviour Research and Therapy* 1986;24:461–470. [PubMed: 3741311]
- Clark, D. M. & Wells, A. (1995). A cognitive model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), *Social Phobia: Diagnosis, assessment and treatment* (pp. 69–93).
- Clark JV, Arkowitz H. Social anxiety and self-evaluation of interpersonal performance. *Psychological Report* 1975;36:211–221.
- Cloitre M, Heimberg RH, Liebowitz MR, Gitow A. Perceptions of control in panic disorder and social phobia. *Cognitive Therapy and Research* 1992;16:569–577.
- Craske MG. Phobic fear and panic attacks: The same emotional states triggered by different cues? *Clinical Psychology Review* 1991;2:599–620.
- Davidson JRT, Hughes DL, George LK, Blazer DG. The epidemiology of social phobia: Findings from the Duke Epidemiological Catchment Area Study. *Psychological Medicine* 1993;23:709–718. [PubMed: 8234577]
- DeRubeis RJ, Evans MD, Hollon SD, Garvey MJ, Grove WM, Tuason VB. How does cognitive therapy work? Cognitive change and symptom change in cognitive therapy and pharmacotherapy for depression. *Journal of Consulting and Clinical Psychology* 1990;58:862–869. [PubMed: 2292637]
- Edelman RE, Chambless DL. Adherence during sessions and homework in cognitive-behavioral group treatment of social phobia. *Behaviour Research and Therapy* 1995;33:573–577. [PubMed: 7598680]
- Ehlers A, Hofmann SG, Herda CA, Roth WT. Clinical characteristics of driving phobia. *Journal of Anxiety Disorders* 1994;8:323–339.
- Emmelkamp PMG, Mersch PP, Vissia E, van der Helm M. Social phobia: A comparative evaluation of cognitive and behavioral interventions. *Behaviour Research and Therapy* 1985;23:365–369. [PubMed: 2860893]
- Evans, M. D. & Hollon, S. D. (1988). Patterns of personal and causal inference: Implications for cognitive therapy of depression. In L. B. Alloy (Ed.), *Cognitive processes in depression* (pp. 344–377). New York: Guilford Press.
- Feske U, Chambless DL. Cognitive behavioral versus exposure only treatment for social phobia: A meta-analysis. *Behavior Therapy* 1995;26:695–720.
- Feske U, Perry KJ, Chambless DL, Renneberg B, Goldstein AJ. Avoidant personality disorder as predictor for severity and treatment outcome among generalized social phobics. *Journal of Personality Disorder* 1996;10:174–184.
- Foa EB, Franklin ME, Perry KJ, Herbert JD. Cognitive biases in generalized social phobia. *Journal of Abnormal Psychology* 1996;105:433–439. [PubMed: 8772013]
- Foa EB, Kozak MJ. Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin* 1986;99:20–35. [PubMed: 2871574]

- Geer JH, Davison GC, Gatchel RI. Reduction of stress in humans through nonverbal perceived control of aversive stimulation. *Journal of Personality and Social Psychology* 1970;16:731–738. [PubMed: 5489508]
- Gelernter CS, Uhde TW, Cimboic P, Arnkoff DB, Vittone BJ, Tancer ME, Bartko JJ. Cognitive-behavioral and pharmacological treatments of social phobia. *Archives of General Psychiatry* 1991;48:938–945. [PubMed: 1929764]
- Glasgow RE, Arkowitz H. The behavioral assessment of male and female social competence in dyadic interactions. *Behavior Therapy* 1975;6:488–498.
- Glass CR, Gottman JM, Shmurak SH. Response-acquisition and cognitive self-statement modification approaches to dating skills training. *Journal of Counseling Psychology* 1976;23:520–526.
- Glass, D. C. & Singer, J. E. (1970). Urban stress. New York: Academic Press.
- Gould RA, Buckminster S, Pollack MH, Otto MW, Yap L. Cognitive-behavioral and pharmacological treatment for social phobia: A meta-analysis. *Clinical Psychology: Science and Practice* 1997;4:291–306.
- Halford K, Foddy M. Cognitive and social skills correlates of social anxiety. *British Journal of Clinical Psychology* 1982;21:17–28. [PubMed: 7126942]
- Heimberg, R. G. (1996). Social phobia, avoidant personality disorder and the multiaxial conceptualization of interpersonal anxiety (pp. 43–61). In P. M. Salkovskis (Ed), Trends in cognitive and behavioural therapies. New York: John Wiley & Sons.
- Heimberg RG, Dodge CS, Hope DA, Kennedy CR, Zollo L, Becker RE. Cognitive behavioral treatment for social phobia: Comparison with credible placebo control. *Cognitive Therapy and Research* 1990;14:1–23.
- Heimberg RG, Holt CS, Schneier FR, Spitzer RL, Liebowitz ML. The issue of subtypes in the diagnosis of social phobia. *Journal of Anxiety Disorders* 1993;7:249–270.
- Heimberg RG, Hope DA, Dodge CS, Becker RE. DSM-III-R subtypes of social phobia. Comparison of generalized social phobics and public speaking phobics. *The Journal of Nervous and Mental Disease* 1990;178:172–179. [PubMed: 2307969]
- Heimberg, R. G., & Juster, H. R. (1995). Cognitive-behavioral treatments: Literature Review. In R. G. Heimberg, M. R. Liebowitz, D. A. Hope, and F. R. Schneier (Eds.), Social phobia. Diagnosis, Assessment, and treatment. New York: Guilford Press.
- Heimberg RG, Salzman D, Holt CS, Blendell K. Cognitive-behavioral group treatment for social phobia: Effectiveness at five year follow-up. *Cognitive Therapy and Research* 1993;17:325–340.
- Herbert JD, Hope DA, Bellack AS. Validity of the distinction between generalized social phobia and avoidant personality disorder. *Journal of Abnormal Psychology* 1992;101:332–339. [PubMed: 1583228]
- Himle JA, Crystal D, Curtis GC, Fluent TE. Mode of onset of simple phobia subtypes: Further evidence of heterogeneity. *Psychiatry Research* 1991;36:37–43. [PubMed: 2017521]
- Hofmann, S. G. (in press). Self-focused attention before and after exposure treatment of social phobia. Behaviour Research and Therapy.
- Hofmann, S. G. & Barlow, D. H. (1999). The costs of anxiety disorders: Implications for psychosocial interventions, pp. 224–234. In N. E. Miller and K. M. Magruder (Eds.), Cost-effectiveness of Psychotherapy. A guide for Practitioners, Researchers and Policymakers. New York: Oxford University Press.
- Hofmann SG, Gerlach A, Wender A, Roth WT. Speech disturbances and gaze behavior during public speaking in subtypes of social phobia. *Journal of Anxiety Disorders* 1997;11:573–585. [PubMed: 9455720]
- Hofmann SG, Ehlers A, Roth WT. Conditioning theory: A model for the etiology of public speaking anxiety? *Behaviour Research and Therapy* 1995;33:567–571. [PubMed: 7598679]
- Hofmann SG, Newman MG, Ehlers A, Roth WT. Psychophysiological differences between subtypes of social phobics. *Journal of Abnormal Psychology* 1995;104:224–231. [PubMed: 7897046]
- Hofmann SG, Newman MG, Becker E, Taylor CB, Roth WT. Social phobia with and without avoidant personality disorder: Preliminary behavior therapy outcome findings. *Journal of Anxiety Disorders* 1995;9:427–438.

- Hofmann SG, Roth WT. Issues related to social anxiety among controls in social phobia research. *Behavior Therapy* 1996;27:79–91.
- Hollon, S. D., Evans, M. D., & DeRubeis, R. J. (1990). Cognitive mediation of relapse prevention following treatment for depression: Implications of differential risk. In R. E. Ingram (Ed.), *Contemporary psychological approaches to depression* (pp. 117–136). New York: Plenum Press.
- Holmbeck GN. Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology* 1997;4:599–610. [PubMed: 9256561]
- Holt CS, Heimberg RG, Hope DA. Avoidant personality disorder and the generalized subtype of social phobia. *Journal of Abnormal Psychology* 1992;101:318–325. [PubMed: 1583226]
- Hope DA, Heimberg RG, Bruch MA. Dismantling cognitive-behavioral group therapy for social phobia. *Behaviour Research and Therapy* 1995;33:637–650. [PubMed: 7654156]
- Hope DA, Herbert &, White C. Diagnostic subtype, avoidant personality disorder, and efficacy of cognitive-behavioral group therapy for social phobia. *Cognitive Therapy and Research* 1995;19:399–417.
- James LR, Brett JM. Mediators, moderators and tests for mediation. *Journal of Applied Psychology* 1984;69:307–321.
- Judd CM, Kenny DA. Process analysis: Estimating mediation in evaluation research. *Evaluation Research* 1981;5:602–619.
- Juster, H. R., Heimberg, R., & Holt, C. S. (1996). Social phobia: Diagnostic issues and review of cognitive-behavioral treatment strategies (pp. XX). In M. Hersen, R. Eisler, & P. Miller (Eds.), *Progress in behavior modification*. Pacific Grove, CA: Brooks/Cole.
- Kagan, J. (1994). *Galen's Prophecy*. New York: Basic Books.
- Kessler RC, McGonagle KA, Shanyang Z, Nelson CB, Hughes M, Eshleman S, Wittchen HU, Kendler KS. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. *Archives of General Psychiatry* 1994;51:8–19. [PubMed: 8279933]
- Lang, P. J. (1985). The cognitive psychophysiology of emotion: Fear and anxiety. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders*. Hillsdale, NJ: Erlbaum.
- Lang, P. J. (1993). The three-system approach to emotion. In N. Birbaumer & A. Ohman (Eds.), *The structure of emotion* (pp. 18030). Seattle, WA: Hogrefe & Huber.
- Leary, M. R., Kowalski, R. M. (1995). The self-presentation model of social phobia. In R. G. Heimberg, M. R. Liebowitz, D.A. Hope, & F. R. Schneier (Eds.), *Social phobia: Diagnosis, assessment, and treatment* (pp. 94–112). New York: Guilford Press.
- Leary MR, Kowalski RM, Campbell CD. Self-presentational concerns and social anxiety: The role of generalized impression expectancy. *Journal of Research in Personality* 1988;22:308–321.
- Leung AW, Heimberg RH. Homework compliance, perceptions of control, and outcome of cognitive-behavioral treatment of social phobia. *Behaviour Research and Therapy* 1996;34:423–432. [PubMed: 8687364]
- Levin AP, Saoud JB, Strauman T, Gorman JM, Fyer A, Crawford R, Liebowitz MR. Responses of “generalized” and “discrete” social phobics during public speaking. *Journal of Anxiety Disorders* 1993;7:207–221.
- Liebowitz MR, Gorman JM, Fyer AJ, Klein DF. Social phobia: Review of a neglected anxiety disorder. *Archives of General Psychiatry* 1985;42:729–736. [PubMed: 2861796]
- Lucock MP, Salkovskis PM. Cognitive factors in social anxiety and its treatment. *Behaviour Research and Therapy* 1988;17:297–302. [PubMed: 3214394]
- Mannuzza S, Schneier FR, Chapman TF, Liebowitz MR, Klein DF, Fyer AJ. Generalized social phobia. Reliability and validity. *Archives of General Psychiatry* 1995;52:230–237. [PubMed: 7872851]
- Marks IM. The classification of phobic disorders. *British Journal of Psychiatry* 1970;116:377–386. [PubMed: 5441795]
- Mattick RP, Peters L. Treatment of severe social phobia: Effects of guided exposure with and without cognitive restructuring. *Journal of Consulting and Clinical Psychology* 1988;56:251–260. [PubMed: 2897386]

- Mattick RP, Peters L, Clark JC. Exposure and cognitive restructuring for social phobia: A controlled study. *Behavior Therapy* 1989;20:3–23.
- McEwan KL, Devins GM. Is increased arousal in social anxiety noticed by others? *Journal of Abnormal Psychology* 1983;92:417–421. [PubMed: 6643820]
- McNally RJ, Steketee GS. The etiology and maintenance of severe animal phobias. *Behaviour Research and Therapy* 1985;23:431–435. [PubMed: 4026772]
- McNally RJ, Foa EB. Cognition and agoraphobia: Bias in the interpretation of threat. *Cognitive Therapy and Research* 1987;11:567–588.
- McNeil DW, Ries BJ, Taylor LJ, Boone ML, Carter LE, Turk CL, Lewin MR. Comparison of social phobia subtypes using Stroop tests. *Journal of Anxiety Disorders* 1995;9:47–57.
- Meehl PE. Theoretical risks and tabular asterisks: Sir Karl, Sir Ronald, and the slow progress of soft psychology. *Journal of Consulting and Clinical Psychology* 1978;46:806–834.
- Mersch PPA, Emmelkamp PMG, Bögels SM, van der Sleen J. Social phobia: Individual response patterns and the effects of behavioral and cognitive interventions. *Behaviour Research and Therapy* 1989;27:421–434. [PubMed: 2775152]
- Mersch PPA, Emmelkamp PMG, Lips C. Social phobia: Individual response patterns and the long-term effects of behavioral and cognitive interventions: A follow-up study. *Behaviour Research and Therapy* 1991;29:357–362. [PubMed: 1888325]
- Mineka, S. (1985). Animal models of anxiety disorders: Their usefulness and limitations. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the anxiety disorders*. Hillsdale, NJ: Erlbaum.
- Newman MG, Hofmann SG, Trabert W, Roth WT, Taylor CB. Does behavioral treatment of social phobia lead to cognitive changes? *Behavior Therapy* 1994;25:503–517.
- Öst LG. Age of onset in different phobias. *Journal of Abnormal Psychology* 1987;96:223–229. [PubMed: 3680761]
- Popper, K. R. (1992). *Realism and the aim of science. Postscript to the Logic of Scientific Discovery*. London: Routledge.
- Rapee RN, Heimberg RG. A cognitive-behavioral model of anxiety in social phobia. *Behaviour Research and Therapy* 1997;35:741–756. [PubMed: 9256517]
- Rapee RM, Lim L. Discrepancy between self- and observer ratings of performance in social phobics. *Journal of Abnormal Psychology* 1992;101:728–731. [PubMed: 1430614]
- Renneberg B, Goldstein AJ, Phillips D, Chambless DJ. Intensive behavioral treatment of avoidant personality disorder. *Behavior Therapy* 1990;21:363–377.
- Rotter JB. Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs* 1966;80:1–28. [PubMed: 5340840]
- Rotter JB. Some problems and misconceptions related to the construct of internal versus external control of reinforcement. *Journal of Consulting and Clinical Psychology* 1975;43:56–67.
- Safren SA, Heimberg RG, Juster HR. Client's expectancies and their relationship to pretreatment symptomatology and outcome of cognitive-behavioral group treatment for social phobia. *Journal of Consulting and Clinical Psychology* 1997;65:694–698. [PubMed: 9256571]
- Sanderson WC, Rapee RM, Barlow DH. The influence of perceived control on panic attacks induced via inhalation of 5.5% CO₂-enriched air. *Archives of General Psychiatry* 1989;46:157–162. [PubMed: 2492423]
- Schneier FR, Heckelman LR, Garfinkel R, Campeas R, Fallon B, Gitow A, Street L, DelBene D, Liebowitz MR. Functional impairment in social phobia. *Journal of Clinical Psychiatry* 1994;55:322–331. [PubMed: 8071299]
- Schneier FR, Johnson J, Hornig CD, Liebowitz MR, Weissman MM. Social phobia: Comorbidity and morbidity in an epidemiological sample. *Archives of General Psychiatry* 1992;49:282–288. [PubMed: 1558462]
- Schneier FR, Spitzer RL, Gibbon M, Fyer AJ, Liebowitz MR. The relationship of social phobia subtypes and avoidant personality disorder. *Comprehensive Psychiatry* 1991;32:496–502. [PubMed: 1778076]
- Scholing A, Emmelkamp PMG. Cognitive and behavioural treatments of fear of blushing, sweating or trembling. *Behaviour Research and Therapy* 1993a;31:155–170. [PubMed: 8095137]

- Scholing A, Emmelkamp PMG. Exposure with and without cognitive therapy for generalized social phobia: Effects of individual and group therapy. *Behaviour Research and Therapy* 1993b;31:667–681. [PubMed: 8105778]
- Smith ER. Beliefs, attributions, and evaluations: Nonhierarchical models of mediation in social cognition. *Journal of Personality and Social Psychology* 1982;43:248–259.
- Sobel, M. E. (1982). Asymptotic confidence intervals for the indirect effects in structural equations models. In S. Leinhardt (Ed.), *Sociological methodology* (pp. 290–321). San Francisco: Jossey-Bass.
- Stein MB, Walker JR, Forde DR. Public speaking fears in a community sample. Prevalence, impact on functioning, and diagnostic classification. *Archives of General Psychiatry* 1996;53:169–174. [PubMed: 8629892]
- Stemberger RT, Turner SM, Beidel DC, Calhoun KS. Social phobia: An analysis of possible developmental factors. *Journal of Abnormal Psychology* 1995;104:526–531. [PubMed: 7673576]
- Stopa L, Clark DM. Cognitive processes in social phobia. *Behaviour Research and Therapy* 1993;31:255–267. [PubMed: 8476400]
- Stravynski A, Grey S, Elie R. Outline of the therapeutic process in social skills training with socially dysfunctional patients. *Journal of Consulting and Clinical Psychology* 1987;55:224–228. [PubMed: 3571677]
- Stravynski A, Marks I, Yule W. Social skills problems in neurotic outpatients: Social skills training with and without cognitive modification. *Archives of General Psychiatry* 1982;39:1378–1385. [PubMed: 7149897]
- Taylor S. Meta-analysis of cognitive-behavioral treatments for social phobia. *Journal of Behaviour Therapy and Experimental Psychiatry* 1996;27:1–9.
- Tran GQ, Chambless DL. Psychopathology of social phobia: Effects of subtype and of avoidant personality disorder. *Journal of Anxiety Disorders* 1995;9:489–501.
- Trower P, Gilbert P. New theoretical conceptions of social anxiety and social phobia. *Clinical Psychology Review* 1989;9:19–35.
- Turner RM. The effects of personality disorder diagnosis on the outcome of social anxiety symptom reduction. *Journal of Personality Disorders* 1987;1:136–143.
- Turner SM, Beidel DC, Long PJ. Reduction of fear in social phobics: An examination of extinction patterns. *Behavior Therapy* 1992;23:389–403.
- Turner SM, Beidel DC, Cooley MR, Woody SR, Messer SC. A multicomponent behavioral treatment of social phobia: Social Effectiveness Therapy. *Behaviour Research and Therapy* 1994;32:381–390. [PubMed: 8192637]
- Turner SM, Beidel DC, Cooley-Quille MR. Two year follow-up of social phobics treated with Social Effectiveness Therapy. *Behaviour Research and Therapy* 1995;33:553–556. [PubMed: 7598676]
- Turner SM, Beidel DC, Townsley RM. Social phobia: A comparison of specific and generalized subtypes and avoidant personality disorder. *Journal of Abnormal Psychology* 1992;101:326–331. [PubMed: 1583227]
- Turner, S. M., Cooley-Quille, M. R., & Beidel, D.C. (1996). Behavioral and pharmacological treatment for social phobia. In M. R. Mavissakalian, and R. F. Prien (Eds.), *Long-term treatments of anxiety disorders*. Washington, DC: American Psychiatric Press.
- Wallace ST, Alden LE. A comparison of social standards and perceived ability in anxious and nonanxious men. *Cognitive Therapy and Research* 1991;15:237–254.
- Wallace ST, Alden LE. Social anxiety and standard setting following social success or failure. *Cognitive Therapy and Research* 1995;19:613–631.
- Wallace ST, Alden LE. Social phobia and positive social events: The price of success. *Journal of Abnormal Psychology* 1997;106:416–424. [PubMed: 9241943]
- Wells A, Papageorgiou C. Social phobia: Effects of external attention on anxiety, negative beliefs, and perspective taking. *Behavior Therapy* 1998;29:357–370.
- Whisman MA. Mediators and moderators of change on cognitive therapy of depression. *Psychological Bulletin* 1993;114:248–265. [PubMed: 8416032]

- Williams SL, Doseman G, Kleifield E. Comparative effectiveness of guided mastery and exposure treatment for intractable phobias. *Journal of Consulting and Clinical Psychology* 1984;52:505–518. [PubMed: 6147365]
- Williams SL, Kinney PJ, Falbo J. Generalization of therapeutic changes in agoraphobia: The role of perceived self-efficacy. *Journal of Consulting and Clinical Psychology* 1989;57:436–442. [PubMed: 2567745]
- Williams SL, Turner SM, Peer DF. Guided mastery and performance desensitization treatment for severe acrophobia. *Journal of Consulting and Clinical Psychology* 1985;53:237–247. [PubMed: 2860143]
- Wlazole Z, Schroeder-Hartwig K, Hand I, Kaiser G, Münchau N. Exposure in vivo vs. social skills training for social phobia: Long-term outcome and differential effects. *Behaviour Research and Therapy* 1990;28:181–193. [PubMed: 1973351]
- Woody SR, Chambless DL, Glass CR. Self-focused attention in the treatment of social phobia. *Behaviour Research and Therapy* 1997;35:117–129. [PubMed: 9046675]

Acknowledgements

Supported by NIMH grant MH-57326 to Dr. Hofmann. I thank Drs. Lynn Bufka, Rosemary Toomey, and four anonymous reviewers for their valuable comments. Please address reprint requests and correspondence to Dr. Stefan G. Hofmann, Center for Anxiety and Related Disorders at Boston University, 648 Beacon Street, 6th floor, Boston, MA 02215. Tel: (617) 353-9610; Fax: (617) 353-9609; e-mail: shofmann@bu.edu.