

## 10 Maintenance mechanisms in social anxiety: an integration of cognitive biases and emotional processing theory

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We feel honoured to contribute this chapter to a volume that is devoted to recognizing the unique place that Andrew Mathews has had in the study of anxiety and the anxiety disorders. From the beginning of his career, he set the course for research on anxiety, including psychophysiology, treatment and, most recently, cognitive mechanisms. This chapter will relate predominantly to Mathews' contribution to the cognitive psychopathology of anxiety (see Chapter 1 in this book), attempting to integrate Mathews and Mackintosh's (1998) concepts of anxiety with Foa and Kozak's (1985, 1986; see also Foa & McNally, 1996; Foa & Cahill, 2001) emotional processing theory to further our understanding of social anxiety disorder and its treatment.

### **Emotional processing theory**

Emotional processing theory utilizes information processing concepts to explain the psychopathology and treatment of anxiety disorders. A basic concept in emotional processing theory is the presence of *fear structures* that serve as blueprints for responding to danger (Foa & Kozak, 1986; Lang, 1977). The theory proposes that three kinds of representations are contained in these structures:

1. information about the stimuli,
2. information about verbal, physiological and behavioural responses, and
3. the interpretive meaning of these stimuli and responses.

Thus, a fear structure is comprised of an intricate network of associations of the different elements. A normal fear structure contains associations that generally reflect reality accurately (e.g. a car veering towards me → fear (heart rate acceleration, scanning the road, veering my car off the road) → cars coming towards me are dangerous). In general, when a normal fear structure is activated by the individual confronted with a dangerous situation (e.g. a car veering towards the person), it

generates fear and leads to adaptive manoeuvring (e.g. moving to safety). In contrast, a pathological fear structure contains associations among the representations of stimulus, response and meaning that do not reflect reality, have excessive response elements (e.g. avoidance), and are more resistant to modification. We propose that the persistence of the fear structure is due to the biases in processing, which interfere with the acquisition of relevant information that is inconsistent with elements of the fear structure.

Foa and Kozak (1985) proposed that specific pathological fear structures underlie the different anxiety disorders, and that successful psychosocial treatment modifies the pathological elements in the structure. Furthermore, each disorder contains elements common to all anxiety disorders (physiological response elements and escape or avoidance responses), as well as disorder-specific elements. For example, the fear structure of patients with panic disorder is characterized by a pathological association between bodily sensations, such as heart palpitations and threat of death; post-traumatic stress disorder (PTSD) on the other hand is characterized by a pathological association between trauma reminders – which are essentially safe situations or images – and danger, or a sense of incompetence. Indeed, Lang and colleagues (e.g. Lang, Davis & Öhman, 2000; Cuthbert et al., 2003) reported different levels of specificity and coherence (strength of association between elements in memory) of the fear structures for PTSD, panic disorder, specific phobia and social anxiety disorder. Physiological reactivity to imagery of feared cues suggested that the physiological and meaning elements are associated within specific anxiety disorders. Other data also suggest a relationship among behavioural responses, meaning, and physiological responses (Avero & Calvo, 1999; Kozak, Foa & Steketee, 1988).

Foa and Kozak (1985, 1986) originally proposed that emotional processing can be defined as the modification of the fear structure to replace pathological associations among stimuli, responses and meaning with non-pathological associations. However, recent work on extinction and reinstatement (Bouton, 2000; Rescorla, 2001) suggests that extinction does not eliminate or replace previous associations, but instead creates new associations (e.g. heart palpitations do not mean heart attack) which, under most contexts, will be more readily retrieved than the pathological ones (e.g. heart palpitations means heart attack). Such a model better accounts for spontaneous recovery in extinction paradigms and relapses after treatment (see Foa & McNally, 1996). The major implication of this reconceptualization is that treatment should include multiple contexts in order to reinforce the non-pathological structure and reduce the likelihood of activating the pathological structure.

Foa and Kozak (1986) proposed that two conditions are necessary for therapeutic emotional processing to occur:

1. activation of the fear structure, and
2. incorporation of information that is incompatible with the pathological elements of the fear structure.

Activation occurs when the person encounters stimuli or responses that are represented in the fear structure (and therefore are associated with danger meaning). In general, the greater the match between the evoking experience and the person's fear structure, the greater the activation. Emotional processing theory posits that while activation is a necessary condition for emotional processing, it is not a sufficient condition for modification of the fear structure. Such modification requires the presence of information that disconfirms the erroneous elements in the structure. When such information is unavailable because the individual avoids or escapes the situation, the fear structure will remain unchanged (c.f. Solomon, Kamin & Wynne, 1953). Moreover, if the evocative situation contains information that confirms the person's feared consequences, the fear structure will be strengthened. Even when disconfirmatory information is present during the evocative experience, emotional processing occurs only when it is encoded and incorporated into existing knowledge. Foa & McNally (1996) argued that the incorporation of the new information results in a new structure that does not contain the erroneous elements of the original fear structure.

As noted earlier, emotional processing theory posits that specific pathological structures underlie each of the anxiety disorders. It follows that the formation of a new, non-pathological fear structure (i.e. emotional processing) will result in a reduction of symptoms in the corresponding anxiety disorder. Emotional processing can occur as a result of everyday experiences (i.e. natural recovery) or in the context of psychosocial treatment. For example, exposure therapy is designed to ensure that exposure exercises will activate the fear structure and at the same time provide information about the non-threat value of the exercise.

Typically, there is fear decrement during exposure exercises (within session habituation; e.g. Chaplin & Levine, 1981; Foa & Chambless, 1978), as well as decrease in peak intensity across sessions (between session habituation). Foa and Kozak (1986) perceived these two types of habituation as indicators of emotional processing that are related to but conceptually independent of symptom reduction.

Several studies found evidence for a relationship of between-session habituation and symptom reduction, i.e. treatment outcome (van Minnen & Foa, submitted; Kozak, Foa & Steketee, 1988; Jaycox, Foa & Morral, 1998). However, the relationship between within-session habituation

and symptom reduction is more ambiguous. Within-session habituation has been found to be positively related to longer continuous exposure (Chaplin & Levine, 1981; van Minnen and Foa, submitted), and longer continuous exposures have been found to be positively related to symptom reduction in some studies (Chaplin & Levine, 1981; Rabavilas, Boulougouris & Stefanis, 1976; Stern & Marks, 1973) but not others (van Minnen & Foa, submitted). However, no relationship between within-session habituation and symptom reduction has been found (van Minnen and Foa, submitted; Jaycox et al., 1998; Foa et al., 1983; Matthews et al., 1974). Other evidence that within-session habituation is not a necessary condition for improvement includes the finding that people with agoraphobia, who were allowed to escape from their feared situation before the anxiety decreased, improved as much as those who were instructed to stay in the situation until the fear diminished (Emmelkamp, 1974; de Silva & Rachman, 1984; Rachman, Craske, Tallman & Solyom, 1986).

It is possible, then, that within-session habituation is not a reliable indicator of emotional processing. Indeed, reduction of anxiety may be due to factors that impair emotional processing, such as distraction or engagement in safety behaviours. However, the relationship between within-session habituation and outcome is not detrimental to the emotional processing theory because the proposed mechanism underlying symptom reduction is the modification of the relevant erroneous associations through disconfirming information, not through habituation per se. In fact, Foa & Kozak (1986) proposed that within-session habituation is mainly important for patients whose core fear is the erroneous belief that anxiety 'stays forever unless escape is realized'. For these patients, within-session habituation provides the information that disconfirms their erroneous evaluation. Indeed, clinical experience suggests that, in some cases, disconfirming information that had been presented during exposure is incorporated after the exposure exercise. In most cases, this process occurs both within and between sessions.

### **The fear structure of social anxiety disorder**

Social anxiety disorder is characterized by excessive fear of embarrassment or humiliation in interpersonal or other social situations that leads to significant distress and impairment. A cardinal feature of social anxiety disorder is that the core fear is not about physical threat, but interpersonal threat. The specific threat meaning in a pathological fear structure of social anxiety disorder is isolation, ostracization, and/or rejection. Thus, social anxiety disorder may be conceptualized as a 'fear of embarrassment.' Phenomenological data suggest that social anxiety disorder can be divided into specific situational fears (e.g. a speech phobia) or more

general fears that vary across a number of social situations, including interpersonal and performance realms (Kessler et al., 1998). In terms of the fear structure, patients with more circumscribed fears appear to have more coherent psychophysiological responses to imagery (Cuthbert et al., 2003).

This suggests that those with speech and other circumscribed types of social anxiety have similar fear structures to individuals with specific phobia, except that the core threat is one of rejection (e.g. due to poor performance or exhibiting signs of embarrassment, like blushing or shaking), rather than physical harm. The fear structure underlying generalized social anxiety disorder is characterized by a larger number of stimulus, response and meaning representations, as well as a larger number of associations among these representations. Because individuals with generalized social anxiety disorder comprise the majority of the patients who seek treatment for social anxiety, we will focus on them here.

Below, we present a model of the fear structure of generalized social anxiety disorder that draws on clinical research into the psychopathology of social anxiety disorder, research in social psychology, emotion theory on embarrassment (e.g. Keltner & Buswell, 1997), and direct clinical experience.

#### *Stimuli representations*

By definition, the stimuli represented in the fear structure of an individual with social anxiety disorder are circumscribed to people or social situations (e.g. peers, authority figures, or individuals of the opposite sex). For some individuals with social anxiety disorder, the number of stimuli representations is small, circumscribed to a particular context. For others, the fear structure contains a multitude of stimuli and contexts.

Images of oneself in social interactions are stimuli that have gained particular interest recently. For example, Hackmann, Clark and McManus (2000), found that patients with social anxiety disorder had specific recurrent images during social interactions, and that these images appeared to be related to negative social interactions surrounding the onset of the disorder (for a more detailed discussion of these and other findings about imagery and social anxiety, see Hirsch & Clark, this volume).

#### *Representations of verbal, physiological and behavioural responses*

Verbal responses can represent anxiety (e.g. hesitations in speech, such as 'ummm' or 'uhhhhh'), or avoidance of poor performance in a social situation (by asking questions, changing topics away from oneself, etc.), or these responses can be an attempt to distract others from signs of one's

anxiety (e.g. saying: 'It's hot in here' if the person feels he is noticeably sweating). Physiological responses include heart rate, blushing, sweating and trembling. Some of the physiological responses reflect anxiety (sweating, trembling or shaking), while others reflect embarrassment (blushing). Notably, anxiety is associated with increases in heart rate (Cuthbert et al., 2003), while embarrassment is often associated with decreased heart rate (Keltner & Buswell, 1997), and either of these experiences may occur in the individual with social anxiety disorder. Behavioural responses include various types of escape and avoidance manoeuvres. As noted by Foa and Kozak (1986), avoidance behaviours may be subtle or of a cognitive nature. Following Salkovskis (1991), Clark and Wells (1995) labelled subtle avoidance behaviours as 'safety behaviours,' emphasizing their cardinal role in the maintenance of social anxiety disorder. Many of these safety behaviors, such as holding a glass tightly, avoiding eye contact, or wearing dark clothing to hide perspiration, can be conceptualized as behavioural responses represented in the fear structure.

#### *Meaning representations of stimuli and responses*

Foa and Kozak (1986, 1993) proposed that the meaning of stimuli and responses in the fear structure can be represented in stimuli-stimuli or response-stimuli associations, as well as in evaluations. They emphasized the central role of two cognitive biases, overestimation of the probability of feared harm and exaggerated cost of the negative outcome, in pathological fear structures. This supposition was based partially on Butler and Mathews' (1983) finding that probability and cost of threats were overestimated in anxious groups, and that ambiguous situations were more likely to be interpreted as threatening. Further evidence for the importance of these two cognitive biases in social anxiety comes from more recent research in the area of information processing, which we review below.

With respect to social anxiety disorder, Foa and Kozak (1985) proposed that the exaggerated cost estimates of criticism and social scrutiny is prominent in the pathological fear structure. They further noted that the anxiety responses themselves are associated with threat meaning because they are viewed as drawing criticism, leading to a spiralling of anxiety in social situations. Foa, Franklin, and Kozak (2001) further elaborated on this model, proposing that the erroneous meaning of stimuli and responses is influenced by interpretation and judgment biases.

Several studies support the hypothesized relationship between judgment biases about social stimuli and social anxiety disorder. Gilboa-Schechtman et al. (2000) reported that, compared with both anxious and non-anxious controls, patients with generalized social anxiety disorder

tended to have greater estimates of probability and cost for unambiguous negative events (e.g. your boss berating you in front of others), greater estimates of negative cost of positive events, and lower estimates of the probability of positive events. Similarly, Foa et al. (1996) found both cost and probability biases in patients with generalized social anxiety disorder, although changes in cost biases were more predictive of change in symptoms of social anxiety after cognitive-behavioural treatment than were changes in probability biases. Consistent with the results of Foa et al. are the findings of Uren, Szabo, & Lovibond (in press) that while both cost and probability bias appear to contribute to social anxiety, the former were a stronger predictor of severity. Stopa and Clark's (2000) results further support the relationship between exaggerated cost for negative social events and generalized social anxiety disorder. The primacy of cost over probability could not be tested in their study because the latter was not examined. Interestingly, Uren et al. found that in panic disorder, probability and cost estimates equally predicted the severity of the fear of bodily sensations. Perhaps, then, specific fear structures underlying the anxiety disorders differ in the relative influence that probability and cost estimates have on the threat meaning associated with stimuli and responses.

Two studies examined the hypothesis that the fear structure of social anxiety disorder contains pathological associations between response representations (e.g. heart racing, blushing, sweating) and meaning (e.g. social incompetence). Consistent with this conceptualization, Roth, Antony & Swinson (2001) found that individuals with social anxiety disorder were more likely than controls to interpret their own symptoms of anxiety as pathological (i.e. intense anxiety or some psychiatric problem), and less likely to interpret them as normal. Furthermore, Wells and Papageorgiou (2001a) reported that false feedback regarding pulse rate (e.g. 'Your pulse has increased/decreased') influenced ratings of self-reported anxiety and the strength of their beliefs about an idiosyncratic feared consequence in the expected direction in patients with social anxiety disorder. Thus, perceived strength of responses influences the threat meaning of those responses.

In summary, there are data consistent with the notion that the fear structure of socially anxious individuals is characterized by the pathological associations proposed by Foa and Kozak (1985, 1986). The following aspects distinguish this fear structure from those of other anxiety disorders:

1. The specific stimuli are social, not physical.
2. The structure includes representations of unique physiological responses, such as blushing, in addition to those more commonly associated with anxiety.

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3. Specific verbal and behavioural responses are associated with concealing fear responses from others.
4. The meaning of stimuli and response representations is associated with embarrassment, social incompetence and rejection.

*Attentional and interpretation biases in social anxiety disorder*

The focus of emotional processing theory is to provide a framework for understanding the pathology underlying the different anxiety disorders and the mechanisms by which this pathology is corrected. In its account of the anxiety disorders, emotional processing theory emphasized the role of judgmental biases; less attention was given to other cognitive biases, such as attentional and interpretation biases. On the other hand, Mathews and colleagues' seminal work has focused on attentional and interpretation biases as the mechanisms underlying the aetiology and maintenance of both normal and pathological anxiety. The cognitive model that emerged from this research is presented in Mathews and Mackintosh (1998) and summarized in Chapter 1. The model states that task demands and the Threat-Evaluation System (TES) compete for attentional resources, and attentional bias towards threat occurs when the TES supercedes the task demands, thereby orienting to the threat stimulus during the parallel processing of threat and neutral stimulus representations. The model suggests that, like attentional bias, interpretation bias also stems from competing resources. However, unlike the competition with task demands in attentional bias, the competition in interpretation bias is between the TES and an appetitive/reward system called the positive evaluation system (PES). It is beyond the scope of this paper to review comprehensively all of the literature on cognitive biases in social anxiety disorder (for recent reviews, see Amir & Foa, 2001; Heinrichs & Hofmann, 2001). The literature on attentional bias and interpretation bias in social anxiety has yielded seemingly conflicting results, many of which may be resolved by Mathews and Mackintosh's model.

*Integration of emotional processing and cognitive biases approaches*

As noted above, emotional processing theory and Mathews and Mackintosh's (1998) cognitive theory emphasize different aspects of conceptualizing anxiety: the former proposes a model for understanding the maintenance and treatment of different manifestations of pathological anxiety, while the latter proposes a model for understanding interpretation and attentional biases in both clinical and non-clinical anxiety. This difference notwithstanding, the two models share a number of features, a characteristic which facilitates their integration and, in turn, further

clarifies processes involved in the maintenance and treatment of social anxiety disorder.

*The fear structure and the TES*

The concept of 'fear structure' in emotional processing theory is similar to the concept of the TES in Mathews and Mackintosh's cognitive theory. Both concepts suggest that representations of threat stimuli are instantiated in an associative network. Mathews and Mackintosh appear to propose a single threat-evaluation system that is activated by the presence of any threatening stimulus. Foa and Kozak (1986), on the other hand, propose multiple fear structures. Perhaps the most coherent and parsimonious way of integrating the concept of fear structures with the TES is to argue that the TES is comprised of multiple fear structures. Alternatively, the TES may be viewed as comprising a general representation of threat, whereas the stimuli and response elements associated with threat reside in different systems. In either case, the question of how TES accommodates the presence of multiple fears within a single system needs to be explicated.

The proposition of a single threat system would suggest that activation of one fear would lead to increased attention to other feared stimuli. On the other hand, if different fear structures are viewed as relatively independent of one another, then activation of one fear would not lead to increased attention to other feared stimuli. One way to examine this differential hypothesis is through the reactions of individuals with comorbid anxiety disorders. For example, will a patient with comorbid obsessive-compulsive disorder and panic disorder be more attentive to contaminants during a CO<sub>2</sub> challenge that activates their panic disorder fear structure? Another method to examine the generality versus specificity issue is to activate the specific fear of the individual (expecting speech) or a common fear (expecting electric shock) in a patient with social anxiety disorder and testing cognitive biases to social and physical stimuli. The supposition of a general system would lead to the hypothesis that cognitive biases to social threat would be similar in both conditions. The supposition that the fear structures are relatively independent would lead to the hypothesis that under moderate activation, cognitive biases for social threat will be increased after expecting a speech but not after expecting a shock. This kind of research would need to examine the impact of level of activation and the relative similarity across fear structures on the generalization of cognitive biases.

The conceptual relationship between the TES and fear structures informs hypotheses about the associations among judgmental, attentional and interpretation biases. It can be hypothesized that for any stimulus

or response represented in a fear structure, estimations of probability and cost are calculated within the TES, and these estimations determine the level of vigilance (attentional biases) and the resolution of ambiguity (interpretation biases). Accordingly, higher probabilities and cost of threat are associated with increased attentional and interpretation biases. Consistent with this hypothesized relationship among the cognitive biases, Mathews and Mackintosh suggest that anxious individuals have more extensive (c.f. probability) and higher threat value (c.f. cost) representations stored in the TES, partially because they are more sensitive to signals associated with punishment and therefore have stored more information about threat.

By proposing a general TES system, Mathews and Mackintosh (1998) provide an account for the observation that all individuals with anxiety disorder manifest negative cognitive biases more often than do individuals without anxiety disorders. They do not account, however, for the specificity of these biases and the failure to find general biases in individuals with anxiety-disorder. Emotional processing theory provides an account for the specificity of the cognitive biases by considering the anxiety disorders as manifestations of specific fear structures that differ in the types of stimuli and/or responses and in their associated meaning. The theory, for example, can account for the observation that physical exercise does not activate the TES in individuals with social anxiety disorder but does activate the TES in individuals with panic disorder (c.f. Schwartz & Kaloupek, 1987). Similarly, the unique physiological responses in social anxiety, such as the blush response, should be less likely to lead to vigilance for fears in non-socially anxious individuals, while it may sensitize unrelated fears in social anxiety. Furthermore, it should be noted that Foa and Kozak (1986) and Mathews and Mackintosh (1998) emphasize the importance of the fear structures/TES potentially operating on two levels of processing (automatic and strategic). Thus, while individuals with social anxiety disorder may be aware of some of the processes that increase their anxiety, they are likely to be unaware of many other such processes.

#### *Application of the integrated model for social anxiety disorder*

Emotional processing theory views social anxiety disorder as a manifestation of a pathological fear structure with multiple representations of social situations associated with the threat meaning of being rejected. (We propose that situations that are perceived as irrelevant are not represented in the structure.) The structure includes erroneous associations between stimuli and response representations and their meaning as well

as evaluations in the form of exaggerated cost and likelihood of negative social interactions. Thus, most social interactions for a person with generalized social anxiety disorder activate the fear structure. This activation, according to Mathews and Mackintosh, would temporarily sensitize the TES, leading to stronger general cognitive biases. In contrast, emotional processing theory would hypothesize that these biases would increase only for socially relevant material.

### **The treatment of social anxiety disorder**

#### *Modifying the fear structure of social anxiety disorder: special considerations*

As noted earlier, Foa and Kozak (1986) suggested that in order to promote emotional processing via exposure therapy (correction of the pathological elements of the target fear structure), the situation that activates the fear structure should incorporate corrective information that is contradictory to the erroneous associations represented in the structure (e.g. people are nice, not nasty). Generally, the corrective information is embedded in the absence of harm during confrontation with the feared situation, object or memory (e.g. giving a speech without the audience booing), thus leading the patients to evaluative changes. Indeed, Hope et al. (1995) found that negative social cognitions decreased significantly after exposure therapy. However, for emotional processing to occur, it is essential that the patient perceive that the feared consequences did not materialize. For a patient with a dog phobia who is confronted with a friendly dog, the absence of negative consequences is obvious. However, because of the nature of social interactions, information disconfirming the patient's belief that others will judge him or her negatively is often obscure (e.g. people do not typically provide unambiguous praise, 'You were absolutely fantastic!', or unambiguous criticism, 'You were totally inadequate!'). A number of factors may interfere with encoding the disconfirming information: the ambiguity of feedback from others, engaging in safety behaviours, attentional bias and interpretation bias. The ambiguity of a social situation stems from the fact that explicit negative feedback during social interactions is censored. Moreover, individuals rarely demonstrate unified enthusiasm after a social interaction. Thus, the absence of open criticism or the presence of some compliments cannot be interpreted as an indication that the individuals involved in a given social interaction greatly and unanimously enjoyed it. Safety behaviours (Clark & Wells, 1995; Salkovskis, 1991), also referred to as subtle avoidance behaviours (Foa & Kozak, 1986), are performed in order

to prevent the feared consequences, reinforcing the perception that criticism or rejection would have occurred had such behaviours been unsuccessful. Attentional and interpretation biases lead to selective encoding of social situations as negative, thus further impeding opportunities for emotional processing in the natural environment of the individual with social phobia.

It follows that the goal of treatment is to set up social situations in sessions that will both activate the fear structure and provide unambiguous information that disconfirms the patient's negative perceptions and evaluations. In other words, successful treatment imposes task demands that are sufficiently strong to override the hypervigilance of negative feedback and forces the patient to incorporate evidence for the adequate social performance. In this way, disconfirming evidence, either during or after the contrived social situation, is incorporated into the fear structure, thus reducing the probability and cost of negative outcomes.

Accordingly, a number of techniques that have recently been introduced into cognitive behavioural therapies for social anxiety disorder emphasize the elimination of safety behaviours and the encouragement of outward focus (Clark & Wells, 1995). Treatments utilizing these techniques have shown a successful reduction of social anxiety (Clark et al., in press; Wells & Papageorgiou, 2001b). To optimize emotional processing, we have incorporated these techniques with imaginal and in vivo exposure and social skills training into our individualized Comprehensive Cognitive Behavioural Therapy (CCBT; Huppert, Roth, & Foa, 2003).

*How to overcome difficulties in activating the fear structure  
of individuals with social anxiety disorder*

By definition, individuals with social anxiety disorder, like other phobic individuals, are reluctant to engage in fear evoking situations that may lead to anxiety. Thus, the instructions to confront such situations in vivo or in imagination are threatening. A special complication in the treatment of social anxiety disorder is that patients often view the therapist as a potential source of evaluation and rejection. Thus, engaging in exposures in the presence of the therapist is threatening in and of itself, and sufficient activation can occur through a simple conversation with the therapist or a confederate. If a patient completely refuses to engage in an in vivo situation that would activate even low levels of anxiety, imaginal exposure may be indicated. For details, see the section below. Overall, clinical experience suggests that most individuals with social anxiety disorder have little problem activating their fear structures; as noted above,

the problem lies with their difficulties in incorporating disconfirming evidence into their fear structure.

*How to overcome the difficulties in disconfirming feared catastrophes of individuals with social anxiety disorder*

One obstacle to successful integration of disconfirming evidence into the pathological fear structure of individuals with social anxiety disorder lies in their claim that although the contrived social situations activate fear, they are artificial and, thus, do not reflect the real world. This claim may reflect the perception that while the contrived situation may tap some aspect of the fear, it is not a 'true' representation of their core fear. For example, a conversation with a stooge in the therapist's office is not equivalent to a conversation with a potential date. Despite such protests, positive outcomes of repeated exposure during sessions combined with homework exposures do eventually get incorporated into the patient's fear structure. Another obstacle is that the feedback given in the contrived situation is not viewed as credible. A combination of feedback from the confederate about his or her own anxiety, the patient's anxiety and an estimation of both people's performance increases perceived credibility and facilitates the modification of the erroneous beliefs. Further, corrective information can be provided through video feedback (e.g. Harvey, Clark, Ehlers, & Rapee, 2000; Kim, Lundh & Harvey, 2002).

Socially anxious individuals often appear extremely awkward because of their anxiety and safety behaviour (Clark, 2001). It follows that after successful treatment the awkward behaviour will disappear without direct intervention. However, our clinical impression is that some patients continue to exhibit poor social skills after safety behaviours have been dropped, and their perception that others are evaluating them negatively is realistic, thereby strengthening the association between social situations and rejection. We believe that with these patients, social skills training is indicated. This includes both assertiveness training and initiating, maintaining and ending conversations. According to our clinical experience, many patients with social anxiety disorder are not assertive because they perceive their assertive behaviour as aggressive and likely to evoke rejection. Their use of passive behaviours has become so habitual that without social skills training their inappropriate behaviour remains unchanged. Similarly, we have seen patients who have been so isolated because of their social anxiety that they are unable to access the skills required for successful social interactions. Social skills training equips the patient with social behaviours that are likely to result in a positive outcome, which in turn provides disconfirmatory information that modifies their fear structure.

*The use of imagery versus in vivo situations: the unique application in social anxiety disorder*

Despite evidence for the efficacy of imaginal exposure in the treatment of social anxiety in early studies (e.g. Schwartz & Kaloupek, 1987; Chaplin & Levine, 1981), it has generally fallen into disuse. However, given the importance of imagery in social anxiety disorder (see Hirsch & Clark, this volume), this procedure seems to have a rediscovered relevance in treating this disorder. The specific guidelines for forming the content of the imaginal exposure in the early studies differed from those used successfully with obsessive-compulsive disorder (Kozak & Foa, 1997) and post-traumatic stress disorder (Foa & Rothbaum, 1998). Some methods of imaginal exposure have used positive imagery scripting, positive coping to negative outcomes, or recall of past negative events (Chaplin & Levine, 1981; Schwartz & Kaloupek, 1987). However, Foa and colleagues' way of using imaginal exposure focuses on the exaggerated consequences. The rationale given to the patients for this approach is that socially anxious individuals do not distinguish sufficiently between their thoughts about possible catastrophes (the entire audience laughing at them) and reality (a few people not liking the talk), and, therefore, these thoughts make them extremely anxious. As a result, they attempt to suppress the thoughts, an attempt that increases the frequency and intensity of the catastrophic thoughts (thought suppression paradox, Wenzlaff & Wegner, 2000). The repeated imagery of the feared consequence sharpens the distinction between reality and imagery. This process is similar to that involved in repeatedly watching a scary movie; both increase one's realization that fear, which is a reaction to an imminent threat, is unwarranted. Accordingly, patients are asked to imagine extremely unrealistic negative outcomes (e.g. the patient speaking in public, the audience booing incessantly and shouting the speaker down, and concluding with rotten tomatoes being thrown at the patient). Frequently, the ultimate consequence is rejection and isolation/alienation from others. Our clinical experience with many patients is that such exposures result not only in decreased anxiety and avoidance, but also in boredom or humour.

Imaginal exposure is used in two circumstances:

1. when patients have catastrophic predictions of specific outcomes that are not easily testable or have been repeatedly discounted (e.g. that the audience will evaluate a performance extremely critically), or
2. when patients refuse to confront situations in their hierarchy due to extreme anxiety.

Through repeated exposure to the imagined scenario, the patient learns to tolerate his or her anxiety to the feared scenario, and after some

repetitions comes to view the imagined scenario as boring, ridiculous, or even funny. Indeed, direct exposure to feared social consequences of the patient can only be achieved in imagination (e.g. the patient being rejected by everyone).

Research with anxiety disorders has shown that repeated imaginal exposure to feared consequences leads to between-session reduction of anxiety (see earlier discussion). Foa and Kozak (1986) proposed that imaginal exposure reduces the exaggerated cost and thereby the estimated probability of the negative outcomes. We suggest that this cognitive process mediates reduction of the anxiety and avoidance of feared situations. In other words, imaginal exposure results in a new, non-threat cognitive structure. This new structure is consolidated through information provided during the contrived, in vivo situations described above. The new associations lower the threshold of the TES during threat situations, thereby decreasing interpretation and attentional biases. Here, we suggest that the same processes take place when imaginal exposure is implemented with socially anxious patients. Indeed, our socially anxious patients exhibit the same pattern of between-session fear reduction and cognitive change.

*Modification in the structure of individuals with social anxiety disorder after treatment*

After successful treatment for an individual with social anxiety disorder, there are a number of changes that would indicate the formation of a non-pathological social structure. These include reduced:

1. probability estimates,
2. cost estimates,
3. attentional biases,
4. interpretation bias,
5. belief that anxiety during social situations remains for ever, and
6. beliefs about the consequence of social situations (e.g. being rejected).

The first four indicators are changes in information processing that likely lead to the changes in the latter two, as well as a general reduction in symptoms. Furthermore, these changes should also reflect a lowered threshold of the positive evaluation system (PES) and a higher threshold of the threat-evaluation system (TES), especially in social situations.

*Discussion*

In this chapter, we have presented a theoretical account of social anxiety disorder that draws on emotional processing theory and Mathew and

Mackintosh's (1998) cognitive model of selective processing in anxiety. How does this revised theory differ from other accounts of social anxiety disorder? Two elaborate theories of social anxiety disorders have been proposed (Clark & Wells, 1995; Rapee & Heimberg, 1997). Both theories account for a variety of the clinical manifestations of the disorder and have made a major contribution to clinical practice. However, emotional processing theory is distinguished in the following ways:

1. It is a general theory of the mechanisms and treatment of pathological anxiety, and thus explains social anxiety disorder within the framework of other anxiety disorders.
2. Consistent with modern learning theories (e.g. Rescorla, 1988), it posits that pathological (erroneous) meaning often resides in associations among representations and does not always involve awareness and recruitment of language processes, such as evaluations and attributions. Thus, it accounts for clinical observations that patients do not always have explanations about their anxiety.
3. Because it conceptualizes meaning in associations among stimuli and/or responses, it accounts for natural recovery and for the efficacy of exposure therapy in the absence of cognitive interventions (e.g. Hope et al., 1995), as well as for the efficacy of cognitive interventions.
4. It explains the efficacy of imaginal exposure to feared catastrophes as a potentially powerful treatment technique.
5. It provides a fuller understanding of social anxiety disorder within an information processing framework and thus generates new hypotheses for future research.

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#### REFERENCES

- Amir, N., & Foa, E. B. (2001). Cognitive biases in social phobia. In S. Hofman & P. M. DiBartolo (Eds.), *From Social Anxiety to Social Phobia: Multiple Perspectives*, 268–280. Needham, MA: Allyn & Bacon.
- Avero, P., & Calvo, M. G. (1999). Emotional reactivity to social-evaluative stress: gender differences in response systems concordance. *Personality and Individual Differences*, 27, 155–170.
- Bouton, M. E. (2000). A learning theory perspective on lapse, relapse, and the maintenance of behavior change. *Health Psychology*, 19, 57–63.
- Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. *Advances in Behaviour Research and Therapy*, 5, 51–62.
- Chaplin, E. W., & Levine, B. A. (1981). The effects of total exposure duration and interrupted versus continuous exposure in flooding therapy. *Behavior Therapy*, 12, 360–368.

- Clark, D. M. (2001). A cognitive perspective on social phobia. In W. R. Crozier & L. E. Alden (Eds.), *International Handbook of Social Anxiety: Concepts, Research and Interventions Related to the Self and Shyness*, 405–430. New York: Wiley.
- Clark, D. M., Ehlers, A., McManus, F., Hackmann, A., Fennell, M., et al. (in press). Cognitive therapy vs. fluoxetine in generalized social phobia: a randomized placebo controlled trial. *Journal of Consulting and Clinical Psychology*.
- 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*, 69–93. New York: Guilford.
- Cuthbert, B. N., Lang, P. J., Strauss, C., Drobles, D., Patrick, C. J., & Bradley, M. M. (2003). The psychophysiology of anxiety disorder: fear memory imagery. *Psychophysiology*, 40, 407–422.
- De Silva, P., & Rachman, S. (1984). Does escape behavior strengthen agoraphobic avoidance? A preliminary study. *Behaviour Research and Therapy*, 22, 87–91.
- Emmelkamp, P. M. G. (1974). Self-observation versus flooding in the treatment of agoraphobia. *Behaviour Research and Therapy*, 12, 229–237.
- Foa, E. B., & Cahill, S. P. (2001). Emotional processing in psychological therapies. In N. J. Smelser & P. B. Bates (Eds.), *International Encyclopedia of the Social and Behavioral Science*, 12363–12369. Oxford: Elsevier.
- Foa, E. B., & Chambless, D. (1978). Habituation of subjective anxiety during flooding in imagery. *Behaviour Research and Therapy*, 16, 391–399.
- Foa, E. B., Franklin, M. E., & Kozak, M. J. (2001). Social phobia: An information processing perspective. In S. Hofman & P. M. DiBartolo (Eds.), *From Social Anxiety to Social Phobia: Multiple Perspectives*, 268–280. Needham, MA: Allyn & Bacon.
- Foa, E. B., Franklin, M. E., Perry, K. J., & Herbert, J. D. (1996). Cognitive biases in generalized social phobia. *Journal of Abnormal Psychology*, 105, 433–439.
- Foa, E. B., Grayson, J. B., Steketee, G. S., Doppelt, H. G., Turner, R. M., & Latimer, P. R. (1983). Success and failure in the behavioral treatment of obsessive-compulsives. *Journal of Counseling and Clinical Psychology*, 51 (2), 287–297.
- Foa, E. B., & Kozak, M. J. (1985). Treatment of anxiety disorders: implications for psychopathology. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and the Anxiety Disorders*. Hillsdale, NJ: Erlbaum.
- Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: exposure to corrective information. *Psychological Bulletin*, 99, 20–35.
- Foa, E. B., & Kozak, M. J. (1993). Pathological anxiety: the meaning and the structure of fear. In N. Birbaumer & A. Öhman (Eds.), *The Structure of Emotion*, 110–121. Toronto, Canada: Hogrefe, Int.
- Foa, E. B., & McNally, R. J. (1996). Mechanisms of change in exposure therapy. In Rapee, R. M., (Ed.), *Current Controversies in the Anxiety Disorders*. New York: Guilford Press.
- Foa, E. B., & Rothbaum B. O. (1998). *Treating the Trauma of Rape: Cognitive-behavioral Therapy for PTSD*. New York: Guilford.
- Gilboa-Schechtman, E., Franklin, M. E., & Foa, E. B. (2000). Anticipated reactions to social events: differences among individuals with generalized social

- phobia, obsessive compulsive disorder, and nonanxious controls. *Cognitive Therapy and Research*, 24, 731–746.
- Hackmann, A., Clark, D. M., & McManus, F. (2000). Recurrent images and early memories in social phobia. *Behaviour Research and Therapy*, 38, 601–610.
- Harvey, A. G., Clark, D. M., Ehlers, A., & Rapee, R. M. (2000). Social anxiety and self-impression: cognitive preparation enhances the beneficial effects of video feedback following a stressful social task. *Behaviour Research and Therapy*, 38, 1183–1192.
- Heinrichs, N., & Hofmann, S. G. (2001). Information processing in social phobia: a critical review. *Clinical Psychology Review*, 21, 751–770.
- Hope, D. A., Heimberg, R. G., & Bruch, M. A. (1995). Dismantling cognitive-behavioral group therapy for social phobia. *Behaviour Research and Therapy*, 33, 637–650.
- Huppert, J. D., Roth, D. A., & Foa, E. B. (2003). Cognitive behavioral therapy for social phobia: new advances. *Current Psychiatry Reports*, 5, 289–296.
- Jaycox, L. H., Foa, E. B., & Morral, A. R. (1998). Influence of emotional engagement and habituation on exposure therapy for PTSD. *Journal of Consulting and Clinical Psychology*, 66, 185–192.
- Keltner, D., & Buswell, B. N. (1997). Embarrassment: its distinct form and appeasement functions. *Psychological Bulletin*, 122, 250–270.
- Kessler, R. C., Stein, M. B., & Berglund. (1998). Social phobia subtypes in the National Comorbidity Survey. *American Journal of Psychiatry*, 155, 613–619.
- Kim, H. Y., Lundh, L. G., & Harvey, A. (2002). The enhancement of video feedback by cognitive preparation in the treatment of social anxiety: a single session experiment. *Journal of Behavior Therapy and Experimental Psychiatry*, 33, 19–37.
- Kozak, M. J., & Foa, E. B. (1997). *Mastery of obsessive-compulsive disorder: a cognitive-behavioral approach (Therapist Guide)*. Boulder, CO: Graywind Publications Incorporated.
- Kozak, M. J., Foa, E. B., & Steketee, G. (1988). Process and outcome of exposure treatment with obsessive-compulsives: psychophysiological indicators of emotional processing. *Behavior Therapy*, 19, 157–169.
- Lang, P. J. (1977). Imagery in therapy: an information processing analysis of fear. *Behavior Therapy*, 8, 862–886.
- Lang, P. J., Davis, M., & Öhman, A. (2000). Fear and anxiety: animal models and human cognitive psychophysiology. *Journal of Affective Disorders*, 61, 137–159.
- Mathews, A. M., Johnston, D. W., Sahw, P. M., & Gelder, M. G. (1974). Process variables and the prediction of outcome in behaviour therapy. *British Journal of Psychiatry*, 125, 256–264.
- Mathews, A., & Mackintosh, B. (1998). A cognitive model of selective processing in anxiety. *Cognitive Therapy and Research*, 22, 539–560.
- Rabavilas, A. D., Boulougouris, J. C., & Stefanis, C. (1976). Duration of flooding sessions in the treatment of obsessive-compulsive patients. *Behaviour Research and Therapy*, 14, 349–355.
- Rachman, S. J., Craske, M. G., Tallman, K., & Solyom, C. (1986). Does escape behavior strengthen avoidance? A replication. *Behavior Therapy*, 17, 366–384.

- Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behavior Research and Therapy*, 35, 741–756.
- Rescorla, R. A. (1988). Pavlovian conditioning: it's not what you think it is. *American Psychologist*, 43, 151–160.
- Rescorla, R. A. (2001). Experimental extinction. In R. R. Mowrer & S. B. Klein (Eds.), *Handbook of Contemporary Learning Theories*. Mahwah, NJ: Erlbaum.
- Roth, D., Antony, M. M., & Swinson, R. P. (2001). Attributions for anxiety symptoms in social phobia. *Behavior Research and Therapy*, 39(2), 129–138.
- Salkovskis, P. M. (1991). The importance of behaviour in the maintenance of anxiety and panic: a cognitive account. *Behavioural Psychotherapy*, 19, 6–19.
- Schwartz, S. G., & Kaloupek, D. G. (1987). Acute exercise combined with imaginal exposure as a technique for anxiety reduction. *Canadian Journal of Behavioral Science*, 19, 151–166.
- Solomon, R. L., Kamin, L. J., & Wynne, L. C. (1953). Traumatic avoidance learning: the outcomes of several extinction procedures with dogs. *Journal of Abnormal and Social Psychology*, 48, 291–302.
- Stern, R. S., & Marks, I. M. (1973). Brief and prolonged exposure: a comparison in agoraphobic patients. *Archives of General Psychiatry*, 28, 270–276.
- Stopa, L., & Clark, D. M. (2000). Social phobia and interpretation of social events. *Behaviour Research and Therapy*, 38, 273–283.
- Uren, T. H., Szabo, M., & Lovibond, P. F. (in press). Probability and cost estimates for social and physical outcomes in social phobia and panic disorder. *Journal of Anxiety Disorders*.
- Van Minnen, A., & Foa, E. B. (submitted). The effects of long versus short imaginal exposure on treatment outcome of PTSD.
- Wells, A., & Papageorgiou, C. (2001a). Social phobic interoception: effects of bodily information on anxiety, beliefs and self-processing. *Behaviour Research and Therapy*, 39, 1–11.
- Wells, A., & Papageorgiou, C. (2001b). Brief cognitive therapy for social phobia: a case series. *Behaviour Research and Therapy*, 39, 653–658.
- Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. In S. T. Fiske (Ed.), *Annual Review of Psychology*, vol. 51, 59–91. Palo Alto, CA: Annual Reviews.