Emotion Regulation in Social Anxiety Disorder

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Sarah had to give a presentation at work. Weeks before she was scheduled to present, Sarah began to worry that she would not do a good job and that her colleagues would evaluate her negatively. This generated a negative mental self-image of her ensuing failure, which produced bouts of fear and anticipatory anxiety. It also resulted in losing sleep, not eating well, withdrawing from her colleagues, and intrusive negative thoughts that interfered with her daily work performance and disruption in her interpersonal relationships outside of work.

When she delivered her presentation, Sarah was distraught and felt overwhelmed with fear and worry. Although Sarah presented well and received some positive feedback from her colleagues, she automatically discounted their comments as not genuine but rather motivated by their pity for her. Instead, she replayed in her mind thoughts about how poorly she had done and what her colleagues were saying about her. These post-event distorted thoughts and negative self-views only maintained her anxiety and worry, as well as her avoidance of co-workers. Sarah felt very isolated and alone, and suffered silently.

This example of a person suffering from social anxiety disorder (SAD) highlights the maladaptive emotional, cognitive, and behavioral patterns that are characteristic of SAD. SAD is highly prevalent (12.1%, Kessler et al., 2005), chronic (Cairney et al., 2007), undertreated (Wang et al., 2005), and manifests in a continuum of severity (Bögels et al., 2010). Individuals with SAD under-utilize mental health services (Magee, Eaton, Wittchen, McGonagle, & Kessler, 1996), and have a low rate of help-seeking behavior (Stein & Kean, 2000). Thus, many people with SAD suffer with their untreated anxiety for an extended period of time despite the existence of effective psychotropic and psychosocial interventions.

According to the DSM-5 (American Psychiatric Association, 2013), SAD is diagnosed in adults when they have—for at least six months—experienced marked fear or anxiety regarding social situations that might expose them to

social scrutiny. Such situations are either avoided or suffered through, and in such situations, individuals with SAD fear that their behaviors or anxiety symptoms will be embarrassing, or will result in negative evaluation. These fears are greater than any actual threat would justify, and they result in significant interference in daily, occupational, educational or social functioning. Although this interference causes the individual marked distress, most individuals with SAD do not receive treatment for their social anxiety. Thus, the negative impacts of SAD on the individual and her/his network of relationships are usually sustained across the lifespan.

Recently, greater attention has been devoted to investigating brain and behavioral mechanisms that perpetuate social anxiety symptoms. One focus of this research effort is on understanding how emotion and emotion regulation (ER) function in individuals with SAD and how they are modulated by clinical interventions. The overarching goal of most clinical interventions for SAD is to decrease reliance on maladaptive ER strategies (e.g., expressive suppression), and to increase ability and implementation of more adaptive ER strategies (e.g., cognitive reappraisal) that lead to reductions in anxiety, greater psychological flexibility, and sustained well-being. In what follows, we will describe a framework for considering emotion and ER in SAD.

EMOTION IN SOCIAL ANXIETY DISORDER

Emotions arise when we attend to a situation and appraise it as being personally salient or relevant to our goals. Emotions are rapid, transient, varied and malleable. They involve variably coupled experiential, behavioral, and physiological responses that unfold and interact over time. The modal model (Gross, 1998a; Figure 17.1) highlights multiple stages in the emotion-generative process, including contact with the initial situation that compels attention, an evaluation of the situation, and multi-system whole-body responses (Gross & Thompson, 2007).

Emotions can be characterized according to their level of arousal and valence. For example, anxiety is an example of a high-arousal, negatively valenced emotion that manifests in anticipation of or during a situation, often to brace ourselves for the consequences of perceived threats. In contrast, sadness is a low-arousal, negatively valenced emotion that usually arises in response to past situations or events. Excitement is a high-arousal, positively valenced emotion that occurs in anticipation of a future event or during an event. Contentment is a low-arousal, positively valenced emotion that reflects happiness in the
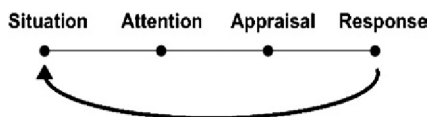

Situation   Attention   Appraisal   Response

FIGURE 17.1   **The Modal Model of Emotion.** *Reprinted with permission from Guilford Press.*

present based on what has happened in the recent past. It is also important to note that in addition to experiencing a single distinct emotion, it is also possible to experience mixed emotions that either co-occur or oscillate rapidly within seconds, for example, when learning about a job offer induces both fluctuating excitement and anxiety, or a piece of music triggers feelings of joy and sadness simultaneously.

Current models of the neural substrates of emotional reactivity suggest that limbic/paralimbic brain regions (amygdala, insular cortex, rostral and posterior anterior cingulate cortex, hippocampus) detect and respond to social cues appraised as indicators of threat. Emotional reactivity spans from pre-conscious to conscious stages of processing over the course of milliseconds to seconds, and activates multiple systems, including an acute narrowing of attentional focus to specific external (i.e., visual features) and internal cues (e.g., bodily sensations), sympathetic nervous system arousal that readies the body to take action, inhibition of ongoing behavior (e.g., freezing), conceptual self and salience brain networks, facial expressions, and longer-term stress hormone responses (e.g., hypothalamic-pituitary-adrenal gland mediated cortisol) and behavioral approach to attack others or withdrawal to protect the self. How each of these features of emotional reactivity differs in SAD is an ongoing focus of clinical research.

Cognitive models (Clark & Wells, 1995; Heimberg, Brozovich, & Rapee, 2010; Hofmann, 2007) suggest that SAD is characterized by exaggerated emotional reactivity before, during, and after social situations. This heightened level of reactivity is thought to be related to problems with negative moods, co-morbidity with major depression disorder (20%) and other anxiety disorders (65%), (Ohayon & Schatzberg, 2010), as well as elevated perceived stress. One of the primary triggers of heightened levels of social anxiety is thought to be the heightened perception of perceived threat of evaluation by others. This is driven by an attentional bias to perceive benign cues (e.g., a colleague yawning or looking away) as social threats, as well as a tendency to misinterpret normal internal physiological patterns (e.g., elevated heart rate, perspiration, blushing) as signals suggesting a loss of control.

Importantly, there is evidence from attention-training procedures that directing attention towards potentially threatening stimuli as well as directing attention away from positive social stimuli may both be causally related to social anxiety symptoms (Amir et al., 2009; Morrison & Heimberg, 2013; Taylor, Bomyea, & Amir, 2011). Several lines of experimental research point to deficient effortful attention control as related to heightened anxiety in individuals with social anxiety as measured by self-reported attention control (Moriya & Tanno, 2008), volitional anti-saccades (Weiser et al., 2009), operation span (Simonds et al., 2007), and functional brain imaging of attention regulation (Goldin & Gross, 2010). Thus, attentional biases towards threat- and difficulty-regulating-attention contribute to heightened emotional reactivity in individuals with SAD.

Another source of exaggerated emotional reactivity in individuals with SAD is biased interpretation of social cues; for example, interpreting a neutral facial expression as indicating social disapproval. There is evidence that specific features of interpretation may promote greater emotional reactivity in SAD such as faster detection of angry and fearful facial expressions during moderate threat (Mullins & Duke, 2004), misinterpretation of disgust facial expressions as expressing contempt (Heuer et al., 2010), and heightened amygdala activation to negative (Stein et al., 2002) and neutral (Cooney, Atlas, Joormann, Eugene, & Gotlib, 2006) facial expressions. This tendency to misinterpret also extends to misconstruing positive social information or feedback, including perceiving positive social events (Alden, Taylor, Mellings, & Laposa, 2008), and other's positive regard (Vassilopoulos & Banerjee, 2010) as sources of social threat. Assessments of the tendency to misinterpret and react to social evaluation includes self-report questionnaires that measure fear of negative (Weeks et al., 2005) and of positive evaluation (Weeks et al., 2010), as well as fMRI studies of brain responses to social criticism and social praise (Blair et al., 2008; Ziv, Goldin, Jazaieri, Hahn, & Gross, 2013). Studies have shown that fear of negative and of positive evaluation each account for unique variance in social anxiety symptom severity (Weeks et al., 2010). These different methods clearly show that interpretation bias is an important feature of SAD.

Neuroimaging studies of emotional reactivity in SAD have demonstrated enhanced functional brain activity in limbic/paralimbic regions, including the amygdala (Stein, Goldin, Sareen, Zorrilla, & Brown, 2002; Straube, Kolassa, Glauer, Mentzel, & Miltner, 2004; Yoon, Fitzgerald, Angstadt, McCarron, & Phan, 2007), anterior cingulate cortex (ACC) (Amir et al., 2005), and insular cortex (Straube, Mentzel, & Miltner, 2005) in response to potential social threat cues such as harsh facial expressions (Goldin, Manber-Ball, Werner, Heimberg, & Gross, 2009; Murray B. Stein, Philippe R. Goldin, Jitender Sareen, Lisa T. Zorrilla, & Gregory G. Brown, 2002), praise, criticism (Blair, Geraci, et al., 2008), experimenter-selected negative self-belief statements (Blair, Geraci, et al., 2008), and anticipation and delivery of a speech (Blair, Shaywitz, et al., 2008; Tillfors et al., 2001), but not physical threat (Goldin, Manber-Ball, et al., 2009). However, detecting heightened emotional reactivity in individuals with SAD compared to healthy controls can depend on the type of information used as the indicator. For example, recent large fMRI studies have found reliable evidence of greater emotional reactivity in SAD versus healthy controls for self-reported negative emotion, but not for brain signal intensity in amygdala and anterior insula across three distinct types of socio-emotional stimuli (Doehrmann et al., 2013; Ziv et al., 2013).

EMOTION REGULATION IN SOCIAL ANXIETY DISORDER

In many situations, emotions are an important source of information about our moment-to-moment mental and bodily state, and reflect one component of our response to our internal and external environments. However, at times,

emotions can be maladaptive rather than adaptive. Furthermore, there are individual differences in the experience of positive and negative affect (Hofmann, Sawyer, Fang, & Asnaani, 2012). At such times, we may attempt to regulate our emotions. Being able to discern the function of different emotions in specific contexts and understand when and how to best up- or down-regulate our emotions is an essential skill that reflects psychological flexibility.

ER refers to both volitional and spontaneous strategies implemented to influence when and how specific emotions are experienced and expressed (Gross, 1998b). While the use of ER strategies varies according to contexts and goals, they are generally categorized into distinct types based upon when they have their primary impact on the emotion-generative process. The process model of ER (Gross, 1998a; Figure 17.2), proposed as an organizing framework, describes five families of emotion regulatory processes: situation selection, situation modification, attentional deployment, cognitive change, and response modulation.

"Situation selection" refers to efforts made to influence an emotion by either increasing or decreasing the likelihood of encountering a given situation where a particular emotion is likely to be elicited. "Situation modification" refers to efforts made to alter one's emotion by changing external, physical features of the environment. "Attentional deployment" refers to efforts made to alter one's emotions by directing one's attention in a particular way to specific features of the environment. "Cognitive change" refers to efforts made to modify one's emotions by changing the meaning of the situation. Lastly, "response modulation" refers to efforts made to alter the experiential, physiological, or behavioral components of an emotion *after* it is fully generated.

A single emotional episode may involve the implementation of multiple ER strategies at different points during the generation of an emotion. Based on the process model, individuals may implement either single or multiple ER strategies over the course of a single emotional episode. This is supported by research showing that most people use multiple ER strategies with a high degree of
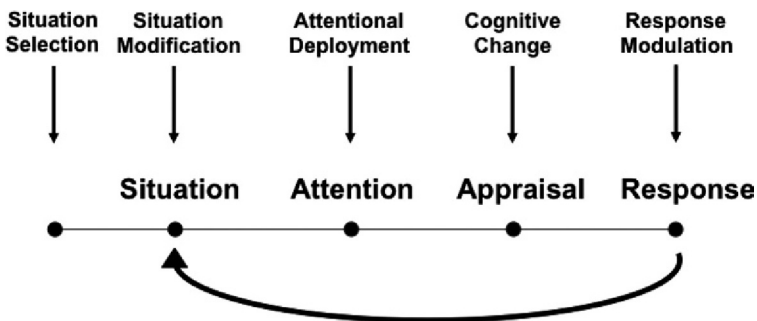
FIGURE 17.2   **The Process Model of Emotion Regulation.** *Reprinted with permission from Guilford Press.*

variability (Webb, Miles, & Sheeran, 2012). This flexibility is important in developing a varied repertoire of ER strategies to apply in different contexts.

However, not all instances of a given ER strategy will be effective or optimal across all contexts, and the characterization of ER strategies as adaptive or maladaptive depends on specific goals in distinct contexts. For example, in one context, a father might suppress showing his own emotional distress in his facial expression or verbal utterances when his young daughter accidently hammers her finger, as an attempt to inhibit any perceivable cues that might amplify the daughter's emotional and physical pain. In contrast, at a moment when the daughter is sharing her concern regarding being socially excluded from a group of classmates, the father might unskillfully use expressive suppression with the intention of not interfering with his daughter's thought process but might inadvertently fail to recognize that visual and verbal expressions of sympathy that constitute emotional resonance is what is most called for to connect and support with his daughter in her moment of despair and suffering.

In another context, the same father might offer his young daughter different reappraisals or reinterpretations that explain or elucidate why a classmate at school did not want to attend her birthday party—in this case, to help reduce the daughter's sense of rejection and socio-emotional pain. Reappraisals, however, may not always be helpful, especially when they contradict or misconstrue reality. For example, there may be occasions when experiencing failure and co-occurring negative emotions such as sadness, frustration and disappointment constitute an important learning experience. Use of reappraisal to downregulate the negative emotion in this instance may actually interfere with the longer-term benefit of facing rather than avoiding failure. The key point here is to understand when reappraisal is being used to avoid directly experiencing adversity that propels maturity. Thus, specific goals and contexts can influence which ER strategies are employed and whether they are adaptive (i.e., helpful) or maladaptive (i.e., unhelpful). For further examples of adaptive and maladaptive forms of each of the five families of ER strategies as they related to SAD, see Table 17.1.

With respect to social anxiety, cognitive models (Clark & Wells, 1995; Heimberg et al., 2010; Hofmann, 2007) and empirical research suggest that individuals with SAD are plagued by ineffective ER, including excessive avoidance of specific social situations, biased and inflexible attentional deployment, unsuccessful cognitive reappraisal, and disproportionate expressive suppression. Given the high propensity to experience negative emotions, the maladaptive use of ER strategies may be especially problematic in SAD. Although avoidance may limit immediate distress over the longer term, it may significantly limit social and professional opportunities. In the case of a person with SAD, for example, when utilizing situation selection to avoid going to social gatherings, one result may be not encountering information that challenges the belief that social gatherings are threatening. Thus, understanding the profile of ER use and promoting adaptive use of ER strategies in individuals with SAD is

TABLE 17.1 Examples of "Adaptive" and "Maladaptive" Emotion Regulation Strategies

Emotion Regulation Strategy	Adaptive	Maladaptive
Situation Selection	Not giving a presentation at work in order to allow a more junior colleague to have the opportunity to present	Not giving a presentation at work in order to avoid feeling anxious because of fear that others may judge you
Situation Modification	Drinking something calming/ soothing (e.g., water, tea) at a social gathering to help one feel more at ease	Drinking excessive amounts of alcohol at a social gathering to help one feel more at ease
Attentional Deployment	Watching one's breath rise and fall while attending a social gathering to help feel more at ease	Watching a TV in the background at a social gathering to help one feel more at ease by not having to directly converse with others
Cognitive Change	Using cognitive reappraisal to down-regulate your distress when stuck in traffic and running late for an important meeting	Using cognitive reappraisal to down-regulate your distress and to convince yourself that it is okay to be in an abusive relationship
Response Modulation	Inhibiting the emotion of anger when hearing one's boss describe yet another vacation to French Polynesia	Inhibiting the emotion of anger when hearing about tragedies within one's community

essential for understanding whether and how clinical interventions alleviate the silent suffering of social anxiety. To further elucidate ER in SAD, Figure 17.3 shows an example of how the Gross process model of ER might be applied to a single social situation. In this instance, we elucidate multiple possible decision points in the course of a social situation in which ER can impact the generation and expression of emotion in an individual with SAD.

Situation Selection

Situation selection refers to decisions to approach or to avoid specific situations based on their likely affective impact. For individuals with SAD, situation selection primarily involves the avoidance of feared social situations. Here, avoidance refers to intentional efforts to avoid social situations in an attempt to pre-empt, escape, or circumvent aversive emotions, thoughts, or sensations. In Figure 17.3, the example of situation selection is whether or not to enter a social
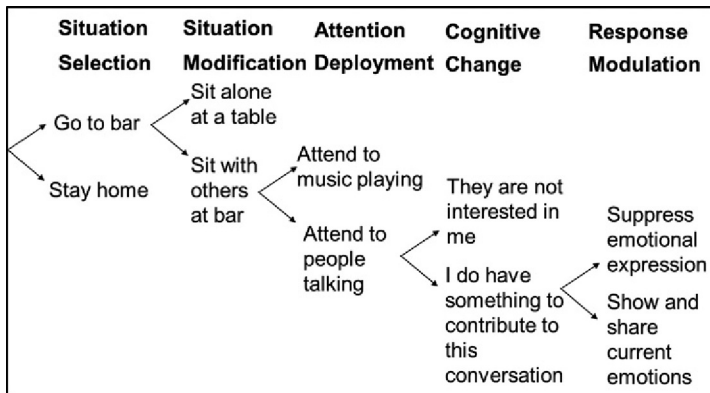
FIGURE 17.3   Gross Process Model of Families of Emotion Regulation Strategies Applied to Social Anxiety Disorder.

situation and to then be exposed to the set of social cues and interactions that might trigger pleasant or aversive emotions. Situation selection is the first step into social situations for individuals with SAD and represents a willingness to expose oneself to a perceived fearful context that is likely to trigger anxiety. The short-term ER goal of attempting to prevent the experience of anxiety comes at the expense of longer-term goals such as making friends (which requires putting oneself in a social situation to meet new people), or obtaining a higher paying job (which requires putting oneself in a performance situation such as a job interview).

Research studies of SAD have measured situation selection in multiple ways. For example, compared to non-anxious controls, individuals high in social anxiety demonstrate greater avoidance in daily face-to-face social interactions. Greater use of situational avoidance regulation in SAD has been reported in the context of social situation speech tasks using the Emotion Regulation Interview (Werner, Goldin, Ball, Heimberg, & Gross, 2011). Furthermore, investigations of autobiographical social situation memories in SAD have shown greater avoidance of current situations similar to past ones (Anderson, Goldin, Kurita, & Gross, 2008). Thus, over-reliance on situation avoidance appears to be a core feature of SAD.

Situation Modification

Once in a social situation, situation modification refers to modifying parameters that will influence which emotions occur. As depicted in Figure 17.3, one of the ways that situation modification manifests in SAD may be deciding whether or not to enact a strategic self-protective safety behavior (e.g., sit alone at a table in a bar) or to increase the likelihood of social interaction (e.g., by sitting with others at the bar).

While there are many ways that individuals modify situations to regulate emotions, in people with SAD one primary method is engaging in safety behaviors which are intended to reduce anxiety and enhance the perception of control and comfort (Clark & Wells, 1995). Safety behaviors may include behaviors that reduce the probability of being noticed by others (e.g., averting eye contact with others, not speaking with others, speaking quietly or not at all, hiding in the back of the room), actively inhibiting the processing of social cues (e.g., by thinking and preparing responses to such a degree that one does not process what others say or do). These safety behaviors are problematic because they reinforce the misapprehension of social situations as dangerous, pre-empt social interaction, make oneself appear avoidant, unapproachable, and aloof, and interfere with processing of evidence that disconfirms distorted views of self and others (Butler et al., 2003). These behaviors may make one *less* appealing to others, which can generate further "evidence" for maladaptive self-beliefs (e.g., "I'm so awkward") or interpretations (e.g., "People don't like me") (Alden & Bieling, 1998; Wells et al., 1995). Importantly, reduction of safety behaviors during treatment has been associated with decreases in social anxiety symptoms (Morgan & Raffle, 1999). These findings support the cognitive model of SAD suggesting that safety behaviors contribute to the maintenance of social anxiety and negative self-beliefs.

Attentional Deployment

Having entered a social situation, the choice of where an individual places her or his attention can have powerful effects on the generation of emotion. As shown in Figure 17.3, within social situations, there is frequently a choice of whether to place attention on other people or to distract attention to other non–social features. When an individual with SAD encounters a social cue or performance situation, attention often shifts inwards, and a detailed, internal monitoring (typically distorted) process ensues. For example, SAD individuals may browse the internet on a smartphone while at a party to avoid engaging in a conversation that may produce anxiety. With concentration, SAD individuals may volitionally direct attention to non-emotional components of a situation in an effort to avoid experiencing anxiety. Thus, individuals with SAD tend to employ several forms of attentional deployment, including distraction, concentration, and rumination. One method of distraction is moving one's attention away from the social cues. There is evidence that individuals with SAD shift attention away from faces (compared to household objects) based on a modified dot-probe task (Chen, Ehlers, Clark, & Mansell, 2002).

With rumination, SAD individuals may intentionally place their attention on "negative" self-referential features of the social situation (self-focused attention; Clark & Wells, 1995) and fixate on them. Rumination can take place before, during, or after a social situation. With both distraction and concentration, accurate processing of the situation is impossible. This ultimately leads

to rumination, which only adds to the distress of the situation as the recall of details pertaining to the event is often negatively distorted. One important target for further investigation is the nature and type of attentional deployment that is helpful versus harmful in SAD.

Cognitive Change

This emotion regulation strategy involves using cognitive skills (e.g., perspective-taking, challenging interpretations, reframing the meaning of situations) to modify the meaning of a stimulus or situation that gives rise to emotional reactivity. Cognitive reappraisal, a primary form of cognitive change, entails using cognitive and linguistic processes to reframe or reinterpret the meaning of a stimulus or situation in order to up- or down-regulate the emotions. Reappraisal can modify emotional reactions to stressful, anxiety-provoking situations and can lead to psychological flexibility and emotional well-being (Gross & Thompson, 2007). Difficulty reappraising emotions is considered a core mechanism in individuals with anxiety and mood disorders (Campbell-Sills & Barlow, 2007).

Using a variety of methods, research studies have demonstrated that, compared to healthy controls, individuals with SAD are less successful using reappraisal to reduce anxiety responses. Behavioral studies have observed that compared to controls, individuals with SAD report lesser "reappraisal self-efficacy" when challenged to give a speech or recall autobiographical social anxiety situations (Werner et al., 2011). Neuroimaging studies have found that, compared with healthy controls, individuals with SAD generate lesser brain responses in cognitive control (DLPFC and DMPFC) and attention (medial precuneus, posterior cingulate, and bilateral dorsal parietal cortex) brain networks during reappraisal of harsh facial expressions (Goldin, Manber, Hakimi, Canli, & Gross, 2009), as well as temporally delayed prefrontal cortex activation (DMPFC, bilateral DLPFC, and bilateral VLPFC) and less PFC-amygdala inverse functional connectivity when reappraising self-generated negative self-beliefs (Goldin, Manber-Ball, et al., 2009). Thus, lesser and slower recruitment of cognitive control networks in SAD is related to less successful cognitive down-regulation of limbic responses. This reflects how heightened levels of anxiety can inhibit recruitment of PFC in the context of anxiety-inducing stimuli.

Response Modulation

Response modulation refers to efforts to modify an emotion after it has been fully generated. The most frequent form of this ER strategy is suppression, or volitional inhibition of verbal and behavioral expressions of emotions. Suppression is often motivated by the belief that emotions and emotional expressions are inappropriate and must be controlled (Spokas, Luterek, & Heimberg, 2009), or else social rejection will result. Therefore, response modulation can be construed as a form of impression management. For example, if an individual with

SAD has been wronged in some way and experiences the emotion of anger, instead of outwardly expressing thoughts and feelings about the situation, the person may actively inhibit signs of anger to avoid confrontation or potential rejection by others.

Response modulation has been associated with less close relationships (Gross & John, 2003) because suppression often leads to *less* warm and outgoing behavior and therefore may elicit less friendly behaviors from others (Clark & Wells, 1995). Theorists identify suppression of anxiety in SAD as a safety behavior used to minimize unpleasant emotions during social interactions (Voncken, Alden, & Bögels, 2006). Paradoxically, emotional suppression can lead to greater probability of social rejection by others and subsequent elevation of negative emotions (Breen & Kashdan, 2011). Elevated expressive suppression tendencies in individuals with social anxiety has been observed using experience-sampling (Farmer & Kashdan, 2012) and clinical interviews (Werner et al., 2011). Suppression in individuals with social anxiety has been linked to fewer positive experiences (Kashdan & Steger, 2006). In fact, compared to individuals with major depression, individuals with SAD report greater use of suppression (D'Avanzato, Joormann, Siemer, & Gotlib, 2013; Hofmann, Heering, Sawyer, & Asnaani, 2009).

EMOTION REGULATION INTERVENTIONS FOR SOCIAL ANXIETY DISORDER

Many interventions target ER, including dialectical behavioral therapy (Linehan, 1993), acceptance- and mindfulness-based interventions (e.g., Hayes, Strosahl, & Wilson, 1999; Roemer et al., 2009; Segal, Williams, & Teasdale, 2002), emotion-focused therapy (Greenberg, 2002), and emotion-regulation therapy (Mennin & Fresco, 2009). Here, we focus on Cognitive Behavioral Therapy (CBT) and Mindfulness-Based Stress Reduction (MBSR).

Cognitive Behavioral Therapy

Aaron Beck, MD, pioneered CBT for major depression (Beck, Rush, Shaw, & Emery, 1979) and anxiety disorders (Beck, Emery, & Greenberg, 1985). CBT involves a combination of cognitive and behavioral strategies designed to test and challenge distorted beliefs that perpetuate psychopathology. Clinical studies have demonstrated that CBT is highly effective for treating numerous psychological problems in children, adolescents, and adults (Beck & Emery, 2005). CBT is considered to be the gold-standard intervention for SAD (Heimberg, 2002).

CBT for SAD consists of cognitive restructuring of maladaptive beliefs in the context of exposures to feared social situations. Exposure directly addresses avoidance of social situations (i.e., situation selection), provides a structure to evaluate beliefs (i.e., cognitive change), and generates more adaptive perception of self, others, and the world (Beck & Emery, 2005). A sequence of exposures

is conducted using imagined, role-played, or in vivo situations in a graded fashion from least to most feared situations. Exposures use emotional reactivity to induce approach (versus avoidance), new learning experiences (versus habitual automatic responses), habituation to physiological arousal and negative emotions, skill in implementing cognitive reappraisals, and extinction of fear responses.

Studies have begun to elucidate factors that help explain how clinical interventions reduce social anxiety. In the context of a randomized controlled trial, Morgan and Raffle (1999) found that, compared to standard CBT, CBT plus explicit instructions to refrain from using any safety behaviors resulted in greater reduction of social anxiety symptom severity. This suggests that, in accordance with cognitive models of SAD, decreasing safety behaviors (i.e., avoidant situation selection and situation modification strategies) may reduce anxiety and negative beliefs about social situations.

Maladaptive appraisals (i.e., beliefs, interpretations, core self-schema) are also thought to play an important role in anxiety disorders (Beck, 1976). Cognitive-behavioral models of SAD posit that negative beliefs about social situations contribute to SAD (Clark & Wells, 1995). Cognitive change is an ER strategy that is explicitly trained in CBT through cognitive restructuring. Individuals observe automatic thoughts that occur before, during, or after social situations and identify distorted and unbeneficial thinking patterns. Through behavioral experiments and refined discernment of thinking patterns, more accurate and beneficial appraisals of self, others, and the world arise (Beck & Emery, 2005). Cognitive restructuring training in the context of exposures produces a reframing of the meaning individuals ascribe to social situations and self.

Mediator analyses have begun to identify specific mediators of the impact of CBT for SAD on social anxiety symptom reduction. A recent randomized controlled trial of CBT for SAD has shown that reductions of maladaptive interpersonal beliefs (Boden et al., 2012), as well as increases in cognitive reappraisal self-efficacy and positive self-views during treatment mediate reductions in social anxiety symptoms (Goldin et al., 2012). Importantly, increases in cognitive reappraisal self-efficacy and positive self-views also predict reduction of social anxiety symptoms one year post-CBT. A more refined analysis that examined weekly change across 16 sessions of individual CBT (Goldin et al., under review) found that weekly social anxiety decreases were associated with decreases in suppression frequency and with increases in reappraisal success during treatment, and that increases in weekly reappraisal success predicted post-CBT reduction in social anxiety symptom severity.

Mindfulness-Based Stress Reduction

Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), originally developed by Jon Kabat-Zinn, Ph.D. and colleagues at the University of Massachusetts nearly 35 years ago, has become a widely-accepted and empirically-supported

intervention for a variety of psychological and medical disorders, as well as a well-being enhancement program (Hofmann, Sawyer, Witt, & Oh, 2010). MBSR generally consists of weekly two and a half hour group sessions for eight weeks, and a one-day retreat between sessions 5 and 6. A variety of experiential contemplative exercises are used to cultivate the mental quality of mindfulness, a non-judgmental, flexible, and present-moment attentional focus, including sustained formal meditation practices (focused attention and open monitoring sitting meditation, body scan, hatha yoga, walking and eating meditation) as well as briefer integrative practices (momentary pauses, mindful listening, speaking). With training, these practices are thought to reduce the habitual tendency to automatically and compulsively engage in and react to mental states and environments (Segal et al., 2002).

Meta-analyses have shown that MBSR reliably decreases symptoms of stress, anxiety, and depression, and increases well-being across clinical and non-clinical samples (e.g., Baer, 2003; Bishop, 2002; Grossman, Niemann, Schmidt, & Walach, 2004). MBSR is associated with increased positive and decreased negative-affective states (e.g., Baer, Carmody, & Hunsinger, 2012; Brown & Ryan, 2003; Hofmann et al., 2010). Evidence suggests that MBSR yields improvement in mixed samples of individuals with anxiety disorders (e.g., Vøllestad, Sivertsen, & Nielsen, 2011). However, few studies have targeted specific anxiety disorders (e.g., Craigie, Rees, & Marsh, 2008; Evans et al., 2008), and even fewer still have focused on SAD (e.g., Koszycki, Benger, Shlik, & Bradwejn, 2007). More general mindfulness-based interventions for SAD have been shown to improve mood, functionality, quality of life, and reductions in fear of negative evaluation (Bögels, Sijbers, & Voncken, 2006; Kocovski, Fleming, & Rector, 2009). Interestingly, in one trial of MBSR for SAD, participants did not achieve the rate of response on core symptoms of SAD when compared to group CBT (with 8/18 in CBGT and 2/22 in MBSR achieving full remission rates), though MBSR was as efficacious as CBT in improving subjective well-being, mood, and overall functioning (Koszycki et al., 2007). A recent study found that in individuals with generalized SAD, MBSR decreased social anxiety and depressive symptoms, perceived stress and loneliness, and increased self-esteem and satisfaction with life (Jazaieri, Goldin, Werner, Ziv, & Gross, 2012). This suggests mindfulness meditation training can reduce clinical symptoms and enhance well-being in individuals with SAD.

Neuroimaging studies have begun to identify how MBSR impacts specific forms of emotion regulation in individuals with SAD. A recent randomized controlled trial assigned 56 patients with generalized SAD to MBSR or an active comparison aerobic exercise (AE) stress reduction program and examined whether one specific form of attentional deployment consisting of observing present-moment unfolding of experience (often referred to as open monitoring) down-regulated emotional reactivity to idiographic negative self-beliefs (Goldin et al., 2012). When implementing attention regulation, compared to AE, MBSR produced greater reductions in negative emotion and increases in attention-related

parietal cortical regions. Within MBSR participants, a greater amount of meditation practice was associated with decreases in negative emotion and social anxiety symptom severity, and increases in attention-related parietal cortex neural responses when implementing attention regulation. These results suggest that mindfulness meditation training may improve clinical symptoms and emotion reactivity through augmentation of meta-cognitive, attention regulation ability.

CONCLUDING COMMENT

It is readily apparent from our review that emotion and ER figure prominently in SAD. It is also clear that some effective treatments for SAD exist. However, when examining clinically significant change, these treatments are far from perfect as many individuals with SAD still exist who do not achieve levels of social anxiety in the range of our non-anxious healthy populations following treatment. Because treatment non-responders as well as individuals who are either unable or unwilling to engage in traditional treatments still exist, future research must continue to refine existing treatments and explore alternative interventions for this subset of the treatment-seeking SAD population. We believe that one important component of this research will involve continued efforts to clarify the role of emotion and emotion regulation processes in SAD.

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