

Measuring Changes in Emotion During Psychotherapy: Conceptual and Methodological Issues

Denise M. Sloan, National Center for Posttraumatic Stress Disorder, VA Boston Healthcare System
Ann M. Kring, Department of Psychology, University of California, Berkeley

A selective review of measures that can be used to assess various aspects of emotional responding during the course of psychotherapy is provided. We pay special attention to measures that index emotion regulation, emotional experience, emotional expression, and emotional awareness across self-report, observer-based, and psychophysiological methods. The review concludes with considerations that should be taken into account when selecting emotion measure(s) for use in psychotherapy research and practice. These considerations include having a clear working definition of emotion, reliability issues that arise when measures reflect a state-dependent construct (e.g., emotional experience), and the potential need to assess more than one component of emotional responding.

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Historically, a focus on emotion has been an important part of the psychotherapy process dating as far back as Freud (1910). This is not surprising given that so many psychological disorders involve disturbances in emotion (Berenbaum, Raghaven, Le, Vernon, & Gomez, 2003; Kring, 2001). The focus on emotion in psychotherapy remains central in contemporary approaches across a

variety of psychotherapy orientations. For example, an emphasis on awareness and acceptance of emotions is the cornerstone of the new wave of cognitive-behavioral therapies (e.g., mindfulness-based approaches). Given that various psychotherapy approaches purport to develop and/or improve skills related to emotional functioning, it is imperative that clinicians using these interventions assess clients' improvement in the targeted emotion skills during the course of therapy. It is also important that changes in the relevant emotion skills be examined along with changes in other pertinent areas (e.g., symptoms, quality of life) in the context of treatment outcome research.

Given the importance of emotion in psychotherapy, it is imperative that we have psychometrically strong and practically useful measures of emotion processes and skills. Indeed, there are a number of emotion measures that can be useful in psychotherapy practice, and we submit that it is important to include such measures as an indicator of whether therapy is effective. Ideally, such measures would be included to monitor progress during the course of psychotherapy, as this provides an important source of feedback to therapists as to whether their case formulation and intervention are correct (Persons, 2005).

Many measures of emotion processes have been developed within the last 15 years. We provide a selective review of measures that assess different aspects of emotional responding, including measures of emotional experience, emotional expression, and emotion regulation, that can be used in adult psychotherapy research and practice. The measures we include vary with respect to the measurement methodology employed (e.g., self-report, observational, and psychophysiology), and we make suggestions regarding when more than one assessment method should be

Address correspondence to Denise M. Sloan, National Center for Posttraumatic Stress Disorder, VA Boston Healthcare System, 150 S. Huntington Ave., Boston, MA 02130. E-mail: denise.sloan@va.gov.

used. Our review will conclude with some considerations for selecting the appropriate emotion measures for use in assessment and treatment endeavors. Throughout our review, it is important to keep in mind that there are no definitive indicators of when an emotional process is maladaptive. That is, unlike a score on a depression measure that indicates the presence of clinically significant depression, whether an emotional response is adaptive or maladaptive depends largely on contextual factors. This is an issue that we will revisit later in the article. Furthermore, additional research on basic emotion processes outside the presence of psychopathology is necessary to better specify adaptive or healthy emotional responding.

EMOTIONAL EXPERIENCE AND EMOTIONAL EXPRESSION

Emotion can be defined as action dispositions, evolved over time, that organize behavior along basic defensive and appetitive states, and that prepares organisms to respond to their environment (e.g., Bradley, Codispoti, Cuthbert, & Lang, 2001; Lang, Bradley, & Cuthbert, 1990). In addition, emotional responses consist of multiple components, including experience, expression, and physiology, as well as a number of cognitive processes that aid in the interpretation or appraisal of the situation that provokes an emotional response. For instance, when a person is confronted by a potentially poisonous snake, the person would first identify the threat (“it’s a snake”), and then likely experience fear, recognize the experience of fear, experience increased autonomic activity that would prepare the person to escape from the threat, and show fear on the face. Disruptions in one or more of these components has been linked to different psychological disorders (Kring, 2001), and thus interventions that target these components will be of great benefit.

Because emotional experience and expression are two key components of emotion, valid and reliable assessment of clients’ emotional experience and expression is critical to the success of many psychotherapy approaches. For example, exposure-based therapies are successful only to the extent to which the therapist is able to gauge the client’s level of distress when repeatedly confronted with a feared stimulus. As noted earlier, increasing a client’s ability to identify and remain in contact with emotions is one of the main goals of mindfulness-based interventions such as Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999) and Mindfulness-Based

Cognitive Therapy for depression (Segal, Williams, & Teasdale, 2002). A primary goal of Emotional Processing Therapy is to improve on clients’ ability to become aware of their emotional experiences (Greenberg, 2002) and then to have clients become more proficient in their ability to experience and express both positive and negative emotions. Measures designed to measure emotional experience, emotional awareness, and emotional expression are essential to the success of such therapy approaches. A number of measures intended to assess these emotion skills have been created and have been shown to be useful in psychotherapy with adults.

Emotional Experience

A measure commonly used in psychotherapy to assess emotional experience is the Subjective Units of Distress Scale (SUDS; Wolpe, 1958). The SUDS consists of one item (e.g., distress, fear, or anxiety) rated using a 0 (not at all) to 100 (extremely) scale. In some cases, the scale is altered to 0 to 10 (e.g., Alpers, Wilhelm, & Roth, 2005). Consistent with Wolpe’s (1958) original use of this measure, the SUDS is most typically used in exposure therapy in order to assess the degree of experienced fear when a client is presented with a phobic stimulus, as well as the degree of habituation of pathological fear responding that occurs within each exposure and across the exposure sessions.

Despite being created nearly 50 years ago and being a measure that is frequently used with exposure-based therapies, there are no available psychometric data for the SUDS. This is largely due to the fact that it is neither possible to examine the internal consistency of a single-item measure nor is it meaningful to assess the test-retest reliability of a measure for a construct (e.g., state anxiety) that is unstable. Convergent validity for the SUDS comes from a recent study that examined the relationship between SUDS and physiology in the context of exposure-based treatments. Alpers et al. (2005) found that SUDS and heart rate reliably covaried during the course of an *in vivo* driving exposure for a group of adult participants who met diagnostic criteria for driving phobia and for a nonphobic control group.

The advantage of the SUDS is that it is face-valid, easy to understand, and brief to administer. The brevity of this measure is particularly important in the context of exposure-based therapy when quick assessment is

necessary in order for the client to remain fully in contact with his or her fear response. The disadvantages of the SUDS include the assumption that the client is able to accurately reflect upon and report his or her current level of anxiety/distress and general measurement issues related to single-item measures (e.g., sampling error and concern about ratio of error variance to true variance).

Another commonly used measure of self-reported emotional experience is the Self-Assessment Manikin (SAM; Bradley & Lang, 1994). The SAM is a nonverbal graphic representation of emotional dimensions (valence, arousal).¹ The SAM uses manikin figures on a continuum for each of the affective dimensions. In measuring valence, the SAM figure ranges from a happy, smiling figure to an unhappy, frowning figure on a 9-point continuum (1 = very pleasant, 9 = very unpleasant). In measuring arousal, the SAM figures range from an excited figure with wide eyes open and an active body to a calm figure with closed eyes and an inactive body on a 9-point dimension (1 = very calm, 9 = very aroused). Individuals are requested to indicate the point along the valence and arousal dimensions that represents their emotional response to a specified stimulus. Unlike the SUDS, there is a considerable amount of psychometric data for the SAM. The valence and arousal dimensions reliably covary with physiological reactions associated with emotional experience (e.g., skin conductance response, heart rate, and facial electromyography), suggesting that the SAM is a valid measure of emotional responding (e.g., Bradley, Greenwald, Petry, & Lang, 1992; Lang, Greenwald, Bradley, & Hamm, 1993). The utility of the SAM to measure emotional reactions has been demonstrated using a variety of stimuli, including pictures, images, sounds, advertisements, and painful stimuli (Bradley & Lang, 1994). In addition, the SAM has also been used to assess emotional responding during exposure-based therapy (e.g., Sloan & Marx, 2006). The SAM is available in both computerized and pencil and paper versions.

There are several advantages to the SAM. One advantage is that, based on exposure models (e.g., Foa & Kozak, 1986), the arousal and valence dimensions are both thought to be important responses when confronted with feared stimuli. Thus, the SAM may be optimal to use in exposure-based therapies, as it includes these two dimensions that are important to emotional responding and has supporting psychometric data in terms of its

correspondence with physiological measures of emotional responding. However, as with the SUDS, the SAM assumes individuals can accurately reflect upon and report their current emotional state.

Another self-report measure of emotional experience is the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS consists of 20 items, with 10 adjectives measuring positive affect (PA; e.g., interested, enthusiastic, active) and 10 adjectives measuring negative affect (NA; e.g., irritable, upset, scared). Like the SAM, the PANAS assesses emotion dimensions. PA reflects a combination of arousal and pleasant valence, and NA reflects a combination of arousal and unpleasant valence. Furthermore, high PA is thought to reflect a state of high energy, full concentration, and pleasurable engagement, whereas high NA is a general dimension of subjective distress and aversive affect. The items are rated using a Likert-type format ranging from 1 (very slightly or not at all) to 5 (extremely). Instructions to complete the items can be altered to reflect various time frames. For example, the PANAS has been used with time instructions for the present moment (“you feel this way right now, that is, at the present moment”), today, past few days, week (“you have felt this way during the past week”), past few weeks, year, and general (“you generally feel this way, that is, how you feel on average”).

Using large samples of college student participants, Watson et al. (1988) reported internal consistency of the PANAS to be very good for both PA and NA scales and for all time frames, ranging from .84 to .90. The PANAS was also found to be stable over a two-month period when the general time instruction was used (e.g., .71). Internal consistency and test-retest reliability findings have been replicated with psychiatric patients and university employees (Watson et al., 1988). Convergent and discriminant validity have also been demonstrated with the NA scale being positively correlated with measures of depression, anxiety, and general distress, whereas the PA scale was negatively correlated with depression, anxiety, and general distress (Watson et al., 1988). Grounded in Watson and Tellegen’s (1985) model of positive and negative affect, the PA and NA scales were constructed to be uncorrelated and research has indicated that the scales are orthogonal (Watson et al., 1988).

Important for use in psychotherapy outcome assessment, Watson (1988) also examined the sensitivity of the

PA and NA scales over time. In one study, participants completed the PANAS each day over a five- to seven-week period using the “today” timing instructions. Participants also estimated their social activity and level of experienced stress. Within-subject variations in stress were strongly correlated with fluctuations in NA but not PA, and social activity was more strongly correlated with PA than NA. In another study (Clark & Watson, 1986), participants completed the PANAS every three waking hours using the “present moment” time instructions, and also completed their current level of stress and whether they had engaged in social activity within the past hour. Consistent with the model of PA and NA, perceived stress was consistently correlated with fluctuations in NA but not PA and social activity was more strongly correlated with PA than NA.

The PANAS has been used extensively in studies of anxiety and depression, with high levels of NA being characteristic of both anxiety, particularly generalized anxiety disorder, and depression and low levels of PA being characteristic of depression and social phobia (for reviews, see Mineka, Watson, & Clark, 1998; Watson, 2005). A few studies have also used the PANAS to examine change over the course of treatment for depression, showing that NA decreases and PA increases in concert with decreases in depression symptoms during cognitive-behavioral (Mohr et al., 2005; Schmid, Freid, Hollon, & DeRubeis, 2002) and pharmacological (Tomarken, Dichter, Freid, Addington, & Shelton, 2004) treatment. An additional study of clients with comorbid anxiety and depression who were treated naturalistically with cognitive-behavioral therapy found that NA decreased along with symptoms of anxiety and depression. However, PA increased only for a subset of clients who showed a significant decline in depression and only over an extended period of treatment (Kring, Persons, & Thomas, 2007).

In summary, the PANAS has extensive psychometric and empirical support in clinical populations, and it is firmly grounded in theory. Other strengths of this measure are the inclusion of various participant samples in the psychometric investigation, the ability to use the PANAS to assess various time frames (i.e., past few weeks, past few days, at this moment), and the investigation of time sensitivity of the measure. The different time frame formats also enable the PANAS to be used in studies that

use ecological momentary assessment procedures. As with other self-report measures, the PANAS assumes that individuals can accurately reflect upon and report their emotional experiences. However, given that the PANAS can be used to index emotional experience at specific time points, the accuracy of self-report for this measure may be better than other measures that do not include a specific time frame for reporting on emotional experiences.

Psychophysiology is another method that can be used to assess emotional responses. Measures that assess autonomic nervous system (ANS) responding have particular appeal to clinical psychologists, as these measures do not rely upon participants’ ability to self-reflect on their emotional experiences. ANS measures include skin conductance, cardiovascular activity, and respiration. There is a rich history demonstrating the utility of psychophysiological methods in clinical practice (e.g., Turpin, 1991). For instance, Lang, Melamed, and Hart (1970) found that concordance of self-reported distress and high autonomic responding during fear imagery predicted treatment outcome success for a group of clients diagnosed with an anxiety disorder. In contrast, anxiety patients who did not show concordance between self-report and autonomic activity during fear imagery benefited less from treatment. Several subsequent studies have reported similar findings in demonstrating the importance of synchrony of response systems in determining treatment outcome for anxiety patients (Alpers et al., 2005; Griffin, Nishith, Resick, & Yehuda, 1997). Taken together, these findings underscore the importance of assessing multiple response systems in assessing and treating anxiety clients.

Although incorporating physiological measures in clinical practice can provide valuable information and has been strongly encouraged as common practice in both assessment and treatment (Turpin, 1991), the incorporation of physiological methods in practice has been sparse. One reason that clinicians may be reluctant to use physiological measures is because traditionally these measures have been cumbersome and not very user friendly. However, technological advancements in psychophysiological recording have overcome many of these difficulties. For example, heart rate activity can be monitored by having the client wear a simple chest strap, similar to those worn to assess cardiovascular activity during exercise. This type of heart rate monitor system (such as Polar) can transmit a heart rate signal to a small monitor worn on the wrist

or held by another person up to three feet away. Thus, the clinician can accurately monitor a client's heart rate while sitting in a chair across from the client. There has also been a substantial increase in reliability and sophistication of ambulatory physiological recording systems, which has particular importance for in vivo exposure therapies (e.g., Alpers et al., 2005; Wilhelm, Alpers, Meuret, & Roth, 2001).

Despite these technological advancements, clinicians still need sufficient knowledge and training in order to use physiological methods accurately and effectively. Another issue that should be considered when using physiological indices of emotional responding is that while ANS measures reflect arousal responses, these measures do not reflect discrete emotions. In addition, ANS activity reflects nonemotional states, such as the orienting response and physical movement (e.g., walking, crying). The reflection of movement in physiological recording can be particularly problematic in the context of in vivo exposure therapy, although there is some evidence that respiratory systems are more accurate in detecting emotional responding during in vivo exposures than other ANS measures such as heart rate and skin conductance (e.g., Alpers et al., 2005).

Another important aspect of emotional experience is awareness of that experience. Emotional awareness refers to the ability to recognize one's (and others') emotions. This ability is central to some forms of therapy, such as Emotion-Focused Therapy (Greenberg, 2002) and Acceptance and Commitment Therapy (Hayes et al., 1999). In addition, researchers have argued that emotion awareness is a necessary prerequisite to effective emotion regulation (Barrett & Gross, 2001; Barrett, Gross, Christensen, & Benvenuto, 2001). Mindfulness-based approaches emphasize that it is not emotional awareness that is important, but rather that one is aware without judging the emotional state (i.e., one should simply observe the emotional state). Others have argued that emotional awareness is neither beneficial nor detrimental to psychological well-being. Instead, emotional awareness appears to be beneficial only under conditions in which a person is good at regulating his or her emotions (Lischetzke & Eid, 2003). Thus, as with other emotion processes, adaptive emotional awareness is determined based on contextual factors. Despite the apparent importance of emotional awareness, there are few measures that have been developed to index this emotion process.

The Levels of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990) is an observer-rated measure of emotional awareness. The LEAS is based on a Piagetian cognitive–developmental model of emotional awareness. This model proposes that emotional awareness increases in complexity with higher levels of development characterized by an ability to differentiate emotional experiences of the self and others, as well as the ability to integrate emotional experiences. At the higher levels, individuals have the ability to understand their environment and its relevance to their well-being and are able to cope effectively with life stressors.

The LEAS consists of 20 hypothetical scenes with each scene described in two to four sentences and involving two persons. The scenes are intended to elicit four types of emotion (anger, sadness, happiness, and fear) at five levels of complexity. Each scene is followed by two questions: “How would you feel?” and “How would the other person feel?” Responses to the LEAS are scored using the LEAS Scoring Manual and Glossary (Lane, 1991). According to the scoring manual, responses for emotions described for the self and other are rated using six levels that vary according to the level of complexity of emotional awareness (Level 1 = nonemotional response, such as “confused”; Level 5 = emotional response for self and other can be differentiated). Total scores for emotional awareness of self and others indicate more complex emotional awareness ability.

Several studies have investigated the validity of the LEAS and have reported that the LEAS is positively correlated with other measures of cognitive development and positively correlated with emotional range, perception of emotion, and openness to experience (Lane et al., 1990, 1996; Lane, Sechrest, Riedel, Shapiro, & Kaszniak, 2000). The LEAS has also been used to assess emotion recognition with individuals with alexithymia, a condition marked by difficulties in identifying one's own feelings (Lane et al., 2000). Discriminant validity for the LEAS has also been shown by its lack of correlation with other emotion measures indexing different emotion constructs (Lane et al., 1990). Moreover, high interrater reliability and good internal consistency for the LEAS have been demonstrated in several studies (e.g., Lane et al., 1990, 1996). Women score higher than men on the LEAS (Barrett, Lane, Sechrest, & Schwartz, 2000). However, no data on test–retest reliability have been reported for the LEAS.

Several investigators have examined LEAS scores with clinical populations. Women diagnosed with eating disorders have lower LEAS scores (both self and others) compared with women without eating disorder diagnoses (Bydlowski et al., 2005). Another study examined a large sample of inpatients diagnosed with psychosomatic disorders and found that the LEAS displayed sensitivity to change in emotional awareness associated with treatment (Subic-Wrana, Bruder, Thomas, Lane, & Kohle, 2005). This finding is particularly important, as it indicates that the LEAS may be a useful measure in clinical practice to examine changes in emotional awareness during the course of treatment.

The Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994) is a self-report measure of emotional awareness that is frequently used in clinical research. The TAS-20 assesses deficits in the cognitive processing of emotions, specifically the inability to accurately identify and label emotions. Originally proposed by Nemiah, Freyberger, and Sifneos (1976), alexithymia has been defined as “a multifaceted construct encompassing difficulty identifying subjective emotional feelings and distinguishing between feelings and the bodily sensations of emotional arousal, difficulty describing feelings to other people, an impoverished fantasy life, and a stimulus-bound, externally oriented cognitive style” (p. 277; Parker, Taylor, & Bagby, 2003a). The TAS-20 has become the most widely used measure of alexithymia in clinical and research settings. This measure has also been translated into 18 different languages and evaluated by confirmatory factor-analytic procedures in 19 different countries (Parker et al., 2003b).

The TAS-20 is comprised of 20 items (e.g., “I am often confused about what emotion I am feeling”) scored on a 5-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree). Factor analysis has identified three factors within the scale: difficulty identifying feelings (e.g., “I am often confused about what emotion I am feeling”), difficulty describing feelings (e.g., “It is difficult for me to find the right words for my feelings”), and externally oriented thinking.

Based on a college student sample, Bagby et al. (1994) found the TAS-20 had good internal consistency for the total score ($\alpha = .81$) and acceptable internal consistency for the factor scores (e.g., difficulty identifying feelings .78, difficulty describing feelings .75). A more

recent psychometric investigation with a large sample of community participants found that the TAS-20 had good internal reliabilities for total and factor scores, with all coefficient alphas greater than .70 (Parker et al., 2003a). Bagby et al. (1994) also found good test-retest reliability ($r = .77$) over a three-week period and convergent validity based on a significant positive relationship with scales of the Neuroticism Extroversion Openness Personality Inventory (Costa & McCrae, 1985). Good internal consistency for translated versions of the TAS-20 has demonstrated for the first two factors, but not for the third factor (i.e., externally oriented thinking; Parker et al., 2003b). Based on a large community sample, Parker et al. (2003a) found no sex differences on the first factor (i.e., difficulty identifying feelings), but women scored significantly higher than men on the other two factors. Modest associations between age and TAS-20 scores, and education and TAS-20 scores have also been reported (Parker et al., 2003a), such that lower educational attainment is associated with greater TAS-20 scores (i.e., less emotional awareness) and greater age is associated with lower TAS-20 scores (better emotional awareness). Although there is some concern that a self-report measure cannot accurately detect impairments in emotional awareness, several studies have shown good agreement between TAS-20 scores and observer ratings of alexithymia (e.g., Bagby et al., 1994).

The TAS-20 has also been demonstrated to be useful in psychotherapy, with high scores negatively predicting treatment outcome (e.g., Rufer et al., 2004). TAS-20 scores have also been shown to be stable during the course of treatment, despite significant reductions in psychopathology symptoms (e.g., Rufer et al., 2004; Schmidt, Jiwany, & Treasure, 1993). The stability findings may suggest that alexithymia is a trait characteristic, although another possibility is that the interventions did not address skills in emotional awareness. Elevated TAS-20 scores have been found with a variety of psychological disorders, such as anxiety disorders, depression, somatoform disorders, eating disorders, and personality disorders (e.g., Grabe, Spitzer, & Freyberger, 2004; Lipanen, Saarijarvi, & Lauerma, 2004; Saarijarvi, Salminen, & Toikka, 2006). Thus, the TAS-20 would not be useful in distinguishing psychopathology. It would be important for future research to examine changes in TAS-20 scores in conjunction with interventions that specifically address

improving emotional awareness (e.g., mindfulness-based interventions, emotion-focused therapy).

In addition to the measures that we have described here, there are also subscales of other measures (e.g., difficulty in the Emotion Regulation Scale and the Trait Meta-Mood Scale) that are intended to index emotional awareness. As noted earlier, emotional awareness is considered important in a number of therapy approaches, yet there are few available measures of emotional awareness. Moreover, the measures that are available are self-report based, which requires that an individual is able to accurately report on his or her emotional awareness ability.

Emotional Expression

Emotional expression refers to the outward display of emotion. A number of measures of emotional expression have been developed, although few have been used in the context of psychotherapy. The self-report measures that have been developed in this area are grounded by a conceptualization of emotional expressivity as a stable, individual difference characteristic. These self-report measures require individuals to report on their general level of emotional expressiveness.

The Berkeley Expressivity Questionnaire (BEQ; Gross & John, 1997) is a 16-item self-report measure of emotional expressivity. Individuals are asked to complete each item using a Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). In addition to a total score, the BEQ has three subscales: Positive Expressivity, Negative Expressivity, and Impulse Strength. The last subscale is intended to measure the overall strength of emotional response tendencies, whereas the Positive and Negative Expressivity subscales are intended to index the degree to which expressive tendencies are generally expressed as manifest behavior. The total score and the three subscales have been shown to have high internal consistency (e.g., .80) and good test-retest reliability over a two-month period (ranging from .71 to .82; Gross & John, 1997). Convergent and discriminant validity for each of the subscales have been demonstrated (Gross & John, 1997). Sex differences have been reported, with women reporting greater expressivity than men on all of the BEQ scales (Gross & John, 1995).

The BEQ has been used in a few studies examining psychopathology. For example, Mennin, Heimberg, Turk, and Fresco (2005) found that college students

scoring high on symptoms of generalized anxiety disorder (GAD) scored significantly higher on the impulse strength and the negative expressivity subscales of the BEQ compared with a group of college students scoring low on GAD symptoms. No group differences were found for self-reported positive emotional expressivity. These findings are consistent with Mennin, Turk, Fresco, and Heimberg's (2002) emotion dysregulation model of GAD.

As with other self-report measures, the BEQ assumes that individuals are aware of their level of expressiveness and are able to accurately report on this characteristic. This ability may be particularly difficult in assessing one's outward emotional expressions. In addition, there is evidence of ethnic differences in emotional expression (e.g., Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002; Vrana & Rollack, 2002), although there are no available data on ethnic differences with the BEQ.

Another commonly used self-report measure of emotional expressivity is the Emotional Expressivity Scale (EES; Kring, Smith, & Neale, 1994). The EES is a 17-item questionnaire that measures the extent to which an individual generally outwardly expresses positive and negative emotions. Respondents evaluate statements such as "I don't express my emotions to other people" and "I think of myself as emotionally expressive" on a 7-point Likert-type scale ranging from 1 (never true) to 6 (always true). Based on college student and adult community participants, the EES has been shown to have high internal consistency, with an average alpha of .91 across seven samples of participants, and four-week test-retest reliability among college students was reported at .90 (Kring et al., 1994). The EES has also been shown to exhibit convergent and discriminant validity based on both self-report, other report, and observational methods of assessment (Kring et al., 1994). For both the college student and community participant samples, women scored significantly higher than men (Kring et al., 1994). This gender difference is consistent with findings for the BEQ.

Several studies examining emotional expressivity and psychopathology have used the EES. In one study, Marx and Sloan (2002) found that, among a group of childhood sexual abuse survivors, EES scores predicted greater psychological distress, with lower emotional expressivity predictive of greater psychological distress. These findings indicate the importance of emotional expression in the development and maintenance of psychopathology.

The reliance on self-report for assessing emotional expressivity may be a particular problem, given that general expressiveness is being assessed. Robinson and Clore (2002) noted that when individuals report on their emotional processes, they first rely on episodic memory and then rely on semantic memory. Thus, when people respond to questions about their emotional expressivity they will draw upon their memory of recent situations as well as their beliefs about how they should respond in emotional situations. Robinson and Clore further proposed that display rules specific to culture and gender may further affect how people respond to questions about their emotional expressivity. Taken together, responses to questions about one's emotional expressivity may not accurately represent one's general emotional expressivity. The general problem of self-report measures of emotion is one that we will return to later.

Observational coding systems are another commonly used method to assess emotional expression, particularly facial expression, in research on emotion. This research typically involves the presentation of emotionally evocative stimuli (film clips, pictures) while participants' expressions are videotaped for later coding.

The Facial Expression Coding System (FACES; Kring & Sloan, 1991, 2007) was designed to assess the valence of facial expressions. When an expression is detected, raters code its valence (positive, negative), intensity, and duration. FACES has demonstrated high interrater agreement, ranging from .60 to .99, and FACES ratings have been shown to be linked in predictable ways to other observational coding systems, facial muscle movements, emotional experience, personality, and psychophysiological responding (Kring & Sloan, 2007). Importantly, FACES has been used in studies of emotional responding in various clinical populations, including schizophrenia (Aghevli, Blanchard, & Horan, 2003; Kring & Neale, 1996), depression (Sloan, Strauss, & Wisner, 2001), post-traumatic stress disorder (Wagner, Roemer, Orsillo, & Litz, 2003), childhood sexual abuse (Luterek, Orsillo, & Marx, 2005), and distressed couples (Heisel & Mongrain, 2004).

Another widely used observational coding system is the Facial Action Coding System (FACS; Ekman & Friesen, 1978). FACS was designed to assess observable muscle movements on the face. A subset of FACS, called EMFACS, allows investigators to concentrate only on

those muscle movements that correspond to emotion. Rather than assessing the valence dimension as is done with FACES, EMFACS assesses expressions that are believed to correspond to specific emotions, such as happiness, sadness, and anger. Interrater agreement data are not often published in studies using FACS or EMFACS as rater fidelity is assumed if coders have passed the instrument developer's test, but a formal study of psychometric properties yielded strong support for the system's reliability (Sayette, Cohn, Wertz, Perrott, & Parrott, 2001). These systems have also been used with clinical populations, in studies of borderline personality disorder (BPD; Renneberg, Heyn, Gebhard, & Bachmann, 2005), schizophrenia (e.g., Gaebel & Wölwer, 2004), bereavement (Bonanno & Keltner, 1997), and depression (Ekman, Matsumoto, & Friesen, 1997). EMFACS has also been used to study facial expressions in the context of psychotherapy (e.g., Benecke & Krause, 2005; Merten, 2005; Rasting & Beutel, 2005).

Although these two systems have a good deal to offer, it is not without cost. Raters must be trained, and this can be time consuming (particularly for FACS). In addition, effective use of these systems would require video recordings of therapy sessions. Nevertheless, the ability of these systems to detect changes in facial expression across the course of therapy is likely great.

EMOTION REGULATION

The role of emotion regulation in psychopathology has received increased attention in recent years, and the construct has been applied to the study of a wide range of phenomena (e.g., Gross, 1998; Underwood, 1997). With the increased attention has also come an increasing concern regarding the definition of the emotion regulation construct. Indeed, several definitions of emotion regulation exist in the literature. For example, according to Thompson (1994), "emotion regulation consists of intrinsic and extrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (pp. 27–28). Using a similar concept, Gross (1998) defined emotion regulation as "the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (p. 275). What is clear from both of these definitions is that regulating emotion can involve either down-regulating

or up-regulating an emotional response. It is also the case that emotion regulation can involve either effortful strategies or automatic strategies. As is the case with other emotional processes, determining whether emotion regulation is adaptive or maladaptive is largely determined by contextual factors.

Because deficits in emotion regulation skills are regarded as central in the development and maintenance of psychological problems, several intervention approaches regard emotion regulation skills as a central feature of the treatment. For example, emotion regulation skills constitute a core component in dialectical behavior therapy and are closely linked to the biosocial theory that BPD is fundamentally a disorder of pervasive emotion dysregulation (Linehan, 1993). Several other interventions also focus on improving emotion regulation ability, such as skills training in affective and interpersonal regulation for treatment of adult survivors of childhood sexual abuse (Cloitre, Cohen, & Koenen, 2006) and emotion regulation therapy for generalized anxiety disorder (Mennin, 2004). In this section, we present three self-report measures of emotion regulation that can be considered for examining changes in emotion regulation ability during the course of treatment.

The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) was designed to assess individual differences in the use of two emotion regulation strategies: cognitive reappraisal and expressive suppression. The authors view emotion regulation strategies as falling into two broad categories, namely antecedent focused and response focused. Antecedent-focused strategies are those that occur before a person enters a situation in which he or she anticipates emotion regulation being necessary and before he or she feels a particular emotion (e.g., public speaking). In contrast, response-focused strategies are those that one employs when one is already feeling an emotion and engaged in a situation in which emotion regulation is deemed necessary. Although Gross (1998) proposed a number of specific strategies that fall within these two categories, Gross and John (2003) elected to focus on two specific strategies, cognitive reappraisal (antecedent focused) and expressive suppression (response focused), simply because these two strategies are well defined, can be studied easily in the laboratory, and are strategies that people use commonly, particularly for negative emotions (Gross, Richards, & John, 2006).

Cognitive reappraisal is defined as a form of cognitive change involving the reevaluation of a potentially evocative situation in a way that alters its forthcoming emotional impact. For example, when taking a major exam, one might view the exam as a mental challenge rather than an experience that could have serious consequences for his or her future should he or she not perform well. This presumably would serve to alter the course of a forthcoming episode of anxiety. Expressive suppression is described as a response modulation strategy that involves inhibiting ongoing emotion-expressive behavior (Gross, 1998). For example, one might hold back from crying in response to a sad movie.

Importantly, Gross and John (2003) proposed that reappraisal and suppression have different effects. They suggested that cognitive reappraisal should be associated with greater benefits, as this strategy takes place early on before behavioral response tendencies have taken place. Thus, it is thought that reappraisal efficiently alters the emotional response trajectory before the emotion unfolds. In contrast, Gross and John (2003) suggested that suppression is associated with fewer benefits, as this strategy simply suppresses the expression of an ongoing emotion but does not impact the experience of emotion. Once an emotion is experienced but not expressed, the emotion will remain and may increase in intensity if expression is suppressed. The authors also suggested that the discrepancy between what is experienced and what is expressed should leave the individual with a sense of not being true to oneself, which may ultimately lead to interpersonal isolation.

Based on the definitions of expressive suppression and cognitive reappraisal, Gross and John (2003) created the ERQ. The measure consists of 10 items rated on a 7-point Likert-type scale that ranges from strongly disagree to strongly agree, with higher scores reflecting a greater emotion regulation tendency. The cognitive reappraisal subscale is comprised of six items (e.g., "I control my emotions by changing the way I think about the situation that I am in"), whereas the expressive suppression subscale is comprised of four items (e.g., "When I am feeling positive emotions I am careful not to express them"). Gross and John (2003) reported high internal consistency for reappraisal (.79) and suppression (.73). In addition, men and ethnic minorities (African Americans, Asian Americans, Latinos) scored higher on the suppression scale, but no

gender or ethnicity differences were found for reappraisal. Evidence for discriminant and convergent validity of the reappraisal and suppression scales was also demonstrated, such that reappraisal was associated with better psychological functioning (e.g., less depressive symptoms, lower neuroticism, greater optimism, greater self-esteem, and better interpersonal relationships), whereas suppression was associated with poorer psychological functioning (lower extroversion, less optimism, greater rumination, more depressive symptoms, and poorer social relationships). In terms of affective responding, reappraisal was associated with greater experienced positive emotions and less experienced negative emotion (using both self- and peer-report measures). In contrast, suppression was associated with less experienced positive emotion and greater experienced negative emotion. These findings are consistent with theory underlying the two emotion regulation constructs.

Taken together, these data provide strong support for the two emotion regulation scales of the ERQ and suggest that the use of cognitive reappraisal is a more effective emotion regulation strategy than expressive suppression. There are several limitations to the psychometric investigation conducted by Gross and John (2003). First, this investigation only included college students, which may limit the generalizability of their findings. Second, although the authors suggested that the use of these emotion regulation strategies should be stable, no test-retest reliability data were reported. Without knowledge of the stability of this measure, it is difficult to know how useful the ERQ might be in the assessment of changes resulting from psychotherapy. To date, there has also been no examination of the ERQ with clinical populations. Nonetheless, the theory underlying these two constructs of emotion regulation is quite strong and there is also considerable empirical support for these emotion regulation constructs (e.g., Gross, 1998, 2001, 2002; John & Gross, 2004).

Another self-report measure of emotion regulation skill is the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS was designed to measure the complexities and clinically relevant difficulties of emotion regulation as described by several theories of emotion regulation. The DERS includes 36 items that require participants to indicate how often each item applies to themselves, with responses ranging from 1

(almost never) to 5 (almost always). Following exploratory factor-analytic procedures, six interpretable factors reflecting the multifaceted nature of emotion regulation emerged: (a) Nonacceptance of Emotional Responses (nonacceptance), with six items reflecting a tendency to have negative secondary emotional responses to one's negative emotions, or nonaccepting reactions to one's distress; (b) Difficulties Engaging in Goal-Directed Behavior (goals), with five items reflecting difficulties concentrating and accomplishing tasks when experiencing negative emotions; (c) Impulse Control Difficulties (impulse), with six items reflecting difficulties remaining in control of one's behavior when experiencing negative emotions; (d) Lack of Emotional Awareness (awareness), with six items reflecting the tendency to attend to and acknowledge emotions, or if reverse scored, reflecting an inattention to, and lack of awareness of, emotional responses; (e) Limited Access to Emotion Regulation Strategies (strategies), with eight items reflecting the belief that there is little that can be done to regulate emotions effectively once an individual is upset; and (f) Lack of Emotional Clarity (clarity), with five items reflecting the extent to which individuals know and are clear about the emotions they are experiencing.

Based on a sample of college student participants, Gratz and Roemer (2004) reported that the six factors were significantly correlated with one another, suggesting that these are not independent domains of emotion regulation difficulties. The total DERS was found to have high internal consistency ($\alpha = .93$) as were each of the subscales, with Cronbach's $\alpha > .80$ for each. Preliminary data also support the measure's construct validity. The overall DERS scale and each of the subscales were positively correlated with the Acceptance and Action Questionnaire (Hayes et al., 2004) and General Expectancy for Negative Mood Regulation (Catanzaro & Mearns, 1990). However, only the overall DERS scale and three of the subscales (nonacceptance, awareness, and clarity) were significantly negatively correlated with a measure of general emotional expressivity. The DERS demonstrated good test-retest reliability over a period ranging from four to eight weeks (.80), with modest to good test-retest reliabilities for each subscale: nonacceptance (.69), goals (.69), impulse (.57), awareness (.68), strategies (.89), and clarity (.80). However, the test-retest reliability data were obtained using a small sample ($n = 21$) of adults

recruited from a university campus. A gender difference was found for the awareness subscale only, such that men reported lower emotional awareness than women (Gratz & Roemer, 2004). Again, only college students were included in the psychometric investigation of the DERS, and it is unclear whether these same gender findings would be obtained using a sample of community-based participants.

The DERS has been used in treatment studies of BPD. For example, compared with a group of BPD patients assigned to a standard psychosocial intervention, BPD patients assigned to the emotion regulation group intervention reported significant decreases in emotion dysregulation (as indexed by the DERS total score) at posttreatment (Gratz & Gunderson, 2006). In another study, the total score on the DERS significantly decreased during the course of an intensive cognitive-behavioral treatment program for individuals diagnosed with BPD (Gratz, Lacroce, & Gunderson, 2006). It should be noted that the Gratz et al. (2006) studies are the only published research that have examined DERS subscales with a clinical population. As several intervention approaches target specific emotion regulation skills, it would be useful to examine whether changes on the subscales of the DERS occur in conjunction with interventions that address specific emotion regulation skills.

Gratz and Roemer (2004) noted a number of limitations with their psychometric investigation of the DERS. These limitations include the small sample used to examine test-retest reliability, the small number of measures used to examine construct validity of the DERS, and the sole reliance on self-report for all of the measures included in their psychometric investigation of the DERS. Gratz and Roemer (2004) also noted that the DERS focuses solely on regulation of negative emotion and that they did not examine ethnic differences or discriminant validity of the measure. Taken together, the available data suggest that the DERS shows promise as a measure of emotion dysregulation and may be useful in psychotherapy with adults. This measure assesses several dimensions of emotion regulation and was developed based on clinically relevant emotion regulation strategies. However, further psychometric investigation of the DERS is necessary.

GENERAL MEASUREMENT CONSIDERATIONS

There are some general measurement considerations that should be taken into account when selecting measures to

use in psychotherapy research and practice. Perhaps the biggest measurement issue is the way in which the emotion construct of interest is conceptualized. For instance, we reviewed two self-report measures of emotion regulation (ERQ and DERS), and these two measures were developed based on different conceptualizations of emotion regulation. In selecting which of these measures to use, one should first be clear about the definition of emotion regulation one is using, and then select a measure that is most consistent with the conceptualization.

Another general issue to consider is that there is no clear indicator of when emotion is maladaptive. That is, no measure reviewed here has clear cutoff scores indicating maladaptive emotion processes. Gross and John (1995) posited that emotional suppression is generally maladaptive. However, this strategy may be adaptive in certain situations (e.g., laughing during a funeral). Indeed, the best regulators of emotion are likely those individuals who are able to flexibly draw from a full repertoire of emotion regulation skills, as different skills are needed in different situations. Gender and cultural factors are also important to consider when evaluating whether an emotional process is adaptive or not. For instance, Robinson and Clore (2002) have emphasized that gender and cultural factors influence display rules about emotional expression. Despite the likely influence of gender and culture on emotional processes, relatively little research in understanding the impact of gender and culture on emotion has been conducted. Most research in this area has focused on gender (e.g., Bradley, Codispoti, Sabatinelli, & Lang, 2001; Kring & Gordon, 1998; Vrana & Rollack, 2002). Gaining a greater understanding of how various contextual factors impact emotion will enable clinicians to be better able to evaluate whether an emotion is adaptive and maladaptive.

Another issue relating to the measurement of emotion is the fact that emotion is manifested in multiple channels (i.e., physiology, subjective experience, expressive behavior). The multiple channels of emotion are loosely coupled and interact in complex ways. Therefore, in order to comprehensively assess emotion, more than one component should be examined. The importance of examining multiple components of emotion is perhaps most clearly demonstrated by the work of Lang et al. (1970), who noted that the desynchrony of physiological and self-report responding of anxiety clients confronted with a feared stimulus

predicted treatment outcome. Although it is ideal to assess multiple channels of emotional responding, there remains disagreement in the field regarding the degree of correspondence that should be expected (e.g., Barrett, 2006; Bradley & Lang, 2000; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). The correspondence of various components of emotion responding is a question that continues to be addressed by basic emotion researchers that has clear implications for clinical research. Decisions about what components of emotion to assess should also be made based on the target of the intervention one is conducting. If the goal of treatment is to reduce distress, including measures of emotional experience would be important. In contrast, if the goal of treatment is to increase expressive behavior, measures of emotion expression would be most helpful.

The need to assess more than one component of emotional responding is particularly important in the case of self-report methods of assessment where there is some question as to whether individuals can accurately reflect upon and report on their emotional state (e.g., emotional experience, emotional awareness, emotion regulation). This is a particular concern with some clinical populations who may have a diminished ability to accurately identify and label their emotional experience (e.g., Lipanen et al., 2004). This concern is even more pressing when individuals are asked to report on past emotional states or how they generally respond (e.g., "I cry at sad movies"). Using ecological momentary assessment (EMA) methods may circumvent some of these measurement problems associated with self-report as EMA requires individuals to report on their experiences throughout the day and in the present moment (Christensen, Barrett, Bliss-Moreau, Lebo, & Kaschub, 2003).

Another measurement issue that arises with emotion concerns reliability. Emotion is most often viewed as a construct that can change quickly and frequently. Because emotion is a complicated state-trait construct we cannot always use typical test-retest correlations as estimates of reliability. Another method of estimating reliability is by examining item homogeneity. However, this method is only possible for multi-item measures, and some emotion measures, such as the SUDS, are single-item measures. As emotional experience is expected to change and the SUDS consists of a single item, we cannot use standard methods of reliability with the SUDS. This, however,

does not mean that we should not be concerned with psychometric properties of such measures. Instead, we need to rely on alternative methods for assessing psychometric properties of these emotion measures. We have reviewed a number of self-report measures that are conceptualized to measure emotion constructs that are viewed as relatively stable characteristics (e.g., ERQ, EES, BEQ, TAS, LEAS). However, it remains an empirical question as to whether these measures are indeed sensitive to change in psychotherapy.

SUMMARY

As noted earlier, this review of emotion measures that can be used in the context of psychotherapy with adults is not intended to be exhaustive. Rather, several measures of emotion regulation, emotional experience, emotional expression, and emotional awareness have been presented and general measurement issues that should be considered have been highlighted. The measures that we selected for review were selected based on available psychometric data and frequency of use in both basic emotion research and clinical research. Selecting the most appropriate measures to use in clinical research and practice will be largely determined by the definition of emotion that one is working with and how well the measure(s) match the goals of the assessment and intervention that is being conducted. As basic research on emotion continues to evolve, we will be able to further refine emotion measures that can be used in clinical research and practice. These advances will, in turn, affect our understanding of psychopathology and enhance the efficacy of our interventions.

NOTE

1. The Self-Assessment Manikin also includes ratings of dominance that focus on changes in control with changes in the size of the manikin (1 = minimal control, 9 = maximum control). Bradley and Lang (1994) have reported that the dimensions of valence and arousal account for the majority of variance associated with self-reported emotional experience. Thus, investigators most typically only use the valence and arousal dimensions.

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