



## EMOTION REGULATION STRATEGIES AS TRANSDIAGNOSTIC PROCESSES: A CLOSER LOOK AT THE INVARIANCE OF THEIR FORM AND FUNCTION

AMELIA ALDAO

Department of Psychology, Ohio State University, Columbus, USA

**Abstract:** Recent investigations suggest that emotion regulation can be conceptualized as a transdiagnostic process (Kring & Sloan, 2010). Specifically, the habitual use of putatively maladaptive emotion regulation strategies (e.g., rumination, suppression), and the infrequent use of putatively adaptive strategies (e.g., acceptance, reappraisal) have been shown to predict various symptoms of psychopathology (Aldao et al., 2010). However, little is known about the extent to which the different facets that constitute the process of implementing such strategies can be conceptualized as transdiagnostic. I propose the adoption of a functional behavioral approach to delineate which aspects of such implementation (i.e., form, function) are variant and which are invariant across disorders. This approach has the potential to further our understanding of the transdiagnostic and disorder-specific mechanisms by which emotion regulation is associated with the development, maintenance, and treatment of mental disorders.

**Keywords:** Emotion regulation; strategies; transdiagnostic; psychopathology.

*Estrategias de regulación emocional como procesos transdiagnósticos:  
Una visión más detenida sobre la invarianza de su forma y función*

**Resumen:** La investigación reciente sugiere que la regulación emocional puede ser conceptualizada como un proceso transdiagnóstico (Kring & Sloan, 2010). Específicamente, el uso habitual de estrategias de regulación emocional supuestamente desadaptativas (p.ej., rumiación, supresión), y el uso infrecuente de estrategias supuestamente adaptativas (p.ej., aceptación, reevaluación), se ha evidenciado que predicen varios síntomas de psicopatología (Aldao et al., 2010). Sin embargo, es escasamente conocido hasta qué punto pueden ser conceptualizadas como transdiagnóstico las diferentes facetas que constituyen los procesos de implementación de dichas estrategias. Propongo la adopción de un enfoque conductual funcional para delimitar qué aspectos de tal implementación (i.e., forma, función) son variantes y cuáles son invariantes a través de los trastornos. Este enfoque tiene el potencial de mejorar nuestra comprensión de los mecanismos transdiagnósticos y no transdiagnósticos (trastorno-específicos) mediante los cuales la regulación emocional se asocia con el desarrollo, mantenimiento, y tratamiento de los trastornos mentales.

**Palabras clave:** Regulación emocional; estrategias; transdiagnóstico; psicopatología.

### BACKGROUND

#### *Transdiagnostic approach to psychopathology*

The past decade has witnessed a growing interest in a transdiagnostic approach to the study of psychopathology (e.g., Harvey, Watkins, Mansell, & Shafran, 2004; Kring & Sloan, 2010). Transdiagnostic factors refer to pathological processes that are shared across various mental disorders. In other words, their form and

---

*Correspondence:* Amelia Aldao, Ph.D., Department of Psychology, The Ohio State University, 1835 Neil Ave, Columbus, OH, 43210, United States.  
E-mail: aldao.1@osu.edu

*Acknowledgements:* The author would like to thank Sam Cooper, Katherine Dixon-Gordon, Annette Mankus, Douglas Mennin, Elena Mayville Wright, and Aliona Tsytses for the insightful comments on earlier versions of this manuscript.

function are considered to be *invariant* across disorders. For example, elevated negative affect can be conceptualized as a transdiagnostic factor that is present in all mood and anxiety disorders (e.g., Watson, 2009). Conversely, blunted positive affect has been found to characterize only a subset of those disorders, namely, depression and social anxiety (Brown, 2007). Thus, the notion of transdiagnostic is relative—it depends (partly) on the disorders being compared. As such, it can help us identify the shared and unique patterns of dysfunction inherent to various forms of psychopathology.

The primary advantage of utilizing a transdiagnostic approach to the conceptualization of psychopathological processes is the flexibility that such a framework provides in modeling and understanding the complex patterns of comorbidity present in mental disorders (e.g., Brown, Campbell, Lehman, Grisham, & Mancil, 2001; Kessler, Berglund, Demler, Jin, & Walters, 2005). Indeed, the transdiagnostic approach has become increasingly popular, inspiring a number of reviews (e.g., Dozois, Seeds, & Collins, 2009; Egan, Wade, & Shafran, 2011; Ehring & Watkins, 2008; Harvey, 2008; Harvey, Murray, Chandler, & Soehner, 2011; Hofmann, Sawyer, Fang, & Asnaani, 2012; Kring, 2008; Mansell; Harvey, Watkins, & Shafran, 2008; Nolen-Hoeksema & Watkins, 2011), empirical investigations (e.g., Aldao & Nolen-Hoeksema, 2010; Gruber, Eidelman, & Harvey, 2008; Wade, Bergin, Martin, Gillespie, & Fairburn, 2006), and books (e.g., Harvey et al., 2004, Kring & Sloan, 2010).

The transdiagnostic framework has also been incorporated in a number of psychosocial interventions, including the Unified Protocol for the Treatment of Emotional Disorders (Barlow, Allen, & Choate, 2004; Boisseau, Farchione, Fairholme, Ellard, & Barlow, 2010) and its youth version (Emotion Detectives Treatment Protocol; Bilek & Ehrenrich-May, in press; Ehrenrich-May, Queen, Bilek, Remmes, & Marciel, in press), Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999), and Transdiagnostic Cognitive Behavioral Therapy for Eating Disorders (Fairburn et al., 2008). In addition, a number of brief transdiagnostic interventions have demonstrated

prevention and alleviation of symptoms of anxiety and depression (e.g., Dear et al., 2011; Dixon, Mansell, Rawlinson, & Gibson, 2011; Norton, 2008; Norton, Hayes, & Hope, 2004; Titov et al., 2011).

More broadly, the enthusiasm for a transdiagnostic approach has influenced the development of the Research Domain Criteria (RDoC; Insel et al., 2010), which is a strategic plan that has recently been launched by the National Institute of Mental Health (NIMH) in the United States to study psychopathology through the assessment of behavior and neurobiology dimensionally and across multiple units of analysis (e.g., genes, neurocircuitry), rather than via the traditional approach of assessing forms of psychopathology according to categorically defined diagnoses. As such, RDoC constitutes a much needed framework for addressing the limitations ingrained in a categorical diagnostic system, specifically, the elevated rates of comorbidity among disorders (e.g., Brown et al., 2001; Kessler et al., 2005).

### *Emotion regulation and psychopathology*

In parallel to the increased enthusiasm about transdiagnostic processes, the last decade has also been characterized by a growing interest in the role of affective disturbances in psychopathology (see Aldao, Nolen-Hoeksema, & Schweizer, 2010; Kring & Sloan, 2010). Specifically, the construct of emotion regulation, adopted from the developmental literature by James Gross (1998; see Thompson, 1994), has gained a considerable amount of attention in the basic and applied literatures. Gross has conceptualized emotion regulation as the process by which individuals implement strategies to modify their emotional experiences, expressions and physiology and the situations eliciting such affective states in order to respond to environmental demands (for additional, yet related definitions, see Campos, Frankel, & Camras, 2004; Cicchetti, Ganiban, & Barnett, 1991; Cole, Martin & Dennis, 2004; Eisenberg & Morris, 2002; Gratz & Roemer, 2004; Koole, 2009). In the process model of emotion regulation, Gross and colleagues have differentiated

between two types of emotion regulation strategies depending on the point in time in which they are implemented in relation to the onset of the emotion to be regulated. Antecedent-focused strategies (e.g., cognitive reappraisal) are implemented before the emotion has been enacted; conversely, response-focused strategies (e.g., suppression) are deployed after the emotion has taken full form. Given that the antecedent-focused strategies are implemented before emotional activation (rather than afterwards), they tend to be more effective in the regulation of affect (e.g., Butler et al., 2003; Denson, Grisham, & Moulds, 2011; Dillon, Ritchey, Johnson, & LaBar, 2007; Goldin, McRae, Ramel, & Gross, 2007; Gross, 1998; Richards & Gross, 2000).

Recently, the emotion regulation framework has been incorporated into the study of psychopathology (see Kring & Sloan, 2010) and emotion regulation strategies have been conceptualized as either adaptive or maladaptive based on their relationship to symptoms. Strategies positively associated with psychopathology have been considered «maladaptive» (e.g., suppression, rumination, worry, avoidance) and strategies negatively correlated with symptoms have been deemed «adaptive» (e.g., reappraisal, acceptance, problem solving; for a review see Aldao et al., 2010). This classification is in line with experimental studies showing that the putatively adaptive strategies facilitate emotion regulation, whereas maladaptive strategies interfere with this process. Acceptance has been conceptualized as the ability to remain in contact with feelings, thoughts, and physical sensations without attempting to change them or manipulate them in any way (Hayes et al., 1999). It has been shown to reduce anxiety and behavioral avoidance (e.g., Eifert & Heffner, 2003) and physiological arousal (e.g., Campbell-Sills, Barlow, Brown, & Hofmann, 2006). Cognitive reappraisal consists of thinking of a situation differently in order to change its emotional impact (Gross, 1998). Most of the empirical investigations have studied it in relation to the downregulation of negative affect; evidence suggests that it is a highly effective strategy and it consistently outperforms expressive suppression (e.g., Butler et al., 2003; Denson et al., 2011;

Dillon et al., 2007; Goldin, et al., 2007; Richards & Gross, 2000). Problem solving is similar to reappraisal, as it consists of conscious attempts to change a situation and/or contain its consequences (Billings & Moss, 1981; D'Zurilla, Chang, Nottingham, & Faccinni, 1998). Although the goal of problem solving is not to modify emotions per se, insofar as it facilitates the management of situations that elicit strong emotions, it can be conceptualized as belonging to the repertoire of emotion regulation strategies.

Suppression entails attempts at pushing away thoughts (Wenzlaff & Wegner, 2001), behaviors (e.g., emotional expression; Gross, 1998), and feelings (Levitt, Brown, Orsillo, & Barlow, 2004) from consciousness. Research on this strategy suggests that it is fairly effective in altering the emotional response in the immediate aftermath of its implementation and within the scope of one—or two—emotional domains. However, it inevitably leads to rebound effects (for a review, see Dixon-Gordon, Aldao, & Turner, under review). For example, expressive suppression has been shown to be quite effective in the immediate downregulation of facial expressions while leading to maintenance and/or increases of the intensity of subjective experience and the amount of physiological arousal (e.g., Butler et al., 2003; Campbell-Sills et al., 2006; Gross, 1998; Richards & Gross, 2000). Avoidance can be broadly conceptualized as a process by which an individual evades and/or escapes from situations that elicit unpleasant affect (Barlow, 2002). More recently, Hayes and colleagues (1999) have conceptualized a specific type of avoidance, namely experiential avoidance. This strategy consists of seeking to escape internal thoughts, images, feelings, and sensations. It has been shown to interfere with goal-directed behavior, for example, by reducing pain tolerance (e.g., Feldner et al., 2006). Rumination has been conceptualized as a thought process that involves repetitively and passively focusing on one's symptoms of distress and their possible causes. A large body of literature indicates that it exacerbates depression, enhances negative thinking, impairs problem solving, interferes with instrumental behavior, and erodes

social support (for review, see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Worry is another repetitive process that involves focusing on future threats. According to Borkovec's avoidance model of generalized anxiety disorder, worry facilitates the avoidance of unpleasant somatic arousal and is therefore negatively reinforced (for review, see Borkovec, Alcaine, & Behar, 2004). Current models have expanded on this model to include the avoidance of emotional states (Mennin & Fresco, 2009; in press; Newman & Llera, 2011; Roemer, Orsillo, & Salters-Pedenault, 2008). In sum, correlational and laboratory studies of emotion regulation strategies support the differentiation between putatively adaptive and maladaptive strategies.

From a treatment standpoint, many of the third-wave cognitive behavioral therapies have explicitly incorporated the emotion regulation framework. Of particular interest, these approaches teach patients to implement putatively adaptive emotion regulation strategies, particularly cognitive reappraisal and acceptance. Therefore, these strategies play a central role in current psychosocial interventions. Such treatments include: Dialectical Behavioral Therapy (Linehan, 1993), Emotion Focused Therapy (Greenberg, 2002), Acceptance and Commitment Therapy (Hayes et al., 1999), Acceptance-Based Behavioral Therapy (Roemer et al., 2008), Mindfulness-Based Cognitive Therapy (Segal, Williams, & Teasdale, 2002), and Emotion Regulation Therapy (Mennin & Fresco, 2010; in press).

### *Emotion regulation as a transdiagnostic process*

The transdiagnostic and emotion regulation approaches have intersected, as emotion regulation has been conceptualized as a transdiagnostic factor (e.g., Kring, 2008; Kring & Sloan, 2010). A large number of investigations have examined the relationship between individual emotion regulation strategies and various disorders. Such work has been summarized in a recent meta-analytic review conducted by our group, in which we calculated 241 effect sizes

from 114 studies examining the relationship between the habitual use of 6 emotion regulation strategies (acceptance, reappraisal, problem solving, rumination, suppression, avoidance) and symptoms of depression, anxiety, eating disorders, and substance abuse (Aldao et al., 2010). We found that most strategies had significant associations with symptoms of anxiety, depression, and eating disorders (the relationships were non-significant for substance abuse disorders) (see Table 4 of that manuscript). We interpreted these findings as providing initial evidence for the transdiagnostic nature of emotion regulation strategies.

However, knowing that a given strategy predicts variance across various disorders constitutes merely a first step in the delineation of the relationship between emotion regulation and psychopathology. Indeed, a central question remains largely unanswered: *Does a given putatively transdiagnostic strategy take the same form and serve the same function across disorders?* For example, does avoidance take the same form in social anxiety and depression? Does suppression produce similar effects in binge eating and panic disorder? In other words, to what extent are the form and function of strategies *invariant* across disorders? Addressing this question will be crucial for the field as it will help us improve our understanding of the role of emotion regulation strategies in the onset, maintenance, and treatment of psychopathology, and it will deepen our appreciation of the strengths and challenges of adopting a transdiagnostic framework.

In the next sections, I will provide methodological suggestions on how to address this question within a conceptual framework that follows Gross' process model of emotion regulation (Gross, 1998). To the extent that investigators deviate theoretically from the assumptions of the process model, the recommendations presented in this review might become less pertinent. Before delving into the specific suggestions of how to test the invariance of form and function of regulation strategies across disorders, I will discuss important methodological issues concerning the transdiagnostic approach: 1) the choice of data analytic models and 2) the selection of psychopathological groups. I will

then propose the adoption of a functional behavioral approach to parse out which facets of the implementation of emotion regulation strategies (i.e., form, function) are *variant* and which are *invariant* across disorders. I will make specific recommendations for how to conceptualize

and test invariance in: 1) the behaviors enacted when a strategy is implemented (form); 2) the transactions between strategies and the emotions they regulate (function); and 3) the pattern of relationships among strategies (form and function). See Table 1.

Table 1. Areas of future study on the form and function of emotion regulation strategies across disorders

1. Behaviors enacted when a strategy is implemented ( <i>form</i> )	2. Transactions between strategies and the emotions they regulate ( <i>function</i> )	3. Pattern of relationships among strategies ( <i>form and function</i> )
Factor invariance of trait level questionnaires	Regulating target versus non-target affect	Emotion regulation repertoire
State level implementation of regulation strategies	Consequences of implementing strategies	
Idiographic descriptions of tactics implemented	Relationships between strategies and other emotion-related processes	

#### TRANSDIAGNOSTIC DATA, ANALYTIC APPROACH AND SAMPLE SELECTION

As the excitement for the transdiagnostic study of emotion regulation strategies (and other processes) continues to grow, it will be important to accompany this enthusiasm with the development of data collection and analytic methods that can provide a fair and rigorous testing of transdiagnostic hypotheses. Without a solid methodological and data analytic approach, one runs the risk of identifying processes as transdiagnostic that might actually show clinically meaningful variability across disorders. Conversely, one might conceptualize a process with such high level of detail that one might fail to see important transdiagnostic relationships. Or one could choose comparison disorders that might represent an oddity in supporting (or failing to support) a given transdiagnostic hypothesis. In other words, the notion of a transdiagnostic process is relative and it largely depends on how the question is asked (e.g., which pathological groups are compared, how broadly are strategies defined). Acknowledging this relativity and utilizing methods to model it properly will be essential for the continuing growth of the field. I now turn to two specific considerations: 1) the choice of data analytic models,

and 2) the selection of psychopathological groups.

#### *Choice of data analytic models*

Of particular importance is the utilization of statistical analyses to model the complex pattern of interactions among disorders. I refer to past research conducted by our group as an illustration. One important limitation of the meta-analysis described above (Aldao et al., 2010) was the inability to statistically account for the shared variance among disorders. For example, we could not demonstrate that the relationship between eating pathologies and emotion regulation strategies was not due to the overlap between eating and emotional disorders (e.g., Hudson, Hiripi, Popoe, & Kessler, 2007; Stice, Burton, & Shaw, 2004). This is particularly important given work suggesting that eating disorders might themselves serve an emotion regulation function (e.g., Macht, Haupt, & Ellgring, 2004; Polivy & Herman, 2002; c.f., Crowdy & Park, 2012, who showed that rumination predicted eating disorders even after adjusting for symptoms of anxiety and depression). However, the concern about shared variance is not an issue exclusive to eating disorders. Rather, the choice of what symptoms to control for (and how) can greatly influence the conclusions



drawn from all kinds of transdiagnostic investigations. For example, Gruber and colleagues (2008) found that participants suffering from insomnia and/or bipolar disorder endorsed utilizing rumination and worry to a greater extent than healthy controls. Importantly, however, the differences between the pathological groups and the control group were no longer statistically significant after the authors controlled for the presence of symptoms of depression and anxiety. These findings highlight the influence that comorbid conditions can have on the testing of transdiagnostic hypotheses and they underscore the need for careful selection of how and when to adjust for patterns of comorbidity.

One commonly used approach to address comorbidity consists of entering overlapping symptoms as covariates in analyses of covariance and as first predictors in multiple regressions and demonstrating that the main findings remain statistically significant. Although widely used, this approach presents a notable limitation because the leftover variance becomes difficult to interpret (see Miller & Chapman, 2002). In our group, we sought to address some of these methodological complexities by using structural equation modeling (SEM; Arbuckle, 2007; Byrne, 2010), which is a multivariate statistical approach that allows one to simultaneously estimate multiple regression coefficients among variables (measured directly) and/or latent factors (measured indirectly, via factor analysis of the observed variables). Importantly, SEM facilitates the estimation of covariance structures among variables/latent factors. Thus, one can estimate relationships among variables/latent factors while also modeling their shared variance. This renders SEM an ideal approach for testing transdiagnostic hypotheses.

In a recent study, we utilized SEM to test the relationships between symptoms of depression, anxiety, and eating disorders, and a latent factor of emotion dysregulation (which consisted of positive loadings for rumination and suppression and a negative loading for reappraisal) in a sample of undergraduate students who completed self-report measures of these constructs (Aldao & Nolen-Hoeksema, 2010). We estimated covariances among the symptoms to

account for their overlap ( $r$ 's ranging from .27 to .37, all  $p$ 's < .01). In line with predictions, we found that all three symptom measures simultaneously predicted the latent factor of emotion dysregulation. This suggested that all three pathologies are independently associated with emotion dysregulation. Similarly, in a longitudinal study examining changes in emotion dysregulation and psychopathology over the course of 7 months in a sample of adolescents, McLaughlin and colleagues (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011) used SEM to show that a latent factor of emotion dysregulation (consisting of rumination, dysregulated expression of sadness and anger, and emotional understanding) predicted increases in anxiety symptoms, aggressive behavior, and eating pathology, but not in depressive symptoms. Such findings are particularly important within the context of the work discussed above that suggests that eating disorders might be associated with emotion dysregulation via their comorbidity with emotional disorders, such as depression or anxiety (e.g., Macht et al., 2005; Polivy & Herman, 2002). As these studies illustrate, running SEM models might constitute a useful way of modeling the complex relationships among overlapping symptoms. It will be important for future investigations to test such models in samples with clinical levels of severity.

### *Selection of psychopathology groups*

In addition to data analytic considerations, it is important to take a closer look into the process by which comparison groups are selected. Of particular interest is the level of analysis at which disorders are assessed. For example, the options might be to select participants suffering from emotional disorders (e.g., depression, anxiety), a series of anxiety disorders (e.g., generalized anxiety disorder, social anxiety disorder, obsessive compulsive disorder, panic disorder, posttraumatic stress disorder, specific phobia), or a specific anxiety disorder (e.g., panic disorder). Different choices of comparison groups would influence whether a given process can be conceptualized as transdiagnos-

tic. Consider, for example, the case of dispositional positive affect, which tends to be blunted in major depression and social anxiety disorder, but not in the rest of the mood and anxiety disorders (Brown, 2007). If one were to compare levels of positive affect in a group of individuals with social anxiety disorder and with panic disorder, one would conclude that it is not a transdiagnostic process. On the other hand, the conclusions would overwhelmingly support the transdiagnostic hypothesis if one were to compare major depression and social anxiety.

Another example of the influence of sample selection on the testing of transdiagnostic hypotheses pertains to the meta-analysis conducted by our group discussed earlier (Aldao et al., 2010), in which we created categories of depression, anxiety, eating, and substance abuse disorders by collapsing across individual diagnostic categories. Similarly, in our study using SEM (Aldao & Nolen-Hoeksema, 2010), we administered self-report measures that assessed overall symptoms of depression, anxiety, and eating disorders. Although useful in providing initial evidence of transdiagnostic processes, these choices might have resulted in the oversight of potentially meaningful distinctions among individual disorders. This is particularly problematic for the case of eating disorders and substance abuse disorders, which showed weaker or non-existent associations with emotion regulation strategies, respectively (see Table 4 of the manuscript). It is possible that the weaker correlations found between these disorders and emotion regulation strategies might be a function of higher heterogeneity in affective processes in these pathologies (for anorexia and bulimia, see Forbush & Watson, 2006; Friederich et al., 2006; Haynos & Fruzzetti, 2011; for substance abuse disorders, see Cheetham, Allen, Yucel, & Lubman, 2010). Whether a process can be considered transdiagnostic or not depends heavily on the diagnostic groups that are the focus of the comparison.

A related issue pertains to the conceptual overlap between certain emotion regulation strategies and the diagnostic criteria for some psychiatric disorders. This issue is best illustrated in the case of anxiety disorders and the emotion regulation strategy of avoidance. Ac-

ording to the Diagnostic and Statistical Manual of Mental Disorders (DSM; APA, 2000), one of the diagnostic criteria for most anxiety disorders (social anxiety disorder, panic disorder with agoraphobia, posttraumatic stress disorder, specific phobia) is the avoidance of the feared stimulus/situation and/or their endurance with intense anxiety or distress (which presumably emerges from the inability to carry out avoidance). Similarly, in the International Statistical Classification of Diseases and Related Health Problems (ICD-10; World Health Organization, 1993), avoidance is included in the description of the phobic anxiety disorders (agoraphobia, social phobia, specific phobia) and posttraumatic stress disorder. The inclusion of avoidance as part of the diagnostic criteria of these disorders would suggest that it might be tautological to show it has a strong association with certain anxiety disorders. However, the veracity of this assumption depends heavily on the scope of analysis. First, not all anxiety disorders explicitly require the presence of avoidance (e.g., generalized anxiety disorder, obsessive compulsive disorder). Second, one needs to take into account the level of analysis of the emotion regulation strategy. If one conceptualizes avoidance too broadly, one is likely to capture part of the avoidance embedded in the diagnostic criteria of a given disorder. If, on the other hand, one precisely differentiates between different types of avoidance, such as behavioral avoidance of a particular type of stimulus or situation, experiential avoidance of a given type of sensation, and avoidance of certain thoughts, one might be able to identify conceptually and clinically meaningful shared and unique processes. I turn to this issue of identifying subtypes of strategies in the next section.

#### IDENTIFYING WHICH ASPECTS OF THE IMPLEMENTATION OF EMOTION REGULATION STRATEGIES ARE VARIANT AND INVARIANT ACROSS DISORDERS

An implicit assumption of the transdiagnostic work is that the form and function of putatively transdiagnostic factors are invariant

across disorders. However, whether the form and function of emotion regulation strategies can be considered invariant remains to be empirically demonstrated. To that end, I discuss three important areas of future empirical work on transdiagnostic emotion regulation strategies that consist of testing invariance in: 1) the behaviors enacted when a strategy is implemented (form); 2) the transactions between strategies and emotions they regulate (function); and 3) the pattern of relationships among strategies (form and function). Such suggestions are by no means exhaustive, but rather represent directions that will, hopefully, pave the way for a more sophisticated understanding of the transdiagnostic nature of emotion regulation strategies. See Table 1.

### **Behaviors enacted when a strategy is implemented**

The findings from our meta-analysis reveal that, although several strategies had significant associations with depression, anxiety, and eating disorders, the magnitude of those associations was smaller for eating disorders (Aldao et al., 2010). Similarly, in the follow-up study using SEM (Aldao & Nolen-Hoeksema, 2010), the coefficients between the latent factor of emotion dysregulation were smaller for symptoms of eating disorders than for those of anxiety and depression. This suggests that emotion regulation strategies might be implemented to a different extent in the context of various disorders, thus calling into question the invariance of their form across psychopathology. Moreover, even if the associations among strategies and different disorders were comparable in magnitude, this would not necessarily provide concluding evidence for the invariance of their form. This is because emotion regulation strategies are usually assessed via self-report questionnaires that contain multiple items asking about different facets of the habitual (i.e., trait) use of that strategy. Therefore, it is possible for two people to obtain similar scores on a questionnaire while endorsing very different items (thus suggesting variance in the form of such strategies).

Indeed, basic research on emotion regulation strategies with normative populations suggests that healthy individuals might show high heterogeneity in the way in which they implement regulation strategies. A recent study by McRae and colleagues (McRae, Ciesielski, & Gross, 2012) has identified 8 ways in which people can implement the strategy of cognitive reappraisal (e.g., obtaining physical or psychological distance, changing the assumed consequences, challenging the authenticity of the situation). Similarly, the strategy of suppression can take various forms depending on the emotional domain(s) that it influences (i.e., thoughts, facial expressions and behavior, physiology; for a meta analytic review, see Dixon-Gordon et al., under review). Recently, Watkins (2008) has proposed a differentiation between constructive and unconstructive forms of repetitive thought processes based on the valence of the thoughts, the interpersonal situations that provide the context, and the level of construal (abstract versus concrete processing). In the case of rumination, Feldman, Joormann, and Johnson (2006) have developed a self-report questionnaire assessing rumination about positive affect, thus constituting a departure from the traditionally examined rumination about negative affect; see Nolen-Hoeksema et al., (2008). However, despite this recent interest in parsing out the behaviors underlying emotion regulation strategies, our understanding of such complexity is still in its infancy. Below, I propose three areas of further inquiry that will allow the field to develop a more in depth understanding of the extent to which the behaviors underlying the implementation of emotion regulation strategies can be conceptualized as transdiagnostic: 1) factor invariance of trait level questionnaires; 2) state level implementation of regulation strategies; and 3) idiographic descriptions of tactics enacted.

### *Factor invariance of trait level questionnaires*

This step consists of conducting psychometric work showing that the total scores for trait level emotion regulation questionnaires are factor invariant; that is, they have the same structure (e.g., the relationship of one item to an



other one is similar) across disorders. Such factor invariance could be tested with multi-group SEM in which one would conduct confirmatory factor analysis (CFA) of the scale in different groups and allow for the free estimation of coefficients (i.e., factor loadings). In a second step, one would constrain the coefficients to equality across the groups, which, by definition, would result in a deterioration of the fit of the model (Byrne, 2010; Cheung & Rensvold, 2002). The statistical significance of such deterioration is calculated by subtracting the  $\chi^2$  statistic of the unconstrained model from that of the constrained model and evaluating it against a  $\chi^2$  distribution with the difference in degrees of freedom. A non-significant  $\chi^2$  difference would indicate factor *invariance*. Conversely, a significant  $\chi^2$  difference would suggest factor *variance*. Items showing variance across groups could then be expanded upon to delineate specific behaviors underlying the strategies in individual disorders. This could be done through the development of additional self-report questionnaires that could, in turn, be submitted to multi-group CFA. Through this iterative process, the field could gain a much more nuanced understanding of the form that emotion regulation strategies take across disorders.

#### *State level implementation of regulation strategies*

Another step consists of examining emotion regulation strategies at the state level, in the context of laboratory assessments. Although there is a large body of literature evaluating the effects of implementing emotion regulation strategies in response to stimuli ranging from pictures (e.g., International Affective Picture System [IAPS], Lang, Bradley, & Cuthbert, 2008) and films (e.g., Gross & Levenson, 1995; Rottenberg, Ray, & Gross, 2007) to interactive tasks, such as giving impromptu speeches (e.g., Hofmann, Heering, Sawyer, & Asnaani, 2009) or doing a CO<sub>2</sub> challenge (e.g., Levitt, et al., 2004), the transdiagnostic assessment of these state level regulation strategies is still in its infancy primarily due to two main reasons. First, such investigations have rarely compared more

than one pathological group (for a review of this important methodological limitation of the emotion regulation literature, see Aldao, in press). The obvious solution is to include more than one pathology group in future studies (and to utilize SEM to model relationships between strategies and symptoms dimensionally). Second, these investigations have assessed state level emotion regulation strategies via single-item measures, and this approach has precluded the examination of factor invariance since one cannot create factors with only one variable. To address this issue, investigators could assess each regulation strategy via multiple items.

#### *Idiographic descriptions of tactics enacted*

Another step that pertains to both the trait and state level assessment of regulation strategies entails asking participants to describe the behaviors they enacted when implementing a given strategy. This would produce a pool of items that could be coded into functionally meaningful categories, such as whether the participants are using cognitive processes or enacting specific behavioral repertoires. Researchers could recruit independent coders and obtain reliability coefficients on these ratings. They could then examine whether such functional categories are variant or invariant across disorders.

#### **Transactions between strategies and the affect they regulate**

A second direction for future work on transdiagnostic emotion regulation strategies involves the delineation of the invariance in the transactions between regulation strategies and the affect they regulate. In other words, it is possible that two disorders might be characterized by the frequent use of a same strategy, enacted in a similar form, yet such strategy might show variance in its relationships with the affect being regulated. That is, it could have *invariance* in its form and *variance* in its function. Empirically examining this distinction between form and function would have important implications for the development of sophis-

ticated transdiagnostic models that can further our understanding of emotion regulation deficits in psychopathology. Below I provide three suggestions on how to examine whether the function of strategies shows variance or invariance across disorders. Specifically, strategies could show variance in: 1) whether they regulate target versus non-target affect; 2) the consequences of their implementation; and 3) the relationships they have with other emotion-related processes.

### *Regulating target versus non-target affect*

Target affect refers to that affect which is central to the disorder by definition (e.g., anxiety in panic disorder). Conversely, non-target affect denotes affective processes that are not necessary for the occurrence of that disorder (e.g., sadness in panic disorder). Straightforward as it might seem, this distinction between target and non-target affect is actually quite complex because of high diagnostic overlap among disorders (e.g., Brown et al., 2001; Kessler et al., 2005). For example, sadness is not a target emotion of social anxiety (rather, anxiety is). However, this disorder is highly comorbid with depression (Stein et al., 2001; Watson, 2009), so it is quite likely that a person suffering from social anxiety would also have depression. In that case, both anxiety *and* sadness would constitute target affect. Understanding the regulation of target versus non-target affect has important implications for the testing of transdiagnostic hypotheses. Researchers could do this in the context of laboratory assessments by presenting participants with emotion-eliciting stimuli that vary in whether they evoke target versus non-target affect. Similarly, investigators could adapt current trait level measures of habitual use of emotion regulation strategies to be anchored to specific situations eliciting target or non-target affect. Lastly, researchers could rely on ecological momentary assessments (EMA) to capture natural variation in the occurrence of target versus non-target affect.

Beyond differentiating between target and non-target affect, it will be important to identify potential disorder subtypes that might show

affective reactivity to different types of stimuli. For example, individuals with social anxiety disorder experience fears about being evaluated while anticipating or participating in social situations, but the type of situations that elicit such fears can vary tremendously, as shown by an analysis of the National Comorbidity Survey in which one-third of individuals with social anxiety reported experiencing fears of public speaking exclusively, whereas the remaining two-thirds endorsed multiple types of fears, including those concerning performance and interaction with others. Interestingly, the former group had lower rates of impairment (Kessler, Stein, & Berglund, 1998). Therefore, identifying variability in the transactions between stimuli and target/non-target affect could be extremely informative in furthering our understanding of emotion dysfunction in psychopathology as well as informing clinical practice.

### *Consequences of implementing strategies*

Another issue that pertains to the relationship between strategies and the affect they regulate involves the consequences of such regulation. Of particular interest is the heterogeneity of such effects. The prevailing assumption in emotion regulation research is that successful regulation takes place when there has been a down-regulation of negative affect in the short term. This is a highly problematic assumption, as people also regulate to maintain/increase positive affect (e.g., Feldman et al., 2006; Gross, 1998) and recent work suggests that individuals might be instrumentally motivated to experience negative affect in the present in order to achieve certain goals in the future (for a discussion of hedonic versus instrumental emotion regulation, see Tamir, Mitchell, & Gross, 2008). For the sake of illustration, let us assume that downregulating of negative affect is the only goal of emotion regulation. Even within this seemingly narrowly defined conceptualization we can find substantial heterogeneity. Let us imagine that a given strategy, say reappraisal, is shown to reduce negative affect in response to emotion-eliciting pictures in participants diagnosed with either depression or

bulimia. Let us further assume that such reductions in negative affect are of comparable magnitude. One would be tempted to draw a transdiagnostic conclusion regarding the effects of reappraisal. However, let us not forget that emotions are multi-modal phenomena that consist of activity in three domains: subjective, behavioral, and physiological (Bradley & Lang, 2000; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Let us now imagine that reappraisal reduced subjective negative affect in participants with depression and physiological arousal (e.g., heart rate, skin conductance) in participants with bulimia. Could we consider this strategy to be transdiagnostic? The answer, once again, is in the eye of the beholder. If one conceptualizes the function of the strategies as consisting of reductions in negative affect in any domain, then, in this example, reappraisal could be considered transdiagnostic. However, if one is particularly interested in the domains upon which the strategy exerts its effects, one would be inclined to conclude that this fictional study did not produce evidence supporting the transdiagnostic nature of reappraisal. Relatedly, it will be important to examine the short- versus long-term effects of this strategy. For example, what if in this study, reappraisal helped reduce negative affect in depression in the short term and in bulimia in the long run? Would this temporal discrepancy disqualify it as a transdiagnostic process? Once again, the notion of a transdiagnostic process is relative. Hopefully these examples have illustrated the importance of presenting clear conceptual frameworks to test transdiagnostic hypotheses and interpret the ensuing findings.

#### *Relationships between strategies and other emotion-related processes*

Another important issue involves the presence of additional processes that might influence the experience of affect and its regulation. Of particular interest are emotion-related processes, such as difficulties identifying and labeling emotions (e.g., Bagby, Parker, & Taylor, 1994; Gratz & Roemer, 2004; Kashdan, Ferszidis, Collins, Muraven, 2010; Mayer, Sa-

love, & Caruso, 2004), mindfulness (i.e., the ability to non-judgmentally remain in contact with the present moment; e.g., Kabat-Zinn, 1990), positive and negative urgency (i.e., the tendency to engage in rash action when experiencing extreme affect; e.g., Cyders & Smith, 2008), emotional inertia (i.e., extent to which a current emotional state is predicted by the previous emotional state; e.g., Kuppens, Allen, & Sheeber, 2009), and distress tolerance (i.e., the ability to endure unpleasant physical, cognitive, or emotional states, with the goal of reaching a particular end-state; e.g., Zvolensky, Bernstein, & Vujanovic, 2011). Recent work suggests that these processes have complex interactions with affect, its regulation, and the presence of symptoms of psychopathology. For example, mindfulness has been shown to mediate the negative association between social problem solving and depression and the positive association between maladaptive perfectionism and depression (Argus & Thompson, 2008). Negative urgency has been found to predict risky behavior above and beyond the frequency and intensity of emotions (Cyders & Coskunpinar, 2010) and substance use after adjusting for neuroticism and distress tolerance (Kaiser, Milich, Lynam, & Charnigo, in press). It has also been shown to mediate the relationship between alexithymia and dysregulated behaviors, such as taking drugs, overeating, and venting with friends excessively when upset (Fink, Anestis, Selby, & Joiner, in press). Distress tolerance has been shown to interact with urgency in the prediction of symptoms of bulimia (Anestis, Selbi, Fink, & Joiner, 2007).

Given these relationships between emotion processes and affect, its regulation, and symptoms of psychopathology, it will be important for future work on transdiagnostic emotion regulation strategies to carefully examine these emotion-related processes as potential contributors of similarities and differences among disorders—and heterogeneity within disorders. For example, it is possible that two individuals experiencing the same type of target affect (e.g., anxious anticipation in the context of panic disorder) might differ in their predominant use of regulation strategies (e.g., behavioral avoidance versus self-injurious behavior). Such dif-

ferences might stem from diverging mediating factors; for example, the latter individual might have higher negative urgency and quickly engage in rash behavior to manage the affect. Incorporating these emotion-related processes in the transdiagnostic evaluation of emotion regulation strategies has the potential of producing a much more sophisticated understanding of affective processes in psychopathology.

### **Pattern of relationships among strategies**

A third area of future work on the transdiagnostic examination of emotion regulation strategies pertains to the study of their form and function in tandem by directly assessing the pattern of relationships among strategies, or in other words, the repertoire of emotion regulation strategies that people possess. Such a repertoire can be thought of as a toolbox of strategies that individuals use, with each person using some strategies more than others (Aldao & Nolen-Hoeksema, 2012). Despite the centrality of such a repertoire in the emotion regulation process, our empirical understanding of it remains largely underdeveloped (see Aldao, in press). Very little is known about the relationships among the strategies, and, in particular, the process by which the form and function of a given strategy influences the form of function of others. How does the regular use of a given strategy over time affect the extent to which another strategy is used? For example, if someone frequently resorts to reappraisal, is s/he less likely to avoid emotionally arousing situations? How does implementing a given strategy influence the function served by another strategy implemented concurrently? For example, if someone who is afraid of dogs finds him/herself going into a house that has a large, barking dog tied to a leash outside, s/he might resort to reappraisal (i.e., «the dog is on a leash, it cannot come over here and bite me») to reduce the amount of anxiety experienced. This would normally be considered an adaptive regulation effort. However, if the person is engaging in the same type of reappraisal, but s/he is also running back to his/her car (i.e., physically avoiding the situation), then could we think of that

reappraisal as adaptive? Or is it rendered maladaptive because it is embedded in the context of avoidance? Understanding these relationships among strategies in the repertoire can help us shed more light into what constitutes adaptive and maladaptive regulation in psychopathology. Below, I provide suggestions for basic and applied work on understanding the emotion regulation repertoire.

### *Understanding the emotion regulation repertoire*

Given our limited understanding of the normative relationships among strategies in the repertoire, a first step will consist of studying it in normative populations. A couple of recent studies have begun to address this question by showing that healthy individuals implement multiple emotion regulation strategies in response to a given emotional stimulus (e.g., Demaree, Robinson, Pu, & Allen, 2006; Wolgast, Lundh, & Viborg, 2011). The next step will consist of modeling the relationships among strategies (for a review of suggested statistical models, see Aldao, in press). Once the field has developed parsimonious models of how strategies in the repertoire interact with each other, such models could be evaluated in relation to psychopathology.

Of particular interest would be to test whether the repertoires are invariant across disorders or rather represent disorder-specific dysfunction. For example, two disorders might be characterized by the regular use of a given strategy, such as avoidance, yet, the first disorder might also consist of the regular use of reappraisal and the second disorder of the frequent use of suppression. We would say that avoidance is invariant across these two disorders whereas reappraisal and suppression are variant. However, by examining the relationships among these strategies, we would then add that, in both disorders, the frequent use of avoidance is coupled with the frequent use of some another strategy (in one disorder reappraisal, and in the other one, suppression). This coupling of avoidance with another strategy could be described as an invariant process. That is, in both disorders,



avoidance would only constitute part of the regulation effort and additional strategies would be needed. Thus, a closer study of the repertoire of strategies would allow us to develop more sophisticated models of transdiagnostic emotion regulation.

## CONCLUDING REMARKS

In the past decade, there has been a growing interest in the role of emotion dysregulation as a transdiagnostic process that can help explain dysfunction across mental disorders. Several investigations have provided compelling evidence that the habitual use of putatively maladaptive strategies and the relatively infrequent use of putatively adaptive strategies are associated with symptoms of various mental disorders, including mood, anxiety, eating, and substance abuse disorders. Yet, this work merely constitutes a stepping-stone in a larger quest to understand the complex relationship between affective disturbances and psychopathology. In this review, I proposed a roadmap for future transdiagnostic examinations of emotion regulation strategies. By carefully assessing variance in the form and function of emotion regulation strategies across disorders, the field can develop a more nuanced understanding of how emotion regulation deficits relate to the onset, maintenance, and treatment of mental disorders.

## REFERENCES

- Aldao, A. (in press). The future of emotion regulation research: Capturing context. *Perspectives on Psychological Science*.
- Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: A transdiagnostic examination. *Behaviour Research and Therapy*, *48*, 974-983. doi:10.1016/j.brat.2010.06.002
- Aldao, A., & Nolen-Hoeksema, S. (2012). When are adaptive strategies most predictive of psychopathology? *Journal of Abnormal Psychology*, *121*, 276-281. doi:10.1037/a0023598
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion regulation strategies across psychopathology: A meta-analysis. *Clinical Psychology Review*, *30*, 217-237. doi:10.1016/j.cpr.2009.11.004
- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.). Washington, DC: Author.
- Anestis, M. D., Selby, E. A., Fink, E. L., & Joiner, T. E. (2007). The multifaceted role of distress tolerance in dysregulated eating behaviors. *International Journal of Eating Disorders*, *40*, 718-726. doi:10.1002/eat
- Arbuckle, J. (2007). *Amos user's guide*. Chicago, Ill.: SPSS Inc.
- Argus, G., & Thompson, M. (2008). Perceived social problem solving, perfectionism, and mindful awareness in clinical depression: An exploratory study. *Cognitive Therapy and Research*, *32*, 745-757. doi:10.1007/s10608-006-9102-1
- Bagby, R. M., Parker, J. D. A., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale: Item selection and cross-validation of the factor structure. *Journal of Psychosomatic Research*, *38*, 23-32. doi:10.1016/0022-3999(94)90005-1
- Barlow, D. H. (2002). Fear, anxiety, and theories of emotion. In D. H. Barlow (Ed.), *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed.). (pp. 37e63) New York: Guilford Press.
- Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy*, *35*, 205-230. doi:10.1016/S0005-7894(04)80036-4
- Bilek, E. L., & Ehrenreich-May, J. (in press). An open trial investigation of a transdiagnostic group treatment for children with anxiety and depressive symptoms. *Behavior Therapy*. doi:10.1016/j.beth.2012.04.007
- Billings, A. G., & Moos, R. H. (1981). The role of coping responses and social responses in attenuating the stress of life events. *Journal of Behavioral Medicine*, *4*, 139-157. doi:10.1007/BF00844267
- Boisseau, C. L., Farchione, T. J., Fairholme, C. P., Ellard, K. K., & Barlow, D. H. (2010). The development of the unified protocol for the transdiagnostic treatment of emotional disorders: A case study. *Cognitive and Behavioral Practice*, *17*, 102-113. doi:10.1016/j.cbpra.2009.09.003
- Borkovec, T. D., Alcaine, O., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 209e242). New York: Guilford Press.
- Bradley, M. M., & Lang, O. J. (2000). Measuring emotion: Behavior, feeling, and physiology. In R. D. Lane & L. Nadel (Eds.), *Cognitive neuroscience of emotion* (pp. 242-276). New York: Oxford University Press
- Brown, T. A. (2007). Temporal course and structural relationships among dimensions of temperament and DSM-IV anxiety and mood disorder constructs. *Journal of Abnormal Psychology*, *116*, 313-328. doi:10.1037/0021-843X.116.2.313

- Brown, T.A., Campbell, L.A., Lehman, C.L., Grisham, J.R., & Mancill, R.B. (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of Abnormal Psychology, 110*, 585-599. doi:10.1037//0021-843X.110.4.585
- Butler, E. A., Egloff, B., Wilhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion, 3*, 48-67. doi:10.1037/1528-3542.3.1.48
- Byrne, B. M. (2010). *Structural equation modeling with AMOS*. New York: Taylor & Francis.
- Campbell-Sills, L., Barlow, D. H., Brown, T. A., & Hofmann, S. G. (2006). Effects of suppression and acceptance on emotional responses of individuals with anxiety and mood disorders. *Behaviour Research and Therapy, 44*, 1251-1263. doi:10.1016/j.brat.2005.10.001
- Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the nature of emotion regulation. *Child Development, 75*, 377-394. doi:10.1111/j.1467-8624.2004.00681.x
- Cheetham, A., Allen, N. B., Yucel, M., & Lubman, D. I. (2010). The role of affective dysregulation in drug addiction. *Clinical Psychology Review, 30*, 621-634. doi:10.1016/j.cpr.2010.04.005
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indices for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255. doi:10.1207/S15328007SEM0902\_5
- Cicchetti, D., Ganiban, J., & Barnett, D. (1991). Contributions from the study of high-risk populations to understanding the development of emotion regulation. Garber, Judy (Ed); Dodge, Kenneth A. (Ed), (1991). *The development of emotion regulation and dysregulation*. Cambridge studies in social and emotional development (pp. 15-48). New York: Cambridge University Press. doi:10.1017/CBO9780511663963.003
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. Hillsdale, NJ: Erlbaum.
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development, 75*, 317-333. doi:10.1111/j.1467-8624.2004.00673.x
- Cowdrey, F. A. & Park, R. J. (2012). The role of experiential avoidance, rumination and mindfulness in eating disorders. *Eating Behaviors, 13*, 100-105. doi:10.1016/j.eatbeh.2012.01.001
- Cyders, M. A., & Coskunpinar, A. (2010). Is urgency emotionality? Separating urgent behaviors from effects of emotional experiences. *Personality and Individual Differences, 48*, 839-844. doi:10.1016/j.paid.2010.02.009
- Cyders, M. A., & Smith, G. T. (2008). Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin, 134*, 807-827. doi:10.1037/a0013341
- D'Zurilla, T. J., Chang, E. C., Nottingham, E. J., & Faccini, L. (1998). Social problem-solving deficits and hopelessness, depression, and suicidal risk in college students and psychiatric inpatients. *Journal of Clinical Psychology, 54*, 1091-1107. doi:10.1002/(SICI)1097-4679(199812)54:8<1091::AID-JCLP9>3.3.CO;2-A
- Dear, B. F. Titov, N., Schwencke, G., Andrews, G., Johnson, L., Craske, M. G., & McEvoy, P. (2011). An open trial of a brief transdiagnostic Internet treatment for anxiety and depression. *Behaviour Research and Therapy, 49*, 830-837. doi:10.1016/j.brat.2011.09.007
- Demaree, H. A., Robinson, J. L., Pu, J., & Allen, J. J. B. (2006). Strategies actually employed during response-focused emotion regulation research: Affective and physiological consequences. *Cognition and Emotion, 20*, 1248-1260. doi:10.1080/02699930500405303
- Denson, T. F., Grisham, J. R., & Moulds, M.L. (2011). Cognitive reappraisal increases heart rate variability in response to an anger provocation. *Motivation and Emotion, 35*, 14-22. doi:10.1007/s11031-011-9201-5
- Dillon, D. G., Ritchey, M., Johnson, B. D., & LaBar, K. (2007). Dissociable effects of conscious emotion regulation strategies on explicit and implicit memory. *Emotion, 7*, 354-365. doi:10.1037/1528-3542.7.2.354
- Dixon, C., Mansell, W., Rawlinson, E., & Gibson, A. (2011). A transdiagnostic self-help guide for anxiety: Two preliminary controlled trials in subclinical student samples. *The Cognitive Behaviour Therapist, 4*, 1-15. doi:10.1017/S1754470X10000176
- Dixon-Gordon, K., Aldao, A., & Turner, B. (under review). A meta-analysis of suppression in the laboratory: The role of psychopathology.
- Dozois, D. J. A., Seeds, P. M., & Collins, K. A. (2009). Transdiagnostic approaches to the prevention of depression and anxiety. *Journal of Cognitive Psychotherapy: An International Quarterly, 23*, 44-50. doi:10.1891/0889-8391.23.1.44
- Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review, 31*, 203-212. doi:10.1016/j.cpr.2010.04.009
- Ehrenreich-May, J., Queen, A. H., Bilek, E., Remmes, C., & Marciel, K. (in press). The unified protocols for the treatment of emotional disorders in youth. In J. Ehrenreich-May & B. Chu (Eds.), *Transdiagnostic mechanisms and treatment of youth psychopathology*. New York: Guilford Press.
- Ehring, T., & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy, 1*, 192-205. doi:10.1680/ijct.2008.1.3.192
- Eifert, G. H., & Heffner, M. (2003). The effects of acceptance versus control contexts on avoidance of panic-related symptoms. *Journal of Behavior Therapy and*

- Experimental Psychiatry*, 34, 293-321. doi:10.1016/j.jbtep.2003.11.001
- Eisenberg, N., & Morris, A. S. (2002). Children's emotion-related regulation. *Advances in Child Development and Behavior*, 30, 189-229. doi:10.1016/S0065-2407(02)80042-8
- Fairburn, C. G., Cooper, Z., Doll, H. A., O'Connor, Bohn, K., Hawker, ... & Palmer, R. L. (2008). Transdiagnostic cognitive-behavioral therapy for patients with eating disorders: A two-site trial with 60-week follow-up. *American Journal of Psychiatry*, 166, 311-319. doi:10.1176/appi.ajp.2008.08040608
- Feldman, G. C., Joormann, J., & Johnson, S. L. (2008). Responses to positive affect: A self-report measure of rumination and dampening. *Cognitive Therapy and Research*, 32, 507-525. doi:10.1007/s10608-006-9083-0
- Feldner, M. T., Hekmat, H., Zvolensky, M. J., Vowles, K. E., Secrist, Z., & Leen-Fedlner, E. W. (2006). The role of experiential avoidance in acute pain tolerance: A laboratory test. *Journal of Behavior Therapy and Experimental Psychiatry*, 37, 146-158. doi:10.1016/j.jbtep.2005.03.002
- Fink, E. L., Anestis, M. D., Selby, E. A., & Joiner, T. E. (in press). Negative urgency fully mediates the relationship between alexithymia and dysregulated behaviors. *Personality and Mental Health*. doi:10.1002/pmh.138
- Forbush, K., & Watson, D. (2006). Emotional inhibition and personality traits: A comparison of women with anorexia, bulimia, and normal controls. *Annals of Clinical Psychiatry*, 18, 115-121. doi:10.1080/10401230600614637
- Friederich, H., Kumari, V., Uher, R., Riga, M., Schmidt, U., Campbell, I. C., ... & Treasure, J. (2006). Differential motivational responses to food and pleasurable cues in anorexia and bulimia nervosa: A startle reflex paradigm. *Psychological Medicine*, 36, 1327-1335. doi:10.1017/S0033291706008129
- Goldin, P. R., McRae, K., Ramel, W., & Gross, J. J. (2007). The neural bases of emotion regulation: Reappraisal and suppression of negative emotion. *Biological Psychiatry*, 63, 577-586. doi:10.1016/j.biopsych.2007.05.031
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26, 41-54. doi:10.1023/B:JOBA.0000007455.08539.94
- Greenberg, L. S. (2002). *Emotion-focused therapy: Coaching clients to work through their feelings*. Washington, D.C.: APA.
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality & Social Psychology*, 74, 234-237. doi:10.1037/0022-3514.85.2.348
- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition and Emotion*, 9, 87, 108. doi:10.1080/02699939508408966
- Gruber, J., Eidelman, P., & Harvey, A. G. (2008). Transdiagnostic emotion regulation processes in bipolar disorder and insomnia. *Behaviour Research and Therapy*, 46, 1096-1100. doi:10.1016/j.brat.2008.05.004
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford Press.
- Haynos, A. F., & Fruzzetti, A. E. (2011). Anorexia nervosa as a disorder of emotion dysregulation: Evidence and treatment implications. *Clinical Psychology: Science and Practice*, 18, 183-202. doi:10.1111/j.1468-2850.2011.01250.x
- Harvey, A. G. (2008). Insomnia, psychiatric disorders, and the transdiagnostic perspective. *Current Directions in Psychological Science*, 17, 299-303. doi:10.1111/j.1467-8721.2008.00594.x
- Harvey, A. G., Murray, G., Chandler, R. A., & Soehner, A. (2011). Sleep disturbance as transdiagnostic: Consideration of neurobiological mechanisms. *Clinical Psychology Review*, 31, 225-235. doi:10.1016/j.cpr.2010.04.003
- Harvey, A. G., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders*. Oxford, UK: Oxford University Press.
- Hofmann, S. G., Heering, S., Sawyer, A. T., & Asnaani, A. (2009). How to handle anxiety: The effects of reappraisal, acceptance, and suppression strategies on anxious arousal. *Behaviour Research and Therapy*, 47, 389-394. doi:10.1016/j.brat.2009.02.010
- Hofmann, S. G., Sawyer, A. T., Fang, A., & Asnaani, A. (2012). Emotion dysregulation model of mood and anxiety disorders. *Depression & Anxiety*, 29, 409-416. doi:10.1002/da.21888
- Hudson, J. I., Hiripi, E., Pope, H. G., Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, 61, 348-358. doi:10.1016/j.biopsych.2006.03.040
- Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., ... & Wang, P. (2010). Research Domain Criteria (RDoC): Toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, 167, 748-751. doi:10.1176/appi.ajp.2010.09091379
- Kabat-Zinn, J. (1990). *Full catastrophe living*. New York: Delacorte Press.
- Kaiser, A. J., Milich, R., Lynam, D. R., & Charnigo, R. J. (in press). Negative urgency, distress tolerance, and substance abuse among college students. *Addictive Behaviors*. doi:10.1016/j.addbeh.2012.04.017

- Kashdan, T. B., Ferrisizidis, P., Collins, R. L., & Muraven, M. (2011). Emotion differentiation as resilience against excessive alcohol use: An ecological momentary assessment in underage social drinkers. *Psychological Science, 21*, 1341-1347. doi:10.1177/0956797610379863
- Kessler, R.C., Berglund, P., Demler, O., Jin, R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*, 393-602. doi:10.1001/archpsyc.62.6.593
- Kessler, R. C., Stein, M. B., Berglund, P. (1998). Social phobia subtypes in the National Comorbidity Survey. *American Journal of Psychiatry, 155*, 613-619. Retrieved from: <http://ajp.psychiatryonline.org/>
- Koole, S. L. (2009). The psychology of emotion regulation: An integrative review. *Cognition and Emotion, 23*, 4-41. doi:10.1080/02699930802619031
- Kring, A. M. (2008). Emotion disturbances as transdiagnostic processes in psychopathology. In M. Lewis, J. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotion* (3rd ed., pp. 691-705). New York, NY: Guilford Press.
- Kring, A. M., & Sloan, D. S. (2010). *Emotion Regulation and Psychopathology*. New York: Guilford Press.
- Kuppens, P., Allen, N. B., & Sheeber, L. (2009). Emotional inertia and psychological maladjustment. *Psychological Science, 21*, 984-991. doi:10.1177/0956797610372634
- Lang, P.J., Bradley, M.M., & Cuthbert, B.N. (2008). International affective picture system (IAPS): *Affective ratings of pictures and instruction manual*. Technical Report A-8. University of Florida, Gainesville, FL.
- Levitt, J. T., Brown, T. A., Orsillo, S. M., & Barlow, D. H. (2004). The effects of acceptance versus suppression of emotion on subjective and psychophysiological response to carbon dioxide challenge in patients with panic disorder. *Behavior Therapy, 35*, 747-766. doi:10.1016/S0005-7894(04)80018-2
- Linehan, M. M. (1993). *Cognitive-behavioral treatment for borderline personality disorder*. New York: Guilford Press.
- Macht, M., Haupt, C., & Ellgring, H. (2005). The perceived function of eating is changed during examination stress: A field study. *Eating Behaviors, 6*, 109-112. doi:10.1016/j.eatbeh.2004.09.001
- Mansell, W., Harvey, A. G., Watkins, E. R., & Shafran, R. (2008). Cognitive behavioral processes across psychological disorders: A review of the utility and validity of the transdiagnostic approach. *International Journal of Cognitive Therapy, 3*, 181-191. doi:10.1680/ijct.2008.1.3.181
- Mauss, I. B., Levenson, R. W., McCarter, L., Wilhelm, F. H., & Gross, J. J. (2005). The tie that binds? Coherence among emotion experience, behavior, and physiology. *Emotion, 5*, 175-190. doi:10.1037/1528-3542.5.2.175
- Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry, 15*, 197-215. doi:10.1207/s15327965pli1503\_02
- McLaughlin, K. A., Hatzenbuehler, M. L., Mennin, D. S., & Nolen-Hoeksema, S. (2011). Emotion dysregulation and adolescent psychopathology: A prospective study. *Behaviour Research and Therapy, 49*, 544-554. doi:10.1016/j.brat.2011.06.003
- McRae, K., Ciesielski, B., & Gross, J. J. (2012). Unpacking cognitive reappraisal: Goals, tactics, and outcomes. *Emotion, 12*, 250-255. doi:10.1037/a0026351
- Mennin, D. S., & Fresco, D. M. (2010). Emotion regulation as a framework for understanding and treating anxiety pathology. In A. M. Kring & D. M. Sloan (Eds.), *Emotion regulation in psychopathology* (pp. 356-379). New York: Guilford Press.
- Mennin, D. S., & Fresco, D. M. (in press). Emotion Regulation Therapy. In J.J. Gross (Ed.), *Handbook of Emotion Regulation* (Second Ed.). New York: Guilford Press.
- Miller, G. A., & Chapman, J. P. (2001). Misunderstanding analysis of covariance. *Journal of Abnormal Psychology, 110*, 40-48. doi:10.1037//0021-843X.110.1.40
- Newman, M. G., & Llera, S. J. (2011). A novel theory of experiential avoidance in generalized anxiety disorder: A review and synthesis of research supporting a contrast avoidance model of worry. *Clinical Psychology Review, 31*, 371-382. doi:10.1016/j.cpr.2011.01.008
- Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*, 400-424. doi:10.1111/j.1745-6924.2008.00088.x
- Nolen-Hoeksema, S., & Watkins, E. R., (2011). A heuristic for developing transdiagnostic models of psychopathology: Explaining multifinality and divergent trajectories. *Perspectives on Psychological Science, 6*, 589-609. doi:10.1177/1745691611419672
- Norton, P. J. (2008). An open trial of a transdiagnostic cognitive-behavioral group therapy for anxiety disorder. *Behavior Therapy, 39*, 242-250. doi:10.1016/j.beth.2007.08.002
- Norton, P. J., Hayes, S. A., & Hope, D. A. (2004). Effects of a transdiagnostic group treatment for anxiety on secondary depression. *Depression and Anxiety, 20*, 198-202. doi:10.1002/da.20045. doi:10.1016/j.brat.2011.03.007
- Polivy, J., & Herman, C. P. (2002). Causes of eating disorders. *Annual Review of Psychology, 53*, 187-213. doi:0084-6570/02/0201-0187
- Richards, J. M. & Gross, J. J. (2000). Emotion regulation and memory: The cognitive costs of keeping one's cool. *Personality Processes and Individual Differences, 79*, 410-424. doi:10.1037/0022-3514.79.3.410



- Roemer, L., Orsillo, S. M., & Salters-Pedneault, K. (2008). Efficacy of an acceptance-based behavior therapy for generalized anxiety disorder: Evaluation in a randomized control trial. *Journal of Counseling and Clinical Psychology, 76*, 1083-1089. doi:10.1037/a0012720
- Rottenberg, J., Ray, R. R., & Gross J. J. (2007). Emotion elicitation using films. In J. A. Coan, & J. J. B. Allen (Eds.). *The handbook of emotion elicitation and assessment* (pp. 9-28). New York: Oxford University Press.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York: Guilford Press.
- Stein, M. B., Fuetsch, M., Muller, N., Hofer, M., Lieb, R., & Wittchen, H. (2001). Social anxiety disorder and the risk of depression: A prospective community study of adolescents and young adults. *Archives of General Psychiatry, 58*, 251-256. doi: 10.1001/archpsyc.58.3.251
- Stice, E., Brunton, E. M., Shaw, H. (2024). Prospective relations between bulimic pathology, depression, and substance abuse: Unpacking comorbidity in adolescent girls. *Journal of Consulting and Clinical Psychology, 72*, 62-71. doi:10.1037/0022-006X.72.1.62
- Tamir, M., Mitchell, C., & Gross, J. J. (2008). Hedonic and instrumental motives in anger regulation. *Psychological Science, 19*, 324-328. doi:10.1111/j.1467-9280.2008.02088.x
- Thompson, R.A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development, 59*, 25-52. doi:10.2307/1166137
- Titov, N., Dear, B. F., Schwencke, G., Andrews, G., Johnston, L., Craske, M. G., & McEvoy, P. (2011). Transdiagnostic internet treatment for anxiety and depression: A randomised control trial. *Behaviour Research and Therapy, 49*, 441-452. doi:10.1016/j.brat.2011.03.007
- Wade, T. D., Bergin, J. L., Martin, N. G., Gillespie, N. A., & Fairburn, C. G. (2006). A transdiagnostic approach to understanding eating disorders. *The Journal of Nervous and Mental Disease, 194*, 510-517. doi:10.1097/01.nmd.0000225067.42191.b0
- Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*, 163-206. doi:10.1037/0033-2909.134.2.163
- Watson, D. (2009). Differentiating the mood and anxiety disorders: A quadripartite model. *Annual Review of Clinical Psychology, 5*, 221-247. doi:10.1146/annurev.clinpsy.032408.153510
- Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. *Annual Review of Psychology, 51*, 59-91. doi:10.1146/annurev.psych.51.1.59
- Wolgast, M., Lundh, L., & Viborg, G. (2011). Cognitive reappraisal and acceptance: An experimental comparison of two emotion regulation strategies. *Behaviour Research and Therapy, 49*, 858-856. doi:10.1016/j.brat.2011.09.011
- World Health Organization. (1993). The ICD-10 classification of mental and behavioural disorders: Diagnostic criteria for research. Geneva: World Health Organization.
- Zvolensky, M. J., Bernstein, A., & Vujanovic, A. A. (2011). *Distress tolerance: Theory, research, and clinical implications*. New York: Guilford Press.