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How the Study of Regulation Can Inform the Study of Coping

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Abstract

It is advantageous to study regulation and coping and their development at multiple levels of expression and origin simultaneously. We discuss several topics of current interest in the emotion-related regulation literature that are relevant to coping, including conceptual issues related to definitions and types of coping, types of physiological responses deemed to tap emotion regulation that could be pursued in work on coping, and findings on the socialization of self-regulation that have implications for understanding the development of coping.

In 1997, Eisenberg, Fabes, and Guthrie defined coping as involving regulatory processes in a subset of contexts—those involving stress—a definition that appears to be consistent with the views of prominent coping theorists writing in the past decade (Compas, Connor, Saltzman, Thomsen, & Wadsworth, 2001; Skinner & Zimmer-Gembeck, 2007). For example, Compas et al. defined coping as “conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances. . . . Coping is a subset of broader self-regulatory processes” (p. 89).

As Skinner and Zimmer-Gembeck (2007) noted, and consistent with Eisenberg et al. (1997), coping under stress includes not only the individual's attempt to deal with emotional experience, expression, and physiological reactions, “but also to coordinate motor behaviors, attention, cognition, and reactions from the social and physical environments” (p. 123). Hence, coping can be viewed as involving emotion-related self-regulation. Yet some aspects of coping differ somewhat from those typically discussed by those interested in emotion-related self-regulation. For example, an act of seeking social support involves the regulation of attention and behavior but often other skills as well, such as exercising various social skills. Nonetheless, seeking support from or contact with an adult sometimes has been coded as a type of emotion regulation in studies of infants and toddlers (Mangelsdorf, Shapiro, & Marzolf, 1995).

In this chapter, we discuss several topics of current interest in the emotion-related regulation literature that are relevant to coping. First, we focus on several conceptual issues related to definitions and types of coping. Then we discuss a type of physiological response deemed to tap emotion regulation that could be pursued in work on coping. Finally, we review some findings on the socialization of self-regulation that have implications for understanding the development of coping. In our view, it is advantageous to study regulation and coping and their development at multiple levels of expression and origin simultaneously.

Regulation and Coping: Conceptual Issues

Some of the issues in the coping literature and in the self-regulation literature are similar. In addition, ideas from the self-regulation literature can be useful for thinking about coping, and research on coping might provide new ideas for the study of regulation.

Effortful and Reactive Processes

An important distinction in both the coping and regulation literatures is between effortful or voluntary processes and more involuntary processes. Compas et al. (2001) defined coping as conscious and volitional; Skinner, Edge, Altman, and Sherwood (2003) argued that some less volitional behaviors should be included under the rubric of coping. Skinner and Zimmer-Gembeck (2007), building on others' work (Metcalf & Mischel, 1999; Rothbart & Bates, 2006), differentiate between temperamental reactivity ("responsiveness to change in the external and internal environment," p. 100) and regulation, or between "hot" emotional and "cool" cognitive systems. They argue that the hot system incorporates experiences through conditioning and learning and is adapted for dealing with stress—for example, "it triggers environmentally tuned actions faster than a more cognitively mediated system" (p. 123).

Eisenberg and colleagues (2004) have been concerned with conceptually and empirically differentiating processes contributing to self-regulation that are more effortful and voluntary (although not necessarily very conscious) from more reactive processes that are less voluntarily managed (also see Carver, 2005). Thus, they have differentiated between effortful control (EC) and reactive control processes. EC is defined as "the efficiency of executive attention—including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" (Rothbart & Bates, 2006, p. 129). EC is temperamentally based and includes the abilities to shift and focus attention as needed, to activate and inhibit behavior as needed, especially when one does not want to do so (for example, has competing goals), and other executive functioning skills involved in integrating information, planning, and modulating emotion and behavior. The processes involved in EC enhance individuals' capacity for regulation of both emotion and the behaviors linked to emotion, as well as for integrating and evaluating information and cognitively laying out a course of response (planning). EC is believed to be centered in the anterior cingulate gyrus of the brain but also involves regions of the prefrontal cortex (Rueda, Rothbart, McCandliss, Saccomanno, & Posner, 2005) and connects to and interacts with subcortical systems.

In contrast to EC are reactive control (RC) processes. They pertain to relatively involuntary motivational approach and avoidance systems of response reactivity that, at extreme levels, result in impulsive undercontrol and rigid overcontrol (including behavioral inhibition—slow or inhibited approach, distress or subdued affect in situations involving novelty or uncertainty; Derryberry & Rothbart, 1997; Kagan & Fox, 2006). Pickering and Gray (1999) and others have argued that approach and avoidance motivational systems related to impulsive and overly inhibited behaviors, respectively, are associated with subcortical systems such as Gray's behavioral activation system (which involves sensitivity to cues of reward or cessation of punishment) and behavioral inhibition system (activated in situations involving novelty and stimuli signaling punishment or frustrative nonreward). RC is part of the broader category of reactivity—a major dimension of temperament discussed by Rothbart.

Although Eisenberg and colleagues (2004) have argued that the term *self-regulation* should include effortful but not reactive control processes, the issue is perhaps one of semantics. It is not clear what should be included in the rubric of self-regulation; it depends on how broad one wants to view regulatory processes (see Thompson, Lewis, & Calkins, 2008). Regardless, it does seem to be useful to differentiate aspects of control and regulation that involve reactive systems versus those systems linked to EC. Eisenberg and colleagues have found that measures

of the two constructs, although correlated, provide some differential or unique prediction of maladjustment (Eisenberg, Cumberland, et al., 2001, 2004; Valiente et al., 2003); they may also interact in predicting developmental outcomes. In addition, there is initial evidence suggesting that with development, EC may be the stronger predictor of maladjustment (Eisenberg et al., 2004; Valiente et al., 2003). We believe the distinction between EC and RC is useful when thinking about coping dimensions.

Dimensions of Coping and Conceptions of Regulation

There are numerous typologies for conceptualizing coping; for example, Skinner et al. (2003) grouped coping into twelve categories, which themselves were grouped into three main kinds of “adaptive processes”: (1) those that coordinate an individual's actions with the contingencies in the environment (problem-solving, information seeking, helplessness, escape); (2) those that coordinate the individual's reliance on others with the social resources in the environment (self-reliance, including emotion and behavior regulation, expression of emotion, emotion approach; support seeking; delegation; and isolation); and (3) those that coordinate an individual's preferences with the options available in the environment (accommodation, negotiation, submission, opposition).

Some of Skinner et al.'s (2003) categories appear to directly reflect EC capacities; these include problem solving, emotion and behavior regulation (components of Skinner's self-reliance), and some aspects of accommodation such as distraction (attention shifting, in regulation terminology) and cognitive restructuring. Others often (but not always) may reflect aspects of reactive control or emotional reactivity, such as emotion approach (under self-reliance) and social withdrawal (under isolation). Similarly, some coping behaviors identified, such as confusion, cognitive interference, and cognitive exhaustion (all under the rubric of helplessness), could be relatively nonvoluntary responses due to high levels of reactivity in stressful contexts and may not reflect conscious or effortful attempts to adapt. Other coping behavior such as emotion expression (under self-reliance) may sometimes reflect relatively involuntary emotional reactivity, whereas at other times may be effortfully regulated. Moreover, Skinner et al. argued that all of the twelve categories of coping they delineated are “adaptive.” We agree that they all can be adaptive in some circumstances; however, these behaviors are not always successful or even adaptive. For example, whining and self-pity (aspects of delegation) may be adaptive in meeting goals in some stressful contexts (such as getting what the child wants from a parent) but may exacerbate stress in other situations. Indeed, many of the coping strategies that have been identified and measured may often be maladaptive in alleviating stress in some contexts. It also seems to us that some behaviors that are coded as coping, such as aggression and rumination, often may reflect a lack of regulation. If aggression is used to achieve a goal, it might involve regulation. However, aggression may primarily reflect impulsivity (that is, reactivity) when it is evoked in an unthinking manner by frustration, anger, or some other emotion.

Thus, conceptual issues plague thinking and research on both coping and regulation. One difficult issue is how to deal with the fact that some stress reactions seem to be evoked and relatively out of an actor's control. There is disagreement on whether these behaviors are instances of regulation or coping, represent primarily involuntary emotional and behavioral reactivity (Compas et al., 2001; Eisenberg et al., 1997), or signal a failure to regulate or cope. It is possible that the significance of such responses also changes with age; for example, some of these behaviors may be more voluntary or even manipulative at certain ages than others. Although it is difficult to fully disentangle emotionality and its regulation, many agree that it is still useful to try to differentiate them on some level. The second, related issue is whether the variants of coping or regulatory behaviors should be likely to produce adaptive consequences for the individual, at least in the short run. Should behaviors in stressful contexts

that usually are associated with more rather than less stress be labeled as coping behaviors? Again, the issue is whether the focus in the definition of coping should include all (or at least very diverse) reactions to stress or if coping behaviors should be confined to those that actually involve some volitional attempt to modulate stress.

Eisenberg has argued that by definition, EC processes can be turned on and off as needed and therefore usually (but not always) are attempts at adaptation (and likely to be adaptive in either the short or long run). In addition, because they are used primarily when needed and are volitional, they are relatively flexible. That is, individuals can not only modulate the degree to which they use EC, but EC processes can be modified (for example, in terms of strategies and multiple approaches) if necessary for adaptation or reaching a goal. The flexibility of EC processes likely contributes to its adaptive value, although there may be times when EC may be used for maladaptive goals. Consistent with this idea, individual differences in EC have been found to be positively related to personality resilience (ego resilience) in a number of samples (Cumberland-Li, Eisenberg, & Reiser, 2004; Eisenberg, Spinrad, & Morris, 2002; Valiente et al., 2003). Ego resilience has been defined as “the dynamic capacity of an individual to modify his/her modal level of ego-control, in either direction, as a function of the demand characteristics of the environmental context” (Block & Block, 1980, p. 48). Thus, it may be important to consider the flexibility of coping behaviors in thinking about their value and how to classify them. For example, strategizing and planning, as well as behavioral regulation (the abilities to voluntarily inhibit or activate behavior), are likely to be relatively flexible means of coping, and perhaps more so with age as these skills improve. In contrast, rumination, rigid perseverance, and intrusive thoughts (aspects of submission in Skinner's categorizing); confusion, cognitive interference, and cognitive exhaustion (aspects of helplessness); and whining or self-pity (aspects of delegation) are probably less flexible.

Vagal Tone, Regulation, and Adaptive Coping

Although reactivity and regulation can be difficult to separate conceptually and operationally, investigators often discuss physiological mechanisms believed to underlie these two processes. Drawing on physiological measures for differentiation is a potentially fruitful research direction for studies of reactivity, regulation, and coping.

Autonomic activity is jointly determined by the interaction of the sympathetic nervous system (SNS) and parasympathetic nervous system (PNS). The SNS serves to mobilize energy in response to environmental demands. The SNS, more than the PNS, is believed to relate to reactivity and thus is relevant to the intensity of reactions to stress. In contrast, the PNS inhibits SNS activity to promote digestive and restorative functions. The vagus is the primary source of PNS influence on heart rate (Porges, 2007), and this influence waxes and wanes with respiration. The change in heart rate occurring at the frequency of respiration is referred to as respiratory sinus arrhythmia (RSA). Although RSA can be affected by SNS influences (Grossman & Taylor, 2007), it is commonly used as an estimate of vagal tone, in part because it can be measured noninvasively.

Porges (Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996), in his polyvagal theory, describes vagal tone as a “brake” that slows metabolic activity in the absence of external demands. When faced with stressful situations, this brake can be removed to rapidly increase heart rate, preparing the body for action. In a number of studies, resting vagal tone has been related to temperamental reactivity (see Rothbart & Bates, 2006). In addition, high vagal tone appears to index the ability to regulate attention (Hansen, Johnsen, & Thayer, 2003; Suess, Porges, & Plude, 1994), and low vagal tone may indicate an attentional bias toward negative or threatening information (Thayer, Friedman, Borkovec, Johnsen, & Molina, 2000).

Although resting vagal tone has been related to successful emotion regulation and coping (Fabes & Eisenberg, 1997), vagal suppression—the decrease in vagal tone from baseline that typically occurs when confronted with a stressful situation—may be a better indicator of regulation than measures of resting vagal tone. However, few researchers have directly examined the relations between emotion-related regulation and vagal suppression. Research from the adult literature suggests that successful regulation of negative emotions through mechanisms such as reappraisal and suppression of emotional expression is related to increases, rather than decreases, in vagal tone (Butler, Wilhelm, & Gross, 2006), but much more research is needed in this area.

High vagal suppression, which may index responsivity to changes in the environment, has consistently been found to moderate the association between stressful family environments and children's adjustment or maladjustment, providing evidence that vagal regulation may be involved in more adaptive coping. For example, Leary and Katz (2004) found that parental conflict was associated with conflicted play for children with low vagal suppression but not high vagal suppression. Similarly, El-Sheikh and Whitson (2006) reported that high vagal suppression was associated with lower levels of internalizing problems for girls exposed to high levels of marital conflict, and El-Sheikh (2001) found that parental problem drinking was associated with internalizing, externalizing, and social problems for children with low, but not high, vagal suppression. Furthermore, it appears that vagal tone and vagal suppression moderate the relations between stress and health outcomes. For example, marital conflict has been found to predict physical health problems in children with low, but not high, vagal suppression (El-Sheikh, Harger, & Whitson, 2001), providing additional evidence that regulation is associated with successful coping. Although most studies have found higher vagal suppression is related to better adjustment, investigators should remain open to nonlinear relations between vagal regulation and successful adaptation. For example, Calkins, Graziano, and Keane (2007) found that externalizing problems were related to low levels of vagal suppression, whereas co-occurring externalizing and internalizing problems were related to high levels of vagal suppression. In addition, it is quite possible that the developmental significance of vagal suppression changes with age, and care should be taken when generalizing to different age groups. For example, high vagal tone in infancy is associated with negative emotionality, but by as early as age two, this relation has reversed, and high vagal tone is related to positive emotionality (Beauchaine, 2001). It is not yet clear whether vagal suppression shows a similar developmental pattern.

We believe that voluntary, effortful coping strategies are more likely to be adaptive because they are more flexible than other strategies or reactions to stress. Although the literature is preliminary, some evidence suggests that vagal capacities are related to physiological flexibility and resilience. Therefore, coping research, which has tended to rely on questionnaire measures (Compas et al., 2001), may benefit from using psychophysiological measures such as vagal tone to clarify the associations of physiologically based regulation with coping strategies and coping efficacy.

Socialization of Coping

Other critical questions are whether and how socializers influence the development of coping. The literature contains both correlational and experimental evidence that children's coping is related to socialization practices (Power, 2004; Sandler et al., 2003), but findings are often small or inconsistent. We believe a greater focus on measurement, development, and consideration of nonlinear relations can result in a more nuanced understanding of the relations between adults' socialization-related behaviors and children's coping.

Recognizing the multidimensionality of coping is critical to the study of the socialization of children's coping. For example, Compas and his colleagues (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000; Wadsworth, Rieckmann, Benson, & Compas, 2004) demonstrated that stress-related responses are best represented by a five-factor model. *Primary control coping*, often labeled as active coping, includes attempts at problem solving. *Secondary control coping* includes acceptance, restructuring, distraction, and positive thinking, whereas *disengagement coping* involves avoidance, denial, and wishful thinking. Measures of rumination, physiological arousal and impulsivity are considered measures of *involuntary engagement*. In contrast, *involuntary disengagement* includes inaction and emotion numbing. Measurement approaches that capture such categories are important because we would expect relations between socialization practices and indexes of the more volitional types of coping such as primary, secondary, and distraction. In contrast, we do not expect very clear and consistent relations with the involuntary responses (because of the difficulty of modulating them). In previous classification systems, involuntary responses were often grouped with more volitional responses into subordinate coping categories, such as problem or emotion focused or approach versus withdrawal, and doing so likely dilutes the relations of those types of reactions to stress with other variables.

This distinction mirrors the work in the emotion-related regulation literature on associations between parenting and children's EC versus reactive overcontrol or undercontrol. For example, we have found an association of parenting with measures of EC (Eisenberg et al., 2001; Eisenberg, Zhou, et al., 2005), and Diamond, Leong, and Bodrova (2006) provided experimental evidence that children's EC can be improved through the mechanism of social interactions. Relations of parenting with reactive processes such as involuntary behavioral inhibition or shyness are often less consistent (see Kiel & Buss, 2006, for a summary). When considering coping and involuntary responses, there is some evidence that parents' positive reactions to children's negative emotions are significantly related to children's primary control coping, secondary control coping, and distraction, but only marginally related to involuntary engagement and disengagement (Valiente, Lemery-Chalfant, & Swanson, in press).

The role of socializers in the coping process is likely to change as children develop. For example, in early childhood, support seeking might be closely linked to qualities in the parent-child relationship, and parents' efforts to guide children through stressful experiences should be fruitful. However, during adolescence, the role of parents in the stress and coping process is likely to change in order to accommodate the increased role of peers and children's own cognitive and emotional abilities. In work on the relation of parenting to children's EC, it is fairly common for measures of parents' positive or negative emotion or parenting style to be associated with children's EC (Eisenberg, Gershoff, et al., 2001), but it is not uncommon for such relations to weaken over time (Valiente et al., 2006). It would also be interesting to examine how parents alter their strategies for assisting their children in coping with stress over time. For example, while role playing and preparing children before they encounter a stressor, such as before a babysitter arrives, clearly have value in early childhood, the use of such activities is likely to decrease as children age. In addition, parents likely need to be fairly active in helping their young children manage and avoid stress (see Fabes et al., 1994), but as children develop, their coping abilities may benefit from developmentally appropriate amounts of stress.

One reason the linear relations between parenting and coping are often weak or inconsistent is that there might also be quadratic relations. In the context of a warm and supportive parent-child relationship, exposure to some parental negative emotion might provide children with opportunities to learn about and experience negative emotion and to witness coping strategies without becoming overly aroused, which would likely interfere with the learning process. Evidence of an inverted-U relation between parents' negative expressivity and children's sympathy provides some support for this line of reasoning. Moreover, EC has been found to

interact with parenting when predicting aspects of children's socioemotional development. For example, Valiente, Eisenberg, et al. (2004) found that the negative relation between parents' expression of negative emotion and children's sympathy was negative only for children low in EC. It is likely that the relations of coping to developmental outcomes are also moderated by the quality of parenting. Moreover, the relation between children's stress and coping has been found to be moderated by the quality of parenting; for example the negative relation between stress and children's constructive coping appears to be stronger for children exposed to low levels of parents' positive emotion and mothers' low level of expression of negative submissive emotion (Valiente, Fabes, Eisenberg, & Spinrad, 2004). Similar moderated relations are likely to be found for measures of self-regulatory skills such as EC.

Conclusion

Researchers studying coping and self-regulation often focus on somewhat different measures, processes, and correlates. However, because of the overlapping nature of the two constructs, they share conceptual problems and likely relate in similar ways to variables such as developmental outcomes, physiological responding, and parenting. Thus, some of the methods used to study self-regulation, such as vagal responding, might be fruitful for the study of coping. In addition, findings in research on the potential role of parenting in self-regulation provide clues to coping researchers interested in the socialization of coping.

If coping is, in fact, a range of strategies that depend on emotion regulation, then findings in the study of children's regulation can inform work on coping and vice versa. One promising avenue of research is to assess coping and emotion regulation in the same study in order to investigate their unique and overlapping contribution to key developmental outcomes. Although some constructs in the coping and self-regulation literatures are likely overlapping (for example, distraction and attention shifting), temperamental self-regulatory capacities based on effortful control (for example, attention focusing, planning) often may contribute to the skills required for competent coping (for example, competent active coping). Thus, it would also be useful to study longitudinally how temperamental and coping capacities relate to one another across time.

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