

Effortful Emotion Regulation as a Unique Form of Cybernetic Control

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Abstract

Emotion regulation is important for psychological well-being, yet we know relatively little about why, when, and how hard people try to regulate emotions. This article seeks to address these motivational issues by considering effortful emotion regulation as a unique form of cybernetic control. In any domain of self-regulation, emotions serve as indices of progress in regulation and inform the expected value of regulation. In emotion regulation, however, emotions also serve as the very target of regulation. This interdependence gives rise to ironic processes that may render people less likely to exert effort in emotion regulation, precisely when they need it most. The proposed analysis complements and extends existing theories of emotion regulation, sheds new light on available findings, carries implications for psychopathology and well-being, and points to new hypotheses that could lead to theoretical and applied advances in the field.

Keywords

emotion, self-regulation, emotion regulation, motivation, psychopathology, well-being, happiness

Emotion regulation (i.e., the process by which people actively try to change the trajectory of an emotional episode; Gross, 2015) is critical for mental health and well-being (e.g., DeSteno, Gross, & Kubzansky, 2013; Nyklicek, Vingerhoets, & Zeelenberg, 2010). Effortful emotion regulation, in particular, has been the focus of most research on emotion regulation to date. It requires effort for initiation, demands monitoring during implementation, and is associated with some level of awareness (Gyurak, Gross, & Etkin, 2011). Although the effects of effortful emotion regulation on psychological functioning have been well documented, we do not yet understand what motivates people to initiate, invest effort in, and persist in emotion regulation (Ghafur, Suri, & Gross, 2018; McRae & Gross, 2020). In an attempt to address such motivational issues, this article offers an analysis of emotion regulation as a form of cybernetic control (Carver & Scheier, 1982, 1998). The analysis builds on features that may be common across self-regulation domains but also highlights features that may be unique to emotion regulation, rendering it particularly challenging.

To demonstrate how emotion regulation might be similar to and distinct from other forms of self-regulation, consider the following examples. Bim does not want to be overweight. When he notices a discrepancy between his current weight and his desired weight, he realizes

he needs to lose weight. This realization makes him feel bad but does not change how much he weighs. He considers the potential benefits and costs of dieting. When he feels sad, resisting another dinner roll, for example, seems beyond his capacity. When he feels better, resisting another dinner roll seems doable, and so he initiates regulatory effort. In comparison, Ben does not want to feel sad. When he notices a discrepancy between his current sadness and his desired sadness, he realizes he needs to decrease his sadness. This realization makes him feel even worse than he is already feeling, which increases the very discrepancy he wants to decrease. He considers the potential benefits and costs of decreasing sadness. He feels sad, and so trying to put a positive spin on things, for example, seems beyond his capacity, and so he fails to initiate regulatory effort. By considering effortful emotion regulation as a form of cybernetic control (Carver & Scheier, 1982, 1998), the proposed analysis examines how emotion control (as reflected in Ben's example) might be similar

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to or distinct from other forms of control (as reflected in Bim's example).

I first review existing theories in emotion regulation and then present an overview of the proposed cybernetic analysis, highlighting features that are common across self-regulation domains and those that are potentially unique to emotion regulation. I then discuss each component of the cybernetic account in greater detail, reviewing related empirical findings. Next, I discuss potential implications of the proposed analysis to psychopathology and well-being. I end by highlighting potential hypotheses and future directions.

Existing Theories of Emotion Regulation

Although empirical research on emotion regulation has grown exponentially in the past few decades in both number and scope (Gross, 2015), the number of theoretical models in the field is still relatively limited. The few existing theoretical accounts, however, have made enormous contributions to the field. Some theories build on models of emotion (e.g., Gross, 1998, 2015), whereas others build on models of self-regulation (e.g., Larsen, 2000; Webb, Schweiger Gallo, Miles, Gollwitzer, & Sheeran, 2012). Below, I briefly review representative theories of each type, highlighting whether and how they address questions about effort and persistence in emotion regulation and how they view emotion regulation in the broader context of self-regulation.

Theories that build on models of emotion

In general, theories that build on models of emotion attend more to affective than to motivational concepts. With respect to affective concepts, affect refers to all evaluative states (i.e., signaling what is good vs. bad for me), mood states refer to diffuse and global affective states that are relatively prolonged, and emotions are intentional affective states that are situationally bound and typically relatively brief (e.g., Clore, Schwarz, & Conway, 1994; Frijda, 1993). Emotion-regulation theories that build on models of emotion target the regulation of emotions specifically, but not other affective states (see Gross, 1998, 2015).

The most widely cited model in the field is the *process model of emotion regulation* (Gross, 1998). It is based on the premise that emotion is generated through a linear sequence of stages (i.e., an emotional situation occurs, it is attended to, it is appraised, and a response is produced). The model suggests that emotion-regulation strategies target each of these stages (e.g., situation selection or modification, attention deployment, cognitive change, response modulation). It addresses the means by which people regulate emotions without

explicitly considering the content or strength of the motivation to regulate. Hence, the model does not explicitly address questions pertaining to effort or persistence. It focuses on the means that are unique to emotion regulation but remains agnostic regarding other potential differences between the regulation of emotion and other targets. These characteristics also apply to other theoretical approaches that focus on identifying or classifying strategies in emotion regulation (Koole, 2009; Larsen, 2000; Parkinson & Totterdell, 1999; Thayer, Newman, & McClain, 1994; Webb, Miles, & Sheeran, 2012).

The extended process model (Gross, 2015) elaborates on the original model. Unlike the original, the extended process model addresses questions pertaining to the initiation and direction of regulation. It distinguishes between three stages of the emotion-regulation cycle: the identification stage, in which an emotion-regulation goal (i.e., the goal to regulate an emotion) is activated; the selection stage, in which a strategy to achieve the goal is selected; and the implementation stage, in which the selected strategy is put into action. The extended process model begins to consider why people regulate emotions, suggesting that a goal to regulate can be activated when an emotion is evaluated as sufficiently negative or positive. Motivation, however, captures both the content and intensity of motivation (Atkinson, 1957; Gollwitzer, 1990; Hull, 1943). The extended process model of emotion regulation acknowledges motivational content but puts less emphasis on motivational intensity. Therefore, questions pertaining to effort or persistence are not fully addressed.

Because they are based on models of emotion, both the process and extended process models have instigated discussions regarding potential differences between emotion generation and emotion regulation (e.g., Gross, Sheppes, & Urry, 2011). However, the process models devote less attention to potential differences between emotion regulation and other forms of self-regulation. According to the extended process model, what is unique about emotion regulation is the content rather than the process of regulation.

Theories that build on models of self-regulation

In general, theories that build on models of self-regulation attend to motivational more than to affective concepts. Indeed, many such theories do not distinguish among the regulation of emotions, mood states, and affect but consider motivational concepts such as impulses and goals. For example, Tice and Bratslavsky (2000) considered emotion regulation to be a form of impulse control. They suggested that, as such, emotion

regulation takes precedence over other goal pursuits and therefore impairs other forms of self-regulation. Their account equates emotion regulation with the regulation of any appetitive or aversive stimulation. Furthermore, their account cannot explain cases in which people regulate emotions in contrahedonic ways (e.g., Tamir, Mitchell, & Gross, 2008) or the many cases in which emotion regulation promotes, rather than impairs, other forms of self-regulation (e.g., Jamieson, Mendes, & Nock, 2013). This account does not consider emotion regulation to be a distinct form of regulation other than the fact that it targets states of pleasure or pain and therefore may provide a stronger incentive to regulate.

Larsen (2000) was the first to rely on control theory to model the regulation of emotions. He suggested that the regulation of affective states results from detecting discrepancies between a current and a desired state. Neither Tice and Bratslavsky (2000) nor Larsen (2000) considered the regulation of emotion to be distinct from other forms of self-regulation. Larsen (2000) did not consider effort or persistence in emotion regulation.

Similar to Larsen (2000) and consistent with classic control theory, Koole, van Dillen, and Sheppes (2011) also acknowledged that emotion regulation could be considered a process that involves reducing discrepancies between current and desired states. They considered such goal-oriented emotion regulation to be effortful but did not elaborate on effort further. Like the approaches mentioned above, Koole and colleagues (2011) considered emotion regulation to be the regulation of any affective state. They also defined emotion regulation as any reaction to an emotional response. They argued that such reactions can be goal-driven but can also occur without reference to goals. According to their approach, habituation is a form of emotion regulation.

Webb, Schweiger Gallo, and colleagues (2012) offered an account of emotion regulation that is grounded in control theory. Like Gross (2015), they divided emotion regulation into identification, selection, and implementation stages. Moving beyond other theories, Webb, Schweiger Gallo, and colleagues (2012) began to address questions regarding initiation and persistence in emotion regulation. They acknowledged that detecting a need to regulate may not necessarily trigger regulatory behavior, as this depends, in part, on whether people believe regulation is possible. They assume that, as in other theories, the regulation of emotion does not differ from the regulation of other targets.

The current approach

Consistent with leading approaches to emotion regulation (e.g., Gross, 2015; Gross et al., 2011; R. A. Thompson, 1994), the proposed analysis focuses on the regulation

of emotions, although it can be extended to mood states (see Extensions section below). The proposed analysis also focuses on effortful emotion regulation, attempting to identify what drives people to initiate and invest effort in regulating their emotions. Finally, the proposed analysis targets the regulation of emotions as unique phenomenological states. Accordingly, it targets the regulation of emotional experience rather than expression and the regulation of one's own emotions rather than the regulation of emotions in others (i.e., intrinsic rather than extrinsic regulation). Because both regulating emotional expressions and regulating emotions in others target one's behavior rather than phenomenology, they might be better explained by classic cybernetic models.

An Overview of the Proposed Analysis

Inspired by cybernetic models in engineering and mathematics, control theory (Carver & Scheier, 1982, 1998) considers self-regulation to be continuous attempts to decrease detected discrepancies between a current state and a goal. The basic unit of control is the negative feedback loop, whose function is to reduce discrepancies. A comparator function monitors the current state and compares it to the goal. When a discrepancy is detected, an output function could produce changes in behavior designed to reduce the discrepancy. Cybernetic models can account for both effortful as well as automatic regulation (Carver & Scheier, 2000). To account for regulatory effort, in particular, the model must include a cost-benefit analysis (e.g., Kool, Shenhav, & Botvinick, 2017; Kruglanski, Chernikova, Rosenzweig, & Kopetz, 2014). When benefits outweigh costs, people exert effort to produce regulatory behavior. Such behavior terminates when a discrepancy is no longer detected or when benefits no longer outweigh costs.

The proposed analysis considers emotion regulation to be a form of cybernetic control. As depicted in Figure 1, emotion regulation operates with reference to an emotion goal (e.g., a desired emotion). A comparator function compares a current emotion to the emotion goal. When a discrepancy is detected, it activates an emotion-regulation goal (i.e., a desired change in emotion). Whereas an *emotion goal* reflects a desired emotional end state (e.g., minimal sadness), an *emotion-regulation goal* reflects a desired directional change in emotion (e.g., decrease sadness). An emotion goal can be activated independently of one's current state (e.g., one may wish for minimal sadness regardless of how one feels), but an emotion-regulation goal is the output of the comparator function and is therefore informed by current emotion (e.g., one may wish to decrease current sadness).

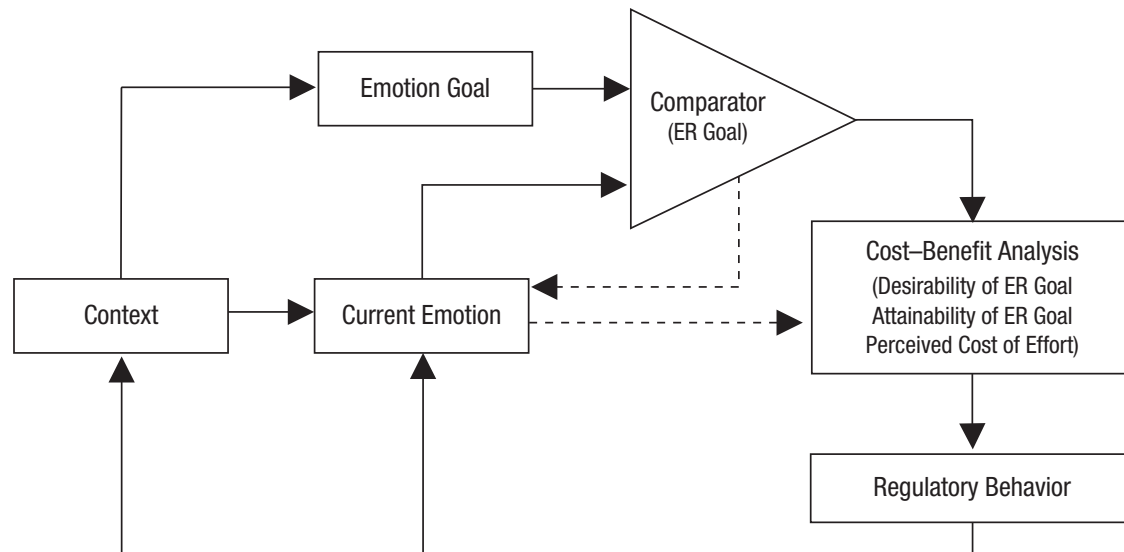


Fig. 1. Effortful emotion regulation as a form of cybernetic control. The dashed lines capture features that may be unique to emotion regulation (ER). They reflect the fact that emotions simultaneously serve as the target of regulation (current emotion), as indices of progress in regulation (via the comparator), and as input to the expected value of regulation (via the cost-benefit analysis).

As in other forms of effortful self-regulation, the activation of an emotion-regulation goal triggers a cost-benefit analysis. When the benefits of regulating an emotion outweigh the costs, people are likely to initiate emotion-regulatory behavior. As long as the benefits outweigh the costs, people are likely to persist in their efforts. For instance, Ben does not want to feel sad. When he fails to complete an assignment at work, he detects a discrepancy between his current and desired sadness, activating the goal to decrease sadness. If the expected benefits of regulation are high (i.e., he would be able to concentrate on his work) and the costs of regulating are low (e.g., he is capable of decreasing his sadness), Ben would engage in emotion-regulatory behavior. If it is effective, such behavior could decrease his sadness, eliminating the discrepancy between current and desired sadness and terminating regulation.

The regulation of emotions is similar to the regulation of other targets (see Larsen, 2000; Webb, Schweiger Gallo, et al., 2012). However, emotion regulation may also be unique in some respects. Unlike other targets, emotion itself is a signal of goal progress. It informs us about our state in the world (e.g., Schwarz & Clore, 1996) and how well or how poorly we are doing in achieving any of our goals (e.g., Carver, 2001; Carver & Scheier, 2000). Emotions also signal how much resources we have to cope with impending demands (Frijda, 1993; Lazarus, 1991). These characteristics inform aspects of the cybernetic process, as described in sequence below.

First, as targets, emotions are highly sensitive to context, carry high epistemic value, and can inform nearly any control system. Because emotions are relatively strong signals of how one is doing in the given context, in some respect, people may be reluctant to regulate them. Moreover, because they provide information about the context, emotions can serve as input to the emotion-control system (i.e., signaling the need to decrease sadness) or inform any other control system (e.g., signaling the need to perform better at work). Sensitivity to context is not unique to emotions as targets. Likewise, there may be other cases in which a current state (e.g., weight) informs the regulation of other targets (e.g., dating). Nonetheless, given their informational value, current emotions may be likely to activate other control systems frequently. The sensitivity of emotions to context is captured in Figure 1 by the depicted effects of both regulatory behavior and context on current emotion.

Second, because emotions signal goal progress, desired emotions are also likely to be context-dependent. For instance, Ben might prefer less sadness at work but more sadness on a day of national remembrance (e.g., Porat, Halperin, Mannheim, & Tamir, 2016). This implies that the equilibrium of an emotion-regulation system may differ from some other systems. In classic control theories, self-regulation is based on homeostatic principles (Carver & Scheier, 1981), in which the system strives for stability (Cannon, 1929). Such principles may be less applicable to the regulation

of emotion, in which stability does not necessarily reflect optimal functioning (e.g., Kuppens, Allen, & Sheeber, 2010). These ideas are captured in Figure 1 by the depicted effect of context on emotion goals. This feature characterizes the emotion-control system but is not unique to it, as other goals can also vary by context.

Third, the comparator in emotion regulation is unique because it can directly influence the target of regulation. In classic control models, the comparator signals what needs to be done as well as the urgency with which it needs to be done by inducing affect (Carver & Scheier, 2000). When discrepancies are small (or progress is satisfactory), people feel relieved or elated. When discrepancies are large (or progress is unsatisfactory), people feel sad or anxious. In other domains of self-regulation, the emotional output of the comparator is independent of the target of regulation. However, the regulation of emotion is unique because the affective output of the comparator is no longer independent of the target of regulation, which is itself affective. In fact, by inducing emotions, the comparator can directly influence the target of regulation before any regulatory action has been implemented. This unique feature is captured in Figure 1 by the direct effect of the comparator on current emotion.

Finally, in any domain of self-regulation, emotions influence the cost–benefit analysis (Grahek, Musslick, & Shenhav, 2020). This is, in part, because emotions provide embodied information about the costs and benefits of anticipated action (Zadra & Clore, 2011). In other domains of emotion regulation, emotions can influence the likelihood of regulatory action (e.g., sadness might make it harder for Bim to avoid an extra dinner roll), but they are independent of the target of regulation (i.e., sadness does not change Bim’s current weight). In contrast, emotion regulation is unique because emotions serve as both the target of regulation and as input to the cost–benefit analysis. Indeed, people are less likely to exert effort in emotion regulation the worse they feel—which is precisely when they need emotion regulation most. In Figure 1, this idea is captured by the direct effect of current emotion on the cost–benefit analysis.

In summary, like other domains of self-regulation, emotion regulation involves a goal, a comparator, and an output. However, emotion regulation might differ from other forms of self-regulation in that (a) current emotion is more likely to inform other control systems; (b) the comparator function can directly influence the target of regulation, even before the initiation of regulatory action; and (c) current emotions directly inform the cost–benefit analysis and are not independent of it. In what follows, I elaborate on each component, review empirical evidence when available, and highlight potential insights.

Emotions as Targets in Regulation

In control models, the current state is the target of regulation, with the output function designed to shift it closer to the goal. Emotions, however, carry unique epistemic value and serve a dual-input function, as discussed below.

Epistemic value

Whether they are pleasant or unpleasant, appropriate or inappropriate, useful or harmful, emotions have a strong epistemic value. They signal what is important to us and how we are doing in the world (Clore, 2018). Therefore, perhaps more than some other domains of self-regulation, emotion regulation is conflicting. On the one hand, emotions should be regulated when they are perceived as harmful or inappropriate. On the other hand, emotions feel “true” (De Sousa, 2011), and it is hard to argue with the truth. Emotion regulation, therefore, can sometimes feel inauthentic, particularly when the target of regulation involves emotions that people consider self-relevant. Indeed, people are motivated to experience emotions that feel authentic to them, even when such emotions are unpleasant (e.g., Ford & Tamir, 2014; Wood, Heimpel, Manwell, & Whitting, 2009). Such findings imply that people may be reluctant to regulate emotions, particularly when they consider them a valid reflection of reality or a defining aspect of their identity.

Dual input

Emotions also serve a dual-input function. In addition to the information they provide about emotions per se, current emotions can provide information about nearly anything (Clore, 2018). Ben’s sadness at work, for instance, could inform him that he is performing poorly or that he feels rejected by his coworkers. As a consequence, whereas Bim’s weight is likely to serve as input primarily to the weight-control system, Ben’s sadness could serve as input to the sadness-control system, the performance-control system, or the sociability-control system. In fact, as signals of goal progress, current emotions should, in theory, serve as input to other control systems more often than to the emotion-control system. Consistent with this analysis, a recent study that examined people’s reactions to events in daily life found that even when they felt negative emotions, people tried to regulate their emotions only 10% of the time (Kalokerinos, Kuppens, & Tamir, 2020). Such findings demonstrate that current emotions often do not trigger the emotion-control system.

One challenge in emotion regulation, therefore, involves determining whether current emotion should serve as input to the emotion-control system or as input

to other control systems. When current emotion serves as input to the emotion-control system, it could activate an emotion-regulation goal. When current emotion serves as input to other control systems, it could activate other regulation goals. Regulating other targets can ultimately influence current emotions, even though emotions were not the target of regulation. For instance, Ben's sadness could inform his performance-control system, leading him to work harder. Working harder might help Ben improve his performance and, as a result, feel less sad. Such a change would not result from emotion-regulatory behavior. Instead, it would reflect the natural course of emotions influencing behavior, behavior changing the environment, and the environment changing emotions. Emotions often change when people are trying to change something else.

Whether current emotions should inform the emotion-control system may depend, in part, on the diagnostic value of current emotions and on the controllability of other targets. In theory, at least, emotion should inform other control systems when it provides valid diagnostic information and when other targets can be controlled (see Lazarus & Folkman, 1984). For instance, current fear when facing a loaded gun provides diagnostic information about immediate threat. In this case, current fear should inform the threat-control system, triggering actions to avoid threat rather than actions to control fear. In contrast, current fear when imagining the possibility of facing a loaded gun while lying safely in bed at night does not provide diagnostic information about immediate threat. In this case, current fear should inform the fear-control system, triggering actions to regulate fear rather than to avoid threat. Because emotions serve a dual-input function, people might regulate emotions when they should be regulating other targets or fail to regulate emotions when they need to.

Consistent with this analysis are findings that show that it is more beneficial to engage in emotion regulation (by using cognitive reappraisal, a strategy that involves changing the meaning assigned to an emotion-eliciting event; Gross, 1998) when the emotion-eliciting situation is uncontrollable (Troy, Ford, McRae, Zorola, & Mauss, 2017; Troy, Shallcross, & Mauss, 2013). In contrast, controlling emotions when the emotion-eliciting situation could potentially be controlled may be less adaptive. For instance, people may choose to regulate anger in response to social injustice, which ultimately prevents them from engaging in collective action that could lead to social change (Ford, Feinberg, Lam, Mauss, & John, 2019). Because of the unique epistemic value of emotions and their sensitivity to context, identifying whether and when the control system should be

activated may be more challenging in the emotion-control system compared with other systems.

Emotions as Goals in Regulation

Goals are representations of desired (or undesired) end points stored in memory (Fishbach & Ferguson, 2007). An emotion goal is referred to as a desired (or undesired) emotional end point. For the sake of simplicity, the following discussion refers to emotion goals that reflect desired emotions that people want to approach. Nonetheless, the propositions below could be applied to emotion goals that reflect undesired emotions that people want to avoid. An emotion goal that reflects desired emotion might capture an emotion considered valuable, socially appropriate, familiar, prevalent, or simply accessible; likewise, an emotion goal that reflects undesired emotion might capture an emotion considered not valuable, socially inappropriate, unfamiliar, not prevalent, or simply inaccessible.

Although emotion regulation is often hedonically driven, toward the early 2000s, scholars began to challenge the hedonic principle as its exclusive motivator, arguing that different emotions could be desired in different contexts (e.g., Bonanno, 2001; Parrott, 1993). Since then, empirical evidence has repeatedly shown that people pursue both pleasant and unpleasant emotions at various levels of intensity (for reviews, see Tamir, 2016; Tamir & Millgram, 2017). For example, people can be motivated to feel various levels of happiness (e.g., Joshanloo & Weijers, 2014), compassion (e.g., Cameron & Payne, 2011), anger (e.g., Tamir et al., 2008), pride (e.g., Tamir et al., 2016), or guilt (e.g., Sharvit & Valetzky, 2019).

Like goals in other domains, emotion goals vary both across and within individuals. Emotion goals vary as a function of personality traits. For example, people tend to desire emotions that are consistent with their general affective dispositions, even when these involve negative feelings. People who tend to experience more (vs. less) negative affect want to experience relatively more intense negative affect (e.g., Ford & Tamir, 2014; Hemenover & Harbke, 2019; Millgram, Joormann, Huppert, & Tamir, 2015). Emotion goals also vary by culture. For example, members of individualistic cultures typically desire more pleasant states than do members of collectivistic cultures (e.g., Ma, Tamir, & Miyamoto, 2018). Members of individualistic cultures also desire high-arousal pleasant states more than do members of collectivistic cultures (e.g., Tsai, Knutson, & Fung, 2006). Emotion goals also differ as a function of gender (Timmers, Fischer, & Manstead, 1998), self-esteem (e.g., Wood et al., 2009), political ideology (e.g.,

Hasson, Tamir, Brahm, Cohrs, & Halperin, 2019), and religion (e.g., Vishkin, Schwartz, Ben-Nun Bloom, Solak, & Tamir, 2020).

People differ in the degree to which they want to feel certain emotions in different contexts, consistent with the proposed analysis. For instance, people want to feel anger in confrontation but not in collaboration (Tamir & Ford, 2012; Tamir et al., 2008). People also differ in the degree to which they want to feel the same emotion toward different targets. For instance, people want to feel more empathy toward in-group than toward out-group members (Hasson et al., 2019). Emotion goals also vary depending on the predicted outcomes of the emotion. For instance, people want to feel less compassion when it is likely to be more (vs. less) costly (Cameron & Payne, 2011). These latter patterns are consistent with the idea that, when it comes to emotions, people do not necessarily strive for homeostasis. Indeed, manipulating anticipated outcomes can change the emotions people desire and their subsequent regulatory behavior (Shafir & Sheppes, 2020; Tamir, Bigman, Rhodes, Salerno, & Schreier, 2015). Emotion goals, therefore, can vary dramatically as a function of contextual demands.

What people want to feel across contexts is not necessarily consistent with what they want to feel in the moment (e.g., Tamir & Ford, 2012). Whereas feeling sad across contexts is typically less desirable, feeling sad after a loss may be more desirable, because in that context, it could help preserve resources and recruit help from others (Keltner & Gross, 1999), or because in that context it is considered socially appropriate (Parrott, 1993). For instance, people want to feel sad on a national day of mourning (Porat et al., 2016).

Some motivational theories assume that as cognitive representations, goals are embedded in larger associative networks that are hierarchically organized (Carver & Scheier, 1981; Kruglanski et al., 2002). The same goal (e.g., lose weight) may serve higher order goals (e.g., be healthy) and be subserved by lower order goals (e.g., eat less chocolate). Goal systems include nodes that vary in accessibility and include excitatory and inhibitory associations. As in other domains, emotion goals may be similarly embedded in broader goal systems. An emotion goal (e.g., be happy) may serve higher order goals (e.g., feel good) and be subserved by lower order goals (e.g., spend time with friends). As reviewed in Tamir (2016), emotion goals can serve hedonic higher order goals (e.g., I want to feel less anxious to feel better) or instrumental higher order goals (e.g., I want to feel less anxious to perform well on an exam). Emotion goals may be associated with other goals in the system through excitatory links (e.g., feeling happier can serve the goal of feeling better) or

inhibitory links (e.g., feeling anxious can impair the goal of doing well on an exam). Emotion goals may be more likely to serve as means to an end rather than as ends in themselves (Tamir, 2016). This implies that they are likely to be concrete (i.e., specific, tangible) rather than abstract. Emotion goals are also more likely to be short-term rather than long-term goals, as it is immediately evident whether they have been successfully attained.

Like other goals, the operation of emotion goals should depend on their availability and activation. To become available, an emotion should be represented as a goal. This should occur when an emotion becomes associated with desired (or undesired) outcomes. If, for instance, pleasure is a desired outcome and happiness is associated with pleasure, happiness is likely to become an available emotion goal. Studies supporting these ideas have shown that increasing the perceived value of an emotion, whether pleasant or unpleasant, can motivate people to pursue it. For instance, people who expected anger to benefit confrontational performance tried to increase their anger before a confrontation (Tamir & Ford, 2012). Furthermore, leading people to associate anger with utility, even outside of conscious awareness, motivated them to increase their anger (Tamir, Chiu, & Gross, 2007). As with other goals, the availability of emotions as goals likely depends on their expected value. Indeed, participants who were led to expect anger to improve performance in an upcoming task were motivated to increase anger when they expected to benefit financially from good performance, but not otherwise (Tamir, Ford, & Gilliam, 2013).

People can learn to associate emotions with hedonic and instrumental outcomes (Tamir, 2016). For instance, happiness could be associated with pleasure but also with social benefits or cognitive benefits (for a review, see Lyubomirsky, King, & Diener, 2005). Associations between emotions and outcomes can be learned from direct idiosyncratic experiences. For instance, people who experienced the beneficial effects of anger on aggressive gaming performance came to consider anger more desirable; greater benefits predicted greater increases in perceived desirability (Netzer, Igra, Bar Anan, & Tamir, 2015). Associations between emotions and outcomes can also be learned from cultural prescriptions. For instance, happiness is associated primarily with positive outcomes in some cultures but with both positive and negative outcomes in other cultures (Joshani & Weijers, 2014). Cultural prescriptions are transmitted to group members, rendering certain emotions available goals in certain contexts.

For emotion goals to become available, people must have some knowledge about emotions and their associations with desired or undesired outcomes. This

implies that knowledge and beliefs about emotions likely play a role in whether and when emotions are represented as available goals (e.g., Ford & Gross, 2019; Karnaze & Levine, 2018). For instance, Buddhism may cultivate the belief that emotions should not be regulated. Accordingly, compared with Protestant practitioners, Buddhist practitioners were less likely to report using strategies that are directed at regulating emotions (Wilken & Miyamoto, 2020). Whether or not emotions are available to individuals as goals likely depends on how they think about emotions.

The availability of emotion goals does not imply that they would be activated in a given context. The activation of an emotion goal likely depends on the structure, strength, and configuration of the goal system. Principles that influence goal activation, in general, might also govern the activation of emotion goals, in particular. According to such principles, a goal could become activated when other goals with which it is associated are activated (Kruglanski et al., 2002). Emotion goals may be activated when higher order goals that are associated with them are activated. For instance, priming the goal of collaboration either consciously or outside of consciousness motivated people to decrease their anger (Tamir, Ford, & Ryan, 2013).

Emotion goals may also be activated when lower order goals that are associated with them are activated. If certain regulation strategies become associated with the pursuit of specific emotion goals, they may become associated with such goals. For instance, distraction might activate the goal of decreasing emotional intensity, whereas rumination might activate the goal of increasing emotional intensity (Millgram, Sheppes, Kuppens, Kalokerinos, & Tamir, 2019). Likewise, if reappraisal is associated with decreasing unpleasant emotions, activating reappraisal might activate the goal of decreasing unpleasant emotions. Indeed, priming the concept of reappraisal outside of consciousness motivated people to decrease their unpleasant emotions (L. E. Williams, Bargh, Nocera, & Gray, 2009).

In summary, emotion goals are concrete, short term, and sensitive to context. Nonetheless, they may not be qualitatively different from other types of goals. Like other goals, they vary across people and contexts, their availability depends on associations between emotions and desirable or undesirable outcomes, and their activation might be dictated by similar principles of associative networks and knowledge representation (Fishbach & Ferguson, 2007).

The Comparator in Emotion Regulation

In control theories, the comparator function monitors current state and compares it to a goal (Carver & Scheier, 1981; Duval & Wicklund, 1972). Likewise, the

comparator function in emotion regulation monitors current emotion and compares it to an emotion goal. The comparator function can be triggered when attention is drawn to current emotion, activating a related emotion goal, or when an emotion goal is activated, drawing attention to current emotion. The comparator function in emotion regulation, however, has two features. First, emotions are inherently attention-grabbing (Brosch, Sander, Pourtois, & Scherer, 2008; Öhman, Flykt, & Esteves, 2001), and so the comparator might monitor them frequently. Second, unlike other domains of self-regulation, the output of the emotion-regulation comparator can directly affect current emotion, even without triggering regulatory action.

Hypermonitoring

The operation of the comparator involves monitoring one's current state through self-directed attention (Carver & Scheier, 1981; Locke & Latham, 1990). For instance, one needs to monitor current body weight to detect a discrepancy with respect to desired body weight. In emotion regulation, one needs to monitor current emotion to detect a discrepancy with respect to desired emotion (Barrett & Gross, 2001). Indeed, people who have greater interoceptive awareness (Fustos, Gramann, Herbert, & Pallatos, 2013) and are more aware of emotion-related bodily changes (Teper, Segal, & Inzlicht, 2013) tend to be more successful in emotion regulation.

One must monitor a target to effectively regulate it. However, an effective self-regulating organism must balance the regulation of multiple simultaneous goals. This requires that monitoring shifts flexibly from goal to goal according to contextual demands. The excessive monitoring of one target is likely to impair overall adaptation in the long run (Cornwell, Franks, & Higgins, 2017). Given that monitoring triggers the comparator function, hypermonitoring implies that a specific control system is constantly on alert. When this occurs, resources are likely to be devoted to the salient regulation system at the expense of other goal pursuits. For instance, increased attention to weight-related information is linked to weight-related disorders, such as anorexia nervosa (e.g., Cooper & Fairburn, 1992; Rieger et al., 1998). Likewise, hypermonitoring emotions has been linked to lower psychological well-being (Wismeijer, van Assen, Sijsma, & Vingerhoets, 2009).

Hypermonitoring is likely to be maladaptive when there are discrepancies between current and desired states. By extension, if there is a discrepancy between one's body weight and one's weight goal, constantly monitoring weight might lead to despair. Likewise, when current emotions match desired emotions, hypermonitoring emotions should not be problematic. However, when

current emotions do not match desired emotions, hyper-monitoring emotions could lead to helplessness and despair, as in depressive or anxiety disorders. Consistent with this idea are findings from Boden and Thompson (2015), who showed that attention to emotion is linked to clinical depression.

Input–output interdependence

According to Carver and Scheier (2000), the comparator function signals what needs to be done (e.g., decrease sadness) and the rate or intensity with which it needs to be done (e.g., more effortfully). The latter is conveyed by affective output. Positive affect signals that discrepancies between current and desired states are smaller than expected, whereas negative affect signals that such discrepancies are larger than expected. Specific emotions can convey even more nuanced information on goal pursuit (e.g., sadness signals the ineffective pursuit of desired goals, whereas anxiety signals the ineffective pursuit of undesired goals; Carver & Scheier, 2000).

In control systems that target states other than emotions, the affective output of the comparator influences the drive to regulate but is independent of the regulation target. Bim might feel sad when he realizes his current weight does not match his desired weight, but such sadness does not influence his weight. In contrast, in the emotion-control system, the affective output of the comparator can change the very target of regulation. Ben might feel sad when he realizes his current sadness does not match his desired sadness, making him even sadder. Such input–output interdependence could lead to an ironic effect in which detecting discrepancies can increase those very discrepancies.

Some evidence is consistent with these suggested ironic effects. For instance, when they were instructed to decrease their negative feelings (vs. not), participants prone to high negative affect ironically reported greater increases in negative affect (Dalgleish, Yiend, Schweizer, & Dunn, 2009). Likewise, setting high happiness goals (vs. not) led people to feel less happy in response to positive stimuli, potentially because they were more likely to detect a discrepancy between current and desired happiness (Mauss, Tamir, Anderson, & Savino, 2011). These findings are consistent with the possibility that, in some cases, detecting discrepancies between current and desired emotions could ironically impair emotion-goal pursuit.

The Cost–Benefit Analysis in Emotion Regulation

The activation of an emotion-regulation goal does not necessarily lead to regulatory behavior. Instead, it

triggers an analysis in which expected benefits are weighted against expected costs. The outcome of the cost–benefit analysis determines whether and how intensely the person is likely to engage in regulatory behavior. If the benefits outweigh the costs, regulatory action is likely to be initiated. The control loop would continue to compare current to desired states. If discrepancies are no longer detected, regulation would be terminated. If discrepancies are detected, they would trigger an updated cost–benefit analysis. As long as the benefits outweigh the costs, regulatory behavior is likely to persist.

Motivational theories posit that the intensity of regulatory action depends on the expected utility of goal pursuit, which is a function of the desirability of the goal and its attainability (Atkinson, 1964; Lewin, Dembo, Festinger, & Sears, 1944). The importance of goal desirability and attainability as determinants of motivated action has been featured in the theory of planned behavior (Ajzen & Fishbein, 1980), theory of reasoned action (Ajzen, 1985), Rubicon model of action phases (Gollwitzer, 1990, 2012), theory of motivational readiness (Kruglanski et al., 2014), and others. These theories propose that whether and how intensely people pursue a goal depends on both the perceived value and the perceived feasibility of goal achievement. For instance, Bim should be more motivated to lose weight the more he considers losing weight desirable and the more he believes he can attain it. By extension, emotion regulation likely depends on the desirability and attainability of the emotion-regulation goal. For instance, Ben should be willing to initiate, invest effort in, and persist in behavior that is designed to decrease his sadness the more he considers decreasing sadness desirable and the more he believes he can decrease his sadness.

Support for these ideas comes from studies on commitment to emotion-regulation goals (Gutentag, Kalokerinos, & Tamir, 2020). The more people considered an emotion-regulation goal (e.g., increasing empathy) desirable, and the more they believed it was attainable, the more effort they reported investing and the more likely they were to engage in emotion-regulatory behaviors (e.g., sign up for a workshop on empathy regulation). In a daily diary study, the more committed people were to decreasing their irritation, the more likely they were the next day to read about and implement tips on how to decrease irritation, the more effort they invested, and the less irritated they felt as a consequence, even when controlling for their level of irritation on the previous day.

Some have proposed that the allocation of regulatory effort also depends on the subjective costs of exerting effort (Botvinick & Cohen, 2015; Shenhav, Botvinick, & Cohen, 2013; Shenhav et al., 2017). By extension,

whether people exert effort to control their emotions may depend on how costly they expect it would be to do so. The more costly the effort to regulate emotions, the less likely people would be to undertake it (Milyavsky et al., 2019). The cost–benefit analysis in emotion regulation, therefore, is likely informed by the desirability of the emotion-regulation goal, the attainability of the goal, and the perceived cost of the effort required to shift current emotion toward the emotion goal. Each of these components and the factors that might influence them are discussed below.

The desirability of emotion-regulation goals

The amount of overall reward for successful regulation signals how beneficial it would be to regulate (Pessoa, 2015). The desirability of an emotion-regulation goal likely reflects the desirability of the emotion goal it captures. As embodied evaluations, emotions signal the value of other goal pursuits (Solomon, 2008). However, under some circumstances, emotions can become the object of evaluation (Frijda & Mesquita, 1994; Harmon-Jones, Harmon-Jones, Amodio, & Gable, 2011). According to theories of evaluation (e.g., Cunningham, Zelazo, Packer, & Van Bavel, 2007; Gawronski & Bodenhausen, 2007), the desirability of an emotion goal is likely an emergent property of multiple iterative computations. It might be informed by attitudes toward the emotion, which reflect relatively stable evaluations stored in memory, as well as by on-line evaluations, which reflect the reward/punishment value of the emotion in the given context in light of other concurrent goals (see Cunningham et al., 2007; Cunningham & Zelazo, 2009).

The desirability of an emotion goal is likely informed by its phenomenology, the circumstances that induced it, and its likely consequences and implications. Different criteria and their weights may yield different evaluations at different moments. For instance, increasing anger may be evaluated negatively when directed at one's children but positively when directed at moral transgressors (see Lerner & Tiedens, 2006). Different criteria could also yield different evaluations that may or may not be consistent. For instance, increasing anger in response to moral injustice may be evaluated negatively when emphasizing phenomenology as a criterion but positively when emphasizing social implications as a criterion. People might compute the overall value of an emotion-regulation goal on the basis of multiple criteria that are differentially weighted as a function of contextual demands and the individual's other goals and values.

Like other types of evaluations (e.g., Fazio & Olson, 2003; Gawronski & Bodenhausen, 2006; Greenwald & Banaji, 1995), evaluations of emotions are informed by both explicit and implicit components and can reflect

associative or propositional processes (see Gawronski & Bodenhausen, 2006). Associative processes involve the activation of mental associations in memory that may or may not be accessible to conscious awareness. For instance, a child may associate anger with personal safety or with positive social regard (Miller & Sperry, 1987; R. A. Thompson & Calkins, 1996), rendering anger more desirable. Propositional processes involve conscious acknowledgment of certain evaluative associations and may or may not be consistent with associative ones. For instance, a child may believe that anger is undesirable on the basis of what she is told by parents, peers, and teachers (Eisenberg, Cumberland, & Spinrad, 1998). Input from components that are consciously accessible and from those that are consciously inaccessible can be integrated to compute the overall desirability of an emotion-regulation goal in a given context. Such input might include the hedonic phenomenology of emotions as well as learned associations with rewards and punishments (e.g., Hussong, Langley, Coffman, Halberstadt, & Costanzo, 2017; Netzer et al., 2015).

The attainability of emotion-regulation goals

Whether or not people engage in regulatory action and how much effort they invest in doing so likely depends not only on the desirability of the goal but also on the perceived likelihood of attaining it (Atkinson, 1957; Gollwitzer, 1990; Heckhausen, 1991; Kruglanski, 1996; Kruglanski et al., 2014). By extension, investing effort to regulate emotions depends not only on the desirability of the emotion-regulation goal but also on its attainability (Gutentag et al., 2020). As with other goals, it is likely that the attainability of emotion-regulation goals must pass a certain threshold for people to initiate emotion-regulatory action. Once it passes this threshold, the more attainable the goal, the greater the regulatory effort.

The attainability of an emotion-regulation goal is a subjective estimate of the probability of attaining it. This subjective probability is based on what people believe they can attain, which may be consistent or inconsistent with the objective probability of attainment. The attainability of an emotion-regulation goal likely varies as a function of both subjective and objective factors and could vary across contexts. Whether or not people believe they can attain an emotion-regulation goal probably depends (a) on their beliefs about emotions—for example, are emotions amenable to control? (Tamir, John, Srivastava, & Gross, 2007); (b) on their beliefs about their own abilities and resources—for example, can I control my emotions? (Catanzaro, 1997; De Castella et al., 2013); and (c) on their beliefs about the emotional context in which regulation

occurs—for example, how difficult is it to regulate my emotions now and which resources are available to me? (Milyavsky et al., 2019).

The perceived cost of emotion control

Effort is costly and people have a bias against tasks that demand effortful control and will even forego reward to avoid them (Dixon & Christoff, 2012; Kool, McGuire, Rosen, & Botvinick, 2010). People discount the value of reward by the amount of effort that needs to be exerted (Dixon & Christoff, 2012; Kool et al., 2017). This might be because resources are limited (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998) or because effort must be expended wisely to maximize net profit (Kurzban, Duckworth, Kable, & Myers, 2013). Any mental effort is costly, including effort in emotion regulation. Therefore, even when the emotion-regulation goal is desirable and attainable, people may refrain from engaging in emotion regulation because of the effort it requires.

The cost–benefit analysis in emotion regulation should also be informed by the potential costs of exerting effort to achieve it. Suri, Whittaker, and Gross (2015) showed that when participants could use cognitive reappraisal to decrease their reactions to negative images they often refrained from doing so, which is consistent with this idea. Such decisions could not be attributed to task difficulty but seemed to be related to the perceived cost of switching from default responses (see also Suri, Sheppes, Schwartz, & Gross, 2013). These findings suggest that the decision to engage in emotion-regulatory behavior might partly depend on the perceived costs of the mental effort required.

In emotion regulation, the costs of mental effort might be relatively high. Because emotional experiences are typically intense, regulating them is costly (see Milyavsky et al., 2019). Moreover, emotions habituate naturally and relatively quickly over time and can change in response to changing environments, and so investing effort to regulate them may not always be worth the cost. For example, Ben's sadness at work might decrease as a result of his emotion-regulatory efforts, as a result of natural habituation over time, or as a result of overhearing a coworker tell a joke. Accordingly, there might be cases in emotion regulation in which refraining from regulatory behavior might be as (or even more) adaptive as engaging in it.

The unique cost–benefit analysis in emotion regulation

Whether parsed into these specific categories or others (e.g., for driving and restraining factors, see Kruglanski et al., 2014; for benefits and costs, see Shenhav et al., 2017), information pertaining to rewards and

punishments, the likelihood of success, and the costs of effortful control determines the likelihood of engaging in emotion-regulatory behavior and how much effort is invested in it. These elements inform any process of self-regulation, and each of them is informed by current emotions (Grahek et al., 2020). In emotion regulation, however, this means that whether people choose to invest effort to regulate their current emotions and how much effort they choose to invest depend directly on their emotions themselves.

First, emotions inform judgments of desirability. The experience of pleasant emotions can engender more positive evaluations, and the experience of unpleasant emotions can engender more negative evaluations (e.g., Clore, Gasper, & Garvin, 2001; Schwarz & Clore, 1988). Emotions inform the desirability of goals in particular. Linking a goal to unpleasant feelings decreases both goal desirability and effort in goal pursuit (Aarts, Custers, & Holland, 2007). In contrast, linking goals to pleasant feelings increases the motivation to pursue them (Custers & Aarts, 2005). Thus, a goal such as losing weight may seem less desirable when a person experiences unpleasant (vs. pleasant) emotions. Emotional experiences may inform the desirability of emotion-regulation goals, just as they inform the desirability of other goals. For instance, desirable emotion-regulation goals (e.g., decrease sadness) may seem less desirable when a person experiences unpleasant emotions (e.g., sadness). Individuals who experience more (vs. less) unpleasant emotions find happiness less desirable (e.g., Augustine, Hemenover, Larsen, & Shulman, 2010; Millgram et al., 2015; Tsai et al., 2006), which is consistent with this possibility. The desirability of an emotion-regulation goal might depend on the very target of regulation.

Although emotional experiences might influence the desirability of emotion-regulation goals in a valence-congruent manner, such effects are not always the case. Pleasant (or unpleasant) emotional experiences do not render all emotion-regulation goals more (or less) desirable. For instance, depressed individuals who tend to experience more frequent unpleasant emotions find happiness less desirable, but they also find sadness less undesirable (e.g., Millgram et al., 2015). Whether and how emotional experiences influence the desirability of emotion-regulation goals remains to be tested.

Second, emotions inform judgments of attainability. They do so, in part, by informing people about resources available to meet demands. People who experience pleasant emotions feel they are better able to cope with demands, whereas the opposite is true for those experiencing unpleasant emotions (Gendolla, 2000; Kavanagh & Bower, 1985). When people experience pleasant (vs. unpleasant) emotions they tend to be more optimistic and have higher self-efficacy (Lyubomirsky et al., 2005).

When people experience certain unpleasant (vs. pleasant) emotions they perceive tasks as more difficult (Gendolla, 2012). Therefore, people are likely to view goals as more attainable when experiencing pleasant emotions and less attainable when experiencing unpleasant emotions. For instance, when Bim experiences unpleasant (vs. pleasant) emotions, he may feel that his goal to lose weight is less attainable, making him less likely to invest effort in attaining it.

Likewise, people experiencing pleasant emotions may consider emotion-regulation goals more attainable, and people experiencing unpleasant emotions may consider emotion-regulation goals less attainable. For instance, when Ben feels sadness, he may feel that his goal to decrease sadness is less attainable, making him less likely to invest effort in attaining that goal. Not surprisingly, depressed individuals have lower self-efficacy in emotion regulation than nondepressed individuals do (e.g., Catanzaro & Mearns, 1990). Thus, the attainability of an emotion-regulation goal, which determines whether people engage in emotion-regulatory behavior, might depend on the target of regulation.

Third and finally, emotions can influence the perceived cost of regulatory effort (Grahek et al., 2020). Emotions influence how effortful it feels to exert control. When people experience unpleasant emotions, exerting control feels more costly, whereas the opposite is true for pleasant emotions. For instance, depressed individuals experience tasks as more effortful than nondepressed individuals (Cléry-Melin et al., 2011; Culbreth, Moran, & Barch, 2018). In addition, some evidence suggests that positive affect leads people to persist in tasks that demand effortful control (Tice, Baumeister, Shmueli, & Muraven, 2007). People may be less likely to exert control, therefore, when experiencing unpleasant emotions (e.g., Inzlicht, Bartholow, & Hirsh, 2015; Pessoa, 2008). If these ideas are extended to emotion regulation, people may be less likely to exert emotion control when experiencing unpleasant emotions, because effort seems more costly.

Emotion regulation, therefore, is unique, because the target of regulation and the input to the cost-benefit analysis are interdependent. Whereas unpleasant emotions render emotion-regulation goals less desirable and attainable and effort more costly, pleasant emotions do the opposite. Regardless of which emotion-regulation strategies they might use, people might be less likely to engage in effortful emotion regulation precisely when they need it most.

Emotion-Regulatory Behavior

The cost-benefit analysis in emotion regulation determines the likelihood of engaging in regulatory behavior

and how much effort to exert in it. When benefits outweigh costs, people determine not only how much effort to exert but also how to exert such effort (i.e., intensity and identity of control, respectively; Shenhav et al., 2013). In emotion regulation, people select how intensely to employ regulatory behavior and which regulatory behavior (i.e., emotion-regulation strategy or tactic) to engage in. Which regulatory behavior people select is likely a function of multiple considerations (see Ghafur et al., 2018; Sheppes, 2020), including the expected benefits of each behavior and the effort required to implement it (Milyavsky et al., 2019). For instance, people may use cognitive reappraisal when emotion regulation requires less effort but switch to distraction when it requires more effort (Sheppes et al., 2012).

The cost-benefit analysis is iterative, and its outcomes determine the initiation of regulatory behavior, its persistence over time, and its termination. Initiation occurs early in the regulation process. Initiating regulation may require a high benefit-to-cost ratio because the cost of initiating or switching action may be perceived as higher than maintaining the default (Samuelson & Zeckhauser, 1998). Alternatively, the perceived cost of effort may increase with time spent exerting control (Kool & Botvinick, 2014), and so the benefit-to-cost ratio may need to increase for effort to be sustained. Control is terminated when benefits no longer outweigh costs or when the comparator no longer detects discrepancies. These principles should apply to emotion regulation. The cost-benefit analysis of pursuing an emotion-regulation goal is constantly updated. As long as the benefits outweigh the costs, behavioral regulation would persist. Such behavior may take on different forms, implementing one strategy or switching between strategies.

Extensions and Implications for Psychopathology and Well-Being

Extensions

The proposed analysis targets the regulation of emotions, but it can be applied to account for the regulation of mood states as well. When regulating mood, people compare current to desired mood and activate mood-regulation goals. Like emotions, mood states carry epistemic value and feel “true,” and so people may be somewhat conflicted about regulating moods that feel self-consistent (e.g., Wood et al., 2009). As with emotion, the mood-comparator function produces affective output that can directly influence current mood, even before the initiation of regulatory effort. Likewise, current mood can bias the cost-benefit analysis and thus directly inform the expected value of mood regulation.

The mood-control system, therefore, should be similar to the emotion-control system, although there are some differences between the two affective states. Contrary to emotions, mood states are not intentional (i.e., they are not “about” something in particular; Armon-Jones, 1991; Clore et al., 1994). Mood states, therefore, may be less sensitive to context. For example, Ben might be sad about his poor performance at work while also being sad for no particular reason. Feeling sad about his performance might activate Ben’s performance-control system, whereas feeling sad for no reason may be more likely to activate Ben’s sadness-control system. Current mood states, therefore, may be less likely than emotions to activate other control systems. This implies that current mood may activate the control system more frequently than current emotion. Likewise, mood goals may also be relatively less sensitive to context and more stable overall. Finally, mood states are also less intense and longer-lasting than emotions (Clore et al., 1994), so investing effort in regulating them may be perceived as more worthwhile.

Implications for psychopathology

Many psychiatric disorders involve deficits in effortful emotion regulation (e.g., Cludius, Mennin, & Ehring, 2020), and many forms of psychotherapy seek to resolve such deficits by training (e.g., Barlow, Allen, & Choate, 2004; Wilamowska et al., 2010). Nonetheless, what underlies emotion-regulation deficits in psychopathology is not yet fully understood (Block, Moran, & Kring, 2009).

According to a cybernetic analysis, effortful emotion regulation may give rise to ironic effects, particularly in forms of psychopathology that are characterized by intense unpleasant emotional experiences. One ironic effect of the cybernetic process is that merely identifying the need to decrease unpleasant emotions could exacerbate them. When current emotions are unpleasant and intense, the control system is likely to detect a discrepancy between current and desired emotions. Detecting this discrepancy is likely to induce negative affect, resulting in even more intense unpleasant emotions, which could exacerbate clinical symptoms and result in a state that is even harder to control.

One way to address this ironic effect is to decrease the likelihood of detecting discrepancies between current and desired emotions. The comparator is sensitive to differences rather than to absolute values. Therefore, a discrepancy would no longer be detected either when the current state shifts closer to the emotion goal or when the emotion goal shifts closer to the current state. Given that emotion goals capture emotions that are desirable or acceptable, leading people to accept their

current emotions should lower their emotional bar. This, in turn, could decrease the discrepancy between current and desired emotions and minimize the negative affective impact of the comparator.

Although these ideas should be tested directly, the proposed analysis might account for some of the effects of acceptance therapy and mindfulness practices. Such practices cultivate a nonjudgmental attitude toward current emotions (Blackledge & Hayes, 2001; Hayes & Lillis, 2012) and decrease depressive symptoms and negative affect (e.g., Shallcross, Troy, Boland, & Mauss, 2010). By increasing the relative desirability of current emotions, acceptance therapy could potentially shift desired emotions closer to current emotions, reducing discrepancies and the negative impact of the comparator.

Another ironic effect of the cybernetic process concerns the cost–benefit analysis. The analysis predicts that as the likelihood of engaging in effortful emotion regulation decreases, the worse people feel. Unpleasant emotions decrease the likelihood of investing effort in any goal pursuit (Gendolla, 2000; Grahek et al., 2020), but such effects are particularly detrimental when the target of regulation is unpleasant emotions themselves. The more intense the unpleasant emotion, the lower the perceived benefit and the greater the perceived cost of effortful emotion regulation, rendering it less likely. These ironic effects may be particularly pronounced for depressed individuals, who are already impaired in exerting motivated effort (Cléry-Melin et al., 2011).

Unpleasant emotions could potentially render the goal of decreasing unpleasant emotions less desirable. People who experience persistent unpleasant emotions might also consider them more authentic than less intense unpleasant emotions. To the extent that people prefer authentic experiences (e.g., Lenton, Bruder, Slabu, & Sedikides, 2013), those who suffer from frequent unpleasant emotions might consider decreasing such emotions less desirable. Indeed, depressed individuals were less motivated than nondepressed individuals to decrease their sadness, as reflected in self-report and in emotion-regulatory behavior (see Millgram, Huppert, & Tamir, 2020). Depressed individuals were reluctant to change their sadness, in part, because it felt authentic to them (Arens & Stangier, 2020).

The experience of intense unpleasant emotions is also likely to render the goal of decreasing unpleasant emotions less attainable. In general, people believe that more (vs. less) intense emotions are harder to control (Shafir, Thiruchselvam, Suri, Gross, & Sheppes, 2016). Such beliefs are likely to be particularly strong among individuals who often experience intense unpleasant emotions. People who are depressed are likely to consider any goal more difficult (Gendolla, Brinkmann, &

Silvestrini, 2012), but this might be particularly true with respect to emotion-regulation goals. Individuals who suffer from more depressive symptoms believe that emotions are less controllable (e.g., Ford, Lwi, Hankin, Gentzler, & Mauss, 2018; Kneeland & Dovidio, 2020). Such individuals are further likely to believe that they personally are less capable of controlling their emotions. For instance, people who suffer from symptoms of anxiety or depression have lower self-efficacy in emotion regulation (Catanzaro, 1997; De Castella et al., 2014; Kassel, Bornovalova, & Mehta, 2007; Tamir, John, et al., 2007). People who are depressed are likely to believe emotion-regulation goals are not only less desirable but also harder to achieve, and this impact is likely to be further amplified when experiencing intense unpleasant emotions.

Finally, unpleasant emotions increase the perceived cost of mental effort (Grahek et al., 2020). Moreover, the perceived cost of effort scales in a nonlinear fashion with time spent exerting control (Kool et al., 2017). This means that people who have to cope with persistent and intense unpleasant emotions perceive not only the effort required to regulate emotions as more costly but also the greater long-term cost of doing so as they try to regulate their emotions. People experiencing intense and prolonged unpleasant emotions may be the least likely to initiate and maintain emotion control, even if regulating such emotions is desirable to them, and even if they have objective means to regulate them.

There might be certain ways to try to address these ironic effects. First, it might be possible to promote the desirability of decreasing unpleasant emotions, for instance, by activating instrumental motives for emotion regulation (e.g., social or performance benefits) rather than epistemic ones (e.g., self-verification). Whether depressed individuals should set lower or higher emotion goals is an important question for future empirical research. On the one hand, given the cost of detecting discrepancies, it is possible that setting lower emotion goals would be beneficial in depression. On the other hand, existing research suggests that lower emotion goals in depression are linked to fewer emotion-regulation attempts and worse clinical outcomes (e.g., Millgram et al., 2015).

Second, regardless of what emotion goals they aspire to, individuals are more likely to engage in emotion regulation the more they believe it is attainable. It might be possible to promote the attainability of decreasing unpleasant emotions in various ways. One way to enhance such attainability is by enhancing actual ability to regulate emotions. For instance, training executive-functioning skills increased the propensity to engage in effortful emotion regulation (i.e., cognitive reappraisal; Cohen & Mor, 2018). Although the attainability

of emotion-regulation goals is likely informed by objective ability, people often misjudge their abilities (see Zell & Krizan, 2014). Given that the cost-benefit analysis relies on perceptions of ability, the perceived ability to regulate emotions might be even more critical for initiating regulatory efforts than is actual ability. Consistent with this claim are findings from Moriera, Parkinson, and Silvers (2019), who showed that how well people believed they could implement cognitive reappraisal predicted well-being, whereas how effectively people actually implemented reappraisal did not.

Another way to promote the attainability of emotion-regulation goals, therefore, is by changing beliefs about one's ability to regulate emotions. This can be done by cultivating the belief that emotions are malleable or by promoting self-efficacy in emotion regulation. Accordingly, individuals who were led to believe emotions are more controllable were more likely to use an effortful regulation strategy (Kneeland, Nolen-Hoeksema, Dovidio, & Gruber, 2016) and to seek help when distressed (De Castella, Platow Tamir, & Gross, 2018).

A different way to increase attainability in emotion regulation is to make emotion regulation less effortful. Emotion-regulatory behaviors that have been frequently and recently practiced should be easier to initiate (Ghafur et al., 2018). People can also decrease effort in emotion regulation by using extrinsic forms of emotion regulation—for instance by turning to close others for help (e.g., Cheung, Gardner, & Anderson, 2015; Coan, 2011; W. C. Williams, Morelli, Ong, & Zaki, 2018). Using implementation intentions can also lead people to initiate emotion-regulatory behaviors relatively effortlessly (Schweiger Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009). Rendering emotion regulation less effortful could boost attainability and increase the likelihood that people who suffer from intense unpleasant emotions would initiate emotion regulation. Alternatively, rendering emotion regulation entirely automatic could bypass the cost-benefit analysis altogether and trigger regulatory action without intention (Braunstein, Gross, & Ochsner, 2017; Mauss, Bunge, & Gross, 2007).

Implications for happiness and well-being. Although emotion regulation involves increasing and decreasing either unpleasant or pleasant emotions (e.g., Gross, 2015), in daily life it typically involves decreasing unpleasant emotions or increasing pleasant emotions (e.g., Riediger, Schmiedek, Wagner, & Lindenberger, 2009). The cybernetic analysis of emotion regulation identifies ironic effects that are most pronounced when people try to decrease unpleasant emotions. However, the analysis can inform all forms of emotion regulation, including attempts to increase pleasant emotions, such as happiness. For instance, Betty wants to feel happy. When she notices a

discrepancy between her current happiness and her desired happiness, she realizes she needs to increase her happiness. This realization makes her feel unhappy, increasing the very discrepancy she wants to decrease. Because Betty considers feeling happy an important goal, she constantly monitors her current happiness, making existing discrepancies salient and diverting attention and resources away from other goal pursuits (that could potentially contribute to her happiness).

Increasing pleasant emotions versus decreasing unpleasant emotions. According to a cybernetic analysis, increasing pleasant emotions may be relatively less challenging than decreasing unpleasant emotions. First, whereas the former involves an approach goal (i.e., I want to feel happy), the latter involves an avoidance goal (i.e., I don't want to feel sad). In theory, approach goals are more manageable than avoidance goals because coming sufficiently close to a target is easier to detect than moving sufficiently away from it (Carver & Scheier, 2000).

Second, the goal to increase pleasant emotions is likely to be activated when people do not feel pleasant emotions but want to feel them. In contrast, the goal to decrease unpleasant emotions is likely to be activated when people feel unpleasant emotions but do not want to feel them. Increasing pleasant emotions involves manufacturing an emotion that does not exist or amplifying one that is not sufficiently intense, whereas decreasing unpleasant emotions involves inhibiting or disregarding an existing emotion that is often relatively intense. Assuming emotions are typically a strong signal that carries epistemic value, amplifying them may be easier than disregarding them.

Finally, unpleasant emotions negatively bias the cost–benefit analysis, making people less likely to engage in effortful emotion regulation. Decreasing unpleasant emotions necessarily involves experiencing unpleasant emotions, so the negative cost of these emotions is inevitable. In contrast, increasing pleasant emotions does not necessarily involve experiencing unpleasant emotions. People may be motivated to increase pleasant emotions when their current state involves the absence of pleasant emotions. This current state, in turn, should not necessarily have a negative impact on the cost–benefit analysis. Alternatively, people may be motivated to increase pleasant emotions, when they feel pleasant emotions that are not sufficiently intense. In such cases, people should be more willing to exert effort because pleasant emotions positively bias the cost–benefit analysis.

Taken together, a cybernetic analysis of emotion regulation implies that, at least in some cases, increasing pleasant emotions may be easier to implement than decreasing unpleasant emotions. McRae and Mauss

(2016) have proposed that increasing pleasant emotions may be more useful in coping with negative events than decreasing unpleasant emotions, which is consistent with these ideas. At the same time, increasing pleasant emotions may not necessarily lead to decreases in unpleasant emotions (McRae, Ciesielski, & Gross, 2012). Further research is needed to better understand the potential benefits of increasing pleasant emotions (see also Waugh, 2020).

Happiness as an emotion goal. Although happiness can be defined as a general sense of meaning and self-actualization (e.g., Waterman, 1993), here I refer to happiness as an emotion. In this respect, a cybernetic analysis identifies several characteristics of the pursuit of happiness as an emotion goal. Earlier, I proposed that emotion regulation might be relatively infrequent because emotion goals are sensitive to context and current emotions can activate other control systems. However, emotion regulation is likely to be more frequent if the emotion goal is less sensitive to context and highly accessible, as might be the case with happiness. In North America, people typically seek relatively high absolute levels of happiness (Diener, 2000; Hornsey et al., 2018), think about happiness often (Diener, 2000), and prioritize happiness over other goals (Diener, Sapyta, & Suh, 1998). These features are less characteristic of members of East Asian cultures, for example (Joshanloo & Weijers, 2014). High standards and high accessibility of happiness as a goal could be adaptive to the extent that it propels people to actively pursue happiness in meaningful ways (see Ford et al., 2015). However, it can also have a downside (for a review, see Ford & Mauss, 2014).

First, given that increasing pleasant emotions often involves manufacturing a signal that does not exist or trying to amplify a weak signal, regulated happiness may seem inauthentic. Indeed, some evidence suggests that regulated happiness may be less useful than reactive happiness and that this effect is mediated by feelings of inauthenticity (Weidman & Kross, 2020). Further research is needed to test whether and how regulated happiness differs from reactive happiness.

Second, according to a cybernetic analysis of emotion regulation, activating happiness as an emotion goal can trigger the comparator and lead to the detection of discrepancies between current and desired happiness. Detecting such a discrepancy, in turn, is likely to induce unpleasant feelings, making people less (rather than more) happy. The happier people want to feel, the larger the detected discrepancy and the more intense the negative affective signal of the comparator. These ideas are consistent with research by Mauss and colleagues and by others (e.g., Schooler, Ariely, & Loewenstein, 2003). For instance, the more excessively people evaluated

happiness (Ford, Shallcross, Mauss, Floerke, & Gruber, 2014) and the more happiness they believed they should feel (R. J. Thompson, Kircanski, & Gotlib, 2016), the more depressed they were. Furthermore, motivating people to feel happier (vs. not) led them to feel less happy, especially in positive situations (Mauss et al., 2011). Such ironic effects, in turn, were mediated by feeling disappointed at their own feelings.

The ironic effects of the happiness comparator are likely to be most pronounced in individuals who want to be very happy and who prioritize the goal of being happy over other goals, as is the case among many North Americans (Diener, 2000). These ironic effects should be attenuated the smaller the discrepancy between current and desired happiness. This possibility is supported by findings that people who reported smaller discrepancies between their current and desired emotions (whether pleasant or unpleasant) were more satisfied with their lives and reported fewer depressive symptoms across cultures (Tamir, Schwartz, Oishi, & Kim, 2017). Feeling as much happiness as one believes is desirable, therefore, may be linked to greater well-being, even if one's desired level of happiness is lower in absolute terms.

Although these ideas need to be tested, there may be several ways to minimize discrepancies between current and desired happiness other than by increasing current happiness. First, it may be possible to achieve more happiness by seeking less of it (see Ford & Mauss, 2014). Setting lower happiness goals might decrease the likelihood of detecting discrepancies and reduce disappointment. This could be done by moderating the valuation of happiness or by increasing the desirability of one's current emotional state (e.g., Hayes & Lillis, 2012). Second, it may be possible to achieve greater happiness by decreasing the accessibility of happiness as a goal. Rather than target happy feelings and constantly monitor them, people may be more likely to attain happiness if they target other outcomes (e.g., stronger social relationships) that are likely to ultimately contribute to greater happiness (e.g., Ford et al., 2015; Mauss et al., 2012). Future research is needed to more directly test when, how, and to what extent people should strive to increase happiness as an emotion-regulation goal.

Future Directions

Observations

Much of the research in emotion regulation is outcome-oriented, focusing on effective emotional change. This is important, but it might reinforce an attribution of emotional change to regulatory processes, even when

there are none. As a result, undesired emotions are sometimes taken as an indication of ineffective emotion regulation when instead they could reflect more intense or frequent emotional reactions or slower habituation. For instance, the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) includes items such as "When I'm upset, my emotions feel overwhelming," which may capture the intensity of emotional experiences rather than the difficulties regulating them. Moving forward, it could be useful to distinguish, both theoretically and empirically, between deficits in emotion generation and deficits in emotion regulation. To reinforce this distinction, it is necessary to identify the motivational underpinning of emotion regulation.

In addition to focusing on outcomes, research in emotion regulation tends to revolve around the means used to regulate emotion (i.e., strategies and tactics). As a consequence, both conceptual discussions and empirical research are often centered around emotion-regulation strategies. This is evident in how questions and hypotheses are framed and in how studies are designed. For instance, we draw conclusions regarding the effects of trying to decrease negative affect using cognitive reappraisal without considering the possible effects of trying to decrease negative affect per se (Tamir, Halperin, Porat, Bigman, & Hasson, 2019). We test whether and when depressed participants use cognitive reappraisal or rumination but rarely ask whether they are motivated to change their feelings and to what end (see Millgram et al., 2020). We talk about people using "noninfluence strategies to regulate emotions" rather than consider the possibility that some people are not trying to influence their emotions at all (Wilken & Miyamoto, 2020). We typically ask questions about reappraisal, rumination, or acceptance and fewer questions about the motivation that underlies their selection and implementation—namely, do people try to change their emotions? Why and in which direction? How motivated are people to change their emotions and how much effort do they invest? Focusing on means to an end, without understanding the end itself and the drive to pursue it, could lead us to ignore or misinterpret key aspects of the regulation process. The proposed cybernetic analysis is but one step toward addressing these issues and nudging them gently to the forefront of emotion-regulation research.

Questions and hypotheses

A cybernetic analysis differentiates between the activation of an emotion goal, the detection of discrepancies between current and desired emotions, and the cost-benefit analysis in emotion regulation. It also identifies unique features of the emotion-control system that

might distinguish it from other control systems. These propositions raise various research questions and give rise to specific hypotheses that could be tested in future research. Several examples are offered below.

Setting the emotional bar. How high should people set their emotion goals? On the one hand, harder goals can facilitate greater effort in goal pursuit (e.g., Silvia, McCord, & Gendolla, 2010). On the other hand, harder goals lead to larger discrepancies. Detecting such discrepancies could be counterproductive in emotion regulation. The cybernetic analysis predicts that there might be cases in which it would be beneficial to set the emotional bar lower. This might be particularly true with regard to increasing pleasant emotions, where detecting discrepancies might make people who did not feel bad to begin with feel bad. The cybernetic analysis also predicts that detecting discrepancies could change emotional experience before people engage in regulatory action. Future research could directly test how lower versus higher emotion standards influence the initiation of regulatory effort and how they influence emotional experiences both before and after emotion-regulatory action.

According to the control theory of emotion regulation, it may be possible in some cases to facilitate healthier emotional outcomes by shifting emotion goals toward current emotions rather than the opposite. This could be done, for instance, by cultivating a nonjudgmental attitude toward current emotions (Blackledge & Hayes, 2001; Hayes & Lillis, 2012). The effects of acceptance therapy on effortful emotion regulation could be tested by measuring current and desired emotions as they change over time—before, during, and after acceptance therapy.

Monitoring the heart. Monitoring is important for effective self-regulation (Harkin et al., 2016). Likewise, to effectively regulate emotions, people must monitor their current emotions. Excessive monitoring of emotions, however, could be harmful when there are discrepancies between current and desired states because they are likely to induce constant negative affect. The lower the attainability of the emotion-regulation goal, the more pronounced should be the negative effects of monitoring (e.g., the more difficult the task or the less capable the individual). For instance, people who want to be happier might be less successful the more frequently they monitor their current happiness (for preliminary evidence, see Schooler et al., 2003). Likewise, anxious individuals who want to decrease their anxiety should be less successful the more frequently they monitor their current anxiety. These hypotheses can be tested by changing the frequency of emotion monitoring and assessing the impact on regulatory success.

The effort that counts. Models of goal pursuit (e.g., Gollwitzer, 1990) highlight the transition between setting goals and actively striving to attain them. In emotion regulation, however, less attention has been devoted to this distinction. The cybernetic analysis suggests that activating an emotion goal or an emotion-regulation goal may not necessarily trigger regulatory behavior. Instead, initiating emotion-regulatory action should depend on the perceived benefits and costs of regulation. This leads to several testable hypotheses. First, people should be more likely to invest effort in regulating an emotion the more they believe it is desirable and the more they believe it is attainable (Gutentag et al., 2020).

Second, the attainability and desirability of an emotion-regulation goal might interact to predict effort. For instance, increasing the perceived value of decreasing sadness should lead depressed individuals to engage in emotion regulation only if they believe they can regulate their emotions. Likewise, increasing the belief that they can regulate their emotions should lead depressed individuals to try to decrease their sadness only if they believe that decreasing their sadness is desirable. Such interactive effects are yet to be tested directly. Identifying objective and subjective factors that contribute to the attainability of emotion-regulation goals should be important for designing tailored interventions to facilitate effortful emotion regulation.

People are different. The cybernetic analysis offers a framework that organizes potential individual differences that might shape emotion regulation (see Table 1). First, current emotion is likely influenced by individual differences in emotional reactivity, including temperament, personality traits, and affective dispositions. Such differences might influence whether and how often people need to regulate their emotions and how likely they are to engage in regulatory behavior when the need is detected. Second, emotion goals are likely influenced by individual differences in attitudes toward emotions, prior implicit and explicit learning about emotions, social and cultural norms, knowledge about emotions, emotional intelligence, and associations between emotion goals and other nodes in the goal system. Such differences might influence whether and when people identify the need to regulate emotions and in which direction. Third, the comparator function is likely influenced by individual differences in attention to emotion, clarity of emotions, and emotion differentiation or granularity. Such differences might influence whether people detect the need to regulate and the desired scope of such regulation (see Kalokerinos, Erbas, Ceulemnas, & Kuppens, 2019). Fourth, the cost-benefit analysis is likely influenced by individual differences that inform the desirability and attainability of emotion-regulation goals and the perceived cost of emotion-regulatory effort. The desirability of

Table 1. Components of the Cybernetic Analysis of Emotion Regulation and Examples of Individual Differences That Are Likely to Influence Them

| Theoretical components | Individual differences |
|-----------------------------|--|
| Current emotion | Emotional reactivity (e.g., temperament, personality traits, affective dispositions) |
| Emotion goal | Attitudes toward emotions; prior learning history; social and cultural norms; knowledge about emotions; emotional intelligence; content and structure of goal system |
| The comparator | Attention to emotion; clarity of emotions; emotion differentiation and granularity |
| Cost–benefit analysis | |
| Desirability | Emotional reactivity; conformism; content and structure of goal system |
| Attainability | Emotional reactivity; beliefs about controllability of emotion; self-efficacy in emotion regulation; self-esteem; past experiences of emotion regulation |
| Cost of effort | Emotional reactivity; executive functioning; cognitive load |
| Emotion-regulatory behavior | Knowledge about emotion-regulation strategies; availability and experience using emotion-regulation strategies; executive-functioning skills; cognitive resources; habits; emotion-regulation flexibility; context sensitivity |

emotion-regulation goals is likely influenced by individual differences in emotional reactivity, conformism, and the broader goal system. The attainability of emotion-regulation goals is likely influenced by individual differences in beliefs about the controllability of emotions, self-efficacy in emotion regulation, self-esteem, and in prior successes or failures in regulation. The perceived cost of effort is likely influenced by individual differences in emotional reactivity, executive-functioning skills, and cognitive load. Finally, emotion-regulatory behavior is likely influenced by individual differences related to emotion-regulation strategies, including knowledge about emotion-regulation strategies, prior experiences using specific strategies, cognitive resources, habits, emotion-regulation flexibility, and context sensitivity.

As reflected in Table 1, one predictor of motivation in emotion regulation is emotional reactivity. In fact, according to the cybernetic analysis, people experiencing intense and prolonged unpleasant emotions should be less willing to initiate and maintain emotion control, even when regulating such emotions is desirable, and even when they have objective means to regulate them. Regardless of which emotion-regulation strategies they might use, the people who need it most might be those who are the least likely to initiate or persist in emotion regulation.

Conclusions

Emotion regulation is motivated, yet we know relatively little about the content and intensity of such motivation—namely, what people want to feel and how motivated they are to achieve such states. A cybernetic analysis of emotion regulation identifies motivational factors that drive the initiation and maintenance of effort in emotion regulation and identifies features that might be unique to it. The analysis complements and extends

existing models in emotion regulation, raises new research questions, and points to testable hypotheses that could potentially help advance research and practice in emotion regulation.

Transparency

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