This is a repository copy of *Foundations and Extensions for the Extended Model: More on Implicit and Explicit Forms of Emotion Regulation.*

White Rose Research Online URL for this paper:
http://eprints.whiterose.ac.uk/88970/

Version: Accepted Version

**Article:**

https://doi.org/10.1080/1047840X.2015.960040

---

**Reuse**
Unless indicated otherwise, fulltext items are protected by copyright with all rights reserved. The copyright exception in section 29 of the Copyright, Designs and Patents Act 1988 allows the making of a single copy solely for the purpose of non-commercial research or private study within the limits of fair dealing. The publisher or other rights-holder may allow further reproduction and re-use of this version - refer to the White Rose Research Online record for this item. Where records identify the publisher as the copyright holder, users can verify any specific terms of use on the publisher’s website.

**Takedown**
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.
Commentary for Psychological Inquiry

Foundations and extensions for the extended model:
More on implicit and extrinsic forms of emotion regulation

Thomas L. Webb, Peter Totterdell, and Daria N. Hernandez Ibar
University of Sheffield, UK

Correspondence. Correspondence concerning this article should be addressed to Thomas Webb, Department of Psychology, University of Sheffield, Sheffield S10 2TN, UK.
Electronic mail may be sent to t.webb@sheffield.ac.uk
Abstract

Gross’s Extended Process Model of Emotion Regulation (or EPM) draws on insights from the psychology of action control to consider not just the strategies that people use to regulate their emotions, but also how people decide when and how to regulate, and go about implementing their chosen strategy. This commentary seeks to extend the action control perspective on emotion regulation even further to connect the EPM with extant frameworks on self-regulation. In this regard, we consider the relation between emotions and behavior, conflict between emotional goals, the nature of the reference value toward which regulation is directed, and the dynamics of emotion regulation. We then consider two issues only touched on by Gross’s review – automatic (or implicit) emotion regulation and (ii) interpersonal (or extrinsic) emotion regulation.
Foundations and extensions for the extended model: More on implicit and extrinsic forms of emotion regulation

The primary contribution of James Gross’s target article is to present an Extended Process Model of emotion regulation that – as the name suggests – quite literally extends the process model, which has been one of the dominant frameworks for understanding emotion regulation to date (for a review, see Webb, Miles, & Sheeran, 2012). Specifically, the extended model (hereafter, termed the EPM) considers (i) what makes people decide to regulate their emotions and (ii) some of the challenges that people are likely to face when regulating their emotions. These are not new ideas. Indeed, the analysis of when people decide to regulate draws heavily on cybernetic models of self-regulation (e.g., the work of Carver & Scheier, 1982; that, in turn, drew on the work of Powers, 1973; Powers, Clark, & McFarland, 1960a, 1960b). The consideration of challenges draws on other action control perspectives on emotion regulation, such as those described by Bonanno and Burton (2013), Gross and Jazaieri (2014), Webb, Schweiger Gallo, Miles, Gollwitzer, and Sheeran (2012). However, these extensions are valuable, in refining and updating theory, integrating disciplines (e.g., work on behavioral and affective sciences), and bringing the action control perspective to a wider audience.

An advantage of integrating insights from behavioral and affective science is that many of the important questions have already been considered. The extensions also potentially bring applied benefit because interventions from the behavioral sciences can be translated to the affective sciences. For example, Webb, Schweiger Gallo, et al. (2012) review how forming specific if-then plans (known as implementation intentions,

1 Not to be confused with the extended parallel process model (Witte, 1992), which is concerned with fear appraisals.
Foundations and extensions for the extended model

Gollwitzer, 1999; Gollwitzer & Sheeran, 2006) can help people to deal with difficulties during emotion regulation. In short, there are a number of reasons to think that the integration of insights gleaned from the regulation of behavioral responses to the regulation of affective responses is long overdue. In this commentary, we want to suggest that more could be done to connect the extended model with the extant literature on which it is (presumably) based and that so doing will reap rewards for research related to the EPM. In addition, we propose that the EPM might be extended further to consider two issues that are important in the field, but about which the target article currently says relatively little: (i) automatic (or implicit) emotion regulation and (ii) interpersonal (or extrinsic) emotion regulation. Gross considers both of these issues in defining the nature of emotion regulation, but they are not considered in relation to the EPM.

**Identifying and Using the Theoretical Foundations of the EPM**

The EPM suggests that emotion regulation comprises a hierarchy of valuation systems. Each valuation system has a control loop in which a discrepancy between a perceived current state of the world and a desired goal state (e.g., someone notices that they are becoming frustrated) produces a response (e.g., the person decides to take a break from what they are doing) that affects the internal or external world (e.g., the person feels less frustrated). The valuation cycle is repeated until the monitored discrepancy is sufficiently reduced. In the EPM, emotion regulation is a second-level valuation system that targets the emotions produced by a first-level valuation system. Powers (1973) and Carver and Scheier (1982) have previously described the same hierarchical organization of feedback loops for controlling behavior and affect, with different terms but equivalent components in each control loop. The output of a control
loop in these schemes usually provides the reference value for the respective lower level negative feedback loop. For example, having good relationships at work (the goal of the higher level loop) requires that one keep feelings of frustration under control (i.e., provides the goal for the lower level of the loop). The question is how might these earlier conceptions and the research that they have produced help to advance research on emotion regulation? We identify four examples that cover issues of: the relation between emotions and behavior, how conflict between emotional goals is resolved, the nature of the reference value toward which regulation is directed, and the dynamics of emotion regulation.

The Relation between Emotions and Behavior. A hallmark of perceptual control theory (PCT; Powers, 1973; Powers et al., 1960a, 1960b) is that living systems are viewed as using behavior (or action) to actively control the perceived environment so as to bring it into line with the system’s goals. Therefore, behavior is viewed as controlling inputs in a goal-directed way, rather than merely a response to what happens in the environment. What this means for the EPM is that emotion regulation should not be seen as a response to a change in emotion state (e.g., becoming frustrated). Instead it is something that is deployed to achieve a particular goal (e.g., to not get frustrated). This change of emphasis is potentially important because it fits with new perspectives on emotion which suggest that behavior pursues emotion in a goal-directed fashion, rather than emotion directly influencing behavior (Baumeister, Vohs, DeWall, & Zhang, 2007; Seligman, Railton, Baumeister, & Sripada, 2013).

Conflict between Emotional Goals. Gross (p. 20) points out that different valuation systems can be active simultaneously, and that when this occurs they can either
be supportive of one another or pull in different directions. Gross provides an example of
the latter occurring when two motives are in conflict and argues that, in such situations,
either the stronger impulse wins or the conflict is adjudicated by another valuation
system. According to PCT, conflict occurs when two or more goals try to set different
reference values for the same lower-level goal (Powers et al., 1960b). For example, the
goal to be sociable and the goal to be successful at work likely have different
implications for the amount of time that a person should spend working. ‘Method of
levels’ therapy (Mansell, 2009) suggests that goal conflict needs to be resolved at a
higher level in the hierarchy, and so people who are trying to resolve conflicts are
encouraged to identify and focus on higher-level goals. Psychopathology can arise when
conflicts between goals are ignored and arbitrary control is applied (Mansell, 2005). This
idea has been used to develop a model of emotion regulation in bipolar disorder in which
symptoms of bipolar disorder are understood to arise as a consequence of the person
having conflicting beliefs about internal states (Searson, Mansell, Lownes, & Tai, 2012).
Arbitrary control of these internal conflicts (that is, control that neglects one of the
conflicting goals) leads to ‘over-regulation’ of emotions, producing a behavioral ascent
cycle for mania or a behavioral descent cycle for depression. Recent evidence also
indicates that goal conflict is a primary source of mixed emotions (Berrios, Totterdell, &
Kellett, 2014), something that the EPM currently says relatively little about, but that are a

The Nature of the Reference Value. Each valuation that occurs in the EPM entails
a comparison between a perceived state of the world and a desired state or reference
value. Theorizing in the behavioral sciences has considered where reference values come
from and how the nature of the reference value changes during the course of goal pursuit. Specifically, evidence suggests that in the early stages of goal pursuit people focus on change from the initial state (i.e., what they have achieved so far), whereas at the later stages of goal pursuit they shift their focus to the difference between the current and desired state (i.e., what they have left to do, Bonezzi, Brendl, & De Angelis, 2011). Research has also shown that it is the rate with which one is making progress toward goals, rather than the absolute size of the discrepancy between current state and desired goal state, that influences the need to act (Carver & Scheier, 1990; Hsee & Abelson, 1991), or the perceived value of regulation in Gross’s terms. It would be valuable to investigate whether similar processes are involved in emotion regulation. For example, is it the rate of change in emotions that influences regulation or the absolute size of the discrepancy between actual and desired emotional states?

Dynamics of Emotion Regulation. The EPM describes the processing dynamics involved in regulating emotions over time, including maintaining, switching and stopping emotion regulation. The importance of these processes in the context of action control has been discussed by a number of authors (for a review, see Gollwitzer & Sheeran, 2006) and it would be worth making explicit connections between the dynamics involved in regulating behavioral and affective responses. With respect to maintenance, for example, Gross’s target article usefully points out that “emotion regulation maintenance requires that the goal to regulate emotion be successfully shielded from other competing goals” (p. 30), but does not refer to the literature on goal shielding, which might help to explain how this is achieved (e.g., Achziger, Gollwitzer, & Sheeran, 2008; Goschke & Dreisbach, 2008; Shah, Friedman, & Kruglanski, 2002). The EPM also discusses the importance of
being able to flexibly switch between emotion regulation strategies (see also Kashdan &
Rottenberg, 2010), but does not specify what instigates the switch. One possibility is
resource depletion (for reviews, see Hagger, Wood, Stiff, & Chatzisarantis, 2010,
Muraven & Baumeister, 2000). That is, people may switch from relatively effortful to
less effortful strategies if they believe that they are running low on resources (Muraven,
Shmueli, & Burkley, 2006).

To summarize this section on theoretical foundations, one of the strengths of the
EPM is that it applies a number of ideas and insights from the behavioral sciences to
understand emotion regulation. We believe that acknowledging these perspectives builds
a more robust theoretical and empirical basis for the EPM, as well as serving to introduce
the ideas to a wider audience. It seems likely that research on emotion regulation will
enter a ‘translational’ period in which researchers examine which processes and insights
can be translated from action control to affective control. Having started to connect the
EPM to extant literature, we now return to our two points for extension.

**Automatic (implicit) emotion regulation**

In relation to automatic emotion regulation, Gross acknowledges that “emotion
regulation can also be engaged outside of conscious awareness” (p. 8) and that emotion
regulation strategies include “both processes that are under deliberate control and
processes that operate implicitly” (p. 10). However, the EPM says relatively little about
whether the conscious or unconscious initiation of emotion regulation goals influences
the process of emotion regulation (although the question is posed on p. 31). For example,
do people need to consciously perceive a discrepancy between the current state (termed
‘the world) and the desired state for emotion regulation to occur? Custers and Aarts
Foundations and extensions for the extended model

(2007) present evidence that discrepancies can prime goal-directed actions outside participants’ conscious awareness. In an illustrative study, participants worked on a language task that unobtrusively activated a discrepancy from the goal of looking well groomed (e.g., participants read the sentence “The shoes you put on look dirty”). Custers and Aarts found that primed participants were faster to respond to instrumental actions (e.g., polishing) than were participants who read matched sentences that did not activate a discrepancy (e.g., read the sentence “The shoes you put on have laces”), at least when participants frequently pursued the goal to look well groomed. These findings suggest that situations requiring emotion regulation may automatically activate relevant goals, and trigger instrumental actions without the person necessarily being aware of so doing (this idea forms the basis of the auto-motive model, Bargh, 1990; Bargh & Chartrand, 1999; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001).

Evidence from the behavioral sciences also suggests that goals that are initiated outside awareness operate in a similar manner to consciously activated goals (e.g., Bargh et al., 2001; Chartrand & Bargh, 1996; Förster, Liberman, & Friedman, 2009). In two experiments, Bargh et al. (2001) found that non-conscious activation of the goal to perform well increased persistence (participants continued working on a word search task after time had run out) and resumption (participants chose to continue doing the same word search task after being interrupted and after being provided with the opportunity to engage in a different task) relative to participants for whom this goal was not activated. These experiments provide evidence that goals that are activated non-consciously have similar features to consciously activated goals; namely, that they are persisted with until completion and resumed when interrupted. Although empirical research has started to
translate these ideas to emotion regulation (for a review, see Bargh & Williams, 1997), it is not yet clear which of the stages of emotion regulation specified by Gross’s EPM are likely to become automatized, when, and with what effects – the value associated with emotion regulation (identification stage) and the choice (selection stage) and application of regulation strategy (implementation stage). We contend that implicit processes are likely to influence all three stages of the regulation process and provide some indicative evidence below.

Williams, Bargh, Nocera, and Gray (2009) showed that it is possible to non-consciously activate emotion regulation goals. Participants were primed via a scrambled sentence task with the goal to reappraise their emotional responses while giving a short speech (i.e., participants constructed sentences that included the words ‘reassessed’, ‘perspective’, ‘appraised again’, ‘carefully analyzed’, and ‘strategy’). Williams et al., found that primed participants were less emotional than a control group who were exposed to neutral sentences and had a similar emotional response to the stressful task (giving a short speech) to participants who were explicitly asked to reappraise their emotional responses. Importantly, careful debriefing indicated that no participants were aware of a theme to the words in the scrambled sentence task nor guessed the hypotheses of the study, suggesting that the priming procedure influenced emotion regulation outside of participants’ awareness (one of the defining features of an automatic process, Bargh, 1994; Moors & De Houwer, 2006). There is also evidence that the valuation sub-step of the identification stage of the EPM can proceed automatically. Mauss, Evers, Wilhelm, and Gross (2006) showed that peoples’ automatic (or implicit) attitudes toward the regulation of emotions can influence responses. Specifically, Mauss et al. found that
participants who showed a positive implicit evaluation of emotion regulation (as indicated by a modified implicit association test; the ER-IAT) were more likely to regulate their emotions (i.e., showed decreased experiential, behavioral, and cardiovascular responding) when provoked.

The selection of emotion regulation strategies is also likely to be influenced by implicit processes. Research on cognitive habits, for example, suggests that there are individual differences in the tendency to respond to emotional events in particular ways (e.g., with self-criticism) and that these responses are relatively automatic (i.e., are unintended, are initiated without awareness, are difficult to control and so on, Verplanken, Wang, Trafimow, & Woolf, 2007). The implication is that the frequent and consistent use of a particular strategy for emotion regulation means that the person does not need to deliberate about how to respond; instead, the strategy is selected relatively automatically (Wood & Neal, 2007). While in many instances, the automatic selection of emotion regulation strategies is likely to be functional (e.g., emotion regulation can proceed relatively efficiently), habitual selection of particular strategies could lead to overgeneralization. For example, a strategy that effectively modifies a sad mood may not work for anxiety (Webb, Schweiger Gallo, et al., 2012). Habits may also be difficult to unlearn, with evidence suggesting that strong habits persist despite changes in the goals that originally supported them (Wood & Neal, 2007) and plans to respond in a different manner (Webb, Sheeran, & Luszczynska, 2009). In short, it seems likely that, in many instances, the choice of strategy to regulate a particular affective experience may be determined relatively automatically.
With respect to the implementation stage, Schweiger Gallo, Keil, McCulloch, Rockstroh, and Gollwitzer (2009) provided evidence that forming implementation intentions to regulate emotions in a particular manner enabled the regulation strategy to be implemented relatively automatically. Specifically, participants who were scared of spiders and formed implementation intentions (“And if I see a spider, then I will remain calm and relaxed!”) were better at down-regulating their fear than similarly scared participants who were given a goal intention (“I will not get frightened!”) and than those in the control group who were given no instructions about regulating their fear. Similar findings have been reported for participants under cognitive load (Schweiger Gallo & Gollwitzer, 2007) and Schweiger Gallo et al. (2009, Study 3) measured ERPs and found that forming implementation intentions reduced early visual activity in response to pictures of spiders. Taken together, these findings suggest that forming implementation intentions enables people to implement emotion regulation in a relatively automatic manner (for a review, see Webb, Schweiger Gallo, et al., 2012). These findings are consistent with research on action control under implementation intentions (e.g., Gollwitzer & Schaal, 1998; Webb & Sheeran, 2008) and point, once again, to the value of translating insights from behavioral to affective sciences.

**Interpersonal (Extrinsic) Emotion Regulation**

The original process model (Gross, 1998a, 1998b) focused on how people regulate their own emotions, and was only concerned with people’s use of interpersonal behaviors in the context of influencing their own emotions (e.g., soothing an upset person in order to feel calmer oneself). However, as Gross acknowledges in the target article, there are also times when people need or want to regulate another person’s emotions, and
the effect of the regulation effort on the other person’s emotions is of interest. Gross terms this “extrinsic emotion regulation” as did Niven, Totterdell and Holman (2009) in their classification of interpersonal emotion regulation strategies, but here we stick with the term interpersonal emotion regulation to contrast it with intrapersonal emotion regulation.

A growing body of research has started to consider interpersonal emotion regulation, including its theoretical (Zaki & Williams, 2013), neural (Hallam et al., 2014), and measurement (Niven, Totterdell, Stride, & Holman, 2011) basis, as well as the types of interpersonal regulation strategies that people use (e.g., Niven et al., 2009) and the consequences of interpersonal emotion regulation for others (Niven, Holman & Totterdell, 2012) and for self (Martinez-Iñigo, Poerio, & Totterdell, 2013; Niven, Totterdell, Holman, & Headley, 2012). This work can contribute to the updated version of the process model, but the question that we address here is whether the EPM can be extended further to help us to understand how people regulate others emotions? To answer this, we highlight the relevance of extant research from organizational psychology on emotional labor; research that seeks to understand how people (workers) regulate their own feelings in order to influence other people’s feelings (clients and colleagues). Research on emotional labor shows the importance of accounting for reciprocal influence when studying interpersonal emotion regulation as a control system.

Research on emotional labor started with Hochschild’s (1983) seminal work The Managed Heart, which identified how employees manage their feelings and emotional expressions as a requirement of their work role. The purpose of this regulation is to influence the feelings and behaviors of clients and colleagues with a view to benefiting
the organization. Sometimes this ‘emotional labor’ benefits the employee too (in money and health), but it can also have adverse consequences such as emotional exhaustion (Holman, Martinez-Iñigo, & Totterdell, 2008). Two types of regulation strategy commonly used by employees have been studied in depth: deep acting which involves bringing emotions into line with those that have to be displayed, and surface acting which involves displaying the required emotions while suppressing actual feelings. These two strategies have been respectively likened to antecedent-focused and response-focused emotion regulation from Gross’s process model (Grandey, 2000). However, emotional labor is also a form of interpersonal emotion regulation because the regulation is directed at changing other people’s feelings.

In general, surface acting has been associated with more negative consequences for employees than deep acting because, although both are effortful and therefore depleting, surface acting is perceived to be less authentic by its targets and is therefore less likely to recover resources through positive feedback from clients and colleagues (Côté, 2005; Martinez-Iñigo et al., 2007). The role of feedback is important because it highlights that interpersonal emotion regulation involves the coupling of (at least) two purposive systems each of which has its own set of goals (Niven, Totterdell, Holman, & Cameron, 2012). In terms of the EPM, this means that the set of valuation systems need to be extended to include each person involved in the interpersonal interaction.

This extension is likely to produce complex dynamics as each person tries to control the other through their own expression of emotions and adjusts their behavior according to the response that is received. Complex dynamics are difficult to study using conventional statistical methods but may be amenable to computer modeling in which
Simulations of the principal control loops involved in interpersonal emotion regulation are built. Exploratory research of this kind has produced promising results (Cameron, 2013; Cameron, Totterdell, Holman, & Bennett, 2009), including predictions about when people are likely to switch from deep acting to surface acting. The MARDY simulation (Cameron, 2013) models the person regulating their emotions as two control loops – one for regulating emotional experience and the other for regulating emotional expression – each of which depletes a common resource when used. Interpersonal dynamics can be generated and evaluated by exposing the model to simulations of emotional events. A benefit of this approach is that a model that produces plausible behavior for known circumstances can be used to predict what might happen in unknown circumstances or those that are difficult to study (e.g., for extremes of emotion and regulation). We suggest, therefore, that computer simulations may offer a productive way forward for research on the EPM.

Conclusion

This commentary has endeavored to extend the EPM further, both to connect it with a broader range of literature and to expand consideration of two issues that are only touched on in the target article – namely, automatic (or implicit) and interpersonal (or extrinsic) forms of emotion regulation. The insights that derive from this analysis are that research in the affective sciences could learn from studies of similar issues in the behavioral sciences, particularly to understand the purpose of emotion regulation, and the effect of goal conflict on responses. Future research might also usefully integrate the possibility that the stages of emotion regulation described by the EPM can proceed relatively automatically. Finally, we agree with Gross that the EPM might help to

understand interpersonal forms of emotion regulation, but suggest that so doing might require more complex models to take into account other people’s valuation systems. Computational models may help in this regard.
References


Foundations and extensions for the extended model


