Twenty-Five Years of Gross's Process Model of Emotion Regulation: Development, Evolution, and Practical Directions

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Abstract

Emotion regulation unfolds in correspondence with the critical temporal nodes before and after emotion emergence, a viewpoint typified by Gross's process model of emotion regulation. With the continuous enrichment of empirical research and through twenty-five years of revision and refinement, this theory has evolved from a linear to a cyclical perspective in describing the morphological structure of emotion regulation, broadened from individual to group-based emotion regulation in clarifying the implementing agents, and shifted from single to multiple emotion regulation in summarizing regulation strategies. Based on these three characteristics, three major research domains have respectively emerged: emotion regulation flexibility, group-based emotion regulation, and multiple emotion regulation. Future research should continuously advance the development of the process model of emotion regulation, derive more novel application modules for emotion regulation, make parallel progress and achieve mutual reinforcement in theoretical exploration and empirical innovation, and promote a contextually grounded understanding of emotion regulation application in real-life contexts.

Full Text

Twenty-Five Years of Gross's Emotion Regulation Process Theory: Development, Evolution, and Practical Directions

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Abstract

The view that emotion regulation unfolds around key time points before and after emotional episodes is exemplified by Gross's emotion regulation process theory. Over the past twenty-five years, with the accumulation of empirical research, this theory has undergone continuous revision and refinement. In describing the morphological structure of emotion regulation, it has evolved from a linear to a cyclical perspective; in clarifying the implementing agent, it has broadened from individual emotion regulation to group-based emotion regulation; and in summarizing regulation strategies, it has advanced from single emotion regulation to emotion polyregulation. Based on these three characteristics, three major research areas have emerged: emotion regulation flexibility, group-based emotion regulation, and emotion polyregulation. Future research should continue to advance the development of emotion regulation process theory, generate new application modules for emotion regulation, and promote parallel and mutually reinforcing theoretical exploration and empirical innovation, thereby facilitating a more nuanced understanding of emotion regulation in real-life contexts.

Keywords: Emotion regulation, Process perspective, Polyregulation
Classification: B84

Theory and Application of Gross's Emotion Regulation Process Interpretation Model

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Abstract: Gross explicitly defines emotion regulation as the process by which individuals influence what emotions they have, when they have them, and how they experience and express them. According to Gross, emotion regulation unfolds alongside the process by which emotions are generated. In explaining emotion regulation, Gross's emotion regulation process model has been widely recognized and continuously expanded, as evidenced by the process model of emotion regulation and the extended process model of emotion regulation. This article integrates Gross's series of models to explain emotion regulation, focusing on three salient features of model development as the main thread: the evolution from the traditional linear model to the current cyclical model, from the individual-based emotion regulation model to group-based emotion regulation, and from single emotion regulation to emotion polyregulation. The main points of each model are then illustrated in temporal context, explaining how empirical research contributes to model development and optimization. Subsequently, combined with the three advances of Gross's emotion regulation process interpretation model, empirical studies in these three aspects are summarized and reviewed: First, exploring and proposing the monitoring stage. Further investigation reveals that it can promote emotion regulation flexibil-

ity, enabling individuals to change their strategies more flexibly to adapt to environmental changes. Second, distinguishing group-based emotion regulation from individual-based emotion regulation and analyzing group-based emotion regulation. Third, moving beyond the limitation of exploring single emotion regulation strategies in previous studies to further investigate multivariate emotion regulation, that is, the simultaneous or continuous use of multiple methods to regulate emotions in a single emotional event. Empirical studies in these three aspects further explain the theoretical rationality and broad applicability of Gross's emotion regulation process interpretation model and confirm the dynamic interaction of emotion regulation mechanisms from a practical application perspective. Finally, existing problems in the empirical research on these three aspects and future exploration directions are briefly discussed.

Keywords: Emotion Regulation, Polyregulation, Process model

Emotions can both guide and shape cognitive processes (Bargh & Williams, 2007) while interfering with persistent goal pursuit (Oettingen et al., 2006). Therefore, when there is a discrepancy between emotion-driven behaviors and current goal-directed behaviors, individuals need to regulate their emotions (Yao, 2011). Successful emotion regulation contributes to improved physical and mental health and enhanced social functioning (Reeck et al., 2016). Conversely, emotion regulation failure can lead to maladaptive behaviors (King et al., 2022; Rufino et al., 2022) and, over time, may expose individuals to more severe emotional problems (Soler-Gutiérrez et al., 2023).

How does emotion regulation occur and develop? As early as 1998, Gross and his research team adopted a process perspective on emotion regulation, defining it as the process by which individuals influence what emotions they have, when they have them, and how they experience and express them. In 2001, they formally proposed the Process Model of Emotion Regulation, which posits that emotion regulation operates around key time points before and after emotion generation. This model was the first to advance the timing of emotion regulation intervention, emphasizing the temporal course of regulation prior to emotional responses. The model divides the emotion regulation process into five sequential steps: situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross, 2001). Upon its introduction, the model received widespread attention and recognition in the academic community, spawning numerous empirical studies built upon its framework (Salas et al., 2019; Yuan et al., 2021).

In 2015, based on accumulated empirical evidence and theoretical considerations, Gross and his team refined the Process Model of Emotion Regulation and proposed the Extended Process Model of Emotion Regulation, which divides emotion regulation into three stages: identification, selection, and implementation (Gross, 2015). The model suggests that different emotion regulation strategies are initiated or terminated based on evaluative outcomes. That is,

grounded in the assumption that emotions are evaluable, the model posits that emotions can be distinguished as "beneficial to me" or "detrimental to me," thereby determining whether regulation is needed. Over twenty-five years of revision and refinement, the model has developed three prominent characteristics: the morphological structure of emotion regulation has expanded from linear to cyclical, the implementing agent has broadened from individual to group-based, and regulation strategies have advanced from single to polyregulation. Concurrently, three corresponding research themes have emerged: emotion regulation flexibility, group-based emotion regulation, and emotion polyregulation. This article first clarifies the main tenets and developmental evolution of Gross's emotion regulation process theory in chronological order of their proposal. Next, it focuses on introducing empirical advances in the three research themes mentioned above. Finally, it summarizes and prospects future development trends of the theory.

The Developmental Evolution of Gross's Emotion Regulation Process Theory

2.1 The Morphological Structure of Emotion Regulation: From Linear to Cyclical

According to the core tenets of the Process Model of Emotion Regulation (Gross, 2001), emotion regulation is considered a process that develops linearly over time, hence termed the linear model. Following the chronological sequence of operation (as shown in the dotted-line box of Figure 1 [Figure 1: see original paper]), emotion regulation can be divided into five steps: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. The first four steps constitute antecedent-focused emotion regulation, occurring between the acquisition of emotional cues and the generation of emotional response tendencies; response modulation constitutes response-focused emotion regulation, occurring between the generation of emotional response tendencies and the execution of emotional responses. Notably, these five steps correspond to five categories of emotion regulation strategies. For example, cognitive reappraisal belongs to the cognitive change category, while expressive suppression belongs to the response modulation category (Gross & Thompson, 2007; Gross, 2015). Gross and Thompson (2007) further clarified the specific entry points through which emotion regulation influences emotion generation in the linear model (as shown in the dashed-line box of Figure 1), namely situation, attention, appraisal, and response, describing the temporal course from acquiring emotional cues to generating emotional responses. Specifically, the emergence of a situation is the first step in emotion generation. Here, a situation can be either a feature of the external environment (e.g., a hunter with glaring eyes chasing me with an axe) or the activation of an internal representation (e.g., feeling that one might be chased by someone with an axe). Individuals engage with these situations while evaluating their significance for current goals. These situation-based appraisals lead to changes in experiential,

behavioral, and physiological response systems, signifying emotion generation. Meanwhile, researchers emphasize the feedback effect of responses on situations, and the closed loop formed by these four factors can cycle multiple times, which inspired the subsequent cyclical model (Gross, 2015). McRae and Gross (2020) incorporated monitoring into the linear model (as shown in the dash-dotted box of Figure 1), emphasizing its important role in the identification (whether to regulate emotion), selection (which strategy to use), and implementation (executing specific methods suitable for the current situation) of emotion regulation, as well as its significance for the overall success of the emotion regulation cycle.

Figure 1 The Development of the Process Model of Emotion Regulation (Linear Model)

However, the Process Model of Emotion Regulation cannot explain when emotion regulation strategies should be initiated or terminated. Therefore, the Extended Process Model of Emotion Regulation (Gross, 2015) adopted a cyclical structure to specifically describe and explain the role of emotion regulation strategies in emotion generation and development. This model assumes that emotion involves appraisal and forms a cyclical structure through the evaluation system in emotion regulation ("W"-"P"-"V"-"A", as shown in the solid-line box of Figure 2 [Figure 2: see original paper]) and the interactions between evaluation systems (as shown in the dash-dotted box of Figure 2). Specifically, "W" (World) refers to external situations or internal feelings that can evoke emotions; "P" (Perception) is the perception of the world; "V" (Valuation) is the evaluation of the world as beneficial, harmful, or irrelevant, involving the representation of the world's actual state versus its target state; "A" (Action) is the emotional response that may follow evaluation. This constitutes the first-order evaluation system, forming the first layer of cyclical structure, corresponding to the situation, attention, appraisal, and response structure in the Process Model of Emotion Regulation. Meanwhile, the first-order evaluation system can serve as the "W" for another evaluation system, receiving a new round of evaluation and thus forming a new cycle, which is the second-order evaluation system. This system can be divided into three independent but functionally coupled cyclical evaluation systems, corresponding to the three different stages of the emotion regulation cycle: identification, selection, and implementation.

The second-order evaluation system influences the first-order evaluation system that generates emotions in five ways: changing the situations people will encounter, changing one or more aspects of the external world, influencing which parts of the world are selected for perception, changing people's cognition of the world, and modifying emotion-related actions. These five ways correspond to the five categories of emotion regulation strategies mentioned earlier. The first-order evaluation system (emotion generation) evolves based on the spiral development of the second-order evaluation system (emotion regulation). When the discrepancy between the world's actual state and target state in initial evaluation exceeds the appraisal threshold, the evaluation system becomes active, forming interactions that continuously initiate the next evaluation cycle, and

emotion regulation begins. When the discrepancy falls below the appraisal threshold, the evaluation system becomes inactive, the cycle ceases, and emotion regulation stops (Gross, 2015). To more concretely illustrate the interaction between evaluation systems in emotion regulation, Ford and Gross (2018) proposed that individuals also engage in higher-level monitoring processes during emotion regulation. The task of this process is to anchor each evaluation system, determine regulation needs, select regulation strategies, implement regulation strategies, and monitor whether the overall regulation process is successful.

Eldesouky and Gross (2019) further described emotion regulation as a process of activating goals to drive changes in unfolding emotional responses, where the monitoring process determines whether to maintain, shift, or cease regulatory efforts, tracking the progress of emotion regulation goals.

The notion that cyclical evaluation processes exist in emotion regulation has been gradually validated. Researchers have verified the identification, selection, and implementation stages and the monitoring process of emotion regulation by isolating and evaluating the selection, use (Blanke et al., 2020; Shi, 2020), and switching (Parsafar et al., 2019) of emotion regulation strategies. Among these, the emotion regulation monitoring paradigm is considered effective for simulating the monitoring process in the Extended Process Model of Emotion Regulation (Murphy & Young, 2020). Research has found that under high-intensity stimuli, individuals tend to maintain or switch to distraction strategies, whereas under low-intensity stimuli, they tend to maintain or switch to reappraisal strategies (Dorman et al., 2019; Zhang, 2021). That is, individuals can flexibly choose to maintain or switch strategies based on the intensity of emotional stimuli, further confirming that in the emotion regulation process, individuals conduct new perception "P" and evaluation "V" along with changes in the world "W" and make new responses "A" to achieve ultimate adaptation. Additionally, some complex emotions (e.g., craving, Giuliani & Berkman, 2015) or abnormal states (e.g., gambling disorder, Rogier & Velotti, 2018) can also be explained through the Extended Process Model of Emotion Regulation.

2.2 The Implementing Agent: From Individual to Group-Based

[Figure 2: see original paper] The Development of the Extended Process Model of Emotion Regulation (Cyclical Model)

The Process Model of Emotion Regulation and the Extended Process Model of Emotion Regulation describe individual emotion regulation characteristics, involving the perception and evaluation of one's own situation. However, when individuals are in group contexts, what characteristics emerge in emotion generation and regulation? This question has also attracted research interest from Gross's team. In 2016, Goldenberg et al. proposed the Process Model of Group-Based Emotion Regulation, which posits that group-based emotion is an emotional response to a commonly experienced situation when an individual identifies as belonging to a specific group. For example, if you are a fan of the Argen-

tine national team, the intense positive emotion you experience when Argentina wins the World Cup is a group-based emotion arising from your identification with the group of Argentine team fans. Meanwhile, members in a group regulate other members' emotions to change the latter's perceptions of the group and subsequent behaviors. Therefore, depending on the agent, group-based emotion regulation can be divided into internal emotion regulation (individuals regulating their own group-based emotions) and external emotion regulation (individuals regulating other group members' emotions). The latter can be further divided into intergroup emotion regulation (group members regulating outgroup members' emotions) and intragroup emotion regulation (group members regulating ingroup members' emotions) (Goldenberg et al., 2016). Currently, empirical research based on this model in the aforementioned areas is emerging in large numbers. For instance, research on internal emotion regulation has found that when individuals categorize themselves as belonging to a group, their internal emotion regulation changes. Compared to solitary environments, football players in group contexts report fewer positive emotions, more restricted emotional expression, and fewer opportunities for emotion regulation (Jones & Memmert, 2019). Research on intergroup emotion regulation has found that the more individuals identify with their own group, the more motivated they are to regulate outgroup members' emotions to achieve ingroup goals (Netzer et al., 2020). Research on intragroup emotion regulation has found that individuals who identify with their group in a narcissistic manner tend to use manipulative and malicious ways to regulate others' emotions (Molend et al., 2023).

This model holds that group-based emotion regulation strategies are not categorically different from individual-based emotion regulation strategies. However, due to differences in how various intragroup and intergroup interactions function in the environment, each strategy category is endowed with new connotations. Take situation selection as an example: individuals may not know which internal representation to select to better elicit group-based emotions; but if collective rituals such as football matches occur or national anthems are played (as shown in Figure 3 [Figure 3: see original paper]), group-based emotions are easily evoked. Therefore, compared to selecting an internal situation that easily generates group-based emotions, selecting an external situation that easily generates group-based emotions is more convenient and efficient (Zheng et al., 2020; Liu et al., 2022).

2.3 Regulation Strategies: From Single to Polyregulation

[Figure 3: see original paper] Comparison of Individual-Based and Group-Based Emotion Regulation Process Models

The proposal of the Emotion Polyregulation Extended Process Model primarily stems from researchers' observations of daily life and experimental investigations. Early empirical studies found that participants who experienced relatively fewer but more intense emotions in daily life used a greater variety of emotion regulation strategies (Barrett et al., 2001). Individuals use an average

of seven different emotion regulation strategies each time they regulate negative emotion (Heiy & Cheavens, 2014). In laboratory settings, when asked to use only one strategy to regulate their emotions, most participants still employed other strategies (Demaree et al., 2006). When subjectively experiencing higher levels of negative emotion toward the same stimulus (Wolgast et al., 2011) or facing relatively fewer but more intense emotional stimuli (Opitz et al., 2015), participants were more likely to report using multiple emotion regulation strategies. As early as 2001, Gross noted that individuals might use more than one emotion regulation strategy in daily life. However, considering the complexity of multiple emotion regulation strategies operating simultaneously, this was not addressed in the Process Model of Emotion Regulation. It was not until 2019 that Ford and colleagues from Gross's team, borrowing the prefix "poly-" used in psychiatry and medicine, proposed the Emotion Polyregulation Extended Model, defining polyregulation as an individual's simultaneous or sequential use of multiple strategies to regulate emotions arising from a single emotional event.

In theoretical perspective, this model shares the same lineage as the Extended Process Model of Emotion Regulation, holding that polyregulation can occur at various stages of the emotion regulation process: including identifying multiple regulation goals, selecting multiple strategy categories, and implementing multiple specific methods. The monitoring process operates at each stage, helping individuals determine regulation goal progress while also causing changes in emotion regulation goals, strategies, or methods. Specifically, the identification stage is responsible for identifying emotion regulation goals: the perception component "P" detects emotions; the valuation component "V" evaluates emotions to determine whether regulation is necessary; if the regulation value is high, the action component "A" will activate multiple emotion regulation goals. The selection stage is responsible for determining which strategies to use to achieve emotion regulation goals: the perception component "P" perceives multiple emotion regulation strategies; the valuation component "V" evaluates the value of these strategies based on features of the "W" (World) that may affect strategies (such as individual cognitive resources and emotion intensity); if multiple strategies receive sufficiently positive evaluations, the action component "A" will activate goals to use these strategies. The implementation stage is responsible for translating selected strategies into targeted methods: the perception component "P" perceives multiple methods; the valuation component "V" evaluates the value of these methods; if a given method receives a sufficiently positive evaluation, the action component "A" will activate the goal to use that method.

It is worth noting that for ease of understanding, Figure 4 [Figure 4: see original paper] depicts the Polyregulation Extended Process Model only for the case of a single emotion, activating one goal, using one strategy and one method, with only two branches at each stage. In contrast, polyregulation processes in individuals' real lives may be far more complex. For example, during an argument with a partner, a person may feel angry at the partner while also worrying about the future of the relationship, and may adopt different strategies to han-

dle these two emotions: using deep breathing (one specific method of response modulation strategy) to reduce their anger while simultaneously reframing the argument as an opportunity to strengthen the relationship (one specific method of cognitive change strategy) to reduce their worry.

Figure 4 Comparison of Emotion Regulation and Emotion Polyregulation Extended Process Models

Practical Applications of Gross's Emotion Regulation Process Theory

Based on the three major advances in Gross's emotion regulation process theory discussed above, three research themes have emerged: emotion regulation flexibility, group-based emotion regulation, and emotion polyregulation. Research in these three areas not only verifies the theoretical validity of Gross's emotion regulation process theory but also confirms the dynamic interactive nature of emotion regulation development. The following sections elaborate on the advances in these three research themes.

3.1 Exploring the Monitoring Process in Emotion Regulation and Advancing Research on Emotion Regulation Flexibility

The Extended Process Model of Emotion Regulation's emphasis on cyclical evaluation systems highlights the importance of the monitoring process in emotion regulation. The monitoring process is considered a process of evaluating and switching between multiple emotion regulation strategies (including selectable strategies and those not directly guiding current behavior) according to context (Boorman et al., 2011; Koechlin, 2016). Its success can be judged by whether the implemented strategy, after evaluation and selection, supports individuals in adaptively changing emotions and behaviors to meet personal and environmental demands (Sheppes et al., 2014; Koechlin, 2016). The proposal of this process has further propelled researchers to investigate the flexible use of emotion regulation strategies. Accordingly, McRae and Gross (2020) proposed that the monitoring process can promote emotion regulation flexibility—individuals flexibly and synchronously change strategies and select emotion regulation goals in response to environmental changes (Aldao et al., 2015; Wang et al., 2016; Zhang et al., 2017). Research examining emotion regulation flexibility from the monitoring process predominantly employs the emotion regulation monitoring paradigm. A criterion in such studies suggests that high emotion regulation flexibility is manifested when individuals gradually tend to switch to "low-involvement" strategies that consume fewer cognitive resources, such as distraction, as negative emotion intensifies, or gradually tend to switch to "high-involvement" strategies that consume more cognitive resources, such as reappraisal, as negative emotion diminishes (Parsafar et al., 2019; Zhang et al., 2022; Wang et al., 2023).

While the above emphasizes the influence of the monitoring process on emotion

regulation flexibility from a strategy perspective, evidence also exists from an emotion regulation goal perspective. Research has found that if individuals cannot achieve emotion regulation goals and obtain the most valuable emotions, they may experience meta-emotions—emotional reactions to one's own emotions (Mitmansgruber et al., 2009). Negative meta-emotions may trap them in negative emotional responses, preventing effortful emotion regulation. In such cases, emotion regulation becomes inflexible, and monitoring cannot help them escape these negative meta-emotions (Ford & Mauss, 2014), which aligns with the Extended Process Model's proposition that individuals monitor their own emotion regulation goal progress (Eldesouky & Gross, 2019). Additionally, Pruessner et al. (2020) argued that the three stages of the Extended Process Model and the monitoring process are closely related to cognitive control, and thus proposed a cognitive control framework for emotion regulation flexibility. They hypothesized that strategy stopping and switching depend on the shifting mode of cognitive control, supported by inhibition, updating, and shifting abilities; strategy maintenance depends on the shielding mode of cognitive control, supported by inhibition and updating abilities; and monitoring does not depend on a specific mode but is also supported by updating ability.

3.2 Distinguishing Group-Based Emotion Regulation and Analyzing Its Dynamics

As previously mentioned, group-based emotion regulation has the distinctive property that group members tend to regulate other members' emotions. When focusing on various strategies, it can be divided into internal emotion regulation and external emotion regulation, with the latter further divided into intergroup emotion regulation and intragroup emotion regulation (Goldenberg et al., 2016). Regarding internal emotion regulation, research has found that individuals' use of emotion regulation strategies is influenced by group members. For instance, individuals use more suppression strategies when others (especially non-intimate partners) are present (English et al., 2017; Gurera et al., 2022). Regarding external emotion regulation, research on intergroup emotion regulation mainly focuses on intergroup conflict (Levy et al., 2017) and intergroup reconciliation (Čehajić-Clancy et al., 2016). Research on intragroup emotion regulation is more extensive. Studies have found that individuals' group-based emotions have a stronger contagion effect on other ingroup members. For example, individuals' group-based emotions typically amplify the social effects of these emotions by influencing other ingroup members to experience the same emotions (Van Zomeren et al., 2004; Smith et al., 2007; Kwon & López, 2022). Additionally, individuals exhibit cognitive biases in their models of regulating other ingroup members' emotions. For example, individuals in intimate relationships believe that the higher the quality of their relationship, the more likely their partner is to use positive emotion regulation strategies (Eldesouky et al., 2017).

The above distinctions categorize group-based emotion regulation based on the agent and target of regulation. Next, we explore from the perspective of in-

teractions between emotion regulation agents and targets how their dynamic interplay causes changes in individual and group emotions and their impacts. Smith and Mackie (2015) argued that current research on group-based emotions mostly adopts a single "snapshot" approach that can only measure current emotions, neglecting the temporal dynamics of group-based emotions. Considering the dynamic nature of group-based emotions, research has found that sharing emotions with other group members causes these emotions to, in turn, affect group-related behaviors again, forming multiple cycles of emotional intensification among group members. This manifests as diffused, contagious, and accumulated group-based emotions among group members that subsequently enhance individuals' emotions (Mackie & Smith, 2018; Zheng et al., 2020). Additionally, group-based emotions can have positive or negative effects on group dynamics (Smeekes, 2015). Positive group emotions produce positive effects, such as promoting social integration and higher group task performance (Knight & Eisenkraft, 2015), while negative group emotions can sometimes also produce positive effects, which is related to the group's sensitivity to situational emergencies (Barsade & Knight, 2015).

3.3 Moving Beyond Single-Strategy Regulation to Advanced Exploration of Emotion Polyregulation

Ford et al. (2019) proposed the Emotion Polyregulation Extended Process Model, breaking away from the conventional approach of investigating one or several emotion regulation strategies and promoting research on emotion regulation strategy use patterns that more closely resemble daily life. Research has found that the choice to use a single strategy or switch between different strategies is influenced by personal preferences (Birk & Bonanno, 2016). Empirical studies in both daily life contexts and standardized laboratory environments support the simultaneous use of multiple emotion regulation strategies by individuals (Demaree et al., 2006; Heiy & Cheavens, 2014; Dixon-Gordon et al., 2015; Opitz et al., 2015). Based on differences in strategy use intensity and specific strategy combinations, researchers have identified nine emotion regulation profiles according to the range of strategies used in different situations (Grommisch et al., 2019). From 1 to 9, these are: multi-ER , situation selection & acceptance, situation modification, no ER, social sharing & situation modification, suppression & situation modification, suppression & ignoring, multi-ER , and social sharing.

Research exploring polyregulation effects has found that between-person use (i.e., on average, which strategies different people tend to use simultaneously) of more Adaptive Engagement strategies (including problem-solving, cognitive reappraisal, mindfulness) and within-person use (i.e., over time, which strategies any particular person tends to use together) of more Adaptive Engagement, Enhancement, and Behavioral strategies can improve emotions. Conversely, between-person use of more Aversive Cognitive Perseveration strategies (including worry, rumination, experiential avoidance) and within-person use of more

Disengagement strategies (including distraction, behavioral avoidance, expressive suppression) lead to emotional deterioration (Southward et al., 2020). Comparing the effects of using one versus multiple strategies, research found that after watching disgusting film clips, participants who used multiple strategies reported higher disgust levels than those who used a single strategy. This may be because using multiple strategies to cope with one stimulus itself indicates haphazard and erroneous emotion regulation; alternatively, simultaneous use of multiple strategies may weaken the emotion regulation effect of each individual strategy (Aldao & Nolen-Hoeksema, 2013). Lischetzke et al. (2021) also found that the more individuals worried about coronavirus, the more frequently they engaged in polyregulation.

4 Summary and Future Directions

In summary, Gross's emotion regulation process theory has achieved fruitful results over the past twenty-five years. Model development has evolved from the Process Model of Emotion Regulation to the Extended Process Model of Emotion Regulation, the Process Model of Group-Based Emotion Regulation, and the Emotion Polyregulation Extended Process Model. These three major theoretical advances have directly spawned three applied research themes: emotion regulation flexibility, group-based emotion regulation, and emotion polyregulation, while practical exploration has also driven theoretical development. Researchers have made progress on these three themes, but many questions remain for future in-depth investigation.

First, regarding the application of theoretical models to emotion regulation flexibility, existing research has primarily investigated emotion regulation flexibility from the perspective of strategy selection and use, establishing a criterion symbolizing high emotion regulation flexibility from the angle of cognitive resource depletion. However, this criterion has limitations, such as considering only the external factor of emotion intensity while neglecting individual internal differences. Therefore, future research has a long way to go in operationally defining high emotion regulation flexibility. Additionally, research has found that prolonged failure to achieve emotion regulation goals can trap individuals in meta-emotions, where the monitoring process of emotion regulation is also ineffective (Ford & Mauss, 2014). Future research could investigate emotion regulation flexibility from the perspective of emotion regulation goals, such as how strategy stopping, maintenance, and switching respond to the achievement of emotion regulation goals and what role the monitoring process plays in this.

Second, regarding the application of theoretical models to group-based emotion regulation, existing research has built models based on the Process Model of Emotion Regulation but has not yet integrated them into the Extended Process Model framework. That is, the processes of internal and external emotion regulation of group members when regulating group-based emotions remain unclear. Therefore, future research should strengthen the integration of the Extended Process Model and the Process Model of Group-Based Emotion Regulation to

explore the applicability of Extended Process Model theoretical perspectives in group-based emotion regulation. For example, whether group members are still influenced by their own monitoring process when regulating their own emotions or others' emotions, and what the underlying mechanisms are; and whether emotions of other ingroup members or outgroup members affect the three stages of individuals' emotion regulation processes and the monitoring process.

Third, regarding the application of theoretical models to emotion polyregulation, previous research has mainly involved verifying the application of emotion polyregulation theory in daily life and evaluating the effects of emotion polyregulation. Laboratory studies have found that the emotion regulation effect of polyregulation is inferior to that of single-strategy use, suggesting that simultaneous or sequential use of multiple strategies resembles a "desperate attempt" behavior with poor effectiveness. However, as exploration of emotion polyregulation is still in its preliminary stage, current research findings are not abundant. The stability and generalizability of this conclusion require further investigation, and the reasons for this conclusion also need in-depth exploration in future research. Additionally, there is currently no experimental paradigm that precisely reflects emotion polyregulation. Future research should propose experimental tasks suitable for investigating emotion polyregulation based on integrating existing studies.

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Note: Figure translations are in progress. See original paper for figures.