Appraisal Dynamics:

A Predictive Mind Process Model Perspective

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Acknowledgement

This work was supported by a postdoctoral fellowship from the Research Foundation Flanders (1202119N) awarded to Jonas Everaert and Estonian Research Council grant PSG525 awarded to Andero Uusberg.

Abstract

The dynamic updating and revising of appraisals affords a crucial measure of flexibility to emotion processing from emotion generation through emotion regulation. However, much remains to be understood about the specific computations underlying appraisal shifts in iterative cycles of emotion generation and emotion regulation. In this chapter, we argue that a predictive mind process model perspective, constituted by predictive coding and active inference accounts, can help to clarify when and how appraisals are updated and revised. We start with a brief overview of basic concepts underlying the extended process model of emotion regulation and the predictive mind perspective. Next, we recast the extended process model in predictive terms, yielding a novel framework for understanding appraisal as well as reappraisal. We finish by outlining implications of this framework for understanding temporal dynamics of emotion and emotion regulation as well as individual differences and clinical phenomena.

Chapter

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The way people cognitively appraise the motivational meaning of a situation shapes the type as well as intensity of their emotional responses (Ellsworth and Scherer 2003; Lazarus 1991). It also provides a pathway for regulating these responses (Uusberg et al. 2019; Yih et al. 2019). This latter point is important because as emotions come and go, the individual experiencing these emotions often evaluates them as being either helpful or unhelpful, pleasant or unpleasant. People may wish that an emotion such as joy would linger on, or that an emotion such as sadness would pass more quickly. As a result, people regularly try their hand at -- and often succeed in -- altering their emotions.

The process of appraisal involves weighing different aspects of a situation against idiographic goals on a relatively small set of appraisal dimensions to optimize one's response to situational demands (Kuppens 2013; Mehu and Scherer 2015). Commonly proposed appraisal dimensions (Moors et al. 2013; Scherer 2001) include *relevance* (the importance of a situation to the individual's goals), *congruence* (the helpfulness of a situation with respect to these goals), *likelihood* (the certainty about the current status and future prospects of the situation), *agency* (the attribution of accountability for the situation), as well as problem- and emotion-focused *coping potential* (the control or power to change the situation). The appraisal process produces a pattern of evaluations along such dimensions that shapes the nature of the emotional episode (Gross 1999; Koole 2009).

Because situations and goals evolve over time, people need to *update* their appraisals to reflect such changes. For instance, a charging dog in a park can initially be appraised as threating and then as benign once it becomes clear that it is on a leash. People also *revise* their appraisals in order to meet emotion regulatory goals. The dog on a leash can be re-appraised as threatening in order to justify one's outburst of anger at the owner. The dynamic updating and revising of appraisals afford flexibility to emotion as a process from generation to regulation. While recent contributions have started to consider appraisal dynamics (Mehu and Scherer 2015; Uusberg et al. 2019; Yih et al. 2019), much remains to be understood about the specific computations underlying appraisal shifts in iterative cycles of emotion generation and regulation that both shape and are shaped by environmental and goal-related changes.

In this chapter, we argue that 'predictive coding' and 'active inference' accounts, collectively

constituting a predictive mind process model perspective, can help to clarify when and how appraisals are updated and revised. We start with a brief overview of basic concepts underlying the extended process model of emotion regulation and the predictive mind perspective. Next, we recast the extended process model in predictive terms yielding a novel framework for understanding appraisal as well as reappraisal. We finish by outlining implications of this framework for understanding temporal dynamics of emotion and emotion regulation as well as individual differences and clinical phenomena.

1. The Extended Process Model (EPM) of Emotion Regulation

The EPM views emotion generation and regulation as arising from interacting valuation systems that output actions for achieving desired states based on perceptual input (Gross 2015; Sheppes et al. 2015). As depicted in Figure 1, the EPM envisions valuation systems as a cascade of processes with four key steps. These are: the current state of the internal or external World (W), perception of that world (P), appraisal or valuation of these perceptions in relation to goals (V), and actions selected to reduce any discrepancy between the goal states and perceived state of the world (A). The World-Perception-Valuation-Action (WPVA) cycles operate iteratively enabling an individual to adaptively respond to changing goals and environments.

Within the EPM, emotion generation is viewed as a first-level WPVA cycle. During this cycle, a person monitors the current situation (W_1), perceives the situation while attending to potentially significant aspects of it (P_1), and appraises these aspects in light of goals (V_1). The resulting appraisals produce a coordinated set of experiential, physiological, and behavioral responses that constitute an emotional response (A_1). For example, the emotion of dissatisfaction may arise when a person delivers a presentation at a conference (W_1), allocates attention to members of the audience who are frowning or looking on their smartphones (P_1), appraises the situation as a missed opportunity to make a good impression (V_1); and feels as well as expresses sadness (A_1).

Emotion regulation is viewed in the EPM as a second-level $WPVA_2$ cycle that modulates the first-level emotion-generating $WPVA_1$ cycle. The emotion-regulation $WPVA_2$ cycle takes the state of the emotion-generation $WPVA_1$ cycle as its input (W_2). Within the second-level cycle, a person perceives and attends to the current emotional state (P_2) and compares it to a desired emotional state (V_2). When there is a sufficiently large discrepancy between perceived and desired emotion, a person may initiate

regulation strategies to modulate the state of the first-level system (A_2). These regulation strategies may change subsequent iterations of the first-level emotion-generative $WPVA_1$ cycle by intervening at one or more of its steps. Emotion regulation may influence emotion by *changing* which *situations* are encountered or how they unfold (W_1), *changing* which aspects of the situation are *attended* by reallocating attention resources between emotionally relevant and irrelevant aspects of a situation (P_1), *changing* how a situation is *appraised* by altering how it is construed or which goals it is compared to (V_1), or *changing* the emotional *response* by influencing its experiential, physiological, or behavioral components (A_1). This second-level $WPVA_2$ cycle is repeated until the discrepancy between perceived and desired emotion is sufficiently reduced or the goal to reduce it is abandoned. The cycle may involve processes that operate automatically to influence which emotions are experienced and only require few iterations. Alternatively, the cycle may involve deliberate attempts to find and successfully deploy a strategy, resulting in slower emotion regulation (Webb et al. 2015).

2. The Predictive Mind (PM) Perspective

A number of models and theories are beginning to coalesce into an overarching perspective that highlights the role of predictive processes in understanding not only perception and action but also cognition and emotion (Barrett and Simmons 2015; Clark 2013; Friston 2010; Seth 2013). At the heart of the predictive mind (PM) perspective is the idea that the mind builds mental models of the external and internal world and uses these models to recognize what it senses, how to think about it, and how to act upon it. Relating different functions of the mind to a common computational theme allows the PM perspective to characterize perception and action using a single set of concepts such as mental models, sensory data, precision, prediction errors, and error minimization (Seth 2013; Uusberg et al. 2020).

The *PM account of perception* (i.e., predictive coding or predictive processing) assumes that the mind implements empirical Bayesian hypothesis testing and updating cycles to produce increasingly accurate models of the world (Clark 2013; Friston 2010). Prior experience has equipped the mind with mental models of the world (*priors* in Bayesian statistical terms, beliefs in cognitive psychology terms) that can be used within a context to generate predictions about sensory data and, in effect, to explain these data in terms of their causes (Friston et al. 2006). Predictions derived from mental models are tested against sensory data yielding a discrepancy measure: a prediction error. Large prediction errors provide

corrective feedback that can be used to update mental models until one is found that minimizes the prediction errors (Barrett and Simmons 2015). Small or non-existent prediction errors thus function as evidence that a mental model is an accurate representation of the world. Mental models that yield the smallest prediction errors in relation to current sensory input populate our perceptual reality.

According to the predictive mind perspective, the mind continuously strives to minimize prediction errors. The degree to which mental models are updated in this process depends on the precision of the model relative to the data. Precision refers to certainty, or the probability with which the mind takes the mental model or the sensory data to be reliable representations of reality. Prediction error minimization is governed by precision weighting whereby more credit is given to more reliable information sources and noisy sources are down-weighted. If a mental model is represented as highly precise, then it will be adjusted only slightly even in the presence of conflicting sensory data yielding a prediction error. Conversely, if the model thought to have low precision, then it will be updated in the direction of the sensory data.

The *PM account of action* (i.e., active inference) suggests that the same constructs of mental models, prediction errors, and error minimization are instrumental for controlling goal-directed behavior (including behavioral components of perception). According to this view, actions produce changes to the world that minimize another version of prediction errors: discrepancies between how the world is and how it is requested to be by the action control system (Friston 2010; Friston et al. 2016; Seth 2013). Actions are taken to be represented in the mind not merely as collections of motor commands, but as collections of predicted sensory consequences of motor commands, or action outcomes. This allows action control systems to compute errors between predicted action outcomes and desired states of the world. For instance, a driver wishing to turn left can use her prior experience to predict the outcomes of turning the steering wheel to the right and to the left, observe the discrepancies between each action and the desired state of the car moving leftwards, and proceed with turning the steering wheel to left given its smaller action outcome prediction error. Different actions can thus be evaluated based on their capacity to minimize action outcome prediction errors until an action is found that gets closest to realizing the desired state in the world (Adams et al. 2013). Predictive action control enables the mind to flexibly initiate successive actions across the motor hierarchy that are tuned to overcome discrepancies between the

current state and the desired state of the world.

3. A Predictive Mind Process Model Perspective

We propose that the PM framework helps to characterize key computations that are involved in the *updating and revising of appraisals* during Valuation after receiving new information within both first-level and second-level WPVA cycles. As the internal and external environment continuously changes ($W_{1.1}$ -> $W_{1.2}$), people must update their mental models of the World by selecting relevant features of the environment for further processing ($P_{1.1}$) and then appraising the perceived input ($V_{1.1}$). New information ($W_{1.2}$) that enters the perceptual system ($P_{1.2}$) may be consistent or inconsistent with the initial appraisal ($V_{1.1}$) and either rejected or integrated into an updated appraisal ($V_{1.2}$). This has the potential to generate dynamics within emotional responses ($A_{1.1}$ -> $A_{1.2}$) that shape the way people behave, leading in turn to changes to the internal and external environment. At times, the unfolding emotion-generative process may instigate parallel second-level multi-stage emotion regulation WPVA cycles that serve to modulate the first-level cycles. Within both cycles, mental models are continuously compared against new information that becomes available when situations and emotions dynamically unfold over time.

Novel insights into the iterative unfolding of emotion generation and regulation can be gained from realizing that the processes that connect different steps of WPVA cycles are well characterized by the predictive mind perspective. Specifically, we argue that each link in the W to P to V to A to W cycle can be thought of as a prediction error reduction process, either of the perceptual or action kind. Perceptual prediction error reduction enables valuation systems to generate a stable representation (P) of their input (W). Likewise, action prediction error reduction enables valuation systems to control behavior so that a requested action (A) has an impact on the world (W). As the W to P and A to W links within valuation systems correspond, respectively, to perception and action control, our proposal thus far simply re-states the core premises of the predictive mind perspective. Our proposal goes beyond existing accounts by offering a predictive mind perspective of appraisal processes. Specifically, we suggest that *appraisal involves both perceptual and action aspects that can be thought of as the P to V and V to A links within WPVA cycles of emotion generation and regulation, served respectively by perceptual and action predictive error reductions*. Figure 1 shows the perception and action PM components of appraisal

within the WPVA cycle.

Perceptual error minimization links P to V in the WPVA cycle by representing the motivational meaning of the perceptual construal (P) of the world using a relatively abstract appraisal (V). A pattern of evaluations on appraisal dimensions can be viewed as a relatively abstract mental model that represents the core relational themes within the situation. Core relational themes refer to broad kinds of person-environment relationships in terms of their motivational meaning, such as harm, benefit, threat, loss or helplessness (Lazarus 1991; Nezlek et al. 2008; Smith and Lazarus 1993). As such, these appraisals represent functional dimensionality reduction processes, distilling the motivational essence of a situation.

We suggest that core relational themes become activated as the P to V step within a WPVA cycle compares predictions derived from candidate themes with perceptual construals of the situation (rather than raw sensory input). For instance, a situation construed as “a dog charging at me” aligns with predictions from an abstract appraisal of “a threatening situation”. Prediction error between appraisal patterns and construals are then used to either settle on an appraisal pattern or alter it, depending on the precision afforded to the construal and the appraisal pattern based on prior experience. More precise perceptual information will shift the appraisal outcome toward the construal. For instance, clearly seeing that the dog is on a leash reduces the threat appraisal. By contrast, more precise appraisal patterns will shift the appraisal outcome toward the activated core relational theme. For instance, prior experience with dogs escaping their leash maintains the threat appraisal. This appraisal-feedback process stabilizes once probable core themes have been inferred from perceived input.

Moreover, *action error minimization links V to A in the WPVA cycle* by translating the motivational properties of appraisals (V) into action tendencies (A) that can go on to affect the World (W). Appraisal patterns are higher-order semantic models that help explain the world that also function as relatively abstract goals. For instance, appraising a situation as threatening also functions as a goal to somehow neutralize the threat. Each appraisal dimension may encompass a different higher-order goal: motive relevance may encompass a desire for immediate rather than delayed action, and self-accountability may lead to a desire to change oneself rather than others (Roseman 2013). Appraisal (V) thus provides desired end states that are translated by lower-order action prediction error reduction processes into more situation-specific action tendencies (V to A) (Eder and Rothermund 2013). Given a desired end

state, different action options are evaluated with respect to their predicted capacity to minimize the mismatch between the current and the desired state. This comparison produces a prediction error that affects the value of an action option (Ridderinkhof, 2017). This valuation of action optimizes the selection of the action (A) that is adequate to accomplish the changes in the world (W) and reach the desired end state prescribed by appraisal (V).

Casting the P-V and V-A steps of the WPVA cycle, and the appraisal processes within it, in PM terms has implications for the dynamic aspects of both emotion generation and regulation. At the first-level WPVA cycles, the initial valuation step forms an initial appraisal ($V_{1.1}$) by weighing perceptions ($P_{1.1}$) of salient features (e.g., a robber with a gun) of a particular situation ($W_{1.1}$, e.g., a bank robbery) and activated core relational themes (e.g., facing an uncertain, existential threat). When situations are new to people, their initial appraisal may be particularly driven by the activated core relational theme because the precision of construal has not yet had time to accumulate. The initial appraisal $V_{1.1}$ in turn shapes emotional responses ($A_{1.1}$) such as feelings (e.g. anxiety), action tendencies (e.g. to flee), and attention allocation to anticipated features (e.g., look at and attend to the robber to determine whether he/she is carrying a gun).

Attention allocation, as an epistemic action, is particularly instrumental in guiding appraisal and emotion dynamics. As appraisals of relevance as well as uncertainty function as a goal to gain more information (e.g., assess the current exposure to threat), information sources that are anticipated to provide more precise information (e.g., the hands of the robber) are preferentially sampled, while those that are expected to provide imprecise information (e.g., the feet of the robber) are ignored (Maratos and Pessoa 2019; Parr and Friston 2018). The resulting new perceptions ($P_{1.2}$, e.g., the robber is unarmed) of the world becomes data that is compared with the initial appraisal ($V_{1.1}$). Prediction errors between the initial appraisal $V_{1.1}$ and new construal ($P_{1.2}$) are resolved through precision weighing to determine the extent to which the initial appraisal is updated. The resulting appraisal ($V_{1.2}$) will again modulate the elicited emotional response (e.g., relief) and guide attention allocation to relevant stimuli ($A_{1.2}$), which in turn influences what is sensed from the World ($W_{1.3}$), etc.

At the second-level WPVA cycles, the emotion generated by the first-level WPVA cycle is first represented using perceptual prediction error minimization. Specifically, an emotion concept ($P_{2.1}$, e.g.,

anxiety) is activated that can predict with minimal errors the interoceptive and meta-cognitive information available about the current emotion ($W_{2.1}$, e.g., sympathetic arousal coupled with unpleasant feeling). Next, perceptual prediction error minimization is also used to relate the represented emotion to more abstract mental models of the motivational meaning of emotional states, or "emotion relational themes" ($V_{2.1}$; e.g., anxiety can impair judgement and should be lowered; Tamir and Millgram 2017). This suggests that the adaptive dynamics of emotion regulation depend on the availability of sufficiently granular mental models to represent the ongoing emotional states and their motivational meaning (Kashdan et al. 2015). The second-level WPVA cycle proceeds by using action prediction error minimization to select and implement a regulatory action. In the V to A step, the predicted outcomes of regulatory action options are compared to the desired change in emotion inherent in its motivational meaning ($V_{2.1}$; e.g., reduce anxiety to a more manageable level). The regulatory action promising the largest extent of error minimization ($A_{2.1}$; e.g., do a deep breathing exercise) is selected and then implemented in the A to W step with the aim of producing changes to the first-level emotion-generative system ($W_{2.2}$; e.g., attenuated sympathetic arousal coupled with less unpleasant feeling).

Within the PM perspective on WPVA cycles, perceptual and action PM processes are intimately related as they continuously interact over time (see Figure 1). Perception PM processes provide input for action PM processes, which in turn, through producing changes to the world and to the emotion, shape the input for perception PM processes. Appraisal processes serve as a hub between perception and action PM. They do this by enabling the engagement of relatively abstract models of key features of the situation and of the emotion and preferentially linking these to relatively abstract models of actions that will bring the state of the world and the state of the mind into alignment with desired state. In this way, appraisal processes involved in emotion and emotion regulation play a critical role in integrating and coordinating perception and action to guide inference and learning.

4. Implications for Understanding Temporal Dynamics of Emotion and Emotion Regulation

The PM perspectives on perception and action during WPVA cycles of emotion generation and regulation help to explain how appraisal relates to temporal dynamics of emotion and emotion regulation. At the level of *emotion*, perceptual and action PM mechanisms may account for specific patterns of moment-to-moment *emotion dynamics*, including emotional inertia and instability. At the level of *emotion*

regulation, perceptual and action PM mechanisms may account for specific patterns of moment-to-moment *emotion regulation dynamics*, including emotion regulation inertia and instability (which, in turn, shape emotion dynamics). In what follows, we consider each of these ideas in turn.

At the level of *emotion*, emotional inertia refers to increased moment-to-moment predictability of emotional states across time and situations (Kuppens et al. 2010). Inertia of emotions may occur when greater precision is afforded to prior models compared to the perceptual input (i.e., *strong prior model hypothesis*). Highly precise predictions derived from core relational themes (e.g., low coping potential in situations of danger or threat) may shift the appraisal process toward the model. An overreliance on prior models will result in a high level of stability in appraisal patterns over time at the cost of integrating perceptual evidence sampled from the world. Consequently, appraisals lose their adaptive sensitivity and may consistently elicit similar emotions regardless of important nuances in the context (Mehu and Scherer 2015).

Action PM processes may further reinforce this pattern of rigidity in emotional responding over time in two ways. First, the stable appraisal outcome may set the stage for active perceptual inferences that increases the likelihood of generating perceptual input that is consistent with the model (e.g., by guiding attention to particular cues). Highly precise models may thus guide perceptual behavior to the detriment of new observations and prediction errors that would correct the model's predictions during perceptual PM, as such fueling emotional inertia. Second, the stable appraisal outcome may also generate stable action tendencies across slightly different situations that nudge these situations to unfold in a converging manner (e.g., an aggressive action tendency escalates interpersonal conflict). Highly precise appraisal models may thus also contribute to emotional inertia by shaping initially diverse situations to become more similar.

At the level of *emotion*, perceptual and action PM processes may also account for *emotional instability*, which refers to the magnitude of moment-to-moment emotional changes (Kuppens et al. 2010). Emotional instability may occur when there is an overreliance on sensory evidence (i.e., *weak prior model hypothesis*). The persistent prediction errors force internal models to change constantly based on situation-specific features of the current context. The internal model of situational appraisals lacks stability and does not progress toward a model that is able to predict and thereby explain the world. This instability

in the internal model may produce emotional responses that differ in magnitude each time the internal model is updated during WPVA cycles, resulting in emotional instability. The unstable nature of the models may render them less potent in informing model-guided perception toward relevant cues in the world during action PM. As a result, only limited model-congruent information enters perception to update the model during perceptual PM, instigating a vicious cycle.

At the level of *emotion regulation*, action PM determines which regulation strategy is selected by weighing the desired emotional state and the anticipated changes in emotion associated with a particular emotion regulation strategy. Beliefs about the malleability of (components of) emotions (Tamir et al. 2007) as well as by beliefs about the effectiveness of emotion regulation strategies may determine whether emotion regulation is attempted, and if so, may guide the selection of the optimal strategy to achieve the desired emotional state within a given context (Sheppes et al. 2014). For example, when someone believes that feelings of shame and anxiety are difficult to control once elicited, one may engage in efforts to avoid or escape the emotion-eliciting stimulus (e.g., avoiding particular places). The perceived effects of the regulatory attempt (i.e., the experienced (lack of) changes in emotion) will be compared to the model's predictions of the expected change in emotions. This discrepancy (prediction error) informs the system whether to keep using the selected strategy or change it to achieve the desired emotional state.

Highly precise expectations regarding emotion malleability and the effectiveness of the selected emotion regulation strategy (*strong prior model hypothesis*) may lead to emotion regulation inertia by discarding the actual data about the (lack of) change(s) in the targeted emotional state. Because the expectations are not brought into congruence with the perceived evidence, more rigid or inflexible patterns of emotion regulation strategy use could emerge. For example, when someone is convinced that thinking frequently about his/her feelings of sadness increases the understanding of one's problems, then this person will likely maintain repetitive negative thinking even though this strategy maintains negative affect. By contrast, when more precision is afforded to the perceived (lack of) change(s) in the targeted emotion (*weak prior model hypothesis*), it is more likely that such an integration of evidence and model's predictions encourages greater flexibility in selecting an emotion regulation strategy from the repertoire (Bonanno and Burton 2013). This is because valuations will shift more toward the experienced emotional state and the model including predictions of the effectiveness associated with the implemented emotion

regulation strategy will be adjusted. The updated model may inform switches in the selection of the emotion regulation strategy in subsequent WPVA cycles.

5. Implications for Understanding Individual Differences and Clinical Phenomena

This predictive mind view on appraisal dynamics has interesting implications for understanding sources of individual differences in temporal characteristics of appraisal, emotion, and emotion regulation. Personality traits and psychopathology are often associated with individual differences in tendencies to appraise situations, as such setting the stage for altered patterns of emotion and emotion regulation dynamics (Everaert et al. 2020; Gross et al. 2019; Kuppens and Van Mechelen 2007; Mehu and Scherer 2015; Scherer 2020).

Research on the relation between personality and appraisal tendencies suggests that neuroticism is related to a tendency to appraise situations as being negative and low in coping potential (Tong 2010, p. 20), whereas traits such as conscientiousness and agreeableness are related to tendencies to appraise situations as being negative and relevant to the individual's current goals (Scherer 2020). Furthermore, studies have shown that personality traits are meaningfully related to individual differences in decisions made during the identification, selection, and implementation stages of emotion regulation (Hughes et al. 2020). The proposed predictive mind perspective may shed light on how personality traits are linked to biased appraisal patterns and associated emotion and emotion regulation dynamics.

We propose that configurations of personality traits (e.g., high on neuroticism and low on extraversion) may be associated with lower activation thresholds of particular core relational themes (e.g., themes related to harm, danger, uncertainty, or threat). When activated, these core relational themes may receive higher precision compared to perceptual information, so that prediction errors are resolved by discarding (inconsistent) perceptual information. Over time, the overreliance on the model may set the stage for distorted emotion dynamics (e.g., inertia of negative emotions such as anxiety). In addition, personality variables may be associated with a particular set of beliefs about the malleability of emotional responses and efficacy of particular strategies (e.g., neuroticism may be linked to avoidance of potentially threatening situations), thereby skewing action PM processes serving the selection of emotion regulation strategy to alter the elicited emotional response. To explore these possibilities, future research could examine how personality traits are related to central concepts of the action and perception PM

perspective on appraisal dynamics.

Research on psychopathology has frequently documented that common disorders such as depression are associated with disturbances in emotion dynamics and emotion regulation strategy use. Depression has been linked to emotional inertia (Kuppens et al. 2010) and rigidity in the use of emotion regulation strategies such as rumination and dampening of positive emotions (Bean et al. 2020; Vanderlind et al. accepted). The action and perception PM perspective on appraisal dynamics provides a potential explanation for factors underlying this rigidity in emotion dynamics and emotion regulation. In particular, depression may be associated with highly precise prior models during perception PM (e.g., a core relational theme related to irrevocable loss) and action PM (e.g., beliefs that certain emotion regulation strategies are appropriate or effective to achieve a goal) so that inconsistent input is consistently ignored, instigating rigidity at the level of emotion and emotion regulation over time. We think that this PM perspective provides a valuable framework to investigate psychopathology-related individual differences in imbalances of weighing precisions of predictions and data to understand individual differences in maladaptive temporal dynamics of emotion and emotion regulation.

6. Concluding Comment

This chapter proposes that appraisal dynamics that at the heart of emotion and emotion regulation dynamics can be understood by linking the extended process model of emotion regulation with the predictive mind perspective. We illustrated how predictive coding and active inference explain the dynamic changes in appraisals based on prediction error, precision weighing, and error minimization through either updating predictions or performing actions that produce changes in line with predictions. Moreover, we argued that imbalances in precisions afforded to predictions versus data might explain how appraisal dynamics shape temporal dynamics of emotion generation and regulation. Finally, we elaborated on how the proposed predictive mind view could be leveraged to better understand personality and psychopathology as sources of individual differences in appraisal patterns, emotions, and emotion regulation. Future research should explore the utility of predicting coding and active inference accounts to model the (sources of) temporal dynamics of appraisal patterns, emotions, and emotion regulation.

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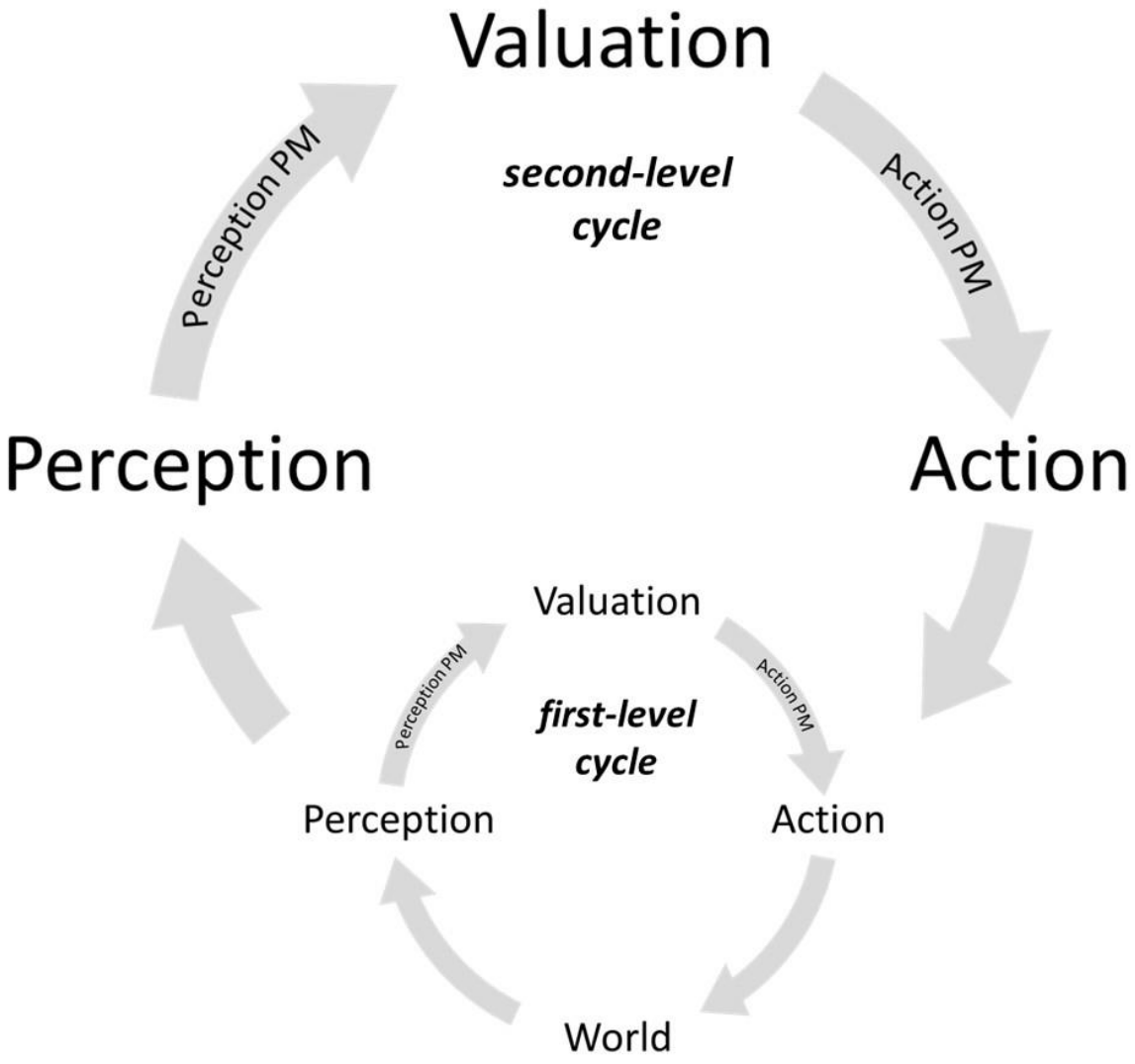

Fig. 1 The iterative process of appraising changing situations