3 Placing Emotion Regulation in a Developmental Framework of Self-Regulation

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INTRODUCTION

Self-regulation can be defined as a coordinated sequence of actions that individuals use to satisfy their personally significant concerns and motives. It encompasses a whole system of psychological functions such as motivation, perception, volition/emotion, and goal-directed behavior. However, individuals are not born with the ability to coordinate these functions effectively without social support; they are initially dependent on the monitoring and regulating interventions of caregivers and acquire increasing levels of self-regulation in the course of ontogenesis. Hence, the term “self-regulation” describes the developed ability of a person to carry out these regulatory interventions in their own motivation, perception, emotion, and behavior autonomously without depending on the support of others (see Carver, 2004; Vohs & Baumeister, 2004). When such regulatory interventions refer specifically to one’s own emotions, this is called emotion regulation (Campos, Campos, & Barrett, 1989; Campos, Frankel, & Camras, 2004; Cole, Martin, & Dennis, 2004; Gross & Thompson, 2007; Thompson, 1994). Hence, emotion regulation which a person applies to his or her own emotion can be understood as being just one particular form of self-regulation in the individual (see later).

This chapter discusses how emotion regulation should be viewed within a broader developmental framework of self-regulation, and how children manage to acquire the necessary competencies to engage in it. We shall start with an example:

Over the last few weeks, a family has built up a specific Sunday ritual. After lunch, the father puts his daughter, Saskia, who has just turned 2, to bed for her afternoon nap. While she is sleeping, he devotes all his attention to his 6-year-old son, Max, who has been looking forward to this all week. Today, they want to lay out the electric train set in the living room together. However, instead of falling asleep, Saskia begins—as she has sometimes done recently—to cry. She is so loud that the father feels obliged to break off play with Max, fetch Saskia from her bed, and sit her on the carpet in the living room. Saskia promptly stops crying, smiles at her father, and reaches out to play with the toy engine. The mild request to leave it alone only seems to encourage Saskia even more. This, in turn, annoys Max so much that he wants to wrest the engine from his sister. However, his father’s mild admonishment not to do that, but to simply offer her another toy in exchange, leads Max to pause and mutter, to think about it, and offer his sister a brightly colored automobile in exchange. The trick works, and Max smiles triumphantly at his father, delighted at how successfully they have managed to trick his sister again.

As the example suggests, very young children often have difficulties with advanced levels of self-regulation. As a result, they often need to solicit the help of others in order to satisfy their motives. Nonetheless, they do already possess the ability to “use” their caregivers for this with the help of their emotional expression. In this example, Saskia signals unmistakable distress, thereby
appealing to her caregiver to take care of her. Sensitive caregivers deduce their child’s current motive from her emotional expression within the given context, and then, as quickly as possible, perform those acts that will satisfy her motive vicariously. Hence, the main means for young children to gain satisfaction for their motives in the here and now is a clear emotional expression. Because “feeling a need” and “acting to satisfy it” are distributed across two persons, this type of regulation is called interpersonal action regulation by means of emotions. In contrast, 6-year-old Max already exhibits an autonomous or, in other words, an intrapersonal action regulation by means of emotions. The fact that his little sister takes his train away from him makes him angry with her, leading him to want to grab the toy back. However, this form of action regulation with the help of emotions will only succeed as long as complying with the action readiness triggered by the emotion does not have negative consequences (Saskia loses her toy and starts to cry again). In such a case, it is necessary to volitionally inhibit the direct emotional action readiness, to think beyond the immediate moment, and to be able to consider alternative ways of satisfying the higher ranking motive.

In this example, it is the father who practices this by proposing that Max should apply a strategy of distraction for his little sister. Max already understands how this strategy works, and he can therefore inhibit his impulse to aggressively get back the toy and apply the strategy successfully. However, he might not have thought of it by himself.

The need to develop different forms of human self-regulation results from the ways in which human beings organize their lives together in cultural communities. In every culture, the satisfaction of individual concerns and motives is embedded in a network of social and material relationships. The individual regulation of actions has to be reconcilable with the intentions of the other members of the social community. Accordingly, each culture subjects action to not only objective constraints but also handed down, traditional cultural norms and rules that ensure coordination with the motives of other people. These norms prescribe how the social coordination of individual motives should be performed and which individual freedoms are available for shaping them (Holodynski & Friedlmeier, 2006). As Vohs and Baumeister (2004) point out:

> Self-regulation is one of the most important factors in making it possible for human beings to live as they do. All cultures require self-regulation and punish its failure, even though they may differ as to what impulses must be regulated and when (or which) lapses may be permitted. (pp. 3–4)

Hence, the central ontogenetic task facing children is to learn to self-regulate their behavior, and one part of this developmental task is learning how to regulate their emotions by themselves. Within this developmental framework, the present chapter addresses the following two questions:

1. How can the special form of “emotion regulation” be located within the developmental framework of human self-regulation? We argue for a narrow understanding of the term “emotion regulation” (see later).
2. During the course of ontogenesis, which competencies contribute to the emergence of “emotion regulation,” that is, the ability to engage in a volitional regulation of one’s own emotions?

The first part of the chapter will describe the framework of self-regulation through four distinctly separable forms of regulation; namely, (a) volitional, (b) habitual, (c) emotional, and, finally, (d) reflective regulation. Only the last of these, the reflective form, refers to the competencies required to regulate one’s own emotions volitionally. This calls for comparable cognitive competencies to those necessary for the volitional regulation of actions and routines as currently being discussed in terms of the differentiation between hot and cool executive functions (see Zelazo & Cunningham, 2007).

The second part of the chapter reviews empirical findings showing which of the cognitive competencies acquired over the course of early childhood are necessary for the emergence of not
only a volitional regulation of actions but also a reflective regulation of one’s own emotions. Aspects of interindividual and cultural differences are not addressed.

**FORMS OF HUMAN SELF-REGULATION**

A host of experimental and observational studies in the different research traditions of developmental psychology, action research, cognitive science, neuroscience, and the psychology of emotions have addressed human self-regulation (Baumeister & Vohs, 2004; Bronson, 2001; Heckhausen & Dweck, 1998; Kopp, 1982; Sokol, Müller, Carpendale, Young, & Iarocci, 2010; Thompson, 1990; Winsler, Fernyhough, & Montero, 2009; Zivin, 1979). Their findings converge to reveal that self-regulation is not a single unified construct, but can be differentiated into at least four distinct forms (volitional, habitual, emotional, and reflective) (Campos et al., 2004; Carver, 2004; Neal & Wood, 2009; Strack, Deutsch, & Krieglmeyer, 2009). The features distinguishing between these four forms can be related to six psychological dimensions that we adopted from the self-regulation model of Carver and Scheier (1998). Although they used a very general cybernetic terminology, we think it is useful to describe the common psychological features of the four distinct forms of regulation:

1. **Reference value function.** Every form of regulation contains a reference value. This is the focus of the current action and is used to measure its success. Although the term “reference value” might suggest a continuous mathematical function, it is mostly better conceptualized in dichotomous and semantic terms of success and failure. It may be, for example, a future state that the individual is striving to achieve (or to avoid). Depending on the form of regulation, this reference value can be represented as a motive, a psychological value, a conscious goal, or a familiar routine.

2. **Input function.** Every form of regulation covers perceptions of the relevant conditions for attaining the reference value.

3. **Comparator function.** Every form of regulation involves a process of comparing currently perceived conditions with the reference value in order to decide whether it has been achieved or not.

4. **Output function.** Every form of regulation leads to behaviors that, as the outcome of the comparison process, should change conditions in order to come closer to the reference value (i.e., to approach the desired state or avoid the undesired state).

5. **Effect on the environment.** Every form of regulation has de facto effects on the situational conditions that are relevant for attaining the reference value.

6. **Who regulates?** In addition, from a developmental perspective, it is important to know who is involved in the regulation process—whether it is the child alone who is regulating him- or herself autonomously, or whether at least one more person is involved who is taking over parts of the regulation for a child who has not (yet) mastered it. This initial interpersonal regulation forms the bridge over which children pass to arrive at autonomous mastery of the single forms of regulation (Holodynski & Friedlmeier, 2006).

The next sections will explain in turn the single forms of regulation on their advanced level as they can be observed in older children and adults and relate them to the psychological functions described earlier. We describe their prototypical features in order to highlight their differences although we concede that they are intertwined in many everyday episodes. Nevertheless, we think that there is noteworthy evidence, especially from other domains of psychological research (e.g. the psychology of action and volition, see Morsella, Bargh, & Gollwitzer, 2009, or discussions on hot and cool executive functions, see Zelazo & Cunningham, 2007), that these four forms of regulation can be clearly distinguished in older children and adults. Some of them (the habitual, volitional, and reflective form) can be observed only from a certain age onwards and they develop their distinctive features only step by step (see later). We are convinced that these distinctions enable a sharpening
of the conceptual boundaries of the term “emotion regulation” again. This term has been overstretched to the point that almost every behavior that precedes or follows an emotion can be subsumed under the term of emotion regulation. Our narrower understanding of “emotion regulation,” however, is limited to the situational need to volitionally inhibit or modify an elicited emotion so that the dominant action readiness linked to the emotion is not enacted but replaced by a subdominant one (Campos et al., 2004; Zelazo, Qu, & Kesek, 2010; see later in the chapter for more details).

THE VOLITIONAL FORM OF ACTION REGULATION

The volitional form of action regulation is based on intentionally generated imaginings about a desirable future state toward which the current behavior of an individual is directed. The imagination functions as the goal of the action. Human activities on an advanced (!) level can be conceived of as chains of goal-directed actions that are interrupted only by the need for sleep (Gollwitzer, 1990; Goschke, 2003; Morsella, 2009).

Volitional Action Regulation as a Self-Regulating Feedback Loop

On an advanced level, the volitional form of action regulation takes the form of a feedback loop (Gollwitzer, 1990; Goschke, 2003; Morsella, 2009; see also Zelazo & Cunningham, 2007). Its single stages can be classified to the psychological dimensions mentioned earlier:

1. **Goal selection.** The individual selects a personally desirable goal (reference value) from a set of culturally available goals. During the selection process, emotions function as markers for desirable goals or goals to be avoided. At the same time, goal selection is also determined by an evaluation of the goal’s feasibility (input function; see Bayer, Ferguson, & Gollwitzer, 2003).

2. **Planning.** The transition to the planning stage is marked by a volitional decision to actually strive toward the goal (fiat tendency; see Gollwitzer, 1990; Gollwitzer, Fujita, & Oettingen, 2004). The individual plans the realization of goals by coordinating them with the anticipated social and material conditions (comparator function). Depending on the complexity of the selected goal (e.g., buying an ice cream or opening an ice cream parlor), such a “plan” can range from a simple action choice (buy an ice) to a highly complex hierarchically nested action plan (renting a shop, hiring staff, purchasing supplies, etc.).

3. **Realization.** The individual carries out the actions directed toward the goal under real conditions (output function).

4. **Evaluation.** The individual monitors the effectiveness of actions continuously, regulates them when necessary, or adjusts plans and goals (renewed input, comparator, and output function).

Necessary Competencies

In order to regulate one’s own actions volitionally beyond the here and now and consider desirable future states, individuals must be capable of freeing themselves from the given situational reference framework of their current action (e.g., eating a tasty ice cream in the here and now) and bringing to mind the reference framework of the desirable goal (e.g., opening an ice cream parlor). This ability to change the frame of reference is also described as psychological distancing (see Giesbrecht, Müller, & Miller, 2010). Vygotsky and Luria (1994) and also Piaget (1954) both view this competence as a basic precondition for volitional action control (see also Sigel, 1993). It is only through such ability that the individual becomes capable of focusing his or her action on the conditions of the desirable goal state and shielding this focus from the intrusive impact of the currently given situation (see also Bischof-Köhler & Bischof, 2007). In the example at the beginning of the chapter, 6-year-old Max understands that his intended aggressive act toward his sister will only lead to resistance rather than make her willingly hand over the fragile electric train engine. He may already
comprehend that he has to take into account also the wish of his sister to play with an interesting toy and to offer her an alternative funny toy in order to get back his train engine without further complications.

The ability to volitionally change the frame of reference for actions in one's mind and direct actions toward frames of references that are represented only mentally requires a series of competencies:

1. **Understanding the goal-directedness of actions** in order to be in any way able to learn and select suitable actions. Very young children do not possess this ability (Tomasello, Carpenter, Call, Behne, & Moll, 2005; Morsella, 2009).

2. **Using a symbol system such as language for a representation of a theory of mind** in order to represent goals, actions, and action conditions and to be able to volitionally select and plan goals on the basis of this knowledge that go beyond the actual situation given (Benson, 1997; Sodian, 2005). Normally, this symbol system is spoken language, but also sign language as used by deaf children can fulfill this function. It should be noted that there is an ongoing discussion about the role of language for the development of a theory of mind that—in our view—reveals striking evidence for the significance of language (see Schneider, Schumann-Hengsteler, & Sodian, 2005; Winsler, Fernyhough, & Montero, 2009).

3. **Mastering executive functions in relation to one's own actions and routines.** This includes a series of skills in being able to (a) direct attention volitionally and ignore intrusive but irrelevant stimuli, (b) control one's motor system in line with prescribed rules, (c) inhibit a currently dominant action impulse, (d) activate a subdominant impulse when the latter proves to be more in line with a goal, and (e) detect and correct mistakes in carrying out an action (Zelazo & Cunningham, 2007). Despite being interrelated, there is controversy over how far these aspects of executive functions are a unified psychological construct (Martin & Failows, 2010; see also later).

4. **Mental time travel.** As soon as individuals' goals lie beyond the immediate situational frame of reference, they require the ability to travel into the future and the past in their minds in order to temporally plan how to attain the goal and initiate its intermediate stages (see Bischof-Köhler, 2000; Haith, 1997; Suddendorf & Corballis, 2007).

5. **Mastering recurrent action-outcome chains in the form of routines.** The availability of such routines makes it possible to choose more complex goals and also attain them by oneself (see later).

6. **Planning actions.** As soon as several goals have to be realized at the same time and their attainment requires a series of smaller acts with nested content that cannot be performed as routines, individuals require the ability to plan the content and timing of sequences of actions, ensure that they remember which acts are planned at which time and in which places, and then carry them out accordingly (Benson, 1997; Friedman & Scholnick 1997; Gollwitzer et al., 2004).

**The Habitual Form of Action Regulation**

Many human actions make such complex demands on coordination and attention that an individual cannot control all their stages and facets volitionally. For example, when first learning to drive an automobile, the whole attention is taken up with technical tasks (accelerating, indicating, braking, steering), leaving hardly any remaining capacity for paying attention to other road users, signposts, danger signs, or even street names. However, learner drivers have to learn to pay attention to these if they are to become confident and careful drivers. Hence, in order to master complex action conditions simultaneously, it is necessary for sub-actions to become so overlearned that they can proceed as routines within more complex actions.
Such a habitual form of action regulation is based on learned stimulus–reaction routines (Eichenbaum & Cohen, 2001; Neal & Wood, 2009). A routine contains a fixed sequence of stimuli, behaviors, and their outcome. This sequence is so overlearned that even perception of the first stimulus can trigger the behavior coupled to it and also control its realization. Following the earlier example, a habitual driver has overlearned the route back home from work to such an extent that he can also carry out an intense conversation with his passenger. However, driving home has become such a routine that he may well completely forget during this conversation that he had urgently wanted to stop off and do some shopping on the way.

Habitual Action Regulation as a Self-Regulating Feedback Loop

Following Carver and Scheier’s (2009) dimensions (discussed earlier), the reference value in the habitual form of regulation is represented by the overlearned action outcome; the input function, by routine-specific cues; the comparator function, by the automatized linkage of reliably anticipated cues with appropriate movement sequences; and the output function, by the sequence of movements triggered. The last should elicit reliably anticipated changes in the environment that the input function then perceives, in turn, as cues that may, if necessary, trigger further routines.

Differentiation from Volitional Action Regulation

The habitual form of regulation differs from volitional regulation in terms of both its psychological characteristics (Moors & De Houwer, 2006) and the physiological brain mechanisms involved (Puttemans, Wenderoth, & Swinnen, 2005). It is no longer triggered by an intention, by a volitional decision, and it proceeds without volitional effort and control and with no emotional reaction (Neal & Wood, 2009). The individual no longer has to initiate and control each stage of the action volitionally. This sets mental capacities free to pursue more complex goals.

Routines structure a major part of everyday life. As studies using the diary method have shown, routines make up a relatively major part of an adult’s day. Wood, Quinn, and Kashy (2002) asked students and community participants to write down what they did, thought, and felt in specific time windows over several days. Results showed that more than 45% of the protocollled behavior was habitual in that it was linked consistently and repeatedly to specific situational contexts. Participants thought about what they were doing in only 40% of these situations compared to 70% of the situations in which they engaged in nonhabitual activities (see also Zerubavel, 1982).

The Emotional Form of Action Regulation

The combination of volitional and habitual forms of regulation makes it possible to achieve goals highly efficiently. As long as the actions initiated by intentions and the routines triggered by situational cues lead to the expected outcomes, the action chains proceed without being interrupted by emotions. Up to now, this line of reasoning would even seem to indicate that emotions are superfluous for a developed volitional and habitual activity regulation. However, this contrasts with the undeniable observation that adults do also experience emotions. What role do these emotions then have for the self-regulation of activities?

Emotions represent a prime mover and major corrective of volitional and habitual action regulation. They provide orientation when selecting and pursuing goals and when controlling routines in terms of their personal significance. They do this by triggering a spontaneous action readiness in order to change the situation in a motive-serving way, e.g., for reaching a desirable future state or avoiding potential negative outcomes. An emotion represents an action readiness that is triggered through an appraisal of occurrences or facts in terms of their relevance for motives and personal concerns. Its goal is to change the situation in a manner that serves these motives. This action readiness can be displayed as expressions, body-related reactions, and subjective feelings (Frijda, 1986). Feelings then serve as subjective somatic markers for the personal significanc
of events (Damasio, 1994), and they are experienced as sensations that simply happen to the person involuntarily. However, what does this appraisal and action readiness function look like in more detail?

**Appraisal Function**

When a person selects goals and considers acting to achieve them, emotions are typically initiated by appraisal of the personal relevance of these goals and the situational constrains of achieving these goals (Arnold, 1960; Campos et al., 1989; Frijda, 1986). The variety of goals in an adult’s life is potentially infinite, and, depending on the situation, identical goals can even be directed toward different motives. For example, take a project meeting with fellow psychologists to formulate a final research report. This should activate an achievement motive signalized by proud thoughts over a colleague who wants to be included as coauthor despite contributing almost nothing to the project’s success.

While pursuing goals, emotions mark precisely those events or outcomes of actions and set routines that deviate—in either a positive or negative direction—from an individual’s expectations (Carver, 2004; Frijda, 1986). The single emotion qualities signalize the particular relational theme (Lazarus, 1991) between the elicited motive and the perceived conditions for its satisfaction. For example, Lazarus (1991, p. 122) has pointed out that pride signals an “enhancement of one’s ego-identity by taking credit for a valued object or achievement” (an anticipated high-ranking publication of the research report), whereas shame signals having failed to live up to an ego ideal (colleagues criticize the author publicly for a big mistake in the research report).

The various emotion theories differ according to which appraisal processes are considered to underlie the single emotion qualities (see Roseman & Smith, 2001). Some assume that they are each based on different combinations of one set of universal appraisal dimensions (e.g., Scherer’s (2001) stimulus evaluation check theory); others assign each emotion quality to a discrete appraisal pattern (e.g., the relational themes of Lazarus’ (1991) theory).

Furthermore, it is necessary to distinguish the emotional appraisal process from a deliberately enacted evaluation of the motive-relevant relationship between an individual and the environment. In the latter, the prior emotional appraisal process is reconstructed post hoc with the aid of conceptual knowledge (Fogel, 2009; Lazarus, 1991, p. 144). This reflective evaluation is stored in other neural circuits than that of emotional appraisal (Fogel, 2009, pp. 95–101).

**Action Readiness Function**

What is special about emotions is that this appraisal function expresses itself as a motive-serving action readiness that disrupts the current flow of action through an expressive reaction, a (peripheral) physiological bodily reaction, and/or an urge to want to do or stop doing something specific (Frijda, 1986). This guides activity in another, previously unanticipated direction that, nonetheless, serves the elicited motive. In the example just given with the project meeting, pride may lead to triumphant gestures and a search for social approval; shame may lead to blushing and avoidance. Individuals experience such expressive and bodily reactions (slumped over in sadness, covering the face in shame) as subjective sensations that simply happen to them involuntarily. This affective nature of emotional experience is also an argument for conceiving it as internal feedback on expressive and bodily processes (see Damasio, 1994; Holodynski & Friedlmeier, 2006; Izard, 1977; Laird, 2007; Scherer, 2004).

Because of the dominance of volitional action regulation in adults, emotions emerge as short-term episodes (Ekman & Friesen, 1982; Sonnemans & Frijda, 1994) that persist only until a new action or routine is found with which one can once more pursue the original goal in a predictable way; that is, until actions can once again be regulated volitionally and habitually. In the example, a blushing reaction in the criticized colleague may lead to an apology by the criticizing colleague that reestablishes their respectful relationship and, in turn, terminates the feeling of shame.
Emotional Action Regulation as a Self-Regulating Feedback Loop

Emotions have an action-regulating function (Barrett, 1998; Campos et al., 1989; Frijda, 1986) that can also be described through the functions of the self-regulating feedback loop sketched at the beginning of this chapter. In emotional action regulation, the reference value is specified by the elicited motive; the input function, by the perceived motive-relevant aspects of the situation; the comparator function, by the emotion-specific appraisal and action readiness process; and the output function, by the newly triggered action that should once more ensure motive satisfaction. As soon as this leads to a change in the situational conditions that serves the motive, the emotion subsides.

Carver and Scheier (2009) limit their emotion model to only quantitative deviations of the real from the anticipated course of action. As a result, their model contains only four emotions: elation and sadness along with relief and fear. Other emotion theories, in contrast, interpret deviations of the real from the anticipated course of action qualitatively, making it possible to model the entire spectrum of emotions (see Frijda, 1986). In this way, emotions regulate the actions of individuals and their interaction partners, while, at the same time, the emotions themselves are regulated by the changes to the situations that occur (Campos et al., 2004; Kappas, 2008).

Necessary Competencies

If a specific emotion is to fulfill its action-regulating function, the following skills are needed for each single emotion quality (see Holodynski & Friedlmeier, 2006, chap. 4):

1. **The necessary cognitive preconditions for an emotion-specific appraisal**, in order to be in any way capable of appraising situations and events in motive-relevant terms.
2. **Especially for interpersonal regulation, the characteristic expression signs for the emotion quality**, in order to be able to appeal appropriately to an interaction partner encouraging him to engage in motive-serving actions. Otherwise, the emotion cannot “function” interpersonally.
3. For intrapersonal regulation, **a repertoire of learned actions** that can be initiated by the action readiness of an emotion in a motive-serving way in line with situational conditions.

The Reflective Form of Emotion Regulation

In a great number of everyday situations, individuals can achieve their motives and goals exclusively through a combination of volitional, habitual, and emotional forms of regulation just described. However, there are at least three scenarios in which these forms of action regulation run up against their limits:

1. **Delay of motive satisfaction.** The satisfaction of an elicited motive has to be delayed (temporally and spatially), for example, because the necessary actions cannot be carried out in the here and now, or an object desired at the present time will only become available later. Empirical research has also studied such scenarios using the experimental paradigm of delay of gratification (Tobin & Graziano, 2010).
2. **Adaptation to cultural display rules for expressing emotions.** Cultural display rules prohibit certain forms of emotional expression in interpersonal communication (e.g., the expression of anger or grief) whereas they favor others. Individuals have to adapt their emotional action regulation to these rules if they wish to avoid the risk of sanctions (e.g., expressing gratitude for a present even when it is disappointing; Saarni, 1984; Saarni & Weber, 1999).
3. **Conflicts of motives.** An action leads to a conflict of motives. This is the case when an emotional action readiness becomes the dominant impulse, but the achievement of higher
goals and motives would be better served if this action readiness were not to run its course, but be replaced by one that is subdominant but more goal appropriate. The dominant impulse can represent the action readiness of a negative or also a positive emotion (e.g., Kerr & Zelazo, 2004); for example, when frightened by a mouse in the cellar, a caregiver might feel the impulse to cry out in horror, but she or he does not want to do this in the presence of her child lest she learns to be afraid of mice herself.

Such situations confront individuals with the task of inhibiting the “inappropriate” realization of the triggered action readiness of their current emotion and, if necessary, replacing it with a more goal-appropriate action in order to avoid threatening a personally more significant goal and motive.

The object of the reflective form of regulation is not an action or a routine, as is the case in the volitional form of regulation, but an emotion that needs to be modified in terms of its quality, intensity, and course. Thompson (1994) offers the following definition: “Emotion regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goal” (pp. 27–28).

A Narrow and a Broad Understanding of Emotion Regulation

If emotions are conceived not only as a “mental state” but also as an action-regulating function, we have to ask how emotion and emotion regulation can be distinguished from each other. This is a controversial issue (see Campos et al., 2004; Cole et al., 2004; Eisenberg & Spinrad, 2004; Gross & Thompson, 2007; Holodynski & Friedlmeier, 2006; Kappas, 2008).

Based on the observation that there is no such thing as an unregulated emotion, a broad understanding of emotion regulation defines it as any activity that leads to the modification of an emotion (see Dennis, Cole, Wiggins, Cohen, & Zalewski, 2009; Thompson, 1994). According to this, for example, even a baby averting her gaze from a source of stimulation that is too arousing or a person running away from a fearful tsunami is engaging in emotion regulation, because both behaviors lead to a reduction of either arousal or fear. With such a broad definition, it is not possible to distinguish the emotional form of action regulation from the reflective form of emotion regulation sketched here. This is because the action triggered by the action readiness of an emotion serves to modify the cause of the emotion in a motive-serving way. If this succeeds, it will make the emotion disappear, so, at the end of the day, it regulates it. For example, the escape behavior or gaze averting correspond to the action readiness of fear—and would have to be classified as an emotional form of action regulation and not as emotion regulation.

However, from the perspective of self-regulation, there is one decisive difference between whether individuals follow an emotional action readiness or whether they force themselves to inhibit this impulse and do something else instead. In the example with the mouse in the cellar, this would be to inhibit the escape impulse, and replace it by taking a close look at the “sweet little mouse” together with the child. However, such inhibitory processes call for a completely different set of competencies (see later).

Accordingly, a narrow understanding of “emotion regulation” is limited to the situational need to volitionally inhibit or modify an elicited emotion so that the dominant action readiness linked to the emotion is not enacted but replaced by a subdominant one (Campos et al., 2004; Zelazo et al., 2010). Such volitional emotion control scenarios have also been applied as a prototypical experimental setting in studies analyzing emotion regulation in a narrower sense (e.g., Gross & Levenson, 1997; Kerr & Zelazo, 2004). In addition, the current discussion on the role of executive functions in the regulation of emotions applies the term “hot” executive functions to such a narrow understanding (Zelazo & Cunningham, 2007). In this sense, the emotional form of action regulation and the reflective form of emotion regulation represent different forms of regulation, and this can be seen in the different regulation competencies they require.
Necessary Competencies
The reflective form of emotion regulation requires a series of competencies that are first acquired during the course of ontogenesis. An inspection of the relevant literature leads to the following list of competencies:

1. **Mastering a repertoire of regulation strategies.** There are a number of effective strategies that individuals can apply to themselves in order to modify the expression of the emotion they feel or even the emotion itself. Examples are distraction, reinterpreting the situation, or changing the situational conditions (see Gross & Thompson, 2007; Larsen & Prizmic, 2004).

2. **Using language to represent a theory of emotion.** Spoken or sign language can be used to represent the triggers, expressions, and feelings of emotions along with the consequences of emotions and their control with the help of regulation strategies. This knowledge enables individuals to act volitionally (see Luria, 1961; Müller, Jacques, Brocki, & Zelazo, 2009; Stegge & Meerman Terwogt, 2007; Vygotsky & Luria, 1994).

3. **Applying executive functions to one’s own emotions.** This means being able to volitionally inhibit the action readiness triggered by an emotion and to replace it with a subdominant action that is more appropriate for attaining one’s goal (see Zelazo, Qu, & Müller, 2005; Zelazo et al., 2010).

4. **Being able to engage in mental time travel during emotion episodes as well.** The ability to volitionally imagine future situations of motive satisfaction can facilitate the inhibition and control of the triggered emotions (see Bischof-Köhler, 2000).

Distinguishing Between Volitional and Reflective Forms of Regulation
Reflective emotion regulation reveals several similarities to volitional action regulation. Both forms require mastery of executive functions such as controlling attention, recognizing and complying with rules, inhibiting action readinesses, and controlling for and correcting mistakes. As a result, Zelazo et al. (2005) have proposed distinguishing between “hot” and “cool” executive functions depending on their object. Hot executive functions are directed toward the regulation of emotional action readinesses, whereas cool executive functions address the regulation of actions and thoughts. Both the regulation of actions (cool) and the regulation of emotions (hot) require the ability to distance oneself psychologically from a dominant action impulse and generate an alternative perspective on the situation (or at least an alternative behavioral response) that is oriented toward one’s higher ranking goal. This makes it possible to inhibit the dominant action readiness and replace it with an action that is more likely to lead to the goal (see Bischof-Köhler, 2000; Giesbrecht et al., 2010; Sigel, 1993; Vygotsky & Luria, 1994).

Despite sharing this precondition, there are a number of good reasons for distinguishing theoretically between hot and cool executive functions:

1. The performances of subjects working on tasks with cool versus hot executive functions show only low to moderate correlations (Hongwanishkul, Happaney, Lee, & Zelazo, 2005).

2. Domain-specific knowledge is required: With a hot executive function, individuals require awareness of their current emotional feeling, and how they can be influenced by regulation strategies; with a cool executive function, they require an awareness of how actions and routines function and how they can be influenced (Müller et al., 2009).

3. fMRI studies on the physiological basis of executive functions in the brain show that inhibiting emotions activates other areas of the prefrontal cortex (namely, the orbitofrontal cortex [OFC]) than the inhibition of actions and routines (namely, the dorsolateral [DL-PFC] and ventrolateral [VL-PFC] prefrontal cortex, and the anterior cingulate cortex [ACC]; see Botvinick, Braver, Barch, Carter, & Cohen, 2001; Elliott, Dolan, & Frith, 2000; Rolls, 2002; Zelazo & Cunningham, 2007).
To summarize, the ability to engage in reflective emotion regulation places individuals in a position in which they are no longer controlled by their emotions and the accompanying action readinesses, but are able to exert an active influence on the effects that their own emotions have. Individuals are generally only considered to be “mature” when they have reached the level of reflective emotion regulation and are capable of self-regulation (see Saarni, 1999). It takes a long developmental period and children’s active effort until they become capable of a reflective emotion regulation.

CONCLUSIONS

Older children and adults do not just use one form of regulation to self-regulate their actions. Depending on their level of competence and the situational conditions, they draw on a variety of forms of regulation to satisfy their motives. Although it might be difficult to empirically differentiate these forms in each case, a conceptual differentiation between four forms of regulation seems to clarify the place of emotion regulation within a developmental framework of self-regulation: (a) volitional regulation of actions with the help of intentional goals and the planning of selected actions and their achievement, (b) habitual regulation with the help of overlearned action–goal chains known as routines, (c) emotional regulation with the help of emotions, that is, motive-relevant appraisals and accompanying specific action readinesses, and (d) the reflective regulation of emotions with the help of volitionally applied executive functions and regulation strategies.

Here, we argue in favor of a narrow concept of emotion regulation. The volitional regulation of actions and the reflective regulation of emotions reveal functional similarities in the executive functions they draw on. However, they differ in the object toward which they are directed (the regulation of actions vs the regulation of emotions) and in the regions of the brain they activate.

The various forms of regulation can supplement and replace one another. For example, a differentiated repertoire of routines that satisfy basic motives in a reliable and predictable way can make it unnecessary to apply the volitional or emotional form of regulation to satisfy motives. Likewise, setting goals to serve motives through anticipatory planning can replace not only the emotional regulation of actions but also protect against situations that would require a reflective regulation of emotions that do not lead to one’s goal. By having learned the various forms of regulation over the course of ontogenesis, adults have become able to satisfy their motives in a way that takes account of cultural norms, the motives of other members of their culture, and situational demands—and thus to regulate themselves.

Learning these forms of regulation sketched earlier has a desirable side-effect: The frequency and intensity of emotions as one form of regulation declines markedly between infancy and adulthood. As Brown and Kozak (1998) point out:

It is widely accepted that when development, in general, goes well, both the frequency and the intensity of emotional reactions decrease. If, as is the case in certain personality disorders, an individual reaches adulthood without achieving the expected diminution in the frequency and intensity of emotional reactions, he or she is considered maladapted or sick. For the parent, teacher, friend, or clinician who has to deal with people having the emotional constitution of a 3-year-old and the executive power of an adult, the experience can be overwhelming. (p. 150)

This developmental trend can be confirmed in studies using the diary method (Hartmann & Holodynski, 2008): Students from Germany were asked to protocol every emotion episode between waking up in the morning and going to sleep at night for four days during one week. Likewise, mothers of 1- to 6-year-old children were asked to protocol the emotion episodes of their children for one day in a similar fashion. Because mothers could only observe emotions of their children that they expressed, the used observational method may underestimate the frequency of children’s emotions. Results showed that, on average, adult students experienced 19 feelings each day.
These were predominantly joy and anger with an average intensity of expression of 3.7 (SD = 2.3) on a 9-point scale. In contrast, mothers observed an average of 42 feelings per day (SD = 27) in their children. Once again, these were predominantly joy and anger with an average intensity of expression of 5.6 (SD = 1.8).

**ONTOGENETIC EMERGENCE OF REFLECTIVE EMOTION REGULATION**

Initially, we said that self-regulation—that is, coordinating the satisfaction of one’s own motives in a socially acceptable way—is a central developmental task. When children enter the school system, they are expected to be able to satisfy their own motives without violating the rights of others, to cooperate with adults and peers, to cope with their frustrations appropriately, and to control their aggressive and destructive action readinesses (Bohart & Stipek, 2001; Caldarolla & Merrell, 1997). Alongside the development of the volitional action regulation needed to set goals, make plans, and control one’s own actions (see Benson, 1997; Haith, 1997; Hudson, Sosa, & Shapiro, 1997; Kopp, 1997), self-regulation particularly requires the competence to regulate one’s own emotions volitionally. This is why we sketched four central competencies that children have to learn in order to master this developmental task. These are:

1. learning to master effective regulation strategies;
2. being able to apply executive functions to one’s own emotions;
3. learning to use (spoken or sign) language as a means of gaining psychological distance;
4. being able to engage in mental time travel.

In the literature, the construct “effortful control” has also been postulated and analyzed as a decisive dispositional temperament factor for the development of emotion regulation. Therefore, we shall also make a brief digression and discuss the significance of this construct.

Because children acquire the first foundations of reflective emotion regulation between the ages of 3 and 6 years, we shall limit the following sketch of the state of research to this age range and also exclude the familial and cultural framing conditions in which it develops (see Eisenberg, Spinrad, & Smith, 2004; Perez & Guay, 2007; Raver, 2004; Thompson & Meyer, 2007; Trommsdorff & Rothbaum, 2008). The aim of this section is to give a differentiated overview on the ontogenetic origins of reflective emotion regulation.

Different demands (see earlier: delay of gratification, motive conflicts, expression control) can be assigned to different levels of difficulty in terms of the regulation competence they require (Carlson & Moses, 2001). For example, delay of gratification requires fewer or different regulative competencies than coping with motive conflicts (Carlson & Beck, 2009, pp. 163–164). However, empirical research on these different demands is still, unfortunately, very patchy, and most studies have analyzed the easier scenario of delay of gratification rather than the more complex demand scenarios of coping with motive conflicts and adapting expression volitionally to comply with cultural display rules.

**LEARNING TO MASTER EFFECTIVE REGULATION STRATEGIES**

For a long time, developmental research on emotion regulation focused particularly on the classification of regulation strategies and the acquisition and use of single strategies over the course of development—in particular, seeking social support, attentional deployment, and reappraisal (Bridges & Grolnick, 1995; Grolnick, Bridges, & Connell, 1996; Masters, 1991; Stansbury & Sigman, 2000; Thompson, 1990).

Generally, these studies were based on a broad understanding of emotion regulation (see later): For example, classifications did not distinguish between whether the strategy being applied (a) corresponded to the induced action readiness of the emotion itself (e.g., for fear: turning away
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from the cause of fear), which we have described as the emotional form of action regulation, or (b) required a volitional modification of one’s own emotional feeling or expression (e.g., not fleeing despite one’s fear), which we have classified as the reflective form of emotion regulation. The latter places different and, above all, greater demands on a child’s (regulation) competence. In the following, we shall restrict ourselves to presenting the developmental trajectory of those regulation strategies that require the volitional modification of one’s own feelings or expression; that is, ones that can be assigned to reflective emotion regulation.

Interpersonal Regulation as the Original Strategy in Ontogenesis

In the development of reflective regulation strategies, it can be seen that the first strategy in ontogenetic terms is the search for social support; that is, interpersonal regulation. It is not just used predominantly by babies but even 18- to 24-month-old infants (Diener & Mangelsdorf, 1999). What is special about this regulation is that it does not yet require children to distance themselves psychologically from a situation. Instead, it corresponds to the action readiness of all emotions at this age; namely, to direct emotional expression as an appeal to the caregiver in order to activate an appeal-specific support behavior in him or her (see Holodynski, 2009; Holodynski & Friedlmeier, 2006). The caregiver then decides whether to respond to this expression-specific appeal and/or to make an attempt to regulate the child’s emotion volitionally through distraction or some other strategy. It is only in the latter case that the caregiver engages in an interpersonal reflective emotion regulation for the child.

Parental use of a strategy can stimulate imitation behavior in the child, so that the child learns to apply the observed strategy alone. However, as yet, we know of no studies that have explicitly compared the parents’ use of regulation strategies for children with the strategies the children apply themselves. However, which strategies can we observe that help children to regulate their emotions by themselves, and at which age can we observe them?

Attentional Deployment

In order to induce emotions and strategies to regulate them when studying young children, researchers have particularly used the contexts of delay in gratification (Tobin & Graziano, 2010). In a typical task, the experimenter shows the child a reward (snack or present), but does not hand it over immediately, thereby obliging the child to wait. The mother is present while the child is waiting, but her availability is varied systematically (mother is busy vs. mother is available). Researchers then test from what age onward children are in any way able to wait, and how far they apply interpersonal or even intrapersonal strategies to cope with the frustration this induces. Bridges and Grolnick (1995) used this design to study children aged 12, 18, 24, 32, and 45 months together with their mothers. They found that reactions that could be interpreted as a spontaneous response to the intrinsic action readiness for the induced frustration—namely, seeking consolation from mother—declined only from 32 months onward from 28% to 1% at 45 months. In contrast, child-initiated but interpersonal distraction strategies in which the children prompted their mothers to play with them—and thereby bridge the waiting time—increased from 1% at 12 months to 25% at 45 months. However, child-initiated intrapersonal distraction strategies—that is, children busying themselves with something else, particularly when their mothers were not available—increased even more strongly, from 13% at 12 months to 61% at 45 months.

Gilliom and colleagues asked mothers to initiate a delay of gratification in their 42-month-old children (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). The mother promised to give her child a cookie when the child waited until she had finished filling out a questionnaire. Most frequently, the children displayed self-initiated active distraction. This was followed by passive waiting. Use of both strategies was accompanied by less increase in anger while waiting, whereas children who kept their attention fixed on the reward showed an increase in anger. The strategy of asking the mother to explain why the child should wait led to a notable reduction in anger—however, this was applied very infrequently.
Researchers have used another situation that makes even greater demands on children’s regulation competence. Children had to wait for a larger reward alone while simultaneously being exposed to the temptation of taking a smaller reward at any time instead of waiting. Different studies showed that even 3-year-olds could already wait, and that distraction (not looking at the reward but actively distracting oneself with something else) was the most frequent and the earliest spontaneously applied strategy (see Bischof-Köhler, 2000; Carlson & Beck, 2009; Eisenberg, Shepard, Fabes, Murphy, & Guthrie, 1998).

In contrast, when the reward remained visible, 3-to 5-year-old children did not manage to wait so long (Mischel & Ebbesen, 1970). However, if an adult suggested to the children how they could distract themselves, they managed to wait longer, because they then more frequently applied the suggested strategy (Mischel, Ebbesen, & Zeiss, 1972). This last finding reveals a not yet completely internalized strategy use, because the strategy for successful regulation still had to be given by another person.

Longitudinal analyses of which child behavior predicts future regulation competence reveal that the best indicator is spontaneous waiting time without receiving any external strategy suggestion (Shoda, Mischel, & Peake, 1990): The longer 4-year-old children could wait for their reward—that is, the more they could already use intrapersonal strategies to regulate themselves—the more competently they could regulate their emotions in adolescence (according to mothers’ ratings) and the better their academic achievement at school.

Hence, distracting attention from the stimulus that triggers emotions (in this case, the promised reward) may be one of the first strategies that children begin to apply in the delay of gratification paradigm in order to engage successfully in reflective emotion regulation, and they seem capable of doing this by the age of 3 years.

Coping with Motive Conflicts

However, the ability to shift attention volitionally does not suffice when it comes to handling motive conflicts. Here, it is not just necessary to inhibit a dominant impulse; one also has to activate an alternative behavioral impulse that is initially only subdominant in terms of the situational affordance. In a task in which children had to deal with a conflict between eating candy and watching a cartoon, Bischof-Köhler (2000) found an age-correlated increase in reflective emotion regulation in children from the age of 3 to 5 years. However, only 50% of her 5-year-olds exhibited task-appropriate regulation behavior (see later).

Control of Emotional Expression

Saarni’s (1984) disappointing present has been the most frequently applied experimental paradigm to find out from which age onward and to what extent children become able to volitionally influence the expression of a currently felt emotion (see Saarni & Weber, 1999). An adult gives a child a wrapped present. This should induce anticipatory joy. However, after being unwrapped, the present proves to be disappointing. A volitional control of expression is given when the child tries to display gratitude and joy despite the disappointment, because this is what the appropriate cultural display rules prescribe. Unexpectedly, even 4-year-olds displayed a comparable expression masking (smiling) to that of 9-year-olds, indicating that the volitional control of expression does not seem to improve during this age period (Cole, 1986; see also Davis, 1995; Josephs, 1994). There seem to be two possible explanations for this unexpected finding:

1. These studies infer children’s expression control on the basis of observable expression indicators (particularly smiling). However, when adapting one’s expression to cultural display rules, the primary concern is to “convince” the interaction partner with the masked expression (i.e., to make the giver believe that the receiver is pleased). Therefore, Baaken (2005) suggested that an intuitive rating by addressees would be a more appropriate success criterion for expression control. She asked 10 naïve observers to rate the intensity of joy and disappointment in children’s expression when being given attractive and unattractive...
presents. She found a marked increase in attributed joy and a decline in attributed disappointment in 6- to 8-year-olds, but not in 4- to 6-year-olds. Hence, children improve their volitional expression control in terms of the desired influence on the addressee.

2. The studies reported here did not give children the explicit task of masking their disappointment. When given explicit instructions, performance improved significantly between 4- to 6-year-old children, and again between 6- to 8-year-olds (Davis, 1995; Färber & Holodynski, 2005). This indicates that children improve their competence in expression control during preschool age, but improvements could remain undiscovered if they are not explicitly instructed to demonstrate their competence and to control their expression. Nevertheless, already some 4-year-olds reacted with smiling to the disappointing gift; that is, showed first reactions of expressive control.

Conclusions
(a) The search for social support in emotion-triggering situations is a primary, early appearing ontogenetic strategy. Emotions are then (generally) regulated interpersonaly by caregivers.
(b) Attentional deployment (distracting) is one of the first strategies that children are able to apply by themselves. It may be easier for the child to use this strategy in situations in which the demands are only to inhibit a dominant action impulse in comparison to situations in which the demands increase. For example, when children have to cope with motive conflicts in advance, and not only inhibit one readiness but also generate an alternative action readiness, they require more cognitively demanding strategies such as self-instructions or reevaluation strategies. These will be analyzed later, because they require language as a representation medium.

BEING ABLE TO APPLY EXECUTIVE FUNCTIONS TO ONE’S OWN EMOTIONS

The human ability to regulate own emotions reflectively has not just been studied from the perspective of using regulation strategies. Recent research has also focused on the executive functions (hot EF) that this involves and their necessary preconditions. Hot EF is viewed as a synonym for the competence to volitionally inhibit and modify emotions (Zelazo & Cunningham, 2007), and it is distinguished from both the regulation of actions by emotions and the development of the cool executive functions (cool EF) that serve the volitional regulation of actions and routines and are thereby assigned to the volitional form of regulation (see Müller et al., 2009; Zelazo et al., 2010).

Even though they address different topics, the constructs “hot” and “cool” EF require comparable competencies; namely, deploying attention, complying with rules, inhibiting dominant action impulses, and detecting errors (Zelazo et al., 2005). Hence, it would seem meaningful to test whether both functions also emerge during the same age period and how far they correlate intraindividually.

Hongwanishkul and colleagues (2005) gave 3- to 6-year-old children four tasks. These were two tasks on volitional action regulation (cool EF)—(1) a self-ordered pointing task and (2) the Dimensional Change Card Sort—and two tasks on reflective emotion regulation (hot EF)—(3) delay of gratification and (4) Kerr and Zelazo’s (2004) Children’s Gambling Task. The idea behind this setting was to playfully simulate an emotional conflict between short-term reward and long-term negative consequences. Results showed that, particularly between the ages of 3 and 4 years, children showed progress in both the volitional control of their actions (cool EF) and the volitional regulation of their emotions (hot EF). However, the measures of action regulation (cool EF) did not correlate with the measures of emotion regulation (hot EF; i.e., children who could control their actions volitionally could not automatically also control their emotions volitionally). This indicates that volitional action regulation and volitional emotion regulation are different competencies, even when they develop within the same age period.

Nonetheless, other findings indicate correlations between the competence to regulate actions/ routines and to regulate emotions. Kieras, Tobin, Graziano, and Rothbart (2005) gave a different type of task to 3- to 5-year-old children: the volitional adaptation of expression to cultural display.
rules with the aid of the disappointing present paradigm (Saarni, 1984). They found a small but significantly positive relation between mastery of cool EF, measured with a task battery taken from the effortful control paradigm, and hot EF, assessed by the children reacting to a disappointing present with a smile as if one were pleased with it. Whereas the children improved their cool EF as they grew older, there was no such age trend for expression control (hot EF). However, the latter finding may have been due to a lack of motivation to control expression in the children or to an inappropriate operationalization of child expression control (see earlier; see also Hoeksma, Oosterlaan, & Schipper, 2004).

Carlson and Wang (2007) also used the disappointing present paradigm with 4- and 5-year-olds and found a positive relation between measures of hot and cool EF. However, both measures were confounded here, because two out of the three tasks assessing cool EF were delay of gratification tasks (gift delay and forbidden toy); that is, typical tasks for assessing hot EF.

Conclusions

(a) The competence to regulate actions volitionally (cool EF) and the competence to regulate emotions volitionally (hot EF) both seem to emerge during the same age period; namely, between the ages of 3 and 5 years. (b) However, findings on how far both competencies also correlate intrindividually are contradictory. There is a need for further studies in which children are asked to perform both action regulation (cool EF) and emotion regulation tasks (hot EF) while also systematically varying the level of difficulty. (c) Experimental studies on the specific use of language in these regulation tasks indicate that when the level of task difficulty is held constant, children tend to find it easier to solve cool EF tasks than hot EF tasks.

**DIGRESSION: EFFORTFUL CONTROL AS A DISPOSITIONAL DETERMINANT OF REFLECTIVE EMOTION REGULATION**

Alongside microgenetic determinants, dispositional factors have also been used to explain children’s competence to volitionally regulate emotions. The construct “effortful control” has been identified as a decisive dispositional determinant (Eisenberg, Hofer, & Vaughan, 2007; Murray & Kochanska, 2002). This temperament construct brings together a range of executive psychological functions that Rothbart and Bates (2006, p. 129) define as “the efficiency of executive attention, including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors.” Zelazo and Cunningham (2007) describe this construct as cool EF and take the competencies listed to be (cognitive) preconditions for goal-directed action. In line with this, Eisenberg et al. (2007) also point out that effortful control should not be equated with reflective emotion regulation. In contrast to the work of Zelazo, studies using the construct of effortful control do not focus on the change of this construct over the course of ontogenesis. Instead, they conceive it as a dispositional temperament factor, and studies look for stable interindividual differences over the course of development. In line with this differential perspective, effortful control as a temperament disposition—rather like the intelligence construct—is assigned an ontogenetic continuity (Rueda, Posner, & Rothbart, 2005). Kochanska and Knaack (2003) found moderate to high interindividual stabilities in the sum scores for effortful control in children between the age of 1 and 4 years (see also Kochanska, Coy, & Murray, 2001; Kochanska, Murray, & Coy, 1997).

However, an inspection of the tasks and measurement tools used to assess effortful control at each age level (Kochanska & Knaack, 2003; Murray & Kochanska, 2002) reveals a clear confounding of cool and hot EF: We find delay of gratification tasks (snack delay, tongue task, gift delay) in which the child has to resist an emotional action impulse, thereby measuring hot EF; tasks requiring a volitional control of gross- and fine-motor behavior; and tasks in which the child has to comply with a verbal instruction under only one of two possible conditions (tower task, bear and dragon task, “Simon says” task, pinball, red–green sign). All these tasks tap the control of one’s own actions and routines with the help of conditional verbal instructions—making them typical cool EF tasks.
If one looks at these subsets of tasks as indicators of cool and hot EF, there are significant but, at most, moderate correlations ($r \leq .40$) between hot and cool EF in both cross-sectional and longitudinal analyses (Kochanska, Murray, & Harlan, 2000; Murray & Kochanska, 2002). Like the data from Hongwanishkul et al. (2005), this indicates that the volitional regulation of actions and the reflective regulation of emotions need to be distinguished theoretically and should not be mixed together in one construct.

**Conclusions**

Even though the construct of effortful control as a personality factor can impressively explain interindividual differences in developmental trajectories, it proves to be inconsistent as an ability construct in developmental psychology. It does not help to discover any developmental levels of reflective emotion regulation. A more careful separation between hot and cool EF is a more promising approach here.

**Learning to Use Language as a Means of Gaining Psychological Distance**

The basis for reflective emotion regulation is the ability to distance oneself from an emotionally triggered action readiness and consider an alternative action (Bischof-Köhler, 2000; Giesbrecht et al., 2010; see also Sigel, 1993). Vygotsky (1933/1997) already pointed out that children have to emancipate themselves from the affordances of a situation and the action readiness it triggers. Doing this requires psychological means. Vygotsky considers these psychological means to be the use of (speech) signs. Signs are effective because they symbolize a situation, an emotion, or an action, and thereby keep these in an individual’s mind without the pressure to act becoming entirely manifest. This is the way in which signs create distance or space for alternative actions. Additionally, the volitional use of verbal signs (either words or the gestures in sign language) reactivates memories and interpretations. These can be used to draw up an alternative situational frame of reference to the given one that can then be used correspondingly to guide attention (Luria, 1961; Müller et al., 2009; Piaget, 1954; Vygotsky & Luria, 1994).

Measures used to assess general language ability at preschool age commonly correlate with the competence to engage in reflective emotion regulation: For example, Kochanska and Knaack (2003) found strong positive correlations between verbal abilities and the construct “effortful control” that assesses both hot and cool EF. Cole et al. (2009) assessed the productive language competence of children with the “mean length of utterances” in free play with mothers and found positive correlations with persistence and problem-solving-oriented behavior in a frustration task. Carlson and Wang (2007) also found low but significantly positive correlations between receptive language competence and measures of hot EF (see, nonetheless, Hongwanishkul et al., 2005).

However, why is it specifically language acquisition that permits a psychological distancing from emotional action impulses? It is worth calling to mind the different functions an advance language system fulfills when it comes to regulating emotions:

1. the verbal representation of knowledge about emotions and how to regulate them (representational function of language);
2. control over actions through self-instruction (appeal function of language);
3. the ability to use language to make fictitious reevaluations of situations and to orient actions toward these visions (planning function of language).

In the following, we shall discuss findings supporting the postulated relation between the emergence of language functions and the emergence of the competence to volitionally regulate emotions.
Verbal Representation of Knowledge about Emotions and Reflective Emotion Regulation

Between the ages of 4 and 7 years, children successively acquire metacognitive knowledge about emotions and their regulation. Analogous to a “theory of mind” (Sodian, 2005), such knowledge has also been called a “theory of emotion” (Meerum Terwogt, & Stegge, 1998). Such a theory of emotion contains an intuitive understanding of the components of emotions; namely, (a) their causes and emotion-specific appraisals, (b) their typical expressions in order to be able to recognize them in others, (c) their subjectively felt sensations in order to be able to identify them in oneself, and (d) their emotion-specific action readinesses that will lead to a motive-serving change of the situation, but may also have negative consequences. In addition, “theory of emotion” contains an intuitive understanding of strategies with which to influence oneself and others (Cole et al., 2009; Janke, 2002, 2010; Lagattuta, 2005; Meerum Terwogt, & Stegge, 1998; Pons, Harris, & de Rosnay, 2004; Stegge & Meerum Terwogt, 2007).

Development of Knowledge about Emotions

Interviews with children have shown that they initially acquire a behavioral understanding of emotions before this is replaced successively by a more mature, mentalist understanding (Meerum Terwogt, & Stegge, 1998):

1. **Emotion causes.** Younger children assume that emotions are triggered directly by situational circumstances and events. Between the ages of 4 and 6 years, they begin to understand that emotions are triggered by an individual’s wishes (motives) and expectations in a given situation. This mentalist understanding can be assessed with false belief tasks similar to those constructed to assess a theory of mind.

2. **Expression and feeling.** For younger children, feeling an emotion is still inseparable from its expression. It is only between the ages of 4 and 7 years that children begin to understand that expression and feeling can be dissociated volitionally.

3. **Regulation of emotions.** Younger children still possess limited knowledge about effective regulation strategies. However, by at least 3 years of age and onward, they become increasingly aware of effective strategies with which they can influence their emotional feelings (Cole et al., 2009).

Studies on the Relation between Knowledge of Emotions and Emotion Regulation

However, very few studies have examined the relation between children’s knowledge of emotions as assessed by verbal interviews and their ability to engage in reflective emotion regulation as assessed by experiments. The study by Cole et al. (2009) (discussed earlier) on the induction of frustration in 3- and 4-year-old children revealed very specific patterns of relations: Higher knowledge about effective regulation strategies for frustration correlated with the use of adaptive strategies in the frustration situation—namely, persistence and problem-solving behavior—and this effect was still present after controlling for age and general language comprehension. However, it was less the knowledge about specific strategies but far more the breadth of the effective strategies named that was decisive. Interestingly, there were no correlations between the verbally expressed regulation knowledge and the use of distraction as a strategy.

In a study on the volitional control of own expressive behavior, Färber and Holodynski (2005) found moderately significant correlations with specific emotion knowledge on the relation between expression and feeling. Children aged 4, 6, and 8 years looked at an attractive, an unattractive, and no present in a random order in front of the experimenter. They were told to pretend that they were looking at an attractive present in each situation. Even when disappointed or not feeling any emotion, they were faced with the comparatively high demand to volitionally express joy and surprise. The three videotaped reactions of each child were shown to 40 students in a random order and they had to judge whether the child had felt joy, disappointment, or nothing at all. In addition, children were
asked about their explicit knowledge about expressions and feelings by using a picture task and an interview task, “Tell me, is it actually possible to be angry [sad, happy] without anybody noticing?” (Holodynski, 2004).

Results showed that 4-year-olds considered that expression and feeling could not be dissociated, and that they could not volitionally express joy while facing a disappointing gift. Raters’ judgments of joy were only 20% on average (SD = 27) and below chance level. In contrast, 8-year-olds possessed both the knowledge and the ability to mask their disappointment by expressing joy, and there were significant positive correlations between the two. They thought it possible that one can feel an emotion “inside” without expressing it and raters’ judgment of joy during the masking task were already 57% on average (SD = 35) and above chance level. The group of 6-year-olds already reached a mean level of 50% (SD = 38) and their comprehension was spread across the entire spectrum of knowledge. Unexpectedly, their level of knowledge and of regulation did not correlate with each other at this age. For the whole group of 4-, 6- and 8-year-olds, however, a positive correlation of \( r = 0.51 \) appeared that remains significant (\( r = 0.32 \)) also after controlling for age. Furthermore, this study revealed a clear developmental increase of children’s ability to volitionally regulate their expression from 4 to 8 years of age. Results contradict the findings of Saarni (1984) and Cole (1986), who did not find such a clear age trend. One reason may be that we measured the success of children’s expression by having naive observers judge children’s expression, which actually may be a more ecologically valid operationalization of a child’s masking ability. In contrast, Saarni and Cole used an objective analysis of children’s expressions and did not consider the impact on an observer’s impression of the child’s expression.

As pointed out already, experimental studies on the relations between verbally represented knowledge about emotions and reflective regulation competence are very rare. Nonetheless, a number of studies have delivered indirect confirmation that children with a more comprehensive knowledge about their emotions can regulate them better (Cole, Armstrong, & Pemberton, 2010; Denham et al., 2003; Dunn, 1995; Dunn & Brown, 1991; Garner & Power, 1996; Wranik, Feldman Barrett, & Salovey, 2007). In addition, studies of children with behavior problems show that these children have markedly less knowledge about emotions than their typically developing peers (e.g., Crick & Dodge, 1994; Dunn & Cutting, 1999; Garner & Lemerise, 2007; Izard et al., 1999; Izard et al., 2001).

**Theory of Mind and Emotion Regulation**

Interesting findings also come from studies in developmental psychology that did not assess children’s knowledge about emotions, but used classic “false belief tasks” to test how far children are in any way capable of mental perspective taking, and how far this mental competence relates to their reflective emotion regulation. Bischof-Köhler (2000) found that 3- to 5-year-old children who successfully mastered a delay of gratification task and an emotional conflict task also mastered false belief tasks. Accordingly, these children were able to perform a mental change of perspective in a given emotion-triggering situation. In contrast, however, there were also many children with ineffective emotion regulation who already possessed such a theory of mind. Hence, a theory of mind alone does not suffice for effective reflective emotion regulation (see section on mental time travel, following).

**Conclusions**

Few studies have examined relations between the proximal measures of mastering an emotion regulation task and specific knowledge about regulation. These show inconsistent positive correlations compared to studies using distal measures of reflective emotion regulation and knowledge of emotions (namely, global parent or teacher ratings). These inconsistent correlations with the proximal variables lead to the conclusion that verbally recallable declarative knowledge about emotions is not very decisive for solving a concrete regulation task. What may well be more decisive is the ability to use language procedurally in order to successfully regulate emotions. This ability is the subject of the next two sections.
Verbal Control of Actions and Reflective Emotion Regulation

Language can also be used procedurally for self-instruction, so that, in case of need, one can give oneself the necessary instructions to control behavior volitionally and goal-directedly. This control function of language also emerges between the ages of 3 and 6 years. It can be seen in private speech and—on a more advanced level, from about 7 years onward—in an individual’s internal speech (Luria, 1961; Vygotsky & Luria, 1994). Individuals use their speech to appeal to and instruct themselves in order to inhibit the dominant situational impulse and activate the subdominant impulse that is appropriate for the action-guiding goal (Goschke, 2003; Jacques & Zelazo, 2005; Luria, 1961; Müller et al., 2009; Müller, Zelazo, Lurye, & Liebermann, 2008).

From Interpersonal to Intrapersonal Speech-Conveyed Regulation

According to Vygotsky (1934/1987), this ability to gain psychological distance from the immediate situational affordances with the help of speech has its origin in the social function of speech. Initially, it is caregivers who use verbal means to guide a child’s attention and elicit corresponding interpretations of a situation. It is only later that children begin to use these verbal means themselves to interpret situations and thereby to apply the regulative aspects of speech to themselves. Vygotsky (1931/1997) has described the emergence of the verbal control function in his genetic law of cultural development:

Every higher psychological function starts off as a social action, that is, as an interpersonal function, before it then emerges as an individual action, that is, an intrapersonal function: For us to call a process “external” means to call it “social.” Every higher mental function was external because it was social before it became an internal, strictly mental function; it was formerly a social relation of two people. The means of acting on oneself is initially a means of acting on others or a means of action of others on the individual. (p. 105)

Private speech can be interpreted as an intermediate stage between social speech and socially triggered regulation on the one hand, and, on the other hand, internal speech as fully internalized self-instructions designed to guide and regulate one’s own actions, thoughts, and emotions (Fernyhough & Fradley, 2005; see, for reviews, Berk, 1992; Winsler, 2009; Winsler et al., 2009).

Private Speech and Emotion Regulation

Whereas the application of private speech in cognitive tasks appears to be well documented, little consideration has been given to the possible role of private speech in the regulation of emotion, and few studies have analyzed this relationship. The available findings indicate a comparable developmental trajectory to that already ascertained by Luria (1961) for volitional action regulation. Initially, children seem to use private speech “only” in a formal way as a trigger for initiating an action, but pay no attention to the semantic content of their utterances. As a result, nonverbal cues prove to be just as efficient. There are great individual differences in when preschool children begin to also pay attention to the semantic content of their speech and become able to draw on it to follow very content-specific action commands. At this stage, for example, the command (spoken in a neutral tone) “Don’t do it” no longer triggers an act, but leads to its inhibition. Likewise, they can also use “if, . . . then” commands. It is this stage of development that first reveals the unique advantage of private speech compared to nonverbal means of guiding attention.

For example, Müller, Zelazo, Hood, Leone, and Rohrer (2004) carried out a task in which 3- to 6-year-old children saw colored candies lying on a sheet of paper of a different color. To get the candies, they had to choose a colored card matching the color of the paper. However, they had to turn away from the display to do this, requiring them to retain the color of the paper in memory and avoid confusing it with the color of the candies. Results showed that 3-year-olds solved only one-half of the trials correctly. However, when advised to name the color of the paper verbally, their
performance improved significantly. However, the same increase in successful trials was also attained when the experimenter merely pointed to the sheet of paper without naming anything. This shows how language serves only as a formal cue for guiding the attention of 3-year-olds—its semantic content is still irrelevant.

Up to now, the few studies on the function of the semantic content of verbal cues have examined only volitional action regulation tasks (cool EF), such as the Flexible Item Selection Task (FIST) (see Müller et al., 2009, pp. 62–63). On the FIST task, 3-year-olds were unable to use the suggestion that they should follow the verbal cue; 4-year-olds were able to do this; and 5-year-olds already drew on the semantic content spontaneously without needing any cues from the experimenter. However, there are still no studies applying analogue tasks on reflective emotion regulation (hot EF).

Nonetheless, a series of studies have assessed the relation between private speech and reflective emotion regulation indirectly: For example, Broderick (2001) examined the private speech of 4- and 5-year-olds on three tasks—a drawing activity, imaginative play, and a table-top puzzle completion activity—and she assessed emotion regulation skills with parent and teacher ratings. When performing the tasks, children with effective emotion regulation competencies used more private speech overall, more private speech with positive valence, less private speech with negative valence, and more metacognitively oriented private speech than children who were rated by adults as being poor emotion regulators (see also Manfra & Winsler, 2006; Sánchez, Montero, & Méndez, 2006).

Conclusions

There are indirect and some initial direct experimental indications that private speech plays an important control role in the regulation of not only actions (cool EF) but also emotions (hot EF). It is a challenge for future research to test the hypothesis that the use of private speech develops in a comparable way for both cool and hot EF; namely, from being used as a simple trigger of regulation processes to being used as a semantically guided self-instruction.

Verbal Reappraisal of the Given Situation and Reflective Emotion Regulation

In the verbal self-instruction described in an earlier section, the function of language was to purposefully guide action, but not to change the situational frame of reference (candies remain candies and are not reinterpreted as, e.g., pebbles). Between the ages of 2 and 6 years, children learn to use language for yet another function: They start to use verbal means to also change the situational frame of reference itself. For example, they create a fictitious situation by saying to themselves that the candies are little pebbles that are impossible to eat. When it comes to the regulation of emotions, a verbal reinterpretation enables the child to make the originally salient, situation-specific action affordance (tasty candies = eat) lose its affordance character (the desire for “pebble” candies is less strong or disappears completely).

Initially, children use this function of language to reinterpret situations in pretend play (Carlson & Beck, 2009; Singer & Singer, 1990). In the early phases, they still need so-called substitute objects to remind them to direct their own action toward the verbally labeled new conditions of the fictitious situation (Vygotsky, 1967). It is only at the end of preschool age that the verbally formulated reappraisal of a given situation is enough by itself without substitute objects. When children have learned to reinterpret situations, they have acquired one of the main successful strategies for regulating emotions: the reappraisal of a given situation (see Gross & Thompson, 2007; Larsen and Prizmic 2004).

Reappraisal of a Situation with the Help of Substitute Objects

Only a few studies have analyzed the effect of using pretend play and substitute objects in order to successfully regulate emotions. In their study on delay of gratification, Carlson and Beck (2009) have shown that some 3- to 4-year olds applied such a reinterpretation explicitly in the form of
pretend play in order to successfully distract themselves from fixation on a reward. However, the most frequently applied strategy was simply averting one’s gaze in order to avoid looking at the desired object.

Carlson, Davis, and Leach (2005) gave the less-is-more task to 3- and 4-year-old dyads. Over several trials, children had to indicate whether they preferred to be given a box with either two or five goldfish crackers. However, the rule of the game was that the box a child pointed to was given to the child’s fellow player. Hence, the children had to control their spontaneous, emotionally triggered action readiness and point to the smaller number of crackers instead if they wanted to receive the larger number themselves. The children could perform this task better when the two versus five crackers were replaced by symbols of increasing abstraction (by two vs. five stones, two vs. five colored dots, a picture of a mouse and an elephant). Replacing the real crackers with symbols created a psychological distance that made it easier for the children to inhibit their dominant emotional action impulse (to reach for the “more”). If the symbols, however, became too “abstract,” another explanation of the children’s success seems more reasonable: Abstract objects were just less emotionally appealing and, therefore, did not elicit a dominant action impulse anymore that the child had to inhibit.

Saltz, Dixon, and Johnson (1977) have shown that intensive and extensive pretend play can also explicitly school the competence to engage in reflective emotion regulation in a pretense training program for economically disadvantaged preschool children: Children who were trained in thematic fantasy play enactment performed better on an inhibition task (to guard a desired toy but not touch it) than children to whom fantasy stories were only read or a control group.

Mental Reappraisal of the Situation

However, the interesting question is whether cognitively reinterpreting the situation with the help of purely verbal means can also create such psychological distance. Mischel and his colleagues carried out a series of successful experiments on this issue in the 1970s. They showed that verbal reinterpretations effectively helped 3- to 6-year-old children to inhibit their spontaneous emotion readiness during a delay of gratification task and wait not only longer but in a more relaxed way. However, Mischel and Ayduk (2004) interpreted these experiments only as confirming a successful attentional deployment. They failed to draw the more far-reaching conclusion that what makes attentional deployment and action control possible is the verbal input and the reinterpretation of the situation that this elicits.

For example, children were able to wait longer (around 18 min) when they were shown the real reward but told to imagine that it was placed in a picture frame as if it were only a “picture of the reward.” As one child commented, “You can’t eat a picture.” The reinterpretation also worked in the opposite direction: Children were unable to wait nearly as long (less than 6 min) when shown pictures of the reward but told to imagine that it was the real reward (Moore, Mischel, & Zeiss, 1976). When children who were seeing the reward were told to imagine that marshmallows were “white, puffy clouds” and pretzels were “little, brown logs,” they once again managed to wait longer (around 13 min). And, vice versa, when told to imagine that the marshmallows were “yummy, and chewy” and the pretzels “salty and crunchy,” they could wait for only 5 minutes (Mischel & Baker, 1975).

Conclusions

Three- to 6-year-old children spend a lot of time engaging in pretend play. Its significance for learning reflective emotion regulation is that they use language (and initially also substitute objects) to create fictitious frames of reference toward which they then successfully direct their current actions. The extensive pretend play in this age group can also be interpreted as a “school” of psychological distancing in which children learn to interpret current situations within a completely different frame of reference, thus enabling them to distance themselves from the immediate situational pressure to act.
MENTAL TIME TRAVEL AND REFLECTIVE EMOTION REGULATION

One cognitively advanced means of psychological distancing and reflective emotion regulation is being able to *mentally imagine* satisfying an elicited motive in the future. If, for example, you are standing at the bus stop outside the ice cream parlor waiting for a bus, you can deactivate the immediate action readiness (to eat a tasty ice cream) by mentally imagining that you could walk back to the ice cream parlor later in the day with your children. What is special about this is that it is not a prolonged volitional inhibition of the desire, but its temporary deactivation until the future situation comes about (Bischof-Köhler, 2011). Once this advanced form of psychological distancing has been mastered, a mental imagination of a future satisfaction situation is all that is needed to deactivate the elicited motive and thereby also the attendant emotional action readiness. Bischof-Köhler (2000, 2011) calls this form of reflective emotion regulation deferring motives through mental time travel.

Suddendorf and Corballis (2007) consider this ability to engage in mental time travel—that is, to free oneself from the conditions of the immediate situation and direct one’s actions toward the conditions of a future situation instead—as being a uniquely human ability (see also Bischof-Köhler & Bischof, 2007; Corballis, 2009). It is only such an ability that makes it possible to successfully resolve current motive conflicts by organizing the satisfaction of single (or even contradictory) motives one after the other.

The ability to engage in mental time travel emerges during preschool age. Busby and Suddendorf (2005) asked 3- to 5-year-old children about past events that had really happened and possible future events. Only a minority of the 3-year-olds were able to report past and future events correctly, whereas a significantly larger proportion of 4- and 5-year-olds could make correct reports, although they also still made mistakes (see also Atance, 2008). Bischof-Köhler (2000) asked 3- to 5-year-old children to estimate the duration of events (estimating how long hourglasses take to empty and the duration of familiar activities). The number of correct answers rose from 0–4% in the 37-month-old children to 56–87% in the 55-month-old children.

Bischof-Köhler (2000) has also reported some very interesting findings on the relation between a time concept and reflective emotion regulation: One task contained a delay of gratification and the second task a motive conflict between two equally attractive activities (waiting in front of a machine that randomly coughed up single candies or watching a cartoon). The conflict was being unable to engage in both at the same time, and therefore having to apply a “successful time planning.” Ninety-two percent of those children who engaged meaningfully in something else while they were waiting during the delay of gratification task (meaning that one could say that they temporarily deactivated their desire for candy), possessed a time concept. In contrast, only 32% of the children who remained fixated on the reward or waited without engaging in another activity possessed a time concept. The last-mentioned behaviour cannot be interpreted as deactivation but as “only” a temporary inhibition of the still-persisting desire for candy. The conflict task produced a comparable pattern of results: 76% of the children who solved the conflict task by “time planning” had a time concept compared to only 39% of the children who shuttled between the two activities. Accordingly, a competent time concept is decisive for a real motive deferment in the sense of temporarily deactivating the specific motive (and not just inhibiting the action impulse while the motive continues to be activated).

Conclusions

The precondition for temporarily deferring the satisfaction of a motive or for successfully managing a motive conflict by applying the strategy of mental time travel is an understanding of what time is, and what it means to forgo something right now but to be able to do it later. Such an understanding enables individuals to distance themselves psychologically from the imperatives of a current situation and imagine a future situation in which they can anticipate their motive being satisfied. The certainty that this future is possible deactivates the elicited motive so that one can turn to actions that will satisfy another motive.
CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

Emotion regulation is a dynamically developing field of research. It started with cross-sectional and longitudinal field studies on the correlations between global constructs of emotion regulation and their social and psychological framing conditions (assessed as sum scores on, e.g., effortful control, knowledge about emotions, social status, parental support). During the last 10 years, these global constructs have been specified more precisely, particularly through analyses of the relation between emotion regulation and executive functions (deploying attention, complying with rules, and controlling for errors). The focus here has been on a narrow understanding of emotion regulation as the volitional regulation of emotions. Experimental designs should help to uncover the microgenetic mechanisms of this regulation process; that is, those mechanisms that permit volitional control of an elicited emotional action readiness. The concepts and findings reviewed in this chapter can be used to derive three questions for future research.

HOW DOES THE DEVELOPMENT OF REFLECTIVE EMOTION REGULATION (HOT EF) RELATE TO THE DEVELOPMENT OF VOLITIONAL ACTION REGULATION (COOL EF)?

Both the volitional regulation of actions and the volitional regulation of emotions emerge during the same age period of 3 to 6 years, and they draw on the same means; namely, language (particularly private speech and pretense). However, intercorrelations are not high enough to justify merging them both into one single competence. To find out more about the specifics of these two competencies—volitional action regulation that has been related to cool EF and reflective emotion regulation that has been related to hot EF—how they emerge, and how they relate to each other, we consider that future research needs to pay attention to two aspects:

- **Separating competence from performance.** In many studies, the spontaneous emotion regulation of children has been observed. Although this research strategy is noteworthy in its own right, it does not enable the testing of the limits of a child’s competence. Therefore, there is a need for studies that ask children explicitly to regulate their emotions (or their actions) volitionally. This is the only way to distinguish clearly between performance and competence and identify what motivation contributes to performance.
- **Systematically varying the demands of the regulation task.** There is a need for studies that systematically vary the level of demands on emotion regulation through a careful selection and construction of tasks. For example, in order to control an emotionally elicited action readiness, it is possible to construct different levels of demands: Does a child merely need to avert his or her gaze, or autonomously generate a more or less complex action alternative (tasks on expression control or motive conflicts), or even engage in mental imagination to regulate his or her emotion? Only such studies will make it possible to specify more clearly the relations between the development of the volitional regulation of actions and the development of the volitional regulation of emotions.

HOW CAN THE PROXIMAL CONDITIONS OF REFLECTIVE EMOTION REGULATION BE SPECIFIED?

Empirical studies have delivered relatively well confirmed and unequivocal findings indicating that the development of reflective emotion regulation relates to distal determinants such as the familial and social environment, general intellectual and verbal development, and knowledge about emotions. There is less clarity and less certainty about the findings on the proximal conditions and microgenetic mechanisms; that is, on the question of how children learn to regulate their immediate emotional action readinesses in line with higher ranking goals and motives. One very promising line of research would be to carry out experimental studies that systematically analyze the effect of using verbal
means (private [and inner] speech as self-instruction or as a reinterpretation of the situation) on the successful regulation of emotions. Vygotsky’s co-constructivist approach can be used to derive the hypothesis that the child’s reflective emotion regulation is initially carried out by the caregiver on the child’s behalf. It is only through imitation and internalization that the child goes on to carry it out alone. From this perspective, the (verbal) regulation strategies of caregivers and their children should be similar. This hypothesis could be tested with experimental designs giving children of various ages reflective emotion regulation tasks in a solitary situation versus a social situation and systematically comparing the competencies they display with the strategies of their caregivers. This would also include a systematic variation of social prompts to promote or prevent private speech and reinterpretations. Findings from such studies could also be used in the design of training programs.

**WHAT IS THE ROLE OF CHILDREN’S PRETEND PLAY IN THE DEVELOPMENT OF REFLECTIVE EMOTION REGULATION?**

Most concepts and studies addressing the social strategies for communicating reflective emotion regulation have described and analyzed four paths of communication: direct commands, proposals on how to reinterpret the emotional episode, imitational learning, and discussions about emotions (Thompson, 1990). Up to now, hardly any attention has been paid to the influence of children’s pretend play, which we have described in this chapter as a school of psychological distancing. It is only recently that studies on the development of emotion regulation have also started to examine play scenarios and uncovered effects of play behavior indicating that children with well-developed play abilities are also able to regulate their emotions more effectively (Galyer & Evans, 2001).

This is in line with studies confirming the positive effects of advanced play on the processing of failures and critical live events, on learning social rules and action scripts, and on the volitional control of one’s own behavior (Denham et al., 2001; Lindsey & Colwell, 2003; Pearson, Russ, & Spannagel, 2008). These are all situations for applying reflective emotion regulation. An inspection of the literature on the psychology of play from the perspective of emotion regulation could deliver new ideas for designing (experimental) studies on the development of regulation competencies at preschool age. It could also provide ideas for the design and evaluation of developmentally appropriate interventions (Denham & Burton, 2003; DiCarlo & Reid, 2004; Moore & Russ, 2006).

**THEORETICAL OUTLOOK: THE FUTURE FRAME OF REFERENCE TO BE FOUND IN BOTH VOLITIONAL AND REFLECTIVE REGULATION**

In the section on learning and applying mental time travel as a regulation strategy, our analysis of reflective emotion regulation already went beyond the present and included a modeling of the future (see also Kopp, 1997). Gross and Thompson (2007) also include this reference to the future in their classification of regulation strategies along the time dimension. They distinguish antecedent-focused strategies serving situation selection, situation modification, attentional deployment, and cognitive change from response-focused strategies serving “only” the control and modification of the expression (response modulation) (see also Curtis & D’Esposito, 2009). Accordingly, an appropriate situation selection, situation modification, and attentional deployment can already be an effective means of completely avoiding getting into situations that oblige one to regulate emotions volitionally.

However, in such a future-oriented planning of actions, the volitional regulation of action and the reflective regulation of emotions merge together. Here is where the competencies to imagine future action realistically and to engage in efficient, motive-related, and context-related action planning come into play. However, their acquisition and development take place at a later age. In this chapter, we have examined their initial emergence during preschool age. There is some justification for hoping that the lines of research reported here will contribute to not only greater insights but also an integration of theoretical work on the relations between cognitive and emotional development.
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References


A Developmental Framework of Self-Regulation


