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Development of Self-Regulation in Context[1]

In this article, we aim to contribute to an understanding of the limits of intentionality from a child development perspective. Here, we define intentionality as goal-directed agentic behavior. Intentions encompass cognitive representations of goals and of means that organize behavior and that are directed to a particular goal (i.e., action plan; see Gollwitzer, 2012; Wieber, Thürmer and Gollwitzer, this volume). Intentions also include the motivation to pursue a goal in order to achieve a desired outcome (Bratman, 1999; Malle, Moses and Baldwin, 2001; Tomasello, Carpenter, Call, Behne and Moll, 2005). More precisely, we focus on self-regulation as intentional behavior that is constitutive for human agency. We conceive of self-regulation as the motivation and ability to guide goal-directed behavior over time and across different situational contexts in the process of goal attainment in order to transfer intentions into behavior and to achieve a desired result (Karoly, 1993). Self-regulation as intentional behavior can be limited by internal (e.g., temperament) and external factors (e.g., parenting) throughout development. In this regard, limits of intentionality may induce incomplete goal attainment (Suchodoletz and Achtziger, 2011; Wieber, Gollwitzer and Seebaß, 2011).

Contextual conditions can have positive and negative influences on the development of self-regulation. Interactionist perspectives point to the active role of the agentic individual within a dynamic person–environment system (*developmental contextualism*; Lerner and Walls, 1999; Magnusson and Stattin, 2006). Cognitive, emotional, and motivational variables (e.g., self-representations) and underlying biological processes are assumed to shape individuals' interactions with their environments, and vice versa (see also Blair and McKinnon, this volume). Self-regulation develops through individuals' intentional activities in different contexts during development throughout the life-span. Referring to Bronfenbrenner's bioecological approach (Bronfenbrenner and Ceci, 1994), the child's microsystem interacts reciprocally with the immediate environment, for instance in the family or the school context. This includes bidirectional effects

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of the child's characteristics and culturally shaped relationships with socialization agents (Trommsdorff, 2006; Trommsdorff and Kornadt, 2003). The behavior of socialization agents (e.g., parents, teachers) is guided by their intentions to socialize children and influence children's emotional, social, and cognitive development in line with prevailing cultural norms and values. At the macro level, collectively shared intentions are represented by cultural values and belief systems (Markus and Kitayama, 1994), which shape socialization agents' and children's intentions (Trommsdorff, Cole and Heikamp, 2012). Culture-specific modes of thinking, feeling, and acting are transmitted through socialization processes of norms and values that organize internalized intentions that in turn, guide individual behavior (Trommsdorff, 2009; Trommsdorff and Rothbaum, 2008).

This view also emphasizes that children are not passive recipients of the socialization efforts in their environment or biological factors. Children are intentional agents who influence the course of their own development by actively seeking information and creating their own "developmental niche". For instance, children intentionally choose settings of social interactions according to their own interests and preferences. This implies that children acquire knowledge about other individuals' intentions and goals (e.g., parental expectations, rules of conduct) and develop personal goals through active interactions with their environments.

Different motivational processes can be distinguished that explain why individuals engage in goal-directed behavior. Whereas intrinsically motivated activities do not demand external control, extrinsically motivated activities are instrumental for attaining a rewarding outcome (Ryan and Deci, 2000). Indeed, curiosity and active exploration promote the differentiation of competencies in more specific personal interests and goals. Early in development, behavior is motivated by the enjoyment of the activity itself. During the second year of life, children's behavior becomes more outcome-centered. Activities are more likely to be motivated by the goal to intentionally cause effects in the environment that are perceived as pleasurable. As children learn to autonomously initiate and control activities (*wanting to do it oneself*), self-evaluative emotions (e.g., pride, shame) become important for goal setting and task motivation. Goal setting and related goal-directed behaviors are increasingly motivated by anticipated feelings of pride or shame related to success or failure, respectively (*hope for success/fear of failure motive*; see Heckhausen, 1987). When children begin to develop self-imposed standards of competence, at the same time caregivers expect that children follow externally imposed rules (e.g., to refrain from prohibited behavior). Thus, early in development children do not only acquire a rudimentary sense of self and feeling of competence that motivates them intrinsically to engage in goal-directed behaviors, they also have to learn that it is important to perform socially

desirable behaviors, particularly activities that are not pleasurable (Ryan, Deci, Grolnick and La Guardia, 2006). Social requests or rewards motivate behavior in the extrinsic domain. A greater degree in internalization is seen when a child identifies with the value of a behavior and considers it as important for his or her own goals by experiencing a greater degree of choice (Ryan and Deci, 2000; Ryan et al., 2006). However, individual differences exist with regard to the subjective importance of specific values, goals, and motives that elicit goal-directed behaviors. For instance, gender differences have been reported with regard to the subjective importance children and adolescents place on sports and social activities and with regard to students' interests in science at school age and competence beliefs boys and girls hold in the respective domains (Wigfield, Eccles, Schiefele, Roeser and Davis-Kean, 2006). Moreover, some studies reported that boys are more performance oriented (i.e., to achieve a high level of performance) than girls, although findings with regard to gender differences in goal orientation are mixed (Anderman, Austin and Johnson, 2002). Albeit gender effects are small, internalization of negative gender-role stereotypes can adversely affect children's ability self-concepts and related achievement motivation (Wigfield et al., 2006).

In order to achieve superordinate goals such as academic success the successful accomplishment of intermediate goals (e.g., attending class, fulfilling course requirements) is necessary. As intermediate goals are instrumental in order to attain a desired outcome in the future they can challenge children's self-regulation differently. Thus, regardless whether their goals are intrinsically or extrinsically motivated, children engage in intentional action that requires the motivation for and ability of self-regulation in order to sustain goal-directed behavior and to attain these goals and related outcomes. The development of self-regulation as motivated, goal-directed behavior is guided by the intention to regulate emotion and behavior in order to pursue and attain individual or collectively shared goals and related desired outcomes (e.g., the goal to comply with rules of conduct, to act prosocially, or to achieve academic success). Thus, development of the motivation and ability to intentionally self-regulate both influences one's flexibility and ability to adapt to different social-cultural contexts as well as promotes internalization of the norms, values, and goals of the groups to which one is striving to adapt (Trommsdorff, 2007, 2009, 2012). Limits in the development of intentionality (e.g., temperament or nonsupportive parenting) may hamper the development of self-regulation. Throughout the child's development, limits of intentionality and its effects on self-regulation may change depending on the context and the developmental domains.

According to a functionalist approach, emotions influence the selection, initiation, and execution of actions in the process of goal attainment. Emotions may limit or activate intentionality. Therefore, emotions and behavior regulation

are specific aspects within the broader domain of self-regulation (McClelland et al., 2007; Trommsdorff, in press), and are inherently fundamental functions for intentional goal attainment. Specifically, emotion regulation refers to the motivation and ability to influence the onset, intensity, and duration of both negative and positive emotions in order to change the experience, physiological arousal, and/ or behavioral concomitants of emotions to achieve individual or social goals (Eisenberg and Spinrad, 2004). Emotion regulation as motivated, goal-directed process is thereby constitutive for the development of agency in infancy and throughout childhood (Kopp, 1989), and presumably throughout the life span (McClelland, Ponitz, Messersmith and Tominey, 2010). In contrast, behavior regulation primarily denotes the ability to regulate behavior in order to delay a gratification, to resist a temptation, or to follow rules of conduct (Mischel, 1996; Thompson, Meyer and McGinley, 2006).

Major developmental changes regarding emotion and behavior regulation accrue from children's maturation and social experiences. Although emotion and behavior regulation are interrelated (Raffaelli, Crockett and Shen, 2005), they are each related to different processes of socialization (Grusec and Davidov, 2010). Moreover, an important factor in the development of emotion and behavior regulation is inhibitory control. Different forms of inhibitory control have been distinguished (e.g., interference control, automatic and intentional inhibitory mechanisms of attention; see Friedman and Miyake, 2004). Here, we aim to investigate inhibitory control as a part of executive functions, which serve to plan and initiate actions and to regulate emotion and behavior (Logan, 1994). Accordingly, inhibitory control is intentional behavior that contributes to the development and performance of higher order voluntary self-regulatory processes (e.g., emotion and behavior regulation) by suppressing inadequate responses (Diamond, 2005; see also Grzyb, this volume).

In summary, we aim to contribute to an understanding of the limits of intentionality from a child development perspective by investigating the development of self-regulation in context. The aforementioned research topics are related to and informed by theoretical approaches and findings from different disciplines such as cognitive psychology (e.g., executive functions; see Grzyb; Blair and McKinnon, this volume), motivational psychology (e.g., cooperation; see Wieber et al., this volume), and philosophy (e.g., intentionality; see Schmitz; Searle, this volume). Our approach aims to disentangle the personal and contextual factors underlying the development of individual agency and, therefore, lead to insights into how the limits of intentionality are shaped by both individual (e.g., temperament) and contextual factors (e.g., parenting, culture).

First, we outline relations between prerequisites for an understanding and performance of intentional action in infancy and children's development of self-

regulation in the family context. Second, reciprocal processes between different microsystems (i.e., individual, family, school) are further examined with regard to their implications for children's development of self-regulation and functioning across different contexts. Finally, in line with Trommsdorff (2012), we raise the question of how cultural values and belief systems are related to children's development of intentional self-regulation through socialization processes.

1 Development of Self-Regulation

Although newborns are endowed with rudimentary reflexes used for modulating arousal (e.g., self-soothing; Mangelsdorf, Shapiro and Marzolf, 1995) and engage in early regulatory behaviors (e.g., thumb sucking; Geangu, Benga, Stahl and Striano, 2011), emotion and behavior are basically regulated through social interactions with caregivers. Caregivers respond to children's distress with soothing behaviors and by providing need-fulfilling routines (e.g., sleeping, feeding). Between 2 and 5 months, children associate specific actions (i.e., body movements) with desired effects and develop mental representations of goal-directed behavior indicated in behavioral schemata (Piaget, 1952). Later, children differentiate between goals and means and learn to coordinate different means in order to achieve a desired outcome (Gergely, 2011). The so-called 9-month revolution (Tomasello, 1999) allows children to understand other persons' actions as goal-directed behavior (Behne, Carpenter, Call and Tomasello, 2005) and to engage in joint interactions with other individuals (Tomasello, Carpenter and Liszkowski, 2007).

The transition to the second year is marked by the development of the self-concept and self–other differentiation (Harter, 2012). At this age, children respond to persons who express signs of distress (Roth-Hanania, Davidov and Zahn-Waxler, 2011). These are important precursors for prosocial behavior at preschool age (Eisenberg, Fabes and Spinrad, 2006; Trommsdorff, Friedlmeier and Mayer, 2007). During the second year, children tend to provide helpful information for others (Liszkowski, Carpenter, Striano and Tomasello, 2006), to engage in cooperative behavior with shared goals and shared intentions (Tomasello, 2005), and to follow rules of conduct (Kochanska, Tjebkes and Forman, 1998). At this age, children also begin to realize that other persons' goals do not always match their own intentions (*goal-corrected partnership*; Bowlby, 1969). Recognizing that other persons' emotional reactions can be different from their own experience, children refer to the emotional expressions of others to interpret the meaning of ambiguous situations and infer how to behave (*social referencing*; Repacholi and

Meltzoff, 2007). In these contexts, children learn how to regulate emotion and behavior in order to meet social expectations.

Between 2 and 3 years of age, children seek support from caretakers in emotionally demanding situations because needs and intentions can be reciprocally communicated in social interactions (Friedlmeier and Trommsdorff, 1998; Holodynski and Friedlmeier, 2006). A further developmental change around the age of 4 is enabled by introspection and metacognition, which are necessary for the development of new cognitive skills such as the ability to reflect upon mental states (i.e., theory of mind) and the ability to envision past and future states of desire (i.e., mental time travel), thus fostering more flexible, intentional self-regulation (e.g., delay of gratification; Bischof-Köhler and Bischof, 2007). Most important, perspective taking enables children to anticipate social expectations and to evaluate themselves and their behavior through the eyes of others, developing representations of their self (*looking-glass-self*; Harter, 2012). At school age, children develop increasingly realistic and accurate perceptions of their abilities (Harter, 2012). Setting challenging yet realistic goals promote positive mastery experiences and self-evaluations that foster commitment and increased effort to maintain self-regulation over time and in face of difficulties (Bandura, 1997).

In summary, the development of self-regulation can be described as a process that takes place in social interactions with caregivers. Infants are endowed with the disposition to attend to social stimuli and to recognize human beings as intentional agents with whom they are willing to cooperate – qualities that are important for the development of the motivation and ability to regulate voluntary action. Moreover, children learn to respond to their social world in line with cultural models provided by their caregivers who attempt to ensure successful adaptation. In the next section, we discuss socialization processes of self-regulation in different contexts.

2 Socialization of Self-Regulation

Research widely acknowledges the positive effects of self-regulation for individuals' adaptation across contexts and over the life-span (e.g., academic achievement, prosocial behavior; Eisenberg et al., 2006; Moffitt et al., 2011; Trommsdorff, 2007, 2009, in press). Self-regulation implies different goals and behaviors that are related to the prevailing values in a cultural context (Trommsdorff, 2007; Trommsdorff and Cole, 2011; Trommsdorff and Rothbaum, 2008). Therefore, self-

regulation can be a result of the intention to achieve an optimal balance between autonomy and relatedness (i.e., independence/ interdependence).

A key to understanding the relation between attachment and the development of self-regulation is the assumption that the attachment behavioral system functions as a biologically based, goal-directed, adaptive system of dyadic affect regulation (Cassidy, 1994). Investigations of the balance of attachment and exploratory behaviors under laboratory conditions (*strange situation*; Ainsworth, Blehar, Waters and Wall, 1978) have demonstrated that after experiencing separation the attachment system is activated, and infants seek closeness to their caregiver. Thereby, early relationship experiences provide a fundamental basis for the development of mental representations of the self and the social world that are integrated in relatively stable *internal working models* (Bowlby, 1969). They help children to explain and predict others' intentions and actions and to structure the direction and strength of self-regulation (e.g., Heikamp, Trommsdorff, Druey, Hübner and Suchodoletz, 2012). The development of regulatory processes is based on both a need for exploration that motivates the child to interact with the environment and a complementary need for attachment. However, the *universality hypothesis* of attachment theory has been challenged by pointing to cultural differences regarding parental goals in sensitivity: fostering either independence or interdependence (Rothbaum and Trommsdorff, 2007; Rothbaum, Weisz, Pott, Miyake and Morelli, 2000).

Attachment research has revealed positive relations between attachment security and compliance with behavioral standards (Thompson et al., 2006), internalizing and externalizing behavior problems (Pasco Fearon and Belsky, 2011), and emotion regulation (Calkins and Leerkes, 2011). Based on a meta-analysis, De Wolff and van IJzendoorn (1997) reported that different aspects of parenting (e.g., responsiveness, positive expressivity) promote the development of attachment security. The *sensitivity hypothesis* posits that development of attachment security and self-regulation depends on attachment figures' responsiveness to children's signals (van IJzendoorn and Sagi-Schwartz, 2008). In a meta-analysis of 41 studies, Karreman, van Tuijl, van Aken, and Dekovic (2006) found rather weak effects regarding relations between parenting behavior and development of self-regulation in preschool-aged children. Darling and Steinberg (1993) argued that parenting behaviors can influence developmental outcomes, whereas parenting styles (e.g., authoritarian, authoritative; Baumrind, 1967) provide contexts that influence a child's "willingness to be socialized" (Darling and Steinberg, 1993, p. 493). This means that parenting behaviors function differently in children's development and are moderated by the context and nature of parent–child interaction (Grusec and Davidov, 2010; see also Davidov, this volume). In line with this reasoning, we take a context-specific approach to socialization, asking

which aspects of parenting behavior are relevant in the development of self-regulation. In the next section, we will discuss the role of specific parenting behaviors (e.g., warmth, responsiveness) for the development of different aspects of self-regulation (i.e., emotion and behavior regulation, inhibitory control). Thereafter, the role of children's individual dispositions (i.e., temperament) in the relation between parenting behaviors and the development of self-regulation is further discussed.

2.1 Socialization of Self-Regulation in the Family Context

According to Morris, Silk, Steinberg, Myers, and Robinson (2007), children learn through observations in the family which emotions are expected in specific situations and how these emotions can be regulated. The general emotional climate provides the emotional background for family interactions. Moreover, children's emotion socialization is related to caregivers' responses to their children's emotions. Whereas caretakers' responsiveness to distress is positively associated with the regulation of negative emotions, warmth (i.e., positive affect) is positively related to regulation of positive emotions (Davidov and Grusec, 2006b). Responsiveness to distress is linked to the protection domain in which a child is in need, attends to a caregiver, and intends to seek support. In contrast, warm parent–child interactions are characterized by reciprocity and collaborative activities with shared goals and intentions between child and caregiver, through which children learn to express socially engaging positive emotions (Grusec and Davidov, 2010). In addition to the positive links of parental warmth to the regulation of positive emotions, several studies have provided evidence in favor of positive relations between behavior regulation and warmth (e.g., Davidov and Grusec, 2006a; Laible and Thompson, 2000). Therefore, we assume here that development of self-regulation (and its different aspects) is related to situation-specific socialization processes (see also Davidov, this volume).

In line with this reasoning, Grusec and Goodnow (1994) postulated that warmth creates a context of reciprocity and promotes children's behavior regulation. Hence, Suchodoletz, Trommsdorff, and Heikamp (2011) investigated links between parenting behavior (i.e., warmth, responsiveness) and children's behavior regulation and internalization of rules of conduct. Children's observed motivation and ability to follow instructions in two regulation tasks (e.g., delay task) was positively related to maternal warmth. In contrast, mothers' reports on children's internalization of rules were positively associated with mothers' reactions to children's distress, but not to maternal warmth. These results may indicate an indirect effect of mothers' responsiveness on the internalization processes

through children's motivation and ability to regulate negative emotions when disciplined. For example, Cole et al. (2011) reported positive relations between self-initiated distraction behavior during a delay task and children's anger regulation suggesting "that development of self-regulation can be understood as the development of integration across domains" (Cole et al., 2011, p. 1087). As emotion and behavior regulation are interrelated during the course of socialization, these findings indicate reciprocal effects.

Regarding the development of inhibitory control – an important form of intentional control that is needed to perform goal-directed behavior – several findings suggest direct relations between attachment and inhibitory control, although empirical research on such links is scarce. Mothers of securely attached children were more likely to attend to their children's intentions and tended to structure children's behavior appropriately by adjusting their instructions in response to their children's abilities (Meins, Fernyhough, Russell and Clark-Carter, 1998). Accordingly, empirical evidence has shown that mothers' autonomy support is linked to inhibitory control (Bernier, Carlson and Whipple, 2010). Emergence of compliant behavior coincides with the development of inhibitory control, which is marked by the maturation of biological control systems in the prefrontal brain (Pechtel and Pizzagalli, 2011), and is related to attachment formation in infancy (Schore, 2000). In order to examine links between attachment security, inhibitory control, and internalization of rules of conduct, preschool children's inhibitory control was observed during a stop task in a further study (Heikamp et al., 2012). The results revealed that children's intentional inhibition of ongoing responses was positively related to mothers' reports on children's internalization of rules of conduct. Moreover, there was an indirect effect of children's attachment security on internalization of rules of conduct mediated by inhibitory control. These findings contribute to previous results suggesting that attachment security promotes children's willingness to internalize rules of conduct because caregivers of securely attached children share positive affect and use inductive reasoning to help children to understand the consequences of their behavior (Laible and Thompson, 2000). However, the results on relations between attachment, inhibitory control, and internalization indicate that a secure attachment also plays an important role for the development of an appropriate regulatory mechanism (i.e., inhibitory control) that facilitates children's ability to transfer intentions into compliant behavior (Heikamp et al., 2012).

2.2 Gender and Temperamental Differences in the Socialization of Self-Regulation

Effects of parenting behavior on children's development are very likely to be moderated by individual characteristics of the child (Trommsdorff and Kornadt, 2003). Boys, in comparison to girls, tend to be less able and less motivated to control aggressive behavior (Knight, Guthrie, Page and Fabes, 2002). Boys have also more difficulties regarding executive functioning (e.g., inhibitory control; Else-Quest, Hyde, Goldsmith and van Hulle, 2006) and resisting temptations (Silverman, 2003) than do girls. Cross, Copping, and Campbell (2011) discuss to what extent these findings reflect gender differences in self-regulation or result from a greater tendency of males in comparison to females to engage in impulsive and risky behaviors. Parents are more likely to demand compliant behavior and less likely to accept inappropriate behaviors (e.g., aggressive behavior) from girls than from boys (Mills and Rubin, 1990). Gender differences in parents' reactions to children's emotions and behavior may reflect culturally transmitted gender-role expectations, for instance, with regard to the regulation of emotions (submissive vs. assertive emotions; Chaplin, Cole and Zahn-Waxler, 2005).

Because biologically based individual differences in temperament are though to be influenced by social experiences early in development, additive and interaction effects of parenting and temperament on the development of self-regulation have been subject to research (Rothbart and Bates, 2006). Kochanska (1995) found that fearful children, in comparison to less fearful children, were more motivated and better able to internalize rules of conduct if their mothers' parenting behavior was characterized by positive control (e.g., reasoning, structuring). However, negative parental control (e.g., criticism, physical intervention) was positively related to children's compliance with rules of conduct in fearless but not in fearful children. Moreover, relations between parenting quality and certain child outcomes tend to be stronger for children with difficult temperaments (e.g., negative emotionality) than for children with less difficult temperaments. Kim and Kochanska (2012) have pointed out that the quality of the mother–child relationship (i.e., mutual responsive orientation) had stronger effects on children's development of intentional self-regulation when infants were prone to negative emotionality early in development and less effect with children who were better able to regulate their emotions in infancy. These findings illustrate that the investigation of dynamic interactions of personal (e.g., temperament) and environmental factors (e.g., parenting) can help to understand how limits of individual action control change during the course of development. Moreover, parenting quality (e.g., sensitivity) in infancy had stronger positive effects on children's school adjustment (i.e., social competence) in first grade for infants with difficult

temperaments (e.g., negative mood; Stright, Gallagher and Kelley, 2008). This result also points to the specific demands that are made on children's motivation and ability to self-regulate when entering the school context. Relations of self-regulation to social competence and academic achievement in the school context will therefore be discussed in more detail in the next section, while also referencing the role of parents.

2.3 Self-Regulation in the School Context

The transition from kindergarten to elementary school is marked by contextual changes concerning achievement and social demands (Kagan and Neuman, 1998). Students are expected to obey rules, to cooperate with their classmates, and to adjust to achievement standards (McIntyre, Blacher and Baker, 2006). For a successful transition and adaptation to the school context, the motivation and ability to self-regulate has been shown to be a central prerequisite (McClelland et al., 2007; McIntyre et al., 2006; Morrison, Ponitz and McClelland, 2010). Several studies have demonstrated the importance of emotion (Graziano, Reavis, Keane and Calkins, 2006) and behavior regulation (Blair, 2002; Blair and Razza, 2007; Hughes, Ensor, Wilson and Graham, 2010) above and beyond intelligence for early and later academic achievement. These findings have been replicated and further extended in a German sample of kindergarten children, where behavior regulation predicted both later academic achievement and social outcomes in elementary school better than nonverbal intelligence did (Suchodoletz, Trommsdorff, Heikamp, Wieber and Gollwitzer, 2009). These results indicate that intentional control of goal-directed behavior is conducive for the pursuit of academic achievement and social goals in the school context.

As outlined earlier, contextual factors (e.g., parenting in the familial environment) and individual characteristics (e.g., temperament) influence the development of self-regulation (Calkins and Howse, 2004; Suchodoletz et al., 2011). Thus, individual differences already exist for the motivation and ability to self-regulate before entry to formal schooling (McClelland et al., 2007; Suchodoletz et al., 2009). Having problems with behavior or emotion regulation in structured learning contexts can have negative consequences for later social and academic outcomes, whereas higher intentional control of goal-directed behavior may foster positive social and academic development. Thus, limits of intentionality become apparent when children are prone to academic failure because they lack the necessary self-regulation skills to resist competing temptations in the school context (e.g., not getting distracted and attending to the teacher in the classroom). More specifically, in a German longitudinal study behavior regulation at preschool

age was positively related to later school performance (Suchodoletz et al., 2009). Children who were able to inhibit undesirable behavior and to comply with rules of conduct, assessed with observational measures at kindergarten age, achieved better academic performance at first grade (according to teachers' reports and standardized tests) than did children with difficulties in intentional regulation of behavior. Moreover, positive relations between behavior regulation and classroom behavior (e.g., less inattention, less peer problems) revealed that kindergarten children who were high in intentional behavior regulation were better able to adapt to the school context.

Furthermore, emotions influence how children perceive a situation and how they evaluate their capabilities to succeed in striving for a goal. Expecting a school test could arouse fear and/or hope for success. Insufficiently regulated children run the risk of not coping adequately with a test situation (Trommsdorff, in press). Resulting failure may increase emotional distress in the next achievement situation and may result in less successful school performance (Naveh-Benjamin, 1991; Zeidner, 1995). Furthermore, in their heuristic model, Eisenberg, Sadovsky, and Spinrad (2005) highlighted bidirectional and mediating relations between emotion-related regulation and academic achievement. Emerging regulation is thereby influenced by children's language and emotion knowledge. The intention to regulate negative emotions in turn has an impact on academic achievement directly as well as indirectly via children's social competence and academic motivation. That means children's ability to understand their own and others' mental states fosters the motivation and ability to regulate their emotions. With regard to the strategies used to regulate negative emotions in the school setting, results of a previous study by Brdar, Rijavec, and Loncaric (2006) suggest that the use of problem-oriented strategies (e.g., seeking support) is positively related to school performance, whereas emotion-oriented strategies (e.g., avoidance, distraction) are negatively related to school performance at school age. An important goal of emotion regulation is reducing feelings of distress. However, the intention to regulate emotions can be limited by the habitual use of inadequate or even maladaptive strategies that are effective in achieving short-term goals (e.g., feeling better), but are related to undesirable long-term outcomes such as peer rejection or poor school performance.

Successful learning and achievement (i.e., good grades) require attentional and effortful control, persistence, and resistance to temptations over extended time periods (Duckworth and Seligman, 2006). Morrison et al. (2010) found that children who lacked efficient regulation strategies had difficulties in attention control. Furthermore, inhibitory control also appears to be particularly important for school performance because it allows for the regulation of complex cognitive activities and goal-directed behavior (Blair, 2002; McClelland et al., 2007).

Whereas earlier studies on emerging mathematical abilities focused on experience-based knowledge as precursors for later mathematical success (e.g., counting ability), a study of a German sample of fourth graders supported the assumption that children with low inhibitory control were more likely to have difficulties applying cognitive strategies in a flexible way in mathematical problem solving tests (measured as performance in standardized tests) than were students with high inhibitory control (Heikamp et al., 2012, July). This result supports the idea that along with domain-specific precursors, intentional self-regulation also contributes to mathematic achievement (Passolunghi and Lanfranchi, 2012).

However, from a domain-specific perspective, the importance of self-regulation might vary depending on the focused situation in which regulation is needed. More precisely, in their recent study Tsukayama, Duckworth, and Kim (2012) suggested that schoolwork-related and interpersonal self-regulation strategies are both equally important in the school context, but might differ with regard to their relations with academic and social outcomes. That is, students who have difficulty completing assignments without being monitored by the teacher might be well regulated in social interactions working together with other students on a group task, and vice versa. The authors found evidence for their suggestion insofar that having lower schoolwork-related self-regulation was related to decreasing academic achievement over the school year, but interpersonal self-regulation was not related to a decrease in academic achievement. Regarding classroom conduct (regular teacher rating), however, both domain-specific types of self-regulation accounted for comparable variance. Depending on the situation and the pursued goal, different domains of self-regulation are activated. This domain-specific view of self-regulation implies that certain conditions may either facilitate or restrict individuals' motivation and ability to regulate their behavior in a way sufficient to achieve the goal and related desired outcome. These findings indicate that interactions between individual characteristics and contextual conditions influence the ability to translate intention into action and to sustain it.

Furthermore, the transition to school and related achievement goals are influenced by other factors outside the individual, such as characteristics of the family (e.g., family learning environment, parents' educational expectations) and school context (e.g., child–teacher relationship, class composition; Pianta and Rimm-Kaufmann, 2006). Thereby, parents serve as important socialization agents influencing children's social and academic adaptation to the school context. Limits of intentionality in contextual conditions (e.g., interaction experiences in the family) can have positive and negative influences on goal-directed behavior and the motivation to engage in intentional self-regulation in order to achieve social and academic goals. Especially with regard to children's socio-emotional competence in the school setting, parents' differing uses of socialization strate-

gies in response to children's negative emotions play a crucial role (Jones, Eisenberg, Fabes and MacKinnon, 2002). More specifically, non-supportive socialization strategies (e.g., punitive or minimization reactions) were negatively related with socio-emotional competence, whereas supportive socialization strategies (i.e., problem-focused reactions) were positively associated for boys and, on the contrary, negatively associated for girls. Most notably, Jones et al. (2002) found that children with observed negative emotionality at school were especially low in teacher-reported socio-emotional competence if their parents reported using high or average levels of comforting behavior. Hence, parents' frequent use of emotion-focused reactions may be disadvantageous for school-aged children who have difficulties in the intentional regulation of emotions. Furthermore, when parents create a stimulating home learning environment in early childhood positive short- as well as long-term consequences for children's mathematical and literacy abilities may emerge (Korat and Haglili, 2007; Kurdek and Sinclair, 2000). In this regard, Grolnick, Kurowski, and Gurland (1999) have pointed to the importance of parental self-efficacy in tutoring their children. According to the authors, mothers who feel efficacious and perceive themselves as teachers should be more involved in joint cognitive activities with their children (e.g., cultural activities such as visiting a museum together). Moreover, the relation between a stimulating learning environment at home and school achievement was accounted for by parental support and achievement expectations for children's school success (Davis-Kean, 2005). A study by Neuenschwander, Vida, Garret, and Eccles (2007) further revealed that relations between children's performance in standardized achievement tests and parents' educational expectations were mediated by students' self-efficacy beliefs. Children were less able to achieve academic goals when they had low academic self-concepts of ability, which in turn was influenced by their parents' low expectations with regard to children's desired academic outcomes. Thus, children's academic self-concepts are direct predictors of achievement intentions and behavior in the school context.

In addition, the school context itself contains crucial factors that can influence children's adaptation. The quality of the teacher–child relationship in particular can have negative consequences for school attitudes. That is, a relationship marked by less closeness and more conflict might result in higher school avoidance (Silva et al., 2011). Effortful control, however, can serve as an important predictor of school avoidance and liking, as well. In their study involving a sample of low-income children, Silva et al. (2011) found that higher effortful control in children was related to less school avoidance and more school liking. Furthermore, this negative relation was mediated by the quality of the teacher–child relationship. Children's motivation and ability to regulate emotions and behavior might, however, also be advantaged in adaptation to school with regard

to school success. In a recent longitudinal study, intentional self-regulation (i.e., effortful control) at age 6 was positively related to academic achievement 6 years later, and this relation was mediated by children's social functioning (e.g., social competence, externalizing problems) in the intervening school years (Valiente et al., 2011). In this regard, children's ability to regulate their emotions in the school context enables them to develop and maintain positive relationships with peers and be accepted by them, thereby increasing inclusion in classroom activities and high-quality opportunities for learning.

3 Socio-Cultural Context and the Development of Self-Regulation

3.1 Socio-Economic Status and Development of Self-Regulation

In addition to the direct effects of parent–child interaction on children's self-regulation, children's development of intentionality is also indirectly influenced by collective intentions as represented by the wider socio-cultural systems (Bronfenbrenner and Ceci, 1994). The socio-economic and family contexts may function to limit children's developing intentions for self-regulation. Relations between socio-economic status (SES; e.g., education, income, occupational status) and children's development are shaped by family stress processes and parenting behavior (Conger and Donnellan, 2007). There is considerable evidence that even ordinary variations in parenting behavior influence children's stress reactivity (Hane and Fox, 2006) and attachment-related differences in cortisol levels as a physiological marker of stress (Schieche and Spangler, 2005). A culture-informed longitudinal study by Rhoades, Greenberg, Lanza, and Blair (2011) has shown that across European American and African American samples, economic hardship was negatively associated with children's development of executive functions. However, the effect of the families' economic situations differed between European American and African American families depending on the respective family structure (e.g., marital status). In African American families, only the most positive environments without any risk factors were related to better executive functioning, whereas in European American families some family characteristics (e.g., mothers' marital status) were protective factors regardless of the presence of other risks. In general, empirical studies have shown that early life stress is related to the activity of physiological stress response systems and can have negative consequences for the development of intentional self-regulation (Blair, 2010).

It has been suggested that particular combinations of experience-based or biological characteristics and negative environmental experiences may be conducive for negative developmental outcomes. However, Belsky and Pluess (2009) proposed a model that assumes different susceptibilities to negative and positive environmental conditions. In a similar vein, Blair (2010) suggested that very low and very high levels of cortisol can adversely affect the development of self-regulation, whereas moderately high levels of cortisol are positively associated with the development of self-regulation skills (see also Blair and McKinnon, this volume). These findings indicate biologically determined individual differences regarding individuals' sensitivity to contextual influences and the development of self-regulation. These biological factors may be seen as limits for the development of intentional self-regulation.

As discussed above, executive functioning is related to a successful transition to the school context (Blair, 2002; Blair and Razza, 2007), the development of cognitive abilities, and academic performance (Bull and Scerif, 2002). Therefore, the improvement of executive functions is highly important for the development of self-regulation (Diamond, Barnett, Thomas and Munro, 2007). For instance, teaching children self-regulation strategies that are effective at extending the limits of individual action control (e.g., implementation intentions; see Wieber et al., this volume) improves executive functioning in children with ADHD (Gawrilow, Gollwitzer and Oettingen, 2011) and helps school-aged children resist temptations (Wieber, Suchodoletz, Heikamp, Trommsdorff and Gollwitzer, 2011).

3.2 Development of Self-Regulation across Cultural Contexts

In the previous sections, we noted interactions between the family and school contexts and the development of self-regulation and described the function of self-regulation for adjusting to these contexts. However, most studies on self-regulation include samples that can be characterized as Western, educated, industrialized, rich, and democratic (WEIRD), mainly focusing on young adult college students (Henrich, Heine and Norenzayan, 2010). In the following sections, we will therefore address culture-sensitive approaches to the socialization and development of self-regulation by taking into account collective intentions such as values, which influence the developmental context and the individual development of intentional self-regulation.

Culture is conceived here as a dynamic system of collective intentionality, based on shared meanings and practices (e.g., values, beliefs, norms, behaviors) that have evolved from adaptations to environmental contexts, which is transmitted across time and generations (Triandis, 2007). A classification of cultures, for

instance, along a dimension of individualism versus collectivism is too oversimplified to be useful (Oyserman, Coon and Kemmelmeier, 2002). From a developmental perspective, such distinctions fall short of capturing both the dynamic interactions between individuals and their socio-cultural contexts as well as the individual and within-cultural variability in development (Raeff, 2010). Cultural contexts differ regarding the degree to which individual behavior is guided by context-specific norms and the degree to which socially deviant behavior is negatively sanctioned (Gelfand et al., 2011). For example, in East Asian cultures (e.g., Korea, Japan), a higher emphasis on conformity has been reported than has been in Western cultures (e.g., United States, Western Europe). Further, higher academic achievement of Asian students may be linked to a greater motivation and ability to self-regulate (Trommsdorff, in press). These studies raise the question of how collective intentionality is related to limits of individual intentions. More specifically, we focus here on how cultural contexts organize the socialization and development of children's self-regulation.

The development of self-regulation is connected to culturally shaped self-construals, emphasizing either interdependent or independent views of the self (Markus and Kitayama, 1991; Trommsdorff, 2007, 2012). Self-construals accentuating interdependence also include a malleable view of the self (i.e., internal attributes are flexible and can be changed) and attempts to adjust to the external situation by adapting emotion, cognition, and behavior in order to reduce negative impacts from outside the person (i.e., secondary control). In contrast, beliefs in an entity view of the self and the world (i.e., attributes are fixed) emphasizing independence are associated with perceived capabilities to cause changes in the social and physical environment (i.e., primary control) (Rothbaum and Trommsdorff, 2007; Rothbaum and Wang, 2011; Trommsdorff, in press). In this regard, primary and secondary control can be seen as agentic modes of intentional regulation because both reflect the intention to exert control over situations and to cope with challenges (Trommsdorff, 2012; Trommsdorff and Cole, 2011). These differences may explain cultural differences regarding the stronger context-dependence of behavior of East Asians as compared to European Americans (Choi, Nisbett and Norenzayan, 1999).

Depending on the self- and world-views that are emphasized in a given cultural context, different cultural models of agency and self-regulation prevail (Rothbaum and Trommsdorff, 2007) and are related to culture-specific parenting practices (Trommsdorff, 2009). Socialization contexts have been conceptualized in terms of a developmental niche that is characterized by ecological (e.g., climate) and social contexts (e.g., family structure) interrelated with cultural customs (e.g., parenting practices) and psychological characteristics of the caregivers. These contexts function as an interface through which culture influences

children's development (Trommsdorff and Kornadt, 2003). These contexts may imply various limits and chances for intentional self-regulation. Super and Harkness (1986) refer to psychological characteristics of caregivers in terms of collectively shared intentions and beliefs in a particular socio-cultural context regarding socialization, parenting goals, and parenting behaviors (for an overview see Trommsdorff, 2007; Trommsdorff and Kornadt, 2003).

In the pursuit of collectively shared values and socialization goals, parents' behavior differs among cultural contexts. Whereas parents in independence-oriented socialization contexts respond to their children's expression of negative emotions, parents in socialization contexts emphasizing interdependence are more likely to anticipate children's needs through indirect cues in order to avoid their children getting upset (Rothbaum, Nagaoka and Ponte, 2006; Trommsdorff, 2012; Trommsdorff et al., 2012; Trommsdorff and Friedlmeier, 2010; Trommsdorff and Rothbaum, 2008). In socio-cultural contexts that emphasize individuals' autonomy, an open expression of self-focused emotions such as anger or pride is accepted because it indicates a person's authenticity and individuality. However, in interdependent socialization contexts, social relations and relatedness with others are most highly valued (Trommsdorff, 2009, 2012; Trommsdorff and Heikamp, 2013; Trommsdorff and Rothbaum, 2008). In a study by Trommsdorff and Friedlmeier (2010), German children were more likely to express negative emotions when experiencing failure than were Japanese children. In contrast, the intensity of the distress expression was significantly higher for Japanese children than for German children when experiencing another person's misfortune. These findings highlight the influence of the given context (e.g., self- vs. other-focused) on the occurrence of culture-specific emotional reactions, regulatory behavior, and social consequences in the course of development. German in comparison to Japanese preschool children were more likely to help when witnessing another person in need. In contrast, Japanese children, who had rarely experienced adults expressing negative emotions, were overwhelmed by the other person's negative emotions and were unable to respond in a prosocial manner because they became distressed themselves (Trommsdorff et al., 2007).

The ways in which specific emotions (e.g., anger, shame) and their regulation are socialized in line with the overarching collective intentions and values in different cultural contexts are not as well studied. Cole, Tamang, and Shrestha (2006) observed child-adult interactions and interviewed caregivers from two ethnic groups in Nepal (Brahman, Tamang). Brahman caregivers discouraged shame, whereas Tamang caregivers ignored children's anger and provided guidance when children felt ashamed. The Tamang, who have a minority status in Nepalese society, socialize their children's emotion in line with collectively shared intentions to devaluate powerful emotions. Regulation of anger serves not only to

maintain social harmony, but can also motivate to pursue a goal when regulated adequately (Maglio, Gollwitzer and Oettingen, in press). These cross-cultural findings indicate different social functions of the regulation of anger depending on the socio-cultural context (Trommsdorff, 2006; Trommsdorff and Cole, 2011); for example, high caste Brahman and U.S. children were more likely to endorse anger than Tamang children (Cole, Bruschi and Tamang, 2002) who belong to a cultural group in which the development of submissive emotions such as shame is encouraged (Cole et al., 2006; for an overview, see Trommsdorff, 2009).

Analyses of Indian and German mothers' parenting behavior in response to children's negative emotions revealed that, in comparison to Indian mothers, German mothers followed different cultural values and related collective intentions. German mothers were more likely to verbally validate their children's negative emotions (e.g., talking about the child's feelings) in line with values of independent emotion regulation than were Indian mothers. Hence, German mothers' discussion of emotions, reflection, and appreciation of children's feelings are intended to make their children aware of their emotions as part of the self (Heikamp, Mishra, Suchodoletz and Trommsdorff, 2008, July). This strategy of socialization is intended to foster independent self-views and a focus on individuals' dispositions in order to explain intentional behavior. In contrast, Indian mothers' behavior supports context-specific attributions referring to social norms and socio-cultural rules for self-regulation when interpreting individuals' motives and intentions (Miller, 1984). These results are in line with observational cross-cultural studies on Japanese and German mother–child interactions when socialization strategies for the child's emotion regulation were experimentally induced. Effective emotion regulation of preschool children was socialized by Japanese mothers through fostering children's intentions of interdependence, while German mothers supported children's intentions to act independently (Trommsdorff, 2012; Trommsdorff and Friedlmeier; 2010 for an overview, see Trommsdorff, 2009).

Systematic cross-cultural research on the socialization processes is scarce. Caregivers' "intuitive theories" (Trommsdorff et al., 2012) are mediating variables that link collective intentions (e.g., cultural values) to individual intentions (e.g., parenting goals and behavior). In a study across Germany, the United States, South Korea, India, and Nepal we found cultural differences in mothers' conceptions about sensitivity and maternal reactions to their children's negative emotions. Indian and Nepalese mothers reported experiencing distress in response to their children's negative emotions and preferred to intervene proactively in order to avoid children becoming upset. In contrast, U.S. and German mothers encouraged children's emotional expressivity. Maternal preferences for either reactive or proactive sensitivity are related to different collective intentions and shared values and socializations goals that aim either to foster independence

or to encourage interdependence, respectively (see Trommsdorff, 2009, 2012; Trommsdorff et al., 2012; Trommsdorff & Heikamp, 2013). These results support the hypothesis that in independence-oriented socialization contexts, emotion regulation is motivated by the intention to foster "socially disengaging" emotions (e.g., anger, pride), because this is in line with shared collective intentions and cultural values of autonomy and independence. In contrast, in cultural contexts that highly value interdependence and relatedness, caretakers instead promote the socialization of "socially engaging" emotions (e.g., positive emotions towards others, shame).

4 Summary and Conclusions

The aim of this article was to examine the limits of intentionality in contextual conditions (e.g., family, school, culture) of self-regulation. The discussed theoretical approaches and findings underline the importance of intentionality for the development of self-regulation. We have outlined that children's development of self-regulation as goal-directed behavior in the first years of life is based on children's inherent tendency to perceive other human beings as intentional agents and children's predisposition to respond to social stimuli. The reviewed findings suggest that the development of different aspects of self-regulation (e.g., emotion and behavior regulation, inhibitory control) takes place in context-specific caregiver–child interactions (see also Davidov, this volume). Caretakers' responsiveness to the child's distress may foster the child's ability to successfully regulate negative emotions; otherwise, the child's experience of unsuccessful regulation may induce a negative self-concept which can foster internal limits of intentionality in self-regulation.

Accordingly, limits of intentionality, in terms of constraints of intentional agency such as self-regulation, have their origin in individual development. Individual differences in limits of intentionality and the related shortcomings in one's motivation and ability to self-regulate depend on biological (e.g., temperament) and socio-cultural factors (see also Blair and McKinnon, this volume). These factors moderate the effects of parenting on the development of self-regulation. Studies on limits of intentionality underline the dynamic interactions between internal (i.e., person) and external factors (i.e., situation). Children as intentional agents influence their own development. In line with this reasoning, we pointed out that developmental changes in one domain (e.g., social domain) can have positive influences on other domains (e.g., academic achievement). Although adverse living conditions (e.g., problematic family environment) and multiple

risk factors can have negative effects by limiting children's development of intentionality, agentic self-regulation can be a protective factor.

Self-regulation is an important predictor for the transition to school and for children's academic performance and social behavior at school age. Therefore, research on the limits of intentionality is highly relevant for the school context. From a developmental perspective, the transitions a child experiences from entry into kindergarten to the secondary school context can be seen as reciprocal processes of adaptation and changes within the child, family, and school (Suchodoletz et al., 2009), with interdependence between these contexts (McClelland et al., 2007).

Moreover, collective intentionality as represented by cultural values can constitute limits for individual intentionality and shortcomings in the development of self-regulation. In line with dominant cultural values, caregivers pursue different intentions and hold different expectations regarding children's optimal development. This can be seen in different socialization goals and different parenting behaviors as means to achieve those goals. Children's development is organized by culture-dependent socialization goals and practices that may constitute limits in the development of intentional self-regulation. For example, caregivers' sensitivity to children's needs is an important predictor for children's emotion socialization in any culture (Trommsdorff and Friedlmeier, 2010; Trommsdorff and Rothbaum, 2008). Differences in culturally transmitted conceptions of child rearing are strongly related to culture-specific beliefs in self- and world-views and related modes of intentionality in the development of self-regulation. Depending on the socio-cultural context, different concepts exist as to what behaviors are socially expected and considered to be adaptive in the respective context (Trommsdorff, 2009, 2012; Trommsdorff and Heikamp, 2013). The successful mastery of these developmental tasks means that individual goals and related behavior are in accordance with "collective intentionality," which is based on culturally shared beliefs (*cultural fit*; Trommsdorff, 2009).

Further research is needed on adequate methods to assess intentionality and its limits in the developmental process of self-regulation. Also, culture-informed studies investigating the development of self-regulation in context as an aspect of intentionality may help to specify and disentangle personal and contextual factors underlying the development and limits of self-regulation.

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