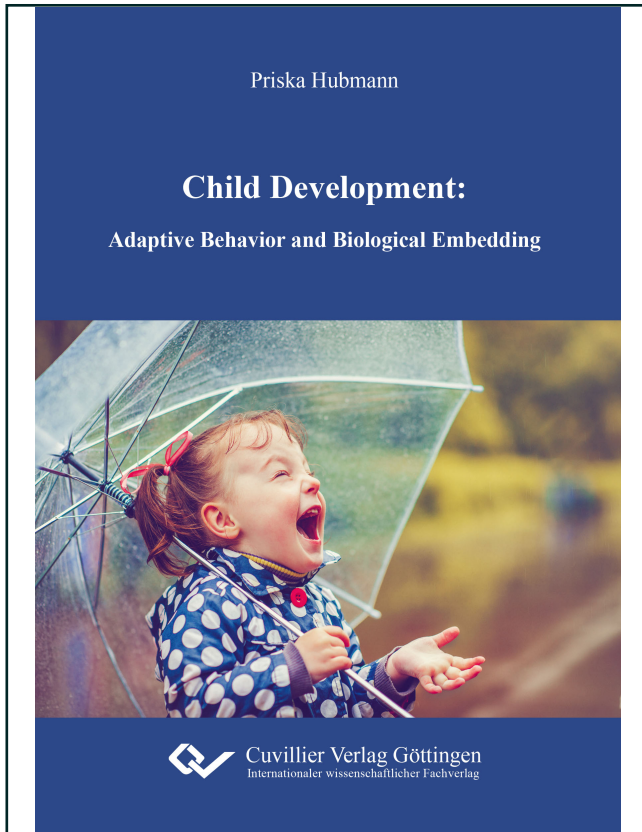




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Child Development
Adaptive Behavior and Biological Embedding



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PART I: THEORETICAL BACKGROUND



1 Risk and protective factors in adaptive child development

Child development entails a normal life progression with age-dependent physical, emotional, motivational, biological, social, and behavioral changes (Pauen, Frey, & Ganser, 2012). During human development, knowledge, behaviors, and skills are acquired and refined. It is generally accepted that it takes place gradually and in a relatively orderly process. However, interindividual differences are mostly found with regard to how fast and how good the skills are accomplished (Lohaus, Vierhaus, & Maas, 2010; Pauen et al., 2012). The first years are especially important for the development of a child, since developmental processes occur faster than in other life periods. Consequently, children are confronted with various developmental tasks, which they have to manage (Largo, 2001). For example, they start to speak and walk around their first birthday, and they enter school in mid childhood. Early developmental milestones have been defined, enabling observers to evaluate the accomplishment of certain skills in the development. These skills can be subsumed into different domains such as gross and fine motor skills, sensory skills, cognition skills, language skills, emotional skills, and social skills. Normally, developmental milestones are achieved during so-called sensitive periods, and a later achievement is much more difficult (Lohaus et al., 2010). Sensitive periods are thought to be caused by maturational processes in the brain and body. For example, the sensorimotor cortex undergoes maturation between the ages of 2 and 3, supporting the acquisition of motor and sensory skills. Instead, the parietal and temporal cortical regions mature within the first 10 years, enabling language acquisition and spatial attention. On the other hand, the prefrontal cortex develops up to early adulthood, permitting the development of executive functions (Gogtay et al., 2004).

Internal and external challenges constantly increase during development and go along with temporary destabilization and increased insecurity until the milestones are achieved (Pauen, 2011). While these destabilizations and insecurities are part of the normal development, the failure to achieve certain milestones may result in maladaptive development involving later problems or even pathologies. However, maladaptive or adaptive development is an extremely broad concept and has been defined in various ways across different studies. In some studies, the presence of emotional or behavior problems or pathologies served as an indicator of maladaptive development, whereas the absence of these problems or pathologies represented healthy or adaptive development (Benjet, Borges, & Medina-Mora, 2010; Fergusson & Horwood, 2003; Weich, Patterson, Shaw, & Stewart-Brown, 2009). However,



many other studies focused, instead on the development of positive outcomes such as social competence, well-being, academic achievement, etc. (Luthar, 2006; Shiner & Masten, 2012). Most of these latter studies have been conducted within the field of resilience research. Resilience describes “the capacity of a dynamic system to withstand or recover from significant challenges that threaten its stability, viability, or development” (Masten, 2011; p. 494). As the exposure to significant risk that increases the possibility of negative development is one obligatory condition in resilience research, most studies investigated child development after severe adversities such as child physical, sexual, or emotional abuse (c.f. Masten, 2007, 2011). However, in this thesis the interest lies in child development under “normal” or “less severe” circumstances, and therefore, instead of speaking about resilience, the term adaptive child development is used. Evidently, resilience and adaptive child behavior are overlapping constructs, sharing many risk and protective factors.

In this chapter, the focus lies on problematic and positive aspects that have been reported to decrease or increase the chance of adaptive child development. First, the most common early child behavior problems, which involve externalizing and internalizing problem behaviors, are depicted. Children with that show one of these problematic characteristics often show comorbidities. Moreover, comorbidity rates seem to increase during childhood, which possibly leads into a vicious cycle, also called negative developmental cascade, resulting in maladaptive behavior. However, it is assumed that the acquisition of competences works in a similar way with one competence resulting in other competences leading into a positive developmental cascade. Therefore, the notion of developmental cascades is explained before presenting central positive characteristics that can be seen as equivalents to the presented problem behaviors.

1.1 Early child behavior problems

Reports regarding onset dates of psychiatric disorders have shown that many adult mental health problems already start in childhood or adolescence (Kessler et al., 2007; Kim-Cohen et al., 2003). However, it is debatable if preschoolers should be diagnosed with psychiatric disorders since the preschool period involves very rapid physical, behavioral, emotional, and cognitive developmental changes, enhancing the chance of mistaking normal development for psychiatric symptoms. These children, then would be labeled inappropriately (Angold & Egger, 2004). Moreover, there is a relative lack of research on preschool psychopathology compared to studies in older children (Egger & Angold, 2006). Nevertheless, overall preva-



lence rates in preschoolers (ranging from 14%-26%) seem to be similar to the overall rate of disorders reported for older children (for a review, see Egger & Angold, 2006). Furthermore, studies using behavioral checklists show strong evidence of continuity between preschool behavioral and emotional problems and psychopathology in later childhood and even adulthood. Notably, when examining specific disorders, the prevalence seems to vary with age. For example, while attention-deficit hyperactivity disorders (ADHD) show relatively consistent rates across the life span, specific anxiety disorders show remarkable variation in their prevalence (Egger & Angold, 2006). In the following, commonly treated child behavior problems, their prevalence rates, and long-term consequences are presented.

Externalizing and internalizing child behavior problems are among the most commonly treated in mental health settings. Externalizing child behavior problems refer to children's outward negative behavior such as attention deficits, hyperactivity, impulsivity, and aggression, which may result in psychopathologies such as ADHD or disruptive behavior disorder (DBD; including oppositional defiant disorder and conduct disorder) (Campbell, Shaw, & Gilliom, 2000). Internalizing child behavior problems such as depression and anxiety refer to behavior in which children direct feelings and emotions inward (Tandon, Cardeli, & Luby, 2009).

ADHD represents one of the most common diagnosis in early childhood, defined by severe, frequent, or persistent inattention and/or hyperactivity-impulsivity (Wilens et al., 2002). Notably, the definition of the boundaries between normal and clinically significant symptoms is challenging, as the capacity to sustain attention and inhibit behavior is still developing during the preschool years. Overall prevalence rates during preschool range from 2.0% to 5.7% and remain highly stable throughout the life span, with symptoms and impairments extending in over 50% of the cases. However, symptoms of hyperactivity/impulsivity are more common than inattentive symptoms. While the latter remain relatively stable, hyperactivity symptoms show an age-related decline during the early school years (Egger & Angold, 2006; Leopold et al., 2016). DBDs have a prevalence rate between 3.3% and 6.8% (Egger & Angold, 2006). Evidence suggests that oppositional and aggressive symptoms show much higher rates around the ages of two and three, and a decrease during later childhood years (Keenan & Wakschlag, 2000). However, some children maintain a high level of disruptive and defiant behaviors after the age of three. Around 60% of these children still show behavior problems during late childhood, and they are at an increased risk of developing adult disruptive or affective disorders (Alink et al., 2006; Cierpka, 2012; Keenan & Wakschlag, 2000; Shaw, Gilliom, Ingoldsby, & Nagin, 2003).



Concerning internalizing behavior problems, depressive disorders seem to be less common in preschoolers with a prevalence rate up to 2%, increasing from toddlerhood to adulthood (Egger & Angold, 2006). Meanwhile, rates of anxiety disorders vary considerably in different studies, depending on which specific anxiety disorder was investigated. When summarizing these into one variable representing any anxiety disorder, the rates seem to lie between 9% and 10%, similar to school age children and adolescence, whereas prevalence rates in adults were twice as high (c.f. Egger & Angold, 2006).

Usually, adults continue to suffer from the same disorders they have had in childhood or adolescence (homotypic continuity). This seems to be especially true for internalizing behavior problems (Kim-Cohen et al., 2003). However, associations with detrimental long-term consequences are stronger for externalizing behavior problems, whereas relations for internalizing behavior problems can mostly be explained by comorbid externalizing problems or parental socioeconomic status (SES; Evensen, Lyngstad, Melkevik, & Mykletun, 2016; Fergusson, Boden, & Horwood, 2007). Externalizing problem behaviors in childhood are associated with academic underachievement, interpersonal problems, persistent antisocial behavior, incarceration, long-term substance dependence, and employment difficulties in later life (Brumley & Jaffee, 2016; Goldstein & Rider, 2013; Odgers et al., 2008; Reef, Diamantopoulou, van Meurs, Verhulst, & van der Ende, 2011).

1.2 Developmental cascades

While behavior problems can already be observed in early childhood, the risk of developing additional problematic symptoms seems to increase with age. Therefore, early symptoms may represent the beginning of a vicious cycle, in which problematic characteristics lead to other problematic aspects, starting a negative developmental cascade.

In general, comorbidity rates in preschoolers are relatively high. Anxiety is associated with depression, ADHD, and DBD, which in turn are inter-correlated themselves (Keenan, Shaw, Walsh, Delliquadri, & Giovannelli, 1997; Overgaard, Aase, Torgersen, & Zeiner, 2012). Notably, oppositional defiant disorders seem to play a central role, mediating the relations between anxiety and depression, depression and conduct disorder, and depression and ADHD (Egger & Angold, 2006). Studies indicate that around 25% of the children with internalizing disorders show also externalizing disorders and vice versa (Keenan et al., 1997; Overgaard et al., 2012). In the study from Egger and Angold (2006), 8% of the preschoolers showed at least one psychiatric disorder. Within these 8%, 51.6% showed no comorbidities,



whereas 25.8% had two types of disorders and 22.6% three types of disorders. Importantly, the proportion of children showing comorbidities increased about 1.6 times each year from age 2 (18.2%) to 5 (49.7%), reducing the chance of positive adjustment while precipitating a cascade of adverse outcomes into adulthood (Egger & Angold, 2006; Goldstein & Rider, 2013).

Developmental cascades are defined as cumulative consequences for development, which result out of various interactions and transactions in developing systems, spreading across levels, domains, and systems. The function in one domain is assumed to influence the function in other domains, and therefore, adaptive and maladaptive functions can spread over time, promoting or undermining development (Masten & Cicchetti, 2010). For example, inattention, hyperactivity, and impulsivity can quickly lead to underachievement, low self-esteem, and interpersonal difficulties or even social rejection and neglect (Barkley, Fischer, Edelbrock, & Smallish, 1990; Milich, Landau, Kilby, & Whitten, 1982). In turn, these problems increase vulnerability for depression and anxiety, and reduce opportunities to develop appropriate social interactions, keeping up a vicious cycle (Goldstein & Rider, 2013).

However, it is assumed that developmental cascades can also be positive, in that competence begets competence, resulting in adaptive behavior (Masten & Cicchetti, 2010). For example, early cognitive abilities were associated with later fluid intelligence (Fry & Hale, 1996), and indirect associations between early behavior and later intellectual functioning were reported (Bornstein et al., 2006). Therefore, it seems important not only to look at problematic aspects that could challenge adaptive development, but also to investigate positive characteristics that may prevent negative developmental cascades or even lead into positive cascades.

1.3 Positive child characteristics

The achievement of key developmental tasks seems to play a central role in developmental models of competence (Masten, Burt, & Coatsworth, 2006). The capacity of self-regulation, the ability to build positive relationships, and the belief in one's own capacities represent key developmental tasks that have been reported to result in less negative and more positive developmental outcomes. These positive child characteristics are assumed to represent equivalent aspects to the aforementioned behavior problems. While self-regulatory competences such as inhibitory control and attentional focusing can be seen as opposite endings of ADHD symptoms, prosociality may be the counterpart of aggression, and self-efficacy may represent



a central aspect that is missing in anxiety. In the following chapter, the role of these three positive aspects on adaptive child development will be described.

One of the most important key developmental tasks in the first years of life is the ability of self-regulation (Lewis, Zimmerman, Hollenstein, & Lamey, 2004). Self-regulation not only refers to the ability to regulate bodily functions such as sleep and urinary excretion, but also to the ability to control automatic behavioral response tendencies by inhibiting undesirable and exhibiting alternative behaviors (inhibiting control), and to maintain, direct, and focus attention (attentional focusing; Smith-Donald, Raver, Hayes, & Richardson, 2007). Inhibitory control and attentional focusing are often summarized into one dimension that is called “effortful control” (Stevens, Bardeen, & Murdock, 2015), or integrated into the concept of executive functioning. Together with other cognitive factors such as working memory, executive functioning plays a role in goal-oriented behavior (Garon, Bryson, & Smith, 2008). Effortful control seems to develop from the age of 2 to 7 (Kochanska, Murray, & Harlan, 2000; Rothbart, Ahadi, Hershey, & Fisher, 2001). It is negatively related to anxiety, anger, peer conflict, and externalizing problem behaviors, but positively related to rule-abiding behavior, low antisocial solutions to hypothetical dilemmas, and delay of gratification. Moreover, it predicts long-term quality of social competence, with higher sociability, better communication, and more assertiveness in peer relations (Acar, Rudasill, Molfese, Torquati, & Prokasky, 2015; Muris, van der Pennen, Sigmond, & Mayer, 2008; Valiente, Smith, Fabes, Guthrie, & Murphy, 2003).

Another important dimension in early child development is the ability to build positive social relationships (Pauen, 2011). Newborns are already able to regulate closeness and distance in relationships. After the age of one, children start to realize that others have different needs and wishes, and initial prosocial behaviors can be observed (Warneken & Tomasello, 2006). Prosociality refers to behaviors that benefit other persons such as sharing and helping others. It often involves increased perspective taking, interactional skills, empathy, and emotional regulation (Eisenberg, Fabes, & Spinrad, 2006; Griese & Buhs, 2014). During middle childhood, peer relationships become more central and prosocial children are less likely to be victimized by peers. Moreover, children showing prosocial behavior were found to be able to establish adaptive peer relationships despite victimization or aggression (Griese & Buhs, 2014). Furthermore, prosocial children were seen as more attractive, felt less lonely, and were more likely to show positive self-concepts and greater self-efficacy (Eisenberg et al., 2006; Griese & Buhs, 2014; Laible & Carlo, 2004). Eisenberg et al. (2006) argue that children with



positive self-concepts and higher self-efficacy feel better about themselves, which leads to less self-focused and more other-oriented behavior, having more resources to assist others.

Self-efficacy can be generally defined as personal beliefs in one's own capabilities. It is grounded in the social cognitive theory proposed by Bandura (1986), which assumes that individuals are self-organizing, proactive and self-reflecting organisms influenced by the environment or inner impulses. Self-efficacy beliefs determine how people feel, think, behave, and motivate themselves, and consequently are involved in every aspect of people's lives. Self-efficacy positively predicts academic performances, work and life satisfaction, and mental health outcomes (Judge & Bono, 2001; Pajares, 2005; Wille, Bettge, Ravens-Sieberer, & BELLA study group, 2008). In contrast, people who doubt their own capabilities have low aspirations, draw back from difficulties and show weak commitment to their own goals. Low self-efficacy has been found to be related to depression, anxiety, and ADHD (F. Klasen et al., 2015; Major, Martinussen, & Wiener, 2013; Tahmassian & Moghadam, 2011).

1.4 Summary

Development in early childhood seems to be of special importance, as it happens very fast and goes along with sensitive periods indicated by maturational processes in the brain. Every child has to acquire various competencies and skills to achieve the expected milestones, leading to an adaptive and healthy development. However, challenges and responsibilities increase with age and some children show difficulties in this adaptational process.

Although it is especially challenging in early childhood to distinguish between normal development and psychopathology, externalizing and internalizing behavior problems are unmistakably already present during preschool years. They may lead to deleterious long-term consequences posing various challenges for individuals, families, and society. DBDs and anxiety disorders seem to be common in preschoolers with DBD showing a peak around two to three years, which is also called the "terrible two's" or "the terrible three's" (Keenan & Wakschlag, 2000). Meanwhile, ADHD rates seem to be relatively stable throughout life, whereas depression rates are low during the preschool years and increase into adulthood.

Moreover, externalizing and internalizing behavior problems are highly comorbid, with increasing comorbidity rates into middle and late childhood, supporting the notion of negative developmental cascades. However, developmental cascades can be positive or negative, leading to maladaptive or adaptive behavior, respectively. On the one hand, externalizing symptoms such as impulsivity, inattention, and aggression, and internalizing symptoms such as



depression and anxiety increase the risk of maladaptive child development. On the other hand, positive factors such as effortful control, including inhibitory control and attentional focusing, prosociality, and self-efficacy increase the likelihood for adaptive child development, possibly leading to a virtuous cycle.

1.5 Contextual risk and protective factors

In the previous chapter, the focus has been on the child as an individual, who can display various problematic or positive characteristics, indicating adaptive or maladaptive development. However, development is influenced by numerous environmental factors that interact with child characteristics. Consequently, when investigating adaptive child behavior, these contextual factors have to be considered.

According to Bronfenbrenner (1979), environmental factors can be divided into several social subsystems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem. The microsystem refers to the close surrounding of an individual, and mostly involves interactions with family members, people at school or at work. Instead, the mesosystem describes interrelated surroundings of the microsystem such as the relationship between the parents and the school or teacher. The exosystem refers to surroundings and relationships that are not directly linked to the individual, but can have indirect effects; as for example, friends of the parents, who can influence parental behaviors. The macrosystem involves values and other aspects of the society, culture, and subculture an individual is living in. Finally, the chronosystem indicates that all subsystems are interrelated and are constantly developing. Consequently, child development should be viewed against the background of all these subsystems, which themselves are constantly changing. However, due to the high complexity of the whole system and the many influential factors to control for, most of the studies in this area have focused on the microsystem, as it is the closest subsystem to the individual (Lohaus et al., 2010). Therefore, the following chapter concentrates on the microsystem. As the family and school environment often represent the most constant and important surroundings for young children, an overview of known risk and protective factors is given. However, investigating all of them would result in a model too complex to be tested. Therefore, some of the most studied and central risk and protective factors (socioeconomic status, parental conflicts, harmonious parental relationship, strict parenting, peer victimization, and classroom climate) have been selected, describing their influence on adaptive child behavior.



1.5.1 Home environment

A vast amount of risk and protective factors within the family has been identified. Table 1 presents some of these factors assembled from Lohaus et al. (2010), O’Dougherty Wright, Masten, and Narayan (2013), and Olsson, Bond, Burns, Vella-Brodrick, and Sawyer (2003).

Table 1. Risk and protective factors of the home environment

Risk factors	Protective factors
<ul style="list-style-type: none"> • Constant family or parental conflicts including partner violence • Frequent changes of the attachment figure • Mental or physical disorders of the parents, or high levels of stress • Problematic parenting styles (e.g. authoritarian, laissez-faire) • Low socioeconomic status (low income, low parental education, crowded living conditions, big family) • Parents unemployment • Parents criminality • Single parenthood • Loss of a parent (separation, divorce, death) • Mother employed before 12 months postpartum • Age-intervals to siblings less than 18 months • Disabilities of siblings • Young mother (Primipara < 20 years) • Unwanted pregnancy • Placement (e.g. institution, foster care) • Frequent relocations • Physical, sexual, emotional child abuse 	<ul style="list-style-type: none"> • Cohesion and care within the family • Harmonious parental relationship • Secure attachment • Parental sensitivity • Healthy parents • Positive parenting style (authoritative, non-blaming, structured) • Socioeconomic advantages (above-average income, postsecondary education) • Positive parent-child relationship (warmth, encouragement, assistance) • Positive sibling relationships • Daily routines and structures • Social support • Faith, religious affiliation

It becomes clear that the distinction between risk and protective factors is not always obvious. The absence of a risk factor is sometimes seen as a protective factor and vice versa (e.g. criminality of a parent). Moreover, risk and protective factors can often be seen as opposite poles of the same dimension (Lösel & Bender, 2014). For example, while low socioeconomic status (SES) represents a risk factor, above-average SES functions as a protective factor. A vast amount of research has been conducted examining the influence of low SES, which seems to have a direct effect on child development. Other relevant chronic risk and protective factors