History of Maltreatment and Mental Health Problems in Foster Children: A Review of the Literature

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Objective Foster children often experience compromising situations such as neglect, physical abuse, or sexual abuse before out-of-home placement. This article aims to give a literature review related to the development and mental health of foster children with special consideration of trauma history. Methods A computer-based literature search was conducted in the databases Medline, PsycINFO, PSYNDEXplus, and SCOPUS. We determined a time frame from 1998 to 2009. Results The literature search resulted in 32 articles reporting empirical data about development and mental health in foster children. Very high rates of exposure to maltreatment, developmental delays and mental disorders were found. A broad spectrum of externalizing as well as internalizing symptoms and a high prevalence of comorbid mental disorders were found. Conclusions Foster children exhibit a broad pattern of developmental problems and psychopathology. The etiology of these disorders is discussed in the context of multiple risk factors, especially that of persistent maltreatment.

Key words abuse; development; foster care; maltreatment; mental health; neglect.

In 2006, 510,000 children were living in foster care in the United States of America (U.S. Department of Health and Human Services, 2008). Of these children, 9% were in long term foster care, 23% were waiting for adoption, and 49% were to be reunified with their parents or primary caretakers. Forty-six percent of the children were placed in non-relative foster families and 24% in relative foster families. In Germany, 47,517 children were living in foster care at the end of 2005 (German Federal Statistical Bureau, 2008). Seventy-eight percent of children entering foster care in Germany in 2006 had previously received assistance from the child welfare system (German Federal Statistical Bureau, 2007). In England, on March 31, 2008 42,300 children were living with foster parents (Department for Children, 2008). Of the whole population of 59,500 children looked after on March 31, 2008, 36,700 were looked after because of abuse or neglect, 2,300 because of the child’s disability, 2,800 because of parental illness or disability, 4,900 because of family in acute stress, 6,300 because of family dysfunction, 1,200 because of socially unacceptable behavior, 130 because of low income, and 5,200 because of absent parenting.

Children living in foster care often experience threatening situations such as neglect, domestic violence, physical, or sexual abuse in their family of origin. A history of persistent maltreatment is the most common background for out-of-home placement of children and the failure of biological parents to care for their children is often correlated with mental health problems, such as drug abuse and alcohol abuse (Chernoff, Combs-Orme, Risley-Curtiss, & Heisler, 1994). In the US, parents’ substance abuse is one of the most frequent causes of foster placement. In 2004, the National Center on Addiction and Substance Abuse of Columbia University (2004) stated that seven out of 10 abused or neglected children had substance addicted parents. An accumulation of multiple psychosocial and biological risk factors can be found in the developmental history of foster children. Compared with children being raised by their biological parents, they are more often single mothers (Kalland, Sinkkonen, Gissler, Meriläinen, & Siiimes, 2006) and have a higher risk of prenatal exposition to nicotine, alcohol (Astley, Stachowiak, Clareen, & Clausen, 2002) or psychotropic drugs (McNichol, 1999). The high exposure to maltreatment and neglect, together
with other risk factors, puts foster children at an elevated risk for developmental and mental disorders, which may persist after their out-of-home placement. Additionally, chronic somatic conditions may be underserved due to medical neglect and after their out-of-home placement these children may need to be comprehensively medically examined with regard to any special needs.

So far, the developmental problems and the morbidity of foster children are not well understood in the context of their traumatic history. Therefore, the aim of this review article is to give an evidence-based overview of the most frequent developmental and mental disorders of foster children and of their exposure to different types of traumatic events such as maltreatment, neglect, or domestic violence. Moreover, it is the aim of this review to discuss the developmental and mental health problems of foster children in the context of their traumatic history and to inform pediatric psychologists about the special needs of these children.

Methods

Inclusion Criteria

We selected journal articles in English representing original data about the development and psychopathology of children living in relative or non-relative family foster care. These were studies particularly addressing the development and mental health of foster children or studies investigating the development and mental health of all children in the child welfare system, but presenting differentiated data for the sub-sample of children in family foster care. We included studies focusing on functional development utilizing objective measures and standardized tests as well as studies investigating psychopathology using screening instruments (in this case, the article needed to report data for the different scales and not only the total score), diagnostic interviews (standardized or clinical judgement), or retrospective analyses of registry data. Studies exploring the mental health of foster children as it related to their use of mental health services were included if differentiated data on psychopathology were presented. We did not include studies investigating broader psychosocial constructs such as quality of life or coping strategies, studies about the effectiveness of special treatment programs on child mental health, or clinical studies analyzing the relationship between protective or risk factors and the mental health of foster children as these studies usually investigated highly selective samples of foster children. Finally, studies exploring the mental health of children coming from war regions (for example Sudan or Boznia and Herzegovina) and subsequently placed in foster care in another country were not included because this review focused on the population of foster children placed in foster care due to harmful conditions in their biological family.

Search Strategy

In order to find eligible studies, a computer-based literature search was conducted in relevant databases for psychological and psychiatric topics. The databases searched were Medline, PsycINFO, PSYNDEXplus, and SCOPUS. We determined a time frame from January 1998 to January 2009 and combined the term “foster care” with the terms “abuse,” “maltreatment,” “neglect,” and “mental health.” For the terms “foster care” and “abuse,” 1,508 articles were retrieved, for the terms “foster care” and “maltreatment” 439, for the terms “foster care” and “neglect” 531 and for the terms “foster care” and “mental health” 612. This high number of articles resulted from repeated citations and articles associated with only one of both combined terms. Based on titles and abstracts, a first selection was conducted by one of the reviewers. Articles not fulfilling inclusion criteria were excluded immediately. The first selection resulted in 101 articles that seemed to meet inclusion criteria. These articles were obtained and read by two reviewers to decide if they met inclusion criteria. In this second selection process, 69 articles were excluded, mostly because they did not report differentiated results for children living in family foster care or did not report specific outcomes.

Results

Finally, 32 articles met our inclusion criteria. Nine articles focused on the functional development of preschool children in family foster care and 23 to their mental health in terms of prevalence of psychopathology and psychiatric disorders. In the following, we present data about frequency of maltreatment types mentioned in these articles and summarize results separately for developmental issues and psychopathology of foster children.

Maltreatment Rates for Children Placed in Family Foster Care

The majority of foster children experienced multiple forms of maltreatment. Only 12 of the 32 included articles (Table I) cited forms and rates of maltreatment experienced by the study populations. The highest rates were found for neglect (18–78%), physical abuse (6–48%) and sexual abuse (4–35%). Other placement reasons were emotional
An evaluation of the medical records of 749 children (0–18 years) examined at the Child Protection Center in San Francisco showed that 30% of children were placed in foster care for neglect, 25% for physical abuse, 24% for no available caretaker, 9% for abandonment, 7% for failed placement, and 5% for sexual abuse (Takayama, Wolfe, & Coulter, 1998). Substance abuse was found in 30% of parents; in children placed for neglect the rate of parent substance abuse was 51%. Sixty percent of children placed in foster care had health problems. For young children, skin conditions were found more frequently among children who had been neglected, had no available caretaker, or had a failed placement. Signs of abuse were limited to physically abused children and developmental delay to neglected or abandoned children. Among school-aged children and adolescents, signs of abuse also were more common in those who had been abused physically and a history of psychiatric illness was more frequent in adolescents who had been neglected or who had a failed placement.

### Development of Children in Family Foster Care

#### Sample Characteristics

Seven of the nine studies about the development of foster children were conducted in the US, one study was conducted in Spain and one in Finland. Age ranged from the neonatal period to school age. Seven studies focused only on children in family foster care and two studies investigated children in different forms of placement, but presented results for children in family foster care separately.

#### Measures

Three studies about neonatal health and maternal background of foster children and one study about cognitive functioning of foster children who had been exposed to substance abuse prenatally, extracted information from databases. One study used objective measures of weight, height and head circumference, and the remaining four
studies assessed functional development using standardized psychometric instruments.

Findings

Neonatal health and maternal background of children placed in foster care was investigated in three studies through analysis of databases. Kalland et al. (2006) analyzed information from the Finnish Medical Birth Registry and the Finnish Child Welfare Registry (n = 1,668). All Finish children born in 1987 served as a control group (n = 59,727). Newborns placed in foster care had poorer health than comparison children. Foster children had reduced birth-weight and birth-length, shorter gestational age, lower 1-min Apgar scores and later discharge from the nursery than the comparison group. In the foster care group, the proportion of teenage mothers was approximately four times higher and the proportion of unmarried mothers was twice as high. Fifty-six percent of mothers reported smoking during pregnancy, whereas only 15% of mothers in the population-based comparison group smoked.

Needell and Barth (1998) used data from the California Children’s Services Archive and the California Birth Statistical Master File. Data from 26,460 infants who entered foster care for reasons of abuse or neglect (86%) were compared with data from 68,401 infants from the general population. Foster children had an increased likelihood of having a single mother (75% vs. 34%), low birth weight (less than 2,500 g; 26% vs. 6%), a birth abnormality (15% vs. 4%), no prenatal care, belonging to a large sibling group, living in poverty, being African American and having a native American mother.

McGuinness and Schneider (2007) determined the extent to which foster children aged zero to 36 months had been screened for suitability for early intervention services and investigated neonatal health only as background variable. Analyses of the files of 75 children showed that the average birth weight was five pounds, that 17 children had been born prematurely and that 36 children had documented histories of prenatal substance exposure consisting mainly of cocaine, alcohol, and marijuana.

A study focusing particularly on physical development of physically neglected and emotionally abused children aged 24 and 48 months (n = 87) upon entry into foster care and one year after initial placement was carried out in Spain (Oliván, 2003). At placement, height and weight of foster children were significantly below the normal standards. The annual growth velocity for height after out-of-home placement was significantly above the normal standards. One year after initial placement, foster children did not differ significantly in height and weight to the normal standards, though still remained below.

Studies investigating the functioning of foster children in different developmental areas (cognitive, psychomotor, language, social, etc.) used standardized instruments. Pears and Fisher (2005) investigated a sample of foster children (n = 99) and a community comparison group of nonmaltreated children (n = 54) both aged 3–6 years. A significantly higher percentage of foster children were at or below the 5th percentile for age-normed height (8% vs. 0%) and head circumference (10% vs. 2%). There was no significant difference in weight-for-height. Foster children scored significantly lower in sensorimotor function, visuo-spatial processing, memory, cognitive function, and language. History of neglect or emotional abuse was negatively correlated with height-for-age, visuo-spatial processing, memory, language, and executive function. Number of maltreatment types was unexpectedly positively correlated with visuo-spatial processing, language, and executive function. The authors suggest that perhaps children who have experienced more types of abuse are perceived earlier by authorities and thereby receive earlier services. Another unexpected result was a positive correlation between age at first placement and executive function. This result was due to the fact that two of the scores comprising the composite executive function scores were not standardized to account for age. When age at time of assessment was held constant, the association between age at first placement and executive function became nonsignificant. No significant association of these variables was observed with number of transitions between placements.

Pears et al. (2008) investigated the association of psychosocial and cognitive functioning of 3- to 6-year-old children with specific profiles of maltreatment. About one third of the sample had experienced physical or sexual abuse. The majority of the sample experienced moderately severe physical neglect, supervisory neglect or emotional maltreatment. Children experienced an average of seven maltreatment incidents perpetrated by an average of three people and were exposed to an average of three different maltreatment types overall. Four maltreatment profiles were found: supervisory neglect/emotional maltreatment (n = 73); sexual abuse/emotional maltreatment/neglect (n = 14); physical abuse/emotional maltreatment/neglect (n = 19); sexual abuse/physical abuse/emotional maltreatment/neglect (n = 11). Lower cognitive functioning was related to profiles with neglect or physical abuse or both, externalizing symptoms were most prominent in the sexual abuse/physical abuse/emotional maltreatment/neglect.
profile, and internalizing symptoms were most prominent in the profiles with physical or sexual abuse or both.

Leslie et al. (2002) collected data on 798 children aged 3–36 months who were admitted to a sole emergency shelter/receiving facility. Sixty-two percent of the children received a “suspect” score on the Denver Developmental Screening Test II. Children with suspected developmental delays were older. Of these children, 73% received a developmental evaluation using the Bayley Scales of Infant Development II. With respect to the Mental Development Index of that instrument, 33–36% of the children were classified as mildly delayed and 26–30% of the children as significantly delayed. Regarding the Psychomotor Development Index, 24–31% of the children were classified as mildly delayed and 12–21% of children as significantly delayed.

Leslie et al. (2005) analyzed data from 1,542 children aged three months to 5 years, 11 months. Eighty-seven percent of the whole sample had physical problems. Dermatological (kinship care: 64%, non-relative foster care: 70%) and respiratory problems (kinship care: 23%, non-relative foster care: 23%) were most common. Evaluation of children with Bayley-Scales II revealed similar results to the previous study (Leslie et al., 2002). Children older than 3 years and 5 months were evaluated with the Stanford-Binet IV. Regarding verbal scores, 43–51% of the children had values in the category mildly delayed and seven to 13% were evaluated as significantly delayed. Regarding nonverbal scores, 33–43% of the children had values in the category mildly delayed and 2–7% were classified as significantly delayed.

McNichol and Tash (2001) reviewed case files of foster children who had been examined for the first time at foster placement (n = 268; average age 5.8 years) and who had been exposed to illegal drugs prenatally (prenatal exposure to alcohol was not included), foster children coming from families with parental substance abuse and foster children with no indication of parental substance abuse. Children with prenatal exposure to illegal drugs (n = 19) showed significantly lower full scale IQ scores than children with a family history of drug involvement (n = 141), but did not differ significantly from children with no indication of parental substance abuse (n = 53). The lack of difference in IQ scores between the children with prenatal exposure to illegal drugs and children with no indication of parental substance abuse is counterintuitive. One would expect lower cognitive skills in children with intrauterine drug exposure due to the harmful effects of drug on children’s development. This lack of differences in cognitive skills might be related to unreliable data sources about substance abuse during pregnancy. Likewise, differences between the sample of children exposed to illegal drugs prenatally and children with no indication of parental substance abuse might not be significant because of the small sample sizes. Furthermore, other reasons for placement as reported by the authors might affect children’s cognitive development as well (physical abuse, neglect, parental mental health illness, sexual molestation, domestic violence, and other reasons). However, the authors did not describe the frequency of these adverse factors in the different samples.

**Mental Health of Children in Family Foster Care**

**Sample Characteristics**

Of the retrieved 23 articles that reported differentiated results about the mental health of children in foster families, 16 studies were conducted in the USA, three in Australia, two in Scotland, one in Norway, and one in Canada.

**Measures**

The studies of the mental health status of foster children utilized different methods and varied in their scope of examined disorders ranging from applying broadband screening instruments to semi-structured diagnostic interviews, and from studies investigating mental health in general to studies focusing on specific psychiatric disorders. More specifically, seven of the selected studies used screening instruments, seven extracted data from databases, seven used diagnostic interviews and two studies analyzed neurobiological parameters. Fourteen studies investigated mental health in general and seven studies focused on the prevalence of a specific disorder in the population of children in family foster care.

**Studies Investigating General Psychopathology in Foster Children**

Studies using screening instruments to evaluate general psychopathology in foster children utilized the Child Behavior Checklist (CBCL), the Youth Self Report (YSR), the Assessment Checklist for Children (ACC), the Center for Epidemiologic Studies Depression Scale (CES-D), the Strengths and Difficulties Questionnaire (SDQ) and the Youth Risk Behavior Surveillance System questionnaire (Clausen, Landsverk, Ganger, Chadwick, & Litrownik, 1998; Sawyer, Carbone, Searle, & Robinson, 2007; Tarren-Sweeney & Hazell, 2006). Foster children showed, in general, elevated values on the CBCL total score and subscales, with between 36% and 61% of children reaching scores over the cut-off for behavior problems (Clausen et al., 1998; Holtan, Ronning, Handegard, & Sourander, 2005; Sawyer et al., 2007; Tarren-Sweeney & Hazell, 2006). On the YSR, 35% of a sample of
disorder (10% in a sample of youth younger than 20 years; DosReis et al., 2001), development
et al., 2000), substance abuse (5% in a sample of youth
(0.8% in children between 5 and 17 years; Harman
2008). Single values were reported for bipolar disorder
Harman, Childs, & Kelleher, 2000; Steele & Buchi,
17%, and for adjustment disorder from 0.4% to 21%
from three to 12%, for attachment disorder from 4%
for mood disorder from 2% to 15%, for anxiety disorder
at least some age-inappropriate sexual behavior
(Tarren-Sweeney & Hazell, 2006). Children showed con-
siderable problems with social behavior, most notably in
the form of nonreciprocal and indiscriminate interpersonal
behavior. Most children revealed behaviors that are sug-
gestive of insecure relationships. In the SDQ, 64% of a
sample of 182 foster children (5- to 16-years old) was evaluated by their foster parents as falling into the abnor-
amal or borderline categories (Minnis et al., 2006). On the
hyperactivity subscale, the percentage of children falling
into the categories abnormal or borderline was 54%, on
the emotional problems subscale it was 45%, on the con-
duct problems subscale 66%, on the peer problems sub-
cale 63%, and on the prosocial subscale 38%.

Registry-based analysis of foster children’s mental
health enables data from large samples to be evaluated. However, diagnoses are not based on standardized diag-
nostic instruments but on clinical evaluation. These stud-
ies show a high prevalence of psychiatric disorders in foster
children. Two studies reporting the general prevalence of
psychiatric disorders in samples of zero to 18 years old
foster children documented rates of 32% (Burge, 2007)
and 44% (Steele & Buchi, 2008). The prevalence for at-tention-deficit/hyperactivity disorder (ADHD) ranged
from 10% to 21%, for conduct disorder (CD) from 2% to
8%, for oppositional defiant disorder (ODD) from 4% to
10% (CD/ODD: 18%), for depression from five to 15%,
for mood disorder from 2% to 15%, for anxiety disorder
from three to 12%, for attachment disorder from 4% to
17%, and for adjustment disorder from 0.4% to 21%
(Burge, 2007; DosReis, Zito, Safer, & Soeken, 2001;
Harman, Childs, & Kelleher, 2000; Steele & Buchi,
2008). Single values were reported for bipolar disorder
(0.8% in children between 5 and 17 years; Harman
et al., 2000), substance abuse (5% in a sample of youth
younger than 20 years; DosReis et al., 2001), development
disorder (10% in a sample of youth younger than 20 years;
DosReis et al., 2001), mental retardation and pervasive
development disorders (eight percent in children aged
zero to 18 years; Burge, 2007), self-injurious behavior
(0.2% in youth < 18 years; Burge, 2007), and tic disorders
(0.2% in children between 0 and 18 years; Burge, 2007).

In accordance with these higher prevalence rates of
mental disorders, foster children had an elevated need
for special health care. The National Survey of Child and
Adolescent Well-being (NSCAW) which examined 5,501
US children aged 15 years or younger showed that adopted
and foster children were significantly more likely to have
had special health care needs and special needs (educa-
tional or health professional) than children in other living
arrangements (foster care: 61% had had special health care
needs, 50% had had special needs) (Ringiesen, Casanueva,
Urato, & Cross, 2008). Foster children were 2.1 times
more likely to have ever had special health care needs
and 2.3 times more likely to have ever had special needs
compared to children who had never been placed out of
the home. Similarly, Dos Reis et al. (2001) reported mental
health service use by 62% of foster children younger than
20 years. Harman et al. (2000) found rates of 35% for
mental health service use and of 6% for inpatient psychi-
atriatric service use in children aged between 5 and 17 years.

Few studies were found which used face-to-face inter-
views for mental health diagnosis in children in family
foster care. Three of the four studies utilized standardized
diagnostic interviews. McMillen, Zima, Scott, Auslander,
and Munson et al. (2005) interviewed 373 17-year-
old-youths in one US state’s foster care system with
some sections of the Diagnostic Interview Schedule for
DSM-IV. The sections administered were posttraumatic
stress disorder, major depression, mania, ADHD, ODD,
and CD. Thirty-two percent of the youths had more than
one lifetime psychiatric disorder. Lifetime prevalence for
any psychiatric disorder was 61%, for major depression
27%, for mania 6%, for PTSD 14%, for CD/ODD 47%,
and for ADHD 20%. Past year prevalence for any psychi-
atriatric disorder was 37%, for major depression 18%,
for mania 6%, for PTSD 8%, for CD/ODD 62%, and for
ADHD 38%.

Shin (2005) investigated mental health and service
use in US foster children aged 16.5–17.5 years by analyz-
ing the Medicaid claims database (ICD-9 diagnoses) as well
as administering the Mental Health Inventory, a standar-
dized, interview-based scale that measures psychological
well-being and psychiatric problems. Of the 113 foster
youths, 75% had a history of abuse, 40% had a conduct
disorder, 32% a depressive disorder, 32% an adjustment
disorder, 19% an anxiety disorder, 13% ADHD, 9%
bipolar disorder, and 8% schizophrenia. Half of the
found significantly higher scores in children in state care compared to a matched control group and a school control group (age range 4 to 16 years) (mean = 12.37 vs. 3.57 and 4.28) on a modified version of the RAD (Reactive Attachment Disorder Scale: a 13-item questionnaire for parents and caregivers).

Posttraumatic Stress Disorder
Dubner and Motta (1999) investigated PTSD in 150 foster children aged 8–19 years who were receiving services from two foster care agencies. Sixty-four percent of children with a history of sexual abuse, 42% of children with a history of physical abuse, and 18% of children who did not experience sexual or physical abuse were diagnosed with PTSD. The latter finding suggests that these children had experienced other traumatic situations like neglect or domestic violence that may have lead to the development of PTSD.

Substance Abuse
Only one study was found that presented differentiated results regarding the prevalence of a substance use disorder in youth placed in family foster care. The study was based on data from the public use file of the 2000 National Household on Drug Abuse (NHSDA) (Pilowsky & Wu, 2006) and analyzed substance use and other psychiatric symptoms in a sample of 19,430 12- to 17-year-old youth (464 youths in family foster care). Foster care adolescents had more symptoms than those in the comparison group. Foster care adolescents were more likely to use alcohol, about two times more likely to engage in illicit drug use, about five times more likely to be drug-dependent, and about two to four times more likely to have other substance use disorders. Furthermore, they showed more than twice the number of conduct symptoms and were significantly more likely to report suicide attempts and ideation than comparison adolescents.

Depression
Depressive symptoms in foster care children were investigated by Allen et al. (2000) through the administration of a screening instrument. Children in foster care (n = 160) and a comparison group (n = 60) (both 8- to 16-years old) made self reports using the Children’s Depression Inventory (CDI). There was no significant difference between children in foster care and published norms or between children in foster care and the comparison group with respect to percentage of children with a CDI score ≥19 (the cut-off for clinical relevance).

Eating Disorders
Eating problems of Australian children in foster or kinship care were analyzed in a sample of 347 4- to 9-year-old youths (50%) had received some type of mental health service. The most frequently used services were diagnostic interviews (50%), individual therapy (49%), emergency care (33%), family therapy (29%), group therapy (25%), and in-patient or residential care (15%).

Lawrence et al. (2006) applied the Kiddie Schedule for Affective Disorders and Schizophrenia Rating (K-SADS-III-R) to 32 adolescents (aged 17.5 years) in family foster care, 37 adolescents who were maltreated but remained at home with the maltreating caregiver and 88 adolescents who had not experienced foster placement or maltreatment. Foster children and maltreated children reported more symptoms in the K-SADS-III-R than the controls but the authors did not give prevalence rates for different psychiatric disorders. Zima, Bussing, Yang, and Belin (2000) investigated help-seeking steps and service use in 6- to 12-year-old children in foster care and analyzed the clinical diagnoses of a county clinician. Interviews were conducted with the foster parent and child and additionally with the child’s teacher. 80% of foster children (n = 203) were identified as having at least one psychiatric diagnosis (disruptive behavior disorders: 41%, affective disorders: 32%, anxiety disorders: 20%, adjustment disorders: 13%, learning disorders: 12%). Forty-seven percent had at least one comorbid disorder. Children with a psychiatric diagnosis were more likely to be referred for specialty mental health or special education services.

Studies Investigating the Prevalence of Specific Disorders in Foster Children
Six studies investigated the prevalence of specific disorders in foster children: three studies investigated attachment disorder, one study posttraumatic stress disorder, one study substance abuse, one study depression symptoms, and one study eating problems.

Attachment Disorder
Zeanah et al. (2004) conducted retrospective interviews with clinicians (psychiatrists, psychologists, clinical social workers) regarding the attachment behavior of foster children who were aged between 10 and 47 months at the time they were placed in foster care. They diagnosed a reactive attachment disorder in 37% and a disorganized attachment disorder in 22% of foster children. Interestingly, 17% of foster children received a diagnosis of both types of disorders. Minnis et al. (2006) used the Reactive Attachment Disorder Questionnaire (RAD: a 17-item questionnaire for parents and caregivers) and described significantly higher scores in foster children compared to a sample of school children (mean = 18.6 vs. 12.74). Similarly, Millward, Kennedy, Towson, and Minnis (2006)
children (Tarren-Sweeney, 2006). For this purpose, caregivers described children using the CBCL and ACC. A quarter of children showed clinically significant eating problems. Two patterns of eating problems were identified: first, a pattern of excessive eating and food acquisition and maintenance behavior without concurrent obesity, and second, a pattern of pica-type eating behaviors that correlated with self-injurious behavior. Children with confirmed maltreatment in care had a higher risk for food maintenance syndrome (OR = 17.4) but not for pica-type behavior.

Psychobiological Correlates of Maltreatment
Research on maltreated children with PTSD found an alteration of the hypothalamic-pituitary-adrenal (HPA) axis activity in these children (De Bellis, Baum, Birmaher, Keshavan, Eccard, Boring, Jenkins, & Ryan, 1999). This association was confirmed in foster children through the analysis of salivary cortisol levels. Fisher, Stoolmiller, Gunnar, and Burraston (2007) compared three to 6-year-old foster children randomized to either multimodal treatment foster care (MTFC; n = 57) or regular foster care (n = 60) and a community comparison group (n = 60) with regard to salivary cortisol levels. For this purpose, monthly early-morning and evening cortisol levels were assessed over 12 months. No significant differences were found at baseline between foster and community children. However, foster children in MTFC exhibited over time an AM-PM cortisol level change that became comparable to the nonmaltreated community children, whereas children in regular foster care exhibited increasingly flattened morning-to-evening cortisol activity over 12 months.

Linares et al. (2008) analyzed salivary cortisol levels in 21 6- to 13-year-old children in foster homes and found different patterns of cortisol production within the sample. Cortisol level was analyzed based on six salivary samples across two weekend days (morning levels within 30 min after waking, afternoon levels at 4 p.m. and evening levels 30 min before bedtime). While 76% of children showed a decreasing release pattern from morning to afternoon to evening (typical cortisol group), 24% of children had flat, irregular diurnal slopes or showed an ascending slope as compared to children with typical patterns of cortisol. Further analyses showed that 80% of children with an atypical pattern of cortisol production had histories of insufficient protection (from exposure to domestic violence) as compared to 13% of children with a typical pattern of cortisol production. Foster parents of children with an atypical pattern reported higher rates of externalizing problems and separation anxiety symptoms on the Eyberg Child Behavior Inventory than foster parents of children with a typical pattern.

Discussion
This review of the literature confirmed that there are very high exposure rates to different forms of maltreatment in foster children. Many foster children had experienced multiple forms of persistent maltreatment, often during their early development. A vast number of foster children showed developmental delays and mental disorders. This clinical picture could be described as one of comorbid mental disorders. However, the construct of comorbidity in children exposed to persistent and multiple traumas has been criticized (De Bellis, 2001; Salmon, 2002), as it fragments the disorder that should rather be conceptualized as a cohesive developmental disorder and ignores the pervasive impact of multiple traumatization during childhood on the psychobiological development.

The description of pathways between maltreatment on the one hand and developmental and mental problems during childhood on the other hand is an emerging field of research (De Bellis, 2001). Numerous studies have found associations between patterns of mental disorders and neurobiological correlates of maltreatment, such as long-term changes in regulation of the HPA axis and structural brain differences (De Bellis et al., 1999; De Bellis, Keshavan, et al., 1999). In this context, the concept of a developmental trauma disorder (van der Kolk, 2005) may provide useful explanations for the pervasive and multiple developmental, emotional, and behavioral difficulties found in foster children.

In spite of the prevalent history of maltreatment in foster children, we retrieved only one study that examined systematically the prevalence of posttraumatic stress disorder in this high-risk population. This study reported high rates of PTSD in foster children and a differential risk of PTSD with regard to type and duration of maltreatment. One difficulty in determining trauma-related disorders in foster children is the absence of developmentally adapted diagnostic criteria. Scheeringa and colleagues (2003) argued that traumatization in early childhood leads to different symptoms compared to traumatization in later life. Therefore it might be useful to apply developmentally adapted diagnostic criteria, at least for preschoolers. Another difficulty in relating symptoms to the traumatic background of foster children is the common absence of valid retrospective information. Many foster children cannot tell their early childhood history and caretakers who could report this history are often not available.
There is still limited evidence as to whether trauma-
tization is the major reason for the multiple developmen
tal and behavioral problems of many foster children. Foster
children are affected by multiple risk factors that may con-
tribute to developmental delay and mental disorders.
Besides maltreatment, genetic and prenatal toxic factors
impacting the development of foster children have to be
considered. As this review demonstrates once more, there
is strong evidence for high prevalence rates of psychiatric
disorders in the biological parents of foster children and for
high rates of intrauterine exposure to drugs, alcohol, and
nicotine. This accumulation of multiple risk factors does
not allow an attribution of symptoms to single factors.
In spite of the large amount of literature related to children
in foster care, maltreatment, abuse, neglect and mental
health, few studies have focused on children living in
family foster care and their special needs, or on the con-
sequences of these compromising traumatic experiences.
Further longitudinal research is necessary to understand
the complex pervasive psychopathology of this population
in the light of multiple psychosocial, environmental and
neurobiological risk factors. Longitudinal studies may help
to disentangle the contribution of genetic and prenatal fac-
tors as well as of environmental factors before and during
foster care for the high prevalence of developmental delays
and mental disorders in this population.

Among studies that reported reasons for foster place-
ment in the studied samples, the frequency of maltreat-
tment types diverged considerably. Prevalence rates for
developmental delays and emotional and behavioral dis-
orders differed as well. Beside methodological reasons
these different rates across countries may be associated
with socio-cultural factors such as differences in structure
and quality of social and child protection services, in pov-
erty rates, in rates of violence against children, and in
selection factors like age at first placement, the relative
number of placements in foster families or the disposability
of alternative placement forms such as shelters or group
homes. To understand these differences, further research
in different countries with its different child welfare and
healthcare systems is needed to get more information
about possible factors impacting the mental health of
foster children after exposure to maltreatment. Differences
between studies could be reduced through the detailed
description of independent variables such as age at first
placement, number of placements, reasons for placement,
duration of exposure to traumatic situations, risk factors
(e.g., prenatal exposure to illegal drugs or alcohol, family
history of psychiatric disorders), etc.

So far there is some evidence that factors as type and
duration of maltreatment, age at first placement and
placement instability are associated with the extent and
type of developmental delay and mental disorders of
foster children. However, results are sometimes inconsist-
ent between different studies, showing that further re-
search is necessary to understand the associations
between experiences before and during placement and
the children’s development and behavior. Although some
studies follow up children after placement in foster families
(McNichol & Tash, 2001; Oliván, 2003) further research is
needed to investigate the risk of retraumatization in foster
families, as some studies revealed high rates of abuse in
foster families (Cavara & Ogren, 1983; Hobbs & Hobbs,
1999).

Despite the many unsolved questions regarding the
etiology of mental disorders found in foster children,
some conclusions for clinical work can be drawn. Foster
children are referred to pediatric clinics more frequently
due to their multiple health problems. Pediatric psycholo-
gists should be aware of the persistent impact of maltreat-
ment and other risk factors on the development of foster
children. It is evident that foster children need a thorough
assessment of their developmental status, their behavioral
and emotional symptoms, and their general level of psy-
chosocial functioning so that areas for intervention can be
identified. Due to their frequent history of neglect, includ-
ing medical neglect, the special needs of foster children
may be underserved. This may be true both for psychoso-
acial needs as well as for chronic somatic conditions that
require persistent medical treatment and special care.
Collaboration of pediatric psychologists with the child
welfare system should aim to refer foster children in
need to specific treatment programs such as MTFC
(Fisher & Kim, 2007) or trauma-focused cognitive–
behavioral interventions (Cohen, 2005) that have been
demonstrated to be effective even for foster children with
a traumatic background.

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