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Five Systems of Psychiatric Classification for Preschool Children: Do Differences in Validity, Usefulness and Reliability Make for Competitive or Complimentary Constellations?

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Abstract *DSM-IV* and *ICD-10* have limitations in the diagnostic classification of psychiatric disorders at preschool age (0–5 years). The publication of the *Diagnostic Classification 0-3 (DC:0-3)* in 1994, its basically revised second edition *(DC:0-3R)* in 2005 and the *Research Diagnostic Criteria—Preschool Age* (*RDC-PA*) in 2004 have provided several modifications of these manuals. Taking into account the growing empirical evidence highlighting the need for a diagnostic classification system for psychiatric disorders in preschool children, the main categorical classification systems in preschool psychiatry will be presented and discussed. The paper will focus on issues of validity, usefulness and reliability in *DSM-IV*, *ICD-10*, *RDC-PA, DC:0-3*, and *DC:0-3R*. The reasons for including or excluding postulated psychiatric disorder categories for preschool children with variable degrees of empirical evidence into the different diagnostic systems will be discussed.

Keywords Preschool psychiatry · Systems of classification · Diagnostic criteria · DSM-IV · ICD-10 · RDC-PA · DC:0-3 · DC:0-3R

Introduction

Research into psychopathology at preschool age has over the last decade become increasingly important [1, 2]. In a review by Egger and Angold [3] the prevalence of psychiatric disorder in preschool children was estimated to be between 14% and 26.4% with a median value of 19.5% in community samples or primary care pediatric clinics. These rates correspond to data from general population studies and are similar to the overall rate of disorders reported for older children [3, 4].

Numerous studies have verified to different degrees the continuity of externalizing and internalizing symptomatology from preschool age to mid-childhood and adolescence

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[5–13]. It is now generally accepted that psychopathology in young children does occur, and in many cases will persist over time [14]. However, basic issues with regard to the appropriate assessment and categorical diagnosis of preschoolers' mental health status still remain unresolved.

Important dimensional assessment tools like Achenbach's *Child Behavior Checklist* (CBCL 1 ½–5) allow a reliable assessment of the frequency of clinically relevant problem behaviors leading to dimensional data of child mental health problems. However, dimensional assessment tools leave the important questions of categorical diagnoses, of onset of psychopathology, of quality and sensitivity to contextual cues unanswered. In addition, many problem behavior checklists for preschool children often exclude behaviors with low base rates of occurrence, although the symptomatology may constitute relevant categorical child psychopathology, because their inclusion would compromise the internal consistency of the check lists [15]. Dimensional assessment tools are essential in research and yield important complimentary data in the process of clinical decision making, but they cannot be a substitute for a valid and reliable diagnostic classification system in preschool psychiatry.

The development of a categorical diagnostic classification system covering the whole range of psychiatric disorders at preschool age and reliably identifying clinically significant syndromes characterized by severity, pervasiveness, persistence and impairment has over the last decade become a disputed issue. At present, such a system is not yet available. Each of the five most recognized and developed categorical classification systems currently in use in research and clinical practice for diagnosis of mental illness at preschool age have their characteristic strengths and limitations: the *Diagnostic and Statistical Manual* (DSM-IV-TR, 2000), the *International Classification of Diseases* (ICD-10-WHO 2006)**,** the *Research Diagnostic Criteria—Preschool Age* (*RDC-PA*, 2003) [16], the *Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood* (*DC:0-3*, 1994) [17] and its thoroughly revised second edition (*DC:0-3R*, 2005) [18].

These classification systems did not develop independently, but influenced each other to a certain extent in a co-evolutionary process. However, a substantial and important difference between them is the degree of evidence deemed to be necessary for a postulated disorder category to be included in the classification. Decisions on inclusion or exclusion of postulated disorder categories have a tremendous impact on further research. On the one hand, accepting all levels of empirical evidence from mere expert consensus to fully evidence based data may lead to the inclusion of unsubstantiated disorder categories into preschool psychiatric classification systems. Defining a certain level of evidence as a threshold for a newly postulated diagnostic category enhances the classification's validity although potentially at the cost of clinical usefulness and hypothesis-generating capacity. These are important aspects which profoundly influence the development of a new classification system.

Apart from a recent review of Wiefel and colleagues [19] that offers a mainly descriptive introduction to existing preschool diagnostic classification systems, a comparative discussion of issues of validity, usefulness, and reliability of the five existing main classification systems is not available to date. Moreover, a discussion of the reasons for including or excluding new psychiatric disorder categories with variable degrees of empirical evidence into *DSM-IV, ICD-10, RDC-PA, DC:0-3,* and *DC:0-3R* is urgently needed for research and clinical purposes.

Subject of this paper is a review of the conceptual origins, validity, usefulness, and reliability of the five most used and recognized diagnostic classification systems of

preschool psychiatric disorders. Where possible, the classifications' criteria for including or excluding new psychiatric disorder categories at preschool age will be discussed. Existing empirical data on conceptually central diagnoses will be presented to illustrate systematic issues involved in the development of classifications.

Developing Diagnostic Classification Systems in Preschool Psychiatry

At present, research data in preschool psychopathology are so scant that the extrapolation of most diagnoses to preschool age is unsupported by any convincing research data. However, in the long research process of construct validation, the absence of evidence should not be considered as invalidating any classification system. The process of validation depends on preliminary nosologies providing a conceptual framework for making clinical hypotheses, which can then be validated or invalidated in ongoing research. This involves attempting to demonstrate that a distinctive pattern of symptoms is associated with specific genetic, neurobiological, psychological and psychosocial correlates. Therefore, the descriptive attempt to classify psychiatric disorders for preschool children is not an end in itself but the means to understanding etiologic mechanisms and to derive appropriate intervention strategies.

In developing diagnostic criteria for preschool psychiatric disorders, age specific and developmental aspects need to be taken into account. Preschool children are limited in their ability to self-report due to cognitive immaturity and limited verbalizing skills [20]. This obstacle is encountered in older children as well, but to a lesser degree.

The speed of socio-emotional development and high inter- and intra-individual variability are more pronounced in early childhood than in mid-childhood and adolescence [21, 22]. Compared to other age groups, preschool children represent the group most variable in developmental changes in important domains like emotional regulation, interpersonal interactions, play, control of physical functions, motor skills and language. Given the tremendous variation according to individual neurodevelopmental maturation and environmental circumstances, preschool children have the broadest degree of variation with respect to normative behavior. Therefore, to distinguish psychopathology from variation within the normal range, psychiatric classifications for preschool children have to rely on operationalized criteria for onset and duration of symptoms, setting clear and age-appropriate boundaries for clinical symptoms beyond normative variation [23]. Thresholds for the frequency of symptomatic behavior in older children are not transferable to preschoolers if these behaviors are developmentally normal in young children. Egger and Angold [3] underline this fact in their approach to studying oppositional defiant disorder at preschool age. If they had used the cutpoints that identified the 90th percentile for older children at school age (e.g. 'often loses temper' defined as 'loses temper at least 2 times/week') in preschool age, the outcome would be a prevalence rate of 30.1% in preschool children. However, a developmentally sensitive approach requires an empirically derived adjustment of the 90th percentile for this age group (e.g. 'often loses temper' defined as 'loses temper at least 2–3 times/day' in preschoolers). If we find a great variation in the nature and the thresholds for psychopathology across age groups, diagnostic criteria that include fixed cutpoints for psychopathology irrespective of age may well prove to be developmentally insensitive and severely flaw the classification's validity.

The role of the infant's and small child's immediate environment as a major determinant of its mental health development and wellbeing is of undisputed importance [22, 24].

Olson and colleagues [13] and Shaw and colleagues [25] demonstrated the interplay of biological and environmental factors in the pathogenesis of early childhood mental illness between a child's difficult temperament and negativity in the mother-child-interaction in externalizing disorders. In early child mental health development biological and environmental factors closely interact requiring a dynamic model of mental health development [26–29]. However, the difficulty of developing reliable measurements of relationship factors remains a serious empirical challenge [30].

Finally, Sadler [31] and Fulford and colleagues [32] have shown that psychiatric diagnosis is not value-neutral and thus it can be argued that every diagnostic manual is indelibly shaped by the particular balancing of clinical and scientific values of its authors. A classification primarily for the needs of clinicians may compromise its scientific discriminatory power. A highly operationalized research classification with a strong focus on empirical evidence may disregard the clinical focus on patient care. There has to be a linkage of both aspects in the development of evidence based clinical practice. This poses a challenge to preschool psychiatry at its present stage of scientific development as clinical experience and empirical research still diverge in important aspects [31, 32].

DSM-IV and ICD-10

All diagnostic classification systems for preschool children such as *DC:0-3*, *RDC-PA* and *DC:0-3R* were developed as improvements and extensions of the world wide established classification systems *DSM-IV* and *ICD-10*. Therefore, an appraisal of preschool psychiatric classification systems first needs to focus on the potential and limitations of *DSM-IV* and *ICD-10* for classifying psychiatric disorders in preschool age.

Only a very limited number of diagnoses in the *Diagnostic and Statistical Manual (DSM-IV)* and the *International Classification of Diseases (ICD-10)* are supposed to be applied in preschool age such as *autism spectrum disorders* or *reactive attachment disorder*. The vast majority of classification categories contained in *DSM-IV* and *ICD-10* were devised almost exclusively from psychopathology in adults, adolescents and children of school age. In the last decade, however, there has been growing research interest in the relevance of these disorder categories for children from 0–5 years and, in cases a disorder category could be relevant for preschool age, in the feasibility of an extension of respective symptom descriptions. Were preschool children to fall fully within the ambit of *DSM-IV* and *ICD-10* it would be possible to study the progression of mental illness over the entire infant-toddler-child-adolescent lifespan into adulthood.

Validity and Usefulness

ICD-10 hyperkinetic disorder (HKD) and *DSM-IV* attention-deficit/hyperactivity disorder (ADHD) categories were valid in 4–6-year-old children when diagnosed by means of structured assessment of both parents and teachers [33]. However, the application of *ICD-10*-criteria of HKD appears to under-identify children with persistent symptoms in comparison to the application of the respective *DSM-IV*-criteria of ADHD [34]. Preschool children missing *DSM-IV* diagnostic criteria by one or two symptoms were reported to be also highly impaired [3]. This challenges the assumption that diagnostic status is the most useful way to define caseness and highlights the importance of combining categorical and dimensional approaches to identifying preschool children in need of mental health services.

Some diagnostic categories from *DSM IV* originally developed for adult psychiatric illness are potentially relevant for child psychiatric disorders at preschool age although they may need adaptation to the developmental psychopathology of preschool age. The criteria for *posttraumatic stress disorder (PTSD)* are derived from criteria for older children and adults. Many of the present diagnostic criteria for PTSD in *DSM-IV* do not reflect the developmental level of preschool children either cognitively ("feelings of hopelessness") or emotionally ("feeling detached or removed from others"). Thus, developmentally age-appropriate criteria for the symptomatology of *PTSD* at preschool age are needed.

A modification for preschool age depression appears to be overdue as the present *DSM-IV* classification categories were devised with reference to the depressive symptomatology of older children with an emphasis on social withdrawal, somatic manifestations and pronounced symptom persistence over time. In their present form, those criteria are not suitable for use in preschool children who in their normal development display a greater variability of mood, accelerated rates of development and greater context dependency [35, 36]. However, rates of comorbidity in depressive preschool children are much higher than could be expected from studies of older children and adolescents [3, 36, 37]. Empirical data based on dimensional classification showed higher rates of internalizing symptoms especially at preschool age [38]. The question whether these symptom patterns should be interpreted as depressive syndromes or as a more encompassing behavioral and emotional dysregulation still has to be answered by future research.

Some research studies have made parallel use of *DSM-IV* and the preschool-age *Diagnostic Classification: 0-3 (DC: 0-3)*. In their study of 82 children between 1and 24 months Dunitz and colleagues [39] postulated that *DC:0-3* provided the not yet evidence based diagnostic category of *regulatory disorder* offering face validity in clinical expertise [40, 41]. A comparable categorical equivalent does not exist in *DSM-IV*. Other studies which made use of parallel codification systems found that cases diagnosed as *regulatory disorder* under *DC:0-3* were under *DSM-IV*, in the majority of cases, classified as *disruptive disorder* and in a minority of cases as *emotional or adjustment disorder* [42–44].

In addition to developmental factors in preschool psychopathology, environmental factors are of crucial importance, especially the impact of parent-child- and child-parent-interactions. Numerous studies conducted on infants and young children document the pivotal role of maladaptive parent-child interaction as risk factors on psychopathogenesis and progression of early childhood psychiatric disorder [13, 25, 45, 46]. On account of the knock-on effects of these risk factors on diagnosis, treatment and prognosis, it would be important in clinical practice that diagnostic classification systems of preschool age take into account the contextual factors influencing developmental psychopathology in young children i.e. child-parent attachment, parental sensitivity and interactive behavioral patterns [42].

An advisory group of family therapists worked closely with the *DSM-IV* Task Force in preparing and submitting a group of 'relational disorders'. However, their proposal never gained the status of 'disorders', but became V codes, a group of categories that are not considered to be mental disorders but should be a focus of clinical attention as important risk factors [31]. Thus, although it is possible to use the multi-axial *DSM-IV* and *ICD-10* classification systems to collect data on the environmental factors contributing to mental illness, the individual patient with his symptoms remains the primary focus of the clinician's attention. Substantial methodological challenges of valid and reliable measurement of relationship factors are still unresolved [30].

Reliability

Operationalized research criteria and standardized assessment tools have significantly improved the reliability of *DSM-IV* and *ICD-10* diagnoses of child psychiatric disorders [47]. However, most diagnostic categories were not devised to be applicable for children at preschool age. Autistic spectrum disorders are an exception as reliable diagnostic criteria are available which can be used in assessing children younger than three years of age [48, 49]. Scheeringa, Zeanah and colleagues [50–54] demonstrated that with modified criteria a reliable diagnosis of *PTSD* could be made in children from 9 months of age onwards. Luby and colleagues [35, 36, 55] have supplied evidence that developmentally sensitive age appropriate modifications of the criteria for *major depression* at preschool age could make it possible to reliably diagnose *major depression* in early childhood.

Summary

Both *DSM-IV* and *ICD 10* offer only a small number of child psychiatric disorder categories for preschool children such as ADHD/HKD or autistic spectrum disorders. Some disorder categories relevant for preschool age such as depression and PTSD were originally developed for older children and adults. Where there have been developmentally sensitive adaptations of the criteria to preschool age, studies have demonstrated that reliable and clinically useful diagnoses of depression and PTSD could be made. Interactional factors like maladaptive parent-child-interaction are not integrated into disorder categories, but coded as risk factors in order to confine the disorder definition to individual illness categories. Taking these aspects into account, it has to be concluded that *DSM-IV* and *ICD 10* at present offer no comprehensive and recognized classification for diagnosing psychiatric and developmental disorders in preschool children.

Research Diagnostic Criteria—Preschool Age (*RDC-PA*)

The lack of operationalized criteria for preschool psychiatric disorders needed for reliable research investigations instigated the setting up of a task force of independent investigators by the *Committee on Preschool Children* of the *American Psychiatric Association* (APA). From 2001 to 2002 this task force received support from the *American Academy of Child and Adolescent Psychiatry* (AACAP). The primary object of this group was to formulate with the greatest possible clarity operationalized diagnostic criteria for psychiatric disorders in preschool children (0–5 years old) on the basis of available empirical data regardless of eventual clinical usefulness. In the face of conflicting evidence greater authority was to be ascribed to scientific data than to clinical expert opinion. As with *DC:0-3* and *DC:0-3R*, the aim was not to create an exhaustive classification system for preschool age mental disorders but to devise a complementary and developmentally sensitive modification to the appropriate categories of *DSM-IV-TR*.

When devising the research criteria the task force only considered scientific studies that had been conducted using proven methodological standards which showed a descriptive, predictive and construct validity for the respective illness categories. The strict selection criteria were met by 40 published scientific studies which were then used as a basis for revising *DSM-IV* diagnoses possibly relevant for preschool age. In the appendix, the relevant studies providing empirical support for the deliberations of the task force are compiled in relationship to face validity, descriptive validity, predictive validity, construct

validity and reliability of the respective disorder categories. Thus, every user of the manual is able to judge the degree of empirical evidence supporting the delineation of a specific disorder category.

The *RDC-PA* was made available on the *World Wide Web* in 2003 [16]. It was hoped that its online publication would initiate studies on reliability and validity in infant and preschool psychiatry in the same way as the research diagnostic criteria published in 1978 were seminal for further research which led to the operationalized diagnostic criteria of DSM-III [56]. Thus, although the majority of the research diagnostic criteria of RDC-PA are still provisional, they can now be refined, confirmed or rejected using evidence based data.

Validity and Usefulness

With a view to possible inclusion in the Research Diagnostic Criteria, 17 diagnostic categories of the *DSM-IV* classification system, which were developed primarily for adults and children over six years of age, were deemed relevant to preschool children and reviewed to determine how they could be appropriately modified for use in the age group 0–5 [16]. Experts decided in consensus meetings that 4 of the 17 *DSM-IV* diagnostic categories have at present only insufficient evidence-based data to warrant a revision but that their clinical relevance to preschool age requires their provisional inclusion into RDC-PA without proposal for modification. The categories were *agoraphobia without history of panic disorder*, *social phobia, obsessive compulsive disorder* and *generalized anxiety disorder*.

The remaining 13 *DSM-IV* diagnostic categories with sufficient data available to undertake a revision offered a total of 87 symptom descriptions. Half of these symptom descriptions were deemed relevant to preschool children and were not changed at all. Approximately a third of the symptom descriptions underwent a change of their denomination only in order to reflect more accurately the developmental stage of the preschool child. Every seventh symptom item was deleted on grounds of being developmentally inappropriate.

Twenty-two new symptom descriptions had to be introduced for this age group, particularly in the new diagnostic sub-categories of *feeding and sleep disorders*. The *DSM-IV* category of *primary sleep disorder* was replaced by two new categories, *feeding disorder in infants and toddlers* by six different illness categories from which five were etiologically differentiated with implications for treatment, prevention, and prognosis. It must be mentioned that only one person has of yet provided corroborative research evidence for this variety of feeding disorders [57]. The same strict scientific standards are again in evidence in the formulation of the research criteria for *major depression* or *reactive attachment disorder*. Both disease categories were finally formulated on the basis of respectively one research group's scientific studies only [36, 58]. Because the *RDC-PA* authors were of the opinion that the pre-existing studies on *regulation disorders* did not meet the strict criteria of scientific evidence this proposed disorder category was not included.

In keeping with the methodology of *DSM-IV* the authors of *RDC-PA* formulated diagnostic categories as syndromes that are made up of phenomenological symptom clusters of the individual child independent of possible contributing etiological factors pertaining to the child and to behavior pattern of parents. In attempting to achieve a phenomenological-objective description of disorder symptoms the importance of interactive factors as risk factors is never in question, but doubt is cast on whether they can be operationalized for use in research studies [16]. Despite the emphasis on phenomenologically derived description of symptoms there is a diagnosis in *RDC-PA* which explicitly takes into account the quality of the child's relationship with its parents. In the diagnosis

category *feeding disorder of caregiver-infant reciprocity* the relationship dynamic between parent and infant is seen as an important etiological factor for the diagnosis. Recent work on the subject of affect regulation confirms the importance of the parent-child interaction as the child's regulatory capacities depend on the parent's intuitive co-regulatory competence [27, 28, 59].

Reliability

It is one of the stated aims of the *RDC-PA* to extend the operationalized diagnostic research criteria and thereby increase diagnostic reliability. On account of the strict phenomenological focus on the symptoms of the child, the quality and frequency of the pathological behavior is specified, but not the data collection method used. Consequently, it is often unclear whether more weight is to be given to the researcher's or the parent's observations of the child. It also remains undefined in what settings the observations are to be conducted, how structured the observations are to be etc. These factors influence the reliability of the classification system enormously as there can be huge discrepancies between parent's individual and joint accounts of their child's behavior and those of a clinician [60, 61]. The improvement of the reliability of a diagnostic classification is not an end in itself as it may occur without improvement of the validity of its disease categories. However, the evaluation of the validity of the different disease categories would be extremely difficult to determine if the diagnostic criteria were unreliable. The improvement in the categories' reliability in *RDC-PA* is therefore of undisputed importance in the further development of a diagnostic classification system of child psychiatric disorders in preschool children.

Summary

In *RDC-PA*, establishing clear criteria for determining a threshold to define whether a diagnostic category is evidence based sets a certain quality standard. However, taking proven methodological standards as the gold standard and dismissing clinical expert opinion can lead to the misleading conclusion that there is no relevant evidence when the evidence fails to reach the particular threshold in the hierarchy of evidence based data. Thus, to a large extent, empirical data like clinical expert opinion in the evolving field of preschool mental health may be insufficient and may need to be corroborated by independent systematic research. However, in many disease categories, clinical expert opinion represents the best empirical evidence available at present [62]. To exclude clinical diagnoses for preschool child psychiatric disorders, which have not yet been sufficiently scientifically validated, from a classification system would increase the relative proportion of evidence-based criteria within a system, but diminish the coverage of disorder phenomena and impinge on clinical usefulness and the scope for hypothesis-generating research [22].

The authors of *RDC-PA* themselves include the postulated *disorder of inhibition/avoidance* in the appendix. Behavioral inhibition is associated with fear and shyness, withdrawal in novel situations, anxious/fearful distress and can be reliably measured in young children [63]. Behavioral inhibition turns out to be rather stable in the course of development [64], is heritable and occurs more frequently in at-risk children of anxious parents [65, 66] and is significantly associated with the later development of anxiety disorders [64, 67]. The question whether behavioral inhibition is a disorder in itself or rather a temperament factor, only relevant as a risk factor for other disorders, presents

methodological and conceptual problems reflected in the degree of overlapping items in measures of temperament and psychopathology measures [68]. In an explicit attempt to stimulate research on the relationship between temperament and early-onset psychopathology the authors included *disorder of inhibition/avoidance* into the *RDC-PA* while stressing its hypothetical character by putting it into the appendix.

Diagnostic Classification 0-3 (*DC:0-3*) and Revised Edition (*DC:0-3R*)

In 1987 the US-American non-profit organization *Zero to Three* dedicated to promoting the healthy development of infants and toddlers established an interdisciplinary task force of experts to address the need for a diagnostic classification system of mental diseases for this age group. Due to a manifest lack of published empirical data the task force was mainly drawing on its members' clinical experience to devise a multi-axial classification system for the diagnosis of psychiatric disorders in the first 4 years of life. 1994 saw the publication of the *Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood* (DC:0-3) [17]. The classification was never intended to be an exhaustive system of early mental illness in this age group but rather a developmentally sensitive addition and complement to the pre-existing *DSM-III-R* and *ICD-9* classification systems. Despite its title, *DC:0-3* has widely been used in service settings with children from birth to age five.

After a decade of experience in the application of *DC:0-3*, an expert panel was set up by *Zero to Three* in 2003 to basically revise the first edition. Users of *DC:0-3* worldwide were interviewed, selected experts were consulted. The growing body of scientific research and *RDC-PA* provided a basis for a profound and empirically informed revision of the manual. Intensive efforts to specify diagnostic criteria to achieve higher reliability were undertaken. In August 2005 the revised version *0-3R Diagnostic Classification of Mental Health and Developmental Disorder of Infancy and Early Childhood: Revised Edition* was published [18].

Validity and Usefulness

In studies where there was a parallel application of *DC:0-3* and *DSM-IV* significant congruence of the respective clinical criteria i.e. *adjustment disorder*, *reactive attachment disorder or posttraumatic stress disorder (PTSD)* was found [39, 42, 44]. A series of smaller clinical studies verified the more age-appropriate criteria of *DC:0-3* in the diagnosis of *posttraumatic stress disorder (PTSD)* [52, 54] and *reactive attachment disorder* [58].

The extent to which cross-classification is encouraged in the revised edition is demonstrated by *DC:0-3R*'s express instruction to its users to adopt Axis-I Diagnoses from *DSM-IV-TR* or *RDC-PA* as required. This applies in particular to those cases where both classification systems have good operationalized diagnostic categories that are not yet available in *DC:0-3R*. In the case of *DSM-IV-TR* one would be referring to the diagnoses of *pica*, *rumination* or *obsessive-compulsive disorder*. On the basis of increasing clinical evidence *DC:0-3R* recommends that *DSM-IV-TR* be used to diagnose *autistic spectrum disorders* from the age of 2 years onwards which fall under the category of *pervasive developmental disorder*. The *DC:0-3R* diagnosis of *multisystem developmental disorder (MSDD)* is now only considered relevant for children under 2 years of age.

DC:0-3R refers to *RDC-PA* when diagnosing *ADHD*, *conduct disorder* and *oppositional-defiant disorder*. Considering the particular difficulties of diagnosing externalizing

behavior disorders at preschool age, this is an important development. The immature self-regulatory abilities of young children often lead to phases of increased activity, oppositional behavior, impulsiveness and aggressive behavior. For some children these are transient features of normal development; they cease as self-regulatory skills mature [9]. For other children these behaviors persist as symptoms of externalizing disorders, which ought to be diagnosed as early as possible [9, 11, 13]. To distinguish between transient developmental perturbations and persisting psychopathology at preschool age, a developmentally sensitive and age-specific diagnostic manual for externalizing disorders is required. Good operationalized diagnostic criteria with a specification of age of onset, severity and duration of symptoms and high rates of evidence based data are required which the stricter research agenda of *RDC-PA* takes into account. For the development of sensitive diagnostic criteria, epidemiological data from representative population studies are needed. These are as yet unavailable [15]. In devising new diagnostic categories *DC:0-3R* was adapted for several disorders using *RDC-PA* criteria i.e. the sub-classifications for *sleep disorder, feeding disorder* and *anxiety disorder* beyond 2 years of age [22].

Focusing on clinical usefulness, the authors of *DC:0-3* and *DC:0-3R* included diagnostic categories not to be found in *DSM-IV* or *ICD 10* which they deemed to be relevant from clinical expertise but which still lack systematic empirical proof and evidence based data. *Regulation disorders* are one such important addition that does not yet possess a level of evidence comparable to the established diagnostic categories [40, 41]. Those affected are presumed to have constitutional and developmental deficits in sensory, senso-motoric and emotional processing. Clinical symptoms range from hypersensitivity, impulsivity, irritability and hyper- or hypoactivity supposedly leading to *sleep and feeding behavior disorders*. In a clinical trial by Minde and Tidmarsh [69] on 57 children between 15–48 months of age 37% met the criteria for *regulation disorders*. However, a thorough empirical validation of this diagnostic category has not yet been undertaken.

Although generally open to postulated disorder categories, neither *DC:0-3* nor *DC:0-3R* offer diagnostic categories specific for infants under 1 year. The *sleep behavior disorder* of *DC:0-3R* can only be diagnosed from 12 months of age onwards. *Crying disorder* is not mentioned at all, as neither sufficient scientific evidence nor clinical consensus exist to establish crying disorder as a distinct child psychiatric category. Few studies have been conducted to date in this area [70]. Some research suggests a progression of *crying disorder* in early childhood to the diagnostically relevant areas of hyperactivity and *conduct disorder* at school age [71]. In addition to a thorough empirical validation of the diagnostic category of *crying disorder*, its developmental psychopathological significance needs to be longitudinally researched to empirically verify this possible link.

DC:0-3 and *DC:0-3R* were devised as multi-axial classification systems building on the five axes of the *DSM-IV* classification. Axis II of *DSM-IV* refers only to *developmental and personality disorders, DC:0-3* and *DC:0-3R* go further in their formulation of a *relationship disorder classification*. Here, in addition to the standard diagnostic interview, observational assessment of parent-child interaction is designed to screen for interactional behavior detrimental to the child's mental health and development. In studies conducted by Minde and Tidmarsh [69] and Keren and colleagues [72] 53% to 73% of the clinical sample satisfied criteria for the diagnosis of *relationship disorder*. In a Danish general population sample, the rate was 8.5% with a significant association to hyperactivity/attention deficit disorder, reactive attachment disorder and disorder of conduct and emotions and regulatory disorders [4]. Thomas and Clark [43] found that *disorders of affect* are significantly more likely to occur in combination with *relationship disorders* than *disorders of regulation* or *posttraumatic stress disorder*.

In the process of revision, the categorization of *Relationship Problems Checklist* has been moderately quantified and specified. The assessment tool *Parent-Infant Relationship Global Assessment Scale (PIR-GAS)* which assesses the functioning level of the parent-child relationship on a scale from 1 to 100 has become more specific and has been extended owing to its popular use in clinical practice. However, what is viewed as successful parent-child-interaction varies considerably depending on cultural background [15]. For this reason Christensen, Emde, and Fleming [73] have adjusted the guidelines of the *Cultural Case Formulation* from Appendix 1 of *DSM-IV* to meet the particular demands of assessing the early parent-child relationship. The pace of globalization suggests that this aspect may need to be considered when further revisions are undertaken.

Reliability

Although *DC:0-3* is a marked improvement on *DSM-IV* it still has clear limitations. While clinical descriptions of the various diagnostic criteria are available, clear operational diagnostic criteria are often lacking [74]. Standard values or comparative values are missing; data interpretation is therefore only qualitative in nature. However, *DC:0-3* validity is dependent on a reliable application of its diagnostic criteria by its users. Many studies which made use of this classification system relied on clinical interview and clinical consensus as data collection methods [11, 43, 44, 52, 58]. Whereas Keren, Feldman, and Tyano [72] and Frankel and colleagues [42] report satisfactory inter-rater reliability on smaller random sampling, Emde and Wise [21] and DeGangi and colleagues [40] while confirming the clinical usefulness could not find convincing proof of its reliability. Angold and Fisher [75] noted that clinicians have been known to assign different diagnoses to one and the same sample of patients when unstructured data collection methods were used. One way chosen to countervail this shortcoming was to use a modified version of proven reliability sampling testing for older children on preschool children [9]. Despite such corrective measures the evidence-based evaluation of *DC:0-3* remained problematic. Notwithstanding its considerable popularity among clinicians it was less useful for clinical researchers [76].

The revised version of DC:0-3 had the aim of increasing the reliability and at the same time broadening the diagnostic categories of psychiatric disorders in children in the first 4 years of life. Numerous operationalized criteria for the number, form and duration of symptoms were introduced. For this purpose generous use was made of *RDC-PA* criteria, resulting in a further convergence of the respective classification systems. The development of a three-step training program designed to help clinicians to make reliable use of the classification system is further evidence of the vigorous efforts to increase the reliability of the *DC:0-3R* classification [22].

Summary

The classification *DC:0-3* published in 1994 covered a wide range of early child psychiatric clinical syndromes based on clinical expert consensus. It offered a good usefulness in terms of acting as a starting point for clinical practice and training and as a hypothesis-generating basis for subsequent systematic research. *DC:0-3* included both diagnostic categories with at least modest empirical evidence such as reactive attachment disorder or PTSD and diagnostic categories whose face validity was derived from clinical consensus and expertise without further empirical proof such as was the case in the introduction of the disease category of regulation disorder.

Although incorporating numerous operationalized criteria for the number, form and duration of symptoms from *RDC-PA*, *DC:0-3R* still maintains a pragmatic focus on usefulness in clinical practice. Unlike *RDC-PA* it does not specify the degree of empirical evidence of an individual disorder category. Without being obvious at first hand to the user, *DC:0-3R* still retains its character as a compilation of diagnostic categories with a highly variable backing in empirical evidence. However, in an effort to guide clinical practice and to stimulate further systematic clinical research, it represents a legitimate possibility to compile a heterogeneous diversity of postulated diagnostic categories in the quickly expanding field of preschool mental health [22]. Clinical expertise and empirical evidence are equally important in medicine and correspond to the underlying evaluation of its main focus, medicine as primarily pragmatic-clinical practice or medicine as primarily research-oriented empirical science respectively [31, 32]. The development of an empirically sound diagnostic classification system depends on both aspects. It is only achievable if the process of clinical observation followed by hypothesis creation and hypothesis testing by means of evidence based research data is repeated in a continuous cycle of model and data interpretation until valid and reliable classifications are achieved.

Discussion

To allow a systematic evaluation of existing classification systems, more comparative studies on one and the same sample of patients using different classification systems for the purposes of diagnostic codification are needed. Studies comparing *RDC-PA* and *DC:0-3R* criteria with unmodified *DSM-IV* criteria would be a possible further step toward the development of an integrated and developmentally sensitive classification across the lifespan.

At preschool age, basic ability to regulate behavior and emotions develops in multiple functional systems. Early and severe dysfunction in underlying developmental processes such as affect regulation, inhibitory control or attention regulation is likely to produce a range of child psychiatric symptoms across diverse contexts [3]. Externalizing behavior in preschool children often presents in combination with emotional and other child psychiatric disorders as comorbidity which requires multiple diagnoses in a single case, each diagnosis illuminating only one particular aspect of the overall psychopathology [76, 77]. A comparison of different classification systems therefore needs to allow comparison of all diagnoses in a case, and not only of the primary diagnoses. When only the primary diagnoses of the different classification systems are compared, less concordance between systems is observed than actually exists [76].

More longitudinal community studies are needed to advance our knowledge of preschool psychopathology. Future research needs to focus on the onset, course and etiology of comorbidity no later than age 2 [3]. In addition, verifying the supposed continuity or progression over time of clinically postulated early child psychiatric disorders e.g. early *regulation disorders* to *ADHD* is a challenging research task. The lack of adequate disorder definition coupled with the complex methodology which requires the involvement of multiple sources of information including parents, preschool settings, and other caregivers, and multiple methods including interview, observation, video-recording, biological markers, and other sources, have made such studies very difficult to date [15, 78].

Epidemiological studies of early child psychiatric disorders need reliable and valid classification systems, just as the development of a diagnostic classification system urgently requires substantiation by epidemiological data. The stricter criteria of the *RDC-PA* offer a

good opportunity for substantiating important epidemiological research. The danger in the use of restrictive *RDC-PA* criteria lies in the risk of substituting random error due to definitional inconsistencies with systematic error if, for instance, restrictive criteria lead to consistent exclusion of segments of an underlying broader syndrome. At present in the young scientific discipline of preschool psychiatry, defining a middle range of operational specificity appears to be the method of choice to stimulate hypothesis-generating and hypothesis-testing research and to maintain the reliability of the categories employed. The increasing number of relevant studies promotes the development of a further synergism and convergence of epidemiological and clinical research and fosters growing interest in the increasingly important field of early child mental health [78].

In this respect *DSM-IV*, *ICD 10* and the diagnostic extensions of *RDC-PA, DC:0-3* and *DC:0-3R* are to be viewed as complementary rather than competing tools to categorical assessment of psychiatric disorder at preschool age. *DC:0-3* and *DC:0-3R* offer a primary focus on psychiatry as clinical and patient-oriented practice. They pragmatically tend to emphasize the broadness of phenomena in clinical research and clinical usefulness in child psychiatric practice providing scope for hypothesis-generating clinical investigation. *RDC-PA* has its focus on psychiatry as a scientific discipline gathering scientifically valid and reliable knowledge on early child psychopathology. It therefore concentrates on the preciseness of reliability oriented research criteria. At this stage of development in preschool psychiatry both foci are essential. Preschool psychiatry itself is still in its infancy. An empirically sound diagnostic classification system is only achievable if the process of clinical observation is followed by hypothesis generating and finally hypothesis testing in evidence based research until valid and reliable systems of classification for preschool psychiatric disorders can be achieved. The evolutionary development of *DC:0-3*, *RDC-PA* and *DC:0-3R* are important steps in this development.

Summary

Research on developmental psychopathology at preschool age has over the last decade become increasingly important. However, most of the respective diagnostic categories have not yet been thoroughly operationalized and verified by methodologically sound scientific studies. At present, all existing classification systems of early childhood psychiatric disorders must still be seen as limited. The encouraging results achieved in the last decade stress the necessity for further research on the whole range of psychiatric disorders in preschool age. This is essential for the development of valid, useful and reliable diagnostic classification systems.

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