European Child & Adolescent Psychiatry (2019) 28:1645–1658
https://doi.org/10.1007/s00787-019-01330-8

ORIGINAL CONTRIBUTION

Impaired predictability: enhanced fluctuations in the parenting behaviour of mothers of pre-school children with clinical diagnoses across three different play tasks

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Received: 24 April 2018 / Accepted: 1 April 2019 / Published online: 16 April 2019

Abstract
Fluctuations in parenting behaviour are thought to be important for the development of child psychopathology. This study focusses on fluctuations in the parenting behaviour of mothers with 3–6-year-old children with a clinical diagnosis according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) ($N=39$) and compared them with a control group of mothers with children without a clinical diagnosis ($N=41$). In a laboratory setting, we compared the quality of mother–child interactions between both groups using three increasingly challenging co-operation tasks. At first, the mother and child interacted via a free play task. They then co-operated within a constructional play task and finally within a challenging problem-solving task. We analysed the mothers' parenting behaviour using the Laboratory Parenting Assessment Battery (LAB-PAB) and children's problem behaviours by means of their mothers' rating using the Child Behavior Checklist 1 ½–5 (CBCL). The results corroborated our hypotheses. Mothers of the group of children with clinical diagnoses had a lower parenting quality and higher fluctuations in parenting behaviour across situations compared with the non-clinical group. Further analysis revealed that specific fluctuations in maternal involvement and hostility uniquely predicted child psychopathology, measured with the CBCL, showing incremental validity of fluctuations in maternal involvement, when controlling for parenting quality and maternal difficulties in emotion regulation, measured with the Difficulties in Emotional Regulation scale. The results are discussed in terms of their implications for clinical interventions, as well as theoretical implications and future research.

Keywords Parenting · Within-person variability · Fluctuation · Child psychopathology · Pre-school children

Introduction

Various studies have shown that parenting behaviour plays a crucial role in the development and maintenance of behavioural problems, child psychopathology, and psychological disorders [1–3]. Conversely, the role parents play in supporting the development of basic competences, like emotional self-regulation [4], is crucial for the healthy development of children [5, 6]. Children aged 2–6 years are strongly influenced by parenting behaviour. Therefore, parental training in a clinical context can aid in supporting child development and health [7]. Considering parenting as an interplay of many individual behaviours, attitudes, emotions, and perceptions of a caregiver across different situations and time, some important parental features, like consistency, predictability, and reliability of caregiver's behaviour, need to be observed across different contexts, situations, or tasks. Observing a caregiver across different situations enables the analysis of these structural aspects of a caregiver's performance. The analysis of (in)stability of parental behaviour—often labelled with the term (in)consistency—refers to either the measurement of rank-order consistencies of a person within a group or to the measurement of a person's intra-individual variability, which reflects a transient within-person change in behavioural performance across different tasks or situations [8]. Consequently, fluctuations in behaviour are best analysed using the measurement of within-person variability. However, fluctuations in behaviour consistently receive less attention when investigating differences between

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the parenting behaviours of caregivers with children with (non-)clinical diagnoses. In the context of child psychiatry, attachment theory research was among the first to show the importance of the predictability of behaviour in terms of a lack of predictable feedback by an inconsistently available caregiver during early child development [9–11]. Ainsworth, Blehar et al. [9] highlighted the need to consider fluctuations in maternal sensitivity across situations and contexts and related fluctuations in maternal behaviour to impaired child development. Subsequent studies showed contextual influences on parenting behaviour and pointed out that a considerable proportion of variance in mother–child-interactions emerges from the impact of the immediate context [12–14]. Further studies revealed that the behavioural fluctuations of a caregiver are associated with stress and a lower feeling of predictability for the child [15]. Lindhiem et al. [16] showed that fluctuations in maternal sensitivity in high-risk mother-infant dyads increased with the number of observations, indicating an enhanced susceptibility to fluctuations in behaviour for clinic-referred mothers. They also found that more fluctuation in behaviour was associated with a non-autonomous attachment representation of mothers and a higher probability of children being removed from their home by child-protective services. Thus, fluctuations in parenting behaviour indeed seem to be an important aspect of mother–child interactions in clinical contexts and associated with maladaptive maternal parenting behaviour. In terms of maternal emotion control, an impaired ability to regulate emotions and emotion variability is both associated with psychopathology symptoms and psychiatric disorders [17–19]. However, the influence of maternal difficulties with emotion regulation in terms of parenting fluctuations and child psychopathology is also understudied.

To our knowledge, the investigation of fluctuations in parenting behaviour [20], in terms of within-person variability of behaviour across contexts, has been investigated in only a few clinical studies [8, 12, 16, 21–23]. Other studies have investigated fluctuations in parenting behaviour only in non-clinical parenting contexts [24–26]. However, only a few studies used a control-group design, to compare behavioural fluctuations of mothers with children with (non-)clinical diagnoses [12, 16, 22, 23]. Moreover, the relationship between fluctuations in parenting behaviour and child conduct and emotional problems has still not been sufficiently investigated. In sum, there is still a gap between the theoretical assumptions and observations from clinical practice concerning the relevance of fluctuating parenting behaviour in clinical pre-school children and the empirical investigation of this phenomenon.

To summarise, parental cross-situational intra-individual variability (IIV) has yet been studied in several mother–child interaction contexts but is still understudied in clinical pre-school contexts. The few previous findings suggest a negative impact of maternal intra-individual change in parenting across contexts on child development and support the notion that they are associated with child psychopathology. However, to our knowledge there is not a single study investigating potential differences in IIV between mothers of normal and clinically referred pre-school children within a controlled laboratory setting. If there are differences in fluctuations and these fluctuations would be related to child psychopathology, this would open new starting points for interventions in family therapy and parent training programs. Especially at this early stage of child development, interventions which are capable to influence cross-situational IIV in parenting may contribute to a reduction of child psychopathology and support normal development of the child.

Aim of the study

With this study, we aim to assess fluctuations in the parenting behaviour of mothers with children with clinical diagnoses and mothers with normal children in increasingly challenging interactions with their child using a controlled laboratory setting, and to investigate differences in fluctuations in parenting behaviour between mothers of pre-school children with and without clinical diagnoses. We hypothesise that there will be a significantly enhanced fluctuation in parenting behaviour on parenting dimensions such as involvement, positive emotionality, hostility, and intrusiveness in mothers of children with clinical impairments when compared with the control sample of children with no clinical impairments and their mothers, indicating impaired predictability in maternal parenting behaviour. Furthermore, we hypothesise that the extent of fluctuations in parenting behaviour will provide an incremental contribution to the degree of children's conduct and emotional problems beyond parenting quality.

Our specific hypotheses were as follows:

1. Mothers of pre-school children with a child psychiatric diagnosis (clinical group) will exhibit significantly more fluctuations in their parenting behaviour toward their child across differing challenging situations than mothers of a control group of children without any diagnosed problems.
2. Mothers of the clinical group will show more unfavourable parenting behaviour in terms of lower involvement and positive emotionality, as well as a higher level of hostility and intrusiveness in each of the three situations and across all situations.
3. Parenting quality and the extent of fluctuations in parenting behaviour will both predict the conduct and emotional problems of the child.

Methods

We compared the parenting behaviour of mothers in three increasingly challenging situations (free play, constructional play, and problem solving play) between a group of mothers with children with clinical impairments and a control group of mothers with children who had developed normally.

Sample

A clinical sample of outpatient and day clinic pre-school children ($N = 39$, 49% girls) with a child psychiatric diagnosis and their mothers (clinical group) was compared to a control group of mothers with healthy children ($N = 41$, 49% girls) recruited from day care centres. All children visited pre-school day-care centres and the age of the children ranged from 3.2 to 6.4 years. The exclusion criteria for both groups were as follows: any autism spectrum disorder or mental disability for the child and psychotic disorders or mental disability for the mother, as well as insufficient German language skills of the mother.

Clinical group

We recruited the clinical group in the Outpatient Clinic and Family Day Clinic of the Department of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy at the University Hospital of Münster. The mothers were asked to participate in the study during an outpatient appointment or at the beginning of the day clinic treatment. Children with a clinical diagnosis according to the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) were included in the study. Of the 72 mothers asked to participate in the study, 11 were excluded due to matching criteria (see below), while 22 declined participation (lack of time, not interested). Finally, 39 dyads participated in the study. Twenty-six children (66%) were outpatients, and 13 (33%) were just beginning day clinic treatment. The distribution of ICD-10 diagnoses was as follows: in terms of externalizing disorders, 15% had a disturbance of activity and attention (F90.0), 15% had a hyperkinetic conduct disorder (F90.1), 3% had a conduct disorder confined to the family context (F91.0), and 8% had an oppositional defiant disorder (F91.3) diagnosis. In terms of internalizing disorders, 12% had a separation anxiety disorder of childhood (F93.0), 3% had a social anxiety disorder of childhood (F93.3), and 27% had other childhood emotional disorders (F93.8). However, 17% had a mixed disorder of conduct and emotions diagnosis (F92.8), which we could not clearly categorize as 'externalizing' or 'internalizing'. In sum, 40% of diagnoses were categorized as an externalizing disorder, and 43% were categorized as an internalizing disorder.

Non-clinical group

Mothers of the non-clinical group were recruited from several day care centres in Münster. To ensure that children of the non-clinical group did not suffer from socio-emotional impairments, mothers filled out the German version of the Child Behavior Checklist (CBCL 1 ½–5, Achenbach & Rescorla, 2000, see description in the "Measurement" section). Finally, two dyads were excluded because mothers reported conduct and emotional problems of their child above the clinical cutoff (93rd percentile), one on the internalizing and total scale and one on the externalizing problem scale, leading to a final sample of 41 participants.

In total, we had a sample size of $N = 39$ in the clinical sample and $N = 41$ in the non-clinical sample, with a perfect match for sex and an excellent match for age (see Table 1). The age of the mother, siblings, educational status, marital status, and the amount of time the child spent in a day-care centre served as additional control variables, as measured with a questionnaire (see Table 1).

Design

To gain information about the structure of parenting behaviour in terms of within-person variability, we used three task settings in which mothers interacted with their children as follows: (1) in the free play task, (2) in a co-operative constructional play task, and (3) in a challenging problem-solving task. The tasks were chosen to induce increasing challenges for the parenting behaviour of the mothers in regulating the actions and emotions of their child. According to previous investigations into parenting behaviours with pre-school children exhibiting behavioural difficulties [21, 27, 28] each task was set to last for 5 min.

Stimulus material

For the free play task (situation 1), the mothers and their children received a box with a standard set of game figures (various knights, animals, little dolls) with which they could play together. For the co-operative constructional play task (situation 2), the mothers and their children received a crate with a wooden rail, which they were to build together. The wooden railway consisted of approximately 80 parts (rails, trains, barriers, etc.) so that the mother–child dyad had enough building material to build simple or complex structures. For the problem-solving task (situation 3), the

Table 1 Demographic characteristics of the sample

	Clinical group		Control group		$t(df)/\chi^2$(df)	p
	M (SD)/*N* (%)	Range	M (SD)/*N* (%)	Range		
Children						
Age	5.0 (1.0)	3.3–5.11	4.9 (1.0)	3.2–6	0.34 (78)	0.73
Girls: boys	19 (48.7): 20		20 (48.8): 21		0.2 (1)	0.66
Number of siblings	0.63 (0.8)	0–3	0.78 (0.72)	0–3	0.87 (78)	0.39
Time in day care centre						
0–25 h per week	11 (28)		15 (37)			
26–45 h per week	28 (72)		26 (63)		0.5 (1)	0.47
CBCL internalizing	64.3 (5.9)	53–73	45.4 (8.9)	29–59	11.1 (78)	< 0.001
CBCL externalizing	60 (5.8)	51–72	43.8 (6.8)	35–60	11.4 (78)	< 0.001
CBCL total problem	66 (3.1)	59–72	41.7 (7.2)	31–62	19.5 (78)	< 0.001
Mothers						
Age	33.6 (3.4)	26.2–41.4	33.2(3.5)	26.8–43.2	0.48 (78)	0.63
Education						
Interm. school leaving cert.	6 (15)		2 (4.9)			
Adv. school leaving cert.	23 (60)		12 (29.3)			
Academic degree	10 (25)		27 (65.9)		12.4 (2)	< 0.01
Employment status						
No employment	9 (23.1)		12 (29.3)			
Part-time employment	21 (53.8)		20 (48.7)			
Full-time employment	9 (23.1)		9 (22)		0.58 (2)	0.74
Marital status						
Married/living together	30 (77)		33 (80.5)			
Single/divorced/sep./widowed	9 (23)		8 (19.5)		0.67 (1)	0.41
DERS	89.6 (11.8)	75–104	69.9 (7.6)	48–90	−9.15 (78)	< 0.001

CBCL Child Behavior Checklist, *Interm. school leaving cert.* intermediate school leaving certificate, *Adv. school leaving cert.* advanced school leaving certificate, *sep.* separated, *DERS* Difficulties in Emotional Regulation Scale

mothers and their children received an etch-a-sketch magic screen with which they were instructed to draw up a template of a house. The screen had an integrated stylus that could be moved by two rotary knobs horizontally (left button) or vertically (right button). When both buttons were turned at the same speed, diagonal lines could be drawn. The drawing of (perfect) diagonals is very challenging, especially where the attunement of two people turning the two buttons is concerned. The children were told that they could get an additional reward in the form of sweets if they solved the task properly and the sweets (two lollipops) were positioned within sight of the mother and her child. This additional incentive aimed to enhance the demand for mothers to scaffold their child in a potentially frustrating situation.

Experimental procedure

The mother–child dyads were videotaped using one front-facing camera. At the beginning, the dyads were positioned on a huge play carpet. The experimenter placed the first box with the game figures in the middle of the carpet, instructed the mothers, and then took a seat at a corner of the room behind a partition that made her invisible to the dyad during their interaction. The mothers were briefly instructed to play with their child using the toys just as they would at home. After a short clean-up break, the mothers were briefly instructed to build a wooden railway with their children within the next 5 min. Then, the material was cleaned-up and the mothers were instructed to take a seat at a table where the etch-a-sketch magic screen was placed in the middle. Above the magic screen lay a picture of a simple house that had been drawn using the same magic screen. To provoke frustration, the roof of the house was drawn with two perfect diagonals. To ensure that the mothers and their child always used the same button, the experimenter instructed the children to sit on the right and the mothers to sit on the left side of the table, next to each other. The experimenter explained the functioning of the screen and instructed the dyad to draw a copy of the drawn house on the screen within the next 5 min. The mothers were also instructed to guide and support their children to do the task thoroughly. To keep the stress levels high, a pair of lollipops was placed in a glass

just in front of the child as a reward for when the task was completed successfully. At the end of the experiment, all children were rewarded for their result and received the two lollipops. Afterwards, the mothers filled out all questionnaires and documents and received an expense allowance.

Measurement

We measured the quality of the mothers' parenting behaviour using the Laboratory Parenting Assessment Battery (LAB-PAB) [29] in each task. We also collected the degree of child behaviour problems using the Child Behavior Checklist for pre-school children (CBCL 1 ½–5) [30] as a control variable for group assignment and for calculating the predictive validity of within-person variability on child behaviour problems.

Parenting behaviour

The LAB-PAB by Wilson and Durbin (2012) is a validated and reliable observational tool that measures five relevant dimensions of parenting behaviour. It was validated for a set of everyday tasks that are age-appropriate for pre-school children in the age of 3–6 years (free play, teaching, prohibition, and co-operation) [30] and also validated for a pre-school psychiatric population with children in the age of 3–6 years [29]. It comprises 36 items that are assigned to five parenting scales: involvement (7 items), positive emotionality (10 items), hostility (10 items), intrusiveness (7 items), and discipline (2 items). In the current study, the original five-step scale (0–4) of the items was transformed into a ten-step response scale (1–10) for better differentiation. The numbers reflect the expression of behaviour from 'low' to 'high'. However, in the present study we did not use the discipline scale, since the play tasks we used did not offer many possibilities to show disciplinary behaviours.

The mother–child interactions were videotaped with a video camera, which was visible to the mother and child. Three independent, extensively trained raters, who were blind to the hypotheses and group assignment of the mother–child dyads, coded the quality of the interactions using the LAB-PAB manual. We analysed a total of 240 5-min interaction sequences, as three 5-min interactions were videotaped per 80 mother–child dyads. Each rater coded randomly assigned interaction sequences to avoid order effects. For the evaluation of inter-rater reliability, 25% of all interactions ($N=60$) were randomly selected and coded by all three raters. Finally, we reached good–very good inter-rater reliabilities for absolute agreement (intra-class-correlation, Fleiss, Levin, and Paik 2003) for all scales (involvement: ICC = 0.74, positive emotionality: ICC = 0.86, hostility: ICC = 0.82, intrusiveness: ICC = 0.74).

Fluctuation in parenting behaviour

Referring to the conceptual work on IIV from Ram and Gerstorf [31] in our study we investigated net intraindividual variability, which is characterized by (a) changes in micro-time that are not systematically ordered in relation to time, which (b) is usually quantified by measures such as the intraindividual standard deviation (ISD), and (c) is used to capture individuals' dynamic characteristics (e.g., lability or fluctuation of behaviour). Since we measured short-term patterns of behavioral change across situations within the same person we used ISD scores to measure IIV [32–35]. We calculated ISD scores for each repeatedly measured parenting dimension (involvement, positive emotionality, hostility, and intrusiveness) across the three tasks and finally calculated an overall fluctuation score as the mean fluctuation score of all parenting dimension ISD scores (ISD of involvement, positive emotionality, hostility and intrusiveness; see Table 3).

Maternal emotion regulation ability

To gain information about the degree to which mothers experience difficulties in their regulation of (aversive) emotions, mothers filled out the Difficulties in Emotion Regulation Scale (DERS) [36]. The DERS is s a self-assessment questionnaire consisting of 36 items, measuring difficulties in emotion regulation over six different subscales: (1) non-acceptance of negative emotional reactions, (2) difficulties with goal-directed behavior in emotionally stressful situations, (3) impulse control difficulties (4) lack of emotional awareness, (5) limited access to emotion regulation strategies and (6) deficit to recognize one's own feelings. The individual items are each answered on a five-point Likert scale (1 = almost never, 5 = almost always). From the sum of all individual items a total value is formed (score between 36 and 182), with a higher total value indicating more difficulties in emotion regulation. The DERS is characterized by high reliabilities of the subscales (Cronbach's $\alpha > 0.80$) and the total scale (Cronbach's $\alpha = 0.93$) as well as adequate construct and predictive validity [36]. In the current study, we only used the total scale for further analysis. In the study the DERS was used as a control variable to ensure to which amount fluctuations would uniquely explain child psychopathology even when controlling for maternal emotion regulation.

Child conduct and emotional problems

All mothers filled out the German version of the Child behaviour Checklist (CBCL 1½–5) [30], a widely used and extensively validated parent questionnaire that identifies behavioural, emotional, and somatic symptoms of children aged between 1.5 and 5 years. It contains 100 problem

items rated as follows: 0 = not true; 1 = somewhat or sometimes true; 2 = very true or often true based on the previous 2 months. The CBCL 1½–5 includes two broadband scales. The first, labelled 'Internalizing' problems ($N = 36$ items), consists of four syndrome subscales (emotionally reactive, anxious/depressed, somatic complaints, and withdrawn). The second scale, 'externalizing' problems ($N = 24$ items), consists of two syndrome subscales (attention problems and aggressive behaviour). Finally, a 'total problem' scale comprises the sum of internalizing and externalizing symptoms, as well as sleep problems (7 items) and other problems (33 items) class that range between 0 and 200. Standardized *T* scores are used to estimate a child's level of impairment relative to the population, and cutoff points describe children with scores falling into the 'borderline' (93rd percentile) and 'clinical' (98th percentile) ranges. The raw CBCL 1½–5 scores can range from 0 to 72 for the Internalizing Scale and 0–48 for the Externalizing Scale. In German-speaking countries, high internal consistencies were found for the three higher-ranking factors (Cronbach's α between 0.85 and 0.95). Although children in the clinical group had a psychiatric diagnosis according to ICD-10, their mothers were additionally rated as having a supplementary indication of group membership. Two children in the control group who revealed a rating above the clinical cutoff on one of the three higher-level scales were excluded from the study.

Analysis plan and preliminary analyses

Data were analysed using the Statistical Package for Social Science (IBM SPSS Statistics Version 24). The threshold for significance was $p = 0.05$. All significance tests were two-sided, except for β-regression coefficients where we used one-sided p values. We then examined our data for outliers (below or above an upper limit of 3 SD of the group mean) in our dependent variables using exploratory data analysis tools (boxplots). We found 4 strong outliers (each one in positive emotionality and hostility, as well as in fluctuations in positive emotionality and fluctuations in hostility) and replaced them with the related value of the corresponding confidence interval limit (2 SD) of the mean. We then calculated bivariate correlations between our outcome measures (parenting dimensions, fluctuations in parenting dimensions, DERS scores and CBCL scores; see Table 2). We then looked for group differences in our demographic variables using t tests and χ^2 tests. We finally found significant differences on the educational status variable, χ^2 (2, $N = 80$) = 12.42, $p < 0.01$. Since the influence of educational status on parent and child outcomes is a common finding [37, 38], we controlled for educational status, when testing hypothesis 1 and hypothesis 2. To realize this, we conducted ANCOVAs with educational status as a covariate. To indicate group differences in fluctuations in parenting behaviour

Table 2 Bivariate correlations of variables

Variable	Mean	SD	Inv.	Pos. em.	Host.	Intrus.	Fluct. inv.	Fluct. pos. emot.	Fluct.host.	Flut. intrus.	CBCL int.	CBCL ext.	CBCL tot.
Involvement	7.09	1.22											
Positive emotionality	6.88	0.97	0.84*										
Hostility	1.43	0.75	−0.75*	−0.72*									
Intrusiveness	2.80	1.06	−0.70*	−0.54*	0.60*								
Fluctuation involvement	0.96	0.51	−0.15	−0.10	0.07	0.31*							
Fluctuation positive emotionality	0.75	0.51	−0.20	−0.17	0.20	0.32**	0.41**						
Fluctuation hostility	0.35	0.44	−0.54**	−0.46**	0.59**	0.59**	0.41**	0.48**					
Fluctuation intrusiveness	1.21	0.59	−0.51**	−0.44**	0.37**	0.56**	0.32**	0.20	0.51**				
CBCL internalizing	54.6	11.9	−0.38**	−0.33**	0.40**	0.23*	0.29**	0.17	0.44**	0.21			
CBCL externalizing	51.9	10.3	−0.47**	−0.31**	0.37**	0.36**	0.32**	0.24**	0.20	0.35**	0.69**		
CBCL total score	53.6	13.5	−0.49**	−0.41**	0.45**	0.34*	0.31*	0.25**	0.26**	0.46**	0.89**	0.89**	
DERS total score	79.2	14.2	−0.53**	−0.38**	0.43**	0.36**	0.12	0.15	0.36**	0.24*	0.65**	0.63**	0.68**

LAB-PAB scores ranged from 0–10. Fluctuation indices were calculated as the intraindividual standard deviation (ISD)

*$p < 0.05$ (two-sided)

**$p < 0.01$ (two-sided)

(hypothesis 1), we at first determined the fluctuation in parenting behaviour by calculating cross-situational intraindividual standard deviations (ISD) of all LAB-PAB parenting dimensions. We then conducted ANCOVAS with fluctuation in each LAB-PAB parenting dimension as the independent variable (fluctuation in involvement, fluctuation in positive emotionality, fluctuation in hostility and fluctuation in intrusiveness), group as the factor variable and educational status as a covariate (see Table 3) to look for group differences and control for educational status. To test for group differences in parenting quality (hypothesis 2) we conducted a 2 (group: clinical versus control) × 3 (task: free play, constructional play, problem solving) repeated-measures analysis of covariance (ANCOVA) for each LAB-PAB parenting dimension (involvement, positive emotionality, hostility and intrusiveness) as the dependent variable, group as the factor variable and educational status as a covariate (see Table 3). For the calculation of predictive validity of each parenting dimension on child behaviour problems (hypothesis 3) hierarchical regression analyses were conducted to test how observed parenting dimensions and fluctuations in parenting dimensions related to CBCL scores of the children. We conducted three consecutive hierarchical regression analyses. In our first regression model (step 1), we tested for the prediction of demographic variables (sex, child age, mother age and maternal educational status) and maternal DERS scores. In our second model (step 2) we included all significant predictors from the first model in a first block and then included all parenting dimensions (involvement, positive emotionality, hostility, and intrusiveness) in a second block. Finally, in our third model, we included all significant predictors from demographic variables, significant predictors from parenting dimension and then included all fluctuation indices (fluctuation in involvement, positive emotionality, hostility and intrusiveness) as the third block (step 3). Dependent variables were (a) the internalizing CBCL score,

Table 3 Differences in parenting quality (LAB-PAB Scores) and in parenting fluctuations between the clinical and the non-clinical group

	Clinical group		Control group		F (df)[a]	p two-sided	d
	M (SD)	Range	M (SD)	Range			
Involvement							
Free play	6.8 (1.3)	4.3–9.1	8 (1)	5.6–10	16.3 (1, 77)	< 0.001	0.94
Co-operation	6 (1.5)	4.8–10	7.4 (1.3)	5.1–9.3	18.5 (1, 77)	< 0.001	0.98
Problem solving	6.3 (0.9)	4.6–10	7.7 (0.9)	5.9–9.4	17.5 (1, 77)	< 0.001	0.94
All sit.	6.4 (1.2)	4.6–8.9	7.7 (0.7)	5.8–9	29.2 (1, 77)	< 0.001	1.37
Fluctuation (ISD)	0.9 (0.38)	0.2–2.3	0.64 (0.4)	0.1–2	12.2 (1, 77)	< 0.001	0.81
Positive emotionality							
Free play	6.7 (1.2)	3.9–9	7.4 (0.9)	5.4–9	9.5 (1, 77)	0.009	0.72
Co-operation	6 (1)	4.1–8	7 (1)	5–8.6	17.2 (1, 77)	< 0.001	0.94
Problem solving	6.6 (1.3)	4.1–8.4	7.5 (1)	5.3–9.5	15.3 (1, 77)	0.012	0.59
All sit.	6.5 (0.9)	4.1–7.7	7.3 (0.8)	5.3–8.6	20.8 (1, 77)	< 0.001	0.94
Fluctuation (ISD)	0.72 (0.49)	0.2–3	0.49 (0.3)	0.1–1.9	8.2 (1, 77)	0.015	0.67
Hostility							
Free play	1.5 (1)	1–1.8	1.1 (0.1)	1–1.3	13.2 (1, 77)	0.001	0.84
Co-operation	1.7 (1.3)	1–2.4	1.2 (0.2)	1–1.3	15.3 (1, 77)	0.056	0.55
Problem solving	2 (1.3)	1–2.3	1.2 (0.3)	1–1.6	12.6 (1, 77)	0.003	0.81
All sit.	1.7 (0.9)	1–2.4	1.2 (0.2)	1–1.3	18.3 (1, 77)	< 0.001	0.97
Fluctuation (ISD)	0.44 (0.44)	0–1.1	0.14 (0.1)	0–0.7	17.7 (1, 77)	< 0.001	0.96
Intrusiveness							
Free play	2.5 (1.7)	1–2.6	1.6 (0.6)	1–3.7	10.6 (1, 77)	0.006	0.74
Co-operation	2.9 (1.4)	1–3	2.5 (1.4)	1–6	1.1 (1, 77)	0.91	0.01
Problem solving	4.2 (1.5)	1–7	3.2 (1)	1.4–5.7	11.3 (1, 77)	0.003	0.77
All sit.	3.2 (1.2)	1.6–6	2.4 (0.8)	1.4–4.4	11.6 (1, 77)	0.001	0.77
Fluctuation (ISD)	1.12 (0.49)	0.3–2.6	0.82 (0.4)	0.1–2.2	7.2 (1, 77)	0.009	0.63
Overall fluctuation (ISD)	0.79 (0.31)	0.4–2.4	0.52 (0.2)	0.2–1.26	20.1 (1, 77)	< 0.001	1.02

LAB-PAB scores ranged from 0 to 10. Fluctuation indices were calculated as the intraindividual standard deviation (ISD) of maternal behaviour on each dimension over the three different situations. The overall fluctuation index was calculated as the mean ISD across all dimensions. To calculate group differences for every single situation, Bonferroni-corrected p values were used ($p = 0.017$)

[a]Educational status was included as a covariate

(b) the externalizing CBCL score and (c) the total problem CBCL (see Table 4).

Results

Demographic and clinical characteristics

Beside the significant difference between educational status (see "Analysis plan and preliminary analyses") there were no significant differences between the age of the mothers, maternal employment status, marital status, infant age, infant sex, number of siblings, or the amount of time spent in a day care centre between the clinical and control groups (see Table 1). All mothers were European Caucasian. As expected, mothers in the clinical group reported significantly more problem behaviours in their children on all three CBCL scales (CBCL internalizing problems: $t(78) = 11.1$, $p < 0.001$; CBCL externalizing problems: $t(78) = 11.4$, $p < 0.001$; CBCL total problems: $t(78) = 19.5$, $p < 0.001$; see Table 1).

Correlations of mother and child variables

Analysis of bivariate correlations revealed significant moderate correlations of parenting behaviours with child CBCL scores in the expected directions. Involvement ($r = -0.38$, $p < 0.01$ for internalizing; $r = -0.47$, $p < 0.01$ for externalizing; $r = -0.49$, $p < 0.01$ for total CBCL scores), as well as positive emotionality ($r = -0.33$, $p < 0.01$ for internalizing; $r = -0.31$ $p < 0.01$ for externalizing; $r = -0.41$, $p < 0.01$ for total CBCL scores) were negatively correlated with CBCL

Table 4 Hierarchical regressions predicting CBCL-scores

Independent variables	CBCL scores								Total			
	Internalizing				Externalizing							
	B	SE	*β*	*p*	*B*	SE	*β*	*p*	*B*	SE	*β*	*p*
Step 1: demographic variables												
Sex	2.73	2.2	0.12	0.210	0.95	2.0	0.05	0.632	0.95	2.0	0.05	0.632
Child age	−2.26	1.1	−0.17	**0.046**	−0.89	1.0	−0.08	0.282	−0.89	1.0	−0.08	0.380
Mother age	0.09	0.3	0.03	0.752	−0.04	0.3	−0.01	0.870	−0.04	0.3	−0.01	0.871
Educational status	−4.10	1.5	−0.25	**0.010**	−2.09	1.4	−0.15	0.140	−2.09	1.4	−0.26	**0.003**
DERS	0.49	0.1	0.58	**0.000**	0.42	0.1	0.59	**0.000**	0.42	0.1	0.59	**0.000**
R^2 (S)	0.48 (8.8)				0.41 (8.1)				0.51 (8)			
F			14.35	**0.000**			10.66	**0.000**			16.60	**0.000**
Step 2: parenting variables												
Involvement	0.67	2.0	0.06	0.740	−2.63	1.8	−0.54	0.118	−2.83	1.8	0.08	0.630
Pos. emot.	−0.29	1.5	−0.02	0.840	1.07	1.3	0.16	0.278	1.40	1.3	−0.04	0.750
Hostility	−1.04	1.8	−0.09	0.571	−1.38	1.7	−0.12	0.230	−2.00	1.7	−0.02	0.880
Intrusiveness	−0.79	1.6	−0.07	0.616	0.75	1.4	0.02	0.550	0.84	1.4	−0.06	0.646
R^2 (S)			0.50 (8.8)				0.44 (8.1)				0.54 (8)	
ΔR^2			0.02				0.03				0.03	
ΔF			0.85	0.5			0.97	0.43			1.04	0.39
Step 3: fluctuation in parenting var.												
Involvement	2.33	1.2	0.19	0.056[a]	2.67	1.1	0.31	**0.009**	2.83	1.1	0.20	**0.030**
Pos. emot.	0.05	1.2	0.00	0.96	0.34	1.1	0.06	0.620	0.55	1.1	−0.03	0.376
Hostility	−1.62	1.3	0.35	**0.022**	−1.61	1.2	0.13	0.120	−1.83	1.2	0.33	**0.017**
Intrusiveness	4.14	1.8	−0.14	0.228	1.28	1.6	−0.20	0.36	1.60	1.6	−0.12	0.310
R^2 (S)			0.57 (8.4)				0.52 (7.7)				0.61 (7.6)	
ΔR^2			0.07				0.08				0.07	
ΔF			2.63	**0.039**			2.95	**0.026**			3.21	**0.018**

Predictors were *z*-standardized. In step 2 and step 3 only significant predictors from step 1 were included in the regression model. Standardized regression coefficients in step 2 and step 3 are from the final step in the analyses

Pos. Emot. positive emotionality

[a]Marginal significant. $N = 80$

Bold values indicate $p < .05$

scores, whereas hostility ($r=0.40$, $p<0.01$ for internalizing; $r=0.37$, $p<0.01$ for externalizing; $r=0.45$, $p<0.01$ for total CBCL scores) and intrusiveness ($r=0.23$, $p<0.05$ for internalizing; $r=0.36$, $p<0.01$ for externalizing; $r=0.34$, $p<0.05$ for total CBCL scores) were positively correlated. In accordance with these findings, DERS scores and CBCL scores were highly correlated (CBCL int: $r=0.65$, $p<0.01$; CBCL ext: $r=0.63$, $p<0.01$; CBCL tot: $r=0.68$, $p<0.01$) and DERS scores were moderately-to-highly correlated to parenting dimension scores (involvement: $r=-0.53$, $p<0.01$; positive emotionality: $r=-0.38$, $p=0.01$; hostility: $r=0.43$, $p<0.01$; intrusiveness: $r=0.36$, $p<0.01$). In terms of fluctuations in parenting behaviour we also found several moderate positive correlations with the CBCL scales, which suggested a positive relation between fluctuations in parenting behaviour and child psychopathology. For example, fluctuations in involvement were significantly correlated with all CBCL scores ($r=0.29$, $p<0.01$ for internalizing; $r=0.32$, $p<0.01$ for externalizing; $r=0.31$, $p<0.05$ for total CBCL scores; see Table 2 for an overview). The highest correlations between parenting dimension scores and fluctuation scores were for hostility and intrusiveness each correlated with fluctuation in hostility in $r=0.59$, $p<0.001$. Notably, fluctuations in involvement ($r=0.12$, $p=0.28$) and positive emotionality ($r=0.15$, $p=0.18$) were not correlated, fluctuation in intrusiveness was lowly related ($r=0.24$, $p<0.05$) and only fluctuations in hostility were moderately related ($r=0.36$, $p<0.01$) with DERS scores. In sum all correlations were in the expected direction.

Hypotheses

Hypothesis 1: higher parenting within-person variability in the clinical group than in the control group

As expected, ANCOVA analyses revealed that the within-person standard deviation was significantly higher in the clinical group than in the control group for all parenting dimensions, namely involvement [$F(1,77)=12.16$, $p=0.001$, $\eta^2=0.14$], positive emotionality [$F(1,77)=8.18$, $p=0.005$, $\eta^2=0.10$], hostility [$F(1,77)=17.07$, $p<0.001$, $\eta^2=0.19$] and intrusiveness [$F(1,77)=7.19$, $p=0.009$, $\eta^2=0.09$; see Table 3]. Consequently, an overall standard deviation score, averaged over all dimensions (overall fluctuation), was also significantly enhanced in the clinical group [$F(1,77)=20.01$, $p<0.001$, $\eta^2=0.21$; see Table 3].

Hypothesis 2: higher parenting quality in the control group than in the clinical group

As expected, parenting quality was significantly lower in the clinical group than in the control group for all parenting dimensions, namely lower involvement [$F(1,77)=29.19$, $p<0.001$, $\eta^2=0.28$], lower positive emotionality [$F(1,77)=20.83$, $p<0.001$, $\eta^2=0.21$], higher hostility [$F(1,77)=18.3$, $p<0.001$, $\eta^2=0.19$], and higher intrusiveness [$F(1,77)=11.64$, $p<0.001$, $\eta^2=0.13$] across all tasks (see Table 3). Interaction effects (situation × group) were non-significant for all dimensions. At the task level, one-sided Bonferroni-corrected (two-sided, $p=0.017$) post hoc tests revealed the same group differences in all individual tasks for all dimensions, except for intrusiveness in the co-operation situation (see Table 3).

Hypothesis 3: predictive validity of parenting fluctuations for child behaviour problems

The results for each CBCL scale score are as follows: prediction of internalizing CBCL scores in the first step revealed a significant model ($R^2=0.48$, $F_{(5, 74)}=14.35$, $p<0.01$) with DERS scores ($\beta=0.58$, $p<0.01$), educational status ($\beta=-0.25$, $p<0.05$) and child age ($\beta=-0.17$, $p<0.05$) as significant predictors. In the second step, the model was not significant ($\Delta R^2=0.02$, $F_{(4, 72)}=0.85$, $p=0.50$), and no parenting dimension significantly contributed to the prediction of CBCL internalizing scores. In step 3, the regression model was significant ($\Delta R^2=0.07$, $F_{(4, 68)}=2.63$, $p<0.05$) and fluctuation in hostility ($\beta=0.35$, $p<0.05$) was a significant predictor and fluctuation in involvement reached at least marginal significance ($\beta=0.19$, $p=0.06$; see Table 4). Prediction of externalizing CBCL scores also showed a significant model in the first step ($R^2=0.41$, $F_{(5, 74)}=10.66$, $p<0.01$) with DERS scores ($\beta=0.59$, $p<0.01$) as a significant predictor ($\beta=-0.59$, $p<0.01$). In the second step, the model again was not significant ($\Delta R^2=0.03$, $F_{(4, 73)}=0.97$, $p=0.43$) and no parenting dimension significantly contributed to the prediction of externalizing CBCL scores. In the third step, the model was again significant ($\Delta R^2=0.08$, $F_{(4, 69)}=2.95$, $p<0.05$), this time solely fluctuation in involvement significantly contributed to the prediction of externalizing CBCL scores ($\beta=0.31$, $p<0.01$). For the prediction of total CBCL scores, we found a significant model in step 1 ($R^2=0.51$, $F_{(5, 74)}=16.60$, $p<0.01$) with DERS scores ($\beta=0.59$, $p<0.01$) and educational status ($\beta=-0.26$, $p<0.05$) as significant predictors. In step 2, we again did not find a significant model ($\Delta R^2=0.03$, $F_{(4, 73)}=1.04$, $p=0.39$) and no parenting dimension score significantly contributed to the prediction of externalizing CBCL scores. In step 3, the model was again significant ($\Delta R^2=0.07$, $F(4, 69)=3.21$, $p<0.05$), this time with fluctuation in involvement ($\beta=0.20$, $p<0.05$) as well as fluctuation in hostility ($\beta=0.33$, $p<0.05$) significantly contributing to the prediction of externalizing CBCL scores (see Table 4).

The most notable results are briefly summarized as follows: as expected, we found enhanced fluctuations on all parenting dimensions across situations for mothers with

children with clinical impairments. These mothers also showed more unfavourable parenting behaviour on every parenting dimension within (with the exception for intrusiveness in the cooperation task) and across situations. Analysis of correlations showed moderate relations between CBCL scores and parenting dimensions as well as fluctuations in parenting dimensions always in the expected directions. However, DERS scores were highly related to CBCL score, moderately-to-highly related with parenting dimension scores and unrelated to fluctuation in involvement and positive emotionality but also weakly related to fluctuations in intrusiveness as well as moderately related to fluctuations in hostility. Prediction of the internalizing CBCL scores showed, beyond the contribution of educational status and DERS scores in the prediction of CBCL scores, that fluctuations in involvement and hostility uniquely contributed to the prediction of CBCL scores for all three CBCL scales, whereas parenting dimensions did not.

Discussion

The aim of the present study was to investigate differences in cross-situational fluctuations in parenting behaviour between mothers of pre-school children with clinical impairments and mothers of normal children for the first time in a controlled laboratory setting. As expected, we found significantly higher fluctuations in parenting behaviour in the clinical group, with middle-to-high effect sizes for every single parenting dimension as well as a high effect size of $d = 1.01$ for the aggregated score over all dimensions. Our results therefore indicate a possible susceptibility of mothers with pre-school children with clinical impairments to be behaviourally influenced by situational cues in the experiment. Moreover, fluctuations in parenting behaviour were associated with child psychopathology, mother's difficulties in emotion regulation and lower parenting quality. Consequently, we found that fluctuations in parenting behaviour, namely fluctuations in maternal involvement and hostility, provided unique predictive power for the prediction of child conduct and emotional problems on all three CBCL scales (internalizing, externalizing, and total), even when before controlling for maternal difficulties in emotion regulation, relevant sociodemographic variables and parenting quality. The finding that both, fluctuations in involvement and hostility, significantly predicted CBCL total scores supports our assumption that fluctuations in parenting behaviour may be generally associated with child psychopathology.

In our view—in accordance with our clinical observations—mothers of children with clinical diagnoses seem to exhibit an increased propensity to align their own behaviour based on situational cues in parenting situations. Owing to this assumed susceptibility, mothers of children with clinical diagnoses will possibly more frequently leave their 'inner line' (own general attitudes, principles, or habits) and, for example, may therefore react more kindly and leniently to a certain behaviour of their child (e.g., wild acting, provocative or 'clownish' behaviour, lack of immediate co-operation) in one situation, whereas in another situation a similar behaviour would be answered with a rather rough and rigorous reaction. These changes may not be extreme or striking (even with regard to the perception of the child) but instead appear as a constantly higher fluctuation and sort of 'distortion' in the predictability of maternal reactions possibly leading to higher levels of insecurity and stress-experience for the child, which has to adapt to these fluctuations. Baram et al. [39] are, to our knowledge, among the first to have discussed the role of unpredictable, fragmented behavioural patterns of the caregiver in early child development in terms of a lack of a consistent and predictable 'rhythm' leading to persistent cognitive and emotional dysfunction in the child. They also concluded that decreased predictability in maternal reactions would support the experience of insecurity and daily stress in affected children. The explanation of unique variance in the prediction of child psychopathology due to enhanced fluctuations in parenting behaviour indicates that these fluctuations may function as a constant moderate stressor for the child and as a potential risk factor for the development of emotional and behavioural problems.

In terms of etiologic and pathogenic factors, we believe that an interplay of different aspects of maternal intrapsychic processing, such as perceived situational challenges, the experience of stress in the situation, and activated self-efficacy expectancies, as well as general severity of acute psychic stress and difficulties with the regulation of stress-related emotions, but also child-related factors, such as a difficult temperament, may moderate these fluctuations in behaviour. Here, we refer to the cognitive-affective personality system [40]. This framework especially explains a person's situational variability and fluctuations in behaviour as a function of cognitive-affective processing. For example, in terms of emotion regulation there is empirical evidence that emotionally labile persons tend to fluctuate more within different emotional states and are more susceptible to emotionally react to external cues, leading to enhanced fluctuations in behaviour [41]. In this study, fluctuations in parenting behaviour were partly positively related to maternal difficulties in emotional regulation. However, further investigation of the relationship between maternal emotional regulation capacities and fluctuations in parenting behaviour is needed to reveal potential moderating effects.

Moreover, fluctuations in parenting behaviour may also be linked to self-efficacy experience and associated judgmental heuristics. Mothers' beliefs about their competence in parenting situations (parenting efficacy) influences the way in which they process information and emotionally

react to a child's behaviour. Cervone [42] demonstrated that a focus on difficult aspects of a task lowered self-efficacy in adults whereas a focus on doable aspects increased it. Accordingly, Furr and Funder [43] found that people who perceived situations as similar (in terms of structure, challenge, etc.) showed very similar behaviours and vice versa. In our study, the mothers in the control group may have perceived the three situations as being rather similar in terms of their challenge level, expected conflicts with their child etc., whereas mothers in the clinical group may have perceived stronger differences in demand, conflict potential, etc. Therefore, mothers in the clinical group may have reacted stronger to the different situational cues, which led to a more unstable, fluctuating behaviour. On a more general level, there is some empirical evidence that the situational stress experience may account for fluctuations in daily parenting behaviour and impaired maternal predictability [44, 45].

For sure, when investigating mother–child-interactions the question arises, to which amount a given parenting behaviour reflects the influence of the parent on the child and vice versa. Given the bidirectional effects on parenting as, for instance, widely investigated in the works of Patterson et al. [46, 47] those bidirectional effects should always be taken into consideration. For instance, child behaviour could also provoke fluctuations in maternal behaviour regarding bidirectional effects of dyadic interactions in terms of coercive processes, especially for expansive behaviour of the child [48, 49]. More specifically, another very interesting focus in this context relates to the work of Wahler and Dumas [43], who assumed that child conduct problems could be indicative of unstable, unpredictable behaviours of the mother. They described aversive reactions of the child as an attempt to gain more predictive behavioural reactions from mothers who frequently exhibited a high amount of instability in their behaviour (predictability hypothesis). They found a relationship between the tendency of mothers with children with a clinical diagnosis to show inconsistent parenting behaviour as a contextual factor [22, 23] and increased child conduct problems. Therefore, beside maternal and situational variables, also child variables, such as child temperament dimensions should be observed in further studies as potential moderators of maternal behavioural fluctuation. Nonetheless, although the question of direction and causality in terms of maternal fluctuations in parenting behaviour is unclear, this study gives empirical evidence for consistent significant differences in fluctuations between mothers with clinical and mothers with non-clinical children. To sum up, the investigation of fluctuations in parenting behaviour seems to be promising for a more comprehensive understanding of the development of child psychopathology. Further studies may find out whether maternal intrapsychic processing (perception and evaluation of a situation, stress experience, perceived self-efficacy) would partly moderate the susceptibility for fluctuations in parenting behaviour. For that reason, maternal perception of situations of dyadic interaction, acute psychological stress within the situations as well as maternal mood symptoms should be taken into consideration in further investigations.

Implications for clinical practice and future research

Our results have important implications for clinical practice. Firstly, in accordance with other clinical studies [12, 16, 23], the results show a relationship between fluctuating parenting behaviours and child psychopathology. This study is among one of the first to provide empirical evidence for significantly enhanced fluctuations in parenting behaviour in four basic parenting dimensions in mothers with pre-school children with clinical impairments. Consequently, due to the fluctuations, in clinical contexts there is a need to observe parenting behaviour across several contexts to gain a more comprehensive impression of it. Moreover, therapeutic progress should also be observed across different contexts and beside a change on level and frequency of maladaptive parental behaviour, a reduction of fluctuations should also be appreciated in clinical practice. However, although consistency in parent discipline is an important element in many parent training programs [49, 50] especially when treating externalizing behaviours of children, fluctuations in other parenting behaviours are not often focussed as a starting point for interventions. For sure, more studies are needed to investigate the moderators of fluctuations in parenting behaviour in mothers of children with clinical diagnoses. Maternal stress-correlates, difficulties with emotional regulation, self-efficacy expectancy, as well as child temperament are possible associated factors influencing fluctuations in parenting behaviour. Moreover, to improve construct, prognostic, and ecological validity, as well as generalization, fluctuations in parenting behaviour should also be investigated across different contexts and timespans.

Limitations

There are several limitations in our study, restricting conclusions and generalization of our findings. First, the cross-sectional nature of our study does not allow the investigation of causal relationships. Here, longitudinal studies should reveal directions of causality. Second, we only investigated fluctuations in parenting behaviour with mothers and their children and we were not able to test for possible differential effects of parent gender. We also induced a considerable moderate increase in demand and only used play tasks. However, it seems reasonable to assume that with higher contrasts between the situations, for example, by implementing parenting demands like tidying-up, abrupt changes in play, the effect of fluctuations in parenting behaviour would

increase. In the study, we included all types of clinical disorders of children, aside from profound developmental disorders (autism), within our clinical sample but had a rather small sample size. It is not clear if the effects would differ across childhood disorders within a larger sample size. Moreover, our study was placed in an experimental setting to the detriment of ecological validity. Further studies are needed to investigate the ecological validity of parenting behaviour fluctuation. For example, parenting behaviour could be observed in many different everyday situations with changing amounts of demand. Also, in terms of predictive validity, increased parenting fluctuations should predict the maintenance or worsening of symptoms in children with clinical impairments. The use of the LAB-PAB as a global measure is another limitation. Although previous studies have indicated that a global observation measure is comparable in indicating variations in maternal parenting behaviour to that of microanalytic observation [51], it may be useful to take different time intervals of the ratings to further investigate the structure of behavioural fluctuations. Furthermore, as aforementioned in the discussion, we were not able to control for the influence of maternal variables beyond maternal difficulties in emotion regulation, such as mood symptoms or maternal psychopathology to analyse if fluctuations solely incrementally explained child psychopathology. Further studies are needed to investigate different moderating maternal factors such as emotional regulation, mood symptoms etc. For sure, we obviously were only able to measure interactions in mother–child dyads and did not include fathers. This was due to the fact that the amount of available fathers was too small. Yet, studies show facilitating as well as impeding effects of paternal parenting behaviours [52] For example, there is robust empirical evidence that paternal support is beneficial to children's development and health [53, 54] but we were not able to control for paternal involvement. The role of the fathers and differential associations between maternal and paternal parenting behaviors [54] also has to be considered and aimed in further studies.

Conclusions

In our study, we were able to show enhanced fluctuations in the parenting behaviour of mothers with pre-school children with clinical impairments across three different play tasks for the first time. Fluctuations in maternal involvement and hostility, as a slightly fluctuating maternal behaviour across situations, which we often observe within our clinical practice, incrementally explained variance in the prediction of child internalizing, externalizing and overall behaviour problems, even after controlling for maternal emotion regulation and parenting quality. In our view, fluctuations in parenting behaviour reflect slight but constant distortions in the predictability of the mother's behaviour, which may constantly stress the child. We conclude that fluctuations in parenting behaviours may be considered an additional risk factor in the genesis and maintenance of child conduct and emotional problems. Here, future research is needed to investigate associated risk variables, long-term influences, and longitudinal effects, as well as the predictive validity for the development of child psychopathology and ecological validity.

Acknowledgements We would like to thank Luisa Lampkemeyer, Lara Jegelka, and Mona Hillmann for the recruitment of the non-clinical group. Moreover, we thank the staff from the outpatient and day clinics of the Department of Child and Adolescent Psychiatry, Psychosomatics and Psychotherapy at the University Hospital of Münster.

Compliance with ethical standards

Conflict of interest On behalf of all authors, the corresponding author states that there are no conflicts of interest.

Ethical standards The study was approved by the Ethics Committee of the Medical Association of the Physicians Chamber Westfalen-Lippe. All mothers gave written consent and their children gave oral consent to participate in the study after a detailed explanation of the course of the study and data protection aspects. All participants got a 15 Euro voucher as an expense allowance.

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