Mental Health & Prevention 13 (2019) 35–42

Contents lists available at ScienceDirect

Mental Health & Prevention

journal homepage: www.elsevier.com/locate/mhp

Stability and change of attachment disorder symptoms and interpersonal problems in foster children

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ARTICLE INFO

Keywords:
Foster children
Attachment
Interpersonal problems
Longitudinal

ABSTRACT

This paper focuses on the longitudinal examination of perceived reactive attachment disorder (RAD) symptoms and indiscriminate, insecure and pseudomature behavior in foster children, many of them having experienced maltreatment and neglect in the family of origin. A total of 84 foster children - aged between 2 and 7 years - and 146 biological children (comparison group) participated across three assessments, with approximately six months between each assessment. At the first measurement, foster children had been living about 18 months on average in the current foster family. The child's RAD symptoms and interpersonal problems were assessed by parent reports (usually completed by the mother) on the Relationship Problems Questionnaire (RPQ) and the Assessment Checklist for Children (ACC), respectively. Foster parents reported substantially more RAD symptoms and further interpersonal problems than biological parents across all assessments. RAD symptoms and interpersonal problems declined over time in both, the foster care and the comparison group. The symptoms showed high rank-order stabilities and moderate to high intercorrelations among each other. To conclude, our findings indicate a high persistency of behavioral and emotional interpersonal problems in young foster children.

1. Introduction

The increased rate of attachment disorder behaviors in foster children, who have often experienced maltreatment, neglect and/or placement changes, compared to children living with their biological parents, is exceptionally challenging for both foster parents and foster children (Committee on Early Childhood, Adoption, and Dependent Care, 2002; Schofield & Beek, 2005). Placement in longterm foster care is intended to provide children with a consistent and reliable environment, which is necessary for the development of a secure attachment and thus may lead to better developmental outcomes (Fisher & Kim, 2007; Kindler, Scheuerer-Englisch, Gabler, & Köckeritz, 2011). At the same time, attachment disorder symptoms potentially interfere with bonding and make secure attachments to the foster parents less likely (Gleason et al., 2011; Zeanah, 2000; Zeanah, Smyke, Koga, & Carlson, 2005). Moreover, some of the symptoms may persist, even if secure attachments have been developed to the new caregiver (Chisholm, 1998; Lyons-Ruth, Bureau, Riley, & Atlas-Corbett, 2009; Zeanah et al., 2005).

Based on the International Classification of Diseases 10th Revision (ICD-10; World Health Organization, 1992) there are two types of reactive attachment disorders (RAD): the disinhibited type (termed in the ICD-10 'disinhibited attachment disorder') and the inhibited type (termed in the ICD-10 'reactive attachment disorder'). The disinhibited type is marked by indiscriminate behavior, attention-seeking behavior and a lack of distinction between caregivers and strangers, especially when looking for comfort. In contrast the inhibited type is characterized by contradictory and rejecting behavior, as well as aggressive and anxious behavior. According to the ICD-10 criteria, a diagnosis of RAD is given if these behavioral symptoms have occurred in early childhood before the age of five. Early pathogenic care is considered to play an etiological role in the development of attachment disorder symptoms (Rutter et al., 2007; Rutter, Kreppner, & Sonuga-Barke, 2009; Ziegenhain, 2009). However, study results suggest a substantial correlation between both types of reactive attachment disorder (Gleason et al., 2011; Minnis et al., 2007; Smyke, Dumitrescu, & Zeanah, 2002),

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https://doi.org/10.1016/j.mhp.2018.12.001
Received 27 April 2018; Received in revised form 22 November 2018; Accepted 7 December 2018
Available online 08 December 2018
2212-6570/

which leads to some difficulties regarding the differential diagnostics.

Increased rates of attachment disorder symptoms were first systematically observed in samples of institutionalized deprived children from Romanian orphanages (Gleason et al., 2011; O´Connor, Rutter and the Romanian Adoptees Study Team, 2000). Further research showed increased prevalence of attachment disorders in never-institutionalized adoptees and foster children from prosperous Western countries as well. In a sample of foster children from the Netherlands, about 33.3% met the criteria of RAD diagnosis (15.1% met the criteria of the disinhibited, 8.7% of the inhibited type, 9.5% of the foster children showed mixed symptoms; Jonkman et al., 2014). Similar results were found in foster children samples in the U.S. (40% RAD diagnoses, 22% met the criteria of the disinhibited, 35% of the inhibited type, 17% foster children showed mixed symptoms; Zeanah et al., 2004) and in Norway (19.4% RAD diagnoses; Lehmann, Havik, Havik, & Heiervang, 2013). These studies primarily assessed attachment disorder symptoms with semi-structured interviews. Using the Relationship Problems Questionnaire (RPQ; Minnis et al., 2007), a dimensional screening instrument for disinhibited and inhibited attachment disorder behavior, foster children from a Swiss sample showed significantly more RAD symptoms compared to children from the general population. Moreover 31.9% of foster children scored higher than a cut-off value, indicating a likely RAD diagnosis (Minnis et al., 2013), in comparison to 2.4 % of children living with their biological families (Schröder, Pérez, Buderer, & Schmid, 2017).

Regarding the developmental course of RAD symptoms after placement, longitudinal data from dimensional measurements indicate a rapid decrease of inhibited behavior after placement, whereas disinhibited behavior is characterized by a high stability even years after placement. These results were evident in samples of Romanian foster children (Smyke et al., 2012) and adoptees, as well as never-institutionalized adoptees born in the United Kingdom (UK; O´Connor et al., 2000).

Based on these longitudinal study results, it has been proposed that a lack of attachment behavior due to pathogenic care underlies the inhibited phenotype. These symptoms decrease and often even disappear when children receive adequate care. In comparison, disinhibited symptoms seem to be less responsive to enhanced caregiving quality and may even persist in children with secure attachments. These behavioral patterns might be an indication of unmodulated social behavior with unfamiliar peers and adults rather than nonselective attachment behavior (Zeanah & Gleason, 2015).

To summarize, the disinhibited and inhibited type differ in several aspects regarding phenotypic characteristics, prevalence after placement and the long-term development (Rutter et al., 2009). It should be noted that longitudinal research and in particular cross-cultural comparisons are scarce. As foster care systems (including their legal basis) differ substantially between countries (Thoburn, 2010), it remains unclear to what extent our results can be generalized to other contexts.

In general, more knowledge is needed about related problems of attachment disorder symptoms in samples of children in care (Newman & Mares, 2007). These children often show a complex attachment- and trauma-related symptomatology (Tarren-Sweeney, 2013). While there are few studies examining indiscriminate friendliness as a key symptom of disinhibited behavior, less is known about additional interpersonal problems, such as pseudomature and insecure behavior. Initial study results from an Australian foster and kinship sample of 347 children indicate that these behaviors are clinically relevant in children in care (Tarren-Sweeney, 2013). Pseudomature behaviors, such as “acting and talking like an adult”, have mostly been examined in the context of sexual abuse regarding precocious behavior so far (Trickett, Noll, & Putnam, 2011). It has been proposed, that these behaviors might be one result of a dysfunctional attachment behavior, in some instances facilitated by sexual abuse or pathogenic family conditions in which children are forced to take care of family members (Tarren-Sweeney, 2008). Similarly, little is known about anxious and insecure behaviors, such as hiding emotions, showing over-adapted behaviors or being worried about rejection (by parents or peers). Tarren-Sweeney (2013) proposed that these behaviors may reflect an insecure attachment style or could equally be an adaptive behavior to prior experiences of attachment distortion and/or placement disruptions.

Prior research confirmed expected correlations of interpersonal problems, such as pseudomature, insecure or indiscriminate behavior, particularly with externalizing and internalizing problems. But, to the best of our knowledge, neither longitudinal investigation, nor measurements of the relation between interspersonal problems and attachment disorder have been conducted so far.

Thus, this paper reports the results of a longitudinal examination of German foster children's RAD symptoms and the outlined interpersonal difficulties in comparison to a group of children living with their biological parents. More specifically, the following research questions are addressed in the current study: (1) How do young German foster children differ from children living in their biological families regarding RAD symptoms and additional interpersonal difficulties typical for children in long-term care? (2) How do these symptoms and interpersonal difficulties change over time in foster children and biological children? (3) How stable are these behaviors? and (4) How are RAD symptoms associated with additional interpersonal difficulties?

2. Method

2.1. Study design

The data were collected in the GROW&TREAT project in the area of Bielefeld, Aachen and Braunschweig (funding code: 01KR1302). The project included a longitudinal study with three assessment waves (T_1, T_2 and T_3). The time between T_1 and T_2 was 6.43 months ($SD = 1.59$) on average, and between T_2 and T_3 it was 5.50 months ($SD = 1.77$). Thus, the mean time span of the study between T_1 and T_3 was 12.37 ($SD = 2.42$) months.

In addition the project included a randomized control trial - a modified Triple P intervention (Taking Care Triple P; Chandler & Sanders, 2013) for a subsample of the foster parents ($N = 23$) between T_1 and T_2. As there were no significant differences in the target variables (RPQ, ACC) between the intervention and control group at any measurement time point, the intervention was not included as a potential influential variable in the analyses reported below.

The procedures and assessments used in the GROW&TREAT project were approved by an independent ethics committee. For more information on the GROW&TREAT project and a complete list of instruments see http://www.grow-and-treat.de.

2.2. Sample

Foster children were recruited via youth welfare offices. Collaborating youth welfare agencies were asked to address all foster children with a history of maltreatment and/or neglect between 2 and 7 years of age placed in foster care for a maximum of 24 months. The comparison group of children living with their biological families was mainly recruited via kindergartens, pediatricians or elementary schools. Prior to the assessments, we obtained the informed consent of the person who held custody of the (foster) child. Thus, for the foster children, the agreement of the foster parent as well as the agreement of either the biological parents, advocates or youth welfare agencies was necessary. Participating families received an incentive of 30 euros for each assessment and an additional 30 Euros after completing the last assessment.

The initial study sample consisted of 94 children living in non-kinship foster care and 157 children living with their biological families. After siblings were randomly excluded, the final sample included 86 foster children and 148 children living with their biological families. Of these 86 foster children, 5 children dropped out after T_1 and

4 children dropped out after T_2. Of the 148 biological children, 9 children dropped out after T_1 and 2 children dropped out after T_2. Dropouts occurred for several reasons, such as placement breakdown or moving to another city.

At T_1, the mean age for the foster children and biological children was 45.18 months (SD = 19.30) and 53.13 months (SD = 17.42), respectively (age range between two and seven years in both groups). In the foster care group, 40 out of 84 children (47%) were female, whereas in the comparison group the number of the female children was 78 out of 146 (53%). A t-test showed a significant age difference between the two samples (t (228) = 3.20, p = .002), but no significant difference regarding sex was found. As a consequence, the analyses reported below included children's age as covariate. In most of the cases, the (foster) mothers completed the questionnaires (>80%). The participating foster parents were significantly older than the participating biological parents of the comparison group (mothers: t (137.28) = −6.93, p < .01; fathers: t (141.69) = −6.78, p < .01). At T_1, foster children lived on average 17.90 months (SD = 8.75) in the current foster family (with few exceptions, the time in foster family was between 2 and 24 month). Most of the foster children had experienced maltreatment and/or neglect, as confirmed by the youth welfare offices due to file analysis. For nine foster children no history of maltreatment and neglect was indicated. These children were taken out of their biological families briefly after birth because of other risk factors, such as parental substance abuse or earlier maltreatment of siblings (for more information see Ehrenberg, Lohaus, Konrad, & Heinrichs, 2018).

2.3. Measurements

Relationship Problems Questionnaire (RPQ). RAD behaviors of the (foster) children were assessed by the German short version of the Relationship Problems Questionnaire (RPQ; Kleinrahm, Ziegenhain, & Schmid, 2009; Original: Minnis et al., 2007; Minnis, Rabe-Hesketh, & Wolkind, 2002). The (foster) parents completed the items on four-point Likert scales (3 = “exactly like my child”, 2 = “like my child”, 1 = “a bit like my child”, 0 = “not at all like my child”). Sum scores were calculated for the two subscales *inhibited behavior*, with six items, and *disinhibited behavior*, with four items, and the total score, including all items. In the present study, the reliability, as assessed by Cronbach's Alpha, was $\alpha^{BF} = 0.34$ (BF = biological families) and $\alpha^{FF} = 0.69$ (FF = foster families) for the inhibited behavior subscale, $\alpha^{BF} = 0.82$ and $\alpha^{FF} = 0.89$ for the disinhibited behavior subscale, and $\alpha^{BF} = 0.72$ and $\alpha^{FF} = 0.83$ for the total score at T_1. According to Minnis et al. (2007,2013), total score values of seven or higher (cut-off value) indicate a ‘likely’ RAD diagnosis. However, it should be noted that the cut-off was assessed in a high-risk population from the UK and there are currently no studies regarding the psychometric properties in the German population.

Assessment Checklist for Children – short version (ACC). To examine potentially attachment-related short-term and long-term emotional and behavioral difficulties as well as social problems that are not addressed by common psychopathology questionnaires, a German translation of selected subscales of the ACC was used (Job & Heinrichs, 2013; Original: Tarren-Sweeney, 2007). The short version included the following subscales: (1) *sexual behavior* (11 Items; $\alpha^{BF} = 0.11$; $\alpha^{FF} = 0.86$), (2) *pseudomature interpersonal behavior* (8 Items; $\alpha^{BF} = 0.62$; $\alpha^{FF} = 0.60$), (3) *indiscriminate interpersonal behavior* (8 Items; $\alpha^{BF} = 0.55$; $\alpha^{FF} = 0.80$), (4) *insecure interpersonal behavior* (14 Items; $\alpha^{BF} = 0.70$; $\alpha^{FF} = 0.80$) and, (5) *self-injury* (11 Items; $\alpha^{BF} = 0.30$; $\alpha^{FF} = 0.35$). Each item was rated by the (foster) parent on a 3-point Likert scale with respect to the last four to six months (“Circle 0 if the statement is not true for your child”, “Circle 1 if the statement is partly true for your child”, “Circle 2 if the statement is mostly true for your child”). Sum scores were calculated for each subscale. Because sexual behavior and self-injury occurred very rarely in the current sample and because both scales were thus extremely skewed to the right (with more than 70% of the children having a sum score of zero at T_1), these scales were not considered in the analyses reported below. Additionally, a total score was calculated, which included all items of the three scales analyzed (30 Items; $\alpha^{BF} = 0.80$; $\alpha^{FF} = 0.87$).

2.4. Statistical analysis

IBM SPSS Statistics 25 was used for the statistical analyses. In order to analyze the amount and the pattern of missing data, missing data analyses (MVA) were conducted. Results showed that 8.3% of the values were missing (foster children group: 10.2%; comparison group: 7.2%). For none of the RPQ and ACC items, more than 12.8% of the values were missing across all participants (foster children group: 16.3%; comparison group: 11.5%). Little´s MCAR test was not significant indicating that the pattern of missing data was completely at random in both the foster children group (χ^2 = 2868.28; df = 5755, p = 1.00) and the comparison group (χ^2 = 3755.52; df = 4971, p = 1.00). Moreover there were no differences between children with complete data (foster care group N = 46; comparison group N = 113) and with missing data (foster care group N = 40; comparison group N = 35) regarding children´s age, sex, duration of stay in the current foster family and the total scores of the target variables (RPQ, ACC) at T_1.

To handle missing data, multiple imputation (MI) was conducted at the item-level, because this provides a significant power advantage compared to scale-level estimations (Gottschall, West, & Enders, 2012). As recommended by Asendorpf, Van De Schoot, Denissen and Hutteman (2014), we imputed m = 20 data sets. Linear regression was used as the univariate model for the included items and the fully conditional Markov Chain Monte Carlo (MCMC) method was applied for the imputations. In cases where all items of a questionnaire were missing the imputed values for this single questionnaire were excluded from further analyses. Across both participant groups, the RPQ was missing in 9 cases at T_1 (3.9%), in 25 cases at T_2 (10.7%) and in 24 cases at T_3 (10.3%). The ACC was missing in 7 cases at T_1 (3.0%), in 20 cases at T_2 (8.5%) and in 25 cases at T_3 (10.7%). This included dropouts as described above and non-responders.

To examine potential group (foster children group vs. comparison group) and time effects (across all three assessments) as well as time × group interactions, marginal models were calculated for the RPQ and ACC subscales/total scores with the procedure ´Mixed´ in SPSS (Research Questions 1 and 2). Marginal Models are similar to Mixed Models but do not include random intercepts or random coefficients. They can, however, appropriately account for the covariance structure of longitudinal data and are able to deal with unbalanced datasets. Thus, participants with missing questionnaires due to dropout or non-response (as reported above) were considered in this analysis. The full model included the following predictors: group, time, age in month as well as the interaction between group and time. Time was dummy coded with T_1 as baseline (T_1 versus T_2; T_1 versus T_3) and age was centered. Initially, the best fitting covariance structure was obtained by Likelihood Ratio Tests. Subsequently, non-significant effects were excluded in a stepwise fashion based on Likelihood Ratio Tests. The final model is reported in the results section. Although not in every model significant, age remained in all models as a control variable.

For Research Question 3, the rank-order consistencies of the RPQ and ACC subscales were examined as a measure of stability, separately for both foster care and comparison group: partial Pearson correlations were calculated between the subscale scores of each measurement time point (T_1 and T_2, T_1 and T_3 as well as T_2 and T_3) with age as covariate. The rank-order consistency reflects the individual stability (e.g. Specht, Egloff, & Schmukle, 2011). Thus, if some foster children show an increase in RAD behaviors while others show a decrease, this may be reflected in lower rank-order consistencies. The strength of the relationships was interpreted according to Cohen (1988). Differences between correlation coefficients were examined using Fisher´s Z-test.

Furthermore, relations between attachment disorder symptoms (RPQ) and related problems (ACC) were calculated at T_1 by partial Pearson correlations with the linear regression procedure in SPSS, again with age as covariate (Research Question 4). Again correlational analyses were calculated for both groups separately. For the correlational analyses, we adjusted the *p*-values using Bonferroni correction.

3. Results

3.1. Research Question 1: How do foster children differ from biological children in RAD symptoms (RPQ) and further interpersonal problems (ACC)?

In the current sample, 31.1% of the foster children scored higher than the cut-off value on the *RPQ total score* at T_1, 28.5% at T_2 and 22.8% at T_3. In comparison, 9.4% of the children living in their biological families scored higher than the cut-off value at T_1, 5.5% at T_2 and 2.3% at T_3. In line with this result, marginal models showed a significant effect of care group (foster care versus comparison group) regarding the *disinhibited* (Estimate ± *SE*; 1.20 ± 0.31; $t = 6.39$, $p < .01$) and the *inhibited subscale* (1.62 ± 0.21; $t = 7.62$, $p < .01$) as well as the *total score* (3.65 ± 0.46; $t = 7.99$, $p < .01$). Table 1 shows the mean values of the dependent variables across the three assessment waves. As can be seen in the table, foster children scored higher on the *inhibited* and *disinhibited subscales* as well as the *RPQ total score* than biological children at each of the three measurement time points. Only for the RPQ subscale *inhibited behavior,* a significant age effect was observed (0.01 ± 0.01; $t = 2.61$, $p = .01$). No age effects were observed for the RPQ subscale *disinhibited behavior* (0.01 ± 0.01; $t = 0.74$, $p = .46$) as well as for the RPQ total score (0.02 ± 0.01; $t = 1.77$, $p = .08$).

For the ACC, marginal models provided significant effects of care group indicating that foster children and biological children significantly differed on all three subscales: *pseudomature* (0.62 ± 0.23; $t = 2.73$, $p = .006$), *indiscriminate* (2.67 ± 0.32; $t = 8.40$, $p < .001$) and *insecure interpersonal behaviors* (1.99 ± 0.31; $t = 6.44$, $p < .01$). In line with this finding, results for the *ACC total score* revealed a group effect as well (5.30 ± 0.72; $t = 7.41$, $p < .01$). Again, foster children in comparison to biological children had higher scores on the ACC subscales as well as the *ACC total score* across all three measurement time points as can be seen in Table 2. Moreover, the analyses revealed a significant age effect for the *ACC total score* (0.06 ± 0.02; $t = 2.88$, $p < .01$) and the ACC subscale *insecure behavior* (0.05 ± 0.01; $t = 5.73$, $p < .01$). No age effects were found for the ACC subscales *pseudomature behavior* (0.01 ± 0.01; $t = 1.21$, $p = .23$) nor for the *indiscriminate behavior* (0.00 ± 0.01; $t = 0.56$, $p = .57$).

Table 1
Mean values (M) and standard error (SE) for the RPQ scores in the foster care group ($n = 72$) and comparison group ($n = 128$).

		FCG		CG	
		M	*SE*	*M*	*SE*
Disinhibited behavior	T_1	3.46	0.43	1.43	0.20
	T_2	3.19	0.40	1.21	0.16
	T_3	2.82	0.41	0.90	.13
Inhibited behavior	T_1	2.17	0.30	0.65	0.10
	T_2	2.04	0.33	0.66	0.12
	T_3	1.47	0.32	0.30	0.06
Total score	T_1	5.64	0.62	2.08	0.25
	T_2	5.23	0.58	1.87	0.24
	T_3	4.29	0.64	1.20	0.15

Note. FCG = Foster Care Group, CG = Comparison Group.

Table 2
Mean values (M) and standard error (SE) for the ACC scores in the foster care group ($n = 71$) and comparison group ($n = 131$).

		FCG		CG	
		M	*SE*	*M*	*SE*
Pseudomature behavior	T_1	1.97	0.25	1.54	0.16
	T_2	1.95	0.31	1.12	0.12
	T_3	1.71	0.22	1.24	0.14
Insecure behavior	T_1	3.50	0.43	2.13	0.21
	T_2	3.17	0.40	1.95	0.20
	T_3	2.89	0.37	1.68	0.16
Indiscriminate behavior	T_1	6.21	0.41	3.69	0.19
	T_2	5.53	0.41	3.02	0.17
	T_3	5.26	0.37	2.75	0.18
Total score	T_1	11.68	0.90	7.35	0.46
	T_2	10.65	0.94	6.09	0.38
	T_3	9.87	0.77	5.66	0.39

Note. FCG = Foster Care Group, CG = Comparison Group.

3.2. Research Question 2: How do RAD symptoms (RPQ) and interpersonal difficulties (ACC) change over time in foster children compared to biological children?

For the RPQ subscales as well as *RPQ total score* no interactions of time and group were found and thus excluded from the final model. Time effects were found from T_1 to T_3 for both RPQ subscales (*disinhibited:* −0.36 ± 0.13; $t = -2.82$, $p = .01$; *inhibited:* −0.53 ± 0.13; $t = -4.11$, $p < .01$) and the *total score* (−0.88 ± 0.22; $t = -4.02$, $p < .01$). As can be seen in Table 1, RAD symptoms decreased from T_1 to T_3 in both groups.

Regarding the ACC, again no significant interactions of time and group were found and thus excluded from the final model. For the *ACC total score* and the ACC subscales *pseudomature* and *indiscriminate* significant time effects were found from T_1 to T_2 (*pseudomature:* −0.34 ± 0.13; $t = -2.70$, $p = .01$; *indiscriminate:* −0.69 ± 0.17; $t = -4.07$, $p < .01$; *total score*: −1.33 ± 0.38; $t = -3.53$, $p < .01$) and from T_1 to T_3 (*pseudomature:* −0.35 ± 0.12; $t = -2.92$, $p < .01$; *indiscriminate:* −0.98 ± 0.18; $t = -5.51$, $p < .01$; *total score*: −1.95 ± 0.38; $t = -5.18$, $p < .01$). For the ACC *insecure behavior*, analyses showed a significant time effect only from T_1 to T_3 (−0.44 ± 0.15; $t = -2.99$, $p < .01$). Similarly to the RPQ scores, interpersonal symptoms, assessed by the ACC, decreased over time in both groups (Table 2).

3.3. Research Question 3: How stable are RAD symptoms and interpersonal problems?

Partial Pearson correlations within the foster care group showed high stabilities in RAD symptoms between T_1 and T_2, T_2 and T_3, as well as between T_1 and T_3, except in two cases. Between T_1 and T_3 only moderate stabilities were found for the *inhibited behavior* and the *RPQ total score* (Table 3). Within the comparison group, low to high stabilities were observed (Table 3). Overall stabilities were higher for foster children in comparison to biological children. After Bonferroni correction, these differences between the foster care and comparison group were statistically significant only for the correlation of *inhibited behavior* at T_1 and *inhibited behavior* at T_2 (*inhibited behavior* T_1/T_2: $z = 3.55$, $p_{adj} < .001$).

Subsequently, we compared the correlation coefficients between the *inhibited* and *disinhibited behavior subscale,* separately for the foster care and comparison group considering Bonferroni correction. Within the foster care group, Fisher´s Z-tests revealed a higher correlation coefficient for the *disinhibited subscale*, indicating a higher stability, compared to the *inhibited subscale* between T_2 and T_3 ($z = 2.45$, $p_{adj} = .01$). For the comparison group we found higher coefficients for the disinhibited compared to the inhibited subscale between T_1 and T_2 ($z = 3.17$,

Table 3
Partial Pearson correlations for the RPQ subscales between the three assessment waves in the foster care group (n = 72) and comparison group (n = 128) with the child's age at T_1 as a control variable.

		T1–T2	*T2–T3*	*T1–T3*
Disinhibited behavior	FCG	.71***	.76***	.58***
	CG	.71***	.57***	.50***
Inhibited behavior	FCG	.77***	.52***	.32**
	CG	.45***	.20*	.22*
Total score	FCG	.78***	.65***	.44***
	CG	.69***	.48***	.46***

Note. FCG = Foster Care Group, CG = Comparison Group.
* $p_{adj.} < .05$.
** $p_{adj.} < .01$.
*** $p_{adj.} < .001$.

Table 4
Partial Pearson correlations for the ACC subscales between the three assessment waves in the foster care group (n = 71) and comparison group (n = 131) with child's age at T_1 as a control variable.

		T1–T2	*T2–T3*	*T1–T3*
Pseudomature behavior	FCG	.52***	.74***	.51***
	CG	.55***	.48***	.49***
Insecure behavior	FCG	.52***	.68***	.41***
	CG	.31***	.36***	.39***
Indiscriminate behavior	FCG	.63***	.68***	.57***
	CG	.47***	.57***	.43***
Total score	FCG	.60***	.78***	.55***
	CG	.46***	.51***	.49***

Note. FCG = Foster Care Group, CG = Comparison Group.
*$p_{adj.} < .05$.
** $p_{adj.} < .01$.
*** $p_{adj.} < .001$.

$p_{adj} < .01$), T_2 and T_3 ($z = 3.50$, $p_{adj} < .01$) as well as between T_1 and T_3 ($z = 2.56$, $p_{adj} = .02$).

Furthermore, mostly high stabilities across the measurement time points were generally found for the ACC subscales as well as the *ACC total score* in the foster care group (Table 4). In the comparison group moderate to high stabilities were shown. Again stabilities were generally higher in foster children in comparison to biological children. After Bonferroni correction, Fisher´s z tests indicate substantial group differences in *pseudomature behavior* T_2/T_3 ($z = 2.83$, $p_{adj.} = .02$), *insecure behavior* T_2/T_3 ($z = 3.00$, $p_{adj} = .01$) as well as the *ACC total score* T_2/T_3 ($z = 3.20$, $p_{adj} = .01$).

Comparing the stabilities of the three ACC subscales, no significant differences were found between the foster care group and the comparison group.

3.4. Research Question 4: How are RAD symptoms (RPQ) associated with additional interpersonal difficulties (ACC)?

Results of the partial Pearson correlations with child's age at T_1 as a covariate in the foster care group and in the comparison group can be found in Table 5. Within the foster care group, all RPQ and ACC subscales showed moderate to high correlations, except for *disinhibited* and *insecure behavior* ($r = 0.15$, $p_{adj} = 3.70$ and the *RPQ total score* and *insecure behavior* ($r = 0.27$, $p_{adj} = .06$). The highest correlation was observed for *disinhibited* and *indiscriminate behavior* ($r = 0.68$, $p_{adj} < .01$). Within the comparison group, the RPQ and ACC scores were moderately correlated, except for the correlation of *inhibited* and *indiscriminate behavior* ($r = 0.28$, $p_{adj} = .02$).

4. Discussion

Examining Research Question 1, substantial differences were found between children living in their biological families and children living in long-term foster care across all three assessment waves (with approximately six months in between): Foster children showed more RAD symptoms as well as pseudomature, indiscriminate and insecure interpersonal behaviors, as assessed by the parent report (mostly mothers). No differential decrease in RAD symptoms or in interpersonal problems was found between the foster care and the comparison group over time (Research Question 2). In line with this result, correlations between the measurement time points (T_1/T_2, T_2/T_3, T_1/T_3) confirmed mainly high stabilities in RAD symptoms and interpersonal problems within the foster care group, which were significantly higher for disinhibited than for inhibited behaviors for T_2/T_3 (Research Question 3). In addition, results showed a similar pattern in the comparison group. However, the stabilities were generally higher in foster children in comparison to biological children (Research Question 3). Moreover, within the foster care group most of the RPQ and ACC subscales were moderately to highly correlated (Research Question 4). More specifically, the most pronounced correlation in the foster children group was observed for disinhibited symptoms (RPQ) and indiscriminate behavior (ACC). Results indicate weaker correlations in the comparison group regarding RAD symptoms and further interpersonal problems.

In line with previous findings from a Swiss sample (31.9%; Schröder et al., 2017), we found that 31% of the foster children showed high scores using the original cut-off value from a high-risk UK-sample (Minnis et al., 2007, 2013) indicating a ´likely´ RAD diagnosis (however it should be noted that no categorical diagnoses are reported). Moreover, results confirmed a moderate correlation between both RAD types (Minnis et al., 2007), which might indicate a mixed symptomatology in several cases. It is noteworthy that 9.4% of the biological children also scored higher than the cut-off value at the initial assessment. In comparison, Schröder et al. (2017) found such increased RPQ scores only in 2.4% of the children from a community sample, including children and adolescents (sample age between four and sixteen years). One potential explanation for these differences at T_1 is the young age of the current sample. Instead of reporting inhibited or disinhibited RAD symptoms, biological parents may rather address age-appropriate behaviors, reflecting typical fears of - or being curious about - others. This interpretation is supported by the decreased prevalence at T_3 in the current sample (2.3% of the biological children), which is, in fact, not different from the prevalence reported for the Swiss sample (Schröder et al., 2017). Additionally, Pears, Bruce, Fisher, and Kim (2010) found in 19% of non-maltreated children living with their biological parents, mostly from a low socio-economic status sample, moderate to high levels of indiscriminate friendliness, one of the main symptoms of disinhibited attachment disorder. The authors concluded that indiscriminate friendliness may not be restricted to children in care (although more prevalent in these samples). Instead, it may be distributed along a continuum of risk in general, which could also explain the higher prevalence in the comparison group at T_1.

In comparison to the ACC item prevalence (percentage of children with item score 1 or 2) in a sample of children in long-term care in New South Wales (NSW; Tarren-Sweeney, 2007), the present foster care sample seemed to be less burdened with respect to pseudomature and insecure behavior. For example, the item “hides feelings” from the ACC subscale *insecure interpersonal behavior* had a prevalence of 37% in the NSW sample (parent-report: partly or mostly true for the child), while the prevalence was 12% in the current foster care sample. In contrast, we found equal or even higher item prevalence for indiscriminate interpersonal behavior than Tarren-Sweeney (2007). The item “clingy” had a prevalence of 52% in the NSW sample and approximately 76% of the foster parents in the present study reported this is partly or mostly true for their foster child, for example. The higher prevalence of indiscriminate interpersonal behavior in the current sample may reflect

Table 5
Partial Pearson correlations of the RPQ and ACC subscales and total scores at T_1 with child's age at T_1 as a control variable in the foster care group (n = 82) and in the comparison group (n = 139).

		RPQ			ACC			
		Disinhibited behavior	Inhibited behavior	Total score	Pseudomature behavior	Indiscriminate behavior	Insecure behavior	Total score
RPQ	Disinhibited behavior	-	.40***	.88***	.38**	.68***	.15	.51***
	Inhibited behavior	.30***	-	.78***	.35*	.37***	.41***	.47***
	Total score	.93***	.64***	-	.44***	.65***	.31	.59***
ACC	Pseudomature behavior	.31***	.39***	.40***	-	51***	.56***	.79***
	Indiscriminate behavior	.46***	.28*	.48***	.56***	-	.40***	.81***
	Insecure behavior	.30***	.32***	.37***	.52***	.61***	-	.81***
	Total score	.42***	.39***	.49***	.79***	.87***	.86***	-

Note. Results for the foster care can be found above the diagonal line, while the results for the comparison group can be found below the diagonal line; RPQ = Relationship Problems Questionnaire, ACC = Assessment Checklist for Children.
* $p_{adj.} < .05$.
** $p_{adj.} < .01$.
*** $p_{adj.} < .001$.

the younger age and/or shorter duration of stay in foster care in the current sample in comparison to the NSW sample (duration of stay: approximately 51 months on average in the NSW sample, approximately 18 months on average in the present sample; age range: 4 to 11 years in the NSW sample, 2 to 7 years in the present sample). Although disinhibited symptoms, such as indiscriminate behavior, are more persistent than inhibited symptoms (O´Connor et al., 2000), previous studies indicate that they also decline after placement in foster care, however this decline is less pronounced and occurs more slowly (Smyke et al., 2012). For a better understanding of these differences in prevalence, normative samples and further research regarding influential sample characteristics, such as age or type of maltreatment, are needed. Nevertheless, the increased symptoms observed in the foster care group compared to the biological children indicate that these behaviors are relevant and should be considered in clinical assessments to obtain a more complete picture of the complex trauma and attachment related symptomatology of children in care.

Regarding the course of RAD symptoms, several studies reported that inhibited behavior decreases or even disappears in samples of former institutionalized foster children when adequate care is provided (Zeanah & Gleason, 2015), whereas the disinhibited behavior (O´Connor et al., 2000; Smyke et al., 2012) as well as indiscriminate interpersonal behavior (Chisholm, 1998) seem to be more stable. In contrast to these previous results, we did not find such a pronounced decrease in inhibited symptoms compared to disinhibited symptoms, when considering the comparison group. One possible explanation is that such a decrease takes place in the first few months after entering foster care. As the average duration of placement in the current foster family was approximately 18 months in our sample, it is possible that we did not assess early adaptation processes. Further research is necessary to investigate these early trajectories directly after entering foster care.

The high stabilities of RAD symptoms, especially in disinhibited symptoms, are consistent with prior findings of O´Connor et al. (2000). They also found high stability of disinhibited behavior in Romanian adoptees (r = 0.59, $p < .001$) and in a never-institutionalized group of UK born adoptees (r = 0.52, $p < .001$) between 4 and 6 years of age assessing these behaviors with dimensional measurements. Additionally the latter pattern has been found for indiscriminate friendliness, even in children adopted very early before the age of four months (Chisholm, 1998). This emphasizes that the very early development period is particularly relevant.

Several studies suggest that this high stability of disinhibited behavior, including indiscriminate friendliness, might reflect general deficits in inhibitory control rather than attachment problems (Bruce, Tarullo, & Gunnar, 2009; Gorter, Helder, Oh, & Gunnoe, 2017). It is considered that a lack of stimulation due to neglect (Colvert et al., 2008) affects the brain development in early childhood and may lead to an impaired executive functioning (Bauer et al., 2009; Bryck & Fisher, 2012). In contrast inhibited behavior might be the result of a collapse of the behavioral attachment system due to a history of maltreatment (Ziegenhain, 2009): the behavioral attachment system, activated by being frightened, addresses the primary caregiver who is at the same time the reason for fear. This vicious circle probably results in withdrawn and inhibited behavior, which decreases when adequate care is received, while deficits in inhibitory control rather remain unaffected.

However, it is noteworthy that, as far as we know, there is no information about the test-retest reliability of the RPQ subscales. Thus, we cannot rule out the possibility that differences in stability between disinhibited and inhibited symptoms (examining rank-order changes) can be accounted for by differences in their test-retest reliabilities.

In all of the analyses, children´s age was considered as a covariate. However, the foster children's age at T_1 and the age at out-of-home placement were highly correlated in the current sample (r = 0.89, $p < .001$). Previous studies showed that the duration of neglect (O´Connor et al., 2000) as well as the age at out-of-home placement (Jonkman et al., 2014; Smyke et al., 2012) are linked to the severity of RAD symptoms. However, the high correlation of age and age at placement makes it impossible to disentangle the effects in this study.

4.1. Strengths and limitations

To the best of our knowledge, the present study is the first longitudinal study assessing both RAD symptoms and interpersonal problems in German foster children compared to children living with their biological families regarding their longitudinal developmental patterns. The inclusion of a comparison group is especially important in differentiating the developmental course of RAD symptoms and interpersonal problems in foster children from developmental processes occurring in the general population, primarily in young children. This became particularly evident in the findings regarding the relatively high RAD prevalence, based on the RPQ cut-off, in the comparison group at T_1.

One limitation that we cannot rule out relates to the representativeness of the sample. For instance, in the case of ongoing legal proceedings or difficulties with the family of origin, some youth welfare offices may have decided to not introduce the study to some foster families. Moreover, participation rate may be higher for foster families who are less burdened by children´s mental health problems, which reduces the representativeness of the sample. In addition the current findings rely on dimensional parent (mostly mother) reports only. Even though several studies showed that foster parents are rather reliable informants (Tarren-Sweeney, Hazell & Carr, 2004), additional informants, such as kindergarten teachers, and/or observational data may be important sources of information regarding inappropriate social behaviors in foster children, especially regarding their interaction with strangers and peers. Moreover, the low Cronbach´s Alpha for the RPQ

subscale inhibited behavior in the comparison group calls into question whether these items can be answered homogeneously, respectively in a low-risk population. Regarding the prevalence of ´likely´ RAD cases in the present study, it should be noted, that no studies exist examining the validity of this cut-off value in Germany so far. Therefore, the specificity and the sensitivity in the current sample is unclear at this point.

4.2. Further research and conclusion

The present findings emphasized the special needs of foster parents in dealing with persistent interpersonal problems. Particularly the results showing a high stability of additional interpersonal problems, such as pseudomature behavior, expand previous research on the stability of attachment disorder related symptoms and provide important insights in the interpersonal problems of foster children. However more studies with larger sample sizes, earlier-starting and longer-lasting observational periods and follow-up examinations are necessary for a deeper understanding from a developmental perspective. Dimensional instruments, like the RPQ, allow a brief screening of RAD symptoms. However more studies are needed with respect to the psychometric properties in Germany. Moreover further research regarding influencing factors (e.g., attachment style) and potential consequences of pseudomature behavior (e.g., social impairments in interaction peers) for developmental outcomes could lead to a better understanding of these behaviors in the context of foster parent–foster child interaction. In general, more research is necessary to investigate not only problematic interpersonal behavior but also factors contributing to a positive foster parent–foster child interaction to improve foster parent support by the youth welfare agencies.

Declarations of interest

None.

Acknowledgment

Funded by the German Federal Ministry of Education and Research (funding code: 01KR1302)

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