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# The key role of positive parenting and children's temperament in post-institutionalized children's socio-emotional adjustment after adoption placement. A RCT study

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## Abstract

Parenting interventions represent a means for experimentally inquiring socio-emotional change of post-institutionalized children after adoption. We used this approach in a three time point RCT study involving 83 post-institutionalized children ($M_{age}$ = 33.5 months, *SD* = 17.1) and their adoptive mothers ($M_{age}$ = 42.6, *SD* = 3.9), attending either the Video-Feedback Intervention to promote Positive Parenting in adoption and foster care or a dummy intervention. Controlling for gender and age at adoption, children showed a significant change in their socio-emotional adjustment in the specific variables inquired—that is, emotional availability-EA, and behavioral problems—after intervention attendance. Mediation and moderated mediation models showed that maternal EA was a main factor affecting children's EA and externalizing behavioral problems, with a key moderating role played by children's temperament; children with high scores on temperamental negative affect benefitted most from their mothers' increase in EA.

KEYWORDS

behavioral problems, post-institutionalized children, RCT, temperament, VIPP positive parenting intervention

  

## 1 | INTRODUCTION

Although the number of internationally adopted children has decreased dramatically in Western countries in recent years (Selman, 2012), adoption still represents unique proof of a natural catch-up and, at the same time, may constitute an unforeseen challenge for healthy socio-emotional development. Due to adversities experienced before adoption, post-institutionalized children are more at risk for experiencing difficulties in their socio-emotional adjustment compared to children reared in biological families (Dozier & Rutter, 2016). Although meta-analytic evidence indicates that adopted post-institutionalized children show less insecure and disorganized attachment than their peers left behind in institutions (Lionetti, Pastore, & Barone, 2015), their recovery is yet not always complete, with more impaired abilities often persisting after the adoption placement (Juffer & van IJzendoorn, 2009). Specifically, several studies have reported rapid improvement after family placement in children's physical parameters for example, weight, height and cranial circumference, paired with an impressive, albeit incomplete, socio-emotional recovery (Bakermans-Kranenburg et al., 2011; Humphreys, Nelson, Fox, & Zeanah, 2017; Sonuga-Barke et al., 2017). What might account for this recovery in the socio-emotional domain is an unsolved issue, calling for further understanding.

### 1.1 | What counts for children's recovery?

Among variables investigated thus far to identify what contributes to socio-emotional recovery after adoption placement, research studies have considered distal and proximal variables. Among the distal variables, the child's age at adoption and length of institutionalization have been extensively explored with mixed outcomes (Niemann & Weiss, 2012; van den Dries, Juffer, van IJzendoorn, & Bakermans-Kranenburg, 2009), and effects ranging from moderate to trivial (see, e.g., Niemann & Weiss, 2012; O'Connor, Rutter, & English and Romanian Adoptees Study Team, 2000; van den Dries et al., 2009). Considering more proximal variables, robust evidence supports the finding that parental sensitivity in caregiving (commonly named positive parenting), is among the main factors affecting children's socio-emotional enhancement (Barone, Barone, Dellagiulia, & Lionetti, 2018; Drozd, Bergsund, Hammerstrøm, Hansen, & Jacobsen, 2018; Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2005). Interestingly, the evidence that children's positive emotional and behavioral development is fostered by maternal sensitivity has been extensively supported by intervention studies aimed at improving maternal sensitivity and involving children biologically related to their parents. However, less data are available when it comes to the adoption context.

A construct that is close to maternal sensitivity, labeled emotional availability (EA), covers several dyadic dimensions implied in the child–parent interaction featuring positive parenting (see Saunders, Kraus, Barone, & Biringen, 2015 for a recent contribution), and would therefore represent, among proximal variables, an eligible measure to capture what may promote mother–child socio-emotional interaction quality after entering the new adoptive family.

Another specific socio-emotional feature of post-institutionalized children is the possible occurrence of indiscriminate friendliness or social disinhibited behaviors. Indiscriminate friendliness, such as lack of social reticence to strangers without the fear or caution that is characteristic of typically developing children, is one of the issues adopted children and their families often face and it is an expected developmental outcome in adapting to the institutional environment of structural neglect (Chisholm, 1998; Gleason et al., 2014). Studies converge on the finding that post-institutionalized children present significantly more social indiscriminate behaviors than never-institutionalized children, even many years after adoption (Bakermans-Kranenburg et al., 2011; Rutter, Kreppner, & Sonuga-Barke, 2009). Nevertheless, a recovery from these behaviors is expected after adoption placement, due to the new caring conditions met in the family.

Last, children's behavioral problems have been identified as worthy to be considered in order to understand children's adjustment to the new family environment. Adopted children are more at risk for high rates of behavioral problems (Juffer & van IJzendoorn, 2005; Merz & McCall, 2010), especially in their externalizing features

(Eisenberg et al., 2005; Sanson, Hemphill, & Smart, 2004; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006), suggesting that the experience of adoption itself may not be completely able to support a complete recovery in this domain.

Furthermore, some children seem to be more susceptible to change in the quality of their environment than others; when behavioral problems are specific targets of parenting interventions, empirical evidence report that some children, thanks to specific individual features, are more likely to benefit from the improved rearing environment (van Zeijl et al., 2007); susceptible children benefit from the influence of positive and supportive environment and, at the same time, show the worst developmental outcomes when exposed to low-quality environments, as low parenting (for a meta-analysis see Slagt, Dubas, Deković, & van Aken, 2016), being thus more affected by both positive and negative environments than their low susceptible peers. Similar findings have been reported also in relation to maternal sensitivity and maternal psychopathology (Mesman et al., 2009), and to professional childcare quality (Pluess & Belsky, 2010). In line with the differential susceptibility model (Belsky & Pluess, 2009; Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007), one of the most extensively explored phenotypical marker of such an increased sensitivity to new environments in children is the temperament trait of negative affect (as captured by difficult temperament and negative emotionality). At the best of our knowledge, this trait has not been explored yet in the context of adoptive positive parenting intervention.

## 1.2 | The role of interventions in the framework of the differential susceptibility model

Effective interventions with precise and limited targets potentially represent a powerful approach for promoting adopted children's recovery, supporting parents in the challenging yet rewarding new parental role. The Video-feedback Intervention to promote Positive Parenting in Adoption and Foster Care (VIPP-FC/A) is a home-visiting intervention that has been recently developed at the Leiden Centre for Family Studies (NL) as an extension of the already widely tested Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD; Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2008, 2017 ). Interestingly, the first available empirical evidence suggested that the VIPP-FC/A version is effective in significantly increasing positive parenting in adoptive families (Barone et al., 2018). Given this outcome, its implementation represents a suitable means for experimentally manipulating and investigating through a RCT design the effect of a proximal variable, such as the quality of parenting, on adopted children's socio-emotional adjustment. If we actually conceptualize children's expected outcomes in the framework of the differential susceptibility model (Belsky, 1997, 2005 ; Boyce & Ellis, 2005), we could hypothesize that some children, due to specific individual features, are more susceptible to intervention-induced environmental changes than others; children who are putatively vulnerable and are most affected by an unfavorable environment, such as life in institution, may also be the ones who reap the most benefits from environmental support and enrichment found in the new adoptive family, thus being responsive to both positive and negative environmental conditions in a "for better and for worse" manner (Belsky et al., 2007). The VIPP parent training employs mothers as the main change agents and could then represent the viable variable for testing if and for whom an increase in maternal parenting quality, namely, positive parenting, would impact on children's socio-emotional outcomes after adoption placement.

So far, most studies addressing the analysis of the aforementioned variables have been cross-sectional, thus suffering from the limitations implied in this kind of design (Dozier & Rutter, 2016).

## 1.3 | The present study

The present study aimed to examine the associations between improvement in positive parenting and children's socio-emotional variables (i.e., emotional availability, externalizing behavioral problems, and indiscriminate friendliness) in a sample of intercountry, late adopted children and their mothers after mothers attended a parenting intervention. Specifically, the study attempted to analyze through an experimental design, that is, a RCT

design—with three time points of data collection (pre-intervention, post-intervention, and 6-month follow-up), the contribution of maternal positive parenting (i.e., maternal emotional availability, EA) on children's socio-emotional adjustment. First the longitudinal pathway of children's outcome variables was explored; second we analyzed the mediating role of positive parenting, that is, maternal emotional availability at post-intervention, on children's significant socio-emotional changes at 6-month follow-up, and a possible moderating role of child's temperament in this model.

In light of the aforementioned aims, we hypothesized that:

1. Based on previous VIPP effectiveness studies on maternal positive parenting increase in the context of adoption (Barone et al., 2018) we expect that, regardless of children's age at adoption and gender, children belonging to the intervention group would show a greater recovery in emotional availability, indiscriminate friendliness, and externalizing behavioral problems than children belonging to the control group, along the three time points tested.
2. Maternal positive parenting would mediate the relation between the mothers' intervention attendance and the children's socio-emotional outcomes (i.e., emotional availability, externalizing behavioral problems, and indiscriminate friendliness). Specifically, at intervention completion, participating mothers who received VIPP-FC/A were expected to show a significant improvement in their emotional availability which, in turn, is expected to promote an increase in the children's socio-emotional outcomes at 6-month follow-up.
3. Based on differential susceptibility model (Belsky, 1997, 2005 ; Boyce & Ellis, 2005), we expect that the children's temperament (i.e., negative affect) would moderate the mediating effect of maternal emotional availability on children's outcomes. Particularly, the strongest effects are expected in children scoring high on temperamental negative affect.

## 2 | METHOD

### 2.1 | Study design

The present study was a RCT with two conditions (i.e., experimental and control) as one group received the intervention, named VIPP-FC/A, and another group received a dummy intervention. Effects were tested at three time points: at pre-test, post-test (at the end of the intervention completion), and at follow-up (approximately 6 months after the post-test).

### 2.2 | Procedure and randomization

Mothers and children involved in the current study were recruited through national health authority adoption services of several Italian Country towns. Each mother–child dyad was randomly assigned either to the experimental condition with VIPP-FC/A intervention or to the control condition with a dummy intervention. Randomization was performed as block randomization with 1:1 allocation using a computerized random number generator. Mothers agreed to participate before randomization into the conditions. Researchers coding and analyzing the observation data were blind to the randomization and assessment (pre-test, post-test, or follow-up).

Assessments took place during home visits through interviews, questionnaires, and standardized measures. The pre-test assessment (T1) was done after randomization, and started about a week before intervention in both groups. All mothers and children were tested for emotional availability using the Emotional Availability scales 4th edition (Biringen, 2008) over the course of a 15-min parent–child interaction (10 min with toys, 5 min of free play with no toys). Mothers were then interviewed about their adoptive children's indiscriminate friendly behavior

using a semi-structured interview (Chisholm, 1998) and asked to provide information about children's emotional and behavioral problems and temperament through questionnaires. The intervention lasted approximately 4 to 6 months and at the last home visit both intervention groups repeated all post-test measures (T2). Finally, 6 months after the post-test the follow-up assessment (T3) was completed using the same procedures.

## 2.3 | Participants

A total of 103 adoptive children and their mothers, who were part of a multisite study conducted in Italy, were assessed for eligibility (a partial database overlap for EA measures can be found with data reported in Barone et al., 2018 paper). The recruitment took place through adoption services. The ethical committee of the Department of Brain and Behavioral Sciences of the University of Pavia approved the study. Eighty-three Caucasian adoptive mothers ($M_{age}$ = 42.6, *SD* = 3.9) and their adopted children (58% boys) were randomly allocated to the VIPP-FC/A intervention group or the dummy intervention group, whereas 20 mothers declined to participate.

In Table 1, characteristics of participants are reported. All children experienced life in institution before adoption placement, but no additional available information concerning their earlier experiences of institutionalization was reported. Children were internationally adopted from the following continents: Europe (*n* = 24), Asia (*n* = 24), South America (*n* = 10), and Africa (*n* = 14). The children's age at assessment ranged from 14 to 75 months (*M* = 43.3, *SD* = 15.9) and children's age at adoption ranged from 1 to 68 months (*M* = 33.5, *SD* = 17.1). The socioeconomic status (SES) of families was calculated with the Four-Factor Index of Social Status (Hollingshead, 1975). All participating families belonged to a middle-class SES (*M* = 30.1, *SD* = 8.7). The *t* test and chi-square analyses did not show any significant differences between the VIPP-FC/A and the dummy intervention groups on any demographic variables (all *p*s > 0.05). Given the high correlation between age at adoption and age at assessment ($r = 0.96$, $p < 0.001$), we chose to consider the first one as an eligible variable (van den Dries et al., 2009).

## 2.4 | Experimental condition with VIPP-FC/A intervention

Mothers and children in the experimental condition received the VIPP-FC/A, which is a short-term and home-based intervention developed at the Centre for Family Studies of Leiden (NL) aimed at enhancing primary caregiver sensitivity and positive and disciplinary strategies using video-feedback. The VIPP-FC/A is an expanded

**TABLE 1** Demographic characteristics of participating families

| Characteristic | *n* (%) | *M* (*SD*) |
|---|---|---|
| Child's gender | | |
| Girls | 35 (42) | |
| Boys | 48 (58) | |
| Child's country of origin | | |
| Asia | 24 (29) | |
| Europe | 35 (42) | |
| America | 10 (12) | |
| Africa | 14 (17) | |
| Child's age at assessment (month) | | 43.3 (15.9) |
| Child's age at adoption (month) | | 33.5 (17.1) |
| Mother's age (year) | | 42.6 (3.9) |
| SES | | 30.1 (8.7) |

*Note*. *M* = Mean; *SD* = Standard Deviation; SES = Socioeconomic status.

version of the well-known VIPP-SD (Juffer, Bakermans-Kranenburg, & van IJzendoorn, M. H., 2008); in addition to the focus on maternal sensitivity and sensitive discipline for preventing behavioral problems, it also provides specific cues on indiscriminate friendliness, and the distinct needs of adopted children, such as special attention to physical contact and communicative signals for seeking help. The protocol involves seven home visits: an initial session to collect a baseline video of parent–child interaction and six intervention sessions. During each intervention session, the intervener meets the mother–child dyad in standardized situations and then gives feedback using the video recorded in the previous home visit, as well as input on positive parenting techniques, in accordance with a standardized procedure.

## 2.5 | Control condition with dummy intervention

Mothers in the control group received a home visit to collect a baseline video of parent–child interaction followed by six telephone calls from an intervener at every planned week. During the phone call, the intervener discussed with the mother about the general child development themes in order to keep in contact with the mothers and provide them with a similar amount of attention as the mothers in the intervention group. No advice about sensitive parenting or attachment was given to the control group mothers during these conversations. Mothers who requested explicit advice or detailed information were referred to their general practitioner and/or their health service agency.

## 2.6 | Measures

### 2.6.1 | Emotional availability

Mothers and children's emotional availability in the dyadic interaction was measured via the Emotional Availability scales, 4th Edition (EAs—Biringen, 2008) by videotaping 15 min of mother's and child's dyadic play (free play with no toys for five min followed by 10 min of free play with toys). The EAs includes four scales of parenting behavior, namely, sensitivity, structuring, non-intrusiveness, and non-hostility, and two scales of child's behavior, namely, responsiveness and involvement. Each scale was coded on a Likert-type scale ranging from 1 to 7. Summary scores for maternal emotional availability (maternal EA) and children's emotional availability (children's EA) were obtained by computing the mean value among their relative EA scales (see also Negrão, Pereira, Soares, & Mesman, 2014). The scales were applied by reliably trained and certified researchers. The coders were unaware of the experimental condition and of the timing of assessment, and time points were coded independently. Furthermore, different coders assessed maternal and child's EA. Inter-coder reliability for randomly chosen observations (25% of all data) was good for both maternal (Cohen's $K = 0.85$) and child EA measures (Cohen's $K = 0.81$).

### 2.6.2 | Indiscriminate friendliness

Indiscriminate friendliness was measured via caregiver reports on the Indiscriminate Friendliness Interview (Chisholm, 1998; Chisholm, Carter, Ames, & Morison, 1995). Mothers were asked five questions regarding the following topics: (a) whether her child wandered without distress, (b) whether her child was willing to go home with a stranger, (c) how friendly her child was with new adults, (d) whether her child was ever shy, and (e) what her child typically did upon meeting new adults. For each question, a child received a score of 1 if the mother selected a response indicating indiscriminate friendliness; otherwise the child received a score of 0. Items were summed to produce a unique summary score ranging from 0 to 5. Cronbach alphas were 0.63, 0.61, and 0.62 for the pre-test, post-test, and follow-up, respectively. Two coders reviewed 25% of the videotapes to calculate interrater reliability; the Cohen's kappa coefficient for the frequency variable was 0.93.

### 2.6.3 | Children's emotional and behavioral problems

Mothers completed the Child Behavior Checklist for Ages 1.5–5 (CBCL/1.5–5; Achenbach & Rescorla, 2001) which is a 100-item questionnaire of problem behaviors of preschoolers (18 months through 5 years). Adoptive mothers indicated whether their children displayed any of the 100 described behaviors in the last two months on a 3-point scale (0 = *not true*, 2 = *very true or often true*). In the present study, we used the raw scale scores of externalizing behavioral problems to test the hypotheses. Additionally, we assigned T scores to describe the sample of the study (Achenbach & Rescorla, 2001). We considered both borderline and clinical scores as clinical problem behavior (Klein Velderman et al., 2006). In the present sample, the Cronbach's alphas across three time points were 0.88, 0.89, and 0.89, respectively.

### 2.6.4 | Child temperament

Mothers completed the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) which is a parent-report measure for the assessment of temperament in children 3–7 years old. It comprises 180 items on a 7-point Likert-style rating scale (1 = extremely untrue and 7 = extremely true). In the present study, we used all items, in line with Lemery and colleagues (2002) who highlighted that possible associations between CBQ temperament items and behavior problem scale items were not due to measurement confounding, with therefore no need to eliminate any item. Based on our hypothesis, for the current study, we used the scores of the Negative Affect (NA) scale in the analyses that follow. The Cronbach's alpha value was 0.74 for the CBQ NA. Data on temperament were available only for a subsample of children between the age of 3 and 7 ($N$ = 57), as younger children completed another measure-ECBQ (Putnam, Gartstein, & Rothbart, 2006) and weren't thus included for this measure in the study.

## 2.7 | Analytic plan

As is common in longitudinal studies, attrition across time points of data collection resulted in a reduced sample size. The dropout from pre-test (T1) to post-test (T2) was 0% ($n$ = 0), whereas from T2 to follow-up (T3) was 4.8% ($n$ = 4). Reasons for dropout were family circumstances ($n$ = 3) and mother unattainability ($n$ = 1), thus resulting in 79 mothers who completed all three time points (43 mothers in the VIPP-FC/A intervention group; 36 mothers in the dummy intervention group). Missing values on follow-up for indiscriminate friendliness ($n$ = 1) and externalizing behavioral problems variables ($n$ = 17) were due to the incomplete assessment or non-response. Because these missing values were randomly distributed across participants, we performed an intention-to-treat analyses, using the last observation carried forward (LOCF) method, whereby the last available measurement for each individual at the time point prior to withdrawal from the study was retained in the analysis (Gupta, 2011). Results were similar when missing data were excluded from the analysis and when the LOCF method was applied.

To assess the longitudinal pathway of children's outcome variables (emotional availability, indiscriminate friendliness, and externalizing behavioral problems) along the three time points, we performed repeated measures ANCOVAs with intervention condition as a between-subjects factor (the VIPP-FC/A intervention and control condition with dummy intervention) and time as a within-subjects factor (pre-test, post-test, and follow-up). Age at adoption and gender were included as covariates to investigate their influence on children's outcomes. When their contributions were not significant, the covariates were removed from the final analyses. Partial eta squared was used as an effect size measure. Tests of the hypotheses for outcome variables (emotional availability, indiscriminate friendliness, and externalizing behavioral problems) were conducted using Bonferroni adjusted alpha levels.

Mediation and conditional process analyses using PROCESS (Hayes, 2013) were conducted to test the hypothesis that the VIPP/FC-A intervention would affect maternal positive parenting (i.e., emotional availability) that, in turn, would affect children's socio-emotional outcomes (i.e., emotional availability, externalizing behavioral

problems, and indiscriminate friendliness) after mothers' completion of the intervention, and the hypothesis that children's temperament (i.e., negative affect) would moderate the aforementioned mediation model. The presence of such simple mediation and conditional mediation (also referred to as moderated mediation) effects were examined following the recommendations of Hayes (2013). Mediation and moderated mediation were tested by assessing the size of the indirect effect or the conditional indirect effect and their confidence intervals (Bootstrap Confidence Interval; Preacher & Hayes, 2004; Preacher, Rucker, & Hayes, 2007). Maternal EA and children's socio-emotional variables at pre-test were used as covariates.

## 3 | RESULTS

### 3.1 | Preliminary analysis

As all variables were normally distributed, the study hypotheses were tested via parametric tests. Means and standard deviations for all primary outcome variables at pre-, post-test, and follow-up are presented in Table 2. We applied independent sample *t* tests to the pre-test values of primary outcome measures. There were no significant differences between the VIPP-FC/A and dummy intervention groups on any of these measures (all *ps* > 0.05). Moreover, there were no significant differences between girls and boys on any of the primary outcome measures

**TABLE 2** Means and standard deviations for all variables at pre-, post-test, and follow-up

| | Intervention | |
|---|---|---|
| | Dummy | VIPP-FC/A |
| | (*n* = 39) | (*n* = 44) |
| Measure | *M* (*SD*) | *M* (*SD*) |
| | Pre-test | |
| Maternal EA | 5.5 (0.8) | 5.4 (0.8) |
| Child EA | 5.0 (1.0) | 4.4 (1.3) |
| IF | 1.8 (1.4) | 2.4 (1.4) |
| Externalizing Problems | 13.4 (6.7) | 15.7 (7.4) |
| Child NA[†] | 3.9 (0.7) | 3.9 (0.7) |
| | Post-test | |
| Maternal EA | 5.3 (1.0) | 6.1 (0.5) |
| Child EA | 5.0 (1.3) | 5.5 (0.9) |
| IF | 1.3 (0.9) | 1.5 (1.2) |
| Externalizing Problems | 14.2 (10.4) | 16.6 (8.5) |
| | Follow-up | |
| Maternal EA | 5.3 (1.4) | 6.1 (0.6) |
| Child EA | 4.8 (1.1) | 5.7 (0.8) |
| IF | 1.1 (0.9) | 1.2 (1.2) |
| Externalizing Problems | 12.7 (10.6) | 16.1 (10.8) |

*Note*. *M* = Mean; *SD* = Standard Deviation; EA = Emotional Availability; IF = Indiscriminate Friendliness; NA = Negative Affect.

[†]n total = 57, n VIPP-FC/A group = 30, n dummy group = 27.

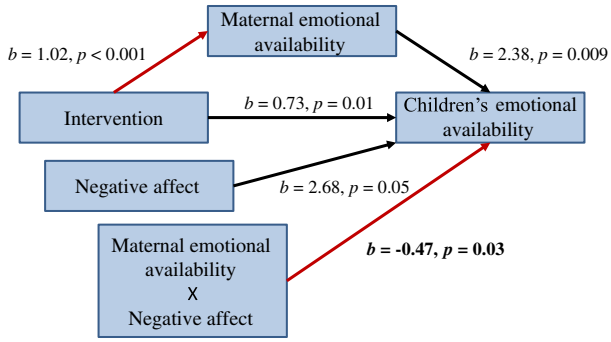


**FIGURE 1** A moderated mediation model in which children's temperament (negative affect) moderates the mediation effect of maternal emotional availability at post-intervention to predict children's emotional availability at 6-month follow-up

(all *ps* > 0.05). Fifteen percent of children in the dummy intervention group and fourteen percent of children in the VIPP-FC/A intervention group reported externalizing behavioral problems in the clinical range.

Pearson product–moment correlation coefficients showed that, at each time point, maternal EA and children's EA were significantly associated to each other. Specifically, the degree of the association increased over time (pre-test: $r = 0.42$, $p < 0.001$; post-test: $r = 0.74$, $p < 0.001$; follow-up: $r = 0.72$, $p < 0.001$). Children's temperamental negative affect (NA) was significantly associated with externalizing behavioral problems at pre-test: ($r = 0.45$, $p = 0.03$) and at post-test ($r = 0.35$, $p = 0.008$), but not at follow-up ($r = 0.16$, $p = 0.27$).

## 3.2 | The longitudinal pathway of children's socio-emotional outcome variables

Regarding children's EA, there was a significant interaction between time and intervention group on children's EA ($F$ (2, 158) = 17. 47, $p < 0.001$, $\eta_p^2 = 0.18$), after controlling for age at adoption and gender. The EA of children whose mothers received the VIPP-FC/A intervention increased the most ($F$ (2, 86) = 42.50, $p < 0.001$, $\eta_p^2 = 0.50$); adopted children's EA values at post-test ($M = 5.5$, $SD = 0.9$) and at follow-up ($M = 5.7$, $SD = 0.8$) were significantly higher than their EA at pre-test ($M = 4.4$, $SD = 1.3$; all *ps* < 0.001; $d = 1.2$ for pre-test vs. post-test; $d = 0.9$ for post-test vs. follow-up). Table 2 presents mean and standard deviation of this variable. On the other hand, neither main effect (time: $F$ (2, 158) = 2.36, $p = 0.10$, $\eta_p^2 = 0.03$; intervention group: $F$ (1, 79) = 2.32, $p = 0.13$, $\eta_p^2 = 0.03$), nor an interaction effect ($F$ (2, 158) = 2.31, $p = 0.10$, $\eta_p^2 = 0.03$) were observed on the indiscriminate friendliness pathway of children along the three time points. Furthermore, once again, no interaction effect ($F$ (2, 158) = 0.31, $p = 0.73$, $\eta_p^2 = 0.004$) and no main effects (time: $F$ (2, 158) = 1.625, $p = 0.28$, $\eta_p^2 = 0.02$; intervention group: $F$ (1, 79) = 2.81, $p = 0.10$, $\eta_p^2 = 0.03$) was found for externalizing behavioral problems.

## 3.3 | The mediating role of maternal positive parenting and the moderator role of children's temperament

First, we tested the effect of VIPP/FC-A on children's EA at 6-month follow-up through maternal EA at post-intervention. We found that VIPP/FC-A indirectly influenced children's EA availability through its effect on maternal EA after intervention attendance completion. Mothers who attended VIPP/FC-A intervention showed more improvement in their EA at post-intervention ($b = 0.92$, $p = 0.001$), and children's EA at follow-up was influenced by the maternal EA ($b = 0.55$, $p = 0.001$). A bias-corrected bootstrap confidence interval for the indirect effect ($b = 0.50$) was entirely above zero (0.208–0.938). Next, we examined whether children's temperament (i.e., negative affect) would moderate the aforementioned mediation model (on the subsample of older children $N = 57$). As

seen in Figure 1, the effect of maternal EA on children's EA after VIPP/FC-A intervention attendance completion was moderated by the children's temperament ($b = -0.47$, $p = 0.03$). There was a significant conditional indirect effect of VIPP/FC-A on children's EA at 6-month follow-up through maternal EA at post-intervention particularly for children with higher negative affect; $b = 0.55$, BCa CI [0.186, 1.062]. The key mechanism able to affect children's EA was the improved EA of mothers; children who improved the most were children with high NA and whose mothers increased their EA.

Second, we tested the effect of VIPP/FC-A on children's externalizing behavioral problems at 6-month follow-up through maternal EA at intervention completion. We found that VIPP/FC-A indirectly influenced children's externalizing behavioral problems through its effect on maternal EA. Mothers who attended VIPP/FC-A intervention showed more improvement in their EA at post-intervention ($b = 0.83$, $p = 0.001$), and, in turn, maternal EA affected children's externalizing problems at 6-month follow-up ($b = -2.64$, $p = 0.01$). A bias-corrected bootstrap confidence interval for the indirect effect ($b = -2.20$) did not contain zero (−5.336, −0.893). Next, we once again performed a moderated mediation model to test whether children's negative affect would moderate this mediation model (in the subsample of older children $N = 57$). As shown in Figure 2, the effect of maternal EA on children's externalizing problems was moderated by children's negative affect ($b = -1.51$, $p = 0.01$). There was a significant conditional indirect effect of VIPP/FC-A on externalizing problems at 6-month follow-up through maternal EA at post-intervention particularly in children with higher negative affect; $b = -1.33$, BCa CI [−4.613, −0.857]. Maternal EA is the mechanism that affects externalizing behavioral problems in adopted children with high negative affect, as higher values in mothers' EA reduced children's externalizing behavioral problems.

Last, we examined whether maternal EA at post-intervention affects children's indiscriminate friendliness at follow-up and whether children's temperament moderated this mediation model. Neither the mediation model ($b = -0.15$, BCa CI [−0.476, 0.123]) nor mediated moderation model was significant (interaction: $b = 0.22$, $p = 0.27$ and all confidence intervals contained zero).

## 4 | DISCUSSION

The present RCT study aimed to determine if, when, and how post-institutionalized children might change their socio-emotional outcomes, specifically emotional availability, externalizing behavioral problems, and indiscriminate friendliness, owing to the experience of a new adoptive family environment and of a positive-parenting intervention program increasing maternal positive parenting. What promotes or hamper the quality of the adoption adjustment is a question that research has been facing since the first seminal studies on adoption. With this study,

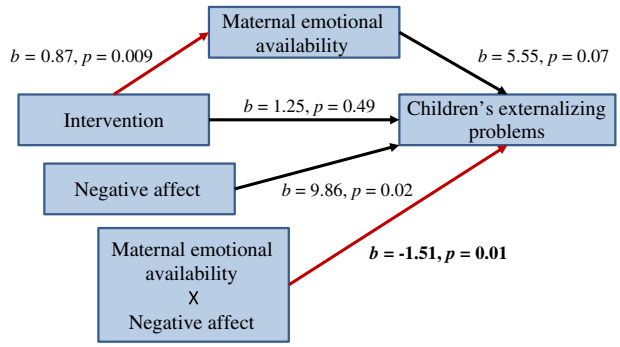


**FIGURE 2** A moderated mediation model in which children's temperament (negative affect) moderates the mediation effect of maternal emotional availability at post-intervention to predict children's externalizing problems at 6-month follow-up

by examining the quality of the adjustment longitudinally with a RCT study design including both mothers and children from the first months after the adoption placement, we have moved a step forward toward a more in-depth understanding of the socio-emotional adjustment of adoptive children and of what contributes to this process. Furthermore, following previous studies dealing with early adopted children (Juffer et al., 2005), we conducted a study with late adopted children, who have been dramatically increasing in number in the last two decades (Selman, 2012), and for whose families interventions are extremely relevant. What is new, representing one of the key strengths of this study, is the method we applied to answer our study questions. We used a version of an evidence-based intervention specifically formulated for adoptive families, the VIPP-FC/A, in order to manipulate a clearly defined environmental variable that is, maternal emotional availability and experimentally explored its role on the three children's outcomes aforementioned as intervention targets. Furthermore, distal variables, including age of the children at adoption and their gender, that were identified by previous research as being able to affect children's outcomes (e.g., Niemann & Weiss, 2012; O'Connor et al., 2000; van den Dries et al., 2009) were controlled in order to unmask possible confounding effects on outcomes. Additionally, we performed mediation and moderated mediation analyses in order to better understand the effect of maternal emotional availability on children's socio-emotional adjustment during the first year and a half after adoption, and to inquiring the moderating role of children's individual traits in this process. As last step, in the frame of the Differential Susceptibility model we explored the moderating role of negative affect in predicting children's outcomes.

The results of this randomized controlled trial support the notion that an intervention aimed at enhancing maternal sensitivity and sensitive discipline is effective in increasing children's EA and in decreasing children's externalizing problems; and this is accomplished through maternal positive parenting enhancement. In our sample, only children whose mothers attended the VIPP-FC/A intervention showed improvement from the beginning to the end of the intervention, with long-term effects lasting approximately 6 months after the intervention was completed. The increase in maternal socio-emotional equipment quality thus represents an essential factor in adopted children's socio-emotional catch-up (e.g., Barone, Lionetti, & Green, 2017; Kim, Chow, Bray & Teti, 2017). However, effects on indiscriminate friendliness failed to reach significance. This partially confutes our first hypothesis and, at the same time, is consistent with previous meta-analytic studies (Juffer & van IJzendoorn, 2005) and with more recent investigations (Tan & Marfo, 2016; van den Dries, Juffer, van IJzendoorn, Bakermans-Kranenburg, & Alink, 2012). Although the effect of indiscriminate friendliness on post-institutionalized children development is undoubtedly detrimental (Gleason et al., 2011; Oliveira et al., 2012), the lack of a change we found could likely be due to the short period of time examined. Indeed, indiscriminate behavior may persist even after adoption (Chisholm, 1998; O'Connor et al., 2003). Future studies need to address this outcome in order to better understand its longitudinal pathway after adoption. In particular, observational measures of indiscriminate friendliness may provide further information in addition to caregiver reports (Bakermans-Kranenburg et al., 2011; Zeanah & Gleason, 2015).

Going further by exploring the variables of interest we found that an increase in parental emotional availability in caregiving is among the main factor affecting children's socio-emotional enhancement after intervention attendance completion. This is a very encouraging result to be highlighted for post-institutionalized children and their families, given their only partial socio-emotional catch-up after adoption placement (Bakermans-Kranenburg et al., 2011; Humphreys et al., 2017; Sonuga-Barke et al., 2017). Moreover, child's temperamental negative affect played a role in refining the results just mentioned; children high in negative affect were those who benefitted the most from an increase in maternal emotional availability, showing a greater reduction of externalizing behavioral problems than their peers low in negative affect. The moderating role of negative affect on outcomes is in line with the theoretical assumption that specific children, due to individual temperamental features which reflect increased susceptibility to environmental influences, are more likely to benefit from the influence of their rearing environment (Belsky & Pluess, 2009; Slagt et al., 2016) and of improved environmental conditions, such as psychological and/or educational interventions (de Villiers, Lionetti, & Pluess, 2018). If maternal emotional availability is able to advance through an effective intervention (Barone et al., 2018), this could play a pivotal role especially for those children who are considered temperamentally difficult children.

In sum, based on our findings, we can state that children, regardless of gender and age at adoption, showed a longitudinal change in their being increasingly more emotional available and in their reducing behavioral problems along the period considered. To better understand this longitudinal pathway, it is worth to consider our mediation and moderated mediation models. Maternal emotional availability and children's temperamental features played a role in their differential socio-emotional catch-up; all children benefitted from an increase in maternal EA by increasing their EA and by decreasing their behavioral problems; the most difficult children, because of their high values of negative affect, were those who benefitted the most from maternal EA improvement and from behavioral problem reduction. This finding is notably important in underlining how maternal contribution could differently count for adopted children, depending on their individual features. We actually found a positive cascade of effects starting from the intervention and ending up in children's emotional availability increase and behavioral problems decrease though maternal emotional availability; and this was indeed valid for the most temperamentally difficult children (Masten, 2014). The result highlights the importance of mothers' sensitivity which seems to play a pivotal role particularly for the most temperamentally difficult children, suggesting that variability in the effects of the intervention program and individual plasticity in response to the environment are partially explained by individual features, with potential relevant implications for the suitability of tailored interventions and prevention approaches.

## 4.1 | Strengths, limitations, and future directions

The present study makes several noteworthy contributions and has important strengths. First, it is unique in the population being addressed, that is, late-adopted children followed up through three time points in the first 18 months of life in their new adoptive family. Second, the study implemented an experimental design thanks to the manipulation (through the intervention) of the main environmental variable able to influence children's socio-emotional developmental outcomes, that is, maternal emotional availability. A multimethod approach implying the use of both observational and parent-report measures further contributed to the strengths just reported. At the same time, our study contributed to a fruitful line of research on post-institutionalized children adjustment by highlighting putative mechanisms implied in their recovery after adoption placement.

Notwithstanding these strengths, limitations must be mentioned. First, although our multisite recruitment efforts and the added value of the experimental design implemented, our sample size was likely limited. Second, having mothers as unique respondents could have had biased our results, especially for parent-report measures that assessed behavioral problems (Klein Velderman et al., 2006; Najman et al., 2001; Ozturk, Barone, & Barone, 2018; Ringoot et al., 2015). Future studies should address measurement issues by implementing a multimethod approach able to overcome data reliability threats. Despite these limitations, the present study constitutes a valuable opportunity to better understand mechanisms implied in the "natural" socio-emotional change occurring after adoption placement, thus significantly contributing to the advance of knowledge in this research field.

## 4.2 | Conclusion

Our findings as a whole suggest the importance of promoting specific maternal and children's behaviors, even starting from the very early first year after adoption placement. At the same time, they attest to how fruitfully design an experimental research by manipulating variables of interest through an intervention. A key recommendation for future research regarding the enduring effects of early abuse and neglect on children's socio-emotional developmental outcomes is to provide study designs with rigorous tests of the potential variables able to affect their current conditions (Raby et al., 2018); the experimental design provided in the adoption field represents a worthy research approach. Notably, the present research highlighted that parenting interventions that have precise and short-term goals may be a good choice especially for the most difficult children, thus providing additional evidence on adopted children socio-emotional mechanisms of change after entering a new family context. Our

study also suggests that children may differ in the extent to which they are sensitive to the influence of the environment, with potential implications for individualized and ad hoc tailored interventions. Finally, given the partial socio-emotional catch-up and the at times at-risk development of these children, this contribution could foster more effective and targeted policies able to prevent later socio-emotional shortcomings (see for a recent review, Humphreys et al., 2017).

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## AUTHOR CONTRIBUTION

LB and FL developed the study design. LB wrote the paper, supervised data collection and intervention implementation, and contributed in the analysis planning. YO contributed to the method section and performed data analysis. FL read and partially contributed to the final draft.

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