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Parents With Substance Use Disorder in the Holding Tight Treatment System: Intervention Effectiveness and Moderating Effects

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ABSTRACT

Parents with substance use disorder have multiple risks affecting their parenting. Mental health problems and adverse childhood experiences (ACEs) with problems in emotion regulation and adult attachment insecurity may impair the early interaction with the infant. An intensive treatment programme, Holding Tight, has been developed in Finland since the 1990s. It integrates social work and psychological interventions with mental health prevention. The aim here was to evaluate changes in parenting and parental well-being from pretreatment to post-treatment and a 6-month follow-up. We further examined the moderating effects of parental ACEs and duration of treatment. Participants were 66 Finnish mothers and 23 fathers, 42.7% entering treatment prenatally and the rest postnatally with their infants ($M_{age} = 5.43$ months, SD = 10.02). Parents completed standardized self-report questionnaires. The results show improvements in child involvement, maternal own attachment insecurity and depressive symptoms and emotion regulation. However, the results also show that mothers with higher ACEs had more depressive symptoms and showed more decrease during and more increase after treatment. Additionally, mothers with longer treatment showed more decrease in attachment anxiety and more increase in child involvement. We discuss how these results may bear significance in the future implementation of comprehensive treatment models.

1 | Introduction

An increasing body of research suggests that children raised in families with parental substance use disorders (SUDs) face a high risk for various developmental problems (Hatzis et al. 2017; Hyysalo et al. 2021). The current study was conducted within a treatment programme, the Holding Tight, developed for parents with SUD. The programme is conducted in residential and/or outpatient treatment units, and it aims to support both abstinence and early parenting. It has been developed to reflect the current understanding of the parental target variables and to match community needs and resources. The initial results of this programme, from 2006, conducted in two Holding Tight units showed benefits for participating mothers and children in terms of parental reflective functioning (PRF) and overall well-being (Pajulo et al. 2012). However, there is a need for current programme evaluation to include more treatment units, more parenting outcome variables and possible moderators (see Meixner et al. 2016).

Generally, effective interventions for parents with SUD focus on facilitating integration of the emotional experiences of becoming a parent, instead of only offering social and medical support or teaching basic parenting skills (Suchman et al. 2010, 2011; Lowell et al. 2021; Renk et al. 2016). It has been highlighted that already starting prenatally is especially warranted (Flykt et al. 2021) as prenatal addiction poses a cumulative risk both to child development (Koponen et al. 2020) and to the development of parenting (Alhusen 2008; Flykt et al. 2021). In *anonymized for peer review*, parental SUD has been one of the major

reasons for placing children in out-of-home care (Koponen et al. 2020). Importantly, the quality of early parenting is impacted by numerous chronic problems that include medical health problems and low SES (Rönkä and Markkula 2020), early childhood adverse experiences (Rowell and Neal-Barnett 2021) and depression and other mental health problems (Pajulo et al. 2012). SUD has also been associated with problems in parental emotion regulation (ER) (Price et al. 2019) and insecure adult attachment (Thorberg and Lyvers 2010), potentially impairing the development of early caregiving (Isosävi et al. 2016) and trust towards treatment personnel (Brorson et al. 2013; Seay et al. 2017). Finally, getting fathers involved in the treatment has been insufficient (Heimdahl and Karlsson 2016).

In evaluating any treatment programme, it is important to start with the overall evaluation of treatment outcomes before starting to implement more ethically demanding randomized designs (Jeong et al. 2021). There have also been indications of differential responsiveness to treatment (Paris et al. 2015, 2023), suggesting the need to understand the possible moderating effects in more detail.

2 | Early Parenting and SUD

2.1 | Parent–Child Interaction and PRF

The emotional interaction with the child has systematically been found to be at risk among parents with SUD (Straussner and Fewell 2018). Emotional availability (EA) is a dyadic concept referring to mutual emotional connection between a parent and a child operationalized via observations and self-report (Biringen et al. 2014, 2023). Prior studies have systematically found mothers with SUD to interact in less sensitive, more intrusive and more intensely hostile ways as compared with mothers without this diagnosis (Salo et al. 2010; Flykt et al. 2012; Frigerio et al. 2019; Porreca et al. 2016). In addition, children exposed to substances in utero may be less responsive and involved on their side of the EA as compared with nonexposed children (Salo et al. 2010).

Additionally, PRF is a fundamental part of emotionally sensitive caregiving (Slade 2005). Parental reflectiveness (PRF) refers to the ability to understand the child and oneself in terms of feelings, wishes and thoughts (Slade 2005). PRF can be conceptualized as comprising dimensions of prementalizing, interest and curiosity and certainty of mental state (Luyten, Mayes, et al. 2017). Optimal reflective functioning is thought to be represented by high levels of interest and curiosity towards the child's mental states, while low levels of prementalizing, for example, only focusing on the child's behavioural cues, and mid-level or high level in being certain what the child might be experiencing internally (Luyten, Mayes, et al. 2017). Mothers with SUD are often reported to have impairments in their PRF, especially towards the prementalizing (Pajulo et al. 2006; Suchman et al. 2010), and it has been suggested that PRF should be the potential target change mechanism for them (Suchman et al. 2010; Milligan et al. 2022). Previous studies have, indeed, indicated that interventions can positively affect PRF among parents with SUD (Pajulo et al. 2006; Suchman et al. 2008, 2011).

3 | Adult Attachment, ER and Depressive Symptoms

3.1 | Adult Attachment

Among many factors affecting early parenting, mothers with SUD have been shown to have more insecure and unresolved adult attachment representations (Isosävi et al. 2016; Schindler 2019). They are strongly related to problems in early interaction (Jones et al. 2015) and in PRF skills (Røhder et al. 2020). Adult attachment can be conceptualized as comprising separate dimensions of attachment avoidance and attachment anxiety (Fraley 2019). Attachment avoidance implies the extent to which individuals shut off their needs for human connection and are uncomfortable with relying on others or having others depend on them (Fraley 2019). Attachment anxiety indicates how much the individual worries about the consistent availability and responsiveness of others and is overly dependent on them. Persons with secure attachment are low on both attachment avoidance and anxiety, whereas those with disorganized attachment may be high on both. As such, insecure adult attachment, high avoidance and anxiety, may not only be a risk for early parenting skills but also in terms of successful commitment to treatment and creating a trusting relationship with treatment personnel (Brorson et al. 2013). Previous studies have already indicated that there can be positive changes after psychotherapy (Slade and Holmes 2019), especially regarding the decrease in attachment anxiety, while results are less clear about avoidance (Taylor et al. 2015). We currently know little about how effective parental interventions are on adult attachment dimensions.

3.2 | Depressive Symptoms

SUD and mental health disorders typically co-occur (Connery et al. 2020), and this is also the case in Finland (Kuussaari and Hirschovits-Gerz 2016). Of the many comorbid mental health diagnoses, depression is among the most frequent (Hunt et al. 2020). It has been highlighted that treatment of depression might also improve recovery from SUD (Alsheikh et al. 2020). Both prenatal and postnatal depressive symptoms have been shown to negatively affect parental sensitivity (Field 2010, 2017) and being related to lower levels of PRF (Khoshroo and Seyed Mousavi 2022). A limited amount of research suggests that treatment for SUD might also be associated with improvements in mental health (Snaychuk et al. 2023), although less is known about dual-focused programmes aimed at improving both parental SUD and parenting.

3.3 | ER

A common emotional mechanism that may be impacted by both SUD and other mental health problems, and that often arises from childhood trauma, is ER. ER refers to the extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals (Thompson 1994). Individual deficits in ER have already been associated with

SUD (Stellern et al. 2023). In relation to parenting, ER is crucial for regulating parental distress and regulatory capacity for infant distress (Rutherford, Wallace, et al. 2015), as well as for PRF (Schultheis et al. 2019). It has been shown that in treatment, parents may first need support in their own ER before they can facilitate their child's developing self-regulation (Suchman et al. 2018; Neger and Prinz 2015). Even treatments that do not directly target ER may have positive effects on aspects of ER (Gratz et al. 2015), making the assessment of ER among parents with SUD important.

4 | The Moderating Role of Adverse Childhood Experiences (ACEs) and Duration of Treatment

A parent's complex, early-life history of attachment trauma, such as experiences of abuse and neglect, may biologically and behaviourally dysregulate their parenting capacity (Erickson et al. 2022; Rowell and Neal-Barnett 2021). ACEs have been shown to impair the relational parent–child interaction quality, with often hypervigilant and counterproductive interaction strategies in the emotional relationship with the child (Herbell and Bloom 2020). Furthermore, ACEs may be associated with lower PRF (Håkansson et al. 2018), although the results are inconsistent (van Rensburg et al. 2024). Finally, ACEs may impact adult attachment (Cooke et al. 2019) and ER (Rudenstine et al. 2019) and depressive symptoms (Wilson-Genderson et al. 2022).

The duration of treatment may also be a moderating factor, as previous studies have shown that longer treatment is required to recover from SUD (Beaulieu et al. 2021; Conners et al. 2006) and that extended treatment also benefits the parenting of those with SUD (Marsh and Cao 2005). Theoretically, it would be expected that during longer treatments, there is more time to create a trusting relationship with the personnel, as well as practice skills in ER, parental reflectiveness and EA with their children. However, research in this topic is limited (Neo et al. 2021), and some parenting intervention studies have shown that increasing the length did not influence the outcomes (Suchman et al. 2011).

5 | Aims of the Current Study

In the present paper, the pretreatment and post-treatment and 6-month follow-up levels and change of EA, PRF and ER, depressive symptoms and attachment among parents participating in Holding Tight treatment are examined as an indicator of naturalistic treatment outcomes. As possible moderators, we examined the role of the ACEs and the treatment duration. Based on previous findings among parents with SUD (Pajulo et al. 2012; Suchman et al. 2010), we expected positive changes in parental EA and PRF from pretreatment to post-treatment and follow-up treatment. We also expected to see a positive change in the parental ER (Milligan et al. 2022; Renk et al. 2016), adult attachment dimensions (Slade and Holmes 2019) and depressive symptoms (Snaychuk et al. 2023). Finally, we expected to see the moderating effect of ACEs and treatment duration so that more ACEs would decrease the positive outcome (Paris et al. 2015), and longer treatment duration would improve the outcome in study variables (Marsh and Cao 2005).

6 | Method

6.1 | Participants

The current study included 66 mothers and 23 fathers (21 couples, 45 mothers and 2 fathers participating alone), in the Holding Tight treatment system with their 93 children (45 girls and 48 boys; four families had two children). The treatment was offered either in residential settings (6 units) and/or in outpatient units (7 units) situated throughout Finland. Study recruitment took place between January 2020 and January 2022 during the COVID pandemic. As shown in Table 1, Thirty-seven parents (45.9%) entered prenatally during the last trimester, gestational week ($M = 32.35$, SD = 6.27) and the rest with their babies between the ages of 1 and 24 months ($M = 5.43$, SD = 10.02). Most parents (> 80%) started the treatment at the residential treatment unit, and 20% continued their treatment in the outpatient unit. The duration of treatment varied from 1 to 24 months ($M = 8.60$, SD = 5.33). Nine parents (11.3%) prematurely interrupted the treatment but were retained in the study.

TABLE 1 | Parents' sociodemographic characteristics and well-being.

	Mothers $n = 66$		Fathers $n = 23$	
	M	SD	*M*	SD
Age	28	5.63	34.08	5.59
	n	%	*n*	%
Entering treatment prenatally	29	46.03	9	47.62
Entering treatment postnatally	34	53.9	12	57.14
Residential setting	46	80.3	17	89.5
Outpatient clinic	12	19.7	2	10.5
Gestational weeks at baseline	32.35	6.27		
Child's age at baseline (months)	5.43	10.02	5.43	10.02
	n	%	*n*	%
Level of education				
Less than primary school	2	3.1	1	4.3
Primary school	57	87.7	17	73.9
Vocational second or third degree	6	9.2	5	21.7
Relationship status				
In a relationship	42	68.9	19	100
Single	18	29.5		
Parity				

(Continues)

TABLE 1 | (Continued)

	Mothers $n=66$		Fathers $n=23$	
Primiparous	34	55.7	7	36.8
Multiparous	25	41	7	36.8
Referral to treatment				
Social services (child protection or adult services)	41	68.3	17	89.4
Well-baby clinic	1	1.7	0	0
Substance-maintenance clinic or other addiction treatment unit	8	13.1	1	5.3
Prison	1	1.7		
Diagnosed psychiatric disorder	42	63.6	8	34.8
Major depression	25	37.9	4	17.4
Anxiety	25	37.9	4	17.4
Bipolar	2	3.0	2	8.7
Personality disorder	13	19.7	1	4.3
Eating disorder	4	6.1	0	0
Neuropsychiatric disorders	8	12.1	2	8.7
Ongoing replacement therapy	12	18.2	3	13
Main substance abused				
Only alcohol	9	13.6	4	17.4
Only drugs	12	18.1	2	8.7
Mixed (both alcohol and drugs)	38	57.6	13	56.5
Drugs used				
Cannabis	30	45.5	9	39.1
Opioids	20	30.3	10	43.5
Buprenorphine (illegal use)	34	51.5	15	65.2
Amphetamine	15	22.7	12	52.1
Medicine (relaxants and stimulants)	3	7.6	5	21.7

Note: N varies between 75 and 89 due to missing data.

Of the participants, 40 (44.9%) were single or separated, while 33 (37.1%) were cohabiting and 16 (18%) were married. More than half of the parents had had their first child (57.5%). Most had a relatively low education level, 77 (87.5%) had basic education or less (9 years at the maximum). Only one parent reported a higher university education level, with a PhD degree. Social services were the main referring agent to treatment. Most parents had misused both alcohol and drugs, with cannabis, buprenorphine and other opioids, and amphetamine being the most used. Less than 20% had ongoing substance replacement therapy when entering the treatment. Fifty-six (62.9%) of the parents had a mental health diagnosis when entering the treatment, most commonly depression, anxiety, personality disorders and neuropsychiatric disorders. Fifty-five parents (68.8%) experienced no substance relapses during treatment according to record data. Table 2 shows that of the children entering treatment (born before the treatment began) at baseline ($n=33$), the majority were born full term (90.9%) and 30.3% received treatment for neonatal opiate withdrawal symptoms after birth. All children were reported to have been exposed to at least some substances prenatally.

TABLE 2 | Children's well-being and development at the baseline.

	$n=34$	
	M	SD
Apgar at birth	8.86	0.56
Birth weight	3323.67	426.28
Birth height	49.42	1.97
	n	%
Full term (over 37 weeks)	30	90.9%
Prenatal SU exposure	33	100
Treatment for withdrawal symptoms after birth	10	30.3

6.2 | Procedure

6.2.1 | The Holding Tight Programme

Holding Tight treatment units are part of an organization called the Federation of Mother and Child Homes and Shelter, and they operate in collaboration with the communal child protection system in the social services sector. Referrals to these units are made by a well-baby clinic, social-welfare agency or hospital-based outpatient addiction clinic where the mother's problem with alcohol and/or other drugs has been identified as part of cost-free communal child protective services. Parents are expected to stay substance-free during the treatment and are regularly screened. The length of the treatment varies between a few months and the first years of life.

Personnel in the Holding Tight treatment units are qualified in social or mental health work. They are trained into following Holding Tight programmes core treatment components in a 2-year training programme, comprising workshops on trauma, SUD, mental health, attachment and reflective parenting and getting trained for more specific mentalizing-based attachment interventions such as Nurture and Play (NaP; Salo et al. 2019) or Theraplay (Booth and Jernberg 2009) implemented within the Holding Tight programme.

The Holding Tight treatment programme is a holistic model, including several elements of change. Firstly, residential facilities, where six to seven families live together, provide a substance-free environment and a model of healthy living for the mothers.

Residential settings operate as therapeutic communities (TC) and the principles of community therapy are applied in them, for example, parents participating in planning and preparing healthy meals, learning about personal self-care, organizing their daily lives and planning enjoyable leisure activities (De Leon 2000). An equally important function of the residential unit is to assist parents in planning outpatient treatment and follow-up plans once their residential stay has ended. Personnel participate actively in all these daily functions. The main interventive principles of the programme, to increase reflective parenting skills, are thus practiced in all daily encounters with the parents, be it planning to prepare a meal or watching TV in the common living room, where positive support, intervening if necessary and guiding are offered. Secondly, the weekly programme in residential settings also includes separate individual therapeutic meetings with the parents (e.g., using reflective video feedback on parent–child interaction and couple counselling sessions), group therapy meetings (e.g., work on SUD or trauma) and attachment-based interventions (e.g., NaP sessions).

Parents can also continue to the outpatient unit after the residential phase. Sometimes parents start directly in the outpatient unit. This happens usually when their life situation is considered stable enough for them to benefit from less intense treatment. The outpatient unit programme is run on the same principles as residential treatment but with less intensity, offering two to three weekly meetings, lasting for several hours instead of living 24 h a day with the caretakers. The outpatient programme also comprises elements of TC, for example, all the families having meals together. Also, in the weekly programme, there are meetings with individual families, group therapy meetings and separate attachment-based intervention sessions.

6.2.2 | Enrolment

Parents were invited to the study by the personnel in their treatment units. The personnel were trained to give information about the study. Within the first months (4–6 weeks) of starting the treatment, the parents were shown a video made by the research team introducing the study goals, and they were given the self-report measures to be filled in. Treatment personnel also filled out a questionnaire on various sociodemographic background details together with the parents. All parents entering the units were offered participation during the baseline collection phase (108 mothers and 49 fathers).

Of all clients, 56.7% accepted participation and enrolled in the study ($N = 89$). According to information derived from the personnel collecting the data, there were various reasons for not taking part. The most common reason was related to the fact that, as the data collection coincided with the COVID pandemic, there was a more than usual degree of uncertainty about getting parents committed to staying in the treatment. Other reasons were related to acute problems in parental or child well-being and/or lack of motivation. Written informed consent was obtained from each parent, and the study was conducted applying the code of ethics of the World Medical Association (Declaration of Helsinki) for experiments involving human subjects. The research plan was approved by the ethical committee of Helsinki University.

6.3 | Measures

Sociodemographic and treatment-related background variables used in this study included parity (1 = primiparous, 2 = multiparous), child gender (1 = girl, 2 = boy), child age or gestational week at the start of treatment, relationship status (classified into 1 = single or divorced and 2 = married or cohabiting), education level (classified into 1 = low, primary education or less and 2 = mid-level/high, secondary education or higher), substances used, replacement therapy, mental health diagnoses and whether the child entering treatment had had withdrawal symptoms at birth. Treatment-related variables included whether the treatment started during pregnancy or postpartum and the duration of treatment.

Edinburgh Postnatal Depression Scale (EPDS) was used to assess depressive symptoms. The EPDS is a widely used and reliable 10-item self-report for the assessment of symptoms of depression (Murray and Cox 1990). It asks about feelings of happiness and sadness, fears, self-blame, sleeping problems and thoughts about harming oneself during the previous week on a 4-point scale (0–3). It is commonly used both prepartum and postpartum to screen for depression (Venkatesh et al. 2016). The cut-off for the presence of depressive symptoms over 11 points has been recently considered to be indicative of more severe depressive problems (Levis et al. 2020). Cronbach's alphas in the present sample were 0.88 for mothers and 0.84 for fathers at T1, 0.75 for mothers and 0.95 for fathers at T2 and 0.75 for mothers and 0.81 for fathers at T3.

ACEs. A modified version of ACE (Finkelhorn et al. 2013) was used. The expanded ACEs consisted of 16 items tapping emotional, physical and sexual abuse; emotional and physical neglect; household substance abuse and mental illness and incarceration; parental separation; physical and emotional violence between parents; bullying, rejection, poverty and community violence exposure; and other adverse events. Participants responded either 'yes' or 'no' to each question; 'yes' responses were summed to yield an ACEs score that could range from 0 to 14. Cronbach's alpha in the present sample was 0.88 for mothers and 0.82 for fathers.

Difficulties in Emotion Regulation Scale—Short Form (DERS-SF; Kaufman et al. 2016) is an 18-item self-report measure of six facets of ER. This abridged version of DERS consists of six subscales, each with three items, for a total of 18 items taken from the original DERS (Gratz and Roemer 2004). The scale has high internal consistency across two samples of adolescents and college students (Cronbach's $\alpha = 0.89–0.91$), and it has comparable concurrent validity to the original DERS (Kaufman et al. 2016). Items are rated on a scale of 1 (*almost never [0%–10%]*) to 5 (*almost always [91%–100%]*). Higher scores indicate more difficulty in ER. The subscales can be added to form a summary scale representing the total ER problems that will be used in this study. Cronbach's alphas for the total ER problems were 0.86 for mothers and 0.84 for fathers at T1, 0.89 for both at T2 and 0.90 for both at T3.

The Experiences in Close Relationships—Short Form (ECR-SF; Wei et al. 2007) questionnaire is a revised version of Brennan et al.'s (1998) Experiences in Close Relationships (ECR) questionnaire. It is a 12-item, self-report questionnaire for the classification of romantic attachment style, comprising two scales that assess attachment anxiety and avoidance (six items for each scale) rated on a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate higher endorsement of the construct. An example of an item representing anxiety is 'I often worry that my romantic partner doesn't really love me'; an example of an item representing avoidance is 'I prefer not to show a partner how I feel deep down'. Cronbach's alphas were at T1 0.83 for maternal and 0.87 for paternal anxiety and 0.69 for maternal and 0.80 for paternal avoidance, at T2 0.90 for maternal and 0.92 for paternal anxiety and 0.83 for maternal and 0.76 for paternal avoidance and at T3 0.89 for maternal and 0.99 for paternal anxiety and 0.78 for maternal and 0.60 for paternal avoidance.

The Parental Reflective Functioning Questionnaire (PRFQ) (Luyten, Mayes, et al. 2017) consists of 18 statements that participants are asked to rate about their child that are relevant to the three PRFQ dimensions: (1) interest and curiosity surrounding mental states (e.g., 'I like to think about the reasons behind the way my child behaves and feels'), (2) prementalizing or difficulties in the acknowledgement of mental states and their influence on behaviour—including malevolent attributions towards the infant's expressed behaviour (e.g., 'My child sometimes gets sick to keep me from doing what I want to do') and (3) certainty of mental states (e.g., 'I always know why my child acts the way he or she does'). Each statement is rated using a 7-point Likert-type scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Optimal reflective functioning is indicated by higher scores on the interest and curiosity and lower scores on the prementalizing subscale. The ideal score for certainty of mental states is a 4 or mid-range. Cronbach's alphas in the present sample were so low at all time points for both mothers and fathers (ranging from 0.30–0.51) that we decided not to use them.

The Emotional Availability—Self-Report (EA-SR; Vliegen et al. 2009) assesses the EA of the parent, the child and aspects of dyadic interaction. The EA-SR consists of 36 items pertaining to two parental subscales, namely, (a) intrusiveness (six items; e.g., 'I find it hard to see my child playing on his own, I prefer to do things together when we're at home') and (b) hostility (comprising two items; e.g., 'It happens that I shout at my child to make something clear'); one child subscale, involvement (comprising nine items; e.g., 'My child is able to get my attention for his/her play'); and two dyadic subscales, namely, (a) mutual attunement (10 items; e.g., 'I succeed in adjusting to my child's behaviors and actions when necessary') and (b) affect quality (five items; e.g., 'My child clearly enjoys being with me'). Each scale is rated on a 5-point Likert-type scale from 0 (*disagree completely*) to 4 (*agree completely*). In this study, we used the single subscales and also calculated a parental EA scale (by reverse coding the intrusiveness and hostility subscales, such that higher scores reflected higher parental EA, and then averaging both scores), a child EA scale (consisting of the involvement subscale) and a dyadic EA scale (by averaging the scores on the mutual attunement and affect quality subscales). EA-SR has not been validated among fathers, and the scale reliabilities were so low for fathers that we chose to use only maternal scales in the analyses. Cronbach's alphas for mothers were T1 adult EA 0.60, child EA 0.75 and dyadic EA 0.66; T2 adult EA 0.61, child EA 0.81 and dyadic EA 0.57; and T3 adult EA 0.70, child EA 0.75 and dyadic EA 0.65.

6.4 | Statistical Analyses

Analyses were performed using SPSS and RStudio. Drop-out analyses were conducted with chi-square tests for categorical background variables and *t* tests for continuous variables. Other descriptive analyses were conducted with *t* tests for categorical background variables. For child variables, only data from the younger sibling in the family were used. We did not include PRFQ in the analysis due to the low reliability of the scales. To maintain an adequate sample size, we combined the prenatally and postnatally starting groups for EA. Thus, the mothers who started their treatment prenatally ($n = 29$) filled this questionnaire when their baby was 8 weeks old, approximately 12 weeks after their treatment began, in contrast to postnatally started mothers ($n = 34$), who filled the questionnaire approximately 4–6 weeks from the beginning. However, as there were group differences in child involvement at T1 between prenatally and postnatally starting mothers (child involvement: $t(79) = -2.20$, $p = 0.031$, dyadic: $t(79) = -0.29$, $p = 0.77$; adult: $t(79) = -0.14$, $p = 0.89$), we included starting time (prenatal vs. postnatal) as a covariate in the analyses regarding EA.

Change over time in attachment anxiety and avoidance, depressive symptoms, ER problems and EA (RQ 1) were tested using generalized linear mixed models (GLMMs) with a gamma link function, as the requirements for normal distribution were not fulfilled. We chose GLMM as it can account for small samples and high levels of missing data. Maximum likelihood was used as an estimation method. Post hoc contrasts comparing the change at different time points were performed with Tukey. Background variables significantly associated with the main variables were used as covariates in each model. For mothers, attachment anxiety and avoidance were covaried with marital status and education levels. For depression, child gender was used as a covariate. ER problems were covaried with education level. For EA variables, covariates included marital status, parity and starting time (prenatal or postnatal). For fathers, we examined only changes in attachment anxiety, avoidance, depression and ER due to inadequate reliabilities of EA and PRF. None of the background variables were significantly associated with the main variables in fathers, so we only covaried the treatment duration. To test for the moderating effects of ACEs and treatment duration (RQ 2), the main effect of ACEs and their interaction with time were added to the generalized linear models. The moderating effects of ACEs and treatment duration were examined only for mothers due to the small sample size for fathers.

7 | Results

7.1 | Descriptive Statistics

Figure 1 presents the participation flow chart of the sample. The attrition was high at both phases for fathers and at T3 for mothers. T2 attrition was associated with the child being a boy,

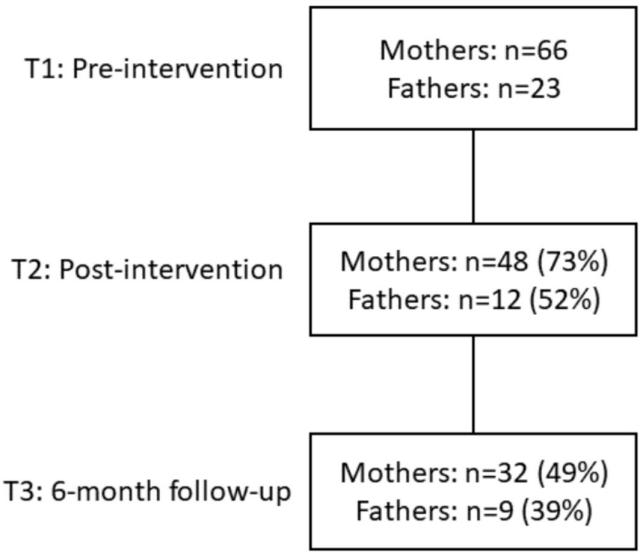

FIGURE 1 | Participation flow chart of the sample.

$\chi^2(1) = 8.33$, $p = 0.004$; premature interruption of treatment, $\chi^2(1) = 8.54$, $p = 0.003$; and younger child age, $t(42) = -2.31$, $p = 0.026$. T3 attrition was only associated with starting treatment prenatally, $\chi^2(1) = 8.96$, $p = 0.003$ and younger child age $t(39) = -2.81$, $p = 0.008$. Attrition was not associated with marital status, parity, education level, having a mental health diagnosis, substance relapses, use of replacement medication, duration of treatment or child health factors.

Table 3 shows the means, standard deviations and ranges of the study variables. Regarding the background variables, child gender was associated with maternal depressive symptoms at T2, $t(46) = 2.16$, $p = 0.036$, mothers of girls showing higher depression than mothers of boys. Education level was associated with the mother's ER problems at T1, $t(63) = -2.37$, $p = 0.021$, and at T2, $t(44) = -2.36$, $p = 0.023$, those with a higher education level reporting more problems. It was also associated with the mothers' attachment anxiety at T2, $t(29) = -2.50$, $p = 0.018$, those with higher education showing higher anxiety. The mother's marital status was associated with her T1 negative adult EA, $t(58) = 2.09$, $p = 0.041$, with single/divorced mothers showing more negative adult EA. It was also associated with attachment avoidance, $t(29) = 2.31$, $p = 0.028$, single/divorced mothers showing higher attachment avoidance. Parity was associated with T2 adult negative EA, $t(35) = 2.16$, $p = 0.038$, and T1 dyadic EA, $t(57) = -2.70$, $p = 0.009$, multiparous parents showing lower adult negative EA and higher dyadic EA.

7.2 | Changes in Maternal and Paternal Outcomes During the Intervention

Table 4 displays the T1 to T2 and T3 changes in outcome variables. Regarding the mother's attachment anxiety, anxiety was lower at T2 (postintervention, $n = 48$) and T3 (6-month follow-up, $n = 32$) than in T1 (baseline, $n = 66$). There was no difference between T2 and T3, suggesting the levels remained the same in the follow-up. Education level was significant as a covariate, higher education level associating with higher attachment anxiety ($B = 0.38$, SE = 0.18, $p = 0.036$). Regarding

TABLE 3 | Means, standard deviations and ranges of the study variables.

	Mothers								Fathers							
	T1 ($n = 66$)			T2 ($n = 48$)			T3 ($n = 32$)		T1 ($n = 23$)			T2 ($n = 12$)			T3 ($n = 9$)	
	M	SD	Range	*M*	SD	Range	*M*	SD	Range	*M*	SD	Range	*M*	SD	Range	*M*	SD	Range
ACEs	7.85	3.47	1–14							6.70	4.44	0–13						
Attachment anxiety	2.85	1.28	1–6	2.17	1.22	1–7	2.00	1.30	1.00–6.5	2.18	1.08	1–4.67	2.12	1.09	1–4.67	2.32	1.91	1–6.50
Attachment avoidance	2.44	1.02	1.17–4.60	2.55	1.18	1.00–4.83	1.93	0.87	1.00–4.83	2.11	1.01	1–4.33	2.68	1.10	1–4.33	2.72	1.27	1.40–4.83
Depression	7.94	5.46	0–22	5.53	3.79	0–16	10.10	4.25	4–21	7.22	4.73	0–16	7.00	7.24	0–22	9.25	5.01	3–18
ER problems	39.69	10.16	22–67	34.41	9.22	19–58	37.22	12.10	18–71	35.41	8.59	26–60	32.50	7.85	19.44	35.00	11.02	25–54
EA—Child	4.36	0.55	2.50–5	4.65	0.47	3–5	4.83	0.26	3.78–5									
EA—Adult	2.53	0.33	1.67–3.58	2.54	0.41	2–4.17	2.92	0.56	1.83–3.92									
EA—Dyadic	4.22	0.32	2.45–4.80	4.31	0.26	3.60–4.85	4.19	0.37	3–4.80									

Abbreviations: ACEs = adverse childhood experiences, EA = emotional availability, ER = emotion regulation, T1 = preintervention, T2 = postintervention, T3 = 6-month follow-up.

TABLE 4 | Change in maternal and paternal outcome variables.

	Mothers ($n=66$)			Fathers ($n=23$)		
	B	**SE**	***p***	***B***	**SE**	***p***
Attachment anxiety						
T2	−0.30	0.09	<0.001	−0.02	0.10	0.84
T3	−0.37	0.11	0.001	0.17	0.12	0.15
Attachment avoidance						
T2	−0.05	0.06	0.40	0.18	0.13	0.18
T3	−0.24	0.08	0.002	0.50	0.15	<0.001
Depressive symptoms						
T2	−0.13	0.03	<0.001	−0.03	0.05	0.52
T3	0.23	0.04	<0.001	0.17	0.05	0.001
Emotion regulation problems						
T2	−0.13	0.04	<0.001	−0.06	0.06	0.33
T3	−0.02	0.04	0.59	−0.01	0.07	0.85
EA: Child involvement						
T2	0.11	0.04	0.003			
T3	0.11	0.04	0.002			
EA: Adult (negative)						
T2	0.03	0.05	0.62			
T3	0.21	0.06	<0.001			
EA: Dyadic						
T2	0.05	0.03	0.057			
T3	0.03	0.03	0.17			

Note: T1 is the reference group. Mothers in T2: 48, fathers: 12. Mothers in T3: 32, fathers: 9.
Abbreviations: T1 = preintervention, T2 = postintervention, T3 = 6-month follow-up.

the mother's attachment avoidance, avoidance was lower from T1 to T3 and from T2 to T3, but not yet between T1 and T2. For fathers, attachment avoidance was higher from T1 ($n=23$) to T3 ($n=9$). There was no change in attachment anxiety for fathers.

For depressive symptoms, there was a significant decrease in the mothers' symptoms from T1 ($n=66$) to T2 ($n=48$), but at T3 ($n=32$), the symptoms again increased above the T1 level. For fathers, there were no changes from T1 ($n=23$) to T2 ($n=12$), but the symptoms at T3 ($n=9$) increased above the T1 level too. The results thus indicate that depressive symptoms increased for both parents from post-treatment to follow-up. For maternal ER problems, they decreased from T1 to T2. However, there was no significant change from T1 to T3, suggesting that the changes were not maintained long term. No changes were found for the fathers' ER.

Regarding EA reported by the mothers, child involvement was higher at T2 ($n=48$) and T3 ($n=32$) than T1 ($n=66$), but it did not change between T2 and T3. There was also a significant change from T1 to T3 in the mother's adult negative EA, showing an increase in adult negative EA. The difference between T2 and T3, but not between T1 and T2, was also significant. The changes in dyadic EA were not significant.

7.3 | Moderating Effects of ACEs on Intervention Changes in Mothers

Figures 2 and 3 show the moderating effects of ACEs for mothers. There were moderating effects of ACEs on T1–T2 change ($B=-0.08$, SE = 0.02, $p<0.001$) and T1–T3 change ($B=-0.05$, SE = 0.03, $p=0.05$) in depressive symptoms. Overall, mothers with higher ACEs had more depressive symptoms and showed a greater decrease during treatment and a greater increase after the treatment.

The results indicated a moderating effect of ACEs on a change in dyadic EA from T1 to T3 ($B=-0.03$, SE = 0.01, $p=0.05$), showing that the dyadic EA decreased more by the follow-up for those who had higher ACEs. When ACEs were added to the model, the main effect of time from T1 to T2 in dyadic EA also became significant, showing a more positive change in dyadic EA, $B=0.03$, SE = 0.01, $p=0.04$.

7.4 | Moderating Effects of Treatment Duration on Intervention Changes in Mothers

Figures 4 and 5 show the moderating effects of treatment duration for mothers. The results indicated a moderating effect of treatment duration on change in the mothers' attachment anxiety from T1 to T3 ($B=-0.05$, SE = 0.02, $p=0.02$), showing that attachment anxiety decreased more in the follow-up for those who had longer treatment duration.

In addition, there were moderating effects of treatment duration on T1–T2 change of mother-reported child involvement (child EA; $B=0.03$, SE = 0.01, $p=0.007$). Mothers with longer treatment showed more increase in child involvement EA during treatment.

8 | Discussion

Using a naturalistic follow-up design, we evaluated treatment outcomes from a model developed for parents with SUD and their young children. Main results show that there were decreases in adult attachment anxiety and avoidance, ER problems and depressive symptoms. Also, there were increases regarding child involvement. However, most of the results were seen among mothers, and not all these results were retained in the longer follow-up (6 months after the treatment). Furthermore, clinically meaningful moderator effects of ACEs and treatment duration were found in relation to depressive symptoms, attachment anxiety and the child's involvement.

In line with our hypothesis, maternal perceptions of the child's involvement increased between the beginning and follow-up treatment phases. As there were no changes between post-treatment and 6-month follow-up, this tentatively suggests that

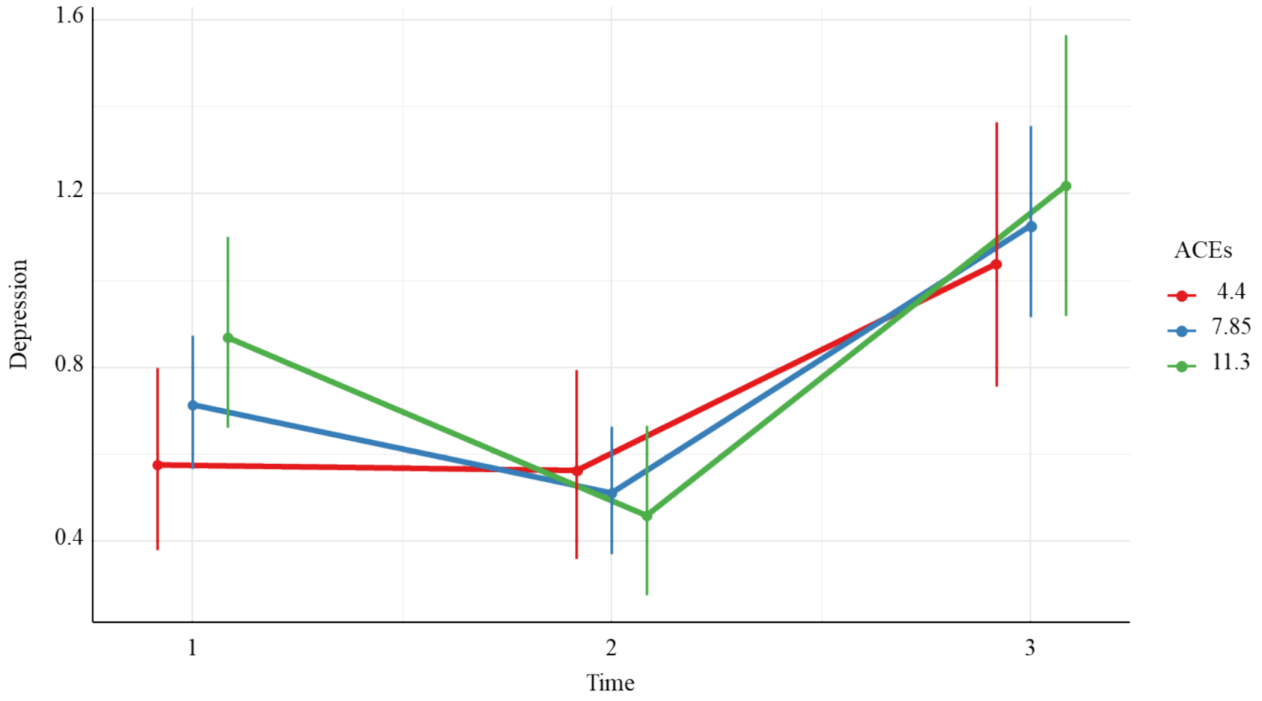

FIGURE 2 | Interaction of time and ACEs for maternal depression.

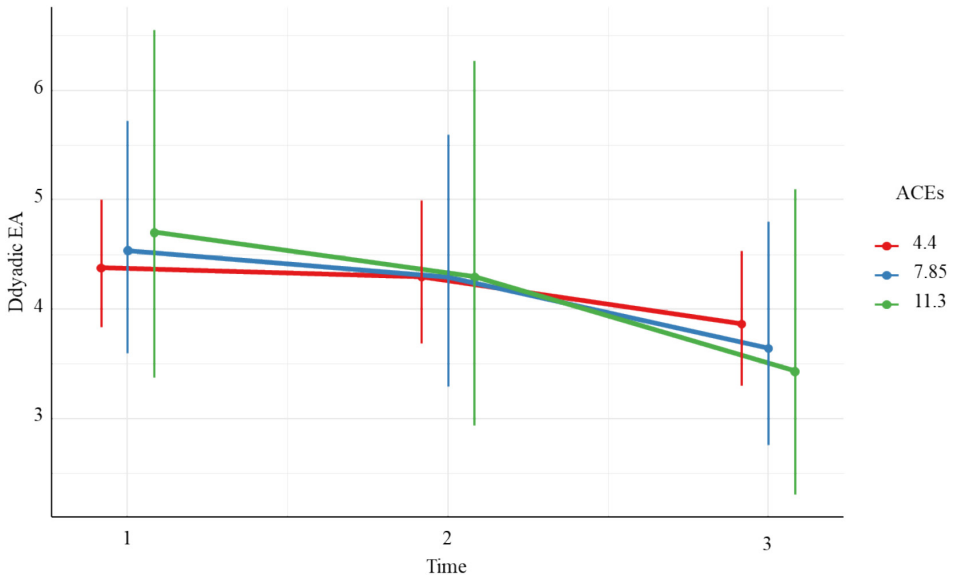

FIGURE 3 | Interaction of time and ACEs for maternal dyadic EA.

the increase in the child's EA during the intervention could have been retained to the follow-up. Previous studies have found mothers with SUD to have systematically lower EA (Flykt et al. 2021; Porreca et al. 2016), and the children themselves were found to be less emotionally available (Salo et al. 2010). All children in the present sample were exposed to substances in utero, which increases their likelihood to behave irritably (Conradt et al. 2018), making early emotional interaction even more difficult for the already vulnerable mother. Seeing your child through more positive lenses may, therefore, be significant in terms of helping the mothers to cope with everyday problems to maintain a more optimal emotional presence with their children.

However, the findings also showed that there was a significant increase in adult side negative EA, which occurred only after the intervention had ended. Negative adult EA indicates that mothers reported more negative feelings or behaviours towards their toddler, such as shouting at the child. This finding may be understood to reflect part of the developmental changes that occur when children move beyond infancy towards toddlerhood. Toddlerhood requires more active limit

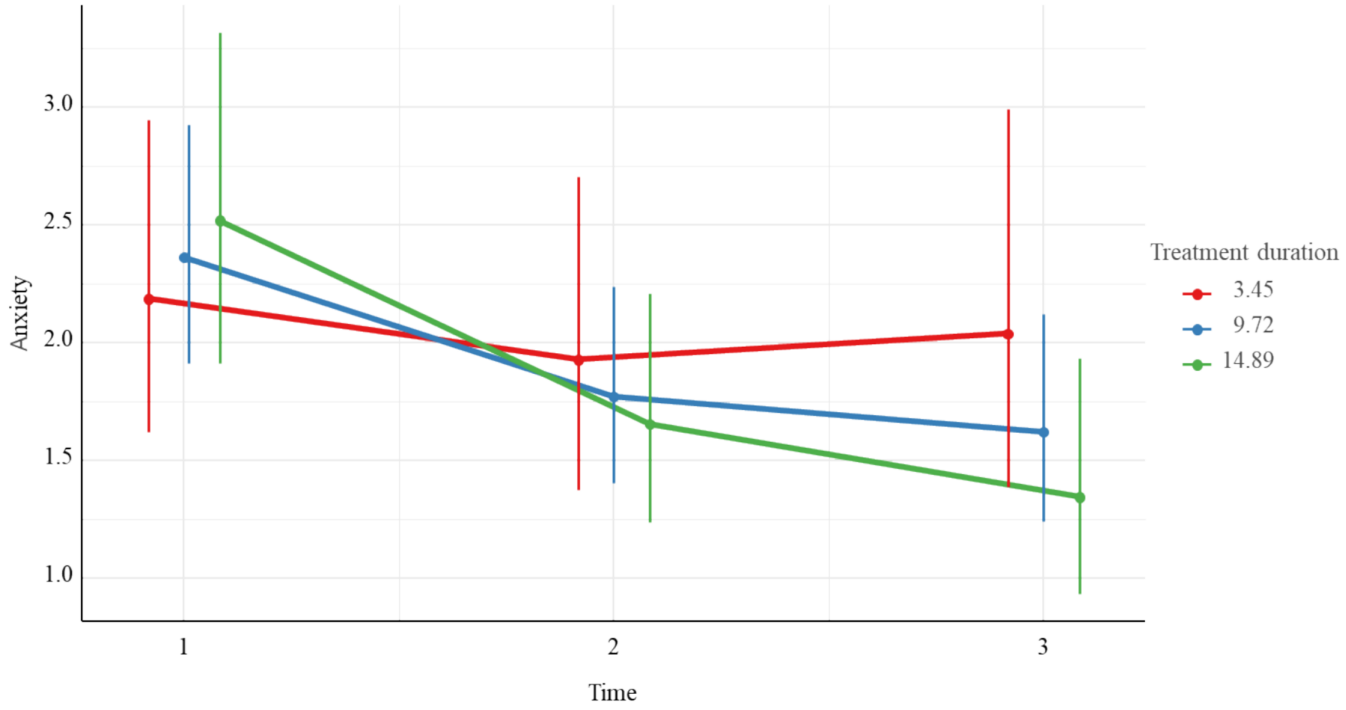

FIGURE 4 | Interaction of time and treatment duration for maternal attachment anxiety.

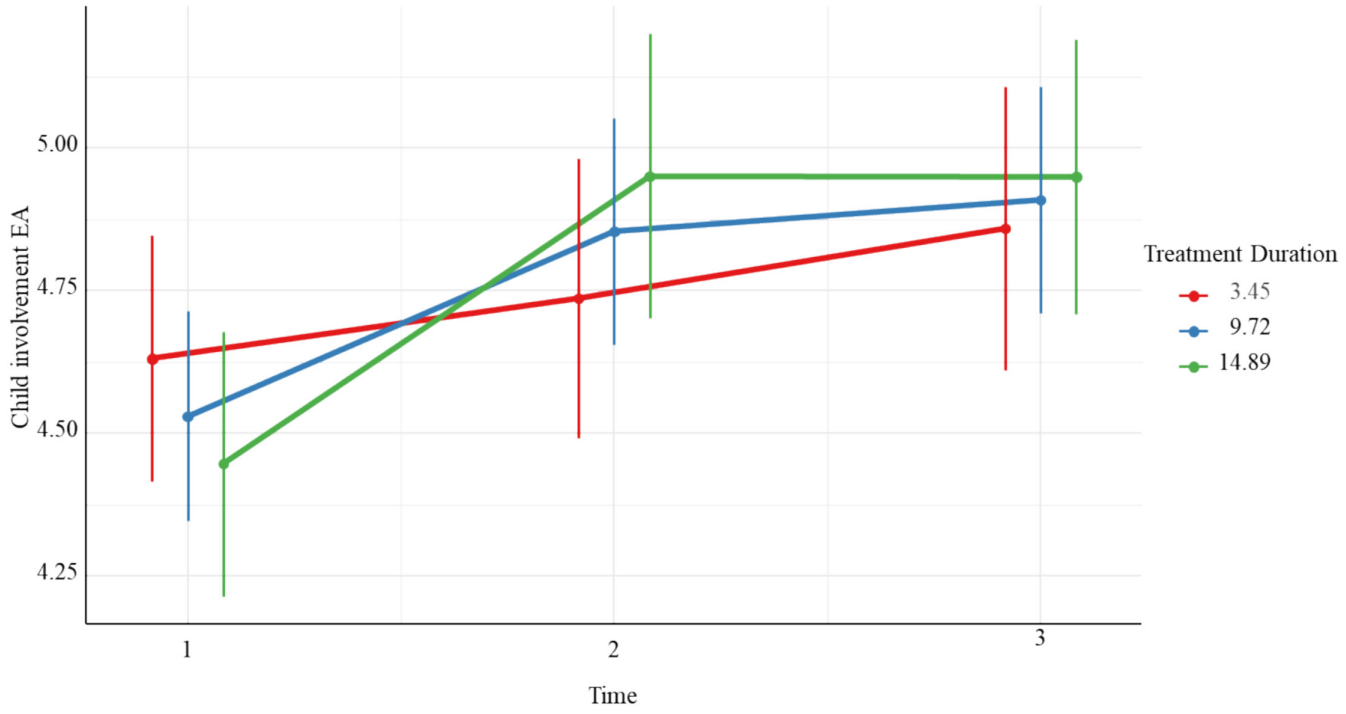

FIGURE 5 | Interaction of time and treatment duration for mother-reported child involvement EA.

setting and guidance, and it is generally a period in which more tension occurs in the parent–child relationship (Kwon et al. 2013). However, from an intervention perspective, it may also be that after the buffering effect of taking part in the intensive intervention, mothers' self-reflections start to become more negative. It is of significance that while they continue to see their child's EA more positively (see above), they assess their own relational behaviours more negatively after the intervention ends. Self-criticism and low self-esteem are very common among parents with SUD, and that may negatively affect recovery (see Raynor 2013). Thus, it may be of relevance to pay particular attention to the different sides of EA-SR when continuing to support mothers as they end an intervention programme.

Regarding PRF, we were unable to assess the change due to the very low reliability of the scales. We used the PRFQ (Luyten, Mayes, et al. 2017; Luyten, Nijssens, et al. 2017), which has generally been shown to exhibit good construct validity, internal consistency and reliability (Anis et al. 2020; Rutherford, Booth, et al. 2015; Luyten, Mayes, et al. 2017) and has previously been used among parents with SUD (Paris et al. 2015). However, our findings suggest that at least some of the questions may be difficult to understand. Alternatively, it may be that among parents with SUD there is a social desirability response bias (Johnson and Fendrich 2005), meaning that parents may try to fake 'good' answers to make them look better parents in a child protection context. As mothers with SUD very often experience guilt and shame (Barnett et al. 2021), it may be very understandable to try to answer sensitive questions in socially desirable ways.

For parental well-being regarding mothers' attachment anxiety, the results showed a decrease that was also maintained in the follow-up. For attachment avoidance, a significant decrease only occurred after the treatment had ended. This result is in line with previous findings that there can be positive changes after psychotherapy (Slade and Holmes 2019), especially regarding a decrease in attachment anxiety (Taylor et al. 2015). However, for fathers, their attachment avoidance increased in the follow-up. This unexpected finding may be related to emotional defensive processes triggered in the treatment, which focuses on attachment with the infant, or, on the other hand, the further need to consider whether there might be some misalignment with the father's needs or perspective in the programme (Sicouri et al. 2018). The role of involving fathers in early parenting interventions is considered highly important (Gonzalez et al. 2023), and further evaluation of our findings is needed.

During the treatment, maternal ER problems decreased but then increased again in the 6-month follow-up. In a similar vein, mothers' depressive symptoms decreased during treatment but increased again in the follow-up at 6 months. For fathers, a similar increase was found. These results support the notions that treatments may have positive effects on aspects of ER (Gratz et al. 2015) and that treatment of depression might also improve recovery from SUD (Alsheikh et al. 2020). What our results suggest is that a parenting-focused early intervention could also have positive associations with parental well-being. As it has generally been suggested that improvement in parental mental well-being and ER may precede the capabilities of functioning as a parent among parents with SUD (e.g., Suchman et al. 2018), the results of the present study can be seen as promising. However, the fact that many of the positive associations were not retained in the longer follow-up is also important. It may reflect the everyday challenges and potential social stigma many parents with SUD still face after intensive treatment (Wilkens and Foote 2019). It may also suggest the need to organize and facilitate mental health services for parents leaving the intense treatment programme.

We also found significant moderator effects for both ACEs and the duration of the treatment. Overall, mothers with higher ACEs had more depressive symptoms and showed a greater decrease during treatment and a greater increase after treatment. It has also previously been found that there is typically more reduction in depressive symptoms for those who have the highest levels in the baseline, potentially suggesting that there is more room to change (e.g., Kounali et al. 2022; Suchman et al. 2017). The significance of considering the role of ACEs in treatments for adult mental health has been repeatedly emphasized (Nurius et al. 2012; Madigan et al. 2023). Both mothers and fathers in the present sample showed a high level of ACEs as compared with adults without SUD (Madigan et al. 2023). While it is positive that during treatment, the mothers with the highest ACEs may have been able to benefit from the intense treatment, it may also be that they need the most support after treatment. Also, it has been suggested that depression might not be a problem only early on—some studies have shown that a subset of mothers only developed symptoms later (Kothari et al. 2016). Therefore, screening for parental depression also later appears justified.

The results regarding the potential moderating effect of treatment duration further support these notions. The results suggest a moderating effect of treatment duration on changes in mothers' attachment anxiety, showing that anxiety decreased more in the follow-up for those who had treatment for a longer time. In addition, mothers with longer treatment showed a greater increase in their perceptions of the child's involvement. Adult attachment anxiety refers to a level of mistrust about getting support in close relationships while strongly needing it (Fraley 2019). A change from insecure to secure attachment style can be an important goal for SUD treatment, as it may prevent the patient from using defensive strategies involving substance use to regulate emotions and interpersonal relationships (Gidhagen et al. 2018). A change in adult attachment style may thus also aid in reducing relapses into substance use. Further, the longer the treatment, the more positive a view of the child emerged.

The limitations of the present study include, first, the small sample size and high level of attrition in the follow-ups. However, our sample consisted of parents with not only SUD but also a high number of other psychiatric diagnoses (over 50% of the sample), a very low level of education (almost 90% had completed only the primary school of 9 years) and a high number of ACEs. Most of them were referred to the Holding Tight programme through social services, which means that it was an alternative to child foster care placement. As such, these parents are very hard to recruit into studies, and due to their unpredictable life situations, it is also hard to keep them involved in the follow-ups. Moreover, the data collection happened during the COVID pandemic, which meant there were more than usual uncertainties in getting parents to commit themselves to continuing in the treatment after initial referral. The low number of participating fathers also meant that there was not enough statistical power to conduct all the analyses with them.

COVID also affected the measures used. In the initial study plan, videotaped observations or interviews would have been used together with parental self-reports measuring EA and PRF. It has been suggested, for example, that although conceptually similar, there might, nevertheless, also be significant differences between observed and self-reported EA (Vliegen et al. 2009; Biringen et al. 2014, 2023). Some emotionally focused parenting intervention studies still indicate positive changes in EA-SR in

infancy (Whittingham and Mitchell 2021) and in early childhood (McConnell et al. 2020), warranting further study on self-reports too. Our results also provide additional information on EA-SR, as no intervention studies have focused on EA-SR among parents with SUD. Furthermore, the PRF and EA-SR questionnaire did not seem to work psychometrically well in this high-risk sample, and their use and potential changes needed for the factor structure/whole questionnaire battery should be examined further.

Finally, related to the study sample composition, randomization in the control or waiting-list group was not possible. Although using an RCT design would clearly be desirable, difficulty recruiting enough families and the desire to provide services to all families in need are also general problems in previous literature (Neo et al. 2021; Neger and Prinz 2015; Straussner and Fewell 2018). All parents and children joining the Holding Tight programme needed comprehensive help, and for ethical reasons, it was not possible to make them wait for treatment. Moreover, there are no comparable, alternative treatment systems in Finland to which the Holding Tight programme could be compared. Also, it would have been interesting to use a residential/outpatient setting as a covariate in the analyses. However, in practice, it proved to be difficult, as 20% of the participants who started in the residential setting then continued their treatment in the outpatient unit. Because our sample was not that big and attrition was high, it prevented us from making different comparison groups. Finally, it would be very interesting to study whether different substance users may have different results. Again, our small sample size and the fact that most of the participants used multiple substances prevented more detailed analyses.

The results of the present study, nevertheless, suggest the importance of this integrated work. For the mothers, their views on their children's involvement were more positive in the follow-ups, and all the mothers reported more attachment security, less depressive symptoms and ER problems, especially by the end of the treatment. Our results also suggest the necessity of taking parental ACEs into account. In clinical work, it may mean personnel having a special trauma-related capacity to form a close alliance, but it may also mean considering what additional support parents might need after intensive treatment ends. Our results regarding treatment duration could also give a clear indication for future clinical intervention efforts; treatments need to be long enough to establish stable changes in the core personality factors often underlying both SUD and the related parenting difficulties. Support is needed not only during treatment, but there is also a need for coordinated long-term services; otherwise, the benefits gained might be lost.

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Ethics Statement

The research plan was approved by the ethical committee of Helsinki University for Human Sciences.

Consent

Written informed consent was obtained from each parent, and the study was conducted applying the code of ethics of the World Medical Association (Declaration of Helsinki) for experiments involving human subjects.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data cannot be shared for ethical restrictions.

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