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Parental Psychological Profiles and Children Functioning: Bidirectional Effects

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ABSTRACT

The bidirectional influence between parents and children, specifically the dynamics within the parent-child relationship, is a well-accepted concept, yet underrepresented in research. This study, based on a clinical sample of children aged 7-13 and their parents, utilizes psychometric instruments to evaluate the reciprocal relationship between parental psychological profiles—including adult attachment, stress levels, mental health, and disciplinary practices—and the development of emotional and behavioral disorders in children. Additionally, this study examines how child problems impact parental distress and parenting. This study also used decision tree analysis to identify key predictors of bidirectional influences between children and parents. Results indicate that both maternal and paternal mental health, attachment patterns, and disciplinary practices significantly influence children's emotional and behavioral outcomes. Crucially, fathers played a central role in children's development through several psychological and disciplinary mechanisms. Taken together, these findings highlight the essential role of both parents, with the father's influence being particularly important for both positive and negative factors, although it is often ignored in the current literature. Finally, the results of the present study are consistent with attachment theory, suggesting that maternal secure attachment relationships promote emotional stability in children. This is without neglecting the importance of co-parenting as an important protective factor that promotes a supportive environment in the family and enhances a positive outcome of children's development.

1. INTRODUCTION

The complex interplay between parental psychological challenges and children's emotional and behavioral issues is a pivotal area of study in developmental psychopathology. However, in most cases, studies have examined the effects of the parent or child separately, instead of examining issues of mutual influence and the possibility that each party's behavior may continue to influence and intensify the behavior of the other throughout development (Roubinov, et al., 2022). Nevertheless, research over the past several decades has increasingly recognized that the interaction between parents and children is more dynamic and reciprocal.

Bidirectional effects are particularly pronounced in early childhood, a critical period characterized by rapid developmental changes. During this stage, the parent-child relationship plays a pivotal role in mediating the influence of the broader ecological context on the child's development (Goodrum, et al., 2021). Current research has yet to explore that this relationship is bidirectional, with mutual influences shaping both parent and child well-being (Goodrum, et al., 2021). Parental psychological features, including stress, adult attachment patterns, and diverse parenting practices, substantially affect child development. Elevated levels of parental stress and insecure adult attachment patterns are often associated with problematic parenting behaviors, such as inconsistent discipline and the use of corporal punishment, as well as diminished engagement in positive parenting practices (Agbaria, 2021).

These challenges can contribute to adverse outcomes in children, including internalizing issues like anxiety and depression, and externalizing behaviors such as aggression and rule-breaking. Effective parenting practices, characterized by consistent discipline, nurturing involvement, and the avoidance of corporal punishment, are vital for promoting healthy emotional regulation and adaptive behavioral responses in children (Paschall & Mastergeorge, 2015). Indeed, this relationship is inherently reciprocal.

Children's emotional and behavioral problems can significantly influence parental psychological well-being and parenting practices. For instance, children experiencing these difficulties can increase parental stress and complicate the implementation of effective parenting, often leading to an increased reliance on punitive measures, including corporal punishment. This reliance can further intensify the child's behavioral problems, creating a negative feedback loop that perpetuates and amplifies the initial challenges.

Such dynamics highlights how children's behaviors and emotional states actively shape parental stress and parenting methods, particularly in the context of disciplinary practices (Wiggers & Paas, 2022). Recognizing the bidirectional nature of these interactions is crucial for developing integrated and effective intervention strategies. Acknowledging that children's behavioral and emotional difficulties substantially impact parental functioning and responses underscores the need for interventions that address both parental and child aspects. Targeted approaches aimed at reducing parental stress and promoting consistent and positive parenting practices, while concurrently addressing children's emotional and behavioral issues, can alleviate negative impacts on family dynamics. These strategies can also reduce the dependence on harmful disciplinary practices such as corporal punishment.

Incorporating this bidirectional perspective into intervention design facilitates a more comprehensive understanding of family dynamics and enhances the potential for fostering healthier developmental outcomes. The present study explores the possibility of reciprocal relationships between parents' psychological profile and emotional/ behavioral problems typical of development from middle childhood to early adolescence. It emphasizes the importance of holistic strategies that consider the interconnected influences between parent and child well-being, ultimately fostering a more supportive and adaptive family environment.

The current literature outlines some focus of scientific attention that can be summarized as follows:

(i) Insecure adult attachment styles, such as avoidant and anxious, resulting from adverse childhood experiences, lead to maladaptive parenting behaviors, affecting the parent-child relationship and the child's emotional development (Jones *et al.,* 2015; Mikulincer & Shaver, 2004);

(ii) Bidirectional influences between parenting stress and child emotional and behavioral issues. Children's internalizing and externalizing behaviors both contribute to and are exacerbated by parenting stress (Mackler et al., 2015; Robinson et al., 2019);

(iii) Negative parenting practices, including harsh discipline and inconsistent emotional responses, are significantly associated with adverse developmental outcomes in children. These practices often perpetuate a cycle of challenging behaviors and ineffective parental responses (Speyer et al., 2022; Wang & Gai, 2024);

(iv) Parental mental health problems, such as depression and anxiety, significantly impact child behavior, leading to internalizing and externalizing issues. Maternal mental health tends to have a more pronounced effect compared to paternal mental health (Connell & Goodman, 2002; Reitz et al., 2016).

(v) The influence of paternal mental health and behavior on child development is underexplored but shows significant effects. The existing literature calls for more research into the father's role in the developmental trajectory of children (Antúnez et al., 2018; Brooker et al., 2015).

More in detail, I consider particularly relevant for the present work the following aspects:

Parental Attachment and Children functioning: reciprocal effects

Attachment theory, as articulated by Bowlby (1988), emphasizes that early relational experiences play a critical role in shaping internal working models of self and others. These models are cognitive frameworks that individuals use to understand and interact with the

world. They influence how individuals perceive their relationships, manage emotions, and respond to stress throughout life. While these internal working models are largely formed during early childhood, they remain dynamic and can be influenced by ongoing relational experiences and environmental factors (Jones, et al., 2015). Adverse childhood experiences, such as neglect, familial dysfunction, or even abuse often disrupt the formation of secure attachment relationships. Children exposed to harsh situations are more likely to develop insecure attachment styles characterized by maladaptive internal working models. These models often manifest as either avoidant or anxious attachment styles in adulthood (Mikulincer & Shaver, 2004).

Insecure attachment styles developed as a result of adverse childhood experiences predispose individuals to perceive relationships through a lens of insecurity and anxiety. Individuals with avoidant attachment styles often emotionally withdraw and maintain distance from others as a defense mechanism against potential threats or rejection. This detachment can manifest in relationships as a reluctance to form close emotional bonds, a preference for independence, and an aversion to intimacy. Such individuals may struggle to provide consistent emotional support to their partners and children, leading to a family dynamic characterized by emotional distance and minimal conflict resolution. On the other hand, individuals with anxious attachment styles tend to display hypervigilance and a pronounced fear of abandonment in their relationships.

This attachment pattern often involves a high level of emotional dependency, excessive need for reassurance, and heightened sensitivity to perceived signs of rejection or disinterest from their partners. Their behavior can oscillate between clinging and hostility, driven by an underlying anxiety about the stability and security of their relationships. These attachment styles significantly influence parenting (Shaver, *et al.*, 2004; Stern, 1995). Avoidantly attached individuals may find it challenging to engage fully with their children's emotional needs, often resorting to a more distant or disengaged form of parenting. This lack of emotional availability can hinder the development of a secure parent-

child attachment, potentially affecting the child's emotional development and sense of security.

Conversely, parents with anxious attachment styles may exhibit over-involvement and inconsistency in their parenting, driven by their fears of inadequacy or rejection. This can create an unpredictable environment for the child, where parenting responses vary dramatically based on the parent's fluctuating emotional state. Children in such environments might experience confusion and insecurity, as the parent's availability and responsiveness can be inconsistent and overly influenced by their own anxieties. As such, mothers with insecure attachment styles may struggle to form and maintain supportive partnerships with the fathers of their children. This struggle can lead to less effective co-parenting, creating a stressful and fragmented family environment that is conducive to a challenging child development.

Furthermore, these insecure internal working models can impede the development of a nurturing and responsive mother-child relationship (Trillingsgaard, *et al.,* 2011). Mothers who perceive their children's behaviors through a lens of insecurity may have difficulty interpreting and responding to their children's emotional needs appropriately. This misalignment can result in inconsistent or maladaptive parenting practices, such as harsh discipline or emotional unavailability, further exacerbating parenting stress and impairing the child's emotional and social development (Jones et al., 2015). Empirical evidence supports the mediating role of adult attachment in the relationship between childhood adversity and parenting stress. Studies have shown that childhood adversity can lead to the development of insecure attachment styles, which in turn contribute to higher levels of parenting stress.

This pathway often involves a complex interplay of psychological processes, where insecure attachment styles lead to maladaptive cognitions and behaviors in parenting, creating a cycle of stress and insecurity (Steele et al., 2016). Moreover, adult attachment styles have been found to mediate the relationship between childhood adversity and

depressive symptoms. This suggests that insecure attachment not only exacerbates parenting stress but also contributes to the overall mental health burden experienced by the parent. A meta-analysis by Dagan, Facompré, and Bernard (2018) highlighted significant links between attachment insecurity and depression, further underscoring the importance of addressing attachment issues in interventions aimed at reducing depressive symptoms and improving parenting practices.

Parental stress and Children functioning: reciprocal effects

A dynamic interplay has been identified between parenting stress and various emotional and/or behavioral issues in children, including overall behavior problems and specific internalizing and externalizing behaviors during early childhood (Cherry, et al., 2019). Both parental and child factors exert reciprocal influences on each other from a young age, indicating that bidirectional relationships between parenting stress and child behavior issues are evident in the early developmental stages (Neece, *et al.*, 2012). From the perspective of child-driven influences, internalizing behaviors (such as anxiety and depression) in children are associated with increased parenting stress from early childhood through to middle childhood. Meanwhile, externalizing behaviors (such as aggression and defiance) are linked to higher levels of parenting stress from middle childhood into adolescence (Pardini, 2008). These findings are consistent with Belsky's (1984) process model, which highlights how children's behaviors can significantly impact parental functioning, including parenting styles, stress levels, and overall psychological well-being throughout different stages of development. Furthermore, Robinson et, al. (2019) support this notion by demonstrating that children's externalizing behaviors are strongly correlated with heightened parental stress, as well as more intrusive and harsh parenting practices. Conversely, regarding parent-driven influences, elevated levels of parenting stress are predictive of both internalizing and externalizing behavioral problems in children during middle childhood and adolescence (Stone, *et al.*, 2016). Parental stress can significantly

impair parents' ability to regulate their emotions effectively, which may reduce their emotional availability and responsiveness to their children. This emotional dysregulation often manifests as decreased parental warmth and increased hostility in interactions with their children. Consequently, the lack of warmth and heightened hostility in parenting practices can contribute to the development of internalizing and externalizing symptoms in children. Moreover, challenging behaviors exhibited by children can further exacerbate this cycle by eliciting less warmth and greater hostility from parents (Chen, et al, 2020). Mackler *et al.* (2015) conducted a longitudinal study involving 404 children and their parents, tracking their progress from ages 4 to 10 across four assessment periods. The findings revealed consistent bidirectional relationships between parenting stress and children's externalizing behaviors at each time point. Other studies have explored parenting stress in relation to externalizing and internalizing behaviors as distinct constructs (Stone et al., 2016; Kochanova et al., 2021). Stone et al. (2016) analyzed data from 1,582 children aged 4 to 9 years and investigated the directionality of these relationships across three assessment points. They found that parenting stress at the initial time point predicted subsequent internalizing behaviors, but there were no observed effects of internalizing behaviors on later parenting stress. In contrast, bidirectional relationships were identified between parenting stress and externalizing behaviors, with notable gender differences: bidirectional associations were present for boys but absent for girls. Kochanova et al. (2021) conducted a transactional study focusing on children aged 2 to 5 at the first assessment, followed over six years through three time points. This study demonstrated that higher parenting stress observed at the second time point (when children were aged 3 to 6) was associated with increased internalizing problems between ages 7 and 11. However, the reverse relationship, where internalizing behaviors influenced subsequent parenting stress, was not supported. For externalizing behaviors, no significant cross-lagged associations with parenting stress were identified throughout the study period. These findings highlight the complex and nuanced relationships between parenting stress and child behavior, suggesting that the

interplay between these factors can vary based on the type of behavior (internalizing versus externalizing) and potentially other variables such as gender and the timing of assessments.

Parental educational practices and Children functioning: bidirectional effects

Parental disciplinary practices and emotional responses are pivotal in shaping children's psychosocial development. Research indicates that negative disciplinary approaches, such as corporal punishment (e.g., smacking) and verbal aggression (e.g., shouting), alongside inconsistent emotional responses from parents, are significantly associated with adverse developmental outcomes in children (Wang, & Gai, 2024). Yet, evocative gene-environment correlations highlight scenarios where the behavior and characteristics of a child significantly influence parental behavior and interactions (Bignardi, *et al.,* 2022).

Children who are naturally more adaptable, cooperative, or easygoing often elicit warmer, more supportive, and engaged parenting. For instance, a child who readily complies with instructions and interacts positively with caregivers may reinforce and encourage nurturing behaviors from parents, leading to a more harmonious and supportive home environment. On the other hand, children who display challenging behaviors, such as frequent tantrums, aggression, or defiance, often provoke stricter, more punitive, or less responsive parenting approaches Speyer, *et al.*, 2022).

These behaviors can lead parents to adopt more controlling, coercive, or disciplinary strategies in an attempt to manage and correct the child's actions. The child's disruptive behavior may generate frustration, stress, or even a sense of incompetence in parents, influencing them to react more harshly or inconsistently. This can create a negative feedback loop where the child's behavior and the parental response continuously reinforce each other, potentially exacerbating behavioral problems and leading to strained parent-child relationships (Pezzoli, *et al.,* 2024). In the 1980s Belsky's influential framework introduced the concept of evocative child effects, highlighting how a child's inherent characteristics—

such as temperament, gender, or health status—can shape and differentiate parental responses.

The core premise of this model is that children's biological and observable traits significantly influence the psychological state and behaviors of parents (Belsky, 1984). Essentially, a child's temperament or other personal attributes can elicit varying types of parental reactions, which can affect parenting practices and parental mental health (De Mol & Buysse, 2008; Russell & Russell, 1992). Patterson's coercion model (1992; Patterson & Reid, 1984) underscored the dynamic interactions between parent and child, focusing on the reciprocal reinforcement of behaviors. According to this model, a feedback loop is created where a child's defiant behavior leads to more severe or punitive responses from parents. This harsh parenting then triggers further defiance in the child, escalating the conflict. Subsequently, parents might become more lenient or withdraw, inadvertently reinforcing the child's challenging behavior and perpetuating a cycle of defiance and inconsistent discipline.

Longitudinal research supports this concept of reciprocal influence, showing that problematic parenting practices—such as inconsistent discipline, harsh punitive measures, or lack of involvement—contribute to an increase in children's externalizing behaviors. Conversely, these externalizing behaviors also provoke more negative and less effective parenting practices, creating a cycle that reinforces these behaviors (Hawes *et al.*, 2011). Moreover, the bidirectional relationship between parenting and child internalizing symptoms, such as anxiety or depression, is less well-studied. Available research indicates that the impact of child internalizing symptoms on parenting might be largely influenced by their overlap with externalizing symptoms. For example, while conduct issues are predictive of harsh parenting, depression is not. Similarly, youth externalizing behaviors are better predictors of parenting responses than depressive symptoms are (Daniel *et al*, 2017). Overall, while the influence of children's externalizing behaviors on parenting

practices is well-documented and significant, the effect of internalizing symptoms on parenting is more complex and often interlinked with externalizing behaviors.

Parental Well-being and Children functioning: bidirectional effects

Research has established that parental mental health issues significantly elevate the risk of various adverse mental health outcomes in children, including both internalizing and externalizing problems (Connell & Goodman, 2002). Sameroff, *et al.* (1987) are often credited with emphasizing the importance of bidirectional influences within parent-child interactions. Otherwise, much of the existing research has primarily explored the one-way relationship from parent to child, illustrating that parental mental health problems can significantly impact child behavior, leading to issues such as depression, anxiety, and aggression (Joelsson et al., 2017).

Children exposed to parental psychopathology are at heightened risk for developing internalizing and externalizing problems. This includes less responsive caregiving, inconsistent discipline, and higher levels of stress in the parent-child relationship, all of which contribute to insecure attachment and behavioral problems in children (Reitz et al., 2016). Thus, mothers' mental health problems, including anxiety and depression, are frequently highlighted as crucial risk factors for both externalizing and internalizing problems in children. Indeed, maternal mental health challenges are well-documented as key risk factors for mental health problems in children (Reitz, et al., 2016).

The underlying causes of this association are multifaceted. They may include genetic vulnerabilities passed from mother to child, the impact of prenatal depression on fetal brain development, and the influence of poor maternal mental health on parenting practices and attachment security. Moreover, Elgar et al. (2004) demonstrated that parental depressive symptoms have profound and consistent effects on child development. This impact is observable in both mothers and fathers. Interestingly, research frequently reveals that maternal depression exerts a more significant influence on child development than paternal

depression. This finding aligns with the higher prevalence of depression among women compared to men (Bromet et al., 2011) and reflects a predominant focus on mothers in studies investigating the intergenerational transmission of depression. This discrepancy often arises because many studies rely predominantly on maternal reports and place greater emphasis on mothers' roles in child development (Choe et al., 2014).

However, research provided partial evidence for reciprocal longitudinal associations between paternal (but not maternal) anxiety-depression and oppositional defiant disorder behaviors in boys at age 3, but this was not observed in girls. Studies like those by Antúnez et al. (2018) and Brooker et al. (2015) indicate that paternal mental health issues can contribute to psychological problems in children, but these effects are often overshadowed by the focus on maternal influences. Furthermore, evidence suggests that children's problem behaviors can also impact paternal mental health. Children's disruptive behaviors, for example, can lead to increased stress and depressive symptoms in fathers, much like the effects observed in mothers. As such, when children engage in challenging behaviors, it often undermines parents' confidence in their ability to manage and nurture effectively, leading to a decrease in parental self-efficacy. This erosion of confidence can exacerbate parents' depressive symptoms, creating a reinforcing cycle (Elgar, et al., 2004). This decrease in parental self-efficacy can lead to heightened stress and depressive symptoms in parents, further contributing to a negative feedback loop. These ineffective strategies, in turn, can escalate the child's disruptive behaviors and further deteriorate the parent's mental health (Eddy, et al., 2000).

Studies have shown that child temperament can moderate these effects. Children with high levels of effortful control, for instance, may mitigate the impact of their behavior on parental mental health over time. Choe et al. (2014) found that child externalizing problems at age 3 were linked to fewer depressive symptoms in mothers of children with high effortful control at age 10, suggesting that a child's self-regulatory abilities can influence the trajectory of these bidirectional interactions. Moreover, a study by Brooker et

al. (2015) involving adopted children and their adoptive parents demonstrated reciprocal longitudinal associations between parental anxiety and the child's negative affect. These associations were consistent across both maternal and paternal reports and observed parent-child interactions and were not explained by genetic factors inherited from biological parents (Forbes *et al.* 2008).

However, the body of literature reveals a disparity in the extent to which paternal depressive symptoms have been explored compared to maternal depressive symptoms and this gap underscores the need for more studies that specifically investigate the unique and potentially differential impacts of fathers' depressive symptoms on child development, especially considering that paternal mental health can play a critical role in the familial and developmental context. Further exploration in this area is essential to fully understand the scope of parental influence and to inform targeted interventions.

The objective of this study is to investigate the bidirectional influences between child psychopathology and parental psychological and psychopathological states, with a specific focus on identifying key predictors of these interactions. I will therefore comprehensively evaluate both the direct and indirect effects of maternal and paternal mental health, disciplinary practices, and co-parenting dynamics on the emotional and behavioral outcomes of children.

Additionally, the present study seeks to address the current gap in literature by using decision tree analysis to determine the most significant predictors of child-to-parent and parent-to-child effects, thereby advancing the understanding of how reciprocal influences shape developmental trajectories and parenting practices. In addition, relatively little research addresses the role of fathers' parenting in the development of children's symptoms and, conversely, how children may elicit certain types of parenting from fathers. In this study, data were collected from 57 families on mothers' and fathers' psychological profiles

and children's symptoms of psychopathology when children age was from 7 up to 13 years old. Summarizing, the aims of my research are:

(1) To conduct an extensive bidirectional analysis of the reciprocal effects between child behaviors and parental mental health, incorporating a range of psychological and psychopathological variables to highlight the importance of multifactorial considerations in developmental outcomes;

(2) To examine how fathers' use of disciplinary methods, particularly corporal punishment, influences the behavioral and emotional development of children. This evaluation will explore how such disciplinary practices contribute to or exacerbate various behavioral issues, emotional responses, and psychological outcomes in children;

(3) To use for the first time a decision tree analysis to identify the best predictors in both directions (parent-to-child and child-to-parent), providing a robust, data-driven approach to understanding these mutual influences;

(4) To examine the critical role of co-parenting practices: demonstrate how effective co-parenting can mitigate negative outcomes associated with parental mental health issues and enhance child developmental outcomes

2. METHODS

2.1. Participants and Procedure

The research has been conducted within the framework of an observational study focused on analyzing data acquired during my clinical practice with children. All procedures were in accordance with the ethical standards and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. All patients and their families (mothers and fathers) participated voluntarily in the study after written consent was obtained by parents or legal caregivers. The study was approved by the local ethical committee (code 763/2021/Oss/AUSLFe). Participants were drawn from referrals to outpatient services located in Ferrara, specialized in assessment and treatment for children and adolescents with emotional and /or behavioral problems. Patients referred from December 2021 to June 2023 were enrolled in the study. The sample, through the inclusion criteria, was composed of 57 children aged 7-13 years and their respective parents. All participants were Caucasians and fluent in the Italian language.

As regards this study, the following inclusion criteria were applied:

a) Age between 7 and 13 years;

b) presence of emotional and/or behavioral and relational problems (ICD-10[1]) diagnoses clustered in the domain of (i) affective-relational problems (ICD-10 diagnoses: F-30-39, mood and affective disorders; F40-48, neurotic, stress-related, and somatoform disorders; F93, emotional disorders with specific onset in childhood and adolescence) or (ii) behavior

[1] The International Classification of Diseases, 10th Revision (ICD-10), represents a globally recognized framework for categorizing and coding data related to mortality and morbidity. Managed by the World Health Organization (WHO), which serves as the principal coordinating entity for global health within the United Nations System, ICD-10 is employed extensively in epidemiology, health management, and clinical settings. Originally conceived as a healthcare classification system, ICD-10 offers a comprehensive coding scheme for diagnosing a broad spectrum of diseases, encompassing intricate classifications of signs, symptoms, abnormal findings, complaints, social factors, and external causes of injury or illness. The system maps health conditions to generic categories and their specific variants, assigning each a code up to six characters in length. This hierarchical structure ensures that major categories encompass related diseases, facilitating detailed and organized classification.

problems (ICD-10 diagnoses: F.91, conduct disorders) or (iii) in both emotional and behavioral problems (IDC-10 diagnoses included in the first and second categories present in comorbidity; F92, mixed emotional and behavioral disorder; F98.8, other behavioral/emotional disorders with onset in childhood and adolescence).

Exclusion Criteria were principal diagnosis of:

a) psychotic disorders (F20-29); (b) pervasive developmental disorders (F84);

c) mental retardation (F70-79);

d) organic disease in the child;

e) presence of disabling conditions that hinder adequate participation in the research (e.g., language and/or comprehension difficulties);

f) age under 7 years or over 13 years;

g) known parental severe psychopathology. Parents (both mothers and fathers) were included in the study if they met the following criteria: (1) aged 18 years or older, (2) fluent in Italian, and (3) without known psychotic psychopathology.

Data collection

After the parents signed a written informed consent, a specialized psychologist conducted the assessment procedures. The initial interview and subsequent socio-demographic form aimed to collect detailed information about the family's background, focusing on both parents' and child's demographic, educational, and linguistic profiles. Participants were administered with several psychometric instruments (for the extensive explanation, see the Measures section below). While the child was administered the Separation Anxiety Test (SAT) and the Self-Administered Psychiatric Scales For Children and Adolescents (SAFA), parents completed questionnaires assessing the child's emotional and/or behavioral problems. Both parents were asked to fill out separately (mothers and fathers) the Child Behaviour CheckList (CBCL) and the Strenghts and Difficulties Questionnaire (SDQ). In addition, ICD-10 diagnostic codes ((i) affective-relational problems, (ii) behavior problems

and (iii) both emotional and behavioral problems) were assigned based on clinicians' psychological observation and assessment. The level of severity of psychopathology was indicated as "mild," "moderate," or "severe" referring to the degree of impact of psychopathology on the child's daily functioning (self-care, school performance and relationship with peers, extracurricular activities) according to the clinicians' observation and to the data obtained from the medical records. In addition, parental stress level and educational practices were respectively examined with Parental Stress Index – 4 - Short Form (PSI-4-SF) and the Alabama Parenting Questionnaire (APQ). Furthermore, the following domains regarding parents' psychological aspects were investigated through different scales: general psychopathology with the Brief Symptom Inventory (BSI), depressive symptoms with Beck Depression Inventory-Short Form (BDI-SF), post-traumatic embitterment disorder symptoms with the Post Traumatic Embitterment Disorder (PTED), demoralization with the Demoralization Scale-I (DS-I), hopelessness with the Beck Hopelessness Scale (BHS) and attachment style with the Adult Attachment Questionnaire by Salvo & Cusinato (QAA-SC)

2.2 Measures

Children – Administered Instruments

1) Self-Administered Psychiatric Scales For Children and Adolescents (SAFA)

The SAFA (Cianchetti & Fancello, 2001; Franzoni et al., 2009) is a structured self-assessment tool designed to provide a preliminary and comprehensive evaluation of psychiatric conditions in children and adolescents aged 8 to 18 years. The instrument has been adapted for use with younger children, including those aged 7, in line with Mammarella et al. (2016). The administration of the full SAFA battery takes approximately 30-60 minutes and includes six primary scales, each subdivided into various subscales tailored to different dimensions of psychiatric evaluation. Scale "A" for assessing anxiety is divided into 4 subscales:

generalized anxiety, social anxiety, separation anxiety, and school-related anxiety. The "D" scale, for assessing depression, is constructed based on the DSM-IV-TR diagnostic criteria for major depressive episode and dysthymia; it is divided into 7 subscales related to the main symptoms of mood disorders: depressed mood, anhedonia/disinterest, irritable mood, sense of inadequacy, level of self-esteem, insecurity, guilt and hopelessness. In contrast, somatic symptoms, which are also present in mood disorders, are grouped in a special "S" scale divided into the 2 subscales of somatic symptoms and hypochondria. The "O" scale for assessing OCD has 5 subscales: obsessive thoughts, compulsions and rituals, rupophobia and contamination, order and control, and doubt and indecision. "P" assesses the presence of eating disorders according to the subscales: bulimic behaviors, anorexic behaviors, body acceptance and evaluation, psychological aspects (in total and separately with reference to fear of maturity, perfectionism, inadequacy). An additional subscale considers the sum of scores for anorexic behaviors and body acceptance/evaluation. To monitor the accuracy and veracity of the answers given, the SAFA presents an "S" scale, a simulation scale, based on several items found in the "D" scale. The SAFA utilizes age-specific questionnaires to ensure comprehension, with separate versions for:

- Scale “A” (Anxiety): Three questionnaires for ages 8-10, 11-13, and 14-18.
- Scales “D”, “O”, “S”, and “P”: Two questionnaires for ages 8-10 and 11-18.

Each item offers three response options: True (replaced by Often in the somatic symptoms scale), False and Somewhere in between. Responses are scored between 0 and 2 points, and scales A and D require grids for calculating total scores due to the presence of both positive and negative items. Other scales involve straightforward summation of negative items.

Scores are converted into T scores using age- and gender-specific reference tables, indicating:

- T < 30: Denial of symptoms.
- T 30-39: Partial denial of symptomatology.
- T 40-59: Statistical normality.

- T 60-69: Risk of pathology.
- T > 69: Indicative of pathology.

In the current study subjects were classified based on their T scores into:

- Nonclinical (T < 60): Indicative of normal ranges.
- Borderline (T 60-69): Suggestive of a potential risk.
- Clinical (T > 69): Reflective of significant pathology.

The SAFA demonstrates robust psychometric properties, with high test-retest reliability and internal consistency (Cronbach's alpha > 0.80). These metrics confirm the SAFA's reliability in providing accurate and consistent assessments of various psychiatric domains in children and adolescents.

2) Separation Anxiety Test (SAT)

The SAT is a semi-structured interview that explores children's feelings and thoughts regarding attachment patterns referred to the relationship with their parents (Attili, 2001; Confalonieri, *et al.* 2009). Children are invited to see six pictures (gender-matched) that represent separations between a child and his/her parent(s). The SAT was introduced as follows "I've got some pictures here and I want you to help me to tell some stories about them. These are pictures about a boy/girl about your age". To avoid subjecting children to excessive pressure of anxiety and negative-inducing emotions, two types of scenes (severe and mild parent–child separation) are showed alternately. Pictures were labeled as "Mild" or "Severe" separations following the existing scoring system. The pictures display the following scenes: (1) mother and father go out for the evening and leave the child at home (severe scene); (2) on the first day of school, the mother drops off the child (mild scene); (3) mother and father go away for a weekend and leave their child with his/her aunt (severe scene); (4) parents are talking and ask the child to walk away from them (mild scene); (5) parents give a present to the child before leaving him/her for 2 weeks (severe scene); and (6) mother leaves the room after having tucked the child in bed (mild scene). The examiner asks to the child three questions: (1) how does the boy/girl in the picture feel? (2) why do

you think the child feels happy, sad, mad, etc (according to the first answer given by the child)? and (3) what the boy/girl will do or will say? All verbal responses to the SAT made by children at the time of administration were recorded verbatim on paper. Responses were brief and, therefore, audiotapes proved unnecessary. The total score is composed by the sum of two global ratings: emotional security and quality of coping responses. Children who are unwilling to show vulnerability, deny the separation or show bizarre or disorganized behavior, obtain low emotional security scores; high security scores are given to children who show recognition of attachment feelings and the corresponding motives. Low coping scores reflect maladaptive coping strategies (e.g., ask parents to stay, refuse to leave or follow parents), or the absence of coping strategy (e.g., think parents will never come back, cry until parents come or do nothing); on the other hand, high coping scores reflect adaptive or constructive strategies involving positive separation behaviors or social support (e.g., plays games, asks someone for help or plays with aunt). A scoring ranging from -2 to +2 is attributed to each of the following eight scales: Attachment, Loss of Self-esteem, Hostility, Trust himself, Avoidance, Anxiety, Anguish, and Confusion. The eight scales are subdivided in turn into 17 subscales: Attachment (Loneliness, Sadness), Loss of Self-esteem (Rejection, Blame himself), Hostility (Anger, Blame others), Trust himself (Well-being), Avoidance (Disbelief, Avoidance, Indifference), Anxiety (Generalized fear, Somatic reaction, Hunger), Anguish (Fear of catastrophe/Irrational fear, Reverse worry, Bizarre responses), Confusion (confused responses). On the basis of the total score, attachment style is classified in (1) Disorganized and Confused (score −3 and below).; (2) Avoidant-Anxious (score −2 to 0); (3) Ambivalent-Anxious (score +1 to +3); and (4) Secure (score +4 and above). For our present study, the attachment style of children was divided into two major classifications: secure and insecure attachment. The insecure attachment styles were comprised of attachment status: (1), (2), (3). The SAT is widely used and has good psychometric properties, including convergent validity and discriminant validity, internal consistency, and predictive validity (Attili, 2001; Bizzi *et al.*, 2015). To test its concurrent

validity, the Attili's modified Italian version of SAT was compared with the test by Klagsbrun and Bowlby (1976). Within a sample of 83 subjects Spearman test showed a correlation coefficient $r = 0.77$ ($p < 0.01$). Predictive validity calculated on 44 children and their mothers revealed an agreement with maternal attachment representations assessed by the AAI of 87.8% ($\kappa = 0.67$, $p < 0.00$) on the security-insecurity dimensions; and of 80.8% ($\kappa = 0.57$, $p < 0.01$) on the AAI "Unresolved state of mind" and the SAT "Disorganization" (Zaccagnino *et al.*, 2005). Test–retest reliability was calculated on 18 subjects who were tested twice with an interval of 2 months. The Spearman coefficient for the overall scores of the four attachment categories was $r = 0.75$ ($p < 0.00$; Attili, 2001).

Parents – Administered instruments on their children emotional and/or behavioral problems

1) Child Behavior Checklist 6-18 (CBCL 6-18)

The Child Behavior Checklist for ages 6-18 (CBCL/6-18) is part of the ASEBA (Achenbach System of Empirically Based Assessment), developed by Achenbach and Rescorla (2001). ASEBA provides a multi-axial empirical approach for gathering comprehensive information on the adaptive functioning, competencies, and emotional-behavioral problems of children and adolescents. This system incorporates multiple sources of information from different contexts (Rescorla et al., 2017). ASEBA includes three parallel questionnaires designed for different informants:

1. Child Behavior Checklist (CBCL): A parent-report form for ages 6-18.
2. Youth Self Report (YSR): A self-report form for ages 11-18.
3. Teacher Report Form (TRF): A teacher-report form for ages 6-18.

These instruments have undergone continuous empirical updates, with the current versions dating to 2001 (Bordin et al., 2013). They are designed to be consistent with the diagnostic criteria of the DSM-5 (APA, 2013), featuring DSM-oriented scales for assessing Affective

Problems, Anxiety Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional-Defiant Problems, and Conduct Problems (Achenbach, 2013).

The CBCL/6-18, used in this study, is a parent-reported questionnaire focusing on internalizing and externalizing difficulties in children aged 6 to 18. It consists of two parts:

(i) Adaptive Functioning:

- Content: Questions on personal and social functioning in areas like participation in sports, group activities, friendships, involvement in household chores, relationships with family members, and academic performance.
- Open-ended Questions: Cover potential illnesses, disabilities, parental concerns about the child's development, and aspects where the child excels.

(ii) Emotional-Behavioral Problems:

- 113 Items: Rated on a 3-point Likert scale (0 = Rarely/Never, 1 = Sometimes, 2 = Often/Always). The questionnaire evaluates problems through 8 syndrome scales and 3 broadband scales:
- Syndrome Scales: Withdrawn/Depressed, Anxious/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, Aggressive Behavior.
- Broadband Scales:
- Internalizing Problems: Sum of Withdrawn/Depressed, Anxious/Depressed, and Somatic Complaints.
- Externalizing Problems: Sum of Rule-Breaking and Aggressive Behavior.
- Total Problems: Sum of all items.

The Internalizing and Externalizing Scales are based on factor analysis of syndrome scales and reflect internal conflicts (Internalizing) and overt behaviors (Externalizing). Both scales can coexist in some children despite their conceptual opposition (Achenbach et al., 2016).

Scores are standardized using four norm groups (6- to 11-year-old males, 6- to 11-year-old females, 12- to 18-year-old males, and 12- to 18-year-old females). Raw scores are converted

to T scores using specific scoring templates. Scoring can be performed manually or via computer using ASEBA's profiling system.

Clinical Significance:

- Syndrome Scales: T scores of 70 or greater.
- Internalizing, Externalizing, and Total Problem Scales: T scores of 64 or greater.

Classification:

- Non-Clinical: $T < 60$.
- Borderline: $T = 60\text{-}63$.
- Clinical: $T > 63$.

The current study classified patients into three classes according to the scores obtained on the Internalizing, Externalizing, and Total Problem Scales. The CBCL is widely used in both research and clinical contexts due to its robust psychometric properties, including excellent reliability (Cronbach's alpha ranging from .85 to .88) (Dedrick et al., 1997; De Groot, Koot, Verhulst, 1994). In Italy, its largest epidemiological use involved the 2001 version, with normative data from earlier versions (Frigerio et al., 2009; 2004). For accurate diagnostic evaluation and to improve the understanding of psychopathology in developmental stages, the CBCL integrates DSM-5 oriented scales. These scales use item groupings that are informative about specific DSM-5 diagnostic categories, such as Affective Problems, Anxiety Problems, Somatic Problems, Attention Deficit/Hyperactivity Problems, Oppositional-Defiant Problems, and Conduct Problems (Achenbach, 2013).

2) Strenghts and Difficulties Questionnaire (SDQ-ITA)

The Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997) is a multi-informant instrument for screening developmental psychopathology, widely used in mental health care and research. It is a brief 25-item questionnaire for assessing negative and positive behavioral attributes of children and adolescents aged 4–16 years, from the point of view of their parents (SDQ-P), teachers (SDQ-T) and of adolescents themselves when they are over

the age of 11. For the current study, we used the Italian version of the SDQ-P report (Tobia, et al., 2018), asking the parent to what extent both the positive and negative psychological attributes of the child were true in the past six months using a 3-point Likert scale (0 = not true, 1 = somewhat true, and 2 = certainly true). The SDQ involves four subscales evaluating youths'difficulties, namely, Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Problems, and one subscale assessing the youths' strengths, Prosocial Behavior. Each subscale includes five items, and its score ranges from 0 to 10. Higher scores suggest a higher degree of difficulties, except for the Prosocial Behavior score. The 25 SDQ items are divided between 5 scales of 5 items each, as shown below:

Emotional Symptoms Scale*:* "Often complains of headaches, stomach-ache or sickness"; "Many worries, often seems worried"; "Often unhappy, downhearted or tearful"; "Nervous or clingy in new situations, easily loses confidence"; and "Many fears, easily scared";

Conduct Problems Scale: "Often has temper tantrums or hot tempers"; *"Generally obedient, usually does what adults request"*; "Often fights with other children or bullies them"; "Often lies or cheats"; and "Steals from home, school or elsewhere".

Hyperactivity/Inattention Scale*:* "Restless, overactive, cannot stay still for long"; "Constantly fidgeting or squirming"; "Easily distracted, concentration wanders"; *''Thinks things out before acting";* and *"Sees tasks through to the end, good attention span'';*

Peer Problems Scale: *"Rather solitary, tends to play alone"; "Has at least one good friend"; ''Generally liked by other children"*; "Picked on or bullied by other children"; and "Gets on better with adults than with other children";

Prosocial Scale*:* "Considerate of other people's feelings "; "Shares readily with other children (treats, toys, pencils, etc.)"; "Helpful if someone is hurt, upset or feeling ill"; "Kind to younger children"; and "Often volunteers to help others (parents, teachers, other children)".

For all the items except the five printed above in italics, the item is scored 0 for "not true", 1 for "somewhat true", and 2 for "certainly true". The five items in italics describe positive

behaviors (items 7, 11, 14, 21, and 2), so it is necessary to reverse the scoring before adding them to the scores of the 4 subscales. For these five items, the item is scored 2 for "not true", 1 for "somewhat true", and 0 for "certainly true". The score for each of the five scales is generated by summing the scores for the five items that make up that scale, thereby generating a scale score ranging from 0 to 10. The scores for hyperactivity/inattention, emotional symptoms, conduct problems, and peer problems can be summed to generate a total difficulties score ranging from 0 to 40; the prosocial score is not incorporated in the reverse direction into the total difficulties score since the absence of prosocial behaviors is conceptually different from the presence of psychological difficulties. To obtain more information about children's behavioral, interpersonal, and emotional profile, it is necessary to consider separately the scores of the 5 subscales (Marzocchi *et al.,* 2002). Therefore, Tobia *et al.,* (2018) recommend to use the total difficulties score. This suggestion is in line with past studies concluding that the five subscales may not tap into distinct aspects of child mental health among low-risk community samples (Niclasen,2012; Goodman, 2010). In the current study, we used both raw scores of the separated 5 scales and the raw score of the total difficulties, based on the original three-band categorisation ("normal", "sub-clinical", and "clinical") (Goodman, 1997) as described in Table 2 according to the cut off scores recommended by Marzocchi, *et al.,* (2002) and Tobia et al., (2018) for the SDQ-ITA Italian version. The SDQ has been translated into over 80 languages (Español-Martín *et al*., 2021), but national norms are available only for a few countries (Stone, et al., 2010). It is commonly adopted in many European countries, including the United Kingdom (Goodman, 2001), Finland (Koskelainen, *et al*., 2000), Germany (Klasen, et al., 2000), Sweden (Smedje, et al., 1999), and Italy (Marzocchi, et al., 2002; Muratori, et al., 2019). Psychometric properties of SDQ-P and SDQ-T for assessing children aged 4–12 have been reviewed by Stone et al. (2010): the questionnaires showed globally satisfactory internal consistency, adequate test–retest reliability, and the original five-factor structure (Goodman, 1997) was confirmed in most of the studies considered. It was also showed that the agreement between parents and

teachers was relatively high (between 0.26 and 0.47) The italian version of the SDQ instrument is available online without charge from a website (https://sdqinfo.org) (accessed in January 2021), and therefore, it is practical and free to use within clinical settings. The SDQ, therefore, represents an agile tool for collecting the most important information on various psychological aspects of the child, but it cannot, be used alone as a tool for making a clinical diagnosis.

Table 2. Classification related to the score obtained in the different scales of the SDQ questionnaire

	Normal	Borderline	Clinical
Emotional Symptoms	0-3	4-5	6-10
Conduct Problems	0-3	4	5-10
Hyperactivity–Inattention	0-5	6-7	8-10
Peer Problems	0-2	3-4	5-10
Prosocial Behavior	5-10	4	0-3
SDQ total difficulties	0-13	14-15	16-40

Parents Self-Report Instruments

1) Alabama Parenting Questionnaire (APQ)

The parental function was measured by using the Italian version of Alabama Parenting Questionnaire (APQ; Frick, 1991; Benedetto & Ingrassia, 2012; 2013). The instrument is taken from the original American version edited by Frick, P.J., University of New Orleans Alabama, 1991. It was carried out from a "pool" of items traditionally used up to that time, in the mid-1990s, to assess the effectiveness of the styles of parenting (educational and caregiving styles) adopted by parents. Through previous research (Loeber & Stouthamer-Loeber, 1986; Loeber, *et al.*, 1987), the author has come to structure 5 constructs (or scales) for assessment: PI (Parental Involvement), PP (Positive Parenting), PM (Poor Monitoring), ID (Inconsistent Discipline) and CP (Corporal Punishment). The Italian version of the APQ was presented by Benedetto and Ingrassia (Benedetto, Ingrassia, 2012) to provide

researchers with an instrument that is easily understandable and administrable in Italy as well. There are 2 versions of the APQ: APQ Child Global Report and APQ Parent Global Report. The use and integration of the different versions makes it possible to assess the predominant parenting style through parents' self-reports and the views of the children. In the current study we used the Parent Global Report version of the APQ which is a widely used instrument to assess the parenting practices of parents of 3–14 school-age children. Respondents were given a list of 42 statements and asked to indicate how often each typically occurred in their home. Response options were never (0), almost never (1), sometimes (2), often (3), and always (4). The APQ has 35 items and seven additional items, which are not considered in any construct, that measure specific discipline practices other than corporal punishment (e.g. “As a punishment you deprive your child of money or limit some of his activities.") to avoid negative biases and to facilitate those parents who use the corporal punishment and who have fewer qualms about admitting it. The questionnaire is divided into 5 subscales. The two positive parenting domains subscales are (1) *parental involvement* (caring about the child's lives, friends and homework; 10 items, e.g. "Ask your child about his or her day at school."); and (2) *positive parenting* (parental nurturance/responsiveness, using positive reinforcement; 6 items, e. g. "You congratulate your child when he does something good."); and three negative parenting domains subscales: (3) *poor monitoring* (poor supervision to what the child is doing; 10 items, e.g. "You are so busy that you forget where your child is and what he is doing."); (4) *inconsistent discipline* (inconsistent application of discipline and rules, the child is threatened with punishment but then the parent does not actually punish him/her; 6 items, e.g. "You take a punishment away from your child earlier than when you had planned."); and (5) *corporal punishment* (3 items, e.g. "Smack your child when he or she has done something wrong."). Items are scored using a 5-point scale (“never”, “almost never”, “sometimes”, “often”, “always”). Higher scores on the positive parenting practice subscale (parental involvement and nurturance) and lower scores on the negative parenting practice subscales (poor

monitoring, inconsistent discipline, and corporal punishment) indicated more effective parenting practices and better parental function. Thus, high scores are interpreted differently depending on whether it is a subscale measuring adequate parenting practices or ineffective parenting practices; in other words, high scores recorded, for example, in the subscale related to parental involvement will reflect an adequate level of participation by the parent in the child's life (Esposito et al., 2016). Conversely, high scores related to the poor monitoring and/or supervision scale, will be interpreted as an inadequate child management and supervision mode. In the current study there is no total scoring of the entire scale, but rather the scores obtained and computed by the 5 subscales. Benedetto and Ingrassia (2012; 2014), confirmed good internal consistency and reliability for each subscale. They reported good Cronbach's values for the different subscales: involvement (α = .80); positive parenting (α = .80); poor monitoring and/or supervision (α = .84); inconsistent discipline (α = .59); and corporal punishment (α = .69). Esposito et al., (2015) also showed internal consistency ranging from 0.62 (poor monitoring) to 0.78 (parental involvement and positive parenting) for fathers, and from 0.56 (poor monitoring) to 0.70 (positive parenting) for mothers, with some variations in the correlations between scales.

2) Parenting Stress Index - 4 - Short Form (PSI-4-SF)

The Parenting Stress Index-4-Short Form (PSI-4-SF; Abidin, 1995; Guarino et al., 2008) is a reliable and widely used questionnaire designed to measure parental stress and difficulties with the parenting role of parents of 0 months up to 11 years children (Guarino et. al, 2008). In the current study the PSI/SF was used with parents of children older than 11 years according to Neelaveni, *et al*. (2014) and Marcela *et al*. (2016). It arises from the long form of the Parenting Stress Index-4 and it's composed of 36 sentences. All 36 items on the Short Form are contained in the Long Form and are written at a 5th-grade reading level. The parents must indicate how much they agree with each of the 36 sentences, according to a 5-

point Likert scale, ranging from "strongly agree" to "strongly disagree". The PSI consists of three subscales:

Parental Distress (PD) which indicates the level of discomfort that a caregiver is experiencing as a parent, also taking into consideration personal factors directly related to that role (e.g. *"I feel trapped by my responsibilities as a parent"*).

Parent-Child Dysfunctional Interaction Scale (P-CDI) referring to the parent's perception of interactions with his or her child (e.g. *"I expected to have closer and warmer feelings for my child than I do, and this bothers me"*);

Difficult Child (DC) referring to the parent's perception of his or her child's characteristics, which are rooted in temperament but also in learned patterns of behaviour (e.g. *"My child makes more demands on me than most children"*). High scores on this scale suggest that the child has self-regulatory, adjustment, and/or behavioral difficulties. The total stress (TS) scores, obtained by the sum of the scores of the 3 subscales, is an index of total parenting stress (Guarini *et. al*, 2016). The PSI-SF produces subscale raw scores ranging from 12 to 60 and an overall parenting stress total score that ranges from 36 to 180; a higher score indicates a greater level of stress. The raw score was converted to t-scores based on age. In the current study a score between 85 - 89 percentiles was used as the cutoff as high level of stress and a score ≥ 90 percentiles indicates a clinically significant level of parenting stress according to Guarini *et al*. (2008). The PSI-SF also includes a defensive response scale (DF), derived from the Marlowe-Crowne Social Desirability Scale, MC-SDS (Marlowe & Crowne (1960)) useful for verifying the validity of the protocol as it indicates whether the parent tends, for example, to present a better self-image or to minimize problems and perceived stress in the relationship with the child. Very low scores (equal to or less than 10) open to several possible interpretations: (1) The subject is trying to portray himself or herself as a competent individual deprived of the stresses normally associated with parenthood (2) He or she is not acting out the role since he or she is not very present (3) The parent is affectively very competent in handling parenting responsibilities well and is able to have excellent

relationships with his or her spouse. The PSI-4-SF demonstrates excellent psychometric properties, with a Cronbach's α exceeding .80 (Hasket et al., 2006). Its validity and reliability have been substantiated across diverse populations (Aracena et al., 2016; Lee, 2016).

3) Brief Symptom Inventory (BSI-53)

The BSI (Derogatis & Melisaratos, 1983) is a shortened, 53-item version of the Symptom Checklist-90-R (Derogatis, 1975; 1993; Derogatis and Spencer, 1982) that measures emotional-behavioral functioning in nine dimensions. Four additional items not specific to any one domain load on several different dimensions. In addition, three global indices – Global Severity Index (GSI), Positive Symptom Total (PST), and Positive Symptom Distress Index (PSDI), provide more general assessment of psychological well-being. Not intended for use as diagnostic tools, the instrument is designed to identify psychological symptoms in medical populations, psychiatric patients, and community non-patients, with separate norms for males and females. In the current study the BSI italian version (Leo et al., 1993) was self-administered separately to mothers and fathers. Respondents rated the extent to which a specific problem had distressed them in the past 7 days, using a 5-point scale (0 = not at all to 4 = extremely). Administration is straightforward, taking 8–10 min (BSI) to complete. BSI measures the same dimensions of the SCL-90-R and the items for each dimension of the BSI were selected based on a factor analysis of the SCL-90-R. Derogatis & Clearly (1977a, 1997b) evaluate the item-dimensions correlation of the SCL-90-R and the items that loaded highest on each dimension were selected to form the BSI. The BSI covers nine primary symptom dimensions (plus the 3 global indices): *somatization* (SOM, which reflects distress arising from bodily perceptions), *obsessive-compulsive* (O-C, which reflects obsessive-compulsive symptoms), *interpersonal sensitivity* (I-S, which reflects feelings of personal inadequacy and inferiority in comparison with others), *depression* (DEP, which reflects depressive symptoms, as well as lack of motivation), *anxiety* (ANX, which reflects anxiety symptoms and tension), *hostility* (HOS, which reflects symptoms of negative affect,

aggression and irritability), *phobic anxiety* (PHOB, which reflects symptoms of persistent fears as responses to specific conditions), *paranoid ideation* (PAR, which reflects symptoms of projective thinking, hostility, suspiciousness, fear of loss of autonomy), and *psychoticism* (PS, which reflects a broad range of symptoms from mild interpersonal alienation to dramatic evidence of psychosis). Written at a sixth-grade reading level, the BSI can be hand-or-computer-administered to individuals ages 13 and older. Scores derived by summing values for each symptom dimension and then dividing by number of items endorsed in the respective dimension. GSI can be calculated by adding the scores for all subscales, as well as the additional items, and then dividing by number of responses (53, if any item was missing). The PST was calculated by counting the number of items endorsed with a positive (nonzero) response, and the PSDI is derived by dividing the sum of the item values by the PST. Raw scores can be converted to standardized T scores, generating a profile that graphically illustrates a respondent's current psychological symptom presentation. Interpretation of the BSI can be done at three levels: global scores, primary symptom dimensions, and discrete symptoms (Derogatis & Melisaratos, 1983). The GSI is the most sensitive indicator of the subject's distress level and according to Khun *et al.,* 1988; Zabora *et al.,* 1990) a parent respondent was considered a *"positive case"* when the GSI score was greater than or equal to a T score of 63, or if any two primary dimensions scores were greater than or equal to a T score of 63. The BSI has been translated into several languages in the decades since its development (Leo *et al*., (1993); Francis *et al*., (1990); Gilbar, *et a.l* (2002); Urbán *et al*., (2014); Jahn *et al.* (2016); Kwee *et al.,* (2019)). The reliability reported in the original manual ranged from 0.71 for Psychoticism to 0.85 for the Depression dimension. Test-retest reliability was demonstrated with global indices ranging from 0.87 (PSDI) to 0.90 (GSI) and for all dimensions, ranging from 0.68 (Somatization) to 0.91 (Phobic Anxiety).

4) Beck Depression Inventory - Short Form (BDI-SF)

All parents were asked to complete the Beck Depression Inventory (BDI-SF; Beck & Beck, 1972) which consists of 13 phrases expressing the person's feelings during the current week (e.g., 0 = I don't feel sad; 1= I feel sad; 2= I'm always sad and can't get out of it; and 3 = I'm so sad or unhappy that I can't stand it). In the present study we used the Italian version of the BDI-SF, translated and adapted by L. Conti, University of Pisa. Participants were asked to select the option that is closest to their feelings. Each item scored on a 4-point scale; a total score is computed by summing the item values, with higher scores indicating more depression (score ranges from 0 to 39). The score of 0–4 consider as non-depressed, the score of 5–7 as mild depression, score of 8–16 moderate depression, and over 16 consider as severe depression (Beck & Beck, 1972). The BDI-SF was developed by the original Depression Inventory which comprises 21 items relevant to various aspects of the depressive syndrome. Each item consists of four alternative statements graded in severity from 0 to 3. Because of the desirability of developing a shorter form which could be administered more rapidly, the accumulated data on the Depression Inventory were reanalyzed. From these data, the independent correlations of each of the 21 items with the total Depression Inventory score and with the clinician's global rating of depression were computed. The items were ranked separately for each of the two correlations and the two ranks were then consolidated into a final one. Beck and Beck (1972) found that this short form of the Depression Inventory correlated .96 with the total score and .61 with the clinician's ratings of depression. As in the original form, each item in the shortened version consisted of 4 alternative statements that were graded to reflect the severity of the specific symptom. However, the hierarchy of the statements within each item was reversed so that the alternative representing the maximal morbidity was first and the statement reflecting absence of the specific symptom was last (e.g. 0 = I don't feel disappointed in myself, 1 = I am disappointed in myself, 2 = I am disgusted with myself, 3 = I hate myself). The study indicates that the 13-item form of the Depression Inventory has a high degree of internal consistency, correlates well with clinician's ratings of depression, and shows a high correlation with the original 21-item

form. The concurrent validity of the new version compares favorably with the findings using the long form. Depending on the sample, the correlations of the shore form with clinical ratings range from .55 to .67 (Beck *et al*., 1974). Previous studies by Beck (1972) using the long form showed correlations ranging from .61 to .67.

5) Beck Hopenessless Scale (BHS)

All parents were asked to complete the Beck Hopelessness Scale (BHS, Beck & Steer, 1993), a self-report instrument, formulated to measure, in the previous week, the extent of negative or positive views about the future. We decided to use this instrument also to evaluate the feeling of hopelessness related to respondents' perceptions of their parental effectiveness in managing their child's psychological issues in daily life. It consists of 20 items covering three domains: feelings about the future, loss of motivation and future expectations. Respondents indicated whether each statement applied to them by selecting "true" or "false". The total BHS score varies from 0 to 20, with higher scores reflecting higher levels of hopelessness. Specifically, total scores of 0–3 are not pathological, while 4–8 suggest mild hopelessness, 9–14 suggest moderate hopelessness and scores greater than 14 indicate severe hopelessness (Simonetti *et al.*, 2014). The Italian validation (Pompili *et al*, 2009) was conducted on three separate samples: 577 university students, 976 subjects from the general population, a group of 169 psychiatric patients, of whom, 58 had previously attempted suicide and 76 subjects were assessed to be at risk of suicide. Statistical analyses of reliability as internal consistency showed the Kuder-Richardson coefficients (KR-20) for dichotomous items in the three samples, respectively: 0.75, 0.78 and 0.89, thus very satisfactory. Exploratory factor analysis (AFE) and confirmatory factor analysis (AFC) revealed a single-factor structure that clearly identifies the despair construct. The discriminative power of the test was studied by comparing the clinical group with a group paired with the former and randomly drawn from subjects from the general population; the comparisons made were all statistically

significant and revealed the greater presence of hopelessness in the clinical group, thus clearly differentiating the two groups.

6) Demoralization Scale-I (DS-I)

All parents were asked to complete the Demoralization Scale-I (DS-I) developed by Kissane et al. (2004) and then translated in Italian by Costantini *et al.,* (2013). The instrument is a 24-items self-report for demoralization symptoms and is derived from the characterization of the demoralization syndrome in cancer patients (Kissane et al., 2004; Clarke, 2011). Demoralization is defined as a perceived inability to cope with a stressor, resulting in feelings of hopelessness and helplessness, a sense of incompetence or failure, and loss of meaning and purpose (Clarke *et al.,* 2002; Kissane *et al.,* 2004). It is a mental state commonly observed in palliative care patients who suffer from existential distress (Kissane *et al.,* 2001; Robinson *et al.,* 2016). Indeed, demoralization syndrome has frequently been studied in the context of patients with cancer at the end of life (An *et al.,* 2018; Vehling, *et al.*, 2019; Grassi *et al.,* 2005) in which clinically significant demoralization rates range between 13 and 18% (Robinson *et al.,* 2015). Demoralization syndrome has attracted increasing research interest also in the context of other chronic physical illnesses (Tecuta, et al., 2015), including Parkinson disease (Koo, *et al.,* 2018), eating disorders (Fichter, *et al.*, 1993), pain (Koo, *et al.,* 2021) and organ transplantation (Rzeszut, et al., 2021; Grandi, *et al*., 2011). In order to adapt the original questionnaire (Kissane *et al.,* 2004) for Italian patients, the original scale was independently translated into Italian by two experts, a native English speaker fluent in Italian and a native Italian speaker fluent in English, and the preliminary Italian version was produced comparing the two translations with the mediation of an external expert. This version was subjected to retroversion procedure from English to Italian, by a U.S. MD, living in Italy, with extensive fluency in Italian, until the scale was optimized, and a substantial semantic equivalence was achieved. The study showed a good degree of stability and internal consistency of DS total score (α=0.90) and the 5 factors represented by (1) *loss of*

meaning and purpose (5 items,; $\alpha = 0.83$), (2) *dysphoria* (5 items; $\alpha = 0.72$), (3) *disheartenment* (6 items; $\alpha = 0.82$), (4) *hopelessness* (4 items; $\alpha = 0.85$) and *sense of failure* (4 items; $\alpha = 0.74$). Items are rated on a 5-point Likert scale ranging from 0 ("never") to 4 ("all the time") over the past 2 weeks. A total score for demoralization is calculated by summarizing the single subscale scores. In the DS validation study (Kissane et al., 2004), an average total DS score of 30.82 (SD=12.73) is reported in a sample of Australian cancer patients, and an overall score above 30 is identified as a cut-off for identifying severe demoralization. In contrast, the research group of Mullane *et al*., (2009) showed significantly lower demoralization values (M=19.94, SD=14.62) in according to Costantini *et al.,* (2013) for the Italian version (M=23,9, SD=14,5). In addition, in a more recent study, Grassi *et al.,* (2017) reported a DS-IT total mean score of 23.55 ± 14.1 in a sample of 194 cancer patients. With regard to the scoring procedure to evaluate the prevalence of demoralization in their sample, the authors used 3 different methods: (1) as recommended by Mullane, *et al*. (2009) (low scorers, <mean − 1SD; middle scorers, mean − 1SD to mean + 1SD; and high scorers, >mean + 1SD), (2) following instructions by Robinson *et al.,* (2016 (low scorers, 0-25th percentile; middle scorers, 25th-75th percentile; and high scorers, >75th percentile) and a (3) mixed method (no/very low, <mean − 1SD; moderate, scores 25th-75th percentile; moderately severe, scores 75th percentile, mean + 1SD; and severe, >mean + 1SD). According to Mullane et al., (2009) and Robinson et al., (2016), most of the population (69,1 %) showed moderate levels of demoralization. Otherwise using the third mixed method only a small subgroup of patients (7.2%) was in an intermediate area (moderately severe demoralization). Thus, Grassi et al., (2017) recommended further investigation to better qualify the continuum of demoralization in clinical care of cancer patients. Most research on the construct of demoralization has focused on patients with serious illness and the impact it can have on patients' well-being and quality of life and likewise studies on DS validation and psychometric properties have often involved samples of cancer patients. More recently Quintero Garzón, *et al.*, (2021) used a 2470 sample of general population in order to provide

normative data as well as psychometric quality criteria on demoralization. According to their findings, we decided to use a threshold score of ≥30 as indicator for clinically relevant moderate demoralization.

7) The Post-Traumatic Embitterment Disorder Self-Rating Scale (PTED Scale)

Parents of difficult children with emotional and/or behavioral problems experience the bitter feeling that they are victims of profound injustice because of their children psychopathological state, and they often report being treated unfairly by fate. So that, they perceive the situation as uncontrollable and experience helplessness and feelings of sadness. Embitterment can become a persistent self-reinforcing condition, in which parents are intensively engaged in ruminations on what happened to them (Nanni *et al.*, 2018). Hence parents were asked to answer to the Post-Traumatic Embitterment Disorder Self-Rating Scale (PTED; Linden et al., 2009) which is designed to assess features of embitterment reactions to negative life events. The characteristic features of reactive embitterment as outlined by Linden (2003) were summarized and translated into self-rating questions by an expert team of researchers experienced with pathological reactive embitterment. We used the Italian the most recent version of the PTED Self-Rating Scale consisting of 21 items to which parents are asked to indicate on a five point scale to what degree the statement applies to. It starts with the statement "*During recent years, there was a severe and negative life event…*," which is followed by answers such as "*…that makes me feel guilty and makes me feel angry with myself*", and "*… that gives me the feeling that it is useless to make an effort to improve the situation*", or "*… that caused me to withdraw from friends and social activities.*" The scale ranges from (0) "not true at all", (1) "hardly true", (2) "partially true", (3) "very much true" to (4) "extremely true". The total score of the questionnaire is obtained by summing all items and dividing the value obtained by the number of items. That is the mean score from the scale indicates the overall degree of embitterment. Linden *et al.*, (2009) suggest that a score greater than or equal to 1 is indicative of some symptoms of embitterment; a score greater than or equal to

2 is indicative of clinically significant symptoms of embitterment and a score greater than or equal to 2.5 is indicative of severe embitterment.

8) Adult Attachment Questionnaire by Salvo & Cusinato (QAA-SC)

The Questionnaire of Attachment among Adults (QAA-SC) by Salvo and Cusinato (1996) is a self-report instrument utilizing a four-point Likert scale, where respondents indicate their level of agreement or disagreement with 56 statements. The QAA-SC was developed based on Griffin and Bartholomew's (1994b) Relationship Scales Questionnaire (RSQ). Salvo and Cusinato (1996) initially compiled 84 items, incorporating the 30 statements from the RSQ and 54 additional items selected from relevant literature. After this initial synthesis, the items were organized into a 56-questionnaire and administered to a sample of 196 subjects between the ages of 16 and 80. Factor analyses conducted revealed four factors, corresponding to Bartholomew's (1990) prototypes. Bartholomew and Horowitz (1991) suggest that varying combinations of positive and negative perceptions of oneself and others shape behavior, emotions, and well-being in interpersonal contexts. Four distinct attachment styles are identified in adulthood: “secure”, “insecure-preoccupied”, “insecure-fearful”, and “insecure-dismissive” (Bartholomew and Horowitz, 1991). There is a conceptual parallel between infant-caregiver attachment and adult romantic attachment, as both encompass four fundamental features: secure base, proximity maintenance, safe haven, and separation distress (Ainsworth *et al.*, 1978; Hazan & Zeifman, 1999). However, adult romantic attachment differs from infant-caregiver attachment in that it is reciprocal, involving both caregiving and receiving, complemented by the sexual mating system, which supports species propagation (Bretherton & Munholland, 1999; Hazan & Zeifman, 1999). The secure attachment style is characterized by a positive, adaptive view of both self and others. In contrast, the three insecure attachment styles exhibit negative, maladaptive views of self-and/or others. Preoccupied attachment involves a negative self-view but a positive view of others. Dismissing attachment is marked by a positive self-view but a negative view

of others. Fearful attachment, which is potentially linked to the poorest outcomes, reflects negative views of both self and others (Riggs et al., 2007). A negative self-view is associated with attachment anxiety and a hyperactivating strategy in interpersonal relations, while a negative view of others correlates with attachment avoidance and a deactivating interpersonal strategy (Brennan, *et al.*, 1998; Griffin & Bartholomew, 1994; Mikulincer & Florian, 1998). For instance, the QAA-SC explores the attachment styles that adults implement in a current relationship (Agostoni & Manzoni, 2007), assessing the four established attachment classifications: secure (F), insecure-preoccupied (E), avoidant dismissing (DS), insecure-fearful (U). For our present study, the attachment representations of both mothers and fathers were categorized into two major classifications: "secure" and "insecure." Although the three distinct insecure attachment patterns were individually scored and analyses were conducted considering the three distinct insecure attachment, then we simplified the classification into two major classifications: "secure" and "insecure" attachment representations. This approach allowed us to focus on the overarching distinction between secure and insecure attachment representations when interpreting the results. The insecure attachment representation was comprised of attachment status: E, DS, U. According to the authors, the instrument adequately reflects Bartholomew's (1990) four-part model, although the overall percentage of variance explained by the four factors identified in the analysis is not high. The internal consistency of the four subscales ranges from $\alpha = .38$ to $\alpha = .7483$. Additionally, a significant difference was found on the Dismissive scale concerning age: specifically, individuals in the 41-60 age group reported significantly higher scores compared to those in the 16-40 age group. There are no available data on the concurrent validity of the questionnaire in the literature.

2.3 Statistical analysis

The study presents a comprehensive analysis of the circular relationship between parents' and children's psychological aspects, integrating both traditional statistical methods and machine learning techniques. After sample description and data narrative description, analysis was split in two directions, exploring how parents psychological and psychopathological facets could be related to children's emotional and behavioral impairments and vice versa: (1) Parent-to-Child Analysis: this direction explores how parents' psychological aspects could be associated to children's psychological and behavioral issues. I investigated factors such as parental stress levels, mental health, educational practices and adult attachment representations to understand their impact on children's emotional and/or behavioral problems; (2) Child-to-Parent Analysis: in this direction, we examined how children's emotional and/or behavioral problems could be related to parents' psychological and psychopathological facets. I assessed factors such as emotional and behavioral difficulties to explore their impact on parent's stress levels, psychological well-being, adult attachment representations and educational practices.

Here is a breakdown of the steps I have taken:

- *Sample description*: Means, standard deviations, frequencies and proportions were provided (Table 1);

- *Data Distribution Analysis*: Narrative description of the data including summary statistics such as mean, standard deviation, minimum, maximum, to provide a quantitative overview of each variable's distribution for each variable (scale or subscale) and through *skewness* and *kurtosis* we examined the normality of the data distribution both for parents' and children's predictor variables included in analysis (see Table 2, Table 3, Table 4).

- *Univariate analysis*

(1) Parent-to-Child Analysis: A univariate analysis was carried out to evaluate the relationship between parents' psychological and psychopathological aspects (independent variables: PSI-4-SF, BSI, BDI-SF, DS-I, PTED, BHS, APQ, AAQ. Mothers and fathers were distinctly classified into three classes -levels- according to the scores obtained at the PTED, BHS, and PSI-4-SF scales; into two classes -levels- according to the BSI, APQ, and AAQ scores) and children's emotional and/or behavioral problems (dependent variables: scores obtained at the SAFA, CBCL, SDQ, and SAT);

(2) Child-to-Parent Analysis: A univariate analysis was conducted to explore the relationship between children's emotional and behavioral problems (independent variables: classified into three levels based on scores from SAFA, CBCL, SDQ-ITA subscales, and into four levels for SAT scores) and parents' psychological and behavioral aspects (dependent variables: scores obtained separately by mothers and fathers from the PTED, BSI, BHS, BDI-SF, QAA-SC, DS, PSI-4-SF, and APQ).

As many data did not meet the criteria of a normal distribution and the sample size was small, a non-parametric method, the Mann-Whitney U Test, was used to compare the distribution of a continuous variable (e.g., parental stress level) between two independent groups (e.g., children classified as "non-clinical" vs. "clinical" or "borderline" vs "clinical", etc). The test assessed whether there were statistically significant differences in the mean ranks of a variable between the groups. Significance level (α) was typically set at $p<0.01$.

- *Machine Learning Decision tree analysis*

A decision tree analysis was conducted to establish a classification model for predicting both (1) children's emotional and/or behavioral problems and (2) parents' (distinctly mothers and fathers) psychological and psychopathological aspects. Decision trees are a popular machine learning algorithm for classification tasks. They are particularly useful because of their simplicity and interpretability (Müller, *et al.*, 2016). The goal of a decision tree model

is to make predictions or decisions by recursively partitioning a dataset into subsets based on available data, aiming for accurate and interpretable results.

At the first step, in the decision tree analysis, children were partitioned into subgroups in a way that maximized the differences between them regarding the outcome variable, which is typically a measure of children's emotional and/or behavioral problems. Predictor variables (that were believed to be relevant to the outcome variable) were selected, these included factors such as parental stress levels, parenting practices, or other psychological parents' variables. Children were divided into subgroups that differed maximally from each other with respect to the outcome variable based on the values of predictor variables. The present outcome variable was the presence of emotional and/or behavioral problems.

In a second step, in turn, a decision tree analysis was conducted to establish a classification model for predicting parents' (mothers' and fathers') psychological and psychopathological aspects based on children's emotional and/or behavioral problems. The decision tree aimed to partition the dataset into subsets that maximized differences regarding the outcome variable, which was a measure of the parents' psychological states (well-being, attachment representations, stress levels, and educational practices).

The decision tree algorithm was then applied to the dataset. This algorithm recursively split the data into subsets based on the predictor variables. This means that each split aims to create subsets of children or parents that are as different as possible from each other in terms of their levels of the outcome variables. The process of splitting the data into subgroups continues recursively until a stopping criterion is met. This criterion was based on Minimum Improvement in Impurity (Gini or Entropy)[2]. After conducting LOOCV (Leave-One-Out-

[2] Gini index and Entropy are two common metrics used to measure impurity or randomness in decision trees. Both the Gini index and Entropy are used as impurity measures in decision trees, with the goal of minimizing impurity at each split, thereby creating more homogeneous child nodes. The *Gini index* measures the degree or probability of a particular variable being wrongly classified when it is randomly chosen. It ranges from 0 to 1, where 0 represents that all elements belong to a certain class, and 1 represents that the elements are randomly distributed across various classes. In decision trees, it's used as a criterion for finding the optimal split. *Entropy* measures the amount of disorder or randomness in the data. It's derived from information theory and quantifies the uncertainty associated with a random variable. In the context of decision trees, entropy is used to calculate the homogeneity of a sample. It ranges from 0 to 1. The closer the entropy value is to 0, the more homogeneous the dataset is after a split, and the better the decision tree can classify new instances.

Cross-Validation), we examined the performance of each decision tree model through the Optimized Tree model likely being the best candidate for prediction accuracy due to its demonstrated superior performance across different metrics.

The data distribution analysis and univariate analysis were all performed using Julia version 1.10. As growing method, CART (Classification And Regression Trees) was applied for the decision tree analysis (Breiman, 2017).

Conversely, the closer the entropy value is to 1, the more mixed the dataset is, and the less effective the decision tree might be at making accurate predictions (James, *et al.*, 2013)

3. RESULTS

- Sample description and data distribution

Among the 57 patients initially involved, 11 were excluded because of incomplete questionnaires (n=6) or drop out (5) during the evaluating process. As a result, we are unable to gather comprehensive data on these patients, and no further information is available regarding their clinical profiles or outcomes. This lack of complete data means that we cannot make any meaningful comparisons between these excluded individuals and the remaining participants. A total of 46 patients (mean age 10 ± 2) (34 boys, 74%; 12 girls, 26%) were ultimately included in this study. The socio-demographic characteristics of the patients and their parents are shown in Table 1.

Table 1. Sample Sociodemographic description

		Children				Mothers				Fathers			
		M	SD	N	%	M	SD	N	%	M	SD	N	%
Age		10	2	46	100	44	5	6	50	47	6	46	50
Gender	Male			34	73,91								
	Female			12.	26,08								
ICD 10 code	Emotional problems F30-39/F40-48/F93			16	34,78								
	Behavioral problems F91			15	32,60								
	Emotional and Behavioral problems F92/F98.8			15	34,78								
Severity of psychopathology	Mild			11	23,91								
	Moderate			17	36,95								
	Severe			18	39,13								
Educational level	Elementary/middle school							3	6,52			8	17,39
	High school							26	56,52			27	58,69
	College							17	36,95			11	23,91

According to the ICD-10 diagnosis, F-30-39: mood and affective disorders; F40-48: neurotic, stress-related, and somatoform disorders; F93: emotional disorders with specific onset in childhood and adolescence; F40-48, neurotic, stress-related, and somatoform disorders; F93:emotional disorders with specific onset in childhood and adolescence; F.91:conduct disorders; F92: mixed emotional and behavioral disorder; F98.8: other behavioral/emotional disorders with onset in childhood and adolescence.

Mothers and fathers did not differ statistically significantly in the variables considered. A few tests did not yield statistically significant results, possibly because they are typically used in populations with cancer (DS-I) or individuals who have experienced severe trauma (PTED), and there is still limited literature on their application in other contexts (Gan, *et al*., 2021; Nanni, *et al*.., 2018). Additionally, both the Beck Hopelessness Scale (BHS) and the Beck Depression Inventory-II-Short Form (BDI-II-SF) did not produce statistically significant outcomes. However, the Global Severity Index (GSI) from the Brief Symptom Inventory (BSI), which measures general psychopathology rather than identifying specific symptoms, did show significant results. This could be attributed to social desirability bias, where participants may have exhibited defensive attitudes. The statistical descriptions for parental variables are presented separately for mothers (Table 2) and fathers (Table 3), with additional descriptions provided for children (Table 4).

Table 2. Descriptive Statistics (Mothers, n = 46)

	M	*SD*	Observed range	Skewness	Kurtosis
PTED	0.5	0.6	0 - 2.3	1.32	0.85
BSI-53					
SOM	0.2	0.3	0 – 1.3	1.63	2.11
O-C	0.5	0.6	0 – 2.2	1.05	0.54
I-S	0.3	0.4	0 – 2.2	2.42	7.10
DEP	0.3	0.4	0 – 1.8	1.84	3.87
ANX	0.4	0.4	0 – 1.8	1.54	1.83
HOS	0.3	0.4	0 – 1.6	1.64	2.47
PHOB	0.1	0.3	0 – 1.6	4.54	22.63
PAR	0.5	0.4	0 – 2.4	1.60	2.71
PS	0.2	0.4	0 – 1.8	2.71	7.73
GSI	0.4	0.4	0 – 2.1	2.32	6.07
BDI-SF	3.4	3.7	0 – 14	1.42	1.20
QAA-SC					
F	49.2	8.4	33 - 66	-0.12	-0.88
E	24.4	8.9	14 - 47	0.96	0.06
DS	32.7	8.9	15 - 56	0.58	0.35
U	24.7	8.0	14 - 45	0.71	-0.27
DS-I					
Loss of meaning	1.0	1.9	0 - 9	2.40	5.99
Dysphoria	4.8	3.9	0 - 17	1.09	0.75
Disheartenment	5.2	3.0	1 - 14	1.09	0.77
Hopelessness	1.8	2.0	0 - 8	1.15	1.05
Sense of failure	10.5	3.7	4 - 16	-0.47	-0.84
Tot	12.8	8.8	3 - 42	1.37	1.85
BHS	5.6	4.2	0 - 16	0.60	-0.66
PSI-4-SF					
DC	31.1	7.2	18 - 44	0.23	-0.88
P-CDI	28.8	8.8	15 - 48	0.46	-0.75

PD	26.6	8.5	12 - 48	0.22	-0.39
Tot	86.6	21.1	47 - 133	0.35	-0.52
APQ					
PI	35.8	6.2	17 - 44	-1.14	1.005
PP	24.2	4.2	9 - 30	-1.30	2.16
PM	13.3	3.6	10 - 30	2.36	8.38
ID	14.0	3.6	7 - 22	-0.07	0.31
CP	4.2	1.4	3 - 9	1.30	1.74

PTED – Post Traumatic Embitterment Disorder; BSI-53-Brief Symptom Inventory-53; SOM-Somatization; O-C-Obssessive-Compulsive; I-S-Interpersonal Sensitivity; DEP-Depression; ANX-Ansia; HOS-Hostility; PHOB- Phobic anxiety; PAR-Paranoid ideation; PS- Psychoticism; GSI-Global Severity Index; BDI-SF-Beck Depression Inventory-Short Form; QAA-SC-Adult Attachment Questionnaire of Salvo &Cusinato; F-Secure; E-Preoccupied; DS-Dismissing; U-Fearful; DS-I-Demoralization Scale-I; BHS- Beck Hopelessness Scale; PSI-4-SF-Parent Stress Index-4-Short Form; DC-Difficult child; P-CDI-Parent-Child Dysfunctional Interaction; PD-Parental Distress; APQ-Alabama Parenting Questionnaire; PI-Parental Involvment; PP-Positive Parenting; PM-Parental Monitoring; ID-Inconsistent Discipline; CP-Corporal Punishment

Table 3. Descriptive Statistics (Fathers, n = 46)

	M	*SD*	Observed range	Skewness	Kurtosis
PTED	0.6	0.7	0 - 2.3	1.17	0.60
BSI-53					
SOM	0.4	0.5	0 – 1.9	1.24	0.84
O-C	0.6	0.7	0 – 3.3	1.66	3.29
I-S	0.5	0.6	0 – 2.0	1.01	-0.35
DEP	0.4	0.4	0 – 1.8	1.54	2.44
ANX	0.5	0.4	0 – 2.0	1.05	0.99
HOS	0.4	0.5	0 – 2.4	2.05	4.88
PHOB	0.1	0.2	0 – 1.0	2.22	4.83
PAR	0.5	0.5	0 – 1.6	0.44	-1.29
PS	0.2	0.4	0 – 1.4	1.66	1.99
GSI	0.5	0.4	0 – 1.8	0.98	0.44
BDI-SF	4.1	3.6	0 - 12	0.56	-0.81
QAA-SC					
F	48.9	8.4	28 - 67	-0.20	0.005
E	23.5	7.6	14 - 44	0.89	0.32
DS	29.9	8.8	14 - 50	0.04	-0.74
U	24.2	8.1	14 - 47	1.05	0.81
DS-I					
Loss of meaning	1.1	2.1	0 - 9	2.07	4.11
Dysphoria	5.7	3.6	0 - 14	0.15	-0.79
Disheartenment	6.2	3.7	2 - 15	0.97	-0.21
Hopelessness	2.2	2.3	6 - 47	0.86	-0.30
Sense of failure	9.8	2.8	4 - 15	-0.30	-0.39
Tot	22.5	10.8	6 - 47	0.42	-0.50
BHS	2.2	2.3	0 - 8	0.42	-0.70
PSI-4-SF					
DC	31.5	6.3	18 - 47	-0.07	0.11
P-CDI	30.4	8.9	15 - 50	0.43	-0.76
PD	27.9	8.7	12 - 49	0.49	-0.47
Tot	89.8	21.3	47 - 138	0.23	-0.41
APQ					
PI	39.1	3.8	31 - 47	0.16	-0.78
PP	25.8	2.8	18 - 30	-0.95	0.48
PM	12.4	2.6	10 - 19	0.93	-0.24
ID	14.5	3.6	8 - 22	0.23	-0.63
CP	4.6	1.5	3 - 8	0.70	-0.36

PTED – Post Traumatic Embitterment Disorder; BSI-53-Brief Symptom Inventory-53; SOM-Somatization; O-C-Obssessive-Compulsive; I-S-Interpersonal Sensitivity; DEP-Depression; ANX-Ansia; HOS-Hostility; PHOB- Phobic anxiety; PAR-Paranoid ideation; PS- Psychoticism; GSI-Global Severity Index; BDI-SF-Beck Depression Inventory-Short Form; QAA-SC-Adult Attachment Questionnaire of Salvo &Cusinato; F-Secure; E-Preoccupied; DS-Dismissing; U-Fearful; DS-I-Demoralization Scale-I; BHS- Beck Hopelessness Scale; PSI-4-SF-Parent Stress Index-4-Short Form; DC-Difficult child; P-CDI-Parent-Child Dysfunctional Interaction; PD-Parental Distress; APQ-Alabama Parenting Questionnaire; PI-Parental Involvment; PP-Positive Parenting; PM-Parental Monitoring; ID-Inconsistent Discipline; CP-Corporal Punishment

Table 4. Descriptive Statistics (Children, n = 46)

	M	*SD*	Observed range	Skewness	Kurtosis
SAFA					
Anxiety	58.3	11.2	35 - 75	-0.34	-0.73
Depression	58.7	10.9	31 - 74	-0.40	-0.78
Obsessive Compulsive	45.0	11,6	25 - 73	0.42	-0.40
Eating problems	54.6	11.9	32 - 75	0.21	-0.75
Somatic and hypochondria symptoms	52.8	13.6	34 - 91	1.05	0.63
SAT	2.1	1.0	1 - 4	-0.70	0.49
CBCL as reported by mothers					
Internalizing problems	63.5	8.4	45 - 81	-0.38	-0.02
Externalizing problems	58.9	9.0	40 - 78	-0.02	-0.54
Internalizing/ Externalizing problems	62.5	8.5	43 - 76	-0.21	-0.56
CBCL as reported by fathers					
Internalizing problems	61.2	8.9	45 - 83	0.48	-0.34
Externalizing problems	56.6	11.1	33 – 58	-0.42	-0.57
Internalizing/ Externalizing problems	59.6	8.8	41 - 76	0.04	-0.68
SDQ as reported by mothers					
Emotional Symptoms	3.9	2.3	0 - 8	0.35	-1.07
Conduct Problems	3.1	2.1	0 - 9	0.76	0.77
Hyperactivity–Inattention	5.1	2.4	1 - 10	0.39	-8.10
Peer Problems	3.3	2.5	0 - 10	0.40	-0.51
Prosocial Behavior	7.6	2.1	2 - 10	-0.78	-0.26
Total problems	15.5	6.5	4 - 32	0.46	-0.32
SDQ as reported by mothers					
Emotional Symptoms	4.0	2.2	1 - 9	0.75	-0.009
Conduct Problems	3.1	2.0	0 - 8	0.32	-0.55
Hyperactivity–Inattention	5.2	2.4	0 - 10	-0.12	-0.87
Peer Problems	2.9	2.5	0 - 8	0.32	-1.13
Prosocial Behavior	7.3	2.2	2 - 10	-0.76	-0.54
Total problems	15.2	6.3	1 – 25	0.04	-0.90

SAFA- Self-Administered Psychiatric Scales For Children and Adolescents; CBCL-Child Behavior and CheckList; SDQ-Strenghts and Difficulties Questionnaire

The decision to analyze fathers' and mothers' self-reports (CBCL/6-18; SDQ) on their children separately was reevaluated after conducting a Mann-Whitney U test, which indicated no statistically significant differences between the two groups across all scales and subscales ($p < 0.01$; see Table 5). Given the absence of significant differences and the complexity of managing multiple variables, it was deemed more efficient and methodologically sound to combine the reports from both parents for a streamlined analysis.

Table 5. Comparison of Mothers' and Fathers' Reports on Children's Emotional and Behavioral Problems (CBCL/6-18 and SDQ): Mann-Whitney U Test (p < 0.01)

		M	*SD*	*P*
CBCL				
	Mothers	63,50	8,40	
Internalizing problems	Fathers	61,17	8,88	0,108
	Mothers	58,91	9,03	
Externalizing Problems	Fathers	56,63	11,08	0,402
	Mothers	62,50	8,45	
Total Problems	Fathers	59,56	8,76	0,101
SDQ				
	Mothers	3,89	2,34	
Emotional Syptoms	Fathers	3,97	2,18	0,749
	Mothers	3,13	2,11	
Conduct Problems	Fathers	3,08	2,009	0,977
	Mothers	5,13	2,41	
Hyperactivity/Inattention	Fathers	5,19	2,38	0,801
	Mothers	3,34	2,47	
Peer Problems	Fathers	2,93	2,49	0,427
	Mothers	7,56	2,11	
Prosocial Behavior	Fathers	7,28	2,23	0,535
	Mothers	15,5	6,47	
Total Difficulties	Fathers	15,96	6,28	0,937

CBCL/6-1- Children Behavior Checklist/6-18years; SDQ- Strengths and Difficulties Questionnaire; M-mean; SD-Standard Deviation

- Univariate analysis

The univariate analysis provided a comprehensive understanding of the significant bidirectional relationship between parents' and children's psychological states. Parental psychological dimensions were associated with children's emotional and behavioral problems, and children's emotional and behavioral problems, in turn, were significantly related to parental psychological states. Analysis highlighted substantial variations in parental psychological and behavioral characteristics such as mental health well-being (BSI/Global Severity Index), stress levels (PSI-4-SF), educational practices (APQ/Involvement, APQ/Inconsistent discipline, APQ/Corporal punishment, APQ/Positive parenting), and adult attachment representations (QAA-SC/secure and unsecure representation attachment) based on whether children were classified as clinical or non-clinical. This classification was grounded on the children's emotional and/or behavioral issues on CBCL, SDQ, SAFA, SAT. Moreover, the analysis identified notable

disparities in children's psychological and behavioral characteristics, including internalizing problems (CBCL, SDQ/Emotional symptoms, SAFA), externalizing problems (CBCL, SDQ/Peer problems, SDQ/Conduct problems, SDQ/Hyperactivity/Inattention) and combined internalizing/externalizing problems (CBCL/Tot, SDQ/Tot) and SAT (secure and unsecure style attachment) contingent upon whether parents were categorized as clinical or non-clinical. The Mann-Whitney U test was used to explore these differences in both directions (1) Parent-to-Child and (2) Child-to-Parent with a significance threshold set at $p<0.01$. This analysis underscores the complex, reciprocal relationship between parents' and children's psychological states, highlighting how parental mental health and behaviors can impact child outcomes and vice versa.

Parental Stress (PSI-4-SF) and children's emotional and/or behavioral problems (CBCL, SDQ)

Parents>Children

Fathers of clinical children exhibiting externalizing problems (CBCL/Ext: e.g., aggressive or disruptive behavior) reported significantly elevated stress levels (DC, P-CDI, TS) compared to fathers of non-clinical children who experienced lower stress ($p < 0.01$). Similarly, mothers of children affected by emotional and behavioral problems (CBCL/Tot) reported higher stress levels (DC, P-CDI, PD) than mothers of non-clinical children, who exhibited lower stress ($p < 0.01$).

Children>Parents

Conversely, fathers of children exhibiting both externalizing and internalizing problems (as measured by the CBCL/Tot) reported significantly higher stress levels (DC, P-CDI, TS) compared to fathers of non-clinical children, whose stress levels were notably lower ($p < 0.01$). Additionally, our findings indicate that children with fathers experiencing high stress (DC, P-CDI, DP, TS) displayed significantly more internalizing (CBCL/Int, SDQ/Emotional Symptoms), externalizing (CBCL, SDQ/Peer Problems, SDQ/Conduct Problems,

SDQ/Hyperactivity/Inattention), and overall emotional and behavioral issues (SDQ/Tot) than children with fathers who reported lower stress levels ($p < 0.01$). Furthermore, children of highly stressed mothers (P-CDI) also exhibited increased emotional and behavioral problems (CBCL/Int) compared to those with mothers experiencing lower stress. Notably, the stress experienced by fathers appeared to be more pronounced and influential, suggesting that children's behavioral issues exert a greater impact on paternal stress than on maternal stress.

Parental educational practices (APQ) and children's emotional and/or behavioral problems (CBCL, SDQ)

Parents>Children

Our analysis revealed that mothers of children displaying externalizing behaviors (CBCL/Ext) were significantly more likely to engage in *inconsistent discipline* (i) practices (APQ/ID) compared to mothers of non-clinical children ($p < 0.01$). Similarly, mothers of children with combined internalizing and externalizing problems (CBCL/Tot; SDQ/Tot) showed a higher likelihood of using *inconsistent discipline* (APQ/ID) than mothers of non-clinical children ($p < 0.01$).

(ii) *corporal punishment* - Additionally, fathers of children with externalizing problems (CBCL/Ext; SDQ/Peer problems) and combined internalizing and externalizing problems (CBCL/Tot) were significantly more likely to use *corporal punishment* (APQ/CP) compared to fathers of non-clinical children ($p < 0.01$). Similarly, mothers of clinical children suffering from externalizing difficulties (CBCL/Ext) also exhibited a greater tendency to employ *corporal punishment* (APQ) compared to mothers of non-clinical children ($p < 0.01$).

Otherwise, an adequate educational practice seemed to protect children from developing emotional and/or behavioral problems: (iii) *positive parenting* (APQ/PP) - mothers of children without internalizing problems (CBCL/Int) and socialization issues (SDQ/Peer Problems) were more likely to engage in positive parenting practices compared

to those with clinical children, who exhibited lower levels of positive parenting (APQ) ($p < 0.01$);

(iv) *involvement* - Likewise, we found a lower *involvement* (APQ) in mothers of children suffering from socialization problems (SDQ_Peer problems) compared to the higher level of *involvement* in mothers of non-clinical children ($p < 0.01$). As well as fathers of non-clinical children had significantly higher APQ_ *involvement* scores compared to lower scores of fathers with children suffering from combined internalizing problems (CBCL/Tot) ($p < 0.01$). Our findings indicate that maternal educational practices are less impactful compared to those of the fathers. This suggests that paternal engagement in parenting strategies has a more significant influence on children's mental health and development.

Children>Parents

We observed different patterns analyzing the impact of children's emotional and/or behavioral problems on parents' educational practices, suggesting that children's psychological issues profoundly affect the educational practices adopted by mothers.

(i) *inconsistent discipline* - Thus, children with mothers who used *inconsistent discipline* (APQ) had higher scores in externalizing problems (CBCL/Ext, SDQ/Conduct problems, SDQ/Hyperactivity/Inattention) while children showing combined internalizing and externalizing problems (CBCL/Tot, SDQ/Tot) were more likely to have fathers with a greater inclination for an inconsistent discipline ($p < 0.01$), compared to non-clinical children;

(ii) *corporal punishment* - Children of fathers who used *corporal punishment* were more likely to exhibit externalizing problems (CBCL/Ext, SDQ/Conduct problems) than children of fathers who did not use *corporal punishment* ($p < 0.01$). Similarly, children with mothers used to adopt physical punishment scored higher on the CBCL/Ext than children whose mothers were more likely to engage in adequate educational practices. Conversely, children of fathers who were not prone to adopt corporal punishment scored higher on the

SDQ/Prosocial Scale, indicating better social skills, compared to children of fathers who showed a higher frequency of corporal punishment practices ($p < 0.01$).

Parental adult attachment representation (QAA) and children's emotional and/or behavioral problems (CBCL, SDQ, SAFA) and attachment style (SAT)

Parents>Children

Our findings indicate that a secure parental adult attachment representation is associated with non-clinical children, while an insecure attachment representation is linked to a higher risk of mental distress in children. Specifically, mothers of children with externalizing and combined internalizing and externalizing problems (CBCL/Ext, SDQ/Peer problems, CBCL/Tot) were more likely to have an insecure attachment representation (QAA-SC) compared to parents of non-clinical children who generally expressed a secure adult attachment representation ($p<0,01$). Furthermore, the adult attachment representation of mothers (QAA-SC) appeared particularly crucial for internalizing problems in children (CBCL/Int, SAFA/Dep). Mothers of non-clinical children typically exhibited a secure attachment representation, whereas mothers of children with clinical problems were more likely to have an insecure attachment representation ($p<0,01$). While fathers are less highlighted in this context, their insecure attachment patterns are specifically associated only with externalizing disorders. Fathers of children exhibiting externalizing issues tend to display an insecure attachment style, in contrast to fathers of non-clinical children, who typically show a more secure attachment.

Children>Parents

Children experiencing emotional and behavioral problems (SDQ/Tot) were more likely to have mothers with an insecure adult attachment representation, whereas mothers of non-clinical children were more likely to exhibit a secure adult attachment representation ($p < 0.01$). Children with a secure attachment style (SAT) typically had mothers with a secure adult attachment representation. In contrast, children with an insecure attachment style

(SAT) were more likely to have mothers with an insecure adult attachment representation ($p < 0.01$).

Parental well-being (BSI/GSI) and children's emotional and/or behavioral problems (CBCL)

Parents>Children

Fathers of children suffering from internalizing problems (CBCL/Int) and combined internalizing and externalizing problems (CBCL/Tot) had higher scores on the BSI/GSI, indicating greater psychological distress, compared to lower scores of fathers with non-clinical children ($p < 0.01$).

Children>Parents

Children of fathers who scored low on the BSI/GSI index were more likely to suffer from internalizing problems (CBCL/Int) compared to fathers of non-clinical children ($p<0.01$).

In summary, as illustrated in Figure 1, the comprehensive analysis revealed significant bidirectional relationships, with a notable pattern overlap in pathways. This overlap indicates that among all observed significant relationships *($p < 0.01$)*, the bidirectional influences were predominantly aligned with fathers experiencing stress while managing a difficult child with emotional and behavioral problems, and employing corporal punishment, which in turn led to children's issues. The interactions between fathers and their children's outcomes were prominently mirrored in both directions, underscoring the critical role of fathers in these reciprocal dynamics. This suggests that paternal well-being plays a crucial role, with stress and disciplinary actions not only significantly contributing to children's problems but also being influenced by the children's behaviors. This intricate and pivotal bidirectional relationship highlights the profound impact of paternal involvement on both parental well-being and child development.

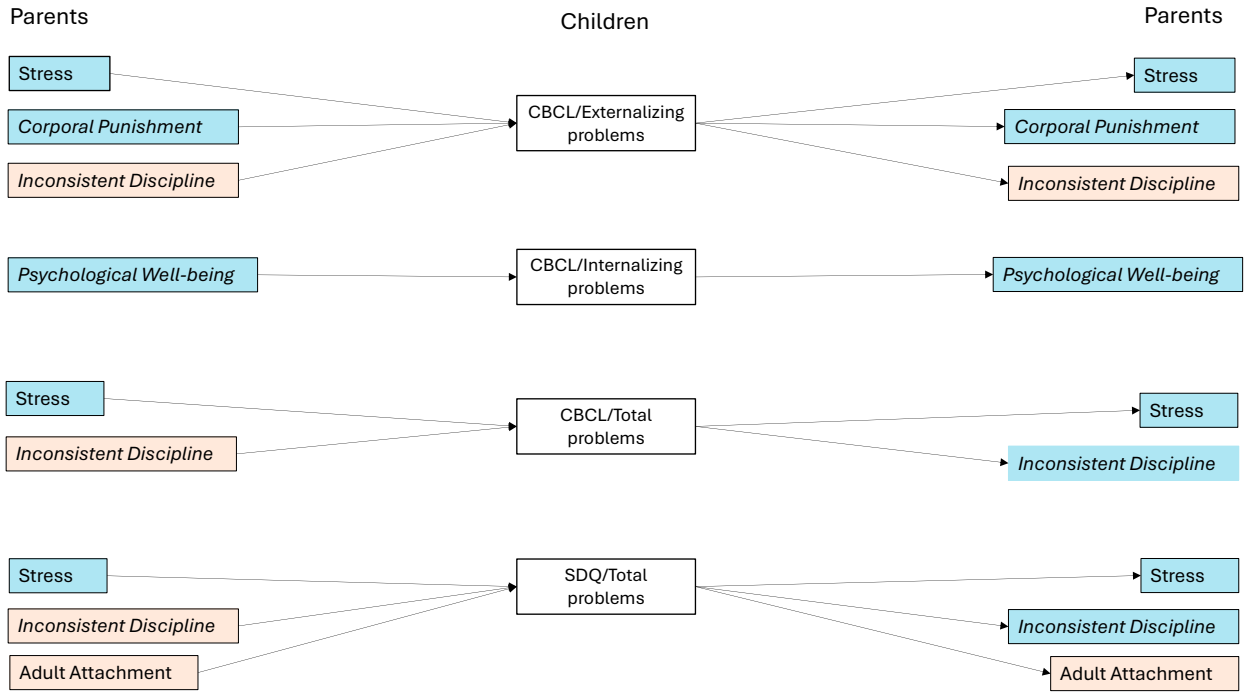

Figure 1. Bidirectional Effects Between Parental Psychological Profiles and Children's Emotional and Behavioral Problems. *CBCL - Child Behavior Checklist; SDQ-Strenghts and Difficulties Questionnaire. Fathers are in blue. Mothers are in pink.*

For instance, (i) children with externalizing problems (CBCL/Ext) were associated with fathers experiencing heightened stress in dysfunctional relationships regarding a difficult child (PSI-4-SF/DC; PSI-4-SF/P-CDI) and a tendency towards inadequate parenting practices, such as corporal punishment (APQ/CP). Crucially, this same pattern was mirrored in the reverse pathway: fathers who were stressed and used inadequate parenting practices were found to have children who developed externalizing problems. This perfect overlap of directional influences underscores that the relationship between child externalizing behaviors and paternal stress and disciplinary practices is both reciprocal and reinforcing, with each factor contributing to and exacerbating the other ($p < 0,01$). While the fathers' role was predominant in these cycles, mothers also played a role through inconsistent discipline (APQ/ID), which contributed to externalizing behaviors in children. In turn, children's externalizing problems exacerbated maternal inconsistent discipline, creating a reinforcing but less significant pathway involving mothers ($p < 0.01$).

Likewise (ii) children with internalizing problems (CBCL_INT), were typically associated with fathers exhibiting higher Global Severity Index (BSI_GSI) scores. A similar pattern was found in the opposite direction. Specifically, fathers who had higher BSI_GSI scores, indicating poorer overall mental health were more likely to have children suffering from internalizing problems. This bidirectional relationship was consistently significant ($p>0.01$), highlighting a reciprocal influence where the father's mental health and the child's internalizing problems mutually reinforce each other. Similarly (iii), children exhibiting both internalizing and externalizing problems, as indicated by elevated CBCL_TOT scores, were linked to fathers experiencing heightened stress in managing challenging relationships with their difficult child (PSI-4-SF/DC_P-CDI/TS) ($p<0.01$). Otherwise, mothers were more likely to engage in inconsistent disciplinary practices (APQ/ID). This bidirectional relationship is significant: from parent to child, mothers' inconsistent discipline exacerbates the child's problems; from child to parent, the child's emotional and behavioral issues significantly impact fathers, leading them to adopt inconsistent discipline ($p<0.01$). Additionally (iv), children with elevated emotional and behavioral problems (SDQ_TOT) often had fathers who reported greater stress within dysfunctional relationships concerning their difficult child (PSI-4-SF/DC_P-CDI) and mothers engaged in inconsistent discipline (APQ/ID). This paternal stress, which significantly influences and is influenced by the child's difficulties ($p < 0.01$), perpetuates a cycle of negative outcomes. Inconsistent disciplinary practices (APQ/ID) by fathers are exacerbated by children's emotional and behavioral problems as measured by SDQ/Tot ($p>0.01$), reinforcing the child's challenges and creating a reciprocal pattern of distress and behavioral issues. In conclusion, fathers appeared more vulnerable to the direct impact of children's problems compared to mothers, as their inconsistent discipline emerged more as a response to the child's difficulties. In the parent-to-child direction, maternal and paternal factors interplay, with mothers' practices triggering children's issues, while in the child-to-parent direction, children's problems more significantly impact mothers, leading them to adopt inconsistent disciplinary practices.

The univariate analysis reveals a significant distinction between the bidirectional pathways involving mothers versus fathers. Specifically, fewer bidirectional effects were identified between mothers and their children compared to the more extensive and significant pathways involving fathers ($p < 0.01$). For instance, the significant bidirectional pathway ($p < 0.01$) between maternal inconsistent discipline (APQ/ID) and children's externalizing problems (CBCL_EXT) indicates that while maternal disciplinary inconsistency contributes to externalizing behaviors in children, these behaviors also influence maternal disciplinary approaches. This reciprocal relationship suggests that children's externalizing problems can perpetuate inconsistent discipline from mothers, thereby creating a cycle of adverse outcomes.

\ These reciprocal dynamic highlights a stronger, stabilizing relationship between mothers and their children, enhancing emotional resilience and well-being on both sides. Differently, fathers demonstrate more vulnerability compared to mothers when impacted by children's emotional and behavioral problems. These problems (SDQ/Tot; CBCL/Tot) subsequently influence fathers' parenting practices, leading to inconsistent discipline by them *($p<0.01$)* (see Table 6 and Table 7). This suggests that children's problems, potentially triggered by fathers' distress and mothers' inconsistent discipline, predominantly impact fathers' parenting rather than mothers. This highlights the critical role of paternal involvement, which remains more pronounced compared to that of mothers in influencing children's outcomes.

Nonetheless, mothers and fathers play crucial and complementary roles in their children's development, each influencing the parent-child dynamic in distinct ways. Fathers often take on a pivotal role but are more directly impacted by children's emotional and behavioral problems. This leads to inconsistent disciplinary practices, frequently as an attempt to manage challenges, alongside heightened stress and, in some cases, corporal punishment, which further perpetuate cycles of distress. Mothers, while less vulnerable to direct influences from their children's problems, demonstrate a unique protective role

through secure attachment. These dynamic highlights fathers' critical role in managing stress and discipline, which significantly shapes outcomes for both children and maternal parenting.

Table 6. Association between Parental Psychological Profiles and Child Internalizing/Externalizing Problems

	Parental stress in Fathers due to having a difficult child		
	With non-clinical fathers *(Mean ± SD)*	With clinical fathers *(Mean ± SD)*	*P*
CBCL/Externalizing problems	50.0±6.79	61.87±8.11	0.0004
CBCL/Total problems	57.17±8.36	66.2±6.94	0.001
SDQ/Total problems	9.45±4.03	17.87±5.03	0.0001
	Parental stress in Fathers due to dysfunctional interactions with a challenging child		
	With non-clinical fathers *(Mean ± SD)*	With clinical fathers *(Mean ± SD)*	*P*
CBCL/Externalizing problems	52.72±6.29	63.03±8.44	0.001
CBCL/Total problems	55.72±5.75	66.81±7.06	0.001
SDQ/Total problems	9.83±3.14	19.14±5.43	0.001
	Parental stress in Fathers (total scale)		
	With non-clinical fathers *(Mean ± SD)*	With clinical fathers *(Mean ± SD)*	*P*
CBCL/Total problems	57.17±8.36	65,2±6.94	0.001
SDQ/Total problems	11.88±6.74	17.76±5.68	0.001
	Corporal punishment by Fathers		
	With non-clinical fathers *(Mean ± SD)*	With clinical fathers *(Mean ± SD)*	*P*
CBCL/Externalizing problems	54.38±10.64	64.7±8.98	0.006
	Inconsistent parenting by Mothers		
	With non-clinical mothers *(Mean ± SD)*	With clinical mothers *(Mean ± SD)*	*P*
CBCL/Externalizing problems	50.81±7.60	61.45±7.95	0.001
CBCL/Total problems	51.45±6.75	62.11±7.75	0.0001
SDQ/Total problems	8.45±3.35	17.31±5.44	0.0001
	Mothers' Secure Adult Attachment		
	With secure attachment mothers *(Mean ± SD)*	With insecure attachment mothers *(Mean ± SD)*	*P*
SDQ/Total problems	11.64±4.44	16.75±6.39	0.008

CBCL-Child Behavior Checklist; SDQ-Strengths and Difficulties Questionnaire

Table 7. Association between Child Internalizing / Externalizing Problems and Parental Psychological Profiles

		Child Externalizing problems		
		With non-clinical children *(Mean ± SD)*	With clinical children *(Mean ± SD)*	*P*
Fathers	**PSI/Difficult Child**	28.88±6.43	35±5.12	0.0018
	PSI/Dysfunctional Interaction	26.4±7.11	37.2±7.47	0.0001
	APQ/Corporal Punishment	4.03±1.17	5.73±1.22	0.0001
Mothers	**APQ/Inconsistent Discipline**	12.64±3.34	16.13±2.61	0.0022
		Child Internalizing Problems		
		With non-clinical children *(Mean ± SD)*	With clinical children *(Mean ± SD)*	*P*
Fathers	**BSI/GSI**	0.15±0.14	0.62±0.43	0.0006
		Child Total Problems		
		With non-clinical children *(Mean ± SD)*	With clinical children *(Mean ± SD)*	*P*
Fathers	**PSI/Difficult Child**	27.37±7.31	34.43±4.42	0.0003
	PSI/Dysfunctional Interaction	24.62±7.58	34.69±8.36	0.0002
	PSI/Total Problems	74.81±22.09	99.13±17.67	0.0002
	APQ/Inconsistent Discipline	12.31±3.26	15.56±3.43	0.009
		Child Strenghts and Diffulties		
		With non-clinical children *(Mean ± SD)*	With clinical children *(Mean ± SD)*	*P*
Fathers	**PSI/Difficult Child**	29.16±6.89	34.09±4.50	0.007
	PSI/Dysfunctional Interaction	26.12±8.09	35.04±7.44	0.0001
	PSI/Total Problems	80±21.90	100±15.56	0.0005
	APQ/Inconsistent Discipline	12.62±2.81	16.63±3.25	0.0001
Mothers	**Secure Adult attachment**	52.52±7.53	45.23±7.73	0.003

BSI/GSI-Brief Symptom Inventory/Global Severity Index; PSI-Parent Stress Index; APQ-Alabama Parenting Questionnaire.

- Machine Learning: Decision tree analysis

In a final step, the decision tree method was applied to identify the best predictors among the psychological and psychopathological states of parents (separately mothers and fathers) that contributed to the development of children's emotional and/or behavioral problems.

The analysis revealed significant predictors that effectively classified children into subgroups of "clinical" and "not clinical", highlighting the critical parental factors influencing the likelihood of children developing these issues.

(i) For **internalizing problems (CBCL/Int)** three were the best predictors: BSI/GSI Index, BSI_SOM and APQ_Positive parenting. Fathers who tended to exhibit psychological distress (BSI_GSI Index > 0.07) associated with somatization symptoms (BSI/SOM > 0.21) seemed to contribute to the development of internalizing problems in children (nc = 0, c = 18; gini = 0.0). As illustrated in Figure 2, this suggests that father's well-being and somatization symptoms were key predictors of children's well-being.

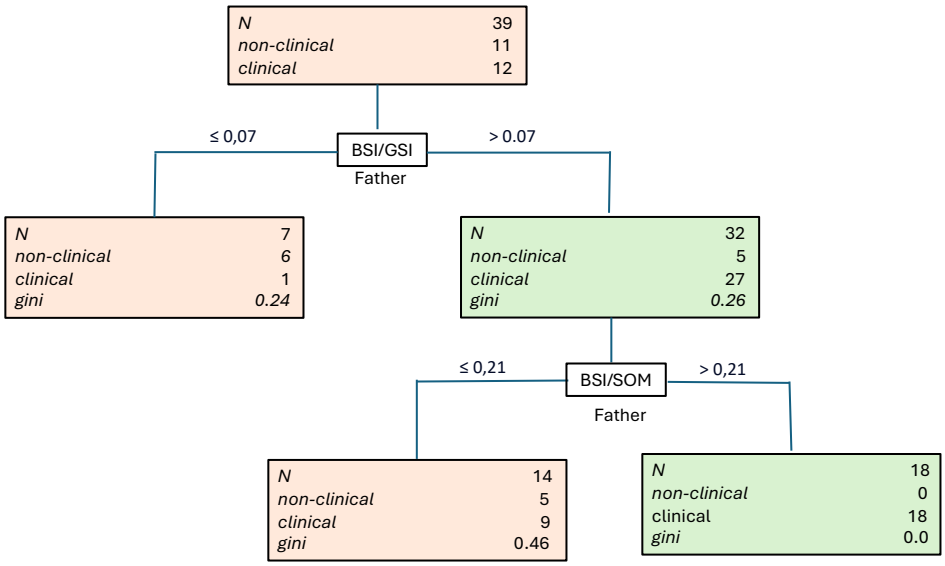

Figure 2. Best predictors for Interrnalizing Problems in Children evaluated with the Child Behavior CheckList. *BSI/GSI– Brief Symptom Inventory/Global Severity Index. BSI/SOM– Brief Symptom Inventory/Somatization*

(ii) The most significant predictors of **externalizing problems in children (CBCL/Ext)** were found to be the adult attachment representations of both mothers and fathers (QAA), fathers' stress levels (PSI-4 SF), fathers' use of corporal punishment and parental

involvement in educational practices (APQ), and fathers' anxiety levels (BSI_ANX). Notably, the role of fathers was crucial." Fathers with a secure adult attachment representation (QAA _Unsecure ≤ 25.5) associated with a low stress level (PSI_DC ≤ 31.5) appear to protect their children from developing externalizing issues (nc = 15, c = 0; gini = 0.0). Meanwhile, an insecure adult attachment representation in fathers (QAA_Unsecure > 25.5) combined with a high stress level (PSI_P-CDI > 26) appeared to contribute to the development of these problems in children (nc = 1, c = 13; gini = 0.14). Another model revealed that a secure adult attachment representation in mothers (QAA_Unsecure ≤ 21,5) combined with fathers who do not use corporal punishment (APQ_Corporal punishment ≤ 5,5) seemed to protect children from developing externalizing problems (nc = 18, c = 0; entropy = 0,0). Conversely, when the mother exhibited an insecure attachment (QAA_Unsecure > 21.5), if the father demonstrated inadequate educational practices, resulting in corporal punishment (APQ_Corporal punishment > 3.5) as well as low involvement (APQ_Involvement ≤ 41.5), their children were likely to develop externalizing problems. This is true even if the father was not anxious (BSI_ANX ≤ 0.91) (nc = 0, c = 12; entropy = 0.0). Based on this model, two critical risk factors for the development of externalizing problems in children are identified: the use of corporal punishment by fathers and the mother's adult attachment representation.

(iii) More specifically, the Figure 3 shows the best predictors for **behavioral problems** (assessed by the **SDQ_Conduct problems**) were mother's psychological well-being (BSI_GSI) and father's use of corporal punishment (APQ_Corporal punishment). A significant model found that a mother with no psychological distress (BSI_GSI ≤ 0.1) and a father who did not use corporal punishment (APQ_Corporal punishment ≤ 3.5) tended to protect children from developing behavioral problems (nc = 3, c = 0; gini = 0.0). However, if the father tended to use corporal punishment (APQ_Corporal punishment > 3.5), even with a mother enjoying good psychological well-being (BSI_GSI ≤ 0.1), children tended to exhibit behavioral problems (nc = 0, c = 7; gini = 0.0).

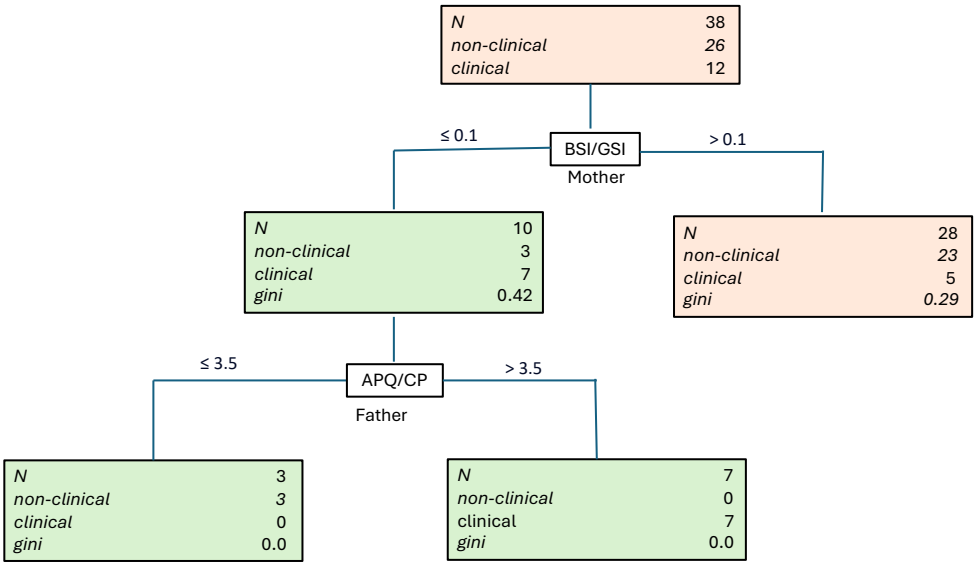

Figure 3. Best predictors for Behavioral problems in Children evaluated with the Strenghts and Difficulties Questionnaire.
BSI/GSI– Brief Symptom Inventory/Global Severity Index. APQ/CP - Alabama Parenting Questionnaire/Corporal Punishment

(iv) Meanwhile, the absence of the corporal punishment by the father (APQ_Corporal punishment ≤ 5.5) combined with a secure adult attachment representation by the mother (QAA_Unsecure ≤ 27.5), predicted well-being in children resulting in no **behavioral problems (SDQ_Conduct problems)** (nc = 23, c = 0; gini = 0.0), as illustrated in Figure 4. This finding underscores again that avoiding corporal punishment by fathers is a crucial factor for children's well-being, highlighting the importance of non-corporal punitive parenting practices in fostering healthy behavioral development.

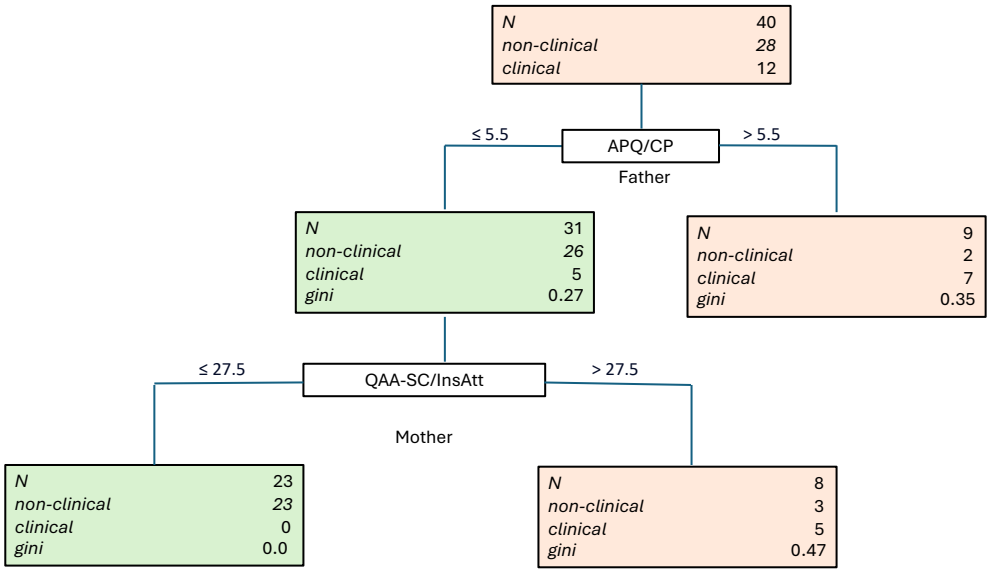

Figure 4. Best predictors for behavioral problems in Children evaluated with the Strenghts and Difficulties Questionnaire. *APQ/CP - Alabama Parenting Questionnaire/Corporal Punishment; QAA-SC/InsAtt – Adult Attachment Questionnaire of Salvo e Cusinato/Insecure Attachment.*

(v) The analysis identified three critical predictors for the development of complex psychological problems in children, encompassing both **internalizing and externalizing issues (CBCL/Tot)**: the father's stress in managing a difficult child (PSI_DC), parenting practices (APQ/Positive parenting) and the mother's adult attachment style (QAA). Specifically, a father experiencing lower stress levels (PSI_DC ≤ 30.5) and a mother not showing an insecure attachment (QAA_Unsecure ≤ 31.5) were associated with a lower risk of children developing these combined issues (nc = 11, c = 0; entropy = 0.0). Conversely, children were more likely to develop such problems if the father experienced higher stress (PSI_DC > 30.5) and lacked positive educational practices (APQ_Positive parenting≤ 27.5) (nc = 0, c = 13; entropy = 0.0). This model underscores that the father's stress level and his parenting practices are pivotal in the emergence of combined internalizing and externalizing problems in children along with maternal adult attachment (see Figure 5).

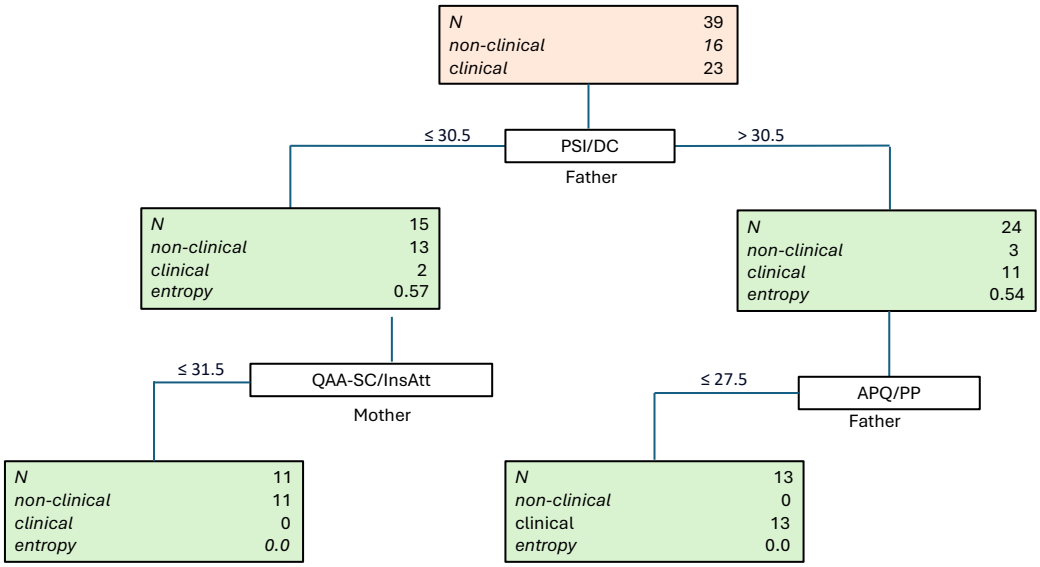

Figure 5. Best predictors for Internalizing and Externalizing problems in Children evaluated with Child Behavior CheckList/Total Problems. *PSI/DC - Parent Stress Index/Difficult Child. APQ/PP - Alabama Parenting Questionnaire/Positive Parenting; QAA-SC/InsAtt – Adult Attachment Questionnaire of Salvo e Cusinato/Insecure Attachment.*

The decision tree method was also used to identify the best predictors among children's emotional and behavioral problems that influence the psychological and psychopathological states of parents, analyzed separately for mothers and fathers. The results revealed crucial predictors for classifying parents into subgroups of "negative (not present)" and "positive (present)" in terms of stress levels (PSI-4-SF), educational practices (APQ), and adult attachment representations (QAA-SC). This analysis highlights the significant impact that children's emotional and behavioral issues have on the mental health and parenting practices of both mothers and fathers.

Our findings highlight that emotional and behavioral problems, as measured by the SDQ scale (SDQ/Tot), along with the presence of obsessive-compulsive symptoms assessed by the SAFA/O scale, are key predictors of a **father's stress level in relation to his perception of interactions with his child (PSI_P-CDI)**. Fathers tend to experience significantly higher stress when their children display emotional and behavioral issues, with SDQ scores exceeding 12.5. This stress is further amplified when even mild obsessive-compulsive tendencies are present, reflected by SAFA/O scores greater than 34.5 (np = 0, p

= 20; gini = 0.0). On the other hand, fathers report minimal stress when their children's emotional and behavioral difficulties, as indicated by SDQ scores of 12.5 or lower, are combined with moderate obsessive-compulsive traits (SAFA/O scores between 34.5 and 55.5). This suggests that both emotional and behavioral challenges, alongside obsessive-compulsive symptoms, moderately influence the level of paternal stress in relation to father-child interactions (np = 13, p = 0; gini = 0.0) (see Figure 6).

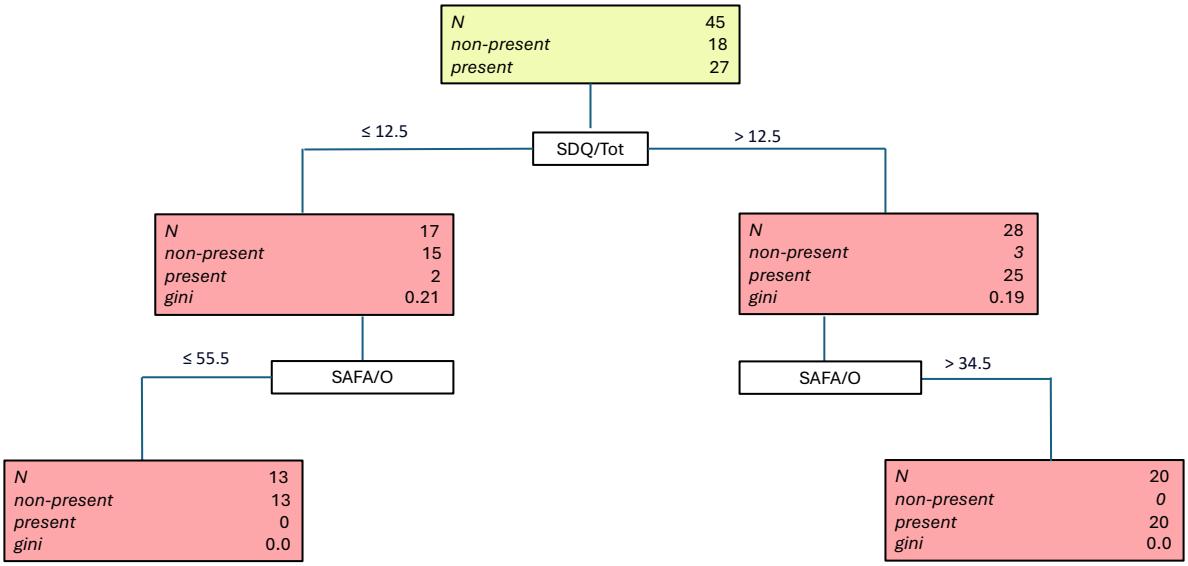

Figure 6. Best predictors for Parental Stress in Fathers assessed with Parenting Stress Index. *SDQ/Tot - Strenghts and Difficulties Questionnaire/Total problems. SAFA/O - Self-Administered Psychiatric Scales For Children and Adolescents /Obsessive Compulsive Disorder*

Moreover, the analysis showed the importance of three predictors that contribute to increasing a mother's **stress level in her perception of interactions with her child (PSI_P-CDI)**: somatic and hypochondria symptoms (SAFA/S), internalizing problems (CBCL/Int). The analysis revealed that children suffering from internalizing problems (CBCL/Int > 64.5) and externalizing problems (CBCL/Ext > 54.5), along with higher scores on the somatic symptoms-hypochondria scale (SAFA/S > 41,5), significantly increased maternal stress levels (np = 0, p = 12; gini = 0.0). Conversely, children who did not suffer from internalizing problems (CBCL/Int ≤ 64.5) and somatic or hypochondria symptoms (SAFA/S ≤ 54.5), but who had externalizing problems (CBCL/Ext > 57) were associated with mothers who were not stressed (np = 12, p = 0; gini = 0.0). This suggests that the absence of internalizing

problems and somatic symptoms in children are crucial factors in reducing maternal stress levels, even in the context of externalizing behaviors.

As shown in Figure 7, the most significant predictors of a father's **well-being, measured by the Global Severity Index (BSI/GSI)**, were the internalizing problems experienced by their children (CBCL/INT). Specifically, when a child exhibited fewer emotional problems, indicated by a CBCL/INT score of 59 or lower, their fathers were more likely to be in good health (np = 11, p = 0; entropy = 0.0). This suggests that the absence of internalizing issues in children is associated with better psychological and overall health outcomes for their fathers.

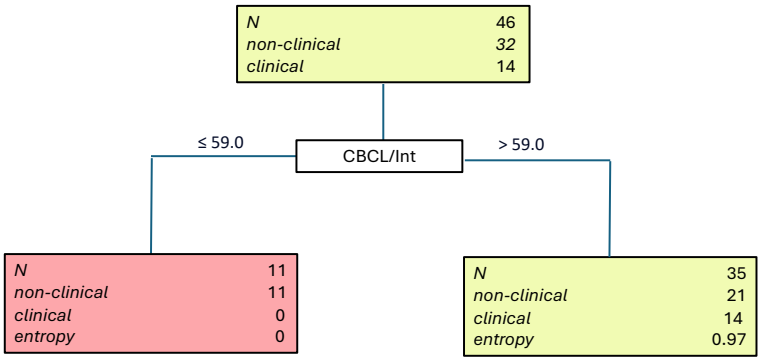

Figure 7. Best predictors for wellness in Fathers assessed with Global Severity Index of the Brief Symptom Inventory. *CBCL/Int – Child Behavior CheckList/Internalizing problems*

As depicted in Figure 8, mothers were more likely to use **inconsistent discipline (APQ/Inconsistent discipline)** when children experienced emotional and behavioral problems (SDQ/Tot > 10.5) along with hyperactivity and inattention issues (SDQ/Hyperactivity/Inattention > 2.5) (np = 0, p = 32; gini = 0.0).

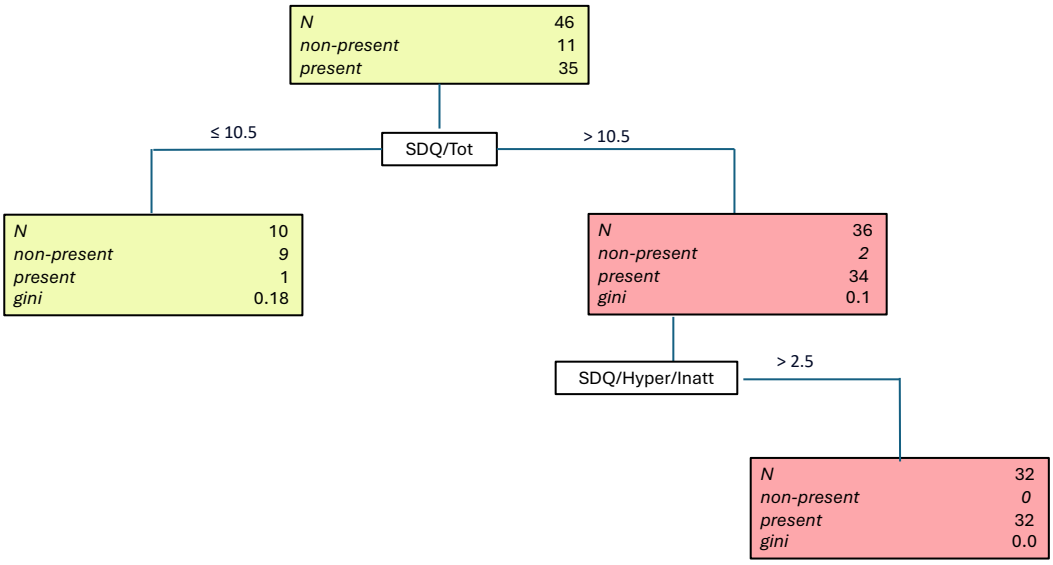

Figure 8. Best predictors for Inconsistent Discipline by Mothers assessed by Alabama Parenting Questionnaire. *SDQ - Strenghts and Difficulties Questionnaire. Tot - Total problems.* Hyper/Inatt - *Hyperactivity/Inattention*

Another model indicated that children's socialization skills (SDQ/Prosocial scale > 6.5) and the absence of combined internalizing and externalizing problems (CBCL/Tot ≤ 67) were good predictors for preventing fathers from adopting **corporal punishment** as an educational practice **(APQ/Corporal punishment)** (np = 27, p = 0; gini = 0.0). This suggests that children with better social skills were also less likely to experience behavioral problems, reducing the likelihood of parents resorting to corporal punishment (see Figure 9).

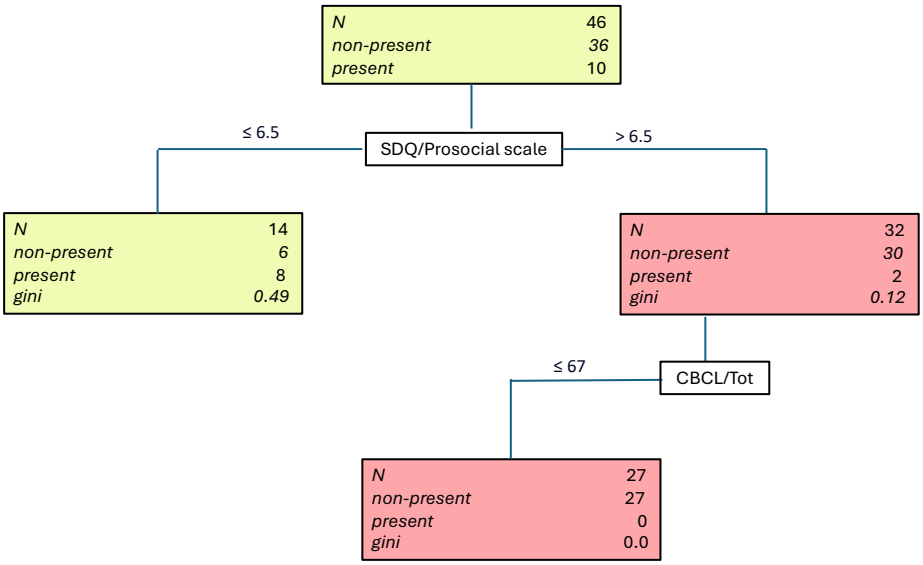

Figure 9. Best predictors for Corporal Punishment by Fathers assessed with Alabama Parenting Questionnaire. *SDQ/Prosocial scale - Strenghts and Difficulties Questionnaire; CBCL/Tot – Child Behavior CheckList/Total problems*

Other interesting findings were observed regarding the relationship between mothers' **secure adult attachment representations** (QAA/Secure Attachment) and children's emotional difficulties (SDQ/Emotional scale > 3.5) along with peer problems (SDQ/Peer problems > 3.5). The analysis revealed that children who exhibited emotional difficulties and peer problems were associated with mothers displaying less secure attachment representations (np = 13, p = 0; gini = 0.0). This suggests that the emotional and social challenges faced by children can negatively impact the security of their mothers' adult attachment representations.

4. DISCUSSION

The goal of this study was to examine the bidirectional influences between child psychopathology and parental psychological states, focusing on both the direct and indirect effects of these interactions. It was evaluated how maternal and paternal mental health, attachment patterns, and disciplinary practices affects children's emotional and behavioral outcomes. The study also placed particular emphasis on the role of fathers, exploring how paternal disciplinary methods, especially the use of corporal punishment, contribute to the development and exacerbation of various behavioral and emotional problems in children. Additionally, this investigation explored the link between harsh physical discipline and the emergence of externalizing behaviors in children, along with the potential moderators that may influence this relationship. Finally, the study underscored the critical role of co-parenting practices, demonstrating how effective co-parenting can mitigate negative outcomes associated with parental mental health issues and enhance the developmental trajectories of children.

Data were collected from 46 families, examining the psychological profiles of both parents and the psychopathological symptoms in children aged 7 to 13 years, providing a nuanced view of the intricate dynamics at play in these familial relationships. In this study, we evaluated children’s emotional and behavioral problems using a dual approach: direct assessments of the children and separate reports from parents. Alongside this, we conducted a comprehensive analysis of parents’ psychological profiles, which covered a broad spectrum of symptoms. This analysis included their levels of stress related to childcare and their educational practices.

Notably, the present study employed both univariate analysis and decision tree modeling to identify the key factors influencing both directions of impact—how parental well-being affects children's emotional and behavioral problems, and vice versa. The univariate analysis provided a straightforward examination of the relationships between

children's emotional and behavioral problems and parental factors, as well as between parents' psychological profiles and their children's emotional and behavioral issues. The decision tree analysis, a robust, data-driven method that pinpointed the most significant predictors of bidirectional effects between parents and children, was employed to further elucidate these relationships. For both the univariate and decision tree analyses, we specifically selected pathways that demonstrated significant overlap in both directions. This focus on overlapping pathways was crucial to underscore the bidirectional influence between parents and children, which is the key finding of the current study. I emphasize four main insights below.

1) The first relevant finding of the present research illuminates a profound *reciprocal relationship* between the psychological profiles of parents and the emotional and behavioral challenges experienced by their children. Indeed, the study underscored that various facet of parental well-being, including mental health (BSI/GSI), stress levels related to caregiving (PSI-4-SF), educational practices (APQ), and attachment styles (QAA-SC), are significantly associated with children's internalizing problems (CBCL/INT), externalizing problems (CBCL/EXT), as well as combined internalizing and externalizing problems (CBCL/TOT; SDQ/TOT). The discovery of significant reciprocal influences between negative affect in children and parents' psychological and psychopathological profile reinforces the long-standing theoretical view that early development involves bidirectional interactions. This perspective, rooted in Bronfenbrenner's bioecological model from over 30 years ago (Bronfenbrenner, 1979), posits that the direction of influence between a developing individual and their environment evolves over time. However, despite the integration of this concept into developmental theories, most empirical research has predominantly examined the unidirectional effects of parental influence on child outcomes (Pardini, 2008).

These findings, along with evidence from other areas, suggest that developmental models focusing solely on parental impacts are insufficient for fully understanding

developmental processes. Consistent with the broader literature on evocative effects (Scarr and McCartney, 1983), our research indicates that children actively shape their early environments, even when these environments may adversely affect their development. That is, results highlight that not only do parental factors impact children's problems, but children's issues also reciprocally influence parental stress and well-being. This underscores a complex, interwoven dynamic where both parent and child behaviors and states affect and perpetuate each other. Likewise numerous studies have demonstrated that an escalating cycle of negative, bidirectional interactions between caregivers and children can significantly shape the trajectory of child behavior and negatively influence parenting practices (Allmann et al., 2021; Pinquart, 2017; Wang et al., 2021). These findings align with Patterson's (1982) social coercion theory, which posits that parents may react negatively to their children's adverse behaviors. Such responses can prompt further maladaptive behaviors in children, creating a self-reinforcing cycle of negative interactions. This feedback loop, characterized by escalating negative exchanges, impacts both the child's behavioral development and the parent's ability to manage and guide behavior effectively. In addition, the current study has further elucidated the reciprocal nature of this dynamic, revealing that the relationship between parenting (APQ/Incosinstent discipline/APQ/Corporal punishment) and children's emotion regulation (CBCL/INT) is inherently bidirectional. For example, Yates et al. (2010) identified a mutual influence between parenting practices and child dysregulation throughout early and middle childhood in boys from low socioeconomic backgrounds. This indicates that poor emotional regulation in children can lead to more negative parenting behaviors, which in turn exacerbates the child's emotional dysregulation, perpetuating the cycle. Similarly, Norona and Baker (2014) found a significant bidirectional association between maternal scaffolding behaviors and the emotion regulation of children aged 3 to 5 with developmental delays. In these cases, effective maternal scaffolding contributed to improved emotional regulation in children, and better-regulated children elicited more positive scaffolding behaviors from

their mothers. Furthermore, two decision tree models have elucidated a reciprocal relationship between fathers' mental well-being (BSI/GSI), and their tendency towards somatization (BSI/SOM), as the most influential predictors of children's internalizing problems. One model highlighted fathers' well-being and somatization as primary predictors of children's emotional issues, underscoring the impact of paternal mental health on offspring. Conversely, the second model underscored that children's internalizing problems significantly predict fluctuations in fathers' mental well-being. Our findings underscore a reciprocal influence between fathers' well-being and children's internalizing problems, highlighting the profound bidirectional effects in family dynamics. This aligns with the insights of previous researchers who have emphasized the crucial role of fathers in shaping children's behavioral outcomes. For instance, Amato and Gilbreth (1999) discussed how paternal involvement influences children's behaviors, particularly in single-mother households, contributing valuable insights into family dynamics. Furthermore, research by Luoma et al. (1999) expands on this understanding by comparing emotional and behavioral outcomes in children living with single fathers versus stepfathers. They found that children in single-father households often exhibited more externalizing problems related to school contexts, while those in stepfather families showed higher rates of internalizing issues linked to home environments. This dual perspective highlights the complex interplay where fathers' well-being can impact children's emotional adjustment, while children's behaviors also influence paternal mental health (Luoma, *et. al*, 1999). These findings imply that interventions and prevention strategies must address both child behaviors and parental symptoms to effectively mitigate early risks, as focusing exclusively on one aspect does not encompass the entire scope of early developmental challenges.

2) The second interesting result of this study is that *fathers*' psychological responses to their children's issues are notably more intense compared to those of mothers. The study reveals a contrast in how fathers and mothers are affected by their children's behavioral and

emotional issues. Fathers exhibit a greater susceptibility to these influences, consistently showing more intense psychological distress. Conversely, mothers, while equally essential, seem less directly impacted in this bidirectional analysis. Although research is limited, some evidence suggests that children's behaviors are more closely associated with mothers' mental health compared to fathers' (Hastings and Brown, 2002). This could imply that the mother-child relationship possesses unique characteristics distinct from father-child interactions, or it may reflect the higher level of maternal involvement with children, especially during infancy (Bulanda, 2004). Conversely, fathers might engage with their children in fundamentally different ways than mothers (Fitzgerald, 1977; Labrell, 1994; Parke, 1996). In line with previous research, our findings indicate that mothers may adjust their educational strategies, often resorting to inconsistent discipline, in their ongoing effort to find the right balance and effective parenting solutions. Importantly, this *"trial-and-error approach"* does not appear to damage the solid and nurturing mother-child relationship. Our results indicate that a secure adult attachment builds resilience in children, mitigating the negative effects of inconsistent discipline and emphasizing the protective role of maternal involvement in their development. According to the internal working model of attachment, a mother's adult attachment not only influences her interactions with her spouse but also shapes her interactions with her children, thereby affecting the quality of the attachment between the mother and the children (Hou, et al., 2005). Indeed, our findings suggest that a maternal secure adult attachment serves as a protective factor, mitigating the risk of children developing emotional and behavioral problems. This underscores the importance of secure maternal attachment in fostering a secure mother-child attachment, thereby promoting healthier psychological functioning in children. Conversely, the psychological well-being of children can reciprocally influence maternal adult attachment, indicating a bidirectional relationship. Thus, the quality of mother-child attachment is likely influenced by maternal adult attachment, marital satisfaction, and the quality of parenting. The spillover hypothesis of family systems theory posits that families consist of interconnected subsystems, including

marital, mother-child, and father-child subsystems. The dynamics within the marital subsystem can influence the parent-child subsystem (Erel, et al., 1995). Numerous researchers have established a strong relationship between maternal marital satisfaction and adult attachment (for a review, see Shah, et al., 2018). Furthermore, mother-child attachment quality has been found to reflect maternal marital satisfaction to some extent (Mikulincer and Shaver, 2008).

The current study therefore underscores the crucial role of fathers in coparenting. It reveals that the active participation of fathers, alongside mothers, is essential for fostering a supportive and nurturing environment. Indeed, another study indicated that both mother and father's mental health symptoms collectively heighten the risk of children developing psychological disorders (Dierker et al., 1999), while other research has found no significant associations between paternal psychological patterns and child behaviors (McClure et al., 2001). Besides the inconsistent findings regarding father-child interactions, we attempted to explain this difference by considering the inherent nature of the early mother-child bond. According to Bulanda (2004) mothers generally form a deep emotional connection with their children beginning prenatally and continuing through infancy. This period is marked by the mother's primary caregiving responsibilities, which include feeding, soothing, and nurturing. Such continuous, early involvement fosters a strong attachment and equips mothers with a profound understanding of their child's needs and behaviors. This early caregiving experience also enhances mothers' confidence and resilience, allowing them to manage their children's problems with a steadier psychological state. Essentially, this early bond serves as a psychological buffer, reducing the emotional toll mothers might otherwise experience when dealing with their children's behavioral and emotional issues. In contrast, fathers, who typically assume a more peripheral role during these early stages, show a greater immediate sensitivity to their children's challenges as they grow older. This heightened emotional response in fathers can be attributed to their relatively less frequent early interaction and the lack of the psychological buffering that mothers develop through

their intensive caregiving. As children mature, the father's role becomes increasingly crucial, providing essential emotional and behavioral support. Fathers' sensitivity to their children's needs and their unique perspectives on problem-solving complement the foundational care provided by mothers. Recognizing and supporting fathers in their unique challenges can help enhance their psychological resilience, while continued support for mothers in their caregiving roles can further strengthen their already established bonds with their children.

Furthermore, understanding the role of fathers in child psychopathology is crucial, as they directly and indirectly influence child development through their caregiving roles and their shaping of the broader family environment where development takes place. Fathers also provide 50% of their children's genetic material (Phares & Compas, 1992). Consequently, neglecting fathers in research on child behavioral problems risks leaving a significant portion of the variance in child outcomes unexplained. Moreover, this oversight may lead to a misattribution of effects solely to maternal influences, potentially skewing both theoretical understanding and practical interventions. In addition, our findings are consistent with previous research indicating that child's psychological problems (CBCL/INT) are influenced significantly by the father's level of well-being (BSI/GSI; PSI-4-SF-P-CDI) (Connell & Goodman 2002). Similarly, Ramchandani and his colleagues (2005) have shown that children exhibiting internalizing problems, such as anxiety and depression, as well as externalizing problems, like aggression and behavioral issues, tended to have fathers who were more distressed. The authors found that paternal depression occurring during the postnatal period had notable effects on children's behavior. Specifically, they observed that children whose fathers experienced depression shortly after their birth were more likely to exhibit internalizing behaviors, such as anxiety and withdrawal, as well as externalizing behaviors, including aggression and hyperactivity, as they grew. These associations remained significant even after accounting for the influence of maternal postnatal depression and subsequent paternal depression. Curiously, Pilowsky *et al.* (2014) found that children with depressed fathers generally exhibit fewer psychiatric disorders and

less impairment compared to those with depressed mothers. However, when parental depression is treated, an interesting pattern emerges. The mental health of children whose fathers suffered from depression shows significant improvement, with noticeable reductions in symptoms over time. Conversely, the mental health of children with depressed mothers shows relatively minor changes after the mother's depression is treated (Paschall & Mastergeorge, 2015). This suggests that while children of depressed fathers initially experience fewer issues, they benefit more substantially from treatment interventions than children of depressed mothers. Indeed, mothers typically serve as the primary attachment figures during early childhood, making their emotional health crucial for the child's foundational development (Bulanda, 2004). Maternal depression can severely disrupt this primary attachment, undermining the child's sense of security and leading to the formation of anxious or avoidant attachment styles. According to our findings, these attachment disruptions can result in persistent emotional and relational difficulties. The child's capacity for emotional regulation is highly dependent on the mother's consistent emotional attunement. When maternal depression interferes with this critical function, children struggle with stress management and emotional stability (Belsky, 2002). These deep-seated effects from disrupted early attachments are difficult to reverse, leading to slow and less pronounced improvements in the child's well-being even after maternal recovery. In contrast, fathers, while crucial to attachment, typically assume a supplementary role that gains significance as children enter later developmental stages. Paternal depression often exerts its influence more indirectly, through changes in behavior such as reduced playfulness, emotional withdrawal, or irritability. These changes subtly affect the child's emotional environment and behavior, contributing to latent emotional disruptions rather than foundational ones. Because the impact of paternal depression is less central to the early attachment and more related to the child's later emotional and behavioral development, recovery from paternal depression tends to yield more immediate and noticeable improvements. Restored paternal engagement quickly enhances the child's emotional

stability and security, leading to rapid positive changes in their emotional environment. As such, the study emphasizes the importance of incorporating paternal roles in research and interventions targeting child psychopathology. In a context where divorce and single-mother households are increasingly common, acknowledging the contributions of fathers becomes crucial. Neglecting paternal influences risks leaving a significant portion of variance in child outcomes unexplained and misattributing behavioral issues solely to maternal factors (Phares & Compas, 1992; Cabrera et al., 2000).

3) Based on evidence that children with stressed fathers are at compounded risk for both externalizing and internalizing problems, consistently with previous research (Deater-Deckard, 2006) our findings suggest that heightened paternal stress (PSI-4-SF/DC and PSI-4-SF-P-CDI - related to managing and interacting with a difficult child) is linked to an inadequate educational practice, including inconsistent discipline (APQ/Inconsistent discipline) and *corporal punishment* (APQ/Corporal punishment). Our findings now corroborate work from other domains suggesting that these practices have been related to adverse child outcomes, particularly exacerbating externalizing behaviors such as aggression and defiance (Gershoff, 2002; Lansford, et al., 2011; Patterson, 1982; Wang et al., 2021).

Research has consistently shown that high levels of caregiving stress can precipitate harsh disciplinary approaches, creating a feedback loop where the child's maladaptive behaviors increase paternal stress, leading to more severe disciplinary measures (Patterson, 1982). The use of corporal punishment by fathers is notably associated with elevated externalizing problems, reinforcing the established understanding that physical punitive measures can have profound negative effects on children's behavioral and emotional health (Gershoff 2002; Maiti, 2021). Our results underscore the notion that children who experience harsh physical punishment (APQ/Corporal punishment) show a rising pattern of externalizing behaviors (CBCL/EXT). Indeed, a significant body of research (Bandura, 1977)

explains the association between corporal punishment and externalizing problems in children through social learning theory. This theory suggests that children learn behavior by observing and imitating their primary caregivers, who serve as role models. When children are subjected to harsh physical punishment, they may internalize the notion that violence is an acceptable means to resolve conflicts or assert control. This learned behavior can manifest as increased aggression, as children replicate the disciplinary tactics they experience in their own interactions. For instance, effective socialization requires that children internalize moral and social norms and develop skills to communicate and interact with peers (Lansford *et al.,* 2005). Physical punishment disrupts this process by failing to provide children with the reasons for appropriate behavior, leading to difficulties in peer relationships and potential social rejection. Although corporal punishment may yield immediate compliance from the child and provide parents with short-term control, it carries the risk of escalating into more severe forms of maltreatment (Lansford, 2013). Afifi and colleagues (2012) found that harsh physical punishment is associated with higher odds of childhood maltreatment, including sexual, physical, and emotional abuse. This study emphasizes the importance of minimizing children's exposure to physical punishment to mitigate the risk of more serious abuse. As for, the detrimental effects of corporal punishment extend beyond immediate behavioral outcomes, influencing a child's broader developmental trajectory. Indeed, Maiti (2021) demonstrated that a stable and supportive home environment is crucial for positive development, and disruptions in this environment can have far-reaching impacts on other aspects of a child's life. In educational settings, for instance, the use of corporal punishment can exacerbate problematic behaviors, hindering academic success.

Studies indicate that children who experience physical punishment often struggle with school engagement and academic performance due to heightened stress and an inability to focus on learning (Lansford *et al.,* 2005). Furthermore, consistent with a broader literature on the bidirectional parent-to-child relationship (Brooker, *et al.,* 2015), children's

difficult behaviors amplify paternal stress, which in turn leads to harsher and less effective parenting practices, further intensifying the child's behavioral issues.

Conversely, maternal secure adult attachment representation (QAA-SC/Secure Attachment) showed no association with children's emotional and behavioral problems. This indicates that a secure attachment to her partner emerges as a protective factor against emotional and behavioral issues in children (SDQ/TOT), as observed in this study. Secure maternal attachment fosters a stable and nurturing family environment, contributing positively to children's emotional regulation and resilience (Bowlby, 1982; Groh et al., 2012).

This finding aligns with attachment theory, which posits that secure attachment relationships provide children with a sense of safety and emotional stability, crucial for healthy development (Main *et al.*, 1985). However, our findings also indicate that inconsistent disciplinary practices by mothers are linked to increased externalizing problems in children, suggesting that while secure attachment provides emotional support, inconsistent discipline remains a risk factor for behavioral issues, according to Pinquart, (2017) and Yates *et al.*, (2010).

Consistent with Norona and Baker, 2014 the bidirectional interactions are evident: children’s externalizing behaviors can elevate maternal stress and emotional insecurity, leading to inconsistent disciplinary practices and further compounding behavioral problems. Similarly, a decision tree model, reaffirmed that mothers tended to employ inconsistent disciplinary methods (APQ/Inconsistent Discipline) more frequently when their children faced emotional and behavioral challenges (SDQ/TOT), alongside issues related to hyperactivity and inattention (SDQ/Hyperactivity/Inattention). These findings stress that maternal responses to discipline can vary significantly based on the specific behavioral and emotional needs presented by their children.

By comparing paternal and maternal influences, the present study reveals distinct but interconnected pathways affecting child development. Paternal stress resulting in harsh educational practices, particularly corporal punishment, have a direct and substantial

impact on externalizing problems (Deater-Deckard, *et al.*, 2006; Heilmann, et. al 2021). In contrast, maternal secure attachment mitigates these issues, although inconsistent discipline poses a risk for externalizing problems (Lansford, *et al.*, 2013).

Therefore, our study underscores a pivotal finding: it emphasizes the critical importance of parents adopting alternative disciplinary practices that foster positive behavioral and social development. Specifically, our research highlights the detrimental effects of relying on physical punishment and stresses the need for approaches that prioritize secure attachment and effective educational methods. These strategies are crucial as they can help mitigate potential adverse impacts across various domains of a child's life.

4) Our findings underscore the crucial role of *co-parenting* in child development, as evidenced by the decision tree analysis, which highlighted the significant impact of collaborative childrearing by two parental figures who share responsibilities. That is, co-parenting resulted a pivotal factor in mitigating children's emotional and behavioral problems. When both parents actively engage in childrearing, sharing responsibilities and supporting each other, it creates a stable and nurturing environment that fosters healthy child development.

This collaborative approach helps buffer the adverse effects of individual parental stress and dysfunctional interactions, highlighting the need for both parents to be actively involved in the upbringing of their children. Our findings further corroborated by previous research show the significance of coparenting in the lives of school-age children. For instance, Stright and Neitzel (2003) found that low parental cooperation during summer vacations predicted attention problems, passivity, and lower mathematics grades in third-grade students. Similarly, Jones et al. (2003) demonstrated both concurrent and longitudinal relationships between coparenting conflict and internalizing as well as externalizing symptoms in school-age children. Moreover, coparenting can significantly impact parent-child relationships.

In a longitudinal study, Floyd, Gilliom, and Costigan (1998) revealed that a lack of coparenting cooperation was associated with an increase in negative behaviors directed from children towards both mothers and fathers. For instance, our analysis revealed that the most effective predictors for protecting children from developing conduct problems (as measured by the SDQ/Conduct Problems scale) are a mother's psychological well-being (as indicated by the BSI/GSI) and a father's avoidance of inadequate parenting practices, particularly the use of corporal punishment (as measured by the APQ/Corporal Punishment scale). Conversely, when mothers exhibit lower levels of well-being and fathers are more inclined to employ physical punishment, children are significantly more likely to develop conduct problems.

The quality of the interparental relationship plays a crucial role in these dynamics. When a mother's psychological well-being is compromised, it can strain the interparental relationship, leading to increased marital conflict and reduced emotional support between parents (Schermerhorn *et al.,* 2007). This stress and conflict can spill over into parenting practices, resulting in inconsistent or harsh discipline methods from fathers, such as corporal punishment. These inadequate parenting practices exacerbate children's behavioral issues, creating a negative feedback loop where conduct problems in children further deteriorate the parents' mental health and parenting quality (Schermerhorn *et al.,* 2007). Moreover, the compensatory process, wherein one parent attempts to counterbalance the deficiencies of the other, often falls short if the foundational interparental relationship is weak. For instance, even if a mother with poor well-being tries to compensate for a father's harsh disciplinary methods, the lack of emotional support and cooperation between parents undermines this effort, leaving children more vulnerable to developing behavioral problems, according to Sturge-Apple *et al.,* (2014).

In families where the interparental relationship is strong and supportive, both parents are more likely to engage in positive and consistent parenting practices. A mother’s well-being is bolstered by a supportive partner, reducing her stress levels and enabling her

to provide consistent emotional attunement to her children. Simultaneously, a father who avoids corporal punishment and employs positive disciplinary practices contributes to a stable and nurturing environment, significantly reducing the risk of conduct problems in children (Sturge-Apple, *et al.*, 2014). Moreover, our study revealed that the presence of a mother's secure adult attachment (QAA-SC/Secure Attachment) with her partner does not offset the negative effects of paternal corporal punishment on children's conduct problems. This indicates that even when a mother feels secure in her relationship with her partner, the use of corporal punishment by the father can significantly contribute to the development of conduct problems in children.

According to Stroud, *et al.*, (2015), a secure adult attachment in mothers typically promotes a positive family climate, characterized by trust, emotional support, and effective communication between partners. This supportive environment can enhance co-parenting practices and provide a stable foundation for child development. However, when fathers engage in corporal punishment, it creates a discordant family climate that undermines these positive dynamics (Fields *et al.*, 2017). The implications for the family climate are profound. Even if a mother feels secure in her relationship with her partner, the father's use of corporal punishment introduces a source of stress and conflict that can pervade the entire family system. This punitive approach to discipline can lead to increased marital tension and reduced parental cooperation, as the mother may struggle to reconcile her supportive role with the father's harsh disciplinary methods.

The inconsistency in parenting styles can confuse the child and exacerbate behavioral issues (Fields *et al.*, 2017). Furthermore, the negative impact of corporal punishment extends beyond immediate behavioral problems in children. It can also affect the emotional bonds between family members, eroding trust and mutual respect. Children exposed to punitive measures such as corporal punishment are more likely to develop feelings of fear and resentment towards the father, which can strain the parent-child relationship and hinder the child's emotional development (Warmuth *et al.*, 2020). Moreover, our findings diverge

from those of Teubert and Pinquart (2010), who reported that, after controlling for the marital relationship, coparenting remained significantly associated with children's internalizing and externalizing symptoms, but the association between coparenting and social functioning attenuated to non-significance. In contrast, our study show that children exhibiting internalizing and externalizing problems, yet possessing good social skills, are more likely to have fathers who do not engage in physical punishment. This suggests that a child's social behavior can serve as a protective factor against corporal punishment. Specifically, the development of robust social skills appears to reduce the likelihood of fathers resorting to harsh disciplinary practices.

Contrary to previous research that emphasizes maternal stress as the primary factor in child development outcomes (Teubert and Pinquart (2010), our decision tree analysis underscores the pivotal role of fathers' stress levels in relation to having a difficult child. Specifically, consistent with to Stroud, *et al.*, (2015), our findings indicate that fathers' stress levels, as assessed by the Parenting Stress Index (PSI-4-SF-DC), combined with mothers' secure attachment to their partners (QAA-SC), can serve as a protective factor against the development of internalizing and externalizing problems in children, according to the Child Behavior Checklist (CBCL/TOT). This suggests that low paternal stress, coupled with a secure maternal attachment, creates a familial environment that mitigates the risk of children developing these behavioral issues. However, if a father experiences high levels of stress and does not engage in positive parenting practices (APQ/Positive Parenting), his children are more likely to develop both internalizing and externalizing problems. This indicates that fathers' involvement in adequate educational practices is crucial for the healthy emotional and behavioral development of their children.

These findings challenge the traditional notion that mothers are the primary figures in managing childcare stress and highlight the significant influence of fathers' stress and parenting practices on child outcomes. They suggest that the dynamics of parental stress and child development are complex and multifaceted, with both parents playing critical

roles. Fathers' stress levels and their engagement in positive parenting practices are essential factors in preventing children's emotional and behavioral problems, reinforcing the importance of shared parenting responsibilities and the need for support systems to address parental stress comprehensively.

Yet, our findings, based on another decision tree model, highlight that the key factor affecting fathers' stress levels when dealing with a difficult child (PSI-4-SF-DC) is the presence or absence of emotional and behavioral problems in the child. Specifically, fathers experienced higher stress levels when their children had emotional and behavioral problems (SDQ/TOT). Conversely, fathers of children without these issues and who had strong social skills faced less stress.

An intriguing detail emerged regarding children's socialization skills, measured by the SDQ_Prosocial scale. These skills significantly influenced paternal stress, but primarily when the children did not have emotional and behavioral problems. In such cases, even a slight decline in social skills led to notably higher stress levels in fathers. This indicates that while children's social competence can alleviate paternal stress, its impact is particularly pronounced when there are no underlying emotional or behavioral issues.

Moreover, these findings underscore the bidirectional influence between parents and children. While previous research indicated that paternal stress could contribute to children's emotional and behavioral problems, this decision tree model along with the univariate analysis show that children's emotional and behavioral problems can also significantly impact paternal stress levels. This highlights the complex interplay between child development and parental well-being, with children's social skills emerging as a particularly influential factor when other behavioral problems are absent.

Our findings further indicate that children who did not exhibit internalizing and externalizing problems (CBCL/TOT) yet possess good social skills (SDQ_Prosocial scale), are more likely to have fathers who do not engage in physical punishment (APQ/Corporal Punishment). This suggests that a child's social behavior plays a critical role in preventing

corporal punishment. Specifically, well-developed social skills in children appear to reduce the likelihood of fathers resorting to harsh disciplinary practices and alleviate paternal stress.

5. CONCLUSIONS: LIMITATIONS AND FUTURE DIRECTIONS

The current study is not without limitations. Firstly, the reliance on self-reported measures introduces potential biases due to social desirability effects. Therefore, future research should incorporate a triangulation of measures, such as diary studies, observations, or specific scales designed to assess parents' tendencies to present themselves in a socially favorable light. However, in this study, we were not allowed to consider additional instruments, given the observational nature of the study. Second, the relatively small sample size limits the statistical power of our findings, and the absence of a control group further weakens the robustness of our conclusions. Including a control group in future studies would allow for more rigorous comparisons and strengthen the validity of our results. Moreover, the cross-sectional design of the current study restricts our ability to observe changes over time and establish temporal relationships between variables. Future research should employ longitudinal designs, which are essential for understanding the dynamics and causal pathways of the observed relationships.

A final consideration concerns the possibility to extend the study longitudinally to allow predictive evaluations. Longitudinal data, in combination with larger samples, would indeed allow for the development of dynamic risk prediction models that can track how risk factors evolve over time. Such models could provide insights into critical periods where interventions might be most effective. These models could play a critical role in early identification, targeted intervention, and personalized treatment planning, ultimately contributing to better outcomes for children and their families. Overall, addressing the limitations of the current study is crucial for improving the reliability and applicability of future research. The present findings can serve as a foundation, guiding the design and direction of more extensive studies, which may yield more comprehensive and generalizable results.

The strength of the current study is the use of both conventional statistical approaches and machine learning methods (decision tree) and the focus on the reciprocal relationship between parents' and children's psychological features. Previous research has often focused on the impact of parental psychopathological profile on children's development. The current study, however, shows that children's behavioral issues can significantly affect parental well-being and parenting, particularly highlighting the role of fathers, who are often overlooked in the diagnostic and therapeutic processes for children.

Our findings underscore the critical importance of recognizing and addressing the bidirectional influences between parental psychological profiles and children's emotional and behavioral problems. By considering these reciprocal effects, researchers and clinicians can develop more effective family-based interventions that enhance overall family well-being and resilience. Our data thus suggest that interventions aimed at supporting parenthood should focus on enhancing parental self-esteem and self-efficacy, which are essential for fostering a positive therapeutic alliance and significantly reducing parental stress. Lower stress levels in parents can, in turn, positively affect both their well-being and their children's psychological health.

Effective interventions must address the distinct stressors and educational practices of both fathers and mothers. Educating parents on stress management and effective caregiving techniques can enhance both parental well-being and child development. Our investigation into fathers' disciplinary methods, particularly corporal punishment, reveals significant associations with negative child behavioral and emotional outcomes. This evaluation underscores the unique contribution of paternal disciplinary practices to child development, expanding the focus beyond maternal influences. Our analysis shows that fathers' use of corporal punishment is linked to increased behavioral issues and emotional dysregulation in children, suggesting that such practices may exacerbate existing problems or contribute to the development of new ones.

Promoting non-punitive and consistent disciplinary strategies is vital for improving child outcomes. Furthermore, our investigation of co-parenting practices reveals their pivotal role in mitigating the negative outcomes associated with parental mental health issues. Effective co-parenting emerged as a significant protective factor, improving child developmental outcomes by fostering a supportive and cohesive family environment. Our findings suggest that when parents engage in cooperative and communicative co-parenting, the adverse effects of psychological distress on both parents and children can be significantly reduced.

Targeted support to enhance inter-parental communication is also essential. Improved communication between parents can strengthen both marital and parental relationships, fostering a family environment conducive to healthy child development and protecting against conduct problems in children. Our findings underscore the need for interventions that promote consistent and non-violent parenting practices within the family. Educating both parents about the harmful effects of corporal punishment and encouraging collaborative parenting strategies aligned with secure attachment patterns can foster a more harmonious family environment. These practices not only nurture the child's development but also promote parents' well-being.

In summary, our findings advocate for a comprehensive approach that incorporates the roles of both fathers and mothers in the study and intervention of child psychopathology. Recognizing the bidirectional and reciprocal influences between parents and children can lead to more effective support systems and therapeutic strategies. Future research should further explore these interactions, particularly within diverse family structures, to deepen our understanding of the dynamic processes that shape child development. Such an inclusive perspective is essential for informing policies and practices aimed at fostering healthier family environments and improving developmental outcomes for children.

Future implications.

The insights gained from this study carry profound implications for both research and clinical practice. Interventions should not only target individual family members but also address the broader family dynamics, including co-parenting practices and disciplinary methods. For example, family therapy sessions could focus on enhancing co-parenting practices, improving communication between parents, and aligning disciplinary methods. By fostering a supportive co-parenting relationship, the negative effects of stress and conflict on children can be mitigated. Additionally, parenting programs that train fathers in positive disciplinary techniques could prevent the development of externalizing behaviors in children. Future research should continue to explore the multifaceted nature of these reciprocal influences, potentially incorporating longitudinal designs to capture changes over time and further elucidate the mechanisms driving these interactions. By leveraging innovative analytical techniques such as decision tree analysis, researchers can develop more precise, data-driven approaches to understanding and addressing the complexities of parent-child relationships. Such as, grasping how stress level, attachment style, and disciplinary practices interact in the long term could provide deeper insights into the developmental pathways of children's behavioral and emotional outcomes. Moreover, employing innovative analytical techniques like decision tree analysis could help researchers identify critical intervention points. For instance, these models could be used to predict which families are at higher risk for negative outcomes and tailor interventions, accordingly, allowing for more targeted and effective clinical practices. Through such efforts, researchers and clinicians can work together to develop evidence-based strategies that address the intricate and interconnected factors influencing child development within the family context.

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