



INSTITUTO
UNIVERSITÁRIO
DE LISBOA

Paternal Involvement: contexts and quality. Its implications for the quality of children's socio-emotional adjustment

Ana Carolina Veríssimo dos Santos

PhD in Psychology

Supervisor:
Doctor Lígia Monteiro, Assistant Professor,
Iscte-Instituto Universitário de Lisboa

October, 2023



CIÊNCIAS SOCIAIS
E HUMANAS

Department of Social and Organizational Psychology

Paternal Involvement: contexts and quality. Its implications for the quality of children's socio-emotional adjustment

Ana Carolina Veríssimo dos Santos

PhD in Psychology

Jury:

Doctor Diniz Lopes, Associate Professor, Iscte-Instituto Universitário de Lisboa

Doctor Bárbara Figueiredo, Associate Professor, Universidade do Minho

Doctor Daniela Aldoney, Assistant Professor, Universidad del Desarrollo

Doctor Cecília Aguiar, Associate Professor, Iscte-Instituto Universitário de Lisboa

Doctor Lígia Monteiro, Assistant Professor, Iscte-Instituto Universitário de Lisboa

October, 2023

Para os meus Avós, Pais, Bela e Leonor

Acknowledgments

First and foremost, I would like to express my deep gratitude to Professor Lúcia Monteiro, for her continuous guidance, support, suggestions, revisions, and encouragement. It was a privilege to work under your supervision. This journey would not have been possible without you.

Next, I would like to acknowledge the collaboration of the schools through which families were recruited, and all the parents and teachers who participated and made this study possible.

A special thank you to Professor Cecília for her concern, feedback, and advice throughout this project.

I would also like to thank the members of CED group (former and current) for their formal and informal advice and reflections. In particular, thank you Nadine and Cláudia for your companionship and encouragement. Also, a special acknowledgement to the colleagues who one way or another assisted me in data collection: Rita, Dália, Cláudia, Margarida, and Maria.

Leonor, my partner through this wild journey. I am very grateful to have shared this adventure alongside you!

Marco, thank you for going above and beyond your duty to help us students navigate the deadlines, bureaucracies, and formalities of the PhD program and scholarships, and ultimately for your friendship and encouragement.

Olivia, I am deeply grateful for all your kindness, care, and generosity during these years. I am very appreciative of all that I have fortunately learned from you.

Carla, Marília e Maryse, thank you for sharing your advice, time, and knowledge.

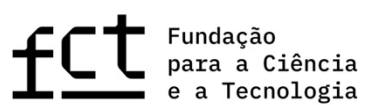
I would also like to thank my research gals, Ana, Inês e Eva for your friendship and for providing precious moments of de-stress. It is great to have colleagues and friends that share in the same joy for the work that we do.

Nuno e Miguel, for all the coffee breaks and late afternoons ‘therapy’ sessions.

Mafalda and Tiago, my oldest friends, *Queen* said it best: “In rain or shine, you’ve stood by me girl; Whenever this world is cruel to me, I got you to help me forgive. Oh, you’re the first one when things turn out bad. You know I’ll never be lonely”.

Lastly, but certainly not least I would like to deeply thank my family, especially my parents and my sister for their unwavering support, patience, and love.

This work was supported by Portuguese national funds through FCT – Fundação para a Ciência e a Tecnologia, I. P. (Portugal) under the PhD Studentship SFRH/BD/138705/2018 and the Exceptional Studentship to Mitigate the Impacts of COVID-19 with the reference COVID/BD/152763/2022.



CIÊNCIA, TECNOLOGIA
E ENSINO SUPERIOR

Resumo

Apesar do aumento da participação do pai na vida quotidiana da família, políticas que promovem o desenvolvimento saudável das crianças continuam a centrar-se principalmente nas mães, sendo os pais frequentemente considerados como uma figura secundária. Assim, o principal objetivo deste projeto é contribuir para o crescimento do conhecimento sobre o pai, e o seu papel no desenvolvimento das crianças, de forma a sustentar novas políticas sociais. Está organizado em quatro estudos, com o objetivo de: (1) Identificar perfis de envolvimento paterno e explorar diferenças em função de características do pai, criança e família; (2) Explorar como características da criança estão associadas ao envolvimento do pai; (3) Analisar preditores do envolvimento, considerando o estilo parental, escolaridade, horas de trabalho do pai, e características da criança; (4) Testar associações entre a qualidade dos comportamentos parentais, níveis de oxitocina e problemas comportamentais das crianças. Os resultados em geral, revelaram que pais mais envolvidos em todas as dimensões tinham níveis mais elevados de escolaridade, eficácia parental, horas de trabalho da mãe, e rendimento familiar. Nas crianças mais novas, pais estavam mais envolvidos no ensino/disciplina e brincadeira com filhas mais extrovertidas; nas crianças mais velhas, pais estavam mais envolvidos no ensino/disciplina e brincadeira quando as crianças apresentavam maior afetividade-negativa, especialmente rapazes. Ainda, para o envolvimento nos cuidados diretos, a escolaridade e horas de trabalho foram preditores significativos; no ensino/disciplina, o estilo autorizante; na brincadeira, a escolaridade. No ensino/disciplina e brincadeira, foi encontrada uma interação entre o estilo autorizante e a afetividade-negativa da criança. Por último, a sensibilidade e a intrusividade do pai estavam negativamente e positivamente, respetivamente, associadas a dificuldades de internalização e níveis de oxitocina das crianças. Estes resultados contribuirão para promover um envolvimento ativo e positivo do pai com impacto no bem-estar das crianças e das famílias.

Palavras-chave: envolvimento paterno; idade e sexo da criança; temperamento da criança; estilos parentais; sensibilidade parental; problemas de comportamento da criança.

Categorias e códigos de classificação PsycINFO:

2800 Psicologia do Desenvolvimento

2956 Educação Infantil & Cuidados Infantis

Abstract

Despite fathers increased participation in family's daily-life, especially in childcare, policies promoting children's healthy development remain mainly focused on mothers, with fathers being often considered as the breadwinner, playmate, or the help when mothers need. Thus, the main goal of this project is to contribute to the growth of knowledge on fathers and their impact on children and sustain new social policies. It's organized into four studies aiming to: (1) Identify involvement profiles in child-related activities, and explore profile differences between regarding father's, child's, and family's characteristics; (2) Explore how child's characteristics are associated with father's involvement; (3) Analyze predictors of involvement, considering fathers' parenting style, education, working hours, and children's characteristics; (4) Test the associations between the quality of parenting behaviors, children's OXT levels and behavioral problems. Overall, the results revealed that fathers who were more involved in all dimensions had higher levels of education, sense of efficacy, mother's working hours, and family income. Also, for younger children, fathers were more involved in teaching/discipline and play with more extroverted daughters: whereas with older children, fathers were more involved in teaching/discipline and play when children were higher on negative-affectivity, particularly with boys. Moreover, for father's involvement in direct care, his education and work hours were significant predictors; for teaching/discipline, his authoritative style; and for play, his education. An interaction between authoritative style and child negative-affect was found for involvement in teaching/discipline and play. Lastly, father's sensitivity and intrusiveness were negatively and positively, respectively, associated with children's internalizing difficulties and oxytocin levels. These results will contribute to promoting an active and positive involvement of the father with an impact on the well-being of children and families.

Keywords: paternal involvement; child's age and sex; child's temperament; parenting styles; parental sensitivity; child's behavior problems.

PsycINFO Classification Categories and Codes:

2800 Developmental Psychology

2956 Childrearing & Child Care

Table of Contents

Acknowledgements	iii
Resumo	v
Abstract	vii
Chapter 1. General Introduction	13
Chapter 2. Characterization of father involvement profiles in care and play activities, in nuclear activities, in nuclear families, with preschool children	21
2.1. Abstract	21
2.2. Introduction	22
2.2.1. Father involvement	22
2.2.2. Determinants of father involvement	24
2.3. Aims of the study	26
2.4. Method	27
2.4.1. Participants	27
2.4.2. Procedures/Instruments	27
2.4.3. Plan of analysis	29
2.5. Results	29
2.6. Discussion	34
2.6.1. Implications for practice	37
Chapter 3. The role of child's age, sex, and temperament in father involvement during the preschool years	39
3.1. Abstract	39
3.2. Introduction	40
3.2.1. Child's age	40
3.2.2. Child's sex	41
3.2.3. Child's temperament	42
3.2.4. Interactions between child characteristics	43
3.2.5. Covariates	43
3.3. Aims of the study	44

3.4. Method	44
3.4.1. Participants	44
3.4.2. Procedures/Instruments	45
3.4.3. Plan of analysis	46
3.5. Results	46
3.5.1. Regression models for group 1: 3-4 years old	49
3.5.2. Regression models for group 2: 5-6 years old	50
3.6. Discussion	52
3.6.1. Limitations, strengths, and future research	53
Chapter 4. Paternal involvement with preschoolers. The contributions of parenting styles and child negative affect	55
4.1. Abstract	55
4.2. Introduction	56
4.2.1. Explanatory variables of father involvement	56
4.3. Aims of the study	60
4.4. Method	61
4.4.1. Participants	61
4.4.2. Procedures/Instruments	61
4.4.3. Plan of analysis	63
4.5. Results	63
4.6. Discussion	66
4.6.1. Limitations and contributions of the study	69
Chapter 5. Parenting sensitivity, salivary oxytocin levels and children's behavioral problems in a Portuguese sample	71
5.1. Abstract	71
5.2. Introduction	72
5.2.1. Parental sensitivity and children's outcomes	72
5.2.2. Parental sensitivity and oxytocin	74
5.2.3. Oxytocin and children's behavioral adjustment	75
5.3. Aims of the study	76
5.4. Method	76
5.4.1. Participants	76

5.4.2. Procedures/Instruments	77
5.4.3. Plan of analysis	80
5.5. Results	80
5.6. Discussion	83
5.6.1. Limitations	84
Chapter 6. General Discussion	87
6.1. Limitations of the studies	91
6.2. Strengths of the studies	91
6.3. Reflections for future studies	92
References	95

List of Tables

Table 2.1. Minimum and maximum values, means and standard deviations for the variables under study	30
Table 2.2. Bivariate correlations between the characteristics of the father, characteristics of the child and family, and paternal involvement (N = 175)	31
Table 2.3. Comparison of father participation in different activities between father involvement profiles	32
Table 2.4. Comparison of the characteristics of the father, child, and family according to the father involvement profiles	33
Table 3.1. Minimum, maximum, mean, and standard deviation of the father's involvement and the child's temperament dimensions	47
Table 3.2. Beta (β) estimates of the regression models for the five dimensions of father involvement in the two age groups	48
Table 4.1. Minimum, maximum, mean, and standard deviations of father's involvement, father's parenting style, and child's temperament	64
Table 4.2. Summary of the regression models for the dimensions of father involvement	65
Table 5.1. Descriptive statistics of the variables in study	80
Table 5.2. Correlations between parenting quality, OXT evoked after parent-child interaction, and children's behavior problems	82

List of Figures

Figure 2.1. Characterization of father involvement profiles in care, teaching/discipline, and play activities	32
Figure 3.1. Interactions of child's sex with child's extroversion on father involvement in teaching/discipline, for the 3-4 years old age group	49
Figure 3.2. Interactions of child's sex with child's extroversion on father involvement in play, for the 3-4 years old age group	50
Figure 3.3. Interactions of child's sex with child's negative affectivity on father involvement in teaching/discipline, for the 5-6 years old age group	51
Figure 4.1. Interaction between father's authoritative style and child's negative affectivity, for father's involvement in teaching/discipline activities	66

CHAPTER 1

General Introduction

Paternal care among primates, which includes humans is extremely rare and when present it is displayed by species that are distantly related, hence its presence cannot be explained by strictly phylogenetic or socioecological theories. Beyond our own species, paternal care is prevalent and distinct across the animal kingdom (Kokko & Jennions, 2008), most broadly in mammals. While paternal care is very common in fish and birds (less common in insects and amphibians), it is rather rare in mammals and even more so in primates (Clutton-Brock, 1991). All mammals are cared for by their mothers, 95% of the species display maternal-only care (i.e., in 95% percent of mammal species there is no paternal care), and the remaining 5% exhibit biparental care of their offspring (Clutton-Brock, 1991; Geary, 2000). Because mammals are categorized by the production of milk and its use for feeding the offspring, there are no mammal species that have male-only care, however, in some of the 5% of species that exhibit biparental care, fathers are the predominant caregivers – e.g., marmosets, titi and owl monkeys. In primates in particular, the expression of paternal care is thought to have independently evolved several times in the primate order and its expression is one of the most puzzling and misunderstood topics of primate behavior (Fernandez-Duque et al., 2009). For instance, some small monkeys from the *New-World* primate species from the *Callitrichidae* family (e.g., Atlantic marmosets, Amazonia marmosets, dwarf and Pygmy marmosets, Goeldi's monkey, and tamarins), the *Aotidae* family (e.g., owl monkeys), and the *Callicebus* family (e.g., titi monkeys) are characterized by the direct and salient display of parental care. This trait is not widespread across all species of these families. In the *Old-World* monkeys, with whom we are more closely related, there is only one species, the siamang from the *Hylobatidae* family, where the male displays paternal care behaviors. In the *Hominidae* family known as the great apes, which includes humans, orangutans, gorillas, chimpanzees, and bonobos, humans are the exception (Clutton-Brock, 1989). The expression of paternal care in humans is thus a very fascinating topic, given its rarity and the fact that the circumstances that fueled its evolution remain a mystery (Geary, 2000).

Although present in our species, it is far from being universal (Fernandez-Duque et al., 2009). For instance, in the hunter-gatherer Aché society (Paraguay) males have little to no contact with their young (Hill & Hurtado, 1996), whereas in the Aka nomadic society (Africa),

males are profoundly invested (Hewlett, 1991). In the Western and industrialized society, in which the remaining literature is going to be based and focused on, there is great variability within and between socio-cultural groups and individuals regarding father roles and involvement in the family and children's daily routines (Cabrera et al., 2018).

In the 1980s, how much fathers were involved in family life became a topic of growing social interest (Pleck, 1997). Thus, the construct of father involvement was introduced in the mid-1980s, when research started to shift from whether fathers were present or absent from children's lives, to focus on other facets of the father-child relationship (Pleck, 2010). During the last decades, a shift in the way society perceives gender roles has occurred, although changes have been slower than expected (Wall et al., 2016b). With women accumulating responsibilities both in the family and work spheres, and with fathers no longer exclusively responsible for the family's financial support or discipline, there is a greater expectation in terms of his participation in childcare and education, but also in his emotional investment (Pleck, 2010). With this new idea of fatherhood, there has been a growing scientific interest in father's participation and its impact on child development (e.g., Lamb, 2000), resulting in numerous and different means of examining and defining it. Father's involvement in children's daily lives is a complex and multifaceted concept, described and investigated over the years through various conceptual models (e.g., Belsky, 1984; Cabrera et al., 2007a, 2014; Lamb et al., 1985, 1987; Parke, 1996, 2000; Pleck, 1997, 2010).

Lamb and colleagues (Lamb et al., 1985, 1987) proposed the first formalization, defining father involvement in a tripartite model: engagement (i.e., father's participation in activities that entail direct interaction with the child), accessibility (i.e., the degree to which the father is available to child), and responsibility (i.e., organizational and planning activities performed by the father that ensure that the child's needs are fulfilled or that resources are available to do so). Both the accessibility and responsibility dimensions do not require direct interaction with the child. The engagement dimension was the most popular, and thus most studied dimension, since it entailed direct father-child interactions (e.g., Palkovitz, 1997), which were believed to provide the highest parental influence (Parke, 2000). However, Parke (1996, 2000) calls attention to the fact that the father's role is multifaceted, and it is important to consider that father's involvement might depend on the context or type of activities in which it occurs and differentiates the following contexts: play and leisure (i.e., ludic activities with the child), direct care (interactional activities that ensure that the basic needs of the child are met), indirect care (planning/organizational activities that do not require direct interaction but ensure that the child's needs are met), and teaching (i.e., teaching of new rules and competencies). Later, Pleck

(1997, 2010) suggested a revised definition of the father involvement construct, in which the author argues that the former definition neglected the importance of the quality of the interactions between the father and the child, thus introducing new components to its conceptualization: positive engagement, warmth and responsiveness, and control. Additionally, Cabrera and colleagues (Cabrera et al., 2007a, 2014) proposed a dynamic model that considers how several variables of the father, child, family, and social context influence or predict father involvement directly and indirectly, and through interactions between them. Variables such as - father's characteristics (e.g., age, education, work hours, parental beliefs), characteristics of the child (e.g., age, sex, temperament) and the family (e.g., mother's work hours, family income), and external characteristics (e.g., cultural, political and social conditions) - are believed to have transactional and reciprocal relationships between them that influence father involvement, and that these relationships will change over time throughout the father's life cycle in accordance with the development of the father, child and the family.

Nonetheless, regardless of the several theoretical perspectives and contributions, there is no comprehensive theoretical framework to guide fathering research (e.g., Schoppe-Sullivan & Fagan, 2020). The present project considers the engagement and responsibility dimensions proposed by Lamb and colleagues (1985, 1987), whilst following the multidimensional structure of Parke's model (e.g., Parke, 1996, 2000), in which the author describes and differentiates the contexts of involvement, i.e., the type of activities in which father's involvement occurs (Parke, 2000). While also considering the complex transactional and reciprocal direct and indirect relationships between father's involvement and the characteristics of the father, child, and family (Cabrera et al., 2007a, 2014). In addition, the project also considers Pleck's (1997, 2010) recommendation to go beyond the time fathers spend with children and examine the quality of the parenting behaviors.

Since parenting does not occur in a vacuum, but within different contexts, and within a family system, especially since fathers seem to be more permeable to external influences (e.g., McBride et al., 2002). To better understand why some fathers are highly involved in their children's lives whereas others do very little, it is important to attempt to characterize involved fathers vs. uninvolved fathers in terms of key different level variables (of the father, mother, child, and family) with known influence on father involvement (e.g., see Diniz et al, 2021, for review).

In this sense, in Chapter 2, the first empirical study aims to identify profiles of father's involvement in various daily family activities, which imply direct interaction between the father and the child (i.e., direct care, teaching/discipline, play). Next, it aims to characterize the

profiles in terms of the characteristics of the father (i.e., beliefs about the role of the father, parental self-efficacy and satisfaction, education level, working hours), child (i.e., age, sex), and family (i.e., education and working hours of the mother, family income). In this chapter, an ecological view of the father involvement phenomenon is considered, recurring to the fathers' perspectives of their own parenting while also considering known important variables from different levels of the father, child, and family. It also, considers a person-centered approach over a variable-centered approach which allows for the description of subgroups and behavioral patterns that surpass the simple less specified analysis of looking at the sample as a whole (e.g., Muthén & Muthén, 2000).

Furthermore, besides being variables of known influence on father involvement, some of these characteristics are also considered to be important determinants of father involvement. Thus, moving beyond the description/characterization of involved and uninvolved fathers, it is imperative to understand how these characteristics positively or negatively influence the degree to which fathers are involved, and in which different types of activities. The child's characteristics are of particular relevance since although theoretically they are believed to have an impact on parenting, and particularly on father involvement, the results are inconsistent.

Thus, in Chapter 3, the second empirical study aims to explore how children's characteristics, such as age, sex, and temperament, predict father's involvement in different types of child-related activities (i.e., direct care, indirect care, teaching/discipline, play, outdoor leisure). Fathers' education and working hours will also be controlled for in these analyses. Additionally, since the literature reports different associations between father's involvement and child's temperament in terms of child's sex, interaction effects between child's sex and temperament will also be explored.

Although it is true that with women taking a more active role in the workforce, there has been a change in the division of tasks and responsibilities of home and child-care duties, this change has been slower than expected (Wall et al., 2016b). While mothers and fathers seem to be equally involved in play and teaching/discipline activities (e.g., Fuertes et al., 2016), in direct care responsibilities and tasks related to day-to-day family management mothers still assume a predominant role (Monteiro et al., 2010; Torres et al., 2014). For example, Monteiro and colleagues (2010) found that mothers and fathers were equally involved in play and teaching/discipline activities, while in direct care and especially in tasks related to day-to-day family management mothers still assume a more salient role (performing almost always these activities). Despite the disparity in the division of child-care activities, being present and doing things with children has been proven to be important for father-child relationships and

children's development. With father's involvement being positively associated with positive socioemotional and cognitive outcomes for children (e.g., Diniz et al., 2021; Rollè et al., 2019; Sakardi et al., 2008). Nevertheless, high involvement (high quantity) may not necessarily result in good outcomes for children (Brown et al., 2012). Some fathers may not be highly involved in specific activities, but when they participate, they are present and attuned to the child's needs. While others may be highly involved (e.g., due to unemployment) but their interactions with the child may lack quality (e.g., delayed responses, inadequate interpretation of needs, wrong responses to the child's signals). Thus, high father involvement per se may not imply good outcomes for children (Brown et al., 2012). In this sense, although it is important to understand and explore the contexts in which today's fathers are involved (what they do) and the quantity/frequency of their participation, there is also a need to critically consider the quality of their involvement (Cabrera et al., 2018).

Following this idea, Palkovitz (2019) advised the need to move the focus of fathering research from simply looking at the father involvement components, to focus on the quality of the father-child relationship (in terms of affect, behavior, and cognitions). The author suggests several ways to consider and analyze this quality, such as through the study of father-child attachment, paternal parenting styles, father-child closeness, father presence, paternal sensitivity, and synchrony. Father's parenting styles, for example, are crucial as it refers to a set of attitudes and behaviors from the father, directed at the child, which in turn foster the emotional climate in which the father-child interactions occur (Darling & Steinberg, 1993). The parenting style that tends to have more positive outcomes for children across cultures (see Pinquart & Kauser, 2018, for a review), is the authoritative parenting style (i.e., high in responsiveness/warmth, high in demandingness; Baumrind, 1971). In addition, father's parenting styles seem to have an important contribution to father's involvement. For example, father's authoritative style is a predictor of higher involvement in direct care and play (Paquette et al., 2000), and teaching (Arsénio & Santos, 2013), whereas father's authoritarian style is a predictor of lower involvement in care (Rentzou et al., 2019).

Therefore, in Chapter 4, the third empirical study aims to analyze the predictors of father's involvement in various activities related to the child (direct care, teaching/discipline, play), considering father's education, working hours and parenting styles, and child's characteristics (e.g., sex, age, and negative affect). Interactions between father's parenting styles and child's negative affectivity will also be tested. In this study, only the negative affectivity dimension of the child's temperament was considered as it is a variable known to create additional challenges for parenthood (Bates et al., 2012).

Parental sensitivity and intrusiveness are also two fundamental concepts used to assess the quality of parenting behaviors (Ainsworth et al., 1979). Parental sensitivity is described as the manner in which parents are available to their child, how they recognize and understand these signals, and whether they can respond properly and in a timely manner (e.g., Ainsworth et al., 1974; Ainsworth et al., 1978). Whereas parental intrusiveness is the degree to which parents respect child's wishes and autonomy (Egeland et al., 1993). These two constructs are keystones of parenting quality, depending greatly on the ability to accurately interpret and respond to the child's needs (Hallers-Haalboom et al., 2014). Given that parent-child relationships are co-constructed in the context of real and ongoing interactions, it is suggested that paternal involvement in children's daily routines will contribute to a better understanding of the child, facilitating the recognition and responsiveness to her/his signals and characteristics (NICHD, 2000).

Despite understudied, the quality of fathers' interactions - i.e., sensitivity and intrusiveness - with their children seem to have a similar effect as mothers' in predicting several children's outcomes (e.g., Lewis & Lamb, 2003; Tamis-LeMonda et al., 2004). Authors such as Fagan and colleagues (2014) believe that we should presume that fathers can display the same level of sensitivity as mothers since there is little empirical support for the idea that mothers are uniquely more sensitive than fathers. Recent meta-analyses (Deneault et al., 2022) of observed paternal and maternal sensitivity found mothers' and fathers' (couples) sensitivity to be correlated, although fathers were also found to be less sensitive than mothers. However, this difference was of small magnitude and was non-significant for European couples. European parental policies (particularly paternity policies), women's strong participation in the workforce, and different expectations of parental roles are appointed as possible explanations for this result. Moreover, paternal sensitivity has been found to be positively associated, for example, with children's attachment security (Lucassen et al., 2011), cognitive development (Malmberg et al., 2015; Shannon et al., 2002), executive functioning (St. George et al., 2017; Towe-Goodman et al., 2014), emotion regulation (Hazen et al., 2010; Martins et al., 2016), language development (Magill-Evans & Harrison, 2001; Malmberg et al., 2015); and negatively associated with children's internalizing (Hazen et al., 2010) and externalizing problems (Jacobvitz et al., 2022; Zvara et al., 2018).

During the preschool years, children face new and diverse challenges arising from a new network of relationships with impact, namely on their ability to play positively with peers, one of the main developmental tasks of this period (Waters & Sroufe, 1983). Parent-child relationships are essential emotional and cognitive resources that allow the child to safely

explore the social environment and within this context the child develops several skills necessary to initiate and maintain positive interactions with others, making them more attractive social partners (Bowlby, 1988; Rubin et al., 2009). These emotional resources, such as the recognition of emotional signals and expressions, and the prediction of emotional responses are fundamental capabilities for creating and maintaining positive relationships with peers during play (e.g., Heinze et al., 2015). Children who struggle to engage and sustain positive interactions with their peers are at a greater risk for developmental deviant trajectories (Cheah et al., 2001). Therefore, understanding how fathers contribute to children's socioemotional development and successful adjustment to the peer group is fundamental.

Consequently, in Chapter 5, the fourth empirical study aims to test the associations between the quality of observed father's parenting behaviors (i.e., sensitivity and intrusiveness), children's OXT levels (measured after a dyadic play interaction), and children's internalizing and externalizing problems. This study follows a family systems approach and includes mother's sensitivity and intrusiveness since it is important to include both parents to better understand children's outcomes. According to Pleck (2010) to not take mothers into account would result in an overvaluation of the father's influence on the child's development. In addition, salivary oxytocin is included in this study due to its critical role, for instance, in the development of social behavior and socioemotional bonds (Bachner-Melman & Ebstein, 2014), and parent-child synchrony (Feldman et al., 2010; Szymanska et al., 2017).

Despite the growing interest in research on fathers, empirical studies exploring the multidimensionality of the role of the father in children's lives and its impact are still scarce. It is important to describe and understand the contexts in which fathers participate in children's daily lives, but also to consider the characteristics and quality of their behaviors (Cabrera et al., 2018). Understanding how fathers impact children's development is fundamental. In this sense, this dissertation, and the studies that are encompassed within it, have the ultimate goal of contributing to empirically support social and educational policies that help mothers and fathers in the exercise of their parenting, considering the well-being of adults and children. In line with SDG's Goal 3 ('Ensure healthy lives and promote well-being for all at all ages') and Goal 4.2 ('Ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education'), we hope that the results of this project will have conceptual, empirical, and practical implications at the community level and contribute to the development of more informed policies and practices, with the aim of improving opportunities for children's healthy development.

Characterization of father involvement profiles in care and play activities, in nuclear families, with preschool children¹

2.1. Abstract

The present work aimed to contribute to a better understanding of the role of the father, aiming to identify profiles of involvement (relative to the mother) in different daily activities related to the child, and that imply direct interaction. It also aimed to explore the differences between these profiles regarding the characteristics of the father, the child, and the family. One-hundred-and-seventy-five couples, with children of preschool age, participated in the study. A two-stage cluster analysis revealed two involvement profiles, considering three involvement dimensions - direct care, teaching/discipline, and play: profile 1 ($n = 67$) – Care helpers and play partners; profile 2 ($n = 108$) – Caregivers and play partners. Fathers in profile 2 had significantly higher values than the parents in profile 1, in all dimensions of involvement. Comparing the two profiles, differences were found for father's education level and sense of parental efficacy, mother's working hours, and family income, with significantly higher values in profile 2. The results highlight the importance of understanding the characteristics associated with a greater involvement of the father (in multiple domains), considering the role of different levels of variables. This will contribute to promote an active and positive involvement of the father with an impact on the well-being of the individual, the family, and child's development.

Keywords: paternal involvement; beliefs about the role of the father; parental efficacy and satisfaction; characteristics of the child and family.

¹ This chapter is published in *Crianças em risco e perigo (Vol. VI)*: Santos, C., & Monteiro, L. (2023). Caracterização de perfis de envolvimento do pai em atividades de cuidados e brincadeira em famílias nucleares, com crianças em idade pré-escolar. In E. Magalhães, L. Monteiro, & M. M. Calheiros (Eds.), *Crianças em risco e perigo. Contextos, investigação e intervenção (Vol. VI)* (pp. 41-62). Edições Sílabo.
© 2023 Edições Sílabo. All rights reserved.

2.2. Introduction

For some authors (e.g., Belsky, 1984) the definition of the role of the father is more easily influenced by external factors, than the role of the mother, given that it is socio-culturally less defined, often minimizing a more active perspective of the father figure in the construction of his own role (Freeman et al., 2008). Understanding, not only in what domains and activities fathers are involved in (in relation to the mother), but also what variables promote or inhibit their involvement, has been the subject of increasing interest given the impact of the father on the development of the child (e.g., see Cabrera et al., 2018; Volling & Cabrera, 2019, for review). Considering the preschool years, Lamb and Lewis (2010) highlight the increased father-child interactions associated, in part, with the rapid and increasing acquisition of new skills by the child, making them a more ‘attractive’ partner, but also creating new challenges to parenting. Although, compared with mothers, the number of studies focusing on, or including, fathers in their analyses is significantly lower, the existing literature has reported that greater involvement of the father in these years is associated with greater emotional regulation (e.g., Cabrera et al., 2007b), social competence (e.g., Torres et al., 2014), or less externalizing problems (e.g., Jia et al., 2012) and internalizing (e.g., Lee & Schoppe-Sullivan, 2017).

2.2.1. Father involvement

Several approaches have been proposed regarding the definition and operationalization of father involvement (e.g., Cabrera et al., 2007a, 2014; Lamb et al., 1985, 1987; Parke, 1996, 2000; Pleck, 1997, 2010). Lamb’s model (1985, 1987) considers paternal involvement in three dimensions – (1) engagement, the father’s participation in activities shared with the child that involve direct interaction with the child, such as feeding or playing; (2) accessibility, the presence, surveillance and readiness of the parent to respond to the child if necessary, and which may not involve interaction, such as monitoring the child while playing alone/with other children; and (3) responsibility for the well-being of the child through the organization and planning of activities that meet the child’s care needs but do not imply direct interaction with the child, such as making an appointment with the pediatrician. Posteriorly, Pleck (1997, 2010) suggested a reformulation to the definition of the engagement dimension, highlighting the importance of the quality of interactions.

Parke (1996, 2000) also highlights the multidimensionality of the father’s role in the day-to-day life of the child, considering it important to analyze the involvement in terms of their frequency, contexts, and types of interaction in which it occurs, as well as the quality of paternal

behaviors. The author emphasizes the idea that the parent's involvement may vary depending on the context or type of activities in which it occurs: (1) direct care, which refers to activities that respond to the essential needs of the child, and which involve direct interaction, such as bathing; (2) indirect care, which refers to activities of organization of the child's life that may not imply direct interaction, such as choosing the child's clothing; (3) teaching, which refers to activities of teaching new skills, such as teaching the alphabet; and (4) play and leisure that refer to playful activities with the child, such as playing in the garden.

The heuristic model proposed by Cabrera and colleagues (Cabrera et al., 2007a, 2014) also adds complex transactional and reciprocal relationships between the father's involvement and (1) father's characteristics – e.g., age, education level, professional situation, motivation, parenting style; parental beliefs; (2) the characteristics of the child and the family – e.g., the age, sex, and temperament of the child; age, mother's education level and professional status, family's economic situation; and (3) contextual, cultural, political, social and economic factors – e.g., social support, community relations. This dynamic model assumes that these variables influence or predict father's involvement directly and indirectly, and through interactions between them. It will be expected that these influences and interactions may change depending on the development of the adult, the child, and the family system itself, throughout the life cycle.

The present study focuses on the engagement dimension proposed by Lamb (1985, 1987), but differentiates the involvement of the father (relative to the mother) according to the different types of activities that involve direct interaction with the child: direct care, teaching/discipline, and play (Parke, 1996, 2000). An analysis of the type of activities in which fathers are involved in (e.g., care, teaching, play) has revealed that, despite being more participatory in day-to-day activities, when compared to previous generations (e.g., Balancho, 2004), the differences remain in the domains traditionally associated with the maternal figure, namely, in child care (e.g., Cabrera et al., 2000; Wall et al., 2016a). Studies that analyze the role of the father, including Portuguese samples, have verified a greater sharing of activities related to the teaching of skills, definition of rules or play, however, the activities of managing the daily routines of the child as well as their basic care (e.g., bathing), continue to be almost always carried out by the mothers (e.g., Cabrera et al., 2000; Lamb & Lewis, 2010; Lima, 2005; Monteiro et al., 2017; Novo & Prada, 2015; Torres et al., 2012; Torres et al., 2014).

Understanding what characterizes fathers who are more involved (or share activities beyond the domains associated with traditional gender roles), as well as those who are less involved or even absent is fundamental, thus this study seeks to include in its analysis different

levels of variables (father, child, and family characteristics) with potential impact on the involvement of the father (Cabrera et al., 2007a, 2014).

2.2.2. Determinants of father involvement

2.2.2.1. Characteristics of the father

Father's beliefs about his parental role are described as specific beliefs concerning what it is to be a parent and the importance of that role to him, and it is hoped that these will have an impact on the exercise of his parenthood (Palkovitz, 2002). The 'traditional' beliefs about the father's role refer to a father regarded as the financial support of the family and the disciplinarian figure, being little involved in caring for the child (Lamb, 2010). More 'modern' beliefs refer to an affectionate, caring father who is as capable as the mother (Lamb, 2010; Pleck & Masciadrelli, 2004), associated with greater father involvement (e.g., Favez et al., 2016; Kwok & Li, 2014; Monteiro et al., 2019b). These parents tend to recognize their competencies as parents, as well as their importance for the development of their children, adopting appropriate behaviors, stimulating a healthy development (McBride et al., 2005).

Another important variable in terms of parental cognitions is parental competence (Jones & Prinz, 2005), operationalized in two dimensions – self-efficacy and satisfaction. The first corresponds to the perception that fathers have about their role as a parent, in terms of their ability to respond adequately to the child's needs, confidence in their parental skills, and their ability to influence children's development (Coleman & Karraker, 1997, 2003). Parental self-efficacy has been considered a key variable to work in the context of family intervention and/or parental education programs, given its impact on the psychological functioning of parents and the adjusted development of children (see Jones & Prinz, 2005, for review). The second dimension refers to the level of satisfaction that the father obtains from his parenthood, and to the quality of affection related to his role as father (Johnston & Mash, 1989). Less attention has been given to this affective dimension comparatively with self-efficacy, however a positive relationship between these two dimensions has been reported (Coleman & Karraker, 2000).

Higher levels of self-efficacy have been associated with greater father involvement (e.g., Jacobs & Kelley, 2006; Kwok & Li, 2014; Kwok et al., 2013; Lamb & Oppenheim, 1989). For example, when parents feel more capable and competent to care for and educate their children, they tend to spend more time with them (Kwok & Li, 2014). Over time, these parents tend to use strategies and practices tailored to the characteristics and competencies of the child, that promote their development (Gilmore & Cuskelly, 2008). Although the relationship between

parental satisfaction and father involvement is unclear, this dimension has been associated, for both fathers and mothers, with more positive parental practices (e.g., McEachern et al., 2012), lower parental stress (Pérez et al., 2010), and lower levels of children's internalizing and externalizing difficulties (Ohan et al., 2000).

Father's work, in particular, the number of hours, is an important variable to consider, given the existing asymmetries in the working environment, between men and women. In Portugal, the figures for 2021 (INE, PORDATA, 2022a) indicate that 59.7% of men work, while for women the figure is 51.5%. Furthermore, men work an average of 34.5 hours per week (INE, PORDATA, 2022b), while women work an average of 30.5 hours. Fathers who work a high number of hours tend to be less involved with their children (e.g., Brown et al., 2011; Jacobs & Kelley, 2006; Lima, 2005; Monteiro et al., 2017; Santos et al., 2021). Rigid and long work schedules leave parents less time available to be involved in the child's direct care and fixed routines, investing their time in activities that are more flexible in terms of schedules, usually more ludic activities (Craig, 2006).

Regarding the education qualifications of the father, these tend to be consistently associated with his parenting. Fathers with higher educational levels tend to be more involved with their children in care, teaching/discipline, and play activities (e.g., Amaral et al., 2019; Beitel & Parke, 1998; Monteiro et al., 2017; Monteiro et al., 2019b; Novo & Prada, 2015; Paquette, 2000; Santos et al., 2021). This is usually associated with a greater availability of resources and knowledge about the child, as well as its impact on child development (Cabrera et al., 2007b). Additionally, higher educational levels (of mothers and fathers) are associated with more egalitarian gender views (Lamb & Lewis, 2010; Pleck, 2010; Wall et al., 2016a), promoting a division of tasks that is also more egalitarian.

2.2.2.2. Characteristics of the child, the mother, and family income

With regard to the child's sex, several studies report that fathers are more involved with their sons than with their daughters (e.g., Lima, 2005; NICHD, 2000). It is suggested that these differences result from biases of gender roles and socialization norms; or, for example, biological differences in children who incite differentiated responses from their caregivers (e.g., see Raley & Bianchi, 2016, for review). However, more recent studies have not reported these differences (e.g., Kulik & Sadeh, 2015; Monteiro et al., 2019b; Schoppe-Sullivan et al., 2013). Regarding child's age, this variable is usually analyzed, or controlled for in studies on parenting, with some authors suggesting that as children grow up and become more autonomous and more socially competent, they become more attractive interactive partners for the father,

thus promoting a greater father involvement (Lamb & Lewis, 2010). In this sense, some studies report that fathers are more involved with older children (e.g., Ferreira et al., 2018), particularly in teaching/discipline activities (Kulik & Sadeh, 2015) and play (Torres et al., 2014).

Regarding the mother, the massive entry of women into the labor market and the ‘double burden’ journey are usually seen as a driving factor for this greater interest in the father and his role (Wall et al., 2016a). In families where both caregivers work, fathers tend to be more involved, with, e.g., mother’s working hours being positively associated with a greater father involvement in caregiving activities (e.g., Monteiro et al., 2019b; NICHD, 2000; Roeters et al., 2010). Regarding mother’s education, higher education levels are associated with greater father involvement (e.g., Amaral et al., 2019; Torres et al., 2014).

Finally, family income is positively associated with greater father involvement (Castillo et al., 2013; Kulik & Sadeh, 2015). Fathers with higher income tend to have more education (qualifications), knowledge about parenting, and the possibility of accessing various resources to support parenting and child development (Cabrera et al., 2007b). On the other hand, lower-income parents typically have fewer educational qualifications (Nelson, 2004) and jobs with little flexibility in hours (Golden, 2008).

2.3. Aims of the study

The present study aims, thus, to identify profiles of father involvement (relative to the mother) in various daily activities of the family, which imply direct interaction between the father and the child, namely: direct care, teaching/discipline, and play. This person-centered approach presupposes that there is not a single model that fully fits a whole sample, but rather the existence of several relatively homogeneous subgroups that can be found in a given sample (Howard & Hoffman, 2018). This approach is important, given that most studies focus on a variable-centered approach, which offers less specificity about the subjects, as it describes the sample as a whole.

In addition, it also intended to characterize the profiles considering variables described in the literature as potentially associated with father involvement (e.g., Cabrera et al., 2014; Pleck, 1997, 2010), in particular, variables of the father (beliefs about the role of the father, self-efficacy and parental satisfaction, education level and working hours), the child (age and sex), and the family (education and working hours of the mother, family income). This way, an attempt is made to include an ecological view of the phenomenon, considering the perspective of the father regarding his parenting, but also sociodemographic variables with relevance to

father involvement (see Diniz et al., 2021). A more complex understanding of this phenomenon will contribute to inform evidence-based parenting programs that promote a more involved and positive parenting, associated with positive outcomes for children (e.g., Cabrera et al., 2018).

2.4. Method

2.4.1. Participants

One-hundred-and-seventy-five couples – father and mother – participated in this study. Fathers were between 27 and 52 ($M = 36.76$, $SD = 4.79$), and their education level ($M = 13.05$, $SD = 3.53$) varied between the primary and higher education (1st cycle: 2.9%, 2nd cycle: 2.3%, 3rd cycle: 14.3%, high school: 43.4 %, higher education: 37.3%). Ninety-three percent of parents worked full-time or part-time on average 40.98 hours per week ($SD = 7.12$). Mothers were aged between 23 and 50 ($M = 35.34$, $SD = 4.61$), and their education ($M = 14.57$, $SD = 3.39$) varied between the primary and higher education (1st cycle: .6 %, 3rd cycle: 10.9%, high school: 33.1%, higher education: 55.4%). Eighty-five percent of mothers worked (full-time or part-time) on average 38.27 hours weekly ($SD = 6.28$). Family income ranged from 500€ to 4200€ per month ($M = 1892.95$, $SD = 831.44$). Target children were between 31 and 76 months ($M = 53.73$, $SD = 10.30$), 83 were girls and 97 had siblings. None were identified as having special educational needs. All the children were attending preschool/daycare centers (private for-profit and non-profit) in the district of Lisbon.

2.4.2. Procedure/Instruments

The present study is integrated into a broader project on the role of the father and the implications of his involvement in child's socio-emotional development. The project follows the ethical indications of The Portuguese Psychologists Association and the American Psychological Association, it has been approved by the Ethics Committee of *Iscte-Instituto Universitário de Lisboa* (Reference No. 27/2018). The participants were informed about the objectives and procedures of the project, and all signed an informed consent prior to data collection. Only one target-child per family was considered (the oldest, in the case of the existence of more than one child of preschool age), parents answered the questionnaires considering only the target child.

2.4.2.1. Sociodemographic information

The information on the sociodemographic characterization of the family – i.e., parents' age, marital status, educational qualifications, professional status, working hours, family income, child's age, and sex – was obtained through a brief sociodemographic questionnaire completed by the mothers.

2.4.2.2. Father involvement

Mothers and fathers (independently) completed the “Parental Involvement: Care and Socialization Activities Scale” (Monteiro et al., 2008) that evaluates the perception that the parents have about the involvement of the father (in relation to the mother) in various daily activities related to the child. The scale consists of 26 items, distributed in five dimensions. For the present study, only three of the dimensions, which imply engagement, were used: direct care (5 items, e.g., “Who feeds your child”), teaching/discipline (5 items, e.g., “Who sets the rules at home”), and play (5 items, e.g., “Who plays with your child”). Items are answered on a 5-point Likert-type scale (1 = always mother, 3 = both mother and father, 5 = always father). Since intra-class correlation coefficients (ICCs) present high or very high values of agreement between the answers given by the fathers and mothers ($ICC > .63$), a composite of involvement was created by calculating the mean responses of both. Cronbach's alphas for direct care, teaching/discipline, and play were respectively .70, .70, and .61.

2.4.2.3. Beliefs about the role of the father

Fathers also completed a questionnaire about the role of their father (“What is a father”, Schoppe, 2001; adapted from “The Role of the Father”, Palkovitz, 1984; Monteiro et al., 2015). This questionnaire aims to analyze the parents' view of fathers' role and their importance for the child's development. It is composed by 15 items (e.g., “A parent should be as strongly involved as the mother in the care of their child”), for each item the parents indicate their level of agreement with the statement presented on a 5-point Likert-type scale (1 = strongly disagree; 5 = strongly agree). The items corresponding to traditional beliefs are reversed, so higher values correspond to modern beliefs about the role of the father. Cronbach's alpha for parental beliefs was .71.

2.4.2.4. Sense of parental competence

Fathers completed the “The Parenting Sense of Competence” (Johnston & Mash 1989), which aims to assess parents' perception of their parental competence. The translated and adapted

version by Ferreira and colleagues (2011) consists of 15 items, organized into three dimensions: satisfaction, effectiveness, and parental interest. In the present study only the dimensions of satisfaction (5 items, e.g. “Sometimes I feel like I’m not accomplishing anything”) and efficacy (7 items, e.g., “Being a parent is easy to manage and the problems that arise are easily solved”). For each item the parents indicate their level of agreement with the statement presented on a 6-point Likert-type scale (1 = strongly agree; 6 = disagree strongly). Seven of the items are inverted, so higher values indicate greater perception of parental satisfaction and efficacy. Cronbach’s alphas for satisfaction and efficacy were .69 and .72, respectively.

2.4.3. Plan of analysis

First, descriptive analyses of the variables under study were performed. The associations between the variables of father involvement, characteristics of the father, the child and the family were also tested. Next, to identify father involvement profiles based on the relative involvement of the father in the activities of direct care, teaching/discipline, and play, a two-stage cluster analysis was carried out (Hair & Black, 2000). First, a hierarchical clustering analysis was performed using Euclidean distances for the initial observations, and Ward’s method for identifying clusters. Next, a non-hierarchical cluster analysis (k-means) was performed in order to optimize the distribution of subjects in each cluster. Using univariate analyses of variance (ANOVAs), the differences between the involvement profiles were tested in terms of the father’s participation in the dimensions of direct care, teaching/discipline, and play. Finally, the differences between the profiles were analyzed considering: the characteristics of the father, the child, and the family, using a multivariate analysis of variance (MANOVA), and subsequent ANOVAs. The multivariate analysis was performed using the Pillai’s Trace criterion (V) due to its robustness in relation to samples with unequal sizes (Tabachnick & Fidell, 2007).

2.5. Results

The results of the preliminary descriptive analyses are presented in Table 2.1.

Table 2.1*Minimum and maximum values, means and standard deviations for the variables under study*

	Min	Max	<i>M</i>	<i>SD</i>
Characteristics of the father				
Education level (in years)	4.00	21.00	13.05	3.53
Work hours (weekly)	0.00	70.00	38.17	12.45
Parental satisfaction	1.60	6.00	4.75	.81
Parental efficacy	2.29	6.00	4.50	.64
Modern parental beliefs	1.66	5.00	4.35	.41
Characteristics of the child, the mother, and family				
Child's age	31.40	75.83	53.73	10.30
Mother's education level (in years)	3.00	21.00	14.57	3.39
Mother's work hours (weekly)	0.00	55.00	32.37	15.02
Family income	500.00	4200.00	1892.95	831.44
Father involvement				
Direct care	1.10	3.40	2.54	.48
Teaching/Discipline	1.90	3.60	2.86	.29
Play	1.90	3.80	3.05	.33

The associations between the variables under study were analyzed using Pearson's correlations. The results are shown in Table 2.2. Positive and significant associations were found between father's involvement in direct care and his education level; parental satisfaction and effectiveness, and mother's working hours. In contrast, father's working hours and child's sex (1 = female) are negatively and significantly associated with father involvement in direct care. A positive and significant association was found between father's involvement in teaching/discipline and his parental satisfaction, as well as between involvement in play and parental satisfaction, and with family income.

Next, to identify father involvement profiles, a hierarchical clustering analysis (Ward) was performed through the analysis of Euclidian distances, a parsimony evaluation of the agglomeration coefficients, and the dendrogram, a solution of two clusters was obtained ($R^2 = 31.51\%$, Silhouette = .34). In order to optimize the distribution of fathers in each cluster, a non-hierarchical clustering analysis (*k*-Means) revealed two profiles ($R^2 = 40.58\%$, Silhouette = .37) of involvement (Figure 2.1): profile 1 – care helpers and play partners ($n = 67$), constituted by fathers who support mothers in care and share teaching and play; profile 2 – caregivers and play partners ($n = 108$), composed of fathers who share all dimensions with mothers.

Table 2.2*Bivariate correlations between the characteristics of the father, characteristics of the child and family, and paternal involvement (N = 175)*

	1	2	3	4	5	6	7	8	9	10	11	12
Characteristics of the father												
1. Education level (in years)												
2. Work hours (weekly)	.05											
3. Parental satisfaction	.18*	.09										
4. Parental efficacy	-.03	.01	.28**									
5. Modern parental beliefs	-.05	-.02	.15*	.04								
Characteristics of the child, the mother, and family												
6. Child's sex (1 = feminine)	-.09	.04	-.10	.07	-.07							
7. Child's age	-.12	.02	.01	.11	.07	.05						
8. Mother's education level (in years)	.57**	.01	.16*	-.07	.11	-.09	-.10					
9. Mother's work hours (weekly)	.04	-.09	.05	-.02	-.04	-.06	-.11	.02				
10. Family income	.48**	.15	.17*	-.07	-.04	.00	.05	.43**	.23**			
Father involvement												
11. Direct care	.18*	-.19*	.18*	.24**	.07	-.17*	.04	.09	.24**	.15		
12. Teaching/Discipline	.13	.02	.18*	.09	.06	-.07	.06	.05	.07	.02	.24**	
13. Play	.13	.03	.22**	.16*	.10	-.01	.06	.13	.04	.19*	.37**	.40**

* $p < .05$; ** $p < .01$

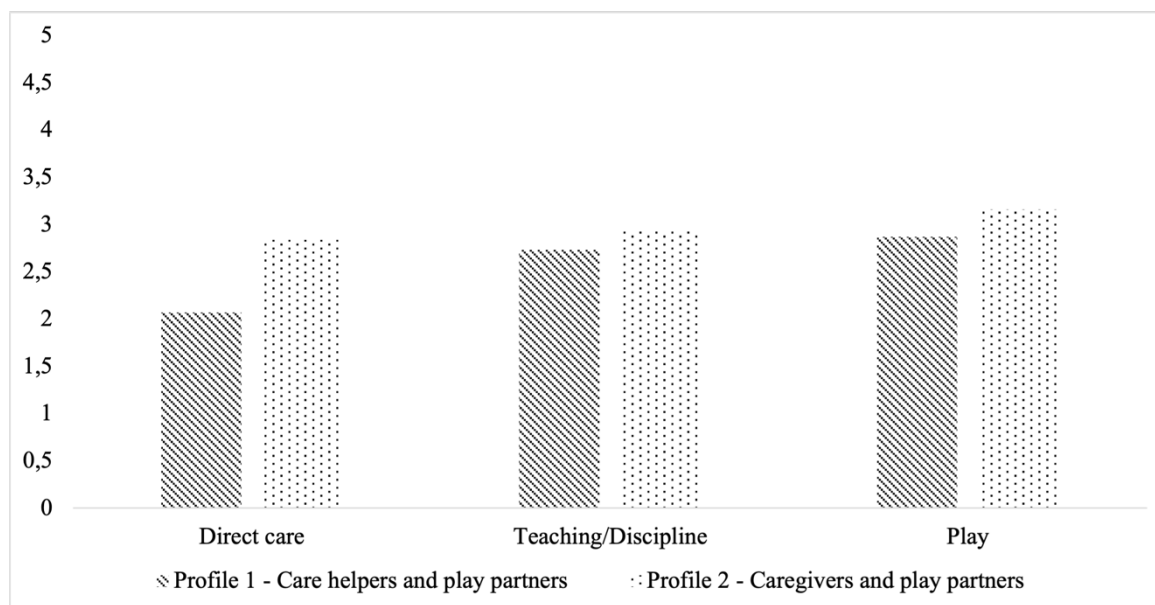


Figure 2.1

Characterization of father involvement profiles in care, teaching/discipline, and play activities

The *x*-axis represents the different dimensions of father involvement, and the *y*-axis the means (on a 5-point scale) of the father's participation in the different dimensions. In order to characterize the father involvement profiles in terms of the father's participation in the dimensions of direct care, teaching/discipline, and play ANOVAs were performed. The results are shown in Table 2.3. These results show that the groups formed include fathers with statistically different profiles of involvement in the different domains. Fathers in profile 2 (Caregivers and play partners) have significantly higher values of involvement than parents in profile 1 (Care helpers and play partners) in all dimensions.

Table 2.3

Comparison of father participation in different activities between father involvement profiles

	1. Care helpers and	2. Caregivers and	ANOVAs		
	play partners (<i>n</i> = 67)	play partners (<i>n</i> = 108)			
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>F</i>	<i>p</i>	η_p^2
Direct care	2.07 (.33)	2.84 (.27)	287.13*	< .001	.62
Teaching/Discipline	2.74 (.32)	2.94 (.25)	21.54*	< .001	.11
Play	2.88 (.32)	3.16 (.29)	36.51*	< .001	.17

Finally, differences between the profiles in terms of the characteristics of the father, the child, and the family were analyzed (Table 2.4). A significant multivariate effect was found for the profiles, $V = .19$, $F(9, 163) = 4.33$, $p < .001$, $\eta_p^2 = .19$, on the dependent variables considered. The detailed analysis of univariate effects revealed the existence of significant differences for father's education, $F(1, 171) = 11.18$, $p = .00$, $\eta_p^2 = .06$, mother's working hours, $F(1, 171) = 7.22$, $p = .01$, $\eta_p^2 = .04$, and family income, $F(1, 171) = 8.03$, $p = .01$, $\eta_p^2 = .05$. Fathers of profile 2 (Caregivers and play partners) have higher values of father's education level, mother's working hours, and family income, than fathers of profile 1 (Care helpers and play partners). There was also a significant univariate effect for parental effectiveness, $F(1, 171) = 12.58$, $p = .00$, $\eta_p^2 = .07$. Fathers of profile 2 have higher mean values of parental effectiveness, than parents who are less involved in care activities (profile 1).

Table 2.4

Comparison of the characteristics of the father, child, and family according to the father involvement profiles

	1. Care helpers and 2. Caregivers and		ANOVAs		
	play partners ($n = 67$)	play partners ($n = 108$)	F	p	η_p^2
	M (SD)	M (SD)			
Characteristics of the father					
Education level (in years)	11.93 (3.59)	13.74 (3.13)	11.18*	.00	.07
Work hours (weekly)	39.82 (12.30)	37.14 (12.49)	1.53	.22	.01
Parental satisfaction	4.60 (.85)	4.84 (.77)	2.88	.09	.02
Parental efficacy	4.31 (.67)	4.63 (.60)	12.58*	.00	.07
Modern parental beliefs	4.33 (.38)	4.36 (.44)	0.08	.78	.00
Characteristics of the child, the mother, and family					
Child's age	53.07 (9.21)	54.14 (10.95)	0.54	.47	.00
Mother's education level (in years)	13.91 (3.12)	14.98 (3.50)	3.40	.07	.02
Mother's work hours (weekly)	28.33 (17.29)	34.87 (12.87)	7.22*	.01	.04
Family income	1674.85 (803.77)	2028.25 (823.04)	8.03*	.01	.05

Finally, there was no multivariate effect of interaction between child's sex and father involvement profiles, $V = .09$, $F(9, 163) = 1.81$, $p = .07$. That is, there are no significant sex differences between the involvement profiles.

2.6. Discussion

In recent years, several studies have demonstrated the importance of the father in the family system and child development (see Volling & Cabrera, 2019), however, multiple questions remain open concerning what determines a greater or reduced involvement of the father (see Diniz et al., 2021). As part of this effort, the present study sought, in a sample of Portuguese fathers, to identify different profiles of involvement (in relation to the mother) in terms of their participation in activities of direct care, teaching/discipline, and play. Next, the differences between the profiles were explored, regarding the characteristics of the father, the child, and the family.

Two profiles of father involved emerged from the analyses that were carried out, namely, profile 1 – Care helpers and play partners, and profile 2 – Caregivers and play partners, which present significant differences in all dimensions of involvement, with particular emphasis on father's involvement in the direct care dimension. Thus, profile 1 is composed of fathers who have lower values of involvement in care, i.e., they participate/support mothers in care tasks but do not share them; and profile 2 is made up of fathers who show higher values of involvement in care, i.e., they share care tasks with the mothers. Our results reflect the importance of analyzing the type of activities in which fathers participate (from care to play), with profile 1 approaching a more traditional view of fatherhood, and profile 2 meeting a more modern view of the role of the father. With a more active participation in the different contexts and routines of children, namely those traditionally associated with the mother (e.g., Lamb, 2010; Parke, 2000; Pleck & Masciadrelli, 2004).

Despite these differences in terms of involvement profiles, the analysis of beliefs about the father's role does not reveal the existence of significant differences between the two profiles, although the literature reports that fathers with a more egalitarian view of gender roles tend to be more involved with their children (e.g., Nangle et al., 2003). It appears that the fathers of profile 1 (fathers who help with care), despite having a modern view of their role, these beliefs do not seem to translate into an egalitarian sharing in everyday life in all domains (e.g., Cabrera et al., 2000; Wall et al., 2016a). This could be due to constraints related to father's work beyond working hours (e.g., policies that promote the reconciliation of work and family in companies, Wall et al., 2016a), or to the vision that mothers have about the role of the father, and the

potential ‘regulatory’ role of his involvement, in domains traditionally associated with the mother figure (e.g., Schoppe-Sullivan et al., 2008).

Regarding parental efficacy, a significant univariate effect was found. As expected, fathers who are more involved in care and play (profile 2) have higher efficacy values (e.g., Jacobs & Kelley, 2006; Kwok & Li, 2014; Kwok et al., 2013). The literature tends to indicate that fathers who perceive themselves as efficient and competent in tasks related to children tend to invest more in these interactions (e.g., Kwok & Li, 2014), adopting adjusted behaviors that promote their development (Gilmore & Cuskelly, 2008). Considering parental satisfaction, a less explored dimension, no significant differences were found between the two profiles, although in terms of bivariate associations this dimension is associated with care, teaching/discipline, and play. We might expect more participatory and involved parents (i.e., profile 2) to show higher levels of satisfaction, however, profile 1 parents report similar levels of satisfaction with their parenting (Johnston & Mash, 1989).

In terms of sociodemographic variables, significant differences were found between the two profiles, with ‘Caregivers and play partners’ (profile 2) showing higher values of father’s education level, mother’s working hours, and family income, compared to ‘Care helpers and play partners’ (profile 1). Regarding father’s qualifications, the results are in line with what is reported in the literature for involvement in direct care (e.g., Monteiro et al., 2017; Novo & Prada, 2015; Paquette et al., 2000; Santos et al., 2021), and play (Beitel & Parke, 1998; Monteiro et al., 2017; Monteiro et al., 2019b; Santos et al., 2021). Higher educational attainment tends to be associated with more equal gender views and division of tasks (Lamb & Lewis, 2010; Pleck, 2010; Wall et al., 2016a), as well as a better understanding of the impact that fathers have on child development (Cabrera et al., 2007b). Likewise, fathers in profile 2 have wives/partners with a higher number of weekly working hours than fathers in profile 1 (e.g., Monteiro et al., 2019b; Roeters et al., 2010). The massive entry of women into the labor market, and their investment in the professional sphere, has been seen as the variable that led to greater focus on the role of the father and the need for greater involvement of men in the family sphere (e.g., Cabrera et al., 2000; Lamb & Lewis, 2010; Wall et al., 2016a). It was also found that fathers in profile 2 report higher values of family income than fathers in profile 1 (e.g., Castillo et al., 2013; Kulik & Sadeh, 2015).

Concerning the child’s characteristics, even though, in terms of bivariate associations, fathers of sons were more involved in direct care, a multivariate interaction effect was not found between the child’s sex and the father involvement profiles. This result is in line with more recent studies where no differences were found for father’s involvement in terms of child’s sex

(e.g., Kulik & Sadeh, 2015; Monteiro et al., 2019b; Schoppe-Sullivan et al., 2013; Torres et al., 2014). Similarly, age did not prove to be a significant factor, as in other studies (e.g., Lima, 2005; Monteiro et al., 2019b), with our sample being composed of children only in the preschool age group.

The results obtained in the present study highlight the multiplicity of father's involvement in the child's daily care and socialization tasks, and the need to consider his participation in terms of different types of activity (e.g., Monteiro et al., 2019b; Pleck, 1997, 2000). They also emphasize the importance of considering multiple levels of variables that may contribute to a more complex view of father involvement.

There are, however, some limitations of the study worth mentioning. Namely the fact that it is a cross-sectional study, does not allow to infer the causality of the relationships under analysis. Moreover, it does not include a quality dimension of father involvement, e.g., in terms of parenting styles and practices (Baumrind, 1997), or parental sensitivity (Ainsworth et al., 1978). Authors such as Pleck (1997, 2010) highlight the need to consider the quality of the behavior, in addition to the time the father spends with the child, suggesting the concept of positive engagement, integrating dimensions such as affection, responsiveness, control, and responsibility. In addition to the importance of the father being present, it will be the quality of the involvement that will promote an adjusted development of the child, thus future studies should integrate this dimension. Furthermore, only self-report measures were used, hence it will be important to include other types of measures, namely observational, in particular for the quality of the father's behavior, since these measures are considered to be the best approach to the study of processes underlying the social and affective patterns of parent-child interaction (Parke, 2000). Additionally, at a methodological level, due to the sample size, it was not possible to carry out a cross-validation of the cluster analysis.

It should also be added that if the study of nuclear families (mother and father) remains relevant and necessary, other types of families exist that must be analyzed and understood in their commonalities and specificities. For example, it is necessary to better understand the involvement of the father and exercise of his parenting in single-parent families (where he is the main caregiver), or the involvement of the father and exercise of co-parenting in cases of separation/divorce where the father does not live with the child (in 2020, the number of divorces per 100 marriages in Portugal was 91.5%; INE, DGPI/MJ, POR-DATA, 2022). It will also be important to study homo-parental families, and how these roles are represented and experienced by caregivers. Finally, it is fundamental to study samples with more diversified sociodemographic and cultural characteristics.

Despite the mentioned limitations, the present study focuses on the analysis of the father's role considering fathers' own perspectives on parenting (with the exception of the measure of involvement - a relative measure, answered by both), given that in many cases fathers continue to be described in the light of, and by the vision of, the maternal figure. This has implications for a bias in the design of parenting programs, which according to Cabrera and colleagues (2018) remain poorly tailored to the characteristics of fathers. Another aspect worth highlighting is the use of a person-centered approach, which allows the identification of dynamic subgroups emerging from a sample or population based on the obtained data, and not determined a priori by theoretical models. It also allows to explore predictors, correlates, and outcomes of different subgroups (Howard & Hoffman, 2018).

2.6.1. Implications for practice

The results presented contribute to a comprehensive look at a sample of Portuguese parents, in nuclear families, with children of pre-school age, forming part of a more recent effort to produce knowledge that may come to inform programs about parenting, based on evidence, considering parents' specificities, but also integrating aspects of family ecology. Some of the dimensions addressed in this study with Portuguese families, namely, parental beliefs and competence are integrated into intervention programs such as "FOCUS" (Nievar et al., 2020) or "Baby Books 2" (Cabrera & Reich, 2017), emphasizing the importance of developing this type of interventions in Portugal, particularly in contexts where father involvement may be more challenging, e.g., in minority contexts, socioeconomic risk, or contentious divorces.

The role of child's age, sex, and temperament in father involvement during the preschool years²

3.1. Abstract

The aim of the study was to explore how child's characteristics (age, sex, and temperament) were associated with father's involvement in child-related activities. In a sample of 410 bi-parental families with preschool age children. Dividing the sample into two age groups, OLS regression models were conducted for each dimension of father involvement with child characteristics as predicting variables. For the younger children (3 and 4 years) fathers were more involved in teaching/discipline and play with their more extroverted daughters. With older children (5 and 6 years), fathers were more involved in teaching/discipline and play when children were higher on negative affectivity. An interaction was found with boys' higher negative- affectivity, predicting fathers' higher involvement in teaching and discipline. Our results suggest that children's characteristics have an impact on what fathers do, particularly in a dimension salient to preschool years such as teaching/discipline. This can help build tailored empirical-sustained programs aiming to encourage and support fathers' positive involvement.

Keywords: father involvement; child's age; child's sex; child's temperament; preschool.

² This chapter is published in *Children*:

Santos, C., Monteiro, L., & Torres, N. (2022). The role of child's age, sex, and temperament in father involvement during the preschool years. *Children*, 9, 1327. doi: 10.3390/children9091327

© 2022 MDPI. All rights reserved.

3.2. Introduction

Over past several decades, family dynamics and gender roles have undergone significant changes, with the increased participation of women in the workforce (Cabrera et al., 2014). These changes have created demands but also opportunities, with fathers no longer being viewed as the main financial providers, and with the expectation that men should be more engaged in childcare and education on a daily basis (Cabrera et al., 2018; Pleck, 2010). This is paramount since, during the last few decades several studies have provided evidence that fathers do have an important role, with combined and independent effects from mothers, across different domains of child development, i.e., social competence, cognitive development, self-regulation, social adjustment, vocabulary knowledge, and quality of play (see Cabrera et al., 2014; Cabrera et al., 2018; Lamb, 2010; Volling & Cabrera, 2019, for review).

Parenting in general and, more specifically, father involvement is multi-determined by individual (e.g., education, parental beliefs), family (e.g., child's characteristics, wife's work status), social and cultural factors (e.g., social support, family's socio-economic status) (Cabrera et al., 2007a, 2014; Lamb & Lewis, 2010; Parke, 2000). Several conceptual models have been proposed to systematize how these factors shape fathers, their involvement, and how they impact child development (Cabrera et al., 2007a, 2014; Parke, 1996, 2000). One important determinant of parenting is child's characteristics, but if for some authors (Belsky, 1984) its effects are not seen as relevant as parent's skills and characteristics, for others (Cabrera et al., 2007a, 2014; Parke, 1996, 2000) the children's characteristics are considered as important as the parents'. Notwithstanding, a recent systematic review of the literature (Diniz et al., 2021) found that out of 86 papers that met all the inclusion criteria, in the 52 that examined the determinants of father involvement, only seven looked at the effect of the child's characteristics (e.g., age, sex, and temperament). Thus, our study aims to contribute to fill this gap by exploring the role of the child's characteristics in shaping father involvement, in the period of the preschool years when father-child interactions are especially salient (Lamb & Lewis, 2010), with the father being viewed as having an important role in helping the child navigate the world beyond the family, e.g., school and peers (Paquette, 2004).

3.2.1. Child's age

Cabrera and colleagues' heuristic model (Cabrera et al., 2007a, 2014) considers that the effects of child's characteristics may change over time, as children grow older, and progressively elicit more involvement from their fathers. According to (Lamb & Lewis, 2010), the father-child

relationship becomes more salient during the preschool years, due to the rapid increase in children's cognitive and socio-emotional skills and abilities, making the child a more competent and appealing partner.

During this period, the child undergoes rapid growth in terms of motor development, language, autonomy, and reasoning skills. There is a progressive development of children's independence and autonomy in being able to accomplish important routinely daily life tasks. Whereas children around 3 are entering preschool, developing new cognitive and emotional abilities, and discovering a wider social network and social challenges; older children are working upon these competences and moving towards more sophisticated and finer tasks, e.g., with children attaining the theory of mind and executive function skills usually around 5 (Sabbagh et al., 2006). The quality of play also changes across the preschool years, from a more parallel to a more cooperative and symbolic play (Parten, 1932) promoting more complex interactions. The development of gender segregation play companions is also evident, with older children (around 5) showing a significantly greater preference for same-sex play companions than younger preschool children (LaFreniere et al., 1984). At this later age, children are also usually getting ready for more formal and structured learning (end of preschool/transition to primary school), and father's greater involvement in this age period has been associated with greater school readiness of children (Meuwissen & Carlson, 2018) and later academic success (Cook et al., 2011). Some studies have found positive associations between child's age and father's involvement in care (Monteiro et al., 2019a), teaching/discipline (Kulik & Sadeh, 2015), and play (Torres et al., 2014), during the preschool years, while others report none (Ato et al., 2015; Lima, 2005; Monteiro et al., 2019b).

3.2.2. Child's sex

Regarding child's sex, when differences are found, fathers tend to be more involved with sons in the contexts of care and play activities (Lima, 2005; Monteiro et al., 2010; NICHD, 2000, 2005; Yeung et al., 2001). It has been suggested that these differences may be related to socialization gender bias of roles and norms (see Raley & Bianchi, 2006, for review). Another hypothesis presented by Emmott and Mace (2020), based on a human behavioral ecological model, is that in Western societies, for the same fitness cost of paternal caregiving, the benefits/gains in terms of 'child quality' (due to the gender inequality of these societies, i.e., superior job placement, higher income, greater reproductive success), are higher for sons than daughters. Nevertheless, Pleck and Masciadrelli (2004) highlight that this effect has been decreasing over time. In this sense, more recent studies have reported no significant sex

differences in father's involvement (Kulik & Sadeh, 2015; Monteiro et al., 2019a; Monteiro et al., 2019b; Schoppe-Sullivan et al., 2013; Torres et al., 2014).

3.2.3. Child's temperament

Not much is known about the impact of child's temperament on father's parenting, with the number of studies focusing on fathers, or even mothers and fathers together, being clearly insufficient (Brown et al., 2011). Although the issue has not received much study, some evidence has shown that fathers, more than mothers, seem to be more influenced by children's characteristics such as temperament (Cummings et al., 2000).

According to Rothbart and Ahadi (1994), temperament can be described as how, due to transactions between biological predispositions and social environment, children react to stimuli and regulate their emotions and behaviors in terms of frequency and intensity across different situations. It can be summarized in three central dimensions (Putnam & Rothbart, 2006): (1) extroversion, entailing high activity and impulsivity levels, and positive expectations; (2) effortful control, referring to the ability to suppress/enact inadequate/adequate behavioral responses, and to direct and focus attention among different stimuli; and (3) negative affectivity, referring to high levels of negative feelings such as frustration, sadness, anger and discomfort, and greater feelings of shyness and difficulty to be soothed. This individual characteristic is considered to contribute to children's adjustment due to indirect influences on parenting practices (Rothbart et al., 2000).

Most studies aiming to understand the relationship between child temperament and father's involvement have analyzed temperament in terms of easy temperament vs. difficult temperament: the first described as low scores of negative affect, high positive affect scores such as extroversion; and the second associated with high scores of negative affect, low extroversion scores, and low effortful control. A child's difficult temperament is thought to hinder father's involvement, as it creates additional challenges for parents (Bates et al., 2012) (e.g., regarding soothing the child; managing engagement in, and transitions between activities or contexts; discipline) and is associated with higher parenting stress and low-quality interactions (Halford et al., 2015). If some studies have reported that fathers are less involved in care with children described as having a difficult temperament (McBride et al., 2002), and in play contexts (Kulik & Sadeh, 2015), suggesting that more demanding, irritable and emotional negative children might prompt less involvement than more social and easily soothed children (Mehall et al., 2009), other studies have reported that fathers tend to be more involved in care (Aring & Renk, 2010; Volling & Belsky, 1991) and in teaching/discipline (Torres et al.,

2012) activities with these children, possibly because they exert more positive efforts, being sensible to their difficulties, than with easy-going children.

3.2.4. Interactions between child characteristics

It is also important to consider the possible interactions between characteristics, since child's sex seems to play a role in the relationship between child's temperament and father's involvement. According to Manlove and Vernon-Feagans (2002), fathers tend to be more involved with temperamentally easy sons, while other authors report that they are less involved with temperamental difficult daughters (Frodi et al., 1982; McBride et al., 2002). It has been suggested that a difficult temperament can be a potential inhibitor of the quality of parenting (Goldberg et al., 2002) and could exacerbate the gender bias found for father's involvement in some samples (NICHD, 2000, 2005). However, other authors (Frodi et al., 1982) have reported that fathers tended to be more involved with their difficult sons, with Feldman (2003) suggesting that same-sex dyads share emotional regulation systems that might facilitate father's engagement, even with less positive characteristics.

3.2.5. Covariates

In addition, as parenting occurs within several different social, economic, cultural, and family organization contexts (Gaertner et al., 2007), several sociodemographic variables have impact on father's involvement. Fathers' employment, and consequent demands on their available time, reduces the time they spend with their children (Hofferth & Anderson, 2003). Fathers' working hours have been negatively associated with fathers' involvement in direct care (Lima, 2005), teaching/discipline (Monteiro et al., 2017) and playing activities (Brown et al., 2011). Fathers' educational level is also an important influence (Cabrera et al., 2007a), and has been positively associated with involvement in direct care (Paquette et al., 2000), indirect care (Monteiro et al., 2010; Torres et al., 2014), teaching (Monteiro et al., 2017), play (Beitel & Parke, 1998; Monteiro et al., 2019b) and leisure (Monteiro et al., 2019a; Yeung et al., 2001). It has been proposed that a father's higher education is linked with greater availability to resources and with more knowledge about child's needs and developmental characteristics, which in turn fosters his involvement (Cabrera et al., 2007b).

3.3. Aims of the study

Although under-studied, enough evidence has been gathered to attest to the impact of fathers' positive involvement on children's socio-emotional and cognitive development (Cabrera et al., 2018; Lamb, 2010; Volling & Cabrera, 2019, for review). So, it is important to better understand variables that promote or inhibit father's involvement in child related activities on a daily basis. As less is known about how individual characteristics of the child such as sex and temperament are associated with parenting behaviors (see Diniz et al., 2021, for review) during the preschool years (Kiff et al., 2011), it is important to explore which factors play a significant role during this period, and whether they foster or lessen paternal involvement.

Since studies have produced mixed results, in this study we aimed to explore how child's characteristics such as age, sex, and temperament influence father's involvement in different types of child-related activities. Considering two children's age groups, i.e., 3/4 and 5/6 years old (thus differentiating developmental characteristics), we tested for the significance of sex and temperament as predictors of fathers' involvement, although the direction of the effect is unclear. Fathers' education and working hours were controlled for in these analyses. Furthermore, as studies exploring the associations between temperament and fathers' involvement reveal different associations for boys and girls (Brown et al., 2011, for review), we expected to find significant interactions between child's temperament and sex.

3.4. Method

3.4.1. Participants

Four-hundred-and-ten nuclear (i.e., married or in a civil partnership) Portuguese families with preschool-age children were involved in the study. Fathers' ages ranged between 24 and 56 ($M = 38.26$, $SD = 4.90$), 50.2% had primary to high school education, 49.8% had a university degree, and 96.1% were employed and worked on average 38.99hr ($SD = 9.39$) per week. Mothers' ages ranged between 24 and 48 ($M = 36.41$, $SD = 4.26$), 29.8% had primary to high school education, 70.2% had a university degree, and 91.7% were employed and worked on average 34.89hr ($SD = 11.80$) a week.

Children were divided in two groups considering the child's age: 3 – 4 years ($n = 118$, range = 36 – 47.6 months, $M = 42.63$, $SD = 3.10$, 51 girls), and 5–6 years ($n = 292$, range = 48.23 – 72.17 months, $M = 58.55$, $SD = 6.84$, 161 girls). All children attended early education settings in the district of Lisbon, from which families were recruited. This was a convenience sample.

3.4.2. Procedure/Instruments

Mothers completed a sociodemographic questionnaire, aiming to collect information regarding parents (e.g., age, education level, work status/hours), the child (e.g., sex, age) and family (e.g., income).

Fathers and mothers independently (order effects were controlled) completed the “Parental Involvement: Care and Socialization Activities Scale” (Monteiro et al., 2008), to assess parents’ perceptions about their participation, in relation to one another, in child-care and socialization activities occurring in everyday family-life. The scale has 26-items organized in five dimensions: direct care (five items) pertains to responsibilities regarding child’s basic needs and that require direct interaction with the child (e.g., “who bathes your child”); indirect care (seven items) relates to managerial and organizational tasks that ensure the child’s needs (e.g., “who chose your child’s school”); teaching/discipline (five items) refers to the instruction of new abilities and information, and the establishment and reinforcement of rules (e.g., “who establishes the rules at home”); play (five items) relates to activities of play with the child (e.g., “who plays table-games with the child: puzzles, card-games”); and outdoor leisure (four items) refers to fun activities with the child outside the home (e.g., “who takes your child to the zoo”). Both parents answered on a 5-point *Likert*-like scale (1 = always the mother; 3 = both mother and father; 5 = always the father). In order to maximize the fidelity of the fathers’ self-reports (NICHD, 2005), and since intra-class correlation coefficients of agreement between couples (direct care = .86; indirect care = .86; teaching/discipline = .67; play = .80; leisure outdoors = .82) were high, a composite value of mothers’ and fathers’ responses was calculated and used in the subsequent analyses (Frodi et al., 1982; Halford et al., 2015). All dimensions reached acceptable Cronbach’s alpha levels: direct care ($\alpha = .73$), indirect care ($\alpha = .68$), teaching/discipline ($\alpha = .71$), play ($\alpha = .62$); and outdoor leisure ($\alpha = .61$).

Mothers completed “The Children’s Behavior Questionnaire–Short Form Version” (Franklin et al., 2003; Putnam & Rothbart, 2006) is a 94-item scale that allows the evaluation of child temperament as the individual manifestation of children’s reactivity and self-regulation as a result of transactions between biological factors and environment (Rothbart & Ahadi, 1994). In its Portuguese validation (Lopes, 2011), 73 of the original items were retained, maintaining the original three-factor structure: extroversion (16-items) that refers to high activity and impulsivity levels, and low inhibition (e.g., “always seem to be in a hurry to get from place to place”); effortful control (25-items) referring to the ability to plan, inhibit or activate responses according to the task/goal (e.g., “can wait to start new activities when told to wait”); and negative affectivity (32-items) which refers to the frequent experience of negative

feelings such as fear, irritation, and sadness (e.g., “throws tantrums when he/she doesn’t get what he/she wants”). Mothers were asked to complete the questionnaire on a 7-point Likert-like scale (1 = extremely untrue of your child; 3 = slightly untrue of your child; 7 = extremely true of your child). All dimensions reached acceptable Cronbach’s alpha levels: extroversion ($\alpha = .81$), effortful control ($\alpha = .81$), negative affectivity ($\alpha = .83$).

3.4.3. Plan of analysis

Analyses were conducted in two steps. First, bivariate tests (product-moment correlations) were conducted to explore the inter-relationships among all the variables under study, and also assess potential multicollinearity between variables. One-way analyses of variance (ANOVAs) were performed to test the potential effect of the child’s sex. A second step was to conduct five multiple Ordinary Least Squares (OLS) regression models for each of the two age groups, with the five father involvement subscales as dependent variables (one model for each subscale) and the following variables as predictors: child’s age, sex, and temperament (extroversion, effortful control, and negative affectivity), and number of hours that fathers work, and their educational level (number of years). Additionally, the interactions terms of the child’s sex, with the three subscales of child’s temperament, were also included in all the models. The interaction effects found were explored through analysis of the simple slopes of the regression (Cohen et al., 2003).

Significant predictors of non-significant regression models were reported and discussed since, statistically, these signify that even if the group of independent variables taken together as a whole do not allow a precise prediction of the dependent variable, we can still draw important conclusions about the relationships between some of the variables in the model. Statistically significant coefficients continue to represent the mean change in the dependent variable given a one-unit shift in the independent variable (Shmueli, 2010), and it is important to interpret them to avoid non-report bias (Page & Higgins, 2016).

3.5. Results

Initial descriptive analyses were carried out for the dimensions of father’s involvement and child’s temperament. Results are presented in Table 3.1. Differences regarding the child’s sex were also tested, and no significant differences were found.

Table 3.1

Minimum, maximum, mean, and standard deviation of the father's involvement and the child's temperament dimensions

	Total sample			Group 1: 3–4 Years			Group 2: 5–6 Years		
	Min	Max	<i>M</i> (<i>SD</i>)	Min	Max	<i>M</i> (<i>SD</i>)	Min	Max	<i>M</i> (<i>SD</i>)
Father involvement									
Direct care	1.00	3.70	2.50 (.52)	1.30	3.70	2.52 (.52)	1.00	3.60	2.49 (.52)
Indirect care	1.00	4.14	2.35 (.43)	1.36	3.29	2.36 (.38)	1.00	4.14	2.34 (.45)
Teaching/Discipline	1.00	3.70	2.86 (.31)	2.00	3.68	2.87 (.30)	1.00	3.70	2.85 (.45)
Play	1.80	3.90	3.03 (.35)	2.10	3.80	3.00 (.33)	1.80	3.90	3.04 (.36)
Outdoor leisure	1.00	4.13	2.85 (.42)	1.88	4.13	2.92 (.39)	1.00	3.88	2.82 (.43)
Child's temperament									
Extroversion	2.00	6.75	4.94 (.76)	2.25	6.75	4.89 (.72)	2.00	6.63	4.96 (.77)
Effortful control	4.00	6.88	5.59 (.55)	4.08	6.76	5.52 (.57)	4.00	6.88	5.61 (.53)
Negative affectivity	2.11	6.30	4.48 (.72)	2.22	6.30	4.53 (.72)	2.11	6.22	4.46 (.72)

Associations between father involvement, fathers' socio-demographic covariates, and predictor variables (children's sex, age, and temperament) were tested using Pearson correlations. In group 1, fathers' education was positively and significantly associated with involvement in direct care, $r(116) = .21, p = .02$, indirect care, $r(116) = .45, p < .001$, teaching/discipline, $r(116) = .21, p = .02$, and outdoor leisure, $r(116) = .24, p = .01$. Children's extroverted temperament was positively and significantly correlated with fathers' involvement in indirect care, $r(116) = .18, p = .049$. In group 2, fathers' education was positively and significantly associated with involvement in direct care, $r(290) = .14, p = .02$, indirect care, $r(290) = .19, p = .00$, and play, $r(290) = .19, p = .00$. Fathers' education was also positively and significantly associated with children's effortful control, $r(290) = .25, p < .001$, and negatively with children's extroversion, $r(290) = -.12, p = .047$, and negative affectivity, $r(290) = -.16, p = .01$. Fathers' working hours were negatively and significantly correlated with involvement in direct care, $r(290) = -.14, p = .02$, and outdoor leisure, $r(290) = -.15, p = .01$.

To analyze the effects of the child's characteristics as predictors of father's involvement, multiple OLS regression models were conducted for each dimension of father's involvement considering the two age groups. The summary of the models is presented in Table 3.2.

Table 3.2*Beta (β) estimates of the regression models for the five dimensions of father involvement in the two age groups*

	Group 1: 3–4 Years					Group 2: 5–6 Years				
	Direct care	Indirect care	Teaching/ Discipline	Play	Outdoor leisure	Direct care	Indirect care	Teaching/ Discipline	Play	Outdoor leisure
	β	β	β	β	β	β	β	β	β	β
Father's education	.22*	.46**	.18	.07	.24*	.16*	.23**	.08	.22**	.12
Father's working hours	-.14	-.12	-.04	-.03	-.03	-.16**	-.08	-.08	-.04	-.15*
Child's sex (1 = feminine)	-.05	.04	-.10	-.08	-.01	.01	-.07	-.09	.02	.04
Child's age	-.10	-.19*	-.14	-.06	-.08	-.02	.05	-.10	-.01	-.07
Extroversion	.07	.17	-.14	-.08	.11	.04	.04	-.10	.07	.09
Effortful control	-.12	.03	-.07	.11	.12	.04	-.03	-.01	.12	.03
Negative affectivity	-.05	.08	.03	.11	.04	-.11	-.02	.27**	.20*	-.05
Extroversion x Sex	.02	.06	.32*	.35*	-.19	.01	.02	.05	-.03	.03
Effortful control x Sex	.27*	.06	-.00	-.03	-.10	-.09	-.07	.05	-.14	-.01
Negative affectivity x Sex	.20	.05	-.12	-.13	.04	.10	.01	-.20*	-.08	-.04
R^2	.13	.29**	.13	.11	.09	.06	.06*	.06*	.07*	.06
$R^2_{adjusted}$	.05	.23**	.05	.02	.00	.03	.03*	.03*	.04*	.02

* $p < .05$, ** $p < .01$

3.5.1. Regression models for group 1: 3-4 years old

In this age group, only the model for indirect care reached significance, $F(10, 107) = 4.43, p < .00, \eta_p^2 = .29, R_a^2 = .23$, with fathers' education ($\beta = .46, p < .001$) and children's age ($\beta = -.19, p = .04$) as significant predictors. For direct care, the model did not reach significance, $F(10, 107) = 1.63, p = .11$, but fathers' education ($\beta = .22, p = .03$) and the interaction between child's effortful control and sex ($\beta = .27, p = .04$) were significant predictors. However, when analyzing the simple slopes for boys ($\beta = -.13, p = .31$) and girls ($\beta = .24, p = .10$), neither was statistically significant. The model for teaching/discipline did not reach significance, $F(10, 107) = 1.60, p = .12$, nonetheless, the interaction between child's extroversion and sex was found to be significant ($\beta = .32, p = .03$). The interaction term is illustrated in Figure 3.1. An analysis of the simple slopes showed the interaction to be significant for girls ($\beta = .26, p = .04$), but not for boys ($\beta = -.14, p = .32$). The difference between the betas of boys and girls was statistically significant ($z = -2.13, p = .02$), meaning that fathers tend to be more involved in teaching/discipline with more extroverted girls, but not more extroverted boys, in this age group.

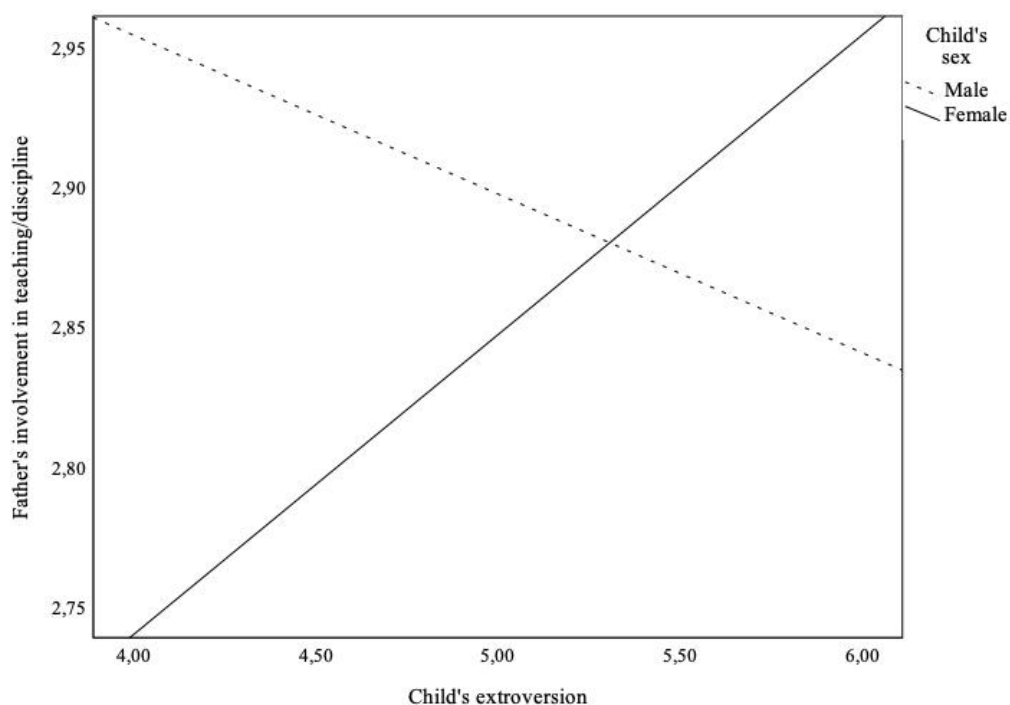


Figure 3.1

Interactions of child's sex with child's extroversion on father involvement in teaching/discipline, for the 3-4 years old age group

Similarly, the model for play was found to be non-significant, $F(10, 107) = 1.25, p = .27$, and only the interaction between child's extroversion and sex attained statistical significance ($\beta = .35, p = .02$). The interaction term is illustrated in Figure 3.2. A simple slope analysis revealed the interaction to be non-significant for boys ($\beta = -.10, p = .47$) but significant for girls ($\beta = .34, p = .01$). The difference between the betas was statistically significant ($z = -2.38, p = .01$), meaning that fathers tend to be more involved with more extroverted girls, but not more extroverted boys in play. Finally, the model for leisure outdoors did not reach significance, $F(10, 107) = 1.04, p = .41$, but fathers' education ($\beta = .24, p = .02$) was found to be a significant predictor.

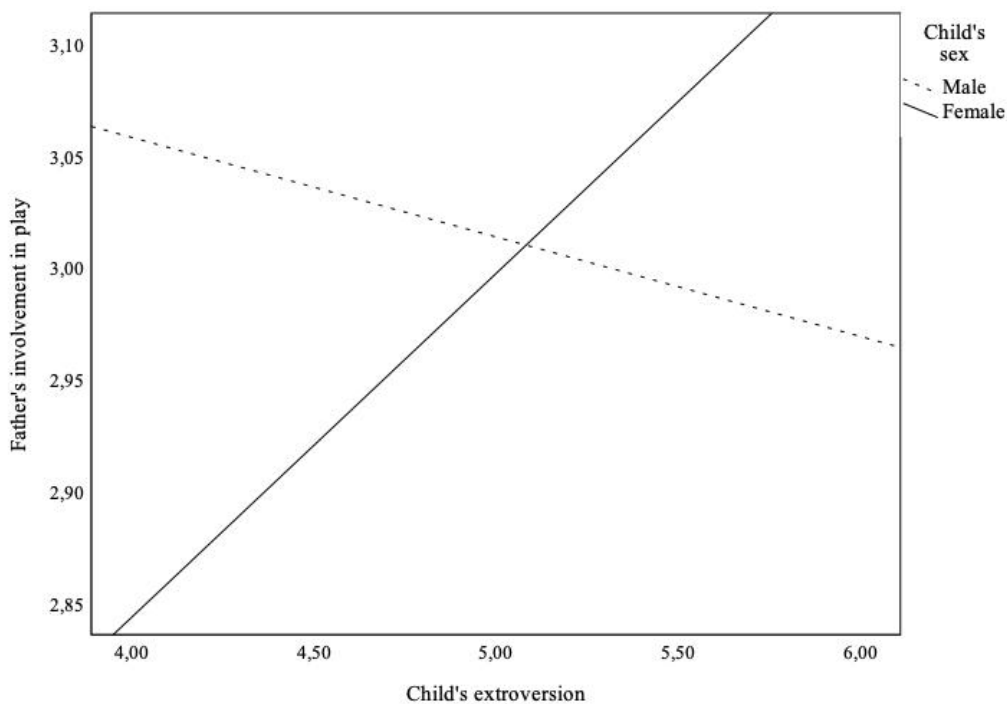


Figure 3.2

Interactions of child's sex with child's extroversion on father involvement in play, for the 3-4 years old age group

3.5.2. Regression models for group 2: 5-6 years old

Results for this age group revealed several models to be significant. Indirect care, $F(10, 281) = 1.88, p = .048, \eta_p^2 = .06, R_a^2 = .03$, was statistically significant, but only fathers' education was a significant predictor ($\beta = .23, p < .001$). The model for play was also significant, $F(10, 281) = 2.09, p = .03, \eta_p^2 = .07, R_a^2 = .04$, with fathers' education ($\beta = .22, p < .001$) and child's

negative affectivity ($\beta = .20, p = .02$) being significant predictors. The teaching/discipline model was also statistically significant, $F(10, 281) = 1.87, p = .049, \eta_p^2 = .06, R_a^2 = .03$, with child's negative affectivity ($\beta = .27, p = .003$), and the interaction between child's negative affectivity and sex ($\beta = -.20, p = .02$), attaining statistical significance. This interaction term is illustrated in Figure 3.3. An analysis of the simple slopes revealed the interaction to be significant for boys ($\beta = .23, p = .01$) but not for girls ($\beta = -.03, p = .68$); additionally, the difference between the betas was statistically significant ($z = 2.22, p = .01$). Meaning that fathers tend to be more involved in teaching/discipline activities with boys who have more negative affectivity, but not with girls who have more negative affectivity.

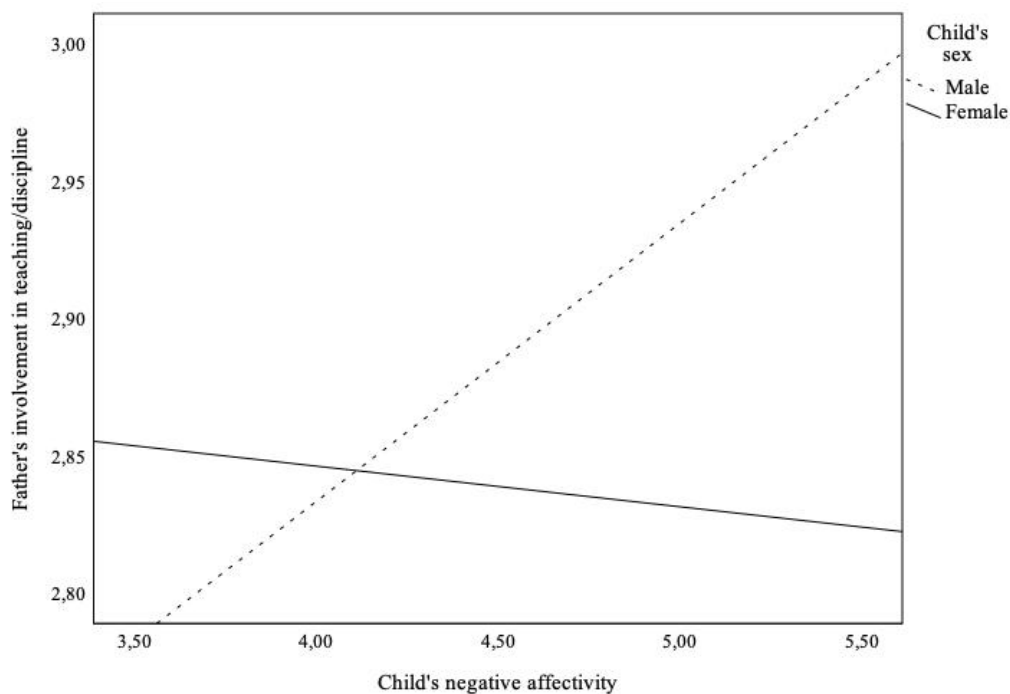


Figure 3.3

Interactions of child's sex with child's negative affectivity on father involvement in teaching/discipline, for the 5-6 years old age group

Although the model for direct care did not reach significance, $F(10,281) = 1.73, p = .07$, father's education ($\beta = .16, p = .01$) and working hours ($\beta = -.16, p = .01$) were significant predictors. The model for leisure outdoors was also non-significant, $F(10,281) = 1.66, p = .09$, with only fathers' working hours ($\beta = -.15, p = .01$) found to be a significant predictor.

3.6. Discussion

Inconsistent results have been reported regarding the role of child's characteristics in shaping father involvement (Aring & Renk, 2010; Ato et al., 2015; Brown et al., 2011; Kulik & Sadeh, 2015; Manlove & Vernon-Feagans, 2002; McBride et al., 2002; Monteiro et al., 2019b; NICHD, 2000, 2005; Yeung et al., 2001). Thus, the main goal of the present study was to explore how the child's characteristics may promote or inhibit father involvement in different types of child-related activities occurring in families' daily lives.

Results showed that for direct care, indirect care, and outdoor leisure, only sociodemographic variables (covariates) were found to be significant predictors. For the oldest group (5-6 years), fathers' working hours were a significant predictor of involvement, that is, fathers with more overloaded work schedules participated less in direct and indirect care activities, as well as in leisure outdoors. Similar results were found in other studies in terms of associations for direct care (Lima, 2005; Paquette et al., 2000) and leisure outdoors (Monteiro et al., 2017). It is suggested that due to the higher demands of longer work-schedules, it is harder for these fathers to engage in children's activities that follow more rigid schedules, such as feeding and bathing times (Craig, 2006), or require more free time such as going to the zoo or to the park. As in other studies, fathers' education was an important predictor of his involvement, since higher levels of education are associated with the availability of greater resources and knowledge of child's development and needs (Cabrera et al., 2007b). In both age groups, it was a predictor of more involvement in direct and indirect care (Monteiro et al., 2017; Monteiro et al., 2019b), and for the younger children (3-4 years), of more involvement in outdoor leisure (Yeung et al., 2001). For older children (5-6 years old), it predicted more involvement in play activities (Monteiro et al., 2017, Santos et al., 2021).

Our results also suggest that not only children's characteristics have an impact on the activities in which fathers are more involved (teaching/discipline and play), but also that their effects may vary as children get older (Cabrera et al., 2014). For the youngest group (3-4 years old) a significant interaction was found for child's extroversion and sex in both teaching/discipline and play activities, with fathers being more involved with their more extroverted daughters. These results are consistent with previous research findings where fathers were more engaged with more sociable daughters (McBride et al., 2002). An extroverted temperament associated with the experience of more positive emotions and openness to the world (Putnam & Rothbart, 2006) could make daughters more appealing partners to fathers and could be a more fitting match for father's style of interaction marked by challenging and

stimulating play, while supporting children's exploration (Cabrera et al., 2000; Lamb & Lewis, 2010).

For the older children (5–6 years old), children's higher negative affectivity, which can be viewed as an inhibitor of father involvement, was a predictor of father's higher involvement in teaching/discipline and play. Studies have reported similar associations for care and play (Aring & Renk, 2010; Kulik & Sadeh, 2015; McBride et al., 2002), and for teaching/discipline (Torres et al., 2012). These children might elicit a higher involvement from their fathers as they are more challenging to soothe and interact with, or fathers could respond to mothers' perspective in the sense that they might perceive their children as being more difficult, and as such solicit more involvement from their partners (Torres et al., 2012). An important dimension to integrate in future studies is the quality of this involvement (Brown et al., 2012; Brown et al., 2007; Cabrera et al., 2000; Monteiro et al., 2017). That is, if it is marked by intrusiveness or an authoritarian style and restrictive practices, or if these fathers are more authoritarian and supportive, as well as sensitive and responsive, since this is expected to produce different socio-emotional outcomes for children (Cabrera et al., 2007b; Lamb, 2010; Pleck, 2010). For instance, Brown and colleagues (2012, 2007) found that father's sensitivity moderated the relationship between his involvement and child's attachment security.

Additionally, for teaching/discipline, a significant interaction was found for boys' negative affectivity. That is, fathers were more involved when their sons had higher values in the negative affectivity dimension. These results are interesting, considering the literature proposing boys as more susceptible to environmental stressors and in need of higher investment from their parents to attain healthier outcomes (Amato & Keith, 1991). Furthermore, as gender identification is easier with a same-gender child, this might facilitate fathers' involvement with their difficult sons, since their own experiences may allow for a better understatement and attunement to the child's needs (Grolnick et al., 1996). In addition, parent-infant interactive synchrony is believed to construct and regulate children's positive arousal and affects; thus, as fathers and sons share analogous schemes of emotion regulation (Feldman, 2003) it might be easier for them to be more involved with their more challenging sons (Brown et al., 2011).

3.6.1. Limitations, strengths, and future research

The present study had a cross-sectional design and was based only on self-reported measures, although multiple informants were used. In the future, longitudinal studies could allow for the inference of causal relationships between father's involvement and child's characteristics, and for the study of bidirectionally effects (Brown et al., 2011).

Despite relying on self-reports, the study validity was increased by using distinct and independent sources to describe father participation in child-related activities. Due to high agreement, a composite measure was created. Therefore, contrary to a large number of studies, fathers' behaviors were not described uniquely by mothers, but considering both caregivers. While studying parenting (and its impact on child development), we should consider mothers and fathers (or other significant caregivers), adopting a family-systems view such as Cabrera and colleagues (Cabrera et al., 2007a, 2014) and Parke's (1996, 2000) models propose. As previously stated, the quality of fathers' involvement should also be included to test for a positive father involvement (Pleck, 2010; Pleck & Masciadrelli, 2004).

A key strength of the study was the focus on fathers, as they are under-studied across several developmental research domains (Cabrera et al., 2018) and tend to be overlooked on parenting programs. Plus, this study highlighted the active role of children's characteristics in shaping, at least in part, parenting behaviors, and therefore the need to consider these characteristics when planning empirical-sustained parenting programs.

Paternal involvement with preschoolers. The contributions of parenting styles and child negative affect³

4.1. Abstract

This study aims to analyze the predictors of paternal involvement, factoring in father's parenting style, education, working hours, and children's characteristic, including age, sex, and negative affect. One-hundred-and-eighty nuclear families with preschool age children (90 boys) participated in the study. The results show that the significant predictors of father's involvement in direct care are his education and work hours; for teaching/discipline, his authoritative style; and for play, his education. There was also a suggestive dynamic relationship found between an authoritative parenting style and child's negative affect in teaching/discipline and play.

Keywords: paternal involvement; parenting styles; child's age; child's sex; negative affect.

³ This chapter is published in *Devenir*:

Santos, C., Monteiro, L., Torres, N., & Tereno, S. (2021). Implication paternelle chez des enfants d'âge préscolaire. Contributions des styles parentaux et de l'affectivité négative de l'enfant. *Devenir*, 33(3), 221-240. doi: 10.3917/dev.213.0221

© 2021 Médecine & Hygiène. All rights reserved.

4.2. Introduction

Paternal involvement in family life, particularly, in the caregiving and upbringing of the child has been the subject of growing interest on the part of researchers with several authors highlighting its positive effects on child development (Cabrera et al., 2018; Lamb & Lewis, 2010; Pleck, 2010). In the Portuguese society, policies promoting gender equality in the context of parenthood (e.g., the implementation of parental leave) have contributed to bringing men closer to family life (Wall et al., 2016a). As in other societies, there has been a gradual emergence of a new conception of a father who is sensitive, available, and involved in care and family routines, in contrast to previous generations (Lamb & Lewis, 2010; Pleck, 2010). Nevertheless, there continues to exist a mixture between traditional beliefs – of a father as a financial provider and a disciplinary agent– and more modern beliefs – those of a participating, affectionate and companion father (Wall et al., 2016a).

Father involvement is a complex and multidimensional phenomenon (e.g., Parke, 2000) and its variability must be considered according to the tasks and contexts in which fathers interact with their children. For example, we can identify the following: direct care, which consists of caring for the child directly (e.g., feeding, dressing); indirect care, which refers to the responsibility to manage resources and routines, even when the child is absent (e.g., choosing and buying clothes), as well as teaching (e.g., teaching the alphabet) and play activities/games (Beitel & Parke, 1998; Parke, 2000). Several studies, including studies with Portuguese samples, indicate that fathers tend to participate more in playful activities (physical or mediated by objects) (e.g., Beitel & Parke, 1998; Craig, 2006; Monteiro et al., 2017; Monteiro et al., 2010; Torres et al., 2014), teaching/discipline (e.g., teaching new skills and imposing rules and limits) and outdoor recreation (e.g., going to the park) (Monteiro et al., 2017; Monteiro et al., 2010; Torres et al., 2014). However, fathers are less involved in the areas of direct care (Craig, 2006) where it is almost always the mother who carries out these activities (Monteiro et al., 2017; Monteiro et al., 2010; Torres et al., 2014).

4.2.1. Explanatory variables of father involvement

In order to promote a greater positive involvement of the father, it is essential to analyze different levels of variables that encourage or inhibit the father, emphasizing the importance of the characteristics of the father and the child (Cabrera et al., 2007a; Cabrera et al., 2018; Parke, 2000).

4.2.1.1. Parenting styles

Parental styles are an important variable to consider, as they refer to individual characteristics, which can contribute to the way parents share family responsibilities and care for their children (Arsénio & Santos, 2013; Cabrera et al., 2007a). They consist of a set of values and attitudes directed at the child, communicated to them and which create an emotional climate where parent-child interactions occur, and in which parental behaviors and practices are expressed (Darling & Steinberg 1993). Among the styles identified by Baumrind (1971), authoritative parents are characterized by the clear establishment of rules and limits, open communication based on verbal exchanges, as well as high responsiveness to the needs of the child, depending on their developmental stage. It is therefore expected that these characteristics contribute to a greater participation of the father in the child's life (Lamb & Lewis 2010). Paquette and colleagues (2000) found that, associated with the authoritative style, father's empathic attitudes towards the child were associated with his greater involvement in care and physical play activities. In the same sense, Arsénio and Santos (2013) found, in a Portuguese sample, that father's authoritative style was a predictor of his higher participation in direct care and discipline activities.

Conversely, in the authoritarian style (Baumrind, 1971), parents are characterized as being less available and emotionally more distant from their children, valuing the obedience and control of the child, which can lead to less participation in their care (e.g., Rentzou et al., 2019). However, in the domain of teaching and discipline these relationships seem to be less clear. Arsénio and Santos (2013) found that although both authoritative and authoritarian styles predicted greater involvement in this type of activities, the parenting strategies used were different. While authoritative parents used a more positive and empathetic educational approach, without disregarding the establishment of rules as a central parenting strategy, authoritarian parents valued child control and obedience strategies. Paquette and colleagues (2000) also found that favorable attitudes to corporal punishment were associated with greater father involvement in the discipline of children. Regarding the permissive parenting style (Baumrind, 1971), parents are characterized by the acceptance and responsiveness to the needs of the child, as well as their low control and monitoring (Baumrind, 1971), which can contribute to a less involved approach. Rentzou and colleagues (2019) found that, similarly to the father's authoritarian style, the permissive style was negatively associated with father's participation in the lives and care of children.

4.2.1.2. Sociodemographic variables

Sociodemographic variables such as father's education and number of working hours are two factors identified as contributing to the variability of father involvement (Cabrera et al., 2007a). Regarding the level of education, several studies have indicated that more educated parents tend to be more involved in direct care (e.g., Monteiro et al., 2017; Paquette et al., 2000), indirect care (e.g., Monteiro et al., 2010), play (e.g., Beitel & Parke, 1998), teaching and discipline (e.g., Paquette et al., 2000), and outdoor recreation (e.g., Monteiro et al., 2017; Yeung et al., 2001). In contrast, lower education levels tend to be associated with lower overall involvement in the child's life (Yeung et al., 2001). The number of parents' working hours is an important contextual variable, since around 70% of Portuguese children live in households where both parents work full-time (Organisation for Economic Co-operation and Development, 2019). Several studies have reported that parents with longer working hours assume fewer responsibilities (e.g., Pleck & Masciadrelli, 2004) and participate less in direct care (e.g., Beitel & Parke 1998; Paquette et al., 2000), play, and teaching/discipline (e.g., Monteiro et al., 2017). Some authors (e.g., Craig, 2006) suggest that parents with such schedules tend to participate more in activities that do not involve a rigid schedule (e.g., playing), compared to other tasks that involve more specific schedules, such as feeding or bathing the child.

4.2.1.3. Characteristics of the child

It is also necessary to consider the characteristics of the child in the analysis of fatherhood, such as age, sex, and temperament. It is suggested that the involvement of the father varies according to the different periods of the child's development, with preschool age being a particularly important period for his increasing participation (Cabrera et al., 2007a). With the increase in children's motor, linguistic, cognitive, and emotional abilities, father-child interactions become more complex and rewarding (e.g., Lamb & Lewis, 2010), which can facilitate father's greater involvement in direct care, play (e.g., Bailey, 1994; Torres et al., 2014) and teaching/discipline (e.g., Kulik & Sadeh, 2015) with older children. On the other hand, other studies have found no association between father involvement and child's age (Ato et al., 2015; Monteiro et al., 2010).

Regarding child's sex, Pleck and Masciadrelli (2004) indicate that fathers may feel more motivated to participate and interact with their sons, although this effect appears to be weaker in more recent studies. This motivation could be due to the fact that parents feel more comfortable interacting with same-sex children and sharing 'masculine' activities (Planalp & Braungart-Rieker, 2016). Some studies have shown that fathers participate more in direct care, play and leisure activities with boys (Monteiro et al., 2010; Yeung et al., 2001), while others

found no differences associated with the sex of the child (Arsénio & Santos, 2013; Kulik & Sadeh, 2015; Torres et al., 2014).

The temperament of the child, in particular, negative affectivity is a variable with a relevant impact on parenthood (e.g., Bates et al., 2012). Negative affectivity is defined as the child's tendency to respond to stressors with high levels of negative emotionality, such as fear, anticipation, anxiety, sadness, frustration, anger, guilt, and discomfort (Rothbart et al., 1994). It is often associated with the concept of difficult temperament, which is considered a characteristic that may hinder the exercise of parenthood (Bates et al., 2012).

According to Mehall and colleagues (2009), children with higher levels of irritability, demandingness, and negative emotional expression are expected to discourage father involvement and father-child interaction, when compared to children who are more sociable and easier to comfort. Other authors have found that child's negative affectivity was associated with lower father involvement (Ato et al., 2015), in particular with father's involvement in play activities (Kulik & Sadeh, 2015). In the same sense, McBride and colleagues (2002) found that children described as emotionally more intense had fathers who were less involved in care, while no associations were found for mothers. This result may suggest that these temperamental characteristics will be particularly important for father's involvement.

In contrast, Aring and Renk (2010) found that higher values of child's negative affectivity were associated with greater father involvement. Similarly, Volling and Belsky (1991) found that fathers, especially in more traditional families (where fathers are the only financial source), tended to assume greater responsibility for the care of children described by mothers as having a difficult temperament. In a Portuguese sample, Torres and colleagues (2012) found that when children were described (by mothers and fathers) as difficult, fathers were more involved in teaching and discipline activities, and not so much in direct care and play.

Brown and colleagues (2011) reported that fathers tended to spend less time on playful activities (considered pleasant) with difficult children on their days off but were more accessible on working days. This could be due to the need to support the mother in care activities, as these children are more demanding. However, other studies have found no association between temperament and father involvement (e.g., Monteiro et al., 2010).

Moreover, Ato and colleagues (2015) found that in addition to lower father involvement, child's negative affectivity was associated with parental characteristics such as lower control, support, and communication with the child. Volling and Belsky (1991) also indicated that fathers tended to be less affectionate and less receptive to children with a difficult temperament. Focusing on parenting styles, Porter and colleagues (2005) found that American parents

perceive themselves as less authoritative, especially with boys, and that American and Chinese parents perceive themselves as being more authoritarian, with boys and girls, when they had higher values of negative emotionality. It is suggested that this characteristic of temperament may lead to more restrictive and controlling practices of children's behavior. Negative affectivity is thus a characteristic considered relevant to understanding the variability of father involvement, having an impact not only on father's involvement and the contexts in which it occurs, but also on their quality (Bates et al., 2012). Its effect on fatherhood is, however, insufficiently explored and still unclear.

4.3. Aims of the study

This study aims to contribute to the understanding of the variability of father involvement in various activities related to the child, which involve direct interaction – direct care, teaching/discipline, and play. In this sense, variables associated with the father – parenting styles, level of education, and the number of working hours (of a more contextual nature) – and the child – sex, age, and negative affectivity – were analyzed.

In terms of sociodemographic variables, it is expected that fathers with a higher educational level will be more involved, and fathers with a higher workload are expected to be less involved in child-related activities.

Considering the literature review, it is expected that fathers with an authoritative parenting style will be more involved in the various activities related to the child, and that more authoritarian fathers will be less involved. In addition, we aim to test whether parents with a more authoritarian parenting style will be more involved in teaching and discipline (Arsénio & Santos, 2013). Fathers are expected to be more involved with boys, especially in direct care and play activities, compared to with girls, and to be more involved in various activities with older children. In terms of temperament, we aim to explore whether fathers will be more involved with children whose negative affectivity values are lower (Ato et al., 2015; McBride et al., 2002), or vice versa, with children with higher levels of this temperament dimension (Aring & Renk, 2010).

Finally, we also aim to explore whether fathers whose children have high negative affectivity values and perceive themselves as having a more authoritative parenting style are more involved, and whether fathers whose children have high negative affectivity values and perceive themselves as having an authoritarian style find themselves to be less involved in child-related activities.

4.4. Method

4.4.1. Participants

One-hundred-and-eighty-six nuclear Portuguese families (141 married and the remaining living together as a couple) participated in the study, with children attending preschool. Fathers were between the ages of 24 and 56 ($M = 37.97$, $SD = 4.67$) and mothers were between 24 and 47 years of age ($M = 36.18$, $SD = 4.26$). Fathers' education level varied between the undergraduate and the doctoral level (years of education: $M = 13.59$, $SD = 3.86$, in years), as well as those of the mothers (years of education: $M = 15.09$, $SD = 3.24$). Ninety-four percent of fathers worked full-time (hours per week: $M = 38.30$, $SD = 9.85$), as well as 86 % of mothers (hours per week: $M = 34.10$, $SD = 13.01$). Focal children's age varied between 36 and 67 months ($M = 52.71$, $SD = 8.18$), 90 were boys.

4.4.2. Procedure/Instruments

This study has been conducted in accordance with the ethical standards of the American Psychological Association and is part of a broader project approved by the Ethics Committee of *Iscte-Instituto Universitário de Lisboa*. Families were recruited in preschools. Parents were informed regarding the objectives and characteristics of the study and signed an informed consent prior to data collection. Parents answered the questionnaires only in relation to one child per family (one target child), the oldest of the siblings. In order not to overload the parents, some questionnaires were completed by only one of the parents (mothers: sociodemographic data, negative affectivity; fathers: parental styles). However, since we use a multi-informative method, some variables are composite measures and require answers from the two parents (e.g., parental involvement).

4.4.2.1. Sociodemographic information

Mothers completed a questionnaire of sociodemographic data, concerning information regarding the couple (age, schooling, marital status, working hours) and the child's (age, sex).

4.4.2.2. Father involvement

In order to calculate the agreement between the two parents, mothers and fathers replied to the "Parental Involvement: Care and Socialization Activities Scale" (Monteiro et al., 2008), which refers to the organization and performance of various activities with the child associated with

daily family routines. It consists of 26 items, organized in 5 dimensions. In this study, only those dimensions that involve direct interactions with the child were analyzed: direct care, referring to care tasks that involve direct interaction with the child (e.g., “Who feeds the child?”); teaching/discipline, which refers to the teaching of skills and the establishment of rules (e.g., “Who teaches the child new skills?”); play, which refers to playful activities mediated by objects or more physical/active games (e.g., “Who plays physical games with the child: football or rough and tumble?”); outdoor leisure, which refers to activities related with being with the child outside (e.g., “Who takes the child to the park?”). Father’s involvement is assessed in relation to the other parental figure, i.e., how these activities are carried out in relation to the mother. Parents answer on a 5-point scale, ranging from (1) always the mother, (3) both mother and father (5) always the father.

For the purpose of testing the agreement between mothers’ and fathers’ responses, intraclass correlations (ICC) were calculated, and all dimensions reached acceptable values ($ICC > .70$). Thus, as in other studies (e.g., Torres et al., 2014), composite measures of involvement were calculated using the arithmetic mean of mothers’ and fathers’ responses and used in the subsequent analyses. Cronbach alphas of the composite dimensions reached acceptable values: .73 for direct care, .65 for teaching/discipline and .70 for play. The dimension of outdoor leisure obtained a value of .56, therefore it was not included in the analysis.

4.4.2.3. Parenting styles

Only fathers completed the short version of the “Parenting Styles and Dimensions Questionnaire” (Robinson et al., 2001). It consists of 32 items, which refer to the three classical parental styles defined by Baumrind (1971). The Portuguese version of the questionnaire (Pedro et al., 2015) retained the original factorial structure, consisting of 32 items, however, there are changes in the level of certain items in each dimension, organized in: authoritative style (18 items, e.g., “I explain to my son how I feel when he behaves well and when he behaves badly”); authoritarian style (10 items, e.g., “I hit my child when he disobeys”); and the permissive style (4 items, e.g., “I wake up when my child has a crisis of anger”). Fathers answered on a 5-point scale, ranging from (1) never to (5) always, referring to the highest values for greater use of this parenting style. Cronbach alphas obtained were .75 for the authoritative style, .77 for the authoritarian style and .50 for the permissive style, the latter having therefore not been considered for the analysis.

4.4.2.4. Negative affectivity

Only mothers answered the “Children’s Behavior Questionnaire - Short Version” (Putnam & Rothbart, 2006), which evaluates the perception of the parental figure on the temperament of children between the ages of 3 and 8 years. This reduced version consists of 94 items, organized in 15 scales, which constitute the three central dimensions of the temperament: negative affectivity, extroversion, and effort control. The reduced Portuguese version (Lopes, 2011) has retained 73 items, which refers to the 15 subscales that can be organized in the 3 dimensions. Given the objective of the study, only the dimension of negative affectivity was used. It includes the scales of irritation/frustration, sadness, discomfort, fear, sensibility/threshold of response, and shyness. Mothers answer on a 7-point scale between (1) very false, (4) neither true nor false, and (7) very true. The Cronbach’s alpha for negative affectivity was .74.

4.4.3. Plan of analysis

First, descriptive statistics of the variables under study were calculated. Then, bivariate correlations between father involvement, parenting styles, sociodemographic variables, and child’s temperament were calculated. The existence of differences by sex of the child for the variables studied was also tested through the analysis of variance (ANOVA). Subsequently, to test the predictive variables of father involvement, three models of multiple hierarchical regression were carried out for the dimensions of direct care, teaching/discipline, and play. These were regressed in the predictive variables in four blocks (parent’s sociodemographic variables, father’s parental styles, child’s characteristics, and interaction effects). The variables were previously standardized to obtain a unit variance and control for multicollinearity. Finally, in order to analyze the interaction effect between father’s authoritative style and child’s negative affectivity, the significance of the effect was analyzed through an analysis of the simple slopes of the regression. To this end, the negative affectivity variable was divided into two groups: low values (a standard deviation below average) and high values (a standard deviation above average) of negative affectivity.

4.5. Results

Preliminary descriptive analyses were carried out for the dimensions of father involvement, father’s parenting styles, and the child’s negative affectivity. ANOVAs were also carried out to test any differences in terms of the sex of the child, no significant differences in any of the variables studied were found (Table 4.1).

Table 4.1

Minimum, maximum, mean, and standard deviations of father involvement, father's parenting style, and child's temperament

	Min	Max	<i>M (SD)</i>	<i>M (SD)</i>		ANOVA	
				Girls	Boys	<i>F</i>	<i>p</i>
Father involvement							
Direct care	1.00	3.70	2.54 (.50)	2.51 (.55)	2.58 (.44)	0.97	.33
Teaching/Discipline	2.00	3.70	2.86 (.27)	2.84 (.28)	2.89 (.26)	1.48	.23
Play	1.20	4.00	3.05 (.38)	3.02 (.42)	3.07 (.33)	0.86	.36
Father's parenting style							
Authoritative style	2.72	4.78	3.83 (.41)	3.85 (.40)	3.81 (.43)	0.51	.48
Authoritarian style	1.00	3.60	1.66 (.41)	1.61 (.35)	1.72 (.46)	3.70	.06
Child's temperament							
Negative affectivity	2.33	5.88	4.56 (.56)	4.61 (.59)	4.51 (.53)	1.41	.24

Secondly, the associations between father involvement and the predictive variables (father's parenting styles, sociodemographic variables, and child's negative affectivity) were tested using Pearson correlations. Father's involvement in teaching/discipline was positively and significantly associated with the authoritative style, $r(184) = .24, p = .001$, and negatively with the authoritarian style, $r(184) = -.15, p = .04$. Father's education level was positive and significantly associated with his involvement in direct care, $r(184) = .15, p = .04$, and play, $r(184) = .18, p = .01$, while father's working hours were negatively and significantly associated with his involvement in direct care, $r(184) = -.18, p = .02$. Finally, the child's negative affectivity did not reveal any significant correlations with father's involvement.

To analyze the effects of predictive variables on father's involvement, three models of multiple hierarchical regression were carried out for the direct care, teaching/discipline and play dimensions. The dimensions of involvement were regressed in the predictive variables organized in four blocks: (1) father's sociodemographic information; (2) father's parental styles; (3) child's characteristics; and (4) the interaction effects between father's parental styles and child's negative affectivity. The final model is presented in Table 4.2.

Table 4.2*Final model of multiple hierarchical regression for dimensions of father involvement*

	Direct care	Teaching/Discipline	Play
	β	β	β
Father's education level (years)	.20*	.10	.21*
Father's working hours	-.21*	-.13	-.02
Father's authoritative style	-.03	.21*	.01
Father's authoritarian style	.01	-.13	.00
Child's sex (1 = feminine)	-.09	-.11	-.07
Child's age	.00	-.00	.11
Negative affectivity	.15	.09	.14
Authoritative x Negative affectivity	.11	.16*	.17*
Authoritarian x Negative affectivity	.06	.03	.01
	R^2	.10*	.13*
	$R^2_{adjusted}$	.05*	.09*

* $p < .05$

The results indicate that the regression model for direct care was statistically significant, $F(9, 176) = 2.07, p = .04, \eta_p^2 = .10, R_a^2 = .05$, explaining 5% of the variance. Father's education level ($\beta = .20, p = .01$) and working hours ($\beta = -.21, p = .004$) were the only significant predictors.

The regression model for teaching/discipline was also statistically significant, $F(9, 176) = 3.03, p = .002, \eta_p^2 = .13, R_a^2 = .09$, explaining 9% of the variance. Only the father's authoritative style ($\beta = .21, p = .01$) and the interaction effect between the authoritative style and child's negative affectivity ($\beta = .16, p = .04$) were significant predictors.

To explore the interaction effect, a simple slopes analysis of the regression was performed, revealing that for low negative affectivity values, the interaction was not significant ($\beta = .10, p = .30$). However, it was significant for high values ($\beta = .36, p = .001$) and medium values ($\beta = .23, p = .001$) of negative affectivity. In other words, for fathers of children who have medium and high negative affectivity values, a more authoritative parenting style contributes to a greater father involvement in teaching/discipline. The differences between the slopes were also calculated, using the 'r to z' transformation significance test, which showed a significant difference ($z = -1.82, p = .03$) between low and high negative affectivity. The graphical representation of the interaction effect is illustrated in Figure 4.1.

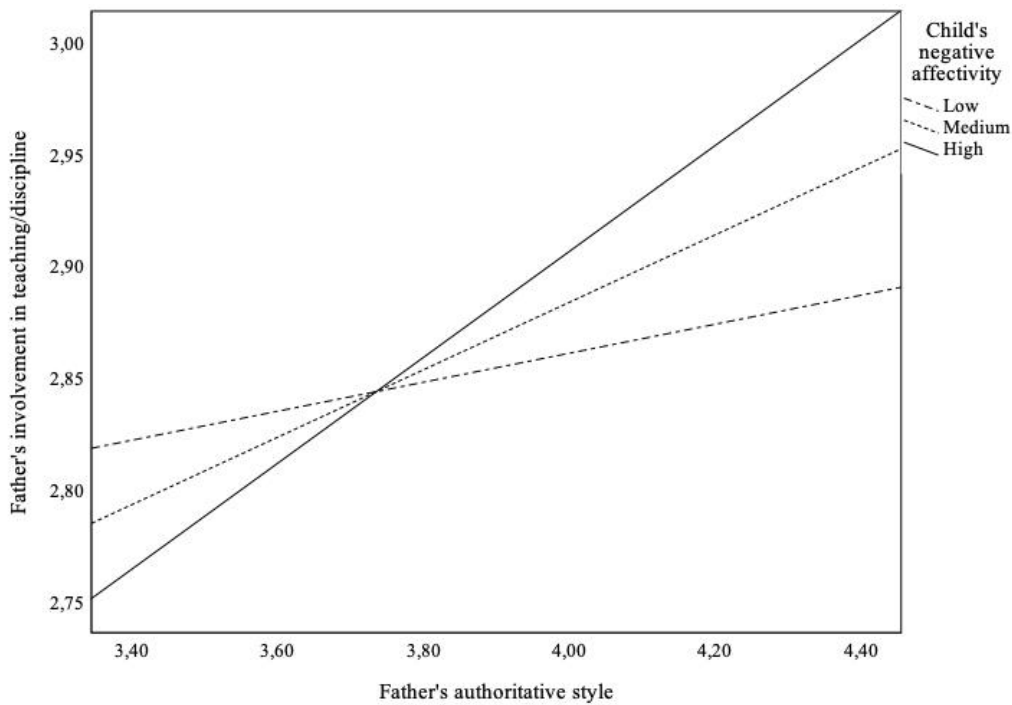


Figure 4.1

Interaction between father's authoritative style and child's negative affectivity, for father's involvement in teaching/discipline activities

For play, the regression model was also statistically significant, $F(9, 176) = 2.18, p = .03, \eta_p^2 = .10, R_a^2 = .05$, explaining 5 % of the variance. Father's education level ($\beta = .21, p = .01$) and the interaction effect between father's authoritative style and child's negative affectivity ($\beta = .17, p = .03$) are the only significant predictors. The interaction effect found was explored by a simple slope analysis. For low ($\beta = -.15, p = .14$) and medium ($\beta = .02, p = .80$) values of negative affectivity, the slopes were not significant. Only a marginal effect was obtained for high negative affectivity values ($\beta = .18, p = .05$). The differences between the slopes were also calculated using the transformation meaning test "r to z", showing a significant slope difference ($z = 2.2, p = .01$) between low and high values of negative affectivity.

4.6. Discussion

Despite the progress made, literature on parenthood tends to do so, from a mother's point of view, with fathers being considered secondary to the maternal figure (Cabrera et al., 2018). This study is part of a growing effort to include the father and to understand parenthood from a male perspective, seeking to analyze the variables that predict a positive involvement of the father

(Cabrera et al., 2007a; Cabrera, et al., 2018; Parke, 2000). This is particularly relevant, as fatherhood is multidimensional and more likely to be influenced by the characteristics of the child, as well as by contextual factors, due to a weaker sociocultural definition of the role of the father, compared to that of the mother (Cabrera et al., 2007a).

Considering a multidimensional perspective of father involvement, several models were tested for the dimensions of involvement in direct care, teaching/discipline, and play. The regression model for involvement in direct care proved to be statistically significant, explaining, however, a small percentage of variance (5 %). Father's higher level of education and fewer working hours were the only significant predictors of father's greater involvement (e.g., Monteiro et al., 2017). More qualified fathers (higher educational level) are expected to have more information and resources, which may facilitate the identification of needs and the adjustment of their behaviors to the challenges associated with the child's age, which may contribute to making them feel more secure and motivated to care for them. (e.g., Bailey, 1994). On the other hand, fathers with less extensive work schedules may have more time to dedicate to the direct care of children, compared to fathers whose longer and more demanding working hours are more difficult to reconcile with such tasks (e.g., Craig, 2006).

The teaching/discipline regression model was statistically significant, explaining a small percentage of variance (9%). In terms of Pearson's bivariate correlations, positive associations were found with the authoritative style (e.g., Arsénio & Santos, 2013) and negative with the authoritarian style (e.g., Rentzou et al., 2019). However, in the multivariate model, father's authoritative style was the only significant predictor of his involvement. Authoritative fathers are characterized by establishing rules and limits for their children, that are appropriate and adapted to the characteristics and competencies of the child, thus favoring an empathetic and positive educational approach (Arsénio & Santos, 2013; Baumrind, 1971). This may help them to be more involved in teaching/discipline activities, and to adopt a more positive approach to this type of tasks, leading to a positive involvement in this dimension (Pleck, 2010).

Although the child's negative affectivity was not revealed to be a significant direct predictor of father's involvement, a significant interaction effect was found between the authoritative style and negative affectivity. Fathers who perceive themselves as having a more authoritative style were more involved with children with medium and high levels of negative affectivity. The results do not seem to be in line with other studies in which fathers of children with high negative affectivity values tend to be less responsive and affectionate (Volling & Belsky, 1991) and to report lower communication and support to their children (Ato et al., 2015).

According to Bates and colleagues (2012), the impact of negative affectivity on parenting will depend on the ability of the parental figures to adapt and respond to the challenges posed by the child. In that sense, Belsky and colleagues (1984) emphasize the importance of parents' ability to inhibit their own impulses and regulate their emotions, as well as to consider the child's point of view and development needs, in the context of a more sensitive and involved parenthood. This may be even more relevant in periods of rapid development at motor, cognitive, social, and emotional levels, such as the preschool years (Lamb & Lewis, 2010), which is the case for our sample. In addition, a previous study concluded that greater involvement of fathers in teaching/discipline activities with children with difficult temperament, was associated with more positive play interactions between preschool children and their peers (Torres et al., 2012).

The model concerning father's involvement in play reached statistical significance, but only explained 5% of the variance. Father's education level proved to be the only significant direct predictor. For example, fathers with higher education levels are more involved in play activities (e.g., Beitel & Parke, 1998; Monteiro et al., 2017), which is an important context of interaction of particular relevance to the paternal figure (e.g., Grossmann et al., 2002; Lamb & Lewis, 2010). An interaction effect between father's authoritative style and the child's negative affectivity was also found, but this effect was only marginally significant for fathers of children with high negative affectivity. Tendentially, fathers of these children were more involved in play when they perceived themselves as using an authoritative style. This will be an interesting result to explore in future studies, to understand whether these fathers are more involved with these children and stimulate them towards autonomy and exploration of the environment, incentivizing them to take more risks under surveillance and sensitive paternal support (e.g., Grossmann et al., 2002). On the other hand, fathers' involvement in the context of play, particular in physical and challenging play, may be an opportunity for the development and exercise of children's emotional regulatory capabilities (Flanders, et al., 2010).

Overall, the results obtained support the idea of multidetermined parenthood, resulting from a complex system of individual, child, and contextual influences, which can be assumed as supporting or stressful variables that interact with each other (Belsky et al., 1984; Cabrera et al., 2007a; Parke, 2000).

4.6.1. Limitations and contributions of the study

However, our study has some limitations, in particular that, of being a correlational and cross-sectional study, which does not allow to infer the causality of the relationships between the variables. It will also be relevant in the future to analyze the potential bi-directional nature between child's temperament and father's involvement (e.g., Aring & Renk, 2010; Brown et al., 2011), and between parenting styles and father's involvement (e.g., Carlson, 2006). In addition, although the present study focuses on the paternal figure, it is necessary to recognize and integrate the role of the mother in this field, considering, for example, mothers' beliefs, expectations, and behaviors regarding the involvement of the father (e.g., Monteiro et al., 2019b). From a sociodemographic point of view, it will be important for samples to be more diverse in terms of, for example, family typologies and socio-economic status. Regarding the measures, only questionnaires were used, thus gaining access to fathers' self-perceptions. In this sense, it is necessary to consider the potential role of social desirability, namely in reporting behavior involving, for example, physical punishment. However, it should be noted that this study used several informants, fathers describing their parental styles, mothers describing the temperament of the child, and involvement having been analyzed based on a composite measurement of mothers' and fathers' reports. Future studies should include other methodologies, namely observation or interview.

Despite the identified limitations, this study is a contribution to the analysis of father involvement, where the importance of the quality of this involvement, beyond the amount of time or the way in which parents share child related activities, is highlighted (Pleck, 2010). Increasing empirical knowledge concerning the father and his role in the life of the child and the family is crucial for the adjustment of parenting programs (which include both caregivers) aimed at healthy parenthood, which in turn promotes an adjusted child development (e.g., Cabrera et al., 2008).

Parenting sensitivity, salivary oxytocin levels and children's behavioral problems in a Portuguese sample⁴

5.1. Abstract

The present study focused on the quality of parenting behaviors (sensitivity and intrusiveness), its associations with children's levels of oxytocin (OXT), and with children's behavioral problems in the preschool context. Thirty nuclear families, including both parents and one focal child, and their preschool teachers participated in the study. Salivary OXT was collected (during two separate home visits) from children after a play task with each parent. Sensitivity and intrusiveness were coded based on the videotapes of these dyadic play interactions. Preschool teachers reported children's behavioral problems using the Caregiver-Teacher Report Form. Salivary OXT was collected by passive drooling, and quantified by radioimmunoassay, after extraction. Results show that only fathers' sensitivity and intrusiveness were significantly correlated with children's OXT concentrations. Both mothers' and fathers' sensitivity were negatively correlated with children's internalizing problems. Mothers' intrusiveness was positively correlated with children's externalizing problems, and fathers' intrusiveness with children's internalizing problems.

Keywords: parental sensitivity; parental intrusiveness; oxytocin; behavior problems.

⁴ This chapter is published in *PSICOLOGIA*:

Torres, N., Santos, C., & Monteiro, L. (2022). Parenting sensitivity, salivary oxytocin levels and children's behavioral problems in a Portuguese sample. *PSICOLOGIA*, 36(2), 42-51. doi: 10.17575/psicologia.1762

© 2022 Associação Portuguesa de Psicologia. All rights reserved.

5.2. Introduction

In recent decades, there has been a slow, but increasing effort to include fathers in the study of parenting, since most studies, although referring to parents or parenting, study mothers and their impact on child development (Cabrera et al., 2018). This increased attention can be framed by the larger socio-cultural and economic transformations regarding families and gender roles, as is the case in Portugal. For example, the changes in legislative measures promoting gender equality, family assistance, and fatherhood have contributed to a new idea of “what is a father” and his multiple roles (Wall et al., 2016a). From an attachment perspective, a central dimension (not exclusive) of parenting is sensitivity (Ainsworth et al., 1974). Although several researchers highlight that sensitivity could be less salient for the father-child relationship and fathers’ impact on children’s social outcomes (Lucassen et al., 2011), other authors have reported that father’s sensitivity, especially in the context of play activities, has a unique and significant impact on children’s attachment internal model (Grossman et al., 2002).

The attachment relationship between the child and the caregivers is considered to be the evolutionarily shaped psychobiological basis of the human tendency to form social bonds, which contribute to general health (physical and mental), and well-being through the lifespan (Carter, 2014). Research on the hypothalamic neuropeptide oxytocin (OXT) suggests that it modulates responsiveness to social stimuli and is implicated in parental care, social-bonding, social affiliation, social memory, and individual differences in pro-social behavior in a broad range of mammalian species, including humans (Blos et al., 2012). OXT, which has often been called a neuro-hormone of attachment, has been suggested as having a central role in the establishment of social bonding between parents and children (Caldwell, 2017).

This study aims to contribute to the field by focusing on the quality of parenting behaviors (sensitivity and intrusiveness), studying both mothers and fathers, and its associations with children’s levels of OXT measured after a dyadic play interaction. Furthermore, we have aimed to clarify the role of sensitivity/intrusiveness and the child’s OXT levels in children’s internalizing and externalizing behavioral problems described by preschool teachers, in another central context for child development – the preschool.

5.2.1. Parental sensitivity and children’s outcomes

The quality of parenting behaviors is crucial for children’s healthy development. From an attachment- theory perspective, sensitivity and intrusiveness are key dimensions of parenting. Sensitivity, as described by Ainsworth, is the degree to which parents are able to detect,

accurately interpret, and respond in an opportune and correct manner to their children's signals (Ainsworth et al., 1974). In contrast, intrusiveness is defined as the degree to which parents are unable to understand and respect their children's requests, desires, and independence (Egeland et al., 1993). It is expected that sensitive patterns will allow the child to feel secure and explore the environment, knowing that in case of need the caregiver will be available and will act as a safe haven (Ainsworth et al., 1974; Bowlby, 1988). Within these relationships, children co-construct not only models of the attachment figure and the relationship, but also of self, and how in general relationships should work.

Furthermore, parallel to these cognitive developments, psychobiological changes also occur in the brain and nervous system of the child. The child's stress response and social-behavior physiological systems are organized by the parents' sensitive behavior and emotional responses, with long lasting structural and functional consequences (Tabachnick et al., 2019). The integration of research from social neuroscience and social development – such as attachment theory – can foster a deeper understanding of the consequences of early-life relationships and of parent-child early interactions, informing clinical interventions as well as child-care policies.

As previously mentioned, the study of parenting has been centered on mothers for decades, and the studies that compare both mothers and fathers regarding sensitivity show different results. For example, some have reported that mothers tend to be more sensitive when compared to fathers (e.g., Hallers-Haalboom et al., 2014; Schoppe-Sullivan et al., 2006), while others have found that, like mothers, fathers are attuned and appropriately respond to their children's needs (Mills-Koonce et al., 2015). Diverse results have also been reported regarding intrusiveness, with some studies finding fathers to be more intrusive than mothers (e.g., Barnett et al., 2008), while others find no differences (e.g., Brown et al., 2007; Tamis-LeMonda et al., 2004).

It has been proposed that mothers and fathers interact differently and in specific contexts with their children (Lamb & Lewis, 2010). Grossman and colleagues (2002) have proposed that fathers may serve as a secure-base for the exploration of the social and physical environment, while mothers might act as the safe-haven, since mothers tend to be more comforting, nurturing, and caring, while fathers are more associated with the contexts of play and leisure (e.g., Lamb & Lewis, 2010). Therefore, several authors have highlighted the need to study parental sensitivity beyond caregiving activities, looking to other domains more associated with fathers' interactional patterns, such as play activities (e.g., van Bakel & Hall, 2020). Studies have found that, when compared to mothers, sensitive fathers focus more on stimulating and exploratory

play interactions (Lucassen et al., 2011; Mills-Koonce et al., 2015), engage more in rough-and-tumble play (StGeorge & Freeman, 2017) and encourage more risk-taking (Cabrera et al., 2014).

Despite the differences found, maternal and paternal sensitivity seem to produce similar effects in the way children develop (Brown et al., 2007). Higher levels of sensitivity are associated with, for example, children's attachment security (although the effects are stronger for mothers, van IJzendoorn, & De Wolff, 1997) and children's cognitive development (Cabrera et al., 2007b; Tamis-LeMonda et al., 2004). Conversely, greater parental intrusiveness is associated with lower academic success (Tamis-LeMonda et al., 2004), emotion regulation and language development (Cabrera et al., 2007b). Parental sensitivity has also been associated with specific dimensions of children's socio-emotional development, such as externalizing and internalizing problems. Higher parental sensitivity, for both mothers (e.g., Kok et al., 2013) and fathers (e.g., Hazen et al., 2010) is associated with fewer internalizing problems. Other studies (e.g., Hazen et al., 2010), however, have found no relationship between mother's sensitivity and child internalizing problems. Similarly, higher maternal sensitivity (e.g., Campbell et al., 2007) and paternal sensitivity (e.g., Gryczkowski et al., 2010) have been associated with lower levels of child externalizing problems.

5.2.2. Parental sensitivity and oxytocin

A vast amount of research in the last three decades has shown that OXT has a central role as a psycho- biological underpinning of socio-emotional bonds, modulating important aspects of cognition, emotion, and behavior in close relationships; both in animal and human behavior (e.g., Bachner-Melman & Ebstein, 2014). It contributes to the suppression of antagonistic behavior (flight and aggression), down-regulates the stress response, increases trust and altruism, attention to social-recognition (cues fundamental to interpret others' feelings and intentions), and a number of basic biological processes common to several mammalian species (Tan et al., 2019).

A systematic review on early infancy showed that during dyadic-interactions with skin-to-skin contact, the OXT levels increased in mothers and fathers (as well as in infants) and were associated with a greater quality of their parenting behaviors (synchrony and responsiveness) (Scatliffe et al., 2019). Another systematic review, covering all childhood ages, similarly concluded that OXT promotes parental sensitivity, bonding and bio-behavioral synchrony between parents and their children (Szymanska et al., 2017). While there are already several studies that have assessed the effects of intranasal inoculation of OXT on parents and children,

research on endogenously produced OXT associated with close interactions, and specifically its association with features of the parent-child relationship, is still scarce (for a review see Torres et al., 2018). Studies with infants showed that the infant OXT system seems to react to episodes of interaction with parents and that OXT variations are correlated between infants and parents and predict parent-child behavioral synchrony (Feldman et al., 2010). At preschool and school ages, studies support a positive association of OXT with positive social relationships and engagement with both parents, and with social reciprocity in best-friend interaction (Feldman et al., 2013). Measuring parental sensitivity (Ainsworth et al., 1974) and endogenous concentrations of OXT, Baião and colleagues (2019) assessed salivary OXT levels of Portuguese preschoolers, before and after an interaction with their mothers (fathers were not included), and its association with maternal sensitivity using the Ainsworth scales. No direct linear association was found between children's OXT levels and their mothers' sensitivity, although an interaction with children's OXT receptor gene polymorphism was found. That is, the child's OXT receptor genotype and the mother's sensitive responsiveness interacted in predicting change in child OXT concentrations from before to after the interaction. However, the study did not assess fathers. Since fathers and mothers have different styles of interaction, it is possible that there are differential effects of paternal and maternal sensitivity on the functioning of neuro-endocrine systems, such as the oxytocinergic system. Nonetheless, research on the effect of father's sensitivity on the salivary OXT response of the child is still, to our knowledge, nonexistent.

5.2.3. Oxytocin and children's behavioral adjustment

The importance of OXT in the development and modulation of both normative and dysfunctional social behavior and cognition has been empirically demonstrated (Bachner-Melman & Ebstein, 2014). Several studies have relied on assessments of OXT levels in saliva, in conjunction with behavior, as a way to gain insight about the role of OXT in human behavior and its dysfunction (Jong et al., 2015). The studies on children have examined a range of dimensions of behavior in samples of different ages (for an extensive review, see Torres et al., 2018). Although the results are mixed, studies have reported significant associations between OXT levels and behavioral problems in children. These studies found associations between OXT in both central and peripheral fluids and depression, anxiety, and conduct problems in children. However, there is still a lack of knowledge about what interpersonal processes and socio-emotional variables determine and are associated with these variations on children's OXT levels. Additionally, research on the associations between salivary OXT and children's

behavioral problems suggest it may represent a useful biomarker of risk for psychopathology in children (Rutigliano et al., 2016; Torres et al., 2018).

Still, many questions remain open regarding: (a) how to adequately measure endogenous levels of OXT; (b) what are the specific bio-behavioral feedback processes, between parents and children, that regulate the production of OXT; (c) what are the observable behaviors and developmental outcomes associated with individual differences in the OXT system response (for a review of present issues with OXT studies in children, see Torres et al., 2018). In the present study, the authors aimed to address issues (a) and (c), firstly by using a previously developed criterion to select the best possible timing and context of saliva sampling for a more reliable OXT measurement (see Torres et al., 2022), and by assessing the observed sensitivity/intrusiveness of both parents and children's behavior problems.

5.3. Aims of the study

This study aims to explore the associations between the quality of observed mother's and father's parenting behaviors (i.e., sensitivity and intrusiveness) and children's OXT levels measured after a dyadic play interaction with each parent; and children's internalizing and externalizing problems reported by their preschool teachers. This study thus uses a multi-methods approach employing observational and self-report measures, and multi-informants – parents and teachers – increasing the validity of the study. This is, to our knowledge, the first study assessing the association of fathers' sensitivity and intrusiveness during a dyadic play interaction with children's OXT levels.

5.4. Method

5.4.1. Participants

Thirty nuclear Portuguese families (30 mothers, 30 fathers, and 30 focal children), and 30 teachers participated in the study. Mothers were between 32-51 years old ($M = 39.1$, $SD = 5.3$), and fathers 33-52 years old ($M = 40.3$, $SD = 5.3$). Mothers' education ranged from high school (21.4%) to a university degree (78.6%), while fathers' education ranged from primary education, (18.5 %), high school (37%), and 44.5% with a university degree. Eighty percent of the mothers and 90% of the fathers worked full-time outside of the home. All children (17 girls; Age: $M = 60.9$, $SD = 9.5$ months) attended preschool classrooms full time; 87.8% had siblings and of those, 65.4% were first born. Thirty preschool teachers (responsible for the classrooms

attended by the participating child) had a university degree in child education (as it's mandatory by law in Portugal).

The criteria for inclusion in the study were: children needed to attend preschool classrooms, and be at least 36 months old, show no evidence of major neurodevelopmental disorders, been born at term, be living in bi-parental families.

5.4.2. Procedure/Instruments

All parents and teachers provided written informed consent, and children were asked if they wanted to participate in a game prior to data collection. All procedures were approved by the Research Ethics Committee of the University of *Ispa-Instituto Universitário de Ciências Psicológicas, Sociais e da Vida* and conducted in accordance with the ethical principles of psychologists and code of conduct of the American Psychological Association. Home visits were scheduled with each parent separately, on different days, and counterbalanced across participants. The intervals between home visits were on average 9.5 days (minimum of 3, maximum of 15 days). During these visits, both parents' sensitivity and intrusiveness, as well as saliva samples were collected. Preschool teachers reported on children's behavioral problems (children attended the same classroom, with the same preschool teacher, for at least 6 months).

5.4.2.1. Parenting sensitivity and intrusiveness

Dimensions of parenting quality, i.e., sensitivity and intrusiveness, were assessed through a semi-structured play activity based on the "Three Boxes Procedure" (NICHD Early Child Care Research Network, 1999). The child and parent were presented with three numbered bags, each with a toy inside, and were told that the goal was for the child to play with each bag for a total of 15 minutes. Participants were told to divide the time between the toys as they saw fit, no instruction was given regarding whether the parent should play with the child. The only rule given was that they should play with the toys in numerical order. Different sets of toys were used for mother/father-child interactions to maximize child interest. Both sets were selected to be age appropriate, but challenging and interesting for the child, and to offer dyads the opportunity to engage in different types of play.

For this study, the child was sat on the parent's lap during the task, in order to promote skin-to-skin contact, which has been shown in previous studies, as mentioned, to be associated with the functioning of the OXT system both in parents and children.

The activity was video-recorded and later codified in terms of sensitivity and intrusiveness by four previously trained independent coders (two of them certified). Inter-rater agreement

before data collection/coding achieved good inter-rater reliability (sensitivity: ICC = .89; intrusiveness: ICC = .91). Sensitivity was assessed with the “Ainsworth Sensitivity Rating Scales” (Ainsworth et al., 1974), measuring the accessibility, attention, interpretation, and response of the parent to the child’s signals. Intrusiveness was coded with the “Erickson Rating Scales” and refers to the degree to which the parent disregards and interferes with the child’s autonomy, wishes, interests or behaviors (Egeland et al., 1990).

5.4.2.2. Salivary OXT

This study is part of a larger project in which a total of seven samples of saliva were collected from each child, in order to estimate the reliability of salivary oxytocin measurements in different contexts (these results were presented in another paper, see Torres et al., 2022). In the present study, only two of those samples showing the highest reliability - those collected after playing with parents – will be analyzed. Saliva samples collected after play had an ICC of .68, while before play the reliability was .60. As stated in the above-mentioned paper, this is possibly because the synchrony between OXT levels in the brain and in peripheral fluids such as saliva occurs after emotionally intense moments, such as stressful and hedonic events (for a meta-analysis, see Valstad et al., 2017). It is crucial that more reliable measures are used in order not to increase the random error of measurement, and risk not finding significant statistical effects when they exist in the population (Type-I error). This is especially important in studies where the samples are not very large (less than 100 subjects), but also in all studies in order to estimate correct effect sizes of the phenomena.

The two samples used in the present study were collected by the researchers, (strangers to the child), during the two home-visits, 15 minutes after the dyadic play task described above. A minimum of 3.5 ml of saliva was collected for each sample. All the requirements for saliva collection had to be met prior to collection. Samples were always collected between 5-6 pm to minimize potential variability related to circadian rhythms.

After collection, the saliva was immediately stored in a freezer (-20 °C), as per standard procedures. Samples were initially frozen at the families’ homes and then transported in a portable freezer to the lab, where they were stored at -80 °C until being sent for analysis in an outsource service (RIAGnosis, Munich, Germany). Transport was made in solid carbon at an average temperature of -80 °C. Samples were collected by passive drooling to a 5 ml plastic polypropylene tube. In a previous study, measurements from passive drool saliva samples provided more accurate estimations of hormonal levels, even after intermediary processing steps, including freezing, thawing, and centrifugation (Robles et al., 2013).

Salivary OXT was quantified by radioimmunoassay (RIAgnosis, Munich, Germany), after extraction. For each sample, 300 ul of saliva was evaporated (SpeedVac, ThermoScientific Inc, Waltham, MA, USA), and 50 ul of assay buffer was added followed by 50 ul antibody (raised in rabbits against OXT). After a 60 min pre-incubation interval, 10 ul ¹²⁵I-labeled tracer (PerkinElmer, Waltham, MA, USA) was added and samples were allowed to incubate for 3 days at 4 °C. Unbound radioactivity was precipitated by activated charcoal (Sigma-Aldrich, St Louis, MO, USA). Under these conditions, an average of 50% of total counts are supposed to bind with < 5% non-specific binding. The detection limit of this assay was determined to be in the 0.5 pg/sample range, depending on the age of the tracer, with typical displacements of 20-25% at 2 pg, 60-70% at 8 pg and 90% at 32 pg. of the standard neuropeptide. In this study, nine (4.4%) of the quantified samples were below the detection range and for this reason were excluded from further analysis. Cross-reactivity with arginine vasopressin (AVP), ring moieties and terminal tripeptides of both OXT and AVP and a wide variety of peptides comprising 3 (melanocyte-stimulating hormone) up to 41 (corticotrophin releasing factor) amino acids are < 0.7% throughout. The intra and inter-assay variabilities are estimated in < 10%. Saliva samples were analyzed in different batches; however, all samples from an individual were always assayed in the same batch. Serial dilutions of saliva samples containing high levels of endogenous OXT run strictly parallel to the standard curve indicating immuno-identity.

5.4.2.3. Children's behavior problems

Preschool teachers answered the "Caregiver-Teacher Report Form (C-TRF)" (Achenbach & Rescorla, 2000), assessing children's behavioral, emotional, and social problems. The Portuguese version (Achenbach et al., 2014) has two global scales that were derived from factor analysis: internalizing problems (32 items) referring to difficulties of an individual nature with symptoms that pertain only to the child's behavior (e.g., has sudden changes in mood or feelings), and encompassing the dimensions of emotion reactivity, anxiety/depression; somatic complaints; withdrawal; and externalizing problems (34 items), which refers to difficulties and conflicts with others, with symptoms that concern child's behavior towards peers and teachers (e.g., is cruel, abusive or bad to others), englobing the dimensions of attention problems, and aggressive behaviors. Teachers rated each item, considering how true each statement was for the child's behavior within the past 2 months, using a three-points *Likert* scale (0 = not true; 1 = somewhat true; 2 = very true). Test-retest reliability for all the scales used in this study was > .75 (Achenbach & Rescorla, 2000).

5.4.3. Plan of analyses

First, statistical descriptive analyses of all variables in study were performed. Secondly, differences between fathers' and mothers' sensitivity and intrusiveness scores were tested, as well as the difference between fathers' and mothers' sensitivity and intrusiveness for girls and boys. In addition, sex differences between children's levels of OXT and behavioral problem scores were tested. Finally, a series of correlation analyses were performed among all variables in study. All test statistics were non-parametric due to the sample size. In the computation of non-parametric correlations, a bootstrap method of estimation was used to increase the accuracy of the coefficients.

5.5. Results

Preliminary descriptive analyses were performed for parenting quality, the child's OXT concentrations after parent-child play activities, and the child's behavioral problems. Results are presented in Table 5.1.

Table 5.1

Descriptive statistics of the variables in study

	Min	Max	<i>M</i>	<i>SD</i>
Parenting quality				
Mother's sensitivity	3.50	7.50	5.33	1.05
Father's sensitivity	4.50	7.50	5.46	.75
Mother's intrusiveness	1.50	6.00	3.57	1.23
Father's intrusiveness	1.50	4.00	2.89	.75
Child's OXT*				
Child OXT after playing with the mother	.35	1.92	1.09	.38
Child OXT after playing with the father	.34	1.89	.99	.39
Child's behavioral problems				
Internalizing problems	.00	17.00	6.59	4.53
Externalizing problems	.00	35.00	13.15	9.74

* OXT concentration measured in picograms per milliliter (pg/mL)

Differences between fathers' and mothers' sensitivity and intrusiveness scores were tested using the Willcoxon signed rank test. Although no significant differences were found for sensitivity ($z = -.99, p = .33$), a significant difference was found for intrusiveness ($z = 2.35, p =$

.02), with mothers scoring higher than fathers. Differences between OXT concentrations after playing with the father and after playing with the mother were also tested, using the Willcoxon signed rank test, no significant differences were found ($z = -.56, p = .61$).

To test the relationship between all variables in study, associations were tested using Spearman's Rho correlations. In addition, the percentile bootstrap method with 1000 samples was used to achieve more reliable coefficients (Bishara & Hittner, 2016). Results are presented in Table 5.2. In order to assess the possible effect of the synchrony of the OXT response after playing with both parents, a composite variable was computed by averaging the two measures of children's OXT levels after playing with the father and with the mother.

Fathers' sensitivity was positively and significantly correlated with children's OXT concentrations after the dyadic play activity, and fathers' intrusiveness was significantly negatively associated with OXT. Mothers' sensitivity and intrusiveness were not correlated with the children's OXT. In addition, children's OXT levels after playing with fathers were positively and significantly correlated with externalizing behaviors, but not with internalizing problems. That was not the case for mothers. Finally, the composite measure of OXT after playing with the father and mother was negatively and significantly associated with the child's externalizing behaviors but was of the same magnitude as the OXT after playing only with the father.

For both mothers' and fathers' sensitivity, scores were negatively and significantly associated with children's internalizing problems. Mothers' intrusiveness scores were positively and significantly correlated with children externalizing problems, whereas fathers' intrusiveness was positively and significantly correlated with children internalizing problems.

Table 5.2*Correlations between parenting quality, OXT evoked after parent-child interaction, and children's behavior problems*

	1	2	3	4	5	6	7	8	9
1. Mother's sensitivity	--	.36*	-.91**	-.19	.04	-.19	-.06	-.31*	-.27
2. Father's sensitivity			-.34*	-.76**	.25	.47*	.34*	-.42*	-.27
3. Mother's intrusiveness				.14	-.06	.12	.03	.27	.33*
4. Father's intrusiveness					-.42*	-.46**	-.53**	.36*	.16
5. Child OXT after playing with the mother						.62**	.92**	-.04	-.18
6. Child OXT after playing with the father							.88**	-.18	-.31*
7. Composite OXT after playing with father + mother								-.17	-.33*
8. Child's internalizing problems									.46**
9. Child's externalizing problems									--

* $p < .05$, ** $p < .01$

5.6. Discussion

This study aimed to assess the association between mothers' and fathers' parenting behaviors (sensitivity and intrusiveness), and the salivary OXT levels of their children, as well as with children's internalizing and externalizing problems as assessed by their preschool teachers. This is, to our knowledge, the first study assessing the association of both mothers' and fathers' sensitivity and intrusiveness during a dyadic play interaction, with children's salivary OXT levels. The literature on parenting tends to emphasize the differences in behaviors and contexts of interaction between fathers and mothers, highlighting the context of play, challenge, and physical interaction (Cabrera et al., 2000; Lamb & Lewis, 2010), and their differential effects on child socio-emotional development (e.g., Grossman et al., 2002). This makes it important to investigate both parents when considering psychobiological processes, such as the children's OXT system association with socio-emotional interactions.

Our results show different effects of fathers' and mothers' sensitivity: while mothers' sensitivity and intrusiveness had no association with children's OXT levels, fathers' sensitivity and intrusiveness were both associated with children's OXT levels after play. Fathers' sensitivity was correlated with higher OXT levels, while intrusiveness had the opposite effect, being significantly associated with lower levels of OXT. A previous study with Portuguese children and their mothers also found no significant direct effect of mothers' sensitivity during play on children's OXT. However, a significant effect was found only when mother sensitivity was moderated by a genetic variation in the child's OXT receptor (Baião et al., 2019). Our study, which used a quite similar play procedure and a comparable measure of maternal sensitivity, partially replicated these results as to the absence of a direct association of maternal sensitivity and intrusiveness with the salivary OXT levels of the child. In contrast, the fact that in our study fathers' sensitivity and intrusiveness were both significantly associated with children's OXT levels, suggests the hypothesis that children's OXT levels after play might be sensitive to specific factors that are triggered by fathers' interaction contexts. Since the present design is correlational, causality inferences cannot be made. However, previous research on the developmental effects of fathers' sensitivity in playing has shown a specific causal effect of fathers' sensitivity in playing with developmental outcomes that are linked with the OXT system. One of these outcomes is the attachment system of the child, which has been shown to be associated with OXT (e.g., Carter, 2017). Previous longitudinal research on attachment has found that fathers' sensitivity during play had a specific and unique effect on the children's attachment and emotional development, from toddlerhood to adolescence, namely on their

internal attachment model (Grossman et al., 2002). While mothers' play sensitivity in early childhood was not associated with children's security of attachment at later ages, father sensitivity in play predicted security at ages 10 and 16.

Additionally, we found that both fathers' and mothers' sensitivity and intrusiveness were directly associated with behavioral problems in the preschool settings, as reported independently by the children's teachers. Previous research has reported the association of maternal sensitivity with children's internalizing problems including large scale population cohort prospective longitudinal studies (Kok et al., 2013). Our results are in line with this previous research on the effect of mothers' sensitivity on behavioral problems, and further contributes to validate the assessment of sensitivity used in our study. The research on fathers' sensitivity association with behavioral problems is less developed than on mothers. However, a recent meta-analysis (Rodrigues et al., 2021) found a great range of variability in the results and very small overall effect sizes for both internalizing and externalizing problems. In contrast with our results, the meta-analysis found a significant effect of paternal sensitivity on externalizing but not on internalizing problems. The disparity in results might have to do with methodological differences in the assessment of both father sensitivity and behavioral problems. In our study, we have used reports of children's behavioral problems from independent informers, the teachers, which makes our results less vulnerable to same-informant bias and is not always the case in all studies. Finally, a very specific and negative association was found between OXT levels after playing with the father and externalizing problems of the child, but not internalizing. In conjunction with the association between fathers' sensitivity and children's OXT levels, this result might suggest a psychobiological path from fathers' sensitivity in play to externalizing problems of the child, which may include OXT levels in the child as an underlying biological link between the two. That is, it is possible that paternal sensitivity may contribute to a more effective OXT system functioning for children, which in turn will manifest behaviorally in a more adapted social behavior in school. However, at the moment, the lack of other studies about paternal sensitivity and children's OXT levels makes it difficult to present clear conclusions about the precise mechanisms involved.

5.6.1. Limitations

Some limitations should be acknowledged. Firstly, our sample size was relatively small and composed of bi-parental middle-class families only, which makes our results preliminary and in need of replication with bigger and more diverse samples to be generalizable to the population. Additionally, our sample was composed of normally developing children, without

development disorders or psychopathological diagnosis. Another limitation is that in this study we could not assess causality in the relation between OXT levels and parental behavior during play: 1) although we collected several saliva samples before the dyadic play, as stated above, none of those samples collected before play reached acceptable levels of reliability (see also Torres et al., 2022, for extensive discussion of this topic); 2) in order to assess the hypothetical causal effect of parental sensitive/intrusive behavior in the variation of OXT, before and after play, an experimental or quasi-experimental comparative study with a control group would be necessary. Finally, in terms of OXT measurement, our findings apply to (1) the specific method of saliva sampling used (passive drooling) with immediate freezing of the saliva at -20 °C; and (2) to the method of quantification we used, radioimmunoassay, including prior extraction.

To understand the precise interactive mechanisms between parents and children that contribute to individual differences in OXT levels, and to differences between mothers and fathers, future studies should focus on analyzing more in-depth micro-sequences of interactive behaviors, as well as gender-typical behaviors. Additionally, our study has focused on the OXT levels found in saliva after a playful, hedonic, event with parents. Since it is known that the OXT system is implicated in other types of emotional events, such as reunion with the mother after separation, as well as being highly responsive to stress, future studies should assess non-play emotional situations.

CHAPTER 6

General Discussion

In the last decades, there has been an increasing interest in understating the influence of the father within the family system and in the development of children (e.g., Volling & Cabrera, 2019). Despite this interest, studies that consider the multidimensionality of the father's role and its impact on children are still lacking, with most studies still focusing only on the mother's influence (Cabrera et al., 2018). For this reason, there are still several questions left to be answered. The long term aim of this dissertation is to empirically contribute to the search for these answers, and to the growing effort to include the father's perspective in the study of parenting (and its relationship with child development), highlighting Cabrera's premise that "Fathers are parents too!" (Cabrera et al., 2018).

The first study (Chapter 2), aimed to identify profiles of father involvement in terms of participation in activities of direct care, teaching/discipline, and play; and subsequently test the differences between the profiles in terms of the characteristics of the father, the child, and the family. Two profiles were identified, with significant differences in all dimensions of involvement. Profile 1 - care helpers and play partners - encompasses fathers who have lower values of involvement in care (i.e., they help mothers in care tasks), whereas profile 2 - caregivers and play partners - contains fathers who have higher values of involvement in care (i.e., they share care tasks). Significant differences were found for parental efficacy, with fathers in profile 2 ('modern') displaying higher values than fathers in profile 1 ('traditional'). These results are congruent with previous studies, fathers who shared care and play activities with the mothers (profile 2) had higher values of parental efficacy (e.g., Kwok & Li, 2014; Kwok et al., 2013). Although the study design does not allow the determination of the causality of this relationship, the literature indicates that fathers who believe that they are capable and efficient in child-related tasks tend to be more invested in these interactions (Kwok & Li, 2014) and adopt behaviors and practices that stimulate children's positive development (Gilmore & Cuskelly, 2008). Thus, supporting the notion that besides external influences being important, father's own characteristics are key variables of interest for father involvement (Cabrera et al., 2007a, 2014) that should be considered in the development of parenting and work/family policies, as well as parenting and intervention programs. Fathers in profile 2 (more 'modern') also presented higher values of father's education level and mother's work hours, which is also

congruent with the literature (e.g., Monteiro et al., 2017; Novo & Prada, 2015; Paquette et al., 2000; Santos et al., 2021). Higher education levels are associated with a higher notion of the impact that fathers have on child development, equal division of childcare responsibilities, and equal gender views (Pleck, 2010; Wall et al., 2016a), all of which are conducive to a higher involvement. Mother's working hours are a known propulsor of the interest in the father's role and his involvement in family and children's lives (Cabrera et al., 2000). In addition, mother's working hours also seem to be a promoter of gender equality (sharing of activities) in childcare (e.g., Schoppe-Sullivan et al., 2008). These results highlight the need to study the multiplicity of father's involvement in the daily care and socialization of children, and the need to analyze his participation in terms of different types of activities (e.g., Monteiro et al., 2019b; Pleck, 1997, 2000). The results also emphasize the importance of considering multiple levels of variables that may contribute to a more complex view of father involvement (Cabrera et al., 2007a, 2014).

The second study (Chapter 3), intended to explore the relationship between children's characteristics, such as age, sex, and temperament, and father's involvement in all dimensions of child-related tasks (e.g., direct care, indirect care, teaching/discipline, play, and outdoor leisure). Results showed that for the younger children (3-4 y), the interaction between children's sex (feminine) and children's extroversion was a significant predictor of father's involvement in teaching/discipline and play, i.e., fathers were more involved with their more extroverted daughters. These results are expected since previous studies have found fathers to be more involved with their more gregarious daughters (e.g., McBride et al., 2002). Daughters who display more positive emotions and openness to explore the world could be more interesting social partners (e.g., Cabrera et al., 2000). For the older children (5-6 y), children's higher negative affectivity was found to be a significant predictor of father's higher involvement in teaching/discipline and play. These results were unexpected since children's challenging temperament is considered to hamper father's involvement (Bates et al., 2012) as it is associated with greater parenting stress and lower quality of parenting interactions (Halford et al., 2015). However similar results have been found in terms of correlations (Aring & Renk, 2010; Kulik & Sadeh, 2015; Torres et al., 2012). Fathers could be more involved since they perceived their children are being more difficult to soothe and to interact with, or perhaps the children themselves solicit more involvement from their fathers (Torres et al., 2012). Plus, an interaction effect was found between children's sex (masculine) and children's negative affectivity for involvement in teaching/discipline, i.e., fathers were more involved when their sons had higher values in negative affectivity. Gender identification, socialization biases (Grolnick et al., 1996),

and homologous emotional regulation strategies (Feldman, 2003) may facilitate father's involvement with the same-gender child. This is particularly interesting since it has been suggested that boys require greater parental involvement to achieve better outcomes (Amato & Keith, 1991). These results indicate that children's characteristics influence which activities fathers are more involved in, and that its effects might change as children age, something that is not often considered.

The third study (Chapter 4), aimed to analyze the relationship between father's involvement in various child-related activities (direct care, teaching/discipline, and play), important variables associated with father's parenting (parenting styles, education level, working hours), and child's characteristics (sex, age, and negative affectivity). The results showed that father's authoritative style was a significant positive predictor of his involvement in teaching/discipline activities. While father's education was a significant positive predictor of higher involvement in direct care and play, father's working hours were a significant negative predictor of father's involvement in direct care. These results are congruent with the literature and stress the need of developing work-family policies that will consider the father's role in family life. In addition, father's working hours are particularly relevant due to the asymmetries between mother's and father's working environments, in Portugal, fathers work in higher proportion and higher hours (INE, PORDATA, 2022a, 2022b). The authoritative parenting style is described by the clear definition and communication of rules and limits that are adequate to the children's developmental stage (e.g., Baumrind, 1971), consequently supporting a positive and compassionate approach when educating (Arsénio & Santos, 2013). This stance might lead them to be more involved in teaching and discipline tasks in a more constructive viewpoint, that promotes a more positive involvement (Pleck, 2010). Additionally, interactions between father's parenting styles and child's negative affectivity were also explored. The interaction effect between child's negative affectivity and father's authoritative parenting was a significant predictor of father's involvement in teaching/discipline, i.e., fathers who perceive themselves as having a more authoritative style were more involved with children with medium and high levels of negative affectivity. This result was not expected, since children's higher negative affectivity tends to be associated with father's lower levels of communication, support (Ato et al., 2015), responsiveness, and affection (Volling & Belsky, 1991). However, father's reaction to children's negative affectivity should be determined by the capacity of the parent to revise and adjust their responses when being challenged by the child (Bates et al., 2012). In this sense, father's authoritative parenting (i.e., quality of parenting) may play a protective role for children with a more challenging temperament, in terms of their social adjustment, which need to be

explored in the future. These results sustain the supposition that the father's role is a result of an intricate multi-level system (i.e., of individual, child, family, and contextual influences) that interact with each other and can either support or hinder father's parenting (e.g., Cabrera et al., 2007; Parke, 2000).

The fourth study (Chapter 5), proposed to investigate the relationships between the quality of mother's and father's observed parenting behaviors, child's salivary OXT levels after a child-mother/father play interaction, and child's behavioral problems. Our results revealed a significant relationship between father's parenting behaviors and children's internalizing problems, but not externalizing. As expected, father's sensitivity was found to be negatively associated with children's internalizing, whereas intrusiveness was found to be negatively associated. These results are in line with previous studies (e.g., Hazen et al., 2010). Curiously, most studies have reported a negative relationship with children's externalizing problems (Jacobvitz et al., 2022; Rodrigues et al., 2021; Zvara et al., 2018) not internalizing problems as it was found in this study, it is however congruent with previous research linking mother's sensitivity with children's internalizing difficulties (e.g., Kok et al., 2013). In addition, the results also show a significant positive relationship between children's OXT levels and father's sensitivity and a negative relationship with children's externalizing problems. If we consider these two results together, it may suggest a possible psychobiological pathway between father's sensitivity, children's OXT levels, and children's externalizing problems. These results underline the importance of studying the quality of father's behaviors and their impact on children, especially since the influence of father's quality of interaction (for instance sensitivity, intrusiveness, support, and sensitive discipline) on children's behavioral adjustment difficulties is less studied than the effect of mothers. But also, the significance of considering both parents (especially when married or cohabiting) when exploring parenting influences on socioemotional development.

In sum, these results empirically contribute to the developing field of fathering research, highlighting the multidimensionality of his role and its associations with child's socioemotional adjustment. Overall, the evidence reported here shows the importance of considering father's own characteristics, such as father's sense of parental competence, education, and working hours (study 1) when studying father's parenting, while emphasizing the importance of including these aspects into the developing of intervention programs (e.g., Cabrera & Reich, 2017). It also supports the notion (study 2 and 3) that children's characteristics have an importance influence on how much fathers are involved with their children, and in which type of activities they do invest (Parke, 2000). It also provided evidence (particularly study 2),

although with caution, that this influence may not be static, but that it might change as children develop (Cabrera et al., 2014). Furthermore, the results (study 3 and 4) also stress the importance of looking beyond what and how much fathers do, but to consider the quality of their involvement and their interactions (Cabrera et al., 2018; Pleck, 2010), while including the other parental figure (study 4) Lastly, these results also aim to support the design and development of parenting programs that will include fathers, and the development of social and educational policies focused on promoting healthy parenting, that will support children's adjusted development.

6.1. Limitations of the studies

These studies are not without some limitations. All four studies were cross-sectional, which does not enable the examination of the causality of these relationships. In addition, a longitudinal design would also allow to explore the bidirectional relationship between father's involvement and its quality and children's characteristics (e.g., Aring & Renk, 2010; Brown et al., 2011). Furthermore, all studies except for the fourth one, only employed self-reported measures. Parenting styles and practices is one venue to access parental quality (Palkovitz, 2019; Pleck, 2010), which are traditionally accessed via self-report measures, that could present some limitations such as social-desirability and reports of perceived experience (instead of behavioral or physiological information). Lastly, our samples were mostly middle-class and bi-parental families which limits the variability of our results and its generalization. It is imperative that in the future, samples are more diverse.

6.2. Strengths of the studies

Notwithstanding the limitations previously mentioned, there are several strengths worth mentioning. For instance, all studies considered the fathers' own perspective regarding their beliefs and behaviors, whereas in most cases fathers are still portrayed by the mothers, or in light of the maternal figure. Except for the relative parental involvement measure, where both mothers' and fathers' reports were used to calculate a composite score, this allows to mitigate the interdependence between both parents' involvement (Pleck, 2010), and consider a family-systems approach (Cabrera et al., 2007a, 2014; Parke, 1996, 2000). Another key strength is the use of independent sources of information, for example, father's beliefs and behavioral styles were described by fathers, children's temperament by mothers, and children's outcomes (behavioral problems) were reported by their teachers. Thus, decreasing the effect of shares

variance. Moreover, in study one, a person-centered approach was used, which offers more specificity regarding the subjects in the sample, resulting in a more detailed analysis of the behavioral patterns of dynamic subgroups and not considering the whole sample according to pre-determined theoretical models (Howard & Hoffman, 2018; Muthén & Muthén, 2000).

The second and third studies highlighted the significant active role that child's characteristics play in influencing parenting behaviors. In addition, in the last two studies, the importance of examining the quality of father's involvement and two components of parenting – parenting styles and sensitivity (Palkovitz, 2019; Pleck, 2010) is underlined. Although parenting styles and practices are traditionally assessed via self-report, father's sensitivity and intrusiveness was measured through the use of an observational measure, which is considered the best approach when studying these aspects of parent-child interactions (Parke, 2000).

6.3. Reflections for future studies

When studying fathers several challenges exist. Most of the research on child development focuses mainly on mothers, and the studies that include fathers in their analyses tend to use measures originally developed to assess maternal behavior (Cabrera et al., 2018). Hence, not contemplating the fact that fathers tend to interact with their children in different contexts and display behaviors that are specific and distinctive (e.g., Lamb & Lewis, 2010). For example, studies report a lower association between father's sensitivity and the quality of attachment when compared to the same association for mother's (van IJzendoorn & de Wolff, 1997). Some authors (e.g., Posada et al., 2007; Waters & Cummings, 2000) have expressed the need to consider how to adjust these constructs (e.g., sensitivity) to other developmental periods, such as the preschool years, where father's involvement becomes more prominent (Lamb, 2010). Following the suggestion of Grossman and colleagues (2002), that fathers may act essentially as a secure base for exploration and mothers as a 'safe-haven', more recently other authors (e.g., Fletcher et al., 2013; St George et al., 2018) have begun to explore father specific behaviors in the context of play as a potential mechanism by which it would impact specific domains of child development (e.g., emotional regulation, play). Proportionally, play activities are where fathers seem to spend more time interacting with their children (e.g., Monteiro et al., 2017), and these father-child play interactions are qualitatively different than with mothers (Grossmann et al., 2008). Father's play with their children tends to be described as more physical, such as rough-and-tumble, defiant, and stimulating (Cabrera et al., 2000; Lamb & Lewis, 2010). Rough-and-tumble (RT) play is defined as a stimulating role-reversal game, initiated by

invitation, entailing shared positive affect between them (Smith, 2010). During father-child quality RT play, fathers are engaged and attuned to the child's signals of interest and enjoyment (Fletcher et al., 2013), and their behaviors can be analyzed in terms of control, sensitivity, and warmth. These shared emotional states and expressions, and reciprocal exchanges of dominance are proposed to promote children's ability to identify emotional signals (Carson et al., 1993), and self-regulation (Peterson & Flanders, 2005), fomenting exploration and bravery (Paquette, 2004). Its frequency peaks during the preschool years (MacDonald & Parke, 1986). Although the literature explaining the connection between father-child play and children's positive development is still reduced, some studies have found father's physical, and rough-and-tumble play to be positively associated with children's social and emotional outcomes (St George & Freeman, 2017, for review).

Additionally, non-human primate research was an important stepping-stone in the conceptualization of the adaptive qualities of human-infant attachment and secure-base adult behaviors, however, in detriment to research on human-child relationships and primate behavior, recent connections between the two fields have been scarce (Kondo-Ikemura & Waters, 1987). Through understanding how paternal care occurs in other species, we can attempt to conceive how it evolved, and why in some species these behaviors don't exist as part of their repertoire. Plus, allows us to consider how we (as a species) have developed these behaviors, why they prevail, and what advantages they grant us. In order to understand how paternal care functions and why/how it evolved, it is essential to expand our research to include primate research, to better understand the expression and quality of paternal care, and better describe and comprehend why paternal behaviors are a crucial component in evolutionary models of human behavior (beyond the mothers).

Furthermore, although efforts have been made to move father research from studying father presence vs father absence, however, currently it is important to explore how fathers co-parent their children, when they do not live with them (in case of separation, divorce, or other reasons) but are not absent from their children's daily lives. To do so, it is necessary to review the instruments of father-child relationships or to develop new measures, since most (wrongly) treat father non-residency as father absence (Cabrera & Volling, 2019). It is also important to consider new and modern family typologies (e.g., homo-parental families, single-father households, or stay-at-home dads in nuclear families). Lastly, it is essential to focus fathering research on the more diversified sociodemographic and cultural characteristics since most literature still centers around WEIRD (western, educated, industrialized, rich, and democratic) samples, which raises several methodological challenges (Henrich et al., 2010).

References

- Achenbach, T. M., Rescorla, L. A., Dias, P., Ramalho V., Lima, V. S., Machado, B. C., & Gonçalves, M. (2014). *Manual do sistema de empiricamente validado (ASEBA) para o período pré-escolar: Um sistema integrado de avaliação com múltiplos informadores*. Psiquilíbrios Edições.
- Achenbach, T., & Rescorla, L. (2000). *Manual for the ASEBA preschool forms & profiles*. University of Vermont, Research Centre for Children, Youth, & Families.
- Ainsworth, M. D. S., Bell, S. M., & Stayton, D. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The integration of a child into a social world* (pp. 99-135). Cambridge University Press.
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Lawrence Erlbaum Associates.
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1979). *Patterns of attachment: a psychological study of the strange situation* (1st ed.). Psychology Press. <https://doi.org/10.4324/9781315802428>
- Amaral, R., Monteiro, L., & Santos, C. (2019). Perfis de envolvimento relativo do pai e ajustamento social de crianças em jardim-de-infância. *Análise Psicológica*, 37(4), 463-477. <https://doi.org/10.14417/ap.1553>
- Amato, P. R., & Keith, B. (1991). Parental divorce and the well-being of children: A meta-analysis. *Psychological Bulletin*, 110(1), 26-46. <https://doi.org/10.1037/0033-2909.110.1.26>
- Aring, S., & Renk, K. (2010). Associations among young children's temperament, parents' perceptions of their young children, and characteristics of the parent-young child relationship. *Journal of Early Childhood and Infant Psychology*, 6, 59-83.
- Arsénio, C., & Santos, S. (2013). *Paternidade na infância: Envolvimento paterno e estilos parentais educativos em pais de crianças em idade escolar*. In A. Pereira et al. (Eds.), VIII Simpósio Nacional de Investigação em Psicologia (pp. 638-648). Associação Portuguesa de Psicologia.
- Ato, E., Galián, M. D., & Fernández-Vilar, M. A. (2015). The moderating role of children's effortful control in the relation between marital adjustment and parenting. *Journal of Child and Family Studies*, 24(11), 3341-3349. <https://doi.org/10.1007/s10826-015-0136-4>
- Bachner-Melman, R., & Ebstein, R. P. (2014). The role of oxytocin and vasopressin in emotional and social behaviors. *Handbook of clinical neurology*, 124, 53-68. <https://doi.org/10.1016/B978-0-444-59602-4.00004-6>
- Baião, R., Fearon, P., Belsky, J., Baptista, J., Carneiro, A., Pinto, R., Nogueira, M., Oliveira, C., Soares, I., & Mesquita, A. R. (2019). Child's oxytocin response to mother-child interaction: The contribution of child genetics and maternal behavior. *Psychoneuroendocrinology*, 102, 79-83. <https://doi.org/10.1016/j.psyneuen.2018.11.022>
- Bailey, W. T. (1994). A longitudinal study of fathers' involvement with young children: Infancy to age 5 years. *The Journal of Genetic Psychology: Research and Theory on Human Development*, 155(3), 331-339. <https://doi.org/10.1080/00221325.1994.9914783>
- Balancho, L. S. F. (2004). Ser pai: Transformações intergeracionais na paternidade. *Análise Psicológica*, 22(2), 377-386. <https://doi.org/10.14417/ap.198>

- Barnett, M. A., Deng, M., Mills-Koonce, W. R., Willoughby, M., & Cox, M. (2008). Interdependence of parenting of mothers and fathers of infants. *Journal of Family Psychology, 22*(4), 561-573. <https://doi.org/10.1037/0893-3200.22.3.561>
- Bates, J. E., Schermerhorn, A. C., & Petersen, I. T. (2012). Temperament and parenting in developmental perspective. In M. Zentner & R. L. Shiner (Eds.), *Handbook of Temperament* (pp. 425-441). Guilford Press.
- Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology Monographs, 4*(1, Pt. 2), 1-103. <https://doi.org/10.1037/h0030372>
- Beitel, A. H., & Parke, R. D. (1998). Paternal involvement in infancy: The role of maternal and paternal attitudes. *Journal of Family Psychology, 12*(2), 268-288. <https://doi.org/10.1037/0893-3200.12.2.268>
- Belsky, J. (1984). The determinants of parenting: A process model. *Child Development, 55*(1), 83-96. <https://doi.org/10.2307/1129836>
- Belsky J., Robins E., & Gamble W. (1984). The determinants of parental competence. in M. Lewis (Ed.), *Genesis of behavior: Beyond the dyad* (pp. 251-280). Springer. https://doi.org/10.1007/978-1-4757-9415-1_11
- Bishara, A. J., & Hittner, J. B. (2017). Confidence intervals for correlations when data are not normal. *Behavior Research Methods, 49*(1), 294-309. <https://doi.org/10.3758/s13428-016-0702-8>
- Blos, P. A., Panksepp, J., Bluthe, R-M., & Honk, J. (2012). Acute effects of steroid hormones and neuropeptides on human social-emotional behavior: A review of single administration studies. *Frontiers in Neuroendocrinology, 33*(1), 17-35. <https://doi.org/10.1016/j.yfrne.2011.01.002>
- Bowlby, J. (1988). *A secure base. Parent-child attachment and healthy development*. Basic Books.
- Brown, G. L., Mangelsdorf, S. C., & Neff, C. (2012). Father involvement, paternal sensitivity, and father-child attachment security in the first 3 years. *Journal of Family Psychology, 26*(3), 421-430. <https://doi.org/10.1037/a0027836>
- Brown, G. L., McBride, B. A., Bost, K. K., & Shin, N. (2011). Parental involvement, child temperament, and parents' work hours: Differential relations for mothers and fathers. *Journal of Applied Developmental Psychology, 32*(6), 313-322. <https://doi.org/10.1016/j.appdev.2011.08.004>
- Brown, G. L., McBride, B. A., Shin, N., & Bost, K. K. (2007). Parenting predictors of father-child attachment security: Interactive effects of father involvement and fathering quality. *Fathering: A Journal of Theory, Research, and Practice about Men as Fathers, 5*(3), 197-219. <https://doi.org/10.3149/fth.0503.197>
- Cabrera, N. J., Fitzgerald, H. E., Bradley, R. H., & Roggman, L. (2007a). Modeling the dynamics of paternal influences on children over the life course. *Applied Developmental Science, 11*(4), 185-189. <https://doi.org/10.1080/10888690701762027>
- Cabrera, N. J., Fitzgerald, H. E., Bradley, R. H., & Roggman, L. (2014). The ecology of father-child relationships: An expanded model. *Journal of Family Theory & Review, 6*(4), 336-354. <https://doi.org/10.1111/jftr.12054>
- Cabrera, N. J., & Reich, S. (2017). *Baby Books 2: A randomized control trial (RCT) to test the effects of a book intervention for low- income mothers and fathers*. In N. Cabrera (Chair), International perspectives on parenting interventions for at-risk families. Symposium conducted at the biennial meeting of the Society for Research in Child Development, Austin, Texas.
- Cabrera, N. J., Shannon, J. D., & Tamis-LeMonda, C. (2007b). Fathers' influence on their children's cognitive and emotional development: From toddlers to pre-k. *Applied Developmental Science, 11*(4), 208-213. <https://doi.org/10.1080/10888690701762100>

- Cabrera, N. J., Tamis-LeMonda, C. S., Bradley, R. H., Hofferth, S., & Lamb, M. E. (2000). Fatherhood in the twenty-first century. *Child Development, 71*(1), 127-136. <https://doi.org/10.1111/1467-8624.00126>
- Cabrera, N. J., Volling, B. L., & Barr, R. (2018). Fathers are parents, too! Widening the lens on parenting for children's development. *Child Development Perspectives, 12*(3), 152-157. <https://doi.org/10.1111/cdep.12275>
- Cabrera, N. J., & Volling, B. L. (2019). Moving research on fathering and children's development forward: Priorities and recommendations for the future. In B. L. Volling & N. J. Cabrera (Eds.), *Advancing research and measurement on fathering and children's development. Monographs of the Society for Research in Child Development, 84*(1), 107-117. <https://doi.org/10.1002/mono.12404>
- Caldwell, H. K. (2017). Oxytocin and vasopressin: Powerful regulators of social behavior. *Neuroscientist, 23*(5), 517-528. <https://doi.org/10.1177/1073858417708284>
- Carlson, M. J. (2006). Family structure, father involvement, and adolescent behavioral outcomes. *Journal of Marriage and Family, 68*(1), 137-154. <https://doi.org/10.1111/j.1741-3737.2006.00239.x>
- Carson, J., Burks, V., & Parke, R. D. (1993). Parent-child physical play: determinants and consequences. In K. MacDonald (Ed.), *Parent-child play: Descriptions and implications* (pp. 197-220). State University of New York Press.
- Carter, C. S. (2017). The role of oxytocin and vasopressin in attachment. *Psychodynamic Psychiatry, 45*(4), 499-517. <https://doi.org/10.1521/pdps.2017.45.4.499>
- Castillo, J. T, Welch, G., & Sarver, C. M. (2013). The relationship between disadvantaged fathers' employment stability, workplace flexibility, and involvement with their infant children. *Journal of Social Service Research, 39*(3), 380-396. <https://doi.org/10.1080/01488376.2013.775089>
- Cheah, C., Nelson, L. J., & Rubin, K. H. (2001). Social and non-social play. In A. Goncu, & E. Klein (Eds.), *Children in play, story, and school* (pp. 39-71). Guilford Press.
- Clutton-Brock, T. H. (1989). Review lecture: mammalian mating systems. *Proceedings of the Royal Society B, 236*(1285), 339-372. <https://doi.org/10.1098/rspb.1989.0027>
- Clutton-Brock, T. H. (1991). *The evolution of parental care*. Princeton University Press.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Erlbaum Associates Publishers.
- Coleman, P. K., & Karraker, K. H. (1997). Self-efficacy and parenting quality: Findings and future applications. *Developmental Review, 18*(1), 47-85. <https://doi.org/10.1006/drev.1997.0448>
- Coleman, P. K., & Karraker, K. H. (2000). Parenting self-efficacy among mothers of school-age children: Conceptualization, measurement, and correlates. *Family Relations, 49*(1), 13-24.
- Coleman, P. K., & Karraker, K. H. (2003). Maternal self-efficacy beliefs, competence in parenting, and toddlers' behavior and developmental status. *Infant Mental Health Journal, 24*(2), 126-148. <https://doi.org/10.1002/imhj.10048>
- Cook, G. A., Roggman, L. A., & Boyce, L. K. (2011). Fathers' and mothers' cognitive stimulation in early play with toddlers: Predictors of 5th grade reading and math. *Family Science, 2*(2), 131-145. <https://doi.org/10.1080/19424620.2011.640559>
- Craig, L. (2006). Does father care mean fathers share? A comparison of how mothers and fathers in intact families spend time with children. *Gender & Society, 20*(2), 259-281. <https://doi.org/10.1177/0891243205285212>
- Cummings, E. M., Davies, P. T., & Campbell, S. B. (2002). *Developmental psychopathology and family process: Theory, research, and clinical implications*. The Guilford Press.

- Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, 113(3), 487-489. <https://doi.org/10.1037/0033-2909.113.3.487>
- Deneault, A.-A., Cabrera, N. J., & Bureau, J. F. (2022). A meta-analysis on observed paternal and maternal sensitivity. *Child Development*, 93(6), 1631-1648. <https://doi.org/10.1111/cdev.13832>
- Diniz, E., Brandão, T., Monteiro, L., & Veríssimo, M. (2021). Father involvement during early childhood: A systematic review of the literature. *Journal of Family Theory & Review*, 13(1), 77-99. <https://doi.org/10.1111/jftr.12410>
- Egeland, B., Erickson, M. F., Clemenhagen-Moon, J., Hiester, M. K., & Korfmacher, J. (1990). *24 months tools coding manual: Project STEEP revised 1990 from mother-child project scales*. Unpublished Manuscript, University of Minnesota.
- Egeland, B., Pianta, R., & O'Brien, M. (1993). Maternal intrusiveness in infancy and child maladaptation in early school years. *Development and Psychopathology*, 5(3), 359-370. <https://doi.org/10.1017/S0954579400004466>
- Emmott, E. H., & Mace, R. (2021). Why the son-bias in caregiving? Testing sex-differences in the associations between paternal caregiving and child outcomes in England. *Journal of Family Issues*, 42(6), 1354-1383. <https://doi.org/10.1177/0192513X20941902>
- Fagan, J., Day, R., Lamb, M. E., & Cabrera, N. J. (2014). Should researchers conceptualize differently the dimensions of parenting for fathers and mothers?. *Journal of Family Theory & Review*, 6(4), 390-405. <https://doi.org/10.1111/jftr.12044>
- Favez, N., Tissot, H., Frascarolo, F., Stiefel, F., & Despland, J. N. (2016). Sense of competence and beliefs about parental roles in mothers and fathers as predictors of coparenting and child engagement in mother-father-infant triadic interactions. *Infant and Child Development*, 25(4), 283-301. <https://doi.org/10.1002/icd.1934>
- Feldman, R. (2003). Infant-mother and infant-father synchrony: The coregulation of positive arousal. *Infant Mental Health Journal*, 24(1), 1-23. <https://doi.org/10.1002/imhj.10041>
- Feldman, R., Gordon, I., Influx, M., Gutbir, T., & Ebstein, R.P. (2013) Parental oxytocin and early caregiving jointly shape children's oxytocin response and social reciprocity. *Neuropsychopharmacology*, 38(7), 1154-1162. <https://doi.org/10.1038/npp.2013.22>
- Feldman, R., Gordon, I., & Zagoory-Sharon, O. (2010). The cross-generation transmission of oxytocin in humans. *Hormones and Behavior*, 58(4), 669-676. <https://doi.org/10.1016/j.yhbeh.2010.06.005>
- Fernandez-Duque, E.; Valeggia, C. R.; & Mendoza, S. P. (2009). The biology of paternal care in human and nonhuman primates. *Annual Review of Anthropology*, 38(1), 115-130. <https://doi.org/10.1146/annurev-anthro-091908-164334>
- Ferreira, T., Cadima, J., Matias, M., Vieira, J. M., Leal, T., Verschueren, K., & Matos, P. M. (2018). Trajectories of parental engagement in early childhood among dual-earner families: Effects on child self-control. *Developmental Psychology*, 54(4), 731-743. <https://doi.org/10.1037/dev0000458>
- Ferreira, B., Veríssimo, M., Santos, A. J., Fernandes, C., & Cardoso, J. (2011). Escala de sentimento de competência parental: Análise confirmatória do modelo de medida numa amostra de pais portugueses. *Laboratório de Psicologia*, 9(2), 147-155. <http://hdl.handle.net/10400.12/2929>
- Flanders, J. L., Simard, M., Paquette, D., Parent, S., Vitaro, F., Pihl, R. O., & Séguin, J. R. (2010). Rough-and-tumble play and the development of physical aggression and emotion regulation: A five-year follow-up study. *Journal of Family Violence*, 25(4), 357-367. <https://doi.org/10.1007/s10896-009-9297-5>
- Fletcher, R., St George, J., & Freeman, E. (2013). Rough and tumble play quality: theoretical foundations for a new measure of father-child interaction. *Early Child Development and Care*, 183(6), 746-759. <http://dx.doi.org/10.1080/03004430.2012.723439>

- Franklin, L., Soares, I., Sampaio, A., Santos, O., Veríssimo, M. (2003). *Children's Behavior Questionnaire* (Unpublished Manual). ISPA-Instituto Universitário.
- Freeman, H., Newland, L. A., & Coyl, D. D. (2008). Father beliefs as a mediator between contextual barriers and father involvement. *Early Child Development and Care, 178*(7-8), 803-819. <https://doi.org/10.1080/03004430802352228>
- Frodi, A. M., Lamb, M. E., Frodi, M., Hwang, C-P., Forsström, B., & Corry, T. (1982). Stability and change in parental attitudes following an infant's birth into traditional and nontraditional Swedish families. *Scandinavian Journal of Psychology, 23*(1), 53-62. <https://doi.org/10.1111/j.1467-9450.1982.tb00413.x>
- Fuertes, M., Faria, A., Beeghly, M., & Lopes-dos-Santos, P. (2016). The effects of parental sensitivity and involvement in caregiving on mother-infant and father-infant attachment in a Portuguese sample. *Journal of Family Psychology, 30*(1), 147-156. <http://dx.doi.org/10.1037/fam0000139>
- Gaertner, B. M., Spinrad, T. L., Eisenberg, N., & Greving, K. A. (2007). Parental childrearing attitudes as correlates of father involvement during infancy. *Journal of Marriage and Family, 69*(4), 962-976. <https://doi.org/10.1111/j.1741-3737.2007.00424.x>
- Geary, D. C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin, 126*(1), 55-77. <https://doi.org/10.1037/0033-2909.126.1.55>
- Gilmore, L., & Cuskelly, M. (2008). Factor structure of the Parenting Sense of Competence Scale using a normative sample. *Child: Care, health and development, 35*(1), 48-55. <https://doi.org/10.1111/j.1365-2214.2008.00867.x>
- Goldberg, W. A., Clarke-Stewart, K. A., Rice, J. A., & Dellis, E. (2002). Emotional energy as an explanatory construct for fathers' engagement with their infants. *Parenting: Science and Practice, 2*(4), 379-408. https://doi.org/10.1207/S15327922PAR0204_03
- Golden, L. (2008). Limited access: Disparities in flexible work schedules and work-at-home. *Journal of Family Economic Issues, 29*(1), 86-109. <https://doi.org/10.1007/s10834-007-9090-7>
- Grolnick, W. S., Weiss, L., McKenzie, L., & Wrightman, J. (1996). Contextual, cognitive, and adolescent factors associated with parenting in adolescence. *Journal of Youth and Adolescence, 25*(1), 33-54. <https://doi.org/10.1007/BF01537379>
- Grossmann, K., Grossmann, K. E., Fremmer-Bombik, E., Kindler, H., Scheuerer-Englisch, H., & Zimmermann, P. (2002). The uniqueness of the child-father attachment relationship: Fathers' sensitive and challenging play as a pivotal variable in a 16-year longitudinal study. *Social Development, 11*(3), 301- 337. <https://doi.org/10.1111/1467-9507.00202>
- Grossmann, K., Grossmann, K. E., Kindler, H., & Zimmermann, P. (2008). A wider view of attachment and exploration: The influence of mothers and fathers on the development of psychological security from infancy to young adulthood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: theory, research, and clinical applications* (pp. 857-879). The Guilford Press.
- Gryczkowski, M. R., Jordan, S. S., & Mercer, S. H. (2010). Differential relations between mothers' and fathers' parenting practices and child externalizing behavior. *Journal of Child and Family Studies, 19*(5), 539-546. <https://doi.org/10.1007/s10826-009-9326-2>
- Hair, J. F., Jr., & Black, W. C. (2000). Cluster analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 147-205). American Psychological Association.
- Halford, W. K., Petch, J., & Creedy, D. (2015). *Clinical guide to helping new parents: The couple CARE for parents program*. Springer. <https://doi.org/10.1007/978-1-4939-1613-9>
- Hallers-Haalboom, E. T., Mesman, J., Groeneveld, M. G., Endendijk, J. J., van Berkel, S. R., van der Pol, L. D., & Bakermans-Kranenburg, M. J. (2014). Mothers, fathers, sons and

- daughters: Parental sensitivity in families with two children. *Journal of Family Psychology*, 28(2), 138-147. <https://doi.org/10.1037/a0036004>
- Hazen, N. L., McFarland, L., Jacobvitz, D., & Boyd-Soisson, E. (2010). Fathers' frightening behaviours and sensitivity with infants: relations with fathers' attachment representations, father-infant attachment, and children's later outcomes. *Early Child Development and Care*, 180(1-2), 51-69. <https://doi.org/10.1080/03004430903414703>
- Heinze, J. E., Miller, A. L., Seifer, R., Dickstein, S., & Locke, R. L. (2014). Emotion knowledge, loneliness, negative social experiences, and internalizing symptoms among low-income preschoolers. *Social Development*, 24(2), 240-265. <https://doi.org/10.1111/sode.12083>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world?. *The Behavioral and Brain Sciences*, 33(2-3), 61-135. <https://doi.org/10.1017/S0140525X0999152X>
- Hewlett, B. S. (1991). *Intimate fathers: the nature and context of aka pygmy paternal infant care*. University Michigan Press
- Hill, K., & Hurtado, A. M. (1996). *Ache life history: the ecology and demography of a foraging people* (1st ed.). Routledge. <https://doi.org/10.4324/9781351329248>
- Hofferth, S. L., & Anderson, K. G. (2003). Are all dads equal? Biology versus marriage as a basis for paternal investment. *Journal of Marriage and Family*, 65(1), 213-232. <https://doi.org/10.1111/j.1741-3737.2003.00213.x>
- Howard, M. C., & Hoffman, M. E. (2018). Variable-centered, person-centered, and person-specific approaches: Where theory meets the method. *Organizational Research Methods*, 21(4), 846-876. <https://doi.org/10.1177/1094428117744021>
- INE, INE | DGPI/MJ, PORDATA (2022). *Número de divórcios por 100 casamentos*. <https://www.pordata.pt/Portugal/N%c3%bamerode+div%c3%b3rcios+por+100+casamentos-531>.
- INE, PORDATA (2022a). *Taxa de emprego: total e por sexo (%)*. [https://www.pordata.pt/Portugal/Taxa+de+emprego+total+e+por+sexo+\(percentagem\)-549](https://www.pordata.pt/Portugal/Taxa+de+emprego+total+e+por+sexo+(percentagem)-549).
- INE, PORDATA (2022b). *Emprego e mercado de trabalho: Emprego*. <https://www.pordata.pt/Subtema/Portugal/Emprego-10>.
- Jacobs, J. N., & Kelley, M. L. (2006). Predictors of paternal involvement in childcare in dual-earner families with young children. *Fathering: A Journal of Theory, Research, and Practice about Men as Fathers*, 4(1), 23-47. <https://doi.org/10.3149/fth.0401.23>
- Jacobvitz, D., Aviles, A. I., Aquino, G. A., Tian, Z., Zhang, S., & Hazen, N. (2022). Fathers' sensitivity in infancy and externalizing problems in middle childhood: the role of coparenting. *Frontiers in Psychology*, 13, 805188. <https://doi.org/10.3389/fpsyg.2022.805188>
- Jia, R., Kotila, L. E., & Schoppe-Sullivan, S. J. (2012). Transactional relations between father involvement and preschoolers' socioemotional adjustment. *Journal of Family Psychology*, 26(6), 848-857. <https://doi.org/10.1037/a0030245>
- Johnston, C., & Mash, E. J. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology*, 18(2), 167-175. https://doi.org/10.1207/s15374424jccp1802_8
- Jones, T. L., & Prinz, R. J. (2005). Potential roles of parental self-efficacy in parent and child adjustment: A review. *Clinical Psychology Review*, 25(3), 341-363.
- Jong, T. R., Menon, R., Bludau, A., Grund, T., Biermeier, V., Klampfl, S. M., Jurek, B., Bosch, O. J., Hellhammer, J., & Neumann, I. D. (2015). Salivary oxytocin concentrations in response to running, sexual self-stimulation, breastfeeding and the TSST: The Regensburg

- Oxytocin Challenge (ROC) study. *Psychoneuroendocrinology*, 62, 381-388. <https://doi.org/10.1016/j.psyneuen.2015.08.027>
- Kiff, C. J., Lengua, L. J., & Zalewski, M. (2011). Nature and nurturing: parenting in the context of child temperament. *Clinical Child and Family Psychology Review*, 14(3), 251-301. <https://doi.org/10.1007/s10567-011-0093-4>
- Kok, R., Linting, M., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Jaddoe, V. W., Hofman, A., Verhulst, F. C., & Tiemeier, H. (2013). Maternal sensitivity and internalizing problems: evidence from two longitudinal studies in early childhood. *Child Psychiatry and Human Development*, 44(6), 751-765. <https://doi.org/10.1007/s10578-013-0369-7>
- Kokko, H., & Jennions, M. (2003). It takes two to tango. *Trends in Ecology & Evolution*, 18(3), 103-104. [https://doi.org/10.1016/S0169-5347\(03\)00009-0](https://doi.org/10.1016/S0169-5347(03)00009-0)
- Kondo-Ikemura, K., Waters, E. (1987). *Secure base Q-Sort of mother macaques*. Suny Stony Brook.
- Kulik, L., & Sadeh, I. (2015). Explaining fathers' involvement in childcare: An ecological approach. *Community, Work & Family*, 18(1), 19-40. <https://doi.org/10.1080/13668803.2014.944483>
- Kwok, S. Y., & Li, B. K. (2014). A mediation model of father involvement with preschool children in Hong Kong. *Social Indicators Research*, 122(3), 905-923. <https://doi.org/10.1007/s11205-014-0708-5>
- Kwok, S. Y. C. L., Ling, C. C. Y., Leung, C. L. K., & Li, J. C. M. (2013). Fathering self-efficacy, marital satisfaction and father involvement in Hong Kong. *Journal of Child and Family Studies*, 22(8), 1051-1061. <https://doi.org/10.1007/s10826-012-9666-1>
- LaFreniere, P., Strayer, F. F., & Gauthier, R. (1984). The emergence of same-sex affiliative preferences among preschool peers: A developmental/ethological perspective. *Child Development*, 55(5), 1958-1965. <https://doi.org/10.2307/1129942>
- Lamb, M. E. (2000). The history of research on father involvement: An overview. *Marriage & Family Review*, 29(2-3), 23-42. https://doi.org/10.1300/J002v29n02_03
- Lamb, M. E. (2010). How do fathers influence children's development? Let me count the ways. In M. E. Lamb (Ed.), *The role of the father in child development* (5th ed., pp. 1-26). John Wiley & Sons, Inc.
- Lamb, M. E., & Lewis, C. (2010). The development and significance of father-child relationships in two-parent families. In M. E. Lamb (Ed.), *The role of the father in child development*, (5th ed., pp. 94-153). John Wiley & Sons.
- Lamb, M. E., Pleck, J. H., Charnov, E. L., & Levine, J. A. (1985). Paternal behavior in humans. *American Zoologist*, 25(3), 883-894.
- Lamb, M. E., Pleck, J. H., Charnov, E. L., & Levine, J. A. (1987). A biosocial perspective on paternal behavior and involvement. In J. B. Lancaster, J. Altman, A. Rossi, & L. R. Sherrod (Eds.), *Parenting across the lifespan: Biosocial perspectives* (pp. 11-42). Academic Press.
- Lee, J. K., & Schoppe-Sullivan, S. J. (2017). Resident fathers' positive engagement, family poverty, and change in child behavior problems. *Family Relations*, 66(3), 484-496. <https://doi.org/10.1111/fare.12283>
- Lewis, C., & Lamb, M. E. (2003) Fathers' influences on children's development: The evidence from two-parent families. *European Journal Psychology of Education* 18(2), 211-228. <https://doi.org/10.1007/BF03173485>
- Lima, J. (2005). O envolvimento paterno nos processos de socialização da criança. In J. B. Ruivo, *Desenvolvimento: Contextos familiares e educativos* (pp. 200-233). Livpsic.
- Lopes, A. M. (2011). Estudo das qualidades psicométricas do children behavior questionnaire (CBQ) para avaliação do temperamento de crianças portuguesas entre os 3 e os 5 anos [Master Thesis, Universidade do Minho].

- Lucassen, N., Tharner, A., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Volling, B. L., Verhulst, F. C., Lambregtse-Van den Berg, M. P., & Tiemeier, H. (2011). The association between paternal sensitivity and infant-father attachment security: A meta-analysis of three decades of research. *Journal of Family Psychology, 25*(6), 986-992. <https://doi.org/10.1037/a0025855>
- MacDonald, K., & Parke, R.D. (1986). Parent-child physical play: The effects of sex and age of children and parents. *Sex Roles, 15*(7-8), 367-378. <https://doi.org/10.1007/BF00287978>
- Magill-Evans, J., & Harrison, M. J. (2001). Parent-child interactions, parenting stress, and developmental outcomes at 4 years. *Children's Health Care, 30*(2), 135-150. https://doi.org/10.1207/S15326888CHC3002_4
- Malmberg, L.-E., Lewis, S., West, A., Murray, E., Sylva, K., & Stein, A. (2015). The influence of mothers' and fathers' sensitivity in the first year of life on children's cognitive outcomes at 18 and 36 months. *Child: Care Health and Development, 42*(1), 1-7. <https://doi.org/10.1111/cch.12294>
- Manlove, E. E., & Vernon-Feagans, L. (2002). Caring for infant daughters and sons in dual-earner households maternal reports of father involvement in weekday time and tasks. *Infant and Child Development, 11*(4), 305-320. <https://doi.org/10.1002/icd.260>
- Martins, E. C., Soares, I., Martins, C., & Osório, A. (2016). Infants' style of emotion regulation with their mothers and fathers: concordance between parents and the contribution of father-infant interaction quality. *Social Development, 25*(4), 812-827. <https://doi.org/10.1111/sode.12171>
- McBride, B. A., Brown, G. L., Bost, K. K., Shin, N., Vaughn, B., & Korth, B. (2005). Paternal identity, maternal gatekeeping, and father involvement. *Family Relations, 54*(3), 360-372. <https://doi.org/10.1111/j.1741-3729.2005.00323.x>
- McBride, B. A., Schoppe, S. J., & Rane, T. R. (2002). Child characteristics, parenting stress, and parental involvement: Fathers versus mothers. *Journal of Marriage and Family, 64*(4), 998-1011. <https://doi.org/10.1111/j.1741-3737.2002.00998.x>
- McEachern, A. D., Dishion, T. J., Weaver, C. M., Shaw, S., Wilson, M. N., & Gardner, F. (2012). Parenting Young Children (PARYC): Validation of a self-report parenting measure. *Journal of Child and Family Studies, 21*(3), 498-511. <https://doi.org/10.1007/s10826-011-9503-y>
- Mehall, K. G., Spinrad, T. L., Eisenberg, N., & Gaertner, B. M. (2009). Examining the relations of infant temperament and couples' marital satisfaction to mother and father involvement: A longitudinal study. *Fathering: A Journal of Theory, Research, and Practice about Men as Fathers, 7*(1), 23-48. <https://doi.org/10.3149/fth.0701.23>
- Meuwissen, A. S., & Carlson, S. M. (2018). The role of father parenting in children's school readiness: A longitudinal follow-up. *Journal of Family Psychology, 32*(5), 588-598. <https://doi.org/10.1037/fam0000418>
- Mills-Koonce, W. R., Willoughby, M. T., Zvara, B., Barnett, M., Gustafsson, H., Cox, M. J., & Family Life Project Key Investigators (2015). Mothers' and fathers' sensitivity and children's cognitive development in low-income, rural families. *Journal of Applied Developmental Psychology, 38*, 1-10. <https://doi.org/10.1016/j.appdev.2015.01.001>
- Monteiro, L., Fernandes, M., Torres, N., & Santos, C. (2017). Father's involvement and parenting styles in Portuguese families: The role of education and working hours. *Análise Psicológica, 35*(4), 513-528. <https://doi.org/10.14417/ap.1451>
- Monteiro, L., Fernandes, M., Veríssimo, M., Pessoa e Costa, I., Torres, N., & Vaughn, B. E. (2010). Perspectiva do pai acerca do seu envolvimento em famílias nucleares. Associações com o que é desejado pela mãe e com as características da criança. *Revista Interamericana de Psicología, 44*(1), 120-130.

- Monteiro, L., Maia, R., Fernandes, C., Fernandes, M., Antunes, M., & Veríssimo, M. (2019a). Uma análise exploratória das relações entre as representações de vinculação do pai e o seu envolvimento em atividades práticas e lúdicas. *Análise Psicológica*, 37(4), 507-519. <https://doi.org/10.14417/ap.1536>
- Monteiro, L., Torres, N., & Salinas-Quiroz, F. (2019b). Preditores do envolvimento paterno numa amostra de famílias portuguesas. O papel das crenças parentais. *Suma Psicológica*, 26(2), 94-102. <https://doi.org/10.14349/sumapsi.2019.v26.n2.5>
- Monteiro, L., Torres, N., Veríssimo, M., Pessoa e Costa, I., & Freitas, M. (2015). Análise fatorial confirmatória do questionário “O Papel do Pai” numa amostra de pais e mães portuguesas. *Análise Psicológica*, 33(1), 113-120. <https://doi.org/10.14417/ap.998>
- Monteiro, L., Veríssimo, M., & Pessoa e Costa, I. (2008). *Parental Involvement Questionnaire: Child Care and Socialization Related Tasks* (Unpublished Manual). ISPA-Instituto Universitário.
- Muthén, B., & Muthén, L. K. (2000). Integrating person-centered and variable-centered analyses: growth mixture modeling with latent trajectory classes. *Alcoholism: Clinical and Experimental Research*, 24(6), 882-891. <https://doi.org/10.1111/j.1530-0277.2000.tb02070.x>
- Nangle, S. M., Kelley, M. L., Fals-Stewart, W., & Levant, R. F. (2003). Work and family variables as related to paternal engagement, responsibility, and accessibility in dual-earner couples with young children. *Fathering: A Journal of Theory, Research and Practice About Men as Fathers*, 1(1), 71-90. <https://doi.org/10.3149/fth.0101.71>
- National Institute of Child Health & Human Development, Early Child Care Research Network. (1999). Child care and mother-child interaction in the first three years of life. *Developmental Psychology*, 35(6), 1399-1413. <https://doi.org/10.1037/0012-1649.35.6.1399>
- National Institute of Child Health & Human Development, Early Child Care Research Network. (2000). Factors associated with fathers' caregiving activities and sensitivity with young children. *Journal of Family Psychology*, 14(2), 200-219. <https://doi.org/10.1037/0893-3200.14.2.200>
- National Institute of Child Health & Human Development, Early Child Care Research Network. (2005). *Child care and child development: Results from the NICHD study of early child care and youth development*. The Guilford Press.
- Nelson, T. J. (2004). Low-income fathers. *Annual Review of Sociology*, 30, 427-451. <https://doi.org/10.1146/annurev.soc.29.010202.095947>
- Nievar, M. A., Ramisetty-Mikler, S., Saleh, M. F., & Cabrera, N. (2020). Families offering children unfailing support (FOCUS) fatherhood program: changing child welfare through child support and parenting skills. *Children and Youth Services Review*, 118(3), 105321. <https://doi.org/10.1016/j.chilyouth.2020.105321>
- Novo, R. M. R., & Prada, A. R. R. (2015). Retratos do envolvimento paterno com crianças em idade pré-escolar na cidade de Bragança. *EDUSER: Revista de Educação*, 7(2), 62.
- Ohan, J. L., Leung, D. W., & Johnston, C. (2000). The parenting sense of competence scale: Evidence of a stable factor structure and validity. *Canadian Journal of Behavioural Science*, 32(4), 251-261. <https://doi.org/10.1037/h0087122>
- Organization for Economic Co-operation and Development. (2019). *Children in households by employment status*. www.oecd.org/els/family/database.htm.
- Page, M. J., & Higgins, J. P. T. (2016). Rethinking the assessment of risk of bias due to selective reporting: A cross-sectional study. *Systematic Reviews*, 5(1), 108. <https://doi.org/10.1186/s13643-016-0289-2>

- Palkovitz, R. (1984). Parental attitudes and fathers' interactions with their 5-month-old infants. *Developmental Psychology*, 20(6), 1054-1060. <https://doi.org/10.1037/0012-1649.20.6.1054>
- Palkovitz, R. (1997). Reconstructing "involvement:" Expanding conceptualizations of men's caring in contemporary families. In A. J. Hawkins & D. C. Dollahite (Eds.), *Generative fathering: Beyond deficit perspectives* (pp. 200-206). Sage.
- Palkovitz, R. (2002). *Involved fathering and men's adult development*. Lawrence Erlbaum Associates. <https://doi.org/10.4324/9781410613059>
- Palkovitz, R. (2019). Expanding our focus from father involvement to father-child relationship quality. *Journal of Family Theory & Review*, 11(4), 576-591. <https://doi.org/10.1111/jftr.12352>
- Paquette, D. (2004). Theorizing the father-child relationship: Mechanisms and developmental outcomes. *Human Development*, 47(4), 193-219. <https://doi.org/10.1159/000078723>
- Paquette, D., Bolté, C., Turcotte, G., Dubeau, D., & Bouchard, C. (2000). A new typology of fathering: Defining and associated variables. *Infant and Child Development: An International Journal of Research and Practice*, 9(4), 213-230. [https://doi.org/10.1002/1522-7219\(200012\)9:4<213::AID-ICD233>3.0.CO;2-0](https://doi.org/10.1002/1522-7219(200012)9:4<213::AID-ICD233>3.0.CO;2-0)
- Parke, R. D. (1996). *Fatherhood*. Harvard University Press.
- Parke, R. D. (2000). Father involvement: A developmental psychological perspective. *Journal of Marriage & Family Review*, 29(2-3), 43-58. https://doi.org/10.1300/J002v29n02_04
- Parten, M. B. (1932). Social participation among pre-school children. *The Journal of Abnormal and Social Psychology*, 27(3), 243-269. <https://doi.org/10.1037/h0074524>
- Pedro, M. F., Carapito, E., & Ribeiro, T. (2015). Parenting styles and dimensions questionnaire—versão portuguesa de autorrelato. *Psicologia: Reflexão e Crítica*, 28(2), 302-312. <https://doi.org/10.1590/1678-7153.201528210>
- Pérez, J., Lorence, B., and Menéndez, S. (2010). Estrés y competencia parental: Un estudio con madres y padres trabajadores. *Suma Psicológica*, 17(1), 47-57.
- Peterson, J.B., & Flanders, J.L. (2005). Play and the regulation of aggression. In R. E. Tremblay, J. Archer, & W.W. Hartup (Eds.), *Developmental origins of aggression* (pp. 133-157). Guilford Press.
- Pinquart, M., & Kauser, R. (2018). Do the associations of parenting styles with behavior problems and academic achievement vary by culture? Results from a meta-analysis. *Cultural Diversity and Ethnic Minority Psychology*, 24(1), 75-100. <https://doi.org/10.1037/cdp0000149>
- Planalp, E. M., & Braungart-Rieker, J. M. (2016). Determinants of father involvement with young children: Evidence from the early childhood longitudinal study-birth cohort. *Journal of Family Psychology*, 30(1), 135-146. <https://doi.org/10.1037/fam0000156>
- Pleck, J. H. (1997). Paternal involvement: Levels, sources, and consequences. In M. E. Lamb (Ed.), *The role of the father in child development* (3rd ed., pp. 66-103). John Wiley & Sons.
- Pleck, J. H. (2010). Paternal involvement: Revised conceptualization and theoretical linkages with child outcomes. In M. E. Lamb (Ed.), *The role of the father in child development* (5th ed., pp. 58-93). John Wiley & Sons, Inc.
- Pleck, J. H., & Masciadrelli, B. P. (2004). Paternal involvement by U.S. residential fathers: Levels, sources, and consequences. In M. E. Lamb (Ed.), *The role of the father in child development* (4th ed., pp. 222-271). John Wiley & Sons, Inc.
- Porter, C. L., Hart, C. H., Yang, C., Robinson, C. C., Olsen, S. F., Zeng, Q., Olsen, J. A., & Jin, S. (2005). A comparative study of child temperament and parenting in Beijing, China and the western United States. *International Journal of Behavioral Development*, 29(6), 541-551. <https://doi.org/10.1080/01650250500147402>

- Posada, G., Kaloustian, G., Richmond, M. K., & Moreno, A. J. (2007). Maternal secure base support and preschoolers' secure base behavior in natural environments. *Attachment & Human Development, 9*(4), 393-411. <https://doi.org/10.1080/14616730701712316>
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the children's behavior questionnaire. *Journal of Personality Assessment, 87*(1), 102-112. https://doi.org/10.1207/s15327752jpa8701_09
- Raley, S., & Bianchi, S. (2006). Sons, daughters, and family processes: Does gender of children matter?. *Annual Review of Sociology, 32*, 401-421. <https://doi.org/10.1146/annurev.soc.32.061604.123106>
- Rentzou, K., Gol-Guven, M., Koumariou, A., & Cabi, N. (2019). Exploring paternal involvement from Greek, Greek-Cypriot and Turkish fathers' and mothers' perspectives: Cross-national differences and similarities. *Global Education Review, 6*(1), 5-25.
- Robinson, C. C., Mandlco, B., Olsen, S. F., & Hart, C. H. (2001). The parenting styles and dimensions questionnaire (PSDQ). In B. F. Perlmutter, J. Touliatos, & G. W. Holden (Eds.), *Handbook of Family Measurement Techniques: Vol. 3. Instruments & Index* (pp. 319-321). Sage.
- Robles, T. F., Sharma, R., Harrell, L., Elashoff, D. A., Yamaguchi, M., & Shetty, V. (2013). Saliva sampling method affects performance of a salivary α -amylase biosensor. *American Journal of Human Biology, 25*(6), 719-724. <https://doi.org/10.1002/ajhb.22438>
- Rodrigues, M., Sokolovic, N., Madigan, S., Luo, Y., Silva, V., Misra, S., & Jenkins, J. (2021). Paternal sensitivity and children's cognitive and socioemotional outcomes: A meta-analytic review. *Child Development, 92*(2), 554-577. <https://doi.org/10.1111/cdev.13545>
- Roeters, A. T., Van Der Lippe, T., & Kluwer, E. S. (2010). Parental work demands and the frequency of child-related routine and interactive activities. *Journal of Marriage and Family, 71*(5), 1193-1204. <https://doi.org/10.1111/j.1741-3737.2009.00663.x>
- Rollè, L., Gullotta, G., Trombetta, T., Curti, L., Gerino, E., Brustia, P., & Calderera, A. M. (2019). Father involvement and cognitive development in early and middle childhood: A systematic review. *Frontiers in Psychology, 10*, 2405. <https://doi.org/10.3389/fpsyg.2019.02405>
- Rothbart, M. K., & Ahadi, S. A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology, 103*(1), 55-66. <https://doi.org/10.1037/0021-843X.103.1.55>
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology, 78*(1), 122-135. <https://doi.org/10.1037/0022-3514.78.1.122>
- Rothbart, M. K., Ahadi, S. A., & Hershey, K. L. (1994). Temperament and social behavior in childhood. *Merrill-Palmer Quarterly, 40*(1), 21-39.
- Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology, 60*(1), 141-171. <https://doi.org/10.1146/annurev.psych.60.110707.163642>
- Rutigliano, G., Rocchetti, M., Paloyelis, Y., Gilleen, J., Sardella, A., Cappucciati, M., Palombini, E., Dell'Osso, L., Caverzasi, E., Politi, P., McGuire, P., & Fusar-Poli, P. (2016). Peripheral oxytocin and vasopressin: Biomarkers of psychiatric disorders? A comprehensive systematic review and preliminary meta-analysis. *Psychiatry Research, 241*, 207-220. <https://doi.org/10.1016/j.psychres.2016.04.117>
- Sabbagh, M. A., Xu, F., Carlson, S. M., Moses, L. J., & Lee, K. (2006). The development of executive functioning and theory of mind: A comparison of Chinese and U.S. preschoolers. *Psychological Science, 17*(1), 74-81. <https://doi.org/10.1111/j.1467-9280.2005.01667.x>

- Santos, C., Monteiro, L., Torres, N., & Tereno, S. (2021) Implication paternelle chez des enfants d'âge préscolaire. Contributions des styles parentaux et de l'affectivité négative de l'enfant. *Devenir*, 33(3), 221-240. <https://doi.org/10.3917/dev.213.0221>
- Sarkadi, A., Kristiansson, R., Oberklaid, F. and Bremberg, S. (2008), Fathers' involvement and children's developmental outcomes: a systematic review of longitudinal studies. *Acta Paediatrica*, 97(2), 153-158. <https://doi.org/10.1111/j.1651-2227.2007.00572.x>
- Scatliffe, N., Casavant, S., Vittner, D., & Cong, X. (2019). Oxytocin and early parent-infant interactions: A systematic review. *International Journal of Nursing Sciences*, 6(4), 445-453. <https://doi.org/10.1016/j.ijnss.2019.09.009>
- Schoppe-Sullivan, S. J., Brown, G. L., Cannon, E. A., Mangelsdorf, S. C., & Sokolowski, M. S. (2008). Maternal gatekeeping, co-parenting quality, and fathering behavior in families with infants. *Journal of Family Psychology*, 22(3), 389-398. <https://doi.org/10.1037/0893-3200.22.3.389>
- Schoppe-Sullivan, S. J., Diener, M. L., Mangelsdorf, S. C., Brown, G. L., McHale, J. L., & Frosch, C. A. (2006). Attachment and sensitivity in family context: The roles of parent and infant gender. *Infant and Child Development*, 15(4), 367-385. <https://doi.org/10.1002/icd.449>
- Schoppe-Sullivan, S. J., & Fagan, J. (2020). The evolution of fathering research in the 21st century: Persistent challenges, new directions. *Journal of Marriage and Family*, 82(1), 175-197. <https://doi.org/10.1111/jomf.12645>
- Schoppe-Sullivan, S. J., Kotila, L., Jia, R., Lang, S. N., & Bower, D. J. (2013) Comparisons of levels and predictors of mothers' and fathers' engagement with their preschool-aged children. *Early Child Development and Care*, 183(3-4), 498-514, <https://doi.org/10.1080/03004430.2012.711596>
- Schoppe, S. J. (2001). *What is a father?* Unpublished manuscript, University of Illinois at Urbana-Champaign.
- Shannon, J. D., Tamis-LeMonda, C. S., London, K., & Cabrera, N. (2002). Beyond rough and tumble: Low-income fathers' interactions and children's cognitive development at 24 months. *Parenting: Science and Practice*, 2(2), 77-104. https://doi.org/10.1207/S15327922PAR0202_01
- Shmueli, G. (2010). "To Explain or to Predict?". *Statistical Science*, 25(3), 289-310. <https://doi.org/10.1214/10-STS330>
- Smith, P.K. (2010). Physical activity play: Exercise play and rough-and-tumble. In P.K. Smith (Ed.), *Children and play: Understanding children's worlds* (pp. 99-123). Wiley-Blackwell.
- St George, J., Fletcher, R., & Palazzi, K. (2017). Comparing fathers' physical and toy play and links to child behaviour: an exploratory study. *Infant and Child Development*, 26(1), e1958. <https://doi.org/10.1002/icd.1958>
- St George, J., & Freeman, E. (2017). Measurement of father-child rough-and-tumble play and its relations to child behavior. *Infant Mental Health Journal*, 38(6), 709-725. <https://doi.org/10.1002/imhj.21676>
- St George, J. M., Goodwin, J. C., & Fletcher, R. J. (2018). Parents' views of father-child rough-and-tumble play. *Journal of Child and Family Studies*, 27(5), 1502-1512. <https://doi.org/10.1007/s10826-017-0993-0>
- Szymanska, M., Schneider, M., Chateau-Smith, C., Nezelof, S., & Vulliez-Coady, L. (2017). Psychophysiological effects of oxytocin on parent-child interactions: A literature review on oxytocin and parent-child interactions. *Psychiatry and Clinical Neurosciences*, 71(10), 690-705. <https://doi.org/10.1111/pcn.12544>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed). Allyn & Bacon/Pearson Education.

- Tabachnick, A. R., Raby, K. L., Goldstein, A., Zajac, L., & Dozier, M. (2019). Effects of an attachment-based intervention in infancy on children's autonomic regulation during middle childhood. *Biological Psychology*, *143*, 22-31. <https://doi.org/10.1016/j.biopsycho.2019.01.006>
- Tamis-LeMonda, C. S., Shannon, J. D., Cabrera, N. J., & Lamb, M. E. (2004). Fathers and mothers at play with their 2- and 3-year-olds: contributions to language and cognitive development. *Child Development*, *75*(6), 1806-1820. <https://doi.org/10.1111/j.1467-8624.2004.00818.x>
- Tan, O., Musullulu, H., Raymond, J. S., Wilson, B., Langguth, M., & Bowen, M. T. (2019). Oxytocin and vasopressin inhibit hyper-aggressive behaviour in socially isolated mice. *Neuropharmacology*, *156*, 107573. <https://doi.org/10.1016/j.neuropharm.2019.03.016>
- Torres, N., Martins, D., Monteiro, L., Santos, A. J., Vaughn, B. E., & Veríssimo, M. (2022). Salivary oxytocin after play with parents predicts behavioural problems in preschool children. *Psychoneuroendocrinology*, *136*, 105609. <https://doi.org/10.1016/j.psyneuen.2021.105609>
- Torres, N., Martins, D., Santos, A. J., Prata, D., & Veríssimo, M. (2018). How do hypothalamic neuropeptides shape youth's sociality? A systematic review on oxytocin, vasopressin and human socio-emotional development. *Neuroscience & Biobehavioral Reviews*, *90*, 309-331. <https://doi.org/10.1016/j.neubiorev.2018.05.004>
- Torres, N., Veríssimo, M., Monteiro, L., Ribeiro, O., & Santos, A. J. (2014). Domains of father involvement, social competence and problem behavior in preschool children. *Journal of Family Studies*, *20*(3), 188-203. <https://doi.org/10.1080/13229400.2014.11082006>
- Torres, N., Veríssimo, M., Monteiro, L., Santos, A. J., & Pessoa e Costa, I. (2012). Father involvement and peer play competence in preschoolers: The moderating effect of the child's difficult temperament. *Family Science*, *3*(3-4), 174-188. <https://doi.org/10.1080/19424620.2012.783426>
- Towe-Goodman, N. R., Willoughby, M., Blair, C., Gustafsson, H. C., Mills-Koonce, W. R., Cox, M. J., & Family Life Project Key Investigators (2014). Fathers' sensitive parenting and the development of early executive functioning. *Journal of Family Psychology*, *28*(6), 867-876. <https://doi.org/10.1037/a0038128>
- Valstad, M., Alvares, G. A., Egknud, M., Matziorinis, A. M., Andreassen, O. A., Westlye, L. T., & Quintana, D. S. (2017). The correlation between central and peripheral oxytocin concentrations: A systematic review and meta-analysis. *Neuroscience and Biobehavioral Reviews*, *78*, 117-124. <https://doi.org/10.1016/j.neubiorev.2017.04.017>
- van Bakel, H. J. A., & Hall, R. A. S. (2020). The father-infant relationship beyond caregiving sensitivity. *Attachment & Human Development*, *22*(1), 27-31. <https://doi.org/10.1080/14616734.2019.1589058>
- van IJzendoorn, M. H., & De Wolff, M. S. (1997). In search of the absent father-meta-analyses of infant-father attachment: A rejoinder to our discussants. *Child Development*, *68*(4), 604-609. <https://doi.org/10.2307/1132112>
- Volling, B. L., & Belsky, J. (1991). Multiple determinants of father involvement during infancy in dual-earner and single-earner families. *Journal of Marriage and the Family*, *53*(2), 461-474. <https://doi.org/10.2307/352912>
- Volling, B. L., & Cabrera, N. J. (2019). Advancing research and measurement on fathering and child development: Introducing the issues and a conceptual framework. In B. L. Volling & N. J. Cabrera (Eds.), *Advancing research and measurement on fathering and children's development. Monographs of the Society for Research in Child Development*, *84*(1), 7-17. <https://doi.org/10.1002/mono.12404>
- Wall, K., Cunha, V., Atalaia, S., Rodrigues, L., Correia, R., Correia, S. V., & Rosa, R. (2016a). *Livro branco: Homens e igualdade de género em Portugal*. Instituto de Ciências Sociais da

- Universidade de Lisboa & Comissão para a Igualdade no Trabalho e no Emprego (Eds.).
Editorial do Ministério da Educação e da Ciência.
- Wall, K., Leitão, M., Correia, S. V., & Ramos, V. (2016b). *Políticas de família em 2014 e 2015: principais desenvolvimentos*. Observatório das Famílias e das Políticas de Família - Relatório 2014-2015. Observatórios do Instituto de Ciências Sociais da Universidade de Lisboa
- Waters, E., & Cummings, E. M. (2000). A secure base from which to explore close relationships. *Child Development*, *71*(1), 164-172. <https://doi.org/10.1111/1467-8624.00130>
- Waters, E., & Sroufe, L. A. (1983). Social competence as a developmental construct. *Developmental Review*, *3*(1), 79-97. [https://doi.org/10.1016/0273-2297\(83\)90010-2](https://doi.org/10.1016/0273-2297(83)90010-2)
- Yeung, W. J., Sandberg, J. F., Davis-Kean, P. E., & Hofferth, S. L. (2001). Children's time with fathers in intact families. *Journal of Marriage and Family*, *63*(1), 136-154. <https://doi.org/10.1111/j.1741-3737.2001.00136.x>
- Zvara, B. J., Sheppard, K. W., & Cox, M. (2018). Bidirectional effects between parenting sensitivity and child behavior: A cross-lagged analysis across middle childhood and adolescence. *Journal of Family Psychology*, *32*(4), 484-495. <https://doi.org/10.1037/fam0000372>