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TRAJECTORY AND DETERMINANTS OF SEXUAL WELL-BEING IN THE TRANSITION TO PARENTHOOD: A COUPLE-CENTERED APPROACH

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**TRAJECTORY AND DETERMINANTS OF SEXUAL WELL-BEING IN
THE TRANSITION TO PARENTHOOD: A COUPLE-CENTERED
APPROACH**

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RESUMO

Cerca de 90% dos casais numa relação de compromisso fará a transição para a parentalidade em algum momento da sua relação. A gravidez e o pós-parto são considerados períodos de vulnerabilidade para o bem-estar sexual dos casais, sendo frequente surgirem dificuldades sexuais (e.g., *distress* sexual, baixo desejo, dor genital) que podem iniciar-se na gravidez e persistir até 12 meses pós-parto. O bem-estar sexual é uma dimensão crítica para a qualidade e longevidade das relações de casal e está associado a melhores índices de saúde global e qualidade de vida. Contudo, o conhecimento acerca de fatores associados com o início e com a persistência de problemas sexuais perinatais é pouco robusto e, atualmente, não existem intervenções baseadas em evidência focadas no bem-estar sexual desta população. O presente trabalho visa compreender processos psicológicos intra- e interpessoais envolvidos no bem-estar sexual dos casais durante a transição para a parentalidade. Com base em modelos de ajustamento diádico e modelos cognitivo-afetivos de resposta sexual, apresentamos cinco estudos que investigam de que forma padrões de interdependência entre as experiências de casal contribuem para o bem-estar sexual durante este período. Recolhemos dados de amostras de casais durante a gravidez e após o parto (total $n = 512$ casais) usando desenhos diádicos transversais e longitudinais. Os resultados destes estudos indicam a presença de vários mecanismos interpessoais (e.g., padrões de [des]semelhança cognitivo-afetiva intradiade, bidirecionalidade entre dimensões de bem-estar sexual e relacional) que contribuem para índices de bem-estar sexual (e.g., função sexual, satisfação sexual, *distress* sexual) durante a gravidez e no pós-parto, de forma transversal e longitudinal. Adicionalmente, identificamos classes de casais com trajetórias de bem-estar sexual distintas ao longo do tempo e examinamos o contributo de determinantes biológicos, psicológicos e relacionais para a pertença a estas trajetórias. Os resultados desta tese contribuem para uma maior compreensão dos processos interpessoais envolvidos no bem-estar sexual em períodos críticos de vida, bem como para o desenvolvimento de intervenções baseadas em evidência para promover o bem-estar sexual desta população.

ABSTRACT

Nearly 90% of committed couples become parents and, across the transition to parenthood, most new parents experience novel sexual difficulties (e.g., sexual distress, low desire, genital pain) that may begin in pregnancy and persist up to 12-months postpartum. Sexual well-being is critical to the quality and longevity of couples' romantic relationships and is associated with greater general health and quality of life. The transition to parenthood is a vulnerable period for sexual well-being, but minimal research has identified factors associated with the onset and persistence of perinatal sexual problems and there are currently no evidence-based interventions focused on sexual well-being for new parent couples. This work seeks to understand psychological intra- and interpersonal processes involved in couples' sexual well-being across the transition to parenthood. Informed by models of relationship adjustment and cognitive-affective models of sexual response, we present five studies that investigate whether and how patterns of interdependence between expectant and new parent couples' experiences contribute to their sexual outcomes across this period. We collected data from samples of expectant and new parent couples (total $n = 512$ couples) using cross-sectional and longitudinal dyadic designs. Results of these studies indicate the presence of several interpersonal mechanisms (e.g., within-couple cognitive-affective [dis]similarity patterns, bidirectionality between sexual and relational dimensions) that are relevant to sexual outcomes (e.g., sexual function, sexual satisfaction, sexual distress) in pregnancy and at postpartum, both cross-sectionally and over time. We also identify dyadic classes experiencing distinct sexual well-being trajectories over time and provide evidence for the interplay between biological, psychological, and relational determinants of such trajectories. Implications of this research include greater understanding of the interpersonal processes involved in sexual well-being across critical life periods as well as informing the development of evidence-based interventions for couples during the vulnerable yet normative life stage of the transition to parenthood.

RESUMÉ

Près de 90% des couples compromis deviennent parents et, pendant la transition vers la parentalité, les nouveaux parents éprouvent de nouvelles difficultés sexuelles (e.g., détresse sexuelle, faible désir, douleur génitale) qui peuvent commencer pendant la grossesse et persister jusqu'à 12 mois post-partum. Le bien-être sexuel est essentiel à la qualité et à la longévité des relations amoureuses et est associé à une meilleure santé générale et qualité de vie. Peu de recherches ont identifié les facteurs associés à l'apparition et persistance des problèmes sexuels périnataux et il n'existe actuellement aucune intervention basée sur l'évidence sur le bien-être sexuel de nouveaux parents. Ce travail cherche à comprendre les processus psychologiques intra- et interpersonnels impliqués dans le bien-être sexuel des couples lors de la transition vers la parentalité. Sur la base de modèles d'ajustement de la relation et modèles cognitifs-affectifs de la réponse sexuelle, nous présentons cinq études qui examinent si et comment les modèles d'interdépendance entre les expériences de futurs et de nouveaux parents contribuent à leurs résultats sexuels. Nous avons recueilli des données auprès de futurs et de nouveaux parents (total $n = 512$ couples) en utilisant des modèles dyadiques transversaux et longitudinaux. Les résultats de ces études indiquent la présence de plusieurs mécanismes interpersonnels (e.g., des modèles de [dés]similarité cognitive-affective au sein du couple, la bidirectionnalité entre les dimensions sexuelles et relationnelles) qui sont pertinents pour les résultats sexuels (e.g., fonction, satisfaction et détresse sexuelles) pendant la grossesse et le post-partum, transversalement et longitudinalement. Nous identifions également des classes de dyades qui connaissent des trajectoires distinctes de bien-être sexuel au fil du temps et nous fournissons des preuves de l'interaction entre les déterminants biologiques, psychologiques, et relationnels de ces trajectoires. Les implications de cette recherche comprennent une meilleure compréhension des processus interpersonnels impliqués dans le bien-être sexuel au cours des périodes critiques de la vie ainsi que l'élaboration d'interventions fondées sur l'évidence pour les couples au cours de la transition vers la parentalité.

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I now realize that this thesis represents a scientific as well as a personal ode to
interdependence.

CO-AUTHORSHIP DECLARATION

This dissertation comprises five empirical studies presented as scientific reports in separate chapters, along with introductory and concluding chapters. Versions of these publications are either published elsewhere or are in revision/submitted. In all instances, the data analysis, interpretation, and manuscript preparation were performed by the author of this dissertation (Inês M. Tavares).

The co-authors listed were involved in conception and design, revisions, and final approval of the manuscripts (Hera Schlagintweit, Julia R. Heiman, Natalie O. Rosen, Pedro J. Nobre, and Tânia Barros). I certify that I have obtained permission from all co-authors to include the below published materials in my thesis.

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INTRODUCTION

Becoming a parent represents a major life transition, with nearly 90% of all committed couples having children at some point in their relationships (Cowan & Cowan, 2012). Welcoming a new being into the family, especially when the child is a firstborn, can be experienced as an exciting and joyful event, but it can also represent one of the most vulnerable and stressful periods in life. In Portugal, approximately 85,000 individuals become parents each year (Instituto Nacional de Estatística, 2021). Of those new parents, 13% are likely to break up their couple relationship within the first year after their baby's birth (Lichter et al., 2016), highlighting the critical implications of this period for the well-being of individuals, couples, and for the subsequent well-being and stability of their families.

The transition to parenthood—the period ranging from pregnancy up to one-year postpartum—imposes both expected and unexpected changes for new parents, as their identities, roles, tasks, and routines are quickly altered. One of such dimensions of change is related to new parents' (as individuals) and new parent couples' (as dyads) sexual lives. Most new parents will experience novel sexual concerns and problems (e.g., sexual distress, low desire, genital pain) that may begin in pregnancy and persist up to 12-months postpartum (i.e., the perinatal period) and beyond (Fitzpatrick et al., 2021). At the individual and couple levels, poorer sexual well-being is associated with poorer general health and quality of life and has also been linked with perinatal anxiety and depression, relational conflict and dissolution, and less sensitive parenting (e.g., Diamond & Huebner, 2012; Sprecher & Cate, 2004), all of which can affect the socioemotional development of children. At the societal level, perinatal sexual problems are linked with increased health service utilization (Bernhard, 2002), which in turn contributes to rising healthcare costs. Still, minimal research has identified factors associated with the onset and persistence of perinatal sexual problems and there are currently no evidence-based interventions focused on sexual well-being for new parent couples. This is critical given the high prevalence of sexual concerns in new parents and the importance of sexual well-being to their overall well-being.

The current work aims to contribute to understanding of which individuals and couples are at most risk for, and what factors protect against, poorer perinatal sexual well-being. Based on a psychological and relational perspective, we also aim to clarify key

mechanisms that contribute to maintaining sexual well-being across this critical life transition. This thesis is organized into nine chapters and presents contributions from five empirical studies with the overarching aim of addressing these central research goals. The first two chapters describe the theoretical background for developing this thesis. In Chapter I, I present a definition of sexual well-being, describe the links between sexual well-being and individual and relational outcomes, and argue for the importance of integrating sex and relationship research to achieve a fuller understanding of couples' sexual adjustment to critical life transitions. In Chapter II, I describe the transition to parenthood as a vulnerability stage for sexual well-being and present up-to-date evidence documenting the contribution of biopsychosocial factors to couples' sexual well-being across the perinatal period. In Chapter III, I present and discuss methodological aspects that crossed over the entire project. Then, from Chapters IV to VIII, I describe in detail the five empirical studies whose title and general contributions are presented in Figure 1. Together, the resulting findings of these studies provide further comprehension of the interdependent contributions of the pregnant/birthing partner's and the non-birthing partner's experiences in terms of the course(s) and determinants of their own and their partners' sexual well-being across the transition to parenthood. This thesis concludes, in Chapter IX, with a general discussion of the conducted research, highlighting the main findings, practical implications, limitations, and directions for future research.

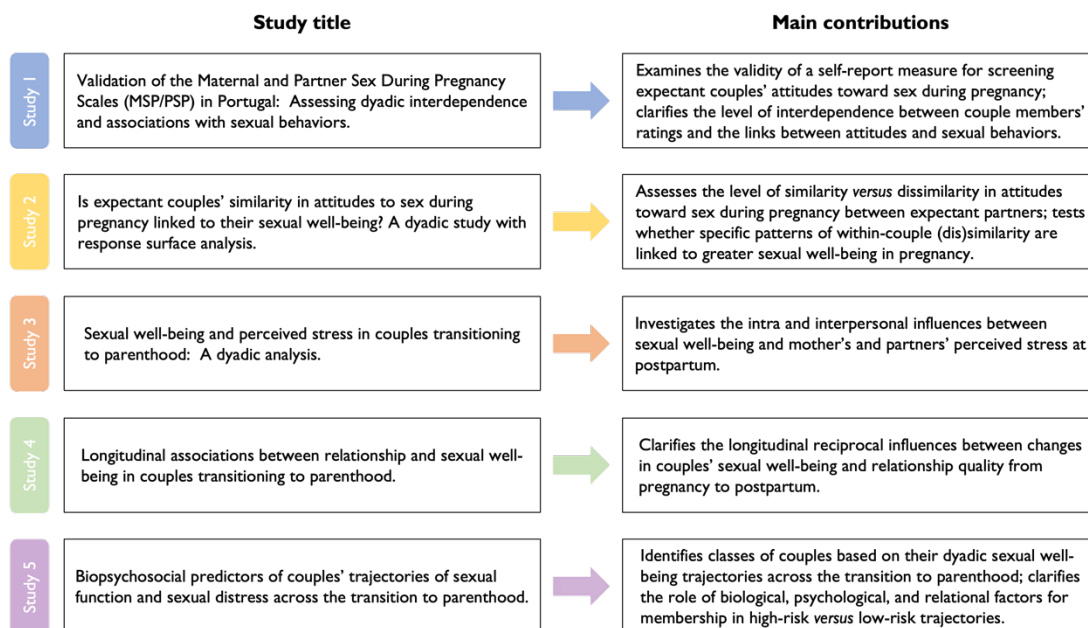


Figure 1. Title and main contributions of each empirical study.

CHAPTER I. SEXUAL WELL-BEING IN INDIVIDUAL AND RELATIONAL CONTEXTS

I. The importance of sexual well-being to overall well-being

Sexual well-being—defined as a positive and pleasurable experience of the physical, emotional, mental, and social aspects of one’s sexuality (Diamond & Huebner, 2012; Mitchell et al., 2021; World Health Organization, 2002)—is intricately linked to both physical and mental well-being. The critical link between sexual well-being and overall well-being (i.e., the subjective state of being comfortable, healthy, or happy; Diener, 1984) has been consistently proposed by scholars and health care professionals across various disciplines (e.g., medicine, psychology, public health) and is supported by a strong body of empirical evidence spanning different contexts, populations, and life stages. Historically, however, the study of sexuality has focused more on its adverse health outcomes and concomitant risks and less on the positive, normative, and pleasurable dimensions of sexual experiences (Diamond & Huebner, 2012). Throughout history—and even today in particular geographical contexts—recommendations and approaches to sexuality have preferred a framework of “less is better”, based on the premise that sex has inevitable risks and, thus, the best way to reduce those risks is to recommend a reduction in sex. This idea is present on societal and public health messages conveying that the central health-relevant aspect of sexuality is its potential for risk, overlooking the potential benefits of positive sexual experiences.

In recent years, authors have claimed that a paradigm shift in the conceptualization and in the study of sexuality is needed, in which sexual pleasure and satisfaction are considered central elements of general physical and psychological outcomes (Diamond & Huebner, 2012; Mitchell et al., 2021). According to this view, the promotion of sexual well-being (rather than the minimization of sexually related risks) should therefore be a fundamental goal of research and clinical approaches to sexuality, as accumulated evidence supports that positive sexual experiences can indeed confer individuals with some protection in terms of their physical and psychological outcomes across the life course.

1.1. Sexual well-being and individual outcomes

Over the last decades, strong empirical evidence has shown that greater sexual well-being can be considered a critical contributor to one's own overall well-being. Individuals who engage in regular sexual activity have better health outcomes as measured in large-scale, cross-sectional observational studies. Longitudinal prospective studies following cohorts of women and men over time (over the course of 5, 10, 14 years, or until death) also indicate that there is a causal link between sex (e.g., higher sexual frequency, greater interest in sexual activity) and better health outcomes (e.g., greater longevity, lower mortality), even when controlling for numerous health-related covariates (for a review, see Diamond & Huebner, 2012). Furthermore, better sexual well-being has been found to be linked to lower levels of a range of psychopathological symptoms such as anxiety, depression, and stress across different life stages and populations (Atlantis & Sullivan, 2012; Bodenmann et al., 2007; Dawson, Strickland, et al., 2020; Ein-Dor & Hirschberger, 2012).

Some explanations for the association between sexual well-being and overall health and well-being have been advanced in the medical and epidemiological literature (e.g., the idea that ejaculation can reduce the risk for prostate cancer by facilitating the removal of certain toxins that build up in the prostate; Rider et al., 2016). Although these biological explanations may indeed account for some of the findings, they fail to consider the myriad of other critical contextual (e.g., particular stressors across the life cycle), psychological (e.g., mood, cognitive processing), and relational (e.g., quality of romantic relationships) factors that co-occur with, and are fundamentally linked to, one's sexual experiences.

1.2. Sexual well-being and relational outcomes

One of the most relevant contexts for the occurrence of sexual experiences is that of an intimate relationship, since around 90% of sexual activity occurs within established romantic relationships (Gagnon et al., 2001; Waite et al., 2009; Willetts et al., 2004). Established romantic relationships are characterized by a strong interdependence between partners over a considerable period of time (Kelley et al., 1983, p. 38) and differ from

other close relationships (e.g., familial, friendships) because they include distinct experiences (e.g., sexual desire) between partners (Regan, 1998; Regan et al., 1998).

Extensive research demonstrates robust links between the quality of a couple's sex life and their overall relationship quality (see Sprecher & Cate, 2004 for a review). Studies examining the dissolution of romantic relationships have shown that sexual problems and sexual incompatibility are frequently listed by individuals as key contributors to the end of their relationship (Kurdek, 1991; Sprecher, 1994). Indeed, on average, people who are more satisfied with their sex lives are also more satisfied with their overall romantic relationship (McNulty et al., 2015; Yabiku & Gager, 2009). The majority of people (70%) consider that a good sexual relationship is very important for a successful romantic relationship, which is considerably higher when compared to the percentage of people who consider adequate income (53%) and shared interests (46%) as very important (Taylor et al., 2007). Furthermore, a recent large-scale meta-analytic study assessing 43 longitudinal dyadic studies (sampling, in total, 11,196 romantic couples) demonstrated that sexual well-being is one of the top five predictors of long-term relationship quality (Joel et al., 2020). Altogether, these findings support the idea that sexual well-being is fundamental to the quality, longevity, and stability of couples' relationships.

Several theoretical models argue for potential mechanisms through which the links between sexual and relational well-being might occur. Models of individual adaptation to stress, such as the transactional model of stress (Lazarus & Folkman, 1984) have been expanded to couples' adaptation to relationship stressors (the vulnerability-stress-adaptation [VSA] model; Karney & Bradbury, 1995). These models argue that partners who make use of more positive interpersonal behaviors experience an overall climate of greater positivity and responsiveness in their couples' relationship, which makes them better able to respond to relationship stressors and to navigate periods of strain (Gable et al., 2004, 2006; Gottman, 1994; Gottman & Levenson, 2000). These positive behaviors between partners can be understood as the "emotional capital"—a series of positive, emotionally shared experiences, such as positive sexual interactions—of a relationship. By accumulating greater emotional capital, partners are then better able to face challenges to their relationship and, ultimately, are less reactive to relationship stressors and threats

than couples with lower accumulated emotional capital (Feeney & Lemay, 2012; Walsh et al., 2017). In short, these theoretical models and empirical findings suggest that positive behaviors between partners, in which sexual experiences are included, constitute the “bricks and mortar” of a high quality, well-functioning relationship.

Couples’ positive sexual experiences are arguably among the most important mechanisms through which partners can build and sustain such a positive climate within their relationship. It is thus surprising that most studies which intend to comprehensively assess couples’ relationships provide little to no information on couples’ sexual well-being. When this information is present, it is typically sparse and comprises only a general assessment of couples’ frequency of sexual activity or how satisfied they are with their overall sex life (Sprecher & Cate, 2004), which is notoriously insufficient to understand the contribution of sexual experiences to the quality of a couples’ relationship. As described above, there is considerable evidence to argue that establishing and maintaining positive sexual experiences is a relevant and effective way to provide couples with protection against stress and relationship strain.

An important nuance that should be noted is that these positive sexual experiences might not be uniformly beneficial for all couples. As has been found for other relationship processes (e.g., positive relationship expectations), positive sexual experiences might be particularly associated with relationship benefits for couples with lower levels of marital problems but not for highly distressed couples, because the presence of these experiences might, paradoxically, prevent couples from acknowledging, addressing and resolving problems, and ultimately enhance distress over the long term (McNulty, 2010). This suggests that it is necessary to establish different profiles of couples for whom specific sexual experiences—similarly to other interpersonal processes in close relationships—might be more beneficial, taking into account the particular contextual (e.g., life stage) and affective circumstances (e.g., prior relationship quality) in which they occur.

2. Why does the interpersonal context matter?

Sexual experiences are fundamentally interpersonal, making it necessary that the context of close relationships is considered when conceptualizing individuals’ and couples’

sexual well-being. Indeed, the experiences of a member of a couple are not isolated from those of their partner. This phenomenon is termed interdependence and translates the idea that one's individual measure reflects not only the characteristics of the person who is assessed but also the characteristics of their partner, because couple members are part of an interdependent system (i.e., the couple).

Intrapersonal effects (or actor effects) are widely studied in research and denote the influence that one's individual characteristics exert on their own outcomes. By studying only intrapersonal effects, we are exclusively focused on the individual level of analysis. But all too often, relationship researchers fail to study (or to reasonably interpret) interpersonal (or partner effects), which denote the influence that one's individual characteristics exert on their partners' outcomes while controlling for their own (i.e., the individual's) characteristics and outcomes. Only by including interpersonal effects can we possibly identify relational phenomena, as it is only partner effects that can reliably capture the interpersonal nature of relationships (Kenny et al., 2006). In fact, solely the presence of partner effects can indicate that interpersonal effects have occurred, such that a person's response depends upon some characteristic of the partner. As Kenny and Cook poetically put it in their seminal work on dyadic interdependence, partner effects are like a love song, saying "I am who I am because of something about you" (Kenny & Cook, 1999).

Because interdependence in dyadic processes assumes that, in the context of close relationships, an individual's outcomes are intertwined with the needs, thoughts, and motives of the other person, the combination between both partners' experiences, rather than the independent effect of their individual characteristics, may therefore be fundamental to better understand both partners' sexual well-being outcomes. Being similar to one's partner on several characteristics and preferences (e.g., demographic variables, physical attractiveness, sexual attitudes) has been linked to greater individual and relational well-being, including satisfaction with life, relationship quality and stability, and importantly, sexual satisfaction (Acitelli et al., 2001; Arrindell & Luteijn, 2000; Cupach & Metts, 1995; Montoya et al., 2008; Wilson & Cousins, 2003). Social-cognitive theories have proposed that similarity between partners poses benefits for them individually as well as for their

relationship (Anderson et al., 2003; Lawrance & Byers, 1995). For instance, the theory of emotional convergence proposes that higher similarity between partners is advantageous because it makes them better able to understand each other by sharing comparable cognitions and feelings relative to a specific situation and are therefore more likely to be responsive in the face of a distressing event (Anderson et al., 2003; Gaunt, 2006; Smith et al., 1993).

Given the critically interpersonal nature of sexuality, it would be expected that much work has been done on understanding the interpersonal dynamics of sexual experiences between partners who have sex with each other, as well as on the interconnections between sexual and relational dimensions. Yet, this is still an emerging area of research. Although many factors are likely to explain this knowledge gap, one central factor seems to be contributing to this hiatus: despite the central role of sexuality in the maintenance and quality of romantic relationships, there seems to be a historical separation between sexuality research and relationship research that only recently has been tapped into. In the last decade, we have witnessed a growing interest in research that bridges the gap between sex and relationship dimensions.

3. Bridging the gap between sex and relationship research

The historical development of sexuality and relationship research has been characterized by a clear separation between these two research traditions. Scholars from these two fields typically publish in separate journals, have different professional organizations, and go to separate academic conferences, which has resulted in few opportunities for mutual enrichment. In fact, until more recently, there was a strong tradition in sex research to rely on individualistic models and research designs, a *modus operandi* which hampers our understanding of interpersonal processes. This is unfortunate because sexual difficulties are not experienced in an interpersonal vacuum but, rather, are experienced within complex relational systems (Dewitte, 2014). On the other hand, romantic relationships are likely to be poorly understood if one ignores the quality of partners' sexual experiences. Current conceptualizations of sex and relationship well-being poorly combine both dimensions together, as the integration of insights from both

fields is underdeveloped at both the theoretical and empirical levels (Dewitte, 2014; Muise et al., 2018).

Several researchers have lamented the relative absence of interaction at the intersection of sexuality and relationship research and have proposed routes for an effective interaction in theories, methods, and discussions between these fields (Dewitte, 2014; Diamond, 2010a, 2010b; Muise et al., 2018). In a recent critical review, Muise and colleagues (2018) propose that theories and methods that have been extensively developed and used in relationship research should be considered in sexuality research. This would help to shed light on important research questions, relevant to both areas, such as:

- Which individuals and couples are most likely to sustain a satisfying sex life over time?
- Which intrapersonal and interpersonal factors help couples navigate sexual challenges with greater success?
- When is sexual well-being associated with positive outcomes in a relationship and when might it undermine relationship quality?
- What are the processes by which sexual well-being influences romantic relationships over time, and vice versa?

In the current thesis, we build upon theoretical models of relationship adjustment (e.g., the Vulnerability-Stress-Adaptation model; Karney & Bradbury, 1995; the Theory of Emotional Capital; Feeney & Lemay, 2012; Walsh et al., 2017; the Theory of Emotional Convergence; Anderson et al., 2003; Gaunt, 2006; Smith et al., 1993) and of sexual functioning and satisfaction (e.g., cognitive-motivational models of sexual response; Barlow, 1986; Basson, 2000; Cranston-Cuebas & Barlow, 1990; the Interpersonal Exchange Model of Sexual Satisfaction; Byers, 1999). The former denote how aspects of and the interplay between romantic partners' interactions (e.g., higher quality relationships) influence their adjustment to critical life periods cross-sectionally and over time, while the latter inform on the contribution of individual psychological (e.g., cognitive) factors to individual's sexual well-being (e.g., sexual function, sexual satisfaction). These models are used to inform dyadic research questions and designs (e.g., Actor-Partner

Interdependence Model, [APIM], Kenny et al., 2006; Dyadic Response Surface Analysis, [DRSA], Schönbrodt et al., 2018) with the overarching aim of bringing sex and relationship research together to more accurately capture the complexity of the sexual and relational experiences of couples undergoing the critical, yet normative life stage of the transition to parenthood.

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CHAPTER II. COUPLES' SEXUAL WELL-BEING ACROSS THE TRANSITION TO PARENTHOOD

I. The transition to parenthood as a vulnerability period for sexual well-being

Couples who become parents for the first time often anticipate the birth of their child with enthusiasm and excitement (Feldman & Nash, 1984), but this period is also often accompanied by challenging and distressful experiences. Adding a new member to a family system priorly composed only by the couple implies a marked reorganization of the couple's relationship. New parents need to learn and manage new tasks to care for their baby, a new division of household is required, new roles arise, and biopsychosocial changes occur from pregnancy to postpartum which affect not only the pregnant/birthing individual but also their partner.

Still, couples are often caught unprepared for the challenges they face across this period and the actual experience of new parenthood is often quite different from what couples expect. Children and parenthood are often romanticized and thought of as fundamentally joyful (Kluwer, 2010; Lawrence et al., 2007). In fact, expectant couples tend to report relatively high expectations regarding several dimensions of change of the transition to parenthood, such as the temperament of their children, their own anticipated feelings about parenting and parental competence, or the division of childcare and support between partners. Interestingly, those partners who hold higher expectations prenatally (i.e., those who expect highly positive experiences) tend to also experience greater declines in marital satisfaction after the baby is born (Lawrence et al., 2007). Indeed, one of the most significant changes identified in research on the transition to parenthood is that marital satisfaction and marital quality suffer an average decline after the birth of the first child, as attested by a meta-analysis (Mitnick et al., 2009) and a systematic review (Doss & Rhoades, 2017). Patterns of intimacy and communication change and new parents report increased amounts of conflict and disagreement relative to before childbirth (Kluwer & Johnson, 2007), with this increase in conflict not being observed among couples who remain childless (Cowan & Cowan, 2000; Crohan, 1996).

Whereas substantial attention has been devoted to the understanding and prevention of new parents' overall relationship quality decline across this vulnerable

period, less attention has been dedicated to another critical dimension of new parents' well-being across the transition—their sexual well-being. Prior studies have found that expectant couples who report greater sexual well-being during pregnancy present indices of better adjustment postpartum (e.g., women are more likely to breastfeed, men are more likely to be present during birth; Fisher & Gray, 1988). Despite the central role of sexuality in the stability and quality of relationships and its importance to overall health of new parents, studies examining sexual well-being across the transition to parenthood have only recently been expanding.

As well as for other dimensions of change in the transition, most future parents also hold positive expectations for their ability to navigate the sexual changes associated with pregnancy and postpartum (e.g., anticipating that their sex lives will quickly return to normal after the baby is born; Harwood et al., 2007). In contrast with these expectations, however, the reality is that most expectant and new parents experience novel and distressing perinatal sexual concerns. Indeed, over 90% of new parents report more than 10 (of 20) postpartum sexual concerns, such as reduced time and energy for sexual activity, poorer body image, or larger desire discrepancies between partners (Schlagintweit et al., 2016; Vannier & Rosen, 2017). In addition, problems related to sexual function affecting the birth-giving individual as well as their partner may newly arise during the perinatal period (Dawson et al., 2021; Leonhardt et al., 2021; Schwenck et al., 2020).

1.1. Prevalence of perinatal sexual difficulties

Outside of the perinatal period, up to 50% of reproductive age women (McCabe et al., 2016; McCool et al., 2016) and up to 40% of men under 60 years of age experience clinically significant problems with their sexual function (McCabe et al., 2016; Nicolosi et al., 2004). In comparison, cross-sectional and longitudinal studies reveal that between 36 to 88% of birth-giving individuals (Daud et al., 2019; Khalesi et al., 2018; Ninivaggio et al., 2017; Vannier & Rosen, 2017) and 19 to 47% of partners (Condon et al., 2004; Nakić Radoš et al., 2015) report problems with their sexual function in pregnancy.¹ In terms of

¹ Differences in the estimated prevalences are in part due to the instrument used to assess sexual function, the timing of pregnancy when sexual function is assessed, and whether or not having engaged in sexual activity is accounted for when scoring the measure.

the types of sexual problems which are most prevalent in pregnancy, cross-sectional (Vannier & Rosen, 2017) and longitudinal (Wallwiener et al., 2017) research has found that problems with low sexual desire are most common (37 to 87%), followed by sexual dissatisfaction (25 to 58%), sexual arousal and lubrication difficulties (21 to 48%), dyspareunia (29 to 42%), and orgasm difficulties (29 to 39%).

Problems with sexual function are most evident at postpartum, with a high prevalence of sexual difficulties emerging particularly at three months after childbirth. Between 41 and 83% of birth-giving individuals report problems at three months postpartum (Barrett et al., 2000; Signorello et al., 2001) with the prevalence decreasing at six months (19 to 64%) (Banaei et al., 2018; Barrett et al., 2000; Lagaert et al., 2017) and 12 months (10 to 30%) (Banaei et al., 2018; Signorello et al., 2001) after childbirth. Partners demonstrate a similar pattern, with 12 to 45% experiencing significant problems with sexual function across the postpartum period (Condon et al., 2004; Saotome et al., 2018). Similar to sexual function in pregnancy, cross-sectional (Banaei et al., 2018; Barrett et al., 2000; Khajehei et al., 2015) and longitudinal (Wallwiener et al., 2017) studies indicate that the most common problems include low sexual desire (40 to 88%), difficulties with sexual arousal and vaginal lubrication (11 to 86%), sexual dissatisfaction (7 to 71%), dyspareunia (39 to 63%), and difficulties with orgasm (10 to 54%). For partners (all male), the most common sexual problems across the postpartum period include erectile dysfunction (45%), sexual dissatisfaction (32 to 37%), and low sexual desire (12 to 16%) (Condon et al., 2004; Saotome et al., 2018).

These findings indicate that, across the transition to parenthood, marked changes to sexual function are commonly reported by both partners in new parent couples (i.e., the pregnant/birthing individual and the partner; Fitzpatrick et al., 2021). However, referring to these difficulties alone as sexual dysfunction is inappropriate as it can lead to the pathologization of a normative experience. For instance, new parents can experience changes to sexual functioning which are normative (e.g., differences in sexual desire) and that may not translate into clinical sexual distress (Rosen et al., 2020). It is also possible for couples to experience clinically significant sexual distress due to other factors than changes to their sexual functioning (e.g., distress related to worries about having sex

during pregnancy). Interestingly, despite both partners experiencing sexual function difficulties, prevalence rates of sexual distress tend to differ across members of the couple. Compared to only 8 to 12% of partners, between 47 and 57% of birth-giving individuals report clinically significant levels of sexual distress during the first year postpartum (Schwenck et al., 2020). Therefore, taking a comprehensive approach to sexual well-being (i.e., by considering several components such as sexual satisfaction, sexual functioning, sexual distress) is central to identify those couples who are most vulnerable across this period.

1.2. Distinct trajectories of sexual well-being

Following the pattern of changes described above, the general view of the transition to parenthood that has dominated research is that becoming a parent entails primarily negative changes for the sexual relationship. However, most studies examining the sexual well-being of expectant and new parents have taken an average-based approach to their longitudinal trajectories. Such a limitation may lead to the loss of important nuance because, by focusing on average trajectories, findings only indicate what the experiences of the *average* couple are. Perhaps more relevant than answering the question of whether all couples go through similar changes is to identify which couples are greatly protected across this period and which couples are most vulnerable to sexual difficulties. Answering such a question requires a shift from examining the overall pattern of change (i.e., homogeneity in trajectories), which masks much of the variation in sexual changes across the transition to parenthood, to a group-based approach, that is, one that is able to identify unique subgroups that share similar characteristics (i.e., heterogeneity in trajectories).

Research provides initial evidence of significant variability in the sexual well-being of expectant and new parents. For example, cross-sectional studies have shown that around a third of couples show increased sexual satisfaction postpartum compared to prepregnancy (Ahlborg et al., 2008). Indeed, there is emerging evidence of heterogeneity in couples' sexual well-being trajectories, evidencing that couples' course of change does not follow one uniform trajectory but, rather, there are groups of couples who follow distinctive trajectories specific to different sexual outcomes. Indeed, many couples are

able to maintain their sexual well-being across the transition, with clinically significant sexual difficulties being experienced by only a subset of couples. For sexual satisfaction, for instance, Rosen and colleagues (2020) followed new parent couples from mid-pregnancy to one year postpartum and observed two unique trajectories, with 64% of couples maintaining high sexual satisfaction across the transition period and 36% of couples reporting low sexual satisfaction over time (Rosen, Dawson, et al., 2020). For sexual distress, the authors observed two distinct trajectories as well. One trajectory captured couples (76%) who were not experiencing clinically significant sexual distress throughout the transition. In this group of couples, mothers showed an overall increase in sexual distress over time but, at one year postpartum, both partners' levels of distress were still below the clinical range. A different trajectory captured couples (24%) who experienced a stable discrepancy in sexual distress over time (i.e., partners consistently reported different levels of distress). In this group, mothers' sexual distress was in the clinical range from pregnancy to one year postpartum, while partners' sexual distress was always below clinical cut-offs.

As for sexual function, only one study, to our knowledge, has examined group-based trajectories across the transition to parenthood, and did so by only sampling new mothers (Dawson, Vaillancourt-Morel, et al., 2020). This study revealed that mothers' sexual function followed three distinct trajectories, which differed based on the severity of sexual function problems at postpartum and on their degree of improvement over the first year postpartum. The majority (52%) of women reported minimal sexual function problems at three months postpartum and improved the least over time, a third of women (35%) reported moderate sexual function problems and improved the most over time, and 13% of women reported marked sexual function problems at three months postpartum and showed minimal improvement over time. These results reinforce the heterogeneity in sexual experiences across the transition to parenthood, but this study reflects only mothers', rather than couples' experiences.

Examining these trajectories at the couple level is valuable given emerging evidence that partners also experience consequences to their sexual function from pregnancy to postpartum and that changes in sexual function are highly interdependent between couple members (Chew et al., 2021; Dawson et al., 2021; Fitzpatrick et al., 2021). In addition to

variability within a particular aspect of sexual well-being, there may be different trajectories for each sexual outcome which necessitate a concomitant assessment between different aspects of couples' sexual well-being.

Concerning sexual frequency, in particular, a systematic review showed that there is a gradual decline in frequency of vaginal intercourse across pregnancy and that most new parents (78% to 90%) had resumed vaginal intercourse around three months postpartum. Furthermore, the frequency of a broad range of sexual behaviors (i.e., manual and oral stimulation, masturbation, and vaginal intercourse) tended to increase, on average, over the first 12 postpartum months, returning to prepregnancy levels closer to the mark of one year postpartum (Javed-Wessel & Sevic, 2017). Still, the only available study that assessed subgroups of couples concerning their trajectories of sexual activity frequency found that around two thirds of couples (67%) maintained low frequency of partnered sexual activities across the whole transition, whereas only one third of couples (33%) engaged in partnered sexual activities frequently (Rosen et al., 2020). Similarly, recent longitudinal studies also show that couples with higher prenatal relationship quality (i.e., greater support, intimacy, and responsiveness) showed a greater decline in sexual frequency in comparison to couples with lower quality relationships, who demonstrated stable levels of sexual frequency, thus suggesting that low sexual frequency across the transition may not be a reliable indicator of poor sexual adjustment.

2. A biopsychosocial model of perinatal sexual well-being

A central question on the study of couples' adjustment to the transition to parenthood is what makes some couples retain high sexual well-being across this vulnerable period, while others evidence marked sexual difficulties. This has been tentatively answered by prior researchers based on a biopsychosocial framework. As supported by models of sexual function (e.g., Basson, 2000; Cranston-Cuevas & Barlow, 1990) and by recent conceptualizations of postpartum couples' sexual well-being (Dawson, Vaillancourt-Morel, et al., 2020; Fitzpatrick et al., 2021; McBride & Kwee, 2017), new parents face a range of biological, psychological, and relational changes that impact their sexual well-being.

2.1. Biological factors

Major physical and physiological changes occur from pregnancy to postpartum for the pregnant/child birthing parent. Biological factors include those related to hormonal changes of pregnancy and postpartum (e.g., breastfeeding) and those related to the characteristics of the birth (e.g., epidural, induction, mode of delivery, episiotomy, degree of perineal tear). Prior studies have mainly focused on the impact of biomedical aspects on the pregnant/birthing parent's well-being, and mainly postpartum, but have neglected the potential influence on their partner's sexual well-being given dyadic interdependency. Still, current evidence does not support, overall, a strong influence of biological factors to new parents' sexual well-being, demonstrating either non-significant or minimal effects on both partners' sexual function (Fitzpatrick et al., 2021).

One of the most significant hormonal-induced changes across the perinatal period is lactation and breastfeeding. Bottle-feeding women present lower levels of sexual problems and are more likely to return to intercourse at six weeks after childbirth (Rowland et al., 2005), whereas those who breastfeed tend to experience more sexual concerns such as vaginal dryness, dyspareunia, increased nipple sensitivity, leaking milk, decreased arousal, and erotic feelings during breastfeeding (Avery et al., 2000; Callahan et al., 2006; Connolly et al., 2005; LaMarre et al., 2003; Von Sydow, 1999). In addition, a longer duration of breastfeeding (three to six months *versus* one month) is linked to decreased sexual function (e.g., arousal, sexual satisfaction; Avery et al., 2000).

These changes may be in part attributed to the specific hormonal and physical characteristics of lactation occurring for the birthing parent. After childbirth, high levels of progesterone (the hormone required to maintain pregnancy) decrease and are replaced by high levels of prolactin, leading to the onset of lactation (Riordan, 2005). The rise in prolactin causes a decline in the effectiveness of the gonadotropin-releasing hormone (GnRH), which stimulates the ovaries (LaMarre et al., 2003). Without this stimulation, ovarian androgen secretion is suppressed and hormones involved in the female sexual response (e.g., estrogen) remain low throughout lactation. Low estrogen levels may cause poorer vaginal lubrication and lead to atrophy of the vaginal epithelium which, in turn, may difficult physical sexual arousal and result in painful intercourse (LaMarre et al., 2003).

Another major hormone involved in lactation is oxytocin. This hormone is responsible for milk secretion from the breasts and for the contractions of the uterus during orgasm and labor and, unlike prolactin, can be induced by simply seeing or interacting with the baby (Riordan, 2005). Because of the effects of oxytocin, the child-birthing individual can experience contractions while breastfeeding and up to 20 minutes after a feeding is over (Riordan, 2005), with associated arousing sensations similar to orgasm in the form of intense uterine contractions. Although this physiological reaction is not based on sexual stimulation and is therefore not inherently sexual, the similarities may imply a sexual context. One metacontent analysis indicated that around 33–50% of breastfeeding women described breastfeeding as erotic, with 25% of those women feeling extremely guilty for experiencing this sensation (Von Sydow, 1999). Because most women lack information about these normative physiological changes, negative emotional outcomes such as shame and guilt are to be expected. Furthermore, the changes in shape and size of the breast, as well as in nipple sensitivity, may be distressful. As such, sexual activity which, pre-pregnancy, included direct stimulation of the nipples may no longer be arousing (Convery & Spatz, 2009) and might lead to heightened sexual distress. Notwithstanding, a recent longitudinal study has found no significant effects of breastfeeding for the child birthing individual's sexual function (Dawson, Vaillancourt-Morel, et al., 2020).

In respect to labor and birth characteristics, cross-sectional studies have shown that some factors (i.e., vaginal delivery with perineal tearing, episiotomy) may slightly increase the risk of the birthing parent experiencing poorer sexual functioning (e.g., poorer overall sexual function, increased genital pain, decreased desire and arousal) at six months postpartum and at later time-points (Fitzpatrick et al., 2021). For instances, the greater use of epidural analgesia during vaginal delivery as a technique to reduce labor pain has been linked to an increased risk of some postpartum sexual difficulties, such as painful intercourse (Du et al., 2021). One explanation for this concerns the fact that epidural prolongs labor duration (i.e., women receiving epidural experience longer first and second stages of labor; Anim-Somuah et al., 2018) by inhibiting the activity of uterine and abdominal muscles and nerves (Qian et al., 2017), which are essential to the well-functioning of the sexual response cycle.

Furthermore, women who experienced vaginal or perineal trauma during labor and birth, as well as those who had a cesarean-section, were less likely to resume intercourse at six weeks postpartum compared to women delivering vaginally with no genital trauma (Rådestad et al., 2008; Rowland et al., 2005). In the only study that examined, to date, the genital arousal response of women who experienced different modes of delivery using psychophysiological measures (i.e., Laser Doppler imaging) in a laboratorial context, primiparous women did not differ in terms of their subjective genital response (in response to an erotic clip) and in overall sexual functioning (using a self-report measure) according to their mode of delivery, but women who experienced a vaginal birth showed lower genital arousal to an erotic clip than women who delivered via unlabored C-section (Cappell et al., 2020).

These differences may be partly explained by the physiological changes that happen after a vaginal birth, which may have a detrimental impact on genital response. It is possible that vaginal delivery can pose some damage to the autonomic pelvic nerves (i.e., pelvic and hypogastric nerves) in the inferior hypogastric plexus—a network of autonomic pelvic nerves—which are an integral part of the physiological process of sexual response by regulating vaginal vasocongestion which is, in turn, an essential process for genital sexual arousal (Giuliano et al., 2002). Still, this potential explanation is only speculative, as there is no direct evidence demonstrating that the inferior hypogastric plexus is indeed damaged during childbirth, although this fact is widely assumed by the medical community (Knowles et al., 2001; Quinn, 2004). This is perhaps a result of findings showing that, in response to other medical interventions that disrupt the autonomic pelvic nerves (e.g., radical hysterectomy), there is impaired genital response, manifested as lower vaginal blood flow in response to an erotic film (Maas et al., 2004; Pieterse et al., 2008).

Other physiological structures such as the internal pudendal artery, which supplies blood to the genitals during vasocongestion (Graziottin & Gambini, 2015; Yeung & Pauls, 2016) may also be affected during vaginal childbirth, which would result in decreased genital blood flow. Despite the plausibility of this, there is currently no evidence that the internal pudendal artery is indeed damaged during labor and vaginal delivery. Notably, as reflected in the lack of differences in self-reported sexual function between women who

had a vaginal birth and women who had a C-section, the observed physiological differences may not differentially and significantly impact women's postpartum subjective sexual experiences. In fact, when assessed longitudinally, biomedical factors (i.e., epidural, mode of delivery, induction, episiotomy, tearing, breastfeeding) were found not to be related to women's trajectory of self-reported sexual function across the transition (Dawson, Vaillancourt-Morel, et al., 2020).

2.2. Psychological factors

Psychological factors have shown a stronger contribution to both partners' sexual well-being across the transition to parenthood relative to biological factors. The change in roles and routines that comes with the birth of a child are typically accompanied by heightened stress and fatigue, which have in turn been found to negatively influence both parents' sexual well-being, both cross-sectionally and longitudinally. Mothers who report greater fatigue at three months postpartum are more likely to follow trajectories involving marked and moderate sexual function problems across the transition, rather than a trajectory of low sexual problems (Dawson, Vaillancourt-Morel, et al., 2020). Mothers and partners who experience greater stress at postpartum are more likely to experience greater sexual function difficulties (e.g., dyspareunia, lower desire) at that time-point and beyond (Alligood-Percoco et al., 2016; Leavitt et al., 2017; Pardell-Dominguez et al., 2021). There is also robust evidence supporting the contribution of mood (i.e., anxiety, depression) to sexual function and distress (Atlantis & Sullivan, 2012; Cranston-Cuebas & Barlow, 1990; Norton & Jehu, 1984). In the transition to parenthood, cross-sectional and longitudinal studies have linked greater anxiety and depression symptoms to greater sexual distress and sexual function difficulties, for both the birthing individual (Asselmann et al., 2016; Dawson et al., 2021; Khajehei et al., 2015) and the non-birthing partner (Dawson, Strickland, et al., 2020; Dawson, Vaillancourt-Morel, et al., 2020).

Another critical factor which may influence expectant partners' sexual experiences concerns their evaluation of whether having sexual activity constitutes a safe practice during pregnancy, as misconceptions and anxiety about having sex are widely common for both the pregnant individual as well as their partners (Beveridge et al., 2018; Jawed-Wessel et al., 2016, 2019). Couples who demonstrate more positive attitudes to having

sex during pregnancy—i.e., less fears and negative beliefs about the potential negative impacts of sex on the baby's and on the pregnant partners' health—show greater sexual satisfaction and lower distress relative to couples who hold less positive attitudes to sex during pregnancy (Beveridge et al., 2018; Jawed-Wessel et al., 2016). Such fears are often related to a misunderstanding about what constitutes safe sexual practices and the belief that vaginal intercourse may induce negative obstetric outcomes (e.g., preterm labor, miscarriage, harm to the fetus, infection). Although these concerns constitute common reasons for couples to abstain from sexual activity during pregnancy (Bartellas et al., 2000; Beveridge et al., 2018; Fok et al., 2005; Gökyildiz & Beji, 2005; Jawed-Wessel et al., 2016), for most couples—those without specific medical conditions—these concerns are not substantiated by medical reasons and are hence unfounded (Bartellas et al., 2000; Ekwo et al., 1993; Fok et al., 2005; Klebanoff et al., 1984; Sayle et al., 2001). Importantly, whether holding more negative attitudes towards sex during pregnancy makes new parents more vulnerable to experience long-term sexual well-being difficulties (i.e., that extend beyond pregnancy) is still currently unexplored.

As proposed by models of sexual functioning informed by cognitive-motivational and information-processing theories (Barlow, 1986; Basson, 2000; Cranston-Cuebas & Barlow, 1990), sexual response (e.g., sexual arousal and sexual desire) is initiated and regulated by one's attention to sexual cues. As such, these negative psychological factors (e.g., low mood, fatigue, negative attitudes about sex during pregnancy) may interfere with sexual function by deviating one's focus of attention from sexual cues or by inhibiting the experience of pleasure (Cranston-Cuebas & Barlow, 1990). Because these psychological factors can also induce negative cognitions and affect (e.g., nonsexual or negative thoughts, anhedonia) that promote avoidance of sexual activity, they can contribute to more persistent sexual difficulties over time (Tavares et al., 2020) and, ultimately, to higher sexual distress. As such, clinicians and researchers should be able to identify expectant couples with a greater presence of negative psychological factors, since these couples might be at heightened risk of experiencing lower sexual well-being across the transition to parenthood.

2.3. Social and interpersonal factors

Social and relational factors (e.g., the quality of the partner relationship, the amount of perceived support from one's partner) are thought to inhibit sexual well-being by reducing feelings of intimacy and connectedness between partners (Basson, 2000; McBride & Kwee, 2017). These relational factors have all been associated with poorer sexual well-being, including in new parents (Dawson, Vaillancourt-Morel, et al., 2020; Lorenz et al., 2020; Schlagintweit et al., 2016), emphasizing the important interpersonal nature of the sexual relationship. Couples with interpersonal dynamics of lower quality may be less able to deal with the demands of the transition to their sexual lives (Dawson, Vaillancourt-Morel, et al., 2020; Fitzpatrick et al., 2021), and it is thus likely that couples who have a strong prenatal bond to their partner will show trajectories characterized by greater sexual well-being across the transition. Still, there are currently mixed findings as to whether very high initial levels of relationship quality might, paradoxically, pose some vulnerability for new parents' adjustment to the transition.

On the one hand, some longitudinal studies suggest that a stronger couple relationship in pregnancy can protect couples from the forthcoming challenges of this transition. Couples who report a better prenatal relationship (e.g., lower levels of conflict, better communication) tend to show smaller declines in relationship quality post-birth (Kluwer, 2010; Shapiro et al., 2000). This is consistent with theoretical models of couples' interpersonal adjustment to critical periods (e.g., vulnerability-stress-adaptation model, Karney & Bradbury, 1995; Lazarus & Folkman, 1984; the theory of emotional capital theory, Feeney & Lemay, 2012), which states that in the face of a significant stressor, as is this transition, the quality of the interactions between partners helps them cope with relationship stressors, facilitates connection and intimacy, and is therefore protective of relationships over time (Karney & Bradbury, 1995; Shapiro et al., 2000). This buffering effect of sexual well-being has been supported by empirical data, with couples with greater sexual well-being coping better with stress, reporting greater intimacy and a stronger bond between partners, including those in the transition to parenthood (Joel et al., 2020; Rosen et al., 2017, 2018).

On the other hand, a better prenatal relationship has also been shown to predict the steepest declines in relationship and sexual outcomes (Doss & Rhoades, 2017; Lorenz et al., 2020). For instance, new parent couples with a better prenatal relationship showed a greater decline in sexual frequency across the transition, whereas sexual frequency was unaltered in couples with lower quality relationships (Lorenz et al., 2020). Although apparently contradictory, these findings suggest that couples with high prenatal levels of relationship quality may hold overly positive expectations for their ability to navigate the challenges occurring during the transition, including sexual ones (e.g., expecting that their sexual lives will quickly return to what they were before). When faced with unexpected and novel sexual experiences (e.g., mismatches in sexual desire, persistent changes to own sexual function; Schlagintweit et al., 2016), it is possible that these couples have their expectations violated and therefore feel unprepared to deal with them, ultimately leading to greater distress.

3. Goals of the current thesis

Taken together, the concurrent presence of the described biomedical and psychosocial factors during pregnancy and/or postpartum makes the transition to parenthood a highly complex period of adjustment for couples' sexual well-being. Still, the complex constellation of risk and protective factors for new parents' sexual well-being has not yet received substantive attention in research, particularly when compared to the focus devoted to other indicators of individual well-being and health in the transition (e.g., exercise, diet, postpartum depression, parental competence).

Current knowledge on couples' postpartum sexual well-being is limited because prior studies typically sample individuals rather than couples, employ correlational or retrospective approaches and, if prospective, focus solely on average change and not on the existent variability within sexual well-being outcomes trajectories. It is particularly noteworthy that no study has examined sexual functioning and sexual distress concomitantly in both new parents, although these are central markers of sexual dysfunction. Sexual distress, in particular, has received little attention in the context of couples' postpartum sexual well-being, although it is arguably the most reliable indicator of

sexual concerns that deserve clinical attention. An integrated view comprising both the description of group-based trajectories of sexual well-being as well as of particular individual and relational risk and protective factors is essential for the early detection of couples who are more vulnerable to sustained sexual problems across this period.

The current research project aims to improve the current understanding of couples' sexual well-being across the transition to parenthood by including the assessment of diverse sexual well-being indicators (such as sexual frequency, sexual satisfaction, sexual functioning, and sexual distress), by prospectively assessing new parent couples rather than new parents individually, and by employing advanced dyadic research methodologies rather than merely assessing intraindividual effects. An integrated model of the expected relationships between the biomedical, psychological, and social/relational factors is depicted in Figure 2 and guided the studies developed in the current thesis, which are described in detail in the following chapters.

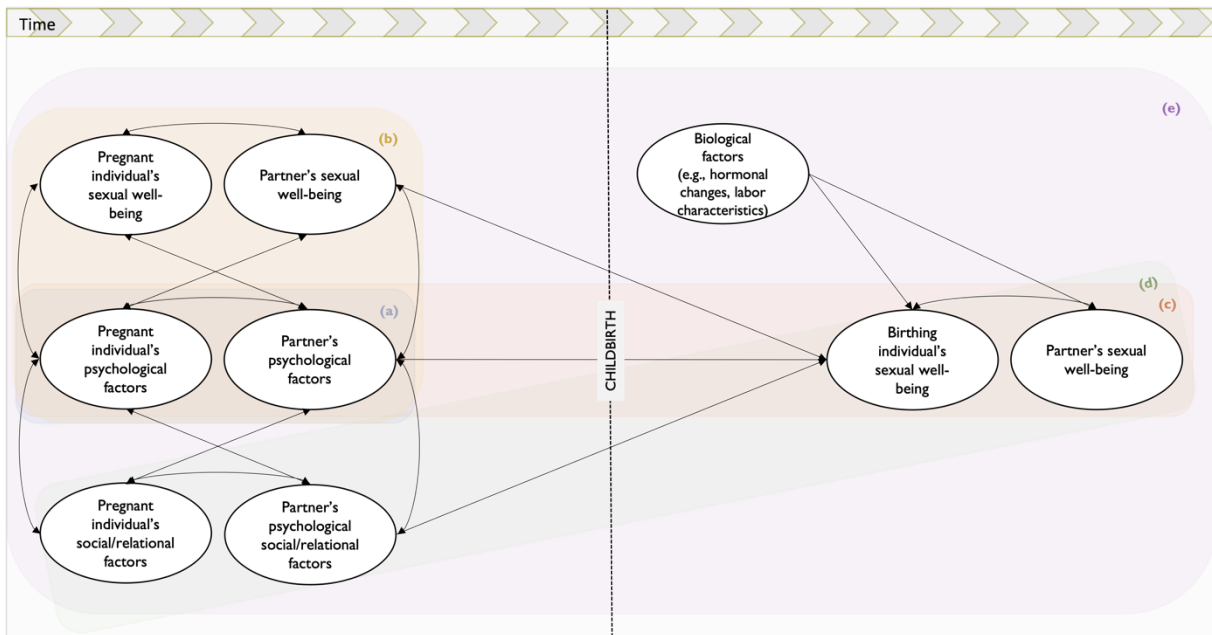


Figure 2. Conceptual model of the hypothesized relationships according to a biopsychosocial model of couples' perinatal sexual well-being for the full research project and for (a) study 1, (b) study 2, (c), study 3, (d) study 4, and (e) study 5.

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CHAPTER III. OVERVIEW OF THE RESEARCH PROJECT

I. General description of the research project

The overarching aim of the present PhD research is to advance knowledge on the mechanisms involved in the development of sexual difficulties of couples transitioning to parenthood, mainly from a psychological and relational approach. As such, this work intends to address three main goals: 1) to ascertain interpersonal processes that contribute to individuals' (i.e., the pregnant/birthing parent *versus* the non-birthing parent) and couples' higher risk of perinatal sexual difficulties; 2) to identify biopsychosocial factors associated with greater *versus* poorer sexual well-being across the transition to parenthood; and 3) to describe new parents' (as individuals) and new parent couples' (as dyads) variability in sexual well-being during this critical period.

To address these goals, and based on knowledge gaps identified in the literature, we designed and conducted five empirical studies, which are fully described in Chapters IV to VIII. The studies presented in this thesis employed a dyadic approach and sampled couples ranging from early pregnancy up to 12 months postpartum, using cross-sectional as well as longitudinal designs. Since these studies used specific methodologies and samples, the current chapter presents a broad view of the goals and methods of the research project as a whole. Details on the methodology of each particular study are presented in the following chapters.

Taken together, results of this work are expected to refine our understanding of sexual well-being by considering relevant interpersonal effects within a couple and to contribute to empirically-based prevention and treatment for new parents, who are particularly vulnerable to sexual changes. More specifically, current findings are expected to promote the early identification and prevention of sexual problems in these couples, by ascertaining factors which can be targeted early on by health practitioners in routine medical care practices and by identifying subgroups of couples who are most vulnerable to sexual difficulties across this life transition.

2. Methodology

2.1. Research design and research questions

This project followed a quantitative research design. For all studies, data were collected from both couple members (i.e., the pregnant/birthing individual and their partner). Each of the five studies addressed a set of specific research questions. Figure 3 depicts a simplified representation of the main predictor and outcome measures for each of these five studies.

Study 1 (see Figure 3a), presented in Chapter IV, investigates the validity of a measure of attitudes to sex during pregnancy, examining the interdependence between the pregnant individual and their partner when reporting on attitudes to sex, and testing the links between these attitudes and frequency of sexual behaviors during pregnancy.

Study 2 (see Figure 3b), presented in Chapter V, followed a cross-sectional dyadic design and focuses on couple members' similarities in attitudes to having sex while pregnant. We investigate whether specific patterns of similarity versus dissimilarity between partners are linked to greater sexual satisfaction and less sexual distress during pregnancy.

Study 3 (see Figure 3c), presented in Chapter VI, also followed a dyadic cross-sectional design but used an independent sample of couples to answer a research question focused on postpartum sexual well-being. Here, we specifically focus on addressing the question of whether greater sexual satisfaction, sexual desire, and lower postpartum sexual concerns are linked to greater overall adjustment (i.e., lower perceived stress) in postpartum couples sampled from 3 to 12 months after childbirth.

Studies 4 and 5 were longitudinal studies and used first-time parent couples' data across four assessment waves (T1: 20-24 weeks pregnancy; T2: 30-34 weeks pregnancy; T3: 3-months postpartum; T4: 6-months postpartum). In **Study 4** (see Figure 3d), presented in Chapter VII, we clarify associations between sexual and relational well-being across the transition by investigating whether there are reciprocal influences between sexual satisfaction, sexual distress, and relationship quality from pregnancy to postpartum. Finally, the last study presented in this thesis, **Study 5** (see Figure 3e), presented in

Chapter VIII, examines a biopsychosocial model of couples' differential trajectories in sexual functioning and sexual distress over time.

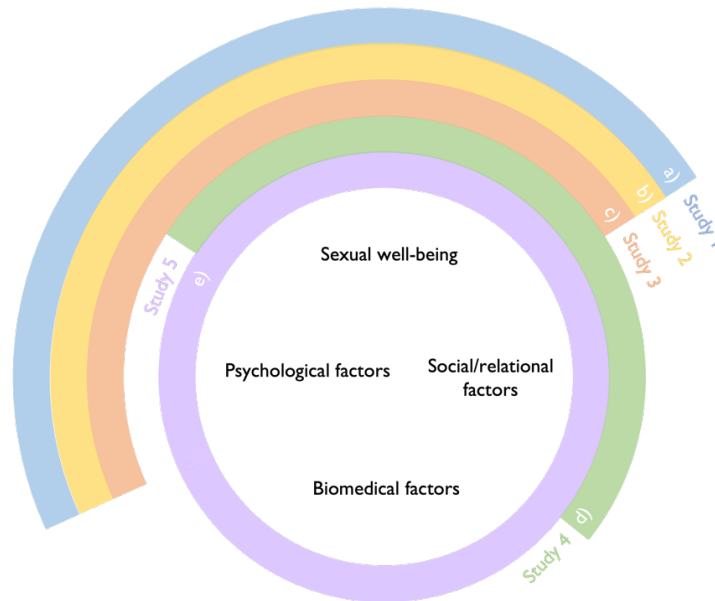


Figure 3. Main predictor and outcome measures for each of the studies presented in this thesis.

2.2. Participants

Two independent samples of couples were recruited and included in the current studies. Expectant couples who were assessed cross-sectionally (Studies 1 and 2) or followed longitudinally (Studies 4 and 5) were community samples recruited in Portugal. Postpartum couples who were assessed cross-sectionally (Study 3) were recruited from the community in Canada and in the United States of America by one of my co-supervisors.

Individuals who were over 18 years of age and in a committed relationship with each other for at least six months were eligible to participate in the current set of studies. At the time of participation, one member of the couple was required to currently have an uncomplicated, singleton pregnancy and have not given birth previously (Studies 1, 2, 4, and 5) or to have given birth to a healthy first child (37 to 42 weeks gestation) in the prior 3-12 months (Study 3). For studies 1, 2, 4 and 5, time of inclusion based on pregnancy weeks differed according to the specific research questions of each study. Across samples, participants who self-reported currently suffering from a severe unmanaged medical or

psychiatric illness were considered ineligible due to the confounding effects of a series of conditions (e.g., cardiovascular disease) on sexual health.

In total, 512 couples (1024 individuals) participated in this project. Participants ranged in age from 19 to 41 years old ($M_{\text{women}} = 28.57$, $SD = 8.00$; $M_{\text{men}} = 25.18$, $SD = 3.33$). Most couples were married or common-law (80.7%) and 19.3% of couples were dating. Couples were in a committed relationship for an average of 5.64 years ($SD = 4.04$, range = 0.50–21.75). Despite the study being advertised as inclusive of couples of all genders and identities, all participants were currently in a mixed-gender/sex relationships. Women mostly described themselves as predominantly or exclusively heterosexual (99.4%) and 0.6% self-identified as bisexual. Men mostly self-identified as predominantly or exclusively heterosexual (99%) and 1% self-identified as bisexual. Across studies, all participants who were pregnant or gave birth self-reported their gender/sex as woman/female and all partners self-identified as man/male. For this reason, we refer to the pregnant/birthing partner collectively as “mothers” and to their partners as “fathers”. Full sociodemographics for each sample are presented in more detail in each corresponding study, in Chapters IV to VIII.

2.3. Procedures

Recruitment for studies with Portuguese samples was conducted between June 2018 and April 2021. Recruitment of the postpartum sample used in Study 3 occurred from September 2014 to May 2015. In the case of the Portuguese samples, data were collected by the principal investigator whereas, in the case of the American sample, data were collected by a Canadian team of research assistants.

Across all studies, couples were recruited employing two main strategies: either in-person at regularly scheduled appointments to gynecologists in a large national obstetrics outpatient unit or via community (i.e., pregnancy-related services, hospital bulletin boards) or online advertisements. Participants recruited through advertisements completed all materials online. For in-person recruitment, participants were recruited through gynecologists’ referral. After the study was described to potential participants, those who were interested and eligible were invited to speak to the principal investigator (either in

person or via telephone) who described the aims and procedures of the study and confirmed eligibility. Participants were invited to complete the survey online, which was sent to both partners separately to their own email addresses.

All individuals provided informed consent online before participating. After providing informed consent and prior to beginning the survey, participants completed a screening questionnaire to assess eligibility. Upon completion of the survey, participants provided their partner's e-mail address. The partner was then e-mailed a questionnaire link generated by the survey software comprising a unique couple identifier that allowed data to be linked once both members completed the survey. Both members of each couple were required to complete the survey within four weeks of each other. After completing the survey, individuals received a list of online resources related to sexuality and relationships during the transition to parenthood and were compensated with a \$15 gift card (Study 3) or with a 10€ gift card at the initial time-point of the study (Studies 1 and 2) and at every other time-point in the case of the longitudinal assessments (Studies 4 and 5).

For longitudinal studies, several strategies were employed to promote the retention of participants over time. Retention strategies included reminder phone calls and reminder emails, such that couples received reminder e-mails one week prior to receiving each follow-up survey (i.e., an e-mail including educational information on fetus or infant development at that time-point), as well as reminder emails and/or phone-calls if they did not complete a survey within 48–72 hours and at one and three weeks after receiving it. Retention rates across studies and time-points were very good (range = 65.4%–92.6%).

2.4. Ethical considerations

All studies included in this thesis were designed and implemented in accordance with the ethical principles for research involving human subjects of the Declaration of Helsinki. All procedures performed in studies involving human participants were in accordance with the necessary ethical standards, namely:

- a) We obtained direct permission from the holder of the copyright of all instruments used;
- b) Before participation, an online informed consent was obtained from all participants, which explicitly mentioned the purpose of the study, the participant's rights and investigator's duties, procedures for data collection and management, assurance of confidentiality, and the contact of the principal investigator to ask questions;
- c) Before data collection, the research plan was submitted for consideration to the Ethical Review Boards of the Faculty of Psychology and Education Sciences of the University of Porto, Centro Materno-Infantil do Norte, and Dalhousie University, having received approval from all committees.

2.5. Measures

Across the five empirical studies we adopted a quantitative approach. The principal investigator, with close supervision of the supervisors, started by developing a questionnaire protocol which included questions oriented to collect data regarding sociodemographic variables and a set of self-report validated questionnaires evaluating different biopsychosocial aspects of pregnancy and postpartum experiences. Measures were carefully selected according to the following criteria: (1) have a self-report format; (2) are widely used instruments to assess the outcome measure; (3) demonstrate good psychometric properties; (4) have a Portuguese version available (in case they were not already translated and adapted for use with the Portuguese population, the corresponding validation study was planned and performed); and (5) are ideally short in order to reduce participant burden (e.g., anxiety or stress) to respondents. Using the method of talked reflection, the protocol was pre-tested in a group of 5 couples with similar characteristics to those of the study population and it was restructured based on their suggestions and remarks.

Throughout the survey, three attention-check items were included as a way to detect inattentive responders (Maniaci & Rogge, 2014). If participants did not respond correctly to at least two out of three of these items in a survey, they would be excluded from analysis; in total, only one participant was excluded due to this criterion. In addition, several items asking on facts about the couples' history or about the baby's characteristics

(e.g., “Where did you and your partner meet?”) were inserted to further increase the validity of responses and to ensure participants were indeed part of a couple. Participants were excluded if own and partner’s responses were inconsistent; only 8 couples, in total, were excluded for this reason.

For all studies and at all time-points, data were collected from both couple members. Participants were instructed to complete their survey independently from each other and within four weeks after having received it. Relevant assessment domains (i.e., aspects of individual’s emotional, sexual, and relational experiences) were collected through self-report questionnaires; labor and deliver characteristics (e.g., epidural, induction of labor, mode of delivery, episiotomy, perineal tear) data were collected via mothers’ self-report or, when available, via medical chart review in the Maternity Hospital. Table I lists the measures used in each one of the studies included in this thesis. A detailed description of all instruments and their respective psychometric properties are presented in the method sections of the studies presented in the following chapters (Chapters IV to VIII).

Table I

Measures used in each study

| | Study 1 | Study 2 | Study 3 | Study 4 | Study 5 |
|--|---------|---------|---------|---------|---------|
| Sociodemographic characteristics | x | x | x | x | x |
| Biological factors (e.g., labor and deliver characteristics, breastfeeding) | | | x | | x |
| Psychological factors (e.g., perceived stress, depression, anxiety, attitudes to sex during pregnancy) | x | x | x | | x |
| Social/relational factors (e.g., relationship quality, perceived social support) | x | | x | x | x |
| Sexual well-being domains | | | | | |
| Sexual frequency | x | x | x | | |
| Sexual function | x | | x | | x |
| Sexual satisfaction | x | x | x | x | |
| Sexual distress | | x | | x | x |

2.6. Data analysis

In this section, we provide a broad view of the analyses conducted across studies. Analyses were performed using the Statistical Package for the Social Sciences (SPSS v26.0, SPSS Inc, Chicago, IL), R (R Core Team, 2017), or MPlus (v8.6, Muthén & Muthén, 1998-2017). The range of analytical approaches across the different studies was broad. Although differing in terms of research questions, data, and study design, all studies in the current thesis share a common feature—they include data from both couple members and, thus, call for the use of dyadic data analysis procedures.

In general, and for all studies, we first calculated descriptive statistics to provide a general overview of the characteristics of each study's sample. Then, we approached the research questions of each study using specific analytical procedures. These procedures include the Actor-Partner Interdependence Model (APIM; Kenny, Kashy, & Cook, 2006), which permits the estimation of actor effects (e.g., the associations between mother's independent variable and mothers' own dependent variable) and partner effects (e.g., the associations between fathers' independent variable and mothers' dependent variable) and is therefore valuable to understand interindividual effects. The APIM was employed for both cross-sectional (Studies 1, 2, 3) and longitudinal (Studies 4 and 5) designs, either as a stand-alone analytical procedure or as the fundamental approach on which other analyses were built upon.

For instance, in Study 1 we made use of psychometric procedures to examine the validity and reliability of a measure of attitudes to sex during pregnancy (e.g., Confirmatory Factor Analysis, goodness of fit indices) as well as of the APIM to test the links between each partners' attitudes and the frequency of a series of sexual behaviors. In other studies, we examined within-couple (dis)similarity patterns (Study 2) by employing a procedure named dyadic response surface analysis (DRSA). This approach examines several aspects related to (dis)similarity patterns in dyads such as the degree (i.e., the magnitude of the difference between partners' attitudes) and direction (i.e., which member of the dyad presents the highest *versus* the lowest score) of partners' (dis)similarity in an examined variable. Finally, in longitudinal studies, we assessed average trajectories (i.e., pattern of longitudinal changes) in couples' sexual well-being by

estimating dyadic latent growth curve models (DLGCM) and identified latent classes of dyadic trajectories (i.e., groups of couples who follow similar trajectories of change in an outcome over time) by estimating dyadic latent class growth analysis (DLCGA). Both approaches allow us to examine dyadic patterns of change over time by combining the principles of Growth Mixture Modeling and of the APIM within a structural equation model.

CHAPTER IV. STUDY I

VALIDATION OF THE MATERNAL AND PARTNER SEX DURING PREGNANCY SCALES (MSP/PSP) IN PORTUGAL: ASSESSING DYADIC INTERDEPENDENCE AND ASSOCIATIONS WITH SEXUAL BEHAVIORS

Tavares, I. M., Heiman, J. R., Rosen, N. O., & Nobre, P. J.

Abstract

Background: The Maternal and Partner Sex During Pregnancy Scales (MSP/PSP) are self-report measures of expectant couples' attitudes towards sex during pregnancy.

Aim: This study aimed to examine dyadic non-independence of MSP/PSP scores in a sample of expectant couples, while providing an evaluation of factor structure, validity, and reliability of the Portuguese versions of the MSP/PSP. The association between partners' attitudes and frequency of sexual behaviors was also examined.

Methods: A total of 189 expectant couples completed a survey that included a sociodemographic questionnaire, the MSP/PSP, frequency of sexual behaviors, as well as validated measures of attitudes to sex, sexual function, sexual satisfaction, depression, and perceived social support.

Outcomes: Dyadic interdependence was tested via Pearson correlation between MSP/PSP scores; between-dyads variability was tested via intraclass correlation of the unconditional model including only MSP/PSP scores using a multi-level model. Associations between attitudes and sexual behavior were tested using regression analysis (between-dyads outcomes) or APIM (mixed outcomes). Factor structure, internal consistency, and validity (convergent, discriminant, and concurrent) of the Portuguese versions of the scales were assessed.

Results: MSP/PSP scores were interdependent within-dyads. Male partners presented significantly more positive attitudes towards sex during pregnancy than pregnant women. Attitudes were linked to indices of sexual well-being for both partners (sexual functioning, sexual satisfaction) and, for both partners, more positive attitudes were associated with higher frequencies of most partnered sexual behaviors. The Portuguese MSP/PSP scales showed good factor structure, and good to excellent indices of reliability and validity.

Clinical Implications: The Portuguese MSP/PSP is adequate for use in couples. The scales can be used to screen partners with negative attitudes towards sex during pregnancy and evaluate how these attitudes relate to intra- and inter-individual sexual well-being during pregnancy.

Strengths & Limitations: A strength of this study is the inclusion of both expectant partners and the use of dyadic analysis. Couples who participated in the study were all in mixed-gender/sex relationships, although this was not defined as an inclusion criterion. Future studies should use the MSP/PSP in more diverse samples in order to further determine how the scale performs for couples with different characteristics.

Conclusion: Scores in the MSP/PSP are interdependent between mixed-sex/gender expectant couple members. More positive attitudes towards sex during pregnancy are linked to higher frequencies of partnered sexual behaviors and to both partners' greater sexual well-being.

Keywords: attitudes toward sex, couples, pregnancy, dyadic interdependence, Portuguese version, psychometric properties, sexual behavior

During pregnancy, pregnant individuals and their partners are faced with a wide range of biological, psychological, and sociocultural changes that require their adaptation. One of the dimensions that needs couples' adjustment while pregnant is that of their sexual experiences and a critical factor that may be related to the observed changes in expectant couples' sexual well-being during early- and mid-pregnancy is the presence of negative attitudes toward having sex while pregnant. Prior studies have found that expectant couples who respond with positive affect to sexuality during pregnancy present indices of better adjustment postpartum (e.g., women are more likely to breastfeed, men are more likely be present during birth), including sexual adjustment (i.e., greater sexual interest, earlier resumption of intercourse; Fisher & Gray, 1988). Moreover, it is known that partners' well-being influence that of the other partner's in a reciprocal manner, a process designated of dyadic interdependence (Kenny et al., 2006). It is thus critical that studies take both expectant partners' attitudes to sex into account when examining relational processes such as those involved in couples' adjustment during pregnancy.

Pregnant women and their partners commonly refer several concerns about sex during pregnancy. Such concerns are often related to a misunderstanding about what constitutes safe sexual practices and the belief that vaginal intercourse may induce negative obstetric outcomes (e.g., preterm labor, miscarriage, harm to the fetus, infection). Although these concerns constitute common reasons for couples to abstain from sexual activity during pregnancy (Bartellas et al., 2000; Beveridge et al., 2018; Fok et al., 2005; Gökyildiz & Beji, 2005; Jawed-Wessel et al., 2016), for most couples – those without specific medical conditions – these concerns are not substantiated by medical reasons and are hence unfounded (Bartellas et al., 2000; Ekwo et al., 1993; Fok et al., 2005; Klebanoff et al., 1984; Sayle et al., 2001). Clinicians and researchers should be able to identify those with negative attitudes and misconceptions about having sex during pregnancy, since they might be at heightened risk of experiencing lower sexual well-being.

Assessing Maternal and Paternal Attitudes Towards Sex During Pregnancy

Negative attitudes towards sex during pregnancy are characterized by negative beliefs (e.g., having sex during pregnancy might cause pregnancy loss) and negative affect (e.g., feeling anxious) about having sex during pregnancy (Jawed-Wessel et al., 2016). To

assess these constructs, Jawed-Wessel and colleagues have designed the Maternal Sex During Pregnancy (MSP) and Partner Sex During Pregnancy (PSP). These self-report measures, originally validated in English and developed based on theory-based approaches of behavior change, allow the assessment of the pregnant individual's (MSP) as well as their partner's (PSP) attitudes relative to sex during pregnancy. The MSP includes six items and the PSP includes eight items, and both versions assess cognitive (e.g., "Having sex can cause a miscarriage") as well as affective (e.g., "I feel anxious about having sex because of the pregnancy") aspects of an individual's experiences. Both scales were shown to have a unidimensional structure.

When compared with other measures that have been used to assess attitudes towards sex during pregnancy, the combined use of the MSP and the PSP presents several advantages. First, studies tend to collect data only from the pregnant women, but not considering dyadic interactions within the couple (Beveridge et al., 2018), although one's beliefs and experiences are likely to be influenced by, and are interdependent with, those of their sexual partners (Jawed-Wessel et al., 2019; Rosen et al., 2018). A measure that permits the assessment of both couple members is therefore valuable. Also, most studies infer attitudes relying only on ad-hoc questionnaires or a single-item question (Naim & Bhutto, 2000; Uwapusitanon & Choobun, 2004) generally asking participants the extent to which they believe sexual intercourse will harm the pregnancy (Naim & Bhutto, 2000; Onah et al., 2002), ignoring other relevant concerns about sex during pregnancy. The Attitudes to Sex subscale of the Maternal/Paternal Adjustment and Maternal/Paternal Attitude During Pregnancy Questionnaire (MAMA-AS/PAPA-AS; Kumar et al., 1984) is a measure that assesses attitudes to sex during pregnancy relying on multiple items, but evaluates broad constructs such as desire and arousal in a specific time-frame (i.e., last month). Hence, this measure mostly reflects expectant couples' experiences and feelings *during* pregnancy (e.g., "Have you wanted to have sexual intercourse?"; "Have you felt you were easily aroused sexually?") instead of assessing the influence that pregnancy *has had* on their sexual experiences.

The MSP/PSP addresses these limitations by including multiple items assessing relevant attitudes regarding sex during pregnancy and comprising two versions that permit

the assessment of the pregnant person's and their partner's attitudes. A general assessment of one's attitude can be obtained using the MSP/PSP and the individual examination of each item can prove helpful to understand specific areas of difficulty for each partner. The MSP/PSP were designed to be gender/sex-neutral and can therefore be used with couples of diverse genders/sexual orientations. Although attitudes are often related to behavior and are likely to shape our experiences and preferences (Ajzen & Fishbein, 1980; Eagly & Chaiken, 1998; Fishbein & Ajzen, 1975), prior studies have mostly paid attention to the association between attitudes and couples' frequency of vaginal intercourse, but less so to other indices of sexual well-being.

Current Study

The goal of this study was to extend previous research by examining interdependence between couple member's attitudes towards sex during pregnancy and to examine whether MSP/PSP scores are associated with couples' indices of sexual well-being beyond vaginal intercourse. As such, the aims of the present study were threefold: (1) to validate the MSP/PSP in a sample of Portuguese expectant couples; (2) to test for dyadic non-independence between couple member's scores in the MSP/PSP; and (3) to assess the degree to which MSP/PSP scores are associated with both partners' several sexual behavioral self-reports (i.e., frequency of sexual behavior) during pregnancy. Using a dyadic approach, we tested for actor (i.e., association between own attitude and own frequency of sexual behaviors) and partner (i.e., association between own attitude and partners' frequency of sexual behaviors) effects. Few prior studies have analyzed these associations at a dyadic level, preventing us from posing specific hypotheses regarding partner effects. Still, given the link between expectant couples' attitudes and behavior during pregnancy (Jawed-Wessel et al., 2019) and the central role of fear that vaginal penetration might induce negative obstetric outcomes (Beveridge et al., 2018), we anticipated that more positive attitudes towards sex during pregnancy would be associated with higher frequencies of vaginal penetrative sexual behaviors but would not be associated with sexual behaviors that do not involve vaginal penetration (e.g., caressing, anal penetration). The screening and identification of partners with negative attitudes towards having sex while pregnant can contribute to a more comprehensive

understanding of both partners' adjustment to this period and to how sexual adjustment impacts partners' overall adjustment. This should better inform the development of effective clinical interventions interested in an early identification of preventable sexual changes.

Materials and Methods

Participants

Couples ($n = 189$) were recruited at regularly scheduled clinical appointments to gynecologists in an obstetrics outpatient unit, and through advertisements in newspapers, online/social media advertisements, and study flyers posted in the community (i.e., pregnancy-related services, clinic and hospital bulletin boards). Eighty-five percent of the study sample was recruited at the obstetrics outpatient unit, 12% recruited through advertisements, and 3% by word of mouth. To be eligible, both couple members were required to be 18 years of age or older, able to read and write in Portuguese, in a committed relationship with each other for at least six months, and both members of the couple had to agree to participate. One partner had to be currently pregnant with their first child (i.e., had not previously given birth or had any other biological children) and this should be a singleton pregnancy. Exclusion criteria included suffering from severe clinical conditions (i.e., psychiatric or medical pathology likely to interfere with the pregnancy). Because we aimed to extend the applicability of the MSP/PSP to couples who were not exclusively in the first few weeks of their pregnancy (as was the case with the original MSP/PSP validation study), we included couples who were in the first or second trimesters of pregnancy. As per the original validation of the MSP/PSP, only first-time parents were included, given that attitudes towards having sex during pregnancy are likely to be different for individuals who have had prior experience with sex during pregnancy. Eligibility criteria were determined using a brief screening questionnaire before the beginning of the survey.

Procedure

The present research received previous approval from the University of Porto's and the Centro Materno Infantil do Norte's institutional review boards and was part of a larger study examining factors associated with couples' sexual well-being during the

transition to parenthood. Recruitment occurred from June 2018 to March 2020. Participants recruited through community/media advertisements completed all the materials online. Participants enrolled in the obstetrics outpatient unit were recruited through gynecologists' referral. After their gynecological appointment, potentially eligible couples were invited to speak directly with the study coordinator present on-site, who introduced them to the study, explained the aims and the procedures, and provided them with a study flyer. Participants were asked to complete the survey online, which was sent to women and partners separately to their own email addresses. Upon following the URL link, participants provided informed consent online before beginning the survey. Both couple members were instructed to complete their surveys independently from each other and within four weeks of each other. After participation, each couple was compensated with 10€ in gift cards and received a list of online resources related to sexuality and relationships during the transition to parenthood.

Measures

Sociodemographics. Information on participants' age, education, sexual orientation, relationship status and duration, and pregnancy/obstetric history (women only) were collected. Each partner responded to these items individually.

Edinburgh Postnatal Depression Scale (EPDS). The EPDS (Cox et al., 1987) is a valid and reliable screening self-report measure of depressive symptoms during and after pregnancy. The total score of the EPDS can be used as a unidimensional assessment of depressive symptoms but three subdimensions (depression, anhedonia, anxiety) can also be calculated (Coates et al., 2017). The intensity of depressive symptoms within the previous seven days (e.g., "I have felt sad or miserable") is assessed using 10 items scored on a 4-point rating scale (e.g., 0 = *yes, most of the time* to 3 = *no, not at all*). Total scores can range from 0 to 30 with higher scores indicating greater intensity of depressive symptoms. The version used in this study is based on the Portuguese population adaptation for both women and men (Areias et al., 1996; Augusto et al., 1996) which demonstrates good internal consistency. In the present sample, Cronbach's alpha coefficient was .85 for women and .80 for men.

Female Sexual Function Index (FSFI). Women's sexual functioning across six domains (desire, arousal, lubrication, orgasm, satisfaction, and pain) was assessed using the well-validated 19-item FSFI (Pechorro et al., 2009; Rosen et al., 2000). Total scores range from 2 to 36 with higher scores indicating better sexual function. Based on current recommendations (Meyer-Bahlburg & Dolezal, 2007), women who reported no sexual activity ($n = 22$) were not included for analyses. The FSFI demonstrated high internal consistency ($\alpha = .96$) in the present study.

Frequency of Sexual Activities. Participants were asked about how often in the past four weeks they practiced each of several solo or partnered sexual activities using 9 items: vaginal penetration, solo masturbation, manual stimulation by partner, mutual masturbation, oral sex, kissing, caressing, anal penetration, and use of sex toys. Answers were assessed on a 6-point rating scale (1 = *never* to 6 = *at least once a day*), wherein higher scores indicate higher frequency.

Global Measure of Sexual Satisfaction (GMSEX). Sexual satisfaction was assessed using the well-validated 5-item GMSEX, a valid and reliable measure of sexual satisfaction in relationships (Lawrance & Byers, 1995; Pascoal et al., 2013). Scores range from 5 to 35, with higher scores indicating greater sexual satisfaction. Reliability in the current study was excellent ($\alpha_{\text{women}} = .96$, $\alpha_{\text{men}} = .97$).

International Index of Erectile Function (IIEF). The well-validated 15-item IIEF (Quinta Gomes & Nobre, 2012; Rosen et al., 1997) was used to measure men's sexual function across five domains (sexual desire, erectile function, orgasmic function, intercourse satisfaction, and overall satisfaction). Total scores range from 5 to 75 with higher scores indicating better sexual function. Men who reported no sexual activity ($n = 26$) were not included for analyses. The IIEF demonstrated high internal consistency ($\alpha = .95$) for this sample.

Maternal and Partner Sex During Pregnancy Scales (MSP/PSP). The MSP and the PSP (Jawed-Wessel et al., 2016) are self-report, unidimensional tools that assess attitudes of pregnant women and their sexual partners toward sex during pregnancy. Respondents are asked to indicate their experiences, thoughts and feelings about their sex life (e.g., "It is impossible to have an exciting sex life because of the pregnancy") on six (MSP) and eight items (PSP) scored on a 6-point Likert-type scale ranging from 1 (*strongly agree*) to 6

(*strongly disagree*). Items on each scale are averaged to obtain a global attitude score. Total scores can range from 1 to 6, with higher scores indicating a more positive sexual attitude toward having sex during pregnancy. The original scales demonstrate good construct validity and high reliability ($\alpha_{\text{MSP}} = .89$; $\alpha_{\text{PSP}} = .91$). In the present sample, Cronbach's alpha coefficient was .71 for the MSP and .81 for the PSP. After permission for translation and use from the original authors, the Portuguese version of the MSP and the PSP was produced. All items were first translated to Portuguese by two bilingual researchers and then back-translated to English by an independent mother-tongue language expert. The English translation was compared with the original questionnaire. The three translators discussed the backward translation and consensus was reached through discussion. Finally, the draft version was tested with 5 expectant couples not participating in the study. No additional revisions were deemed necessary, resulting in the final Portuguese version of the MSP/PSP.

Maternal/Paternal Adjustment and Maternal/Paternal Attitudes Questionnaire (MAMA/PAPA). The well-validated MAMA and PAPA scales (Figueiredo et al., 2004; Kumar et al., 1984; Pinto et al., 2015) measure expectant mothers' and fathers' adjustment and attitudes during pregnancy and after delivery in five different subscales. Only the Attitudes to Sex subscale (MAMA-AS/PAPA-AS) was relevant to this study. In this 11-item subscale, participants are asked to report how often they have experienced certain feelings during or about sexual activity in the past month. Scores range from 11 to 44 with higher scores indicating higher adjustment and more positive attitudes towards sex during pregnancy. Reliability in the current study was also high ($\alpha_{\text{MAMA-AS}} = .81$; $\alpha_{\text{PAPA-AS}} = .75$).

Multidimensional Scale of Perceived Social Support (MSPSS). Perceived social support received from three sources (family, friends, and significant other) was assessed using the well-validated 12-item MSPSS (Martins et al., 2012; Zimet et al., 1988). Total scores range from 12 to 72 with higher scores indicating higher perceived social support. Reliability in the current study was high for the total scale ($\alpha = .91$ for both women and men) and for the subscales (Family: $\alpha_{\text{women}} = .94$, $\alpha_{\text{men}} = .93$; Friends: $\alpha_{\text{women}} = .95$, $\alpha_{\text{men}} = .94$; and Significant Other: $\alpha_{\text{women}} = .94$, $\alpha_{\text{men}} = .91$).

Data Analysis

To examine the psychometric characteristics of the MSP and the PSP, we analyzed (1) factor structure, (2) internal consistency, and (3) construct and criterion validity. We assessed (1) factor structure of the scale using confirmatory factor analysis (CFA). To analyze model goodness of fit, we computed and assessed several indices according to recommendations (Browne & Cudeck, 1993; Hu & Bentler, 1999). A good model fit was considered if evidenced by a comparative fit index (CFI) and Tucker–Lewis Index (TLI) of at least .95, a Root Mean Square Error of Approximation (RMSEA) of .06 or less, and a Standardized Root Mean Square Residual (SRMR) of .08 or less; however, less stringent criteria of a reasonable fit (e.g., $RMSEA \leq .08$, $CFI \geq .90$, and $TLI \geq .90$) were also considered (Marsh et al., 2004). To examine (2) internal consistency, we performed analyses of Cronbach’s alpha coefficient, item–total correlation, and mean–item correlation. Good internal consistency was assessed following Field’s guidelines (Field, 2005): Cronbach’s alpha coefficients higher than .70, item-total correlations over .30, and mean–item correlations higher than .15. To examine (3) construct and criterion validity, we calculated Pearson correlations between MSP/PSP and other measures.

Within dyads non-independence of MSP and PSP scores was determined through Pearson correlation (Kenny et al., 2006). Between dyads variability in attitude scores was tested via the Intraclass correlation (ICC) of the unconditional model including only MSP/PSP scores using a multi-level model, where partners were nested within couples (Kenny et al., 2006). Finally, we examined attitudes towards sex during pregnancy as predictors of the frequency of diverse sexual behaviors. For between-dyads outcomes (i.e., same frequency for both couple members)—such as vaginal penetration, anal penetration, oral sex, mutual masturbation, kissing, and caressing—we tested frequency of sexual behaviors as a couple-level variable (average between both partners’ scores) via regression analysis. For mixed outcomes (i.e., frequency of sexual behavior varies both between and within dyads)—such as manual stimulation by the partner, solo masturbation, and use of sex toys—we estimated actor-partner interdependence models (APIM) via multi-level modelling, where partners were nested within couples (Kenny et al., 2006). MSP and PSP were used as predictors centered at the grand mean. Statistical analyzes were performed using SPSS v26.0 except for CFA which was performed using MPlus v8.0.

Results

The final sample comprised 189 expectant couples who ranged in age from 19 to 47 years old (women: *Mdn* = 30, *IQR* = 27–33; men: *Mdn* = 32, *IQR* = 28–35). A total of 31 participants were excluded for failing to meet the selection criteria ($n = 27$ women; $n = 4$ partners). Of the 226 couples that met eligibility criteria and initially agreed to participate, 15 couples had only one partner responding to the questionnaire, 5 couples had missing data for one partner representing more than 20% of a measure, and 17 couples withdrew before completing the survey, resulting in a final sample size of 189 (84%) couples. All couples were mixed-gender/sex, despite the study being advertised as inclusive of couples of all gender/sex. Sociodemographic characteristics of the sample are presented in Table 1. Self-reported frequencies for partnered and solo sexual behaviors are depicted in Table 2.

Table 1
Participants' sociodemographic characteristics (N = 378, 189 women)

| | Women | | Men | |
|------------------------------------|-----------------|----------|-----------------|----------|
| | Mdn or <i>n</i> | IQR or % | Mdn or <i>n</i> | IQR or % |
| Age (years) | 30 | 27–33 | 32 | 28–35 |
| Education (years) | | | | |
| ≤ 9 | 13 | 6.9% | 25 | 13.4% |
| 10 – 12 | 58 | 30.7% | 83 | 44.0% |
| > 12 | 118 | 62.4% | 81 | 42.6% |
| Professional status | | | | |
| Employed | 155 | 82% | 175 | 92.6% |
| Unemployed | 28 | 14.8% | 9 | 4.8% |
| Student | 6 | 3.2% | 5 | 2.6% |
| Self-identified sexual orientation | | | | |
| Exclusively heterosexual | 173 | 91.6% | 179 | 94.8% |
| Predominantly heterosexual | 16 | 8.4% | 8 | 4.2% |
| Bisexual | 0 | 0% | 2 | 1% |
| Other | 0 | 0% | 0 | 0% |
| Relationship status | | | | |
| Married | 77 | 40.8% | — | — |
| Common law | 56 | 29.6% | — | — |
| Dating | 56 | 29.6% | — | — |
| Living with partner | | | | |
| Yes | 172 | 91.0% | — | — |
| No | 17 | 9.0% | — | — |
| Relationship length (months) | 84 | 44–126 | — | — |
| Weeks pregnant | 20 | 14–23 | — | — |
| 7–12 | 85 | 45.0% | — | — |
| 13–24 | 104 | 55.0% | — | — |
| Planned pregnancy | | | | |
| Yes | 154 | 81.5% | — | — |
| No | 35 | 18.5% | — | — |
| High-risk pregnancy | | | | |
| Yes | 5 | 2.6% | — | — |
| No | 184 | 97.4% | — | — |

Table 2

Sexual behavior frequencies for pregnant women and male partners (N = 378, 189 women)

| | Women | | Men | |
|--------------------------------------|----------|------|----------|------|
| | <i>n</i> | % | <i>n</i> | % |
| Vaginal penetration | | | | |
| Never | 27 | 14.3 | 28 | 14.8 |
| About once a month | 20 | 10.6 | 16 | 8.5 |
| 2-3 times a month | 39 | 20.6 | 41 | 21.7 |
| 1-2 times a week | 83 | 43.9 | 75 | 39.7 |
| 3-6 times a week | 17 | 9.0 | 26 | 13.8 |
| Once a day or more | 3 | 1.6 | 3 | 1.6 |
| Solo masturbation | | | | |
| Never | 117 | 61.9 | 59 | 31.2 |
| About once a month | 21 | 11.1 | 22 | 11.6 |
| 2-3 times a month | 19 | 10.1 | 25 | 13.2 |
| 1-2 times a week | 28 | 14.8 | 52 | 27.5 |
| 3-6 times a week | 3 | 1.6 | 28 | 14.8 |
| Once a day or more | 1 | .5 | 3 | 1.6 |
| Manual stimulation by partner | | | | |
| Never | 69 | 36.5 | 79 | 41.8 |
| About once a month | 20 | 10.6 | 40 | 21.2 |
| 2-3 times a month | 30 | 15.9 | 22 | 11.6 |
| 1-2 times a week | 58 | 30.7 | 36 | 19.0 |
| 3-6 times a week | 9 | 4.8 | 11 | 5.8 |
| Once a day or more | 3 | 1.6 | 1 | .5 |
| Mutual masturbation | | | | |
| Never | 87 | 46.0 | 95 | 50.3 |
| About once a month | 14 | 7.4 | 22 | 11.6 |
| 2-3 times a month | 37 | 19.6 | 25 | 13.2 |
| 1-2 times a week | 39 | 20.6 | 34 | 18.0 |
| 3-6 times a week | 11 | 5.8 | 12 | 6.3 |
| Once a day or more | 1 | .5 | 1 | .5 |
| Oral sex | | | | |
| Never | 71 | 37.6 | 67 | 35.4 |
| About once a month | 37 | 19.6 | 36 | 19.0 |
| 2-3 times a month | 31 | 16.4 | 33 | 17.5 |
| 1-2 times a week | 41 | 21.7 | 38 | 20.1 |
| 3-6 times a week | 8 | 4.2 | 13 | 6.9 |
| Once a day or more | 1 | .5 | 2 | 1.1 |
| Kissing | | | | |
| Never | 2 | 1.1 | 1 | .5 |
| About once a month | 0 | 0 | 0 | 0 |
| 2-3 times a month | 4 | 2.1 | 3 | 1.6 |
| 1-2 times a week | 6 | 3.2 | 5 | 2.6 |
| 3-6 times a week | 14 | 7.4 | 20 | 10.6 |
| Once a day or more | 163 | 86.2 | 160 | 84.7 |
| Caressing | | | | |
| Never | 2 | 1.1 | 2 | 1.1 |

| | | | | |
|-------------------------|-----|------|-----|------|
| About once a month | 2 | 1.1 | 3 | 1.6 |
| 2-3 times a month | 6 | 3.2 | 6 | 3.2 |
| 1-2 times a week | 7 | 3.7 | 9 | 4.8 |
| 3-6 times a week | 25 | 13.2 | 29 | 15.3 |
| Once a day or more | 147 | 77.8 | 140 | 74.1 |
| Anal penetration | | | | |
| Never | 171 | 90.5 | 171 | 90.5 |
| About once a month | 15 | 7.9 | 14 | 7.4 |
| 2-3 times a month | 2 | 1.1 | 1 | .5 |
| 1-2 times a week | 0 | 0 | 1 | .5 |
| 3-6 times a week | 1 | .5 | 1 | .5 |
| Once a day or more | 0 | 0 | 1 | .5 |
| Use of sex toys | | | | |
| Never | 166 | 87.8 | 169 | 89.4 |
| About once a month | 14 | 7.4 | 17 | 9.0 |
| 2-3 times a month | 6 | 3.2 | 2 | 1.1 |
| 1-2 times a week | 1 | .5 | 0 | 0 |
| 3-6 times a week | 2 | 1.1 | 1 | .5 |
| Once a day or more | 0 | 0 | 0 | 0 |

MSP/PSP Factor Structure

Results of the CFA indicated an excellent fit of the unifactorial model for the MSP, $\chi^2(9) = 7.46$, $p = .49$, CFI = 1.00, TLI = 1.00, RMSEA = .00, SRMR = .03. Results showed an overall good fit of the unifactorial model for the PSP, $\chi^2(20) = 51.66$, $p < .001$, CFI = .93, TLI = .90, RMSEA = .09, SRMR = .05 (Hu & Bentler, 1999; Marsh et al., 2004). The modification indices suggested an improvement in model fit if the errors of PSP items 3 and 5 were allowed to covary (MI = 10.49; both items referred to finding previously

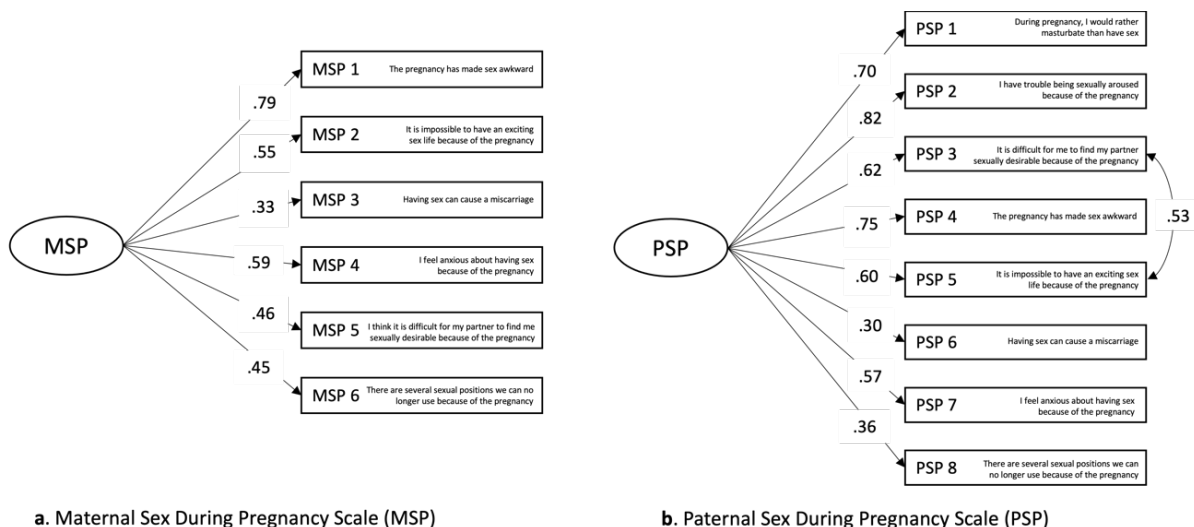


Figure 1. Path diagram of the one-factor structure of the MSP (a) and the PSP (b)

exciting aspects of sexual activity less arousing due to the pregnancy). Including this error covariance improved fit significantly, $\chi^2(19) = 41.43$, $p = .003$, CFI = .95, TLI = .93, RMSEA = .08, SRMR = .04. Factor loadings ranged from .33 to .79 for the MSP and from .30 to .82 for the PSP (see Figure 1a–b).

MSP/PSP Item Analysis and Internal Consistency

Item analysis for the MSP and PSP is presented in Table 3. Both scales demonstrated good internal consistency ($\alpha_{\text{MSP}} = .71$ and $\alpha_{\text{PSP}} = .81$). All items presented an item–total correlation $\geq .30$ and mean–item correlations were $\geq .15$ for both scales (see Table 3).

Table 3
MSP/PSP: Item analysis and internal consistency (N = 189 women and men)

| Item | M | SD | MIC | ITC | α IID |
|--|------|------|------|------|--------------|
| MSP ($\alpha = .71$) | | | .295 | | |
| 1. The pregnancy has made sex awkward | 4.05 | 1.46 | | .609 | .616 |
| 2. It is impossible to have an exciting sex life because of the pregnancy | 4.43 | 1.46 | | .459 | .668 |
| 3. Having sex can cause a miscarriage | 5.14 | .90 | | .363 | .699 |
| 4. I feel anxious about having sex because of the pregnancy | 4.70 | 1.35 | | .536 | .644 |
| 5. I think it is difficult for my partner to find me sexually desirable because of the pregnancy | 4.57 | 1.35 | | .377 | .693 |
| 6. There are several sexual positions we can no longer use because of the pregnancy | 3.31 | 1.57 | | .357 | .706 |
| Total MSP | 4.37 | .87 | | | |
| PSP ($\alpha = .81$) | | | .349 | | |
| 1. During pregnancy, I would rather masturbate than have sex | 4.62 | 1.31 | | .592 | .775 |
| 2. I have trouble being sexually aroused because of the pregnancy | 4.92 | 1.16 | | .698 | .760 |
| 3. It is difficult for me to find my partner sexually desirable because of the pregnancy | 5.28 | .93 | | .549 | .785 |
| 4. The pregnancy has made sex awkward | 4.74 | 1.27 | | .694 | .758 |
| 5. It is impossible to have an exciting sex life because of the pregnancy | 4.83 | 1.31 | | .566 | .779 |
| 6. Having sex can cause a miscarriage | 5.35 | .85 | | .301 | .814 |
| 7. I feel anxious about having sex because of the pregnancy | 4.98 | 1.07 | | .501 | .789 |
| 8. There are several sexual positions we can no longer use because of the pregnancy | 2.90 | 1.51 | | .355 | .810 |
| Total PSP | 4.70 | .78 | | | |

Note. M = mean, SD = standard deviation, MIC = mean–item correlation; ITC = item–total correlation; α = Cronbach’s alpha; IID = if item deleted.

MSP/PSP Validity

The MSP and the PSP showed moderate and positive correlations with attitudes to sex as measured with the MAMA-AS and PAPA-AS, respectively (see Table 4), indicating good convergent validity. The MSP/PSP also showed weak to non-significant correlations with both depression (EPDS) and perceived social support (MSPSS), demonstrating good discriminant validity. More positive attitudes towards sex during pregnancy were associated with one's own higher sexual function (IIEF/FSFI) and higher sexual satisfaction (GMSEX), showing good concurrent validity (see Table 5).

Table 4

MSP/PSP: Correlations between the MSP/PSP and attitudes to sex, depressive symptoms, and perceived social support (N = 189 women and men)

| | MSP | PSP |
|------------------------------------|-------|-------|
| Attitudes to sex (MAMA-AS/PAPA-AS) | .58** | .61** |
| Depressive symptoms (EPDS) | -.19* | -.12 |
| Perceived social support (MSPSS) | .10 | .15* |
| Family | -.02 | .09 |
| Friends | .10 | .14 |
| Significant other | .18* | .14 |

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

Table 5

MSP/PSP: Correlations between the MSP/PSP and sexual satisfaction and sexual functioning

| | MSP | PSP |
|--|-------|-------|
| Sexual satisfaction (GMSEX; $n = 189$ women and men) | .28** | .35** |
| Sexual functioning ($n = 167$ women and 163 men) | | |
| Total (FSFI) | .39** | — |
| Desire | .31** | — |
| Arousal | .43** | — |
| Lubrication | .12 | — |
| Orgasm | .22** | — |
| Satisfaction | .26** | — |
| Pain | .30** | — |
| Total (IIEF) | — | .35** |
| Sexual desire | — | .17* |
| Erectile function | — | .19* |
| Orgasmic function | — | .09 |
| Intercourse satisfaction | — | .30** |
| Overall satisfaction | — | .31** |

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

Dyadic Interdependence and Association with Sexual Behaviors

As expected, partners' attitude scores were significantly and moderately correlated ($r = .47, p < .01$), indicating within-dyads interdependence (Kenny et al., 2006). The unconditional model revealed that 41.4% of the variability in attitude scores was at a between-dyads level. Furthermore, gender differences were found between women's and men's attitudes, $t(188) = -5.45, p < .001$, with men reporting more positive attitudes towards sex during pregnancy ($M = 4.70, SD = .78$) than pregnant women ($M = 4.37, SD = .87$).

Only actor effects were found for the examined APIM models for mixed-outcomes. Both partners' more positive attitudes towards sex during pregnancy were associated with higher frequency of vaginal penetration ($B_{MSP} = .26, p < .001; B_{PSP} = .40, p < .001$), manual stimulation by partner ($B_{MSP} = .46, p < .001; B_{PSP} = .40, p < .01$), mutual masturbation ($B_{MSP} = .20, p < .05; B_{PSP} = .28, p < .01$), and oral sex ($B_{MSP} = .18, p < .05; B_{PSP} = .30, p < .01$), but were not associated with frequencies of solo masturbation ($p_{MSP} = .49, p_{PSP} = .31$), kissing ($p = .49$), caressing ($p = .07$), anal penetration ($p = .77$), or use of sex toys ($p = .13$).

Discussion

The MSP and PSP (Jawed-Wessel et al., 2016) are short unidimensional scales that allow the assessment of pregnant individuals' and their partners' attitudes toward sex during pregnancy based on the premise of interdependence between partners' scores. This study aimed to examine dyadic non-independence of MSP/PSP scores in a sample of expectant couples, while providing an evaluation of factor structure, validity, and reliability of the Portuguese versions of the MSP/PSP.

The present study suggested the Portuguese versions of the MSP and the PSP are reliable unidimensional self-report measures of maternal and paternal attitudes towards sex during pregnancy. Confirmatory factor analyses corroborated the unidimensional structure of both scales, resembling their original factor structure (Jawed-Wessel et al., 2016). Both scales demonstrated good indices of internal consistency and good to excellent indices of validity (convergent, discriminant, and concurrent). Compared to the original validation study, in which ratings across items were fairly homogenous, pregnant

women in the current sample demonstrated greater variability in the degree to which they endorsed the items comprised in the MSP, which might be related to the slightly lower Cronbach's alpha observed in the present study for the MSP. Both the MSP and the PSP presented good convergent validity, showing positive associations with the MAMA/PAPA Sexual Attitudes subscale scores. This was expected since both scales include items that have been used to measure partners' attitudes towards sex during the transition to parenthood (Jawed-Wessel et al., 2016; Kumar et al., 1984). The MSP and PSP were not correlated, for the most part, to distal constructs such as depression and perceived social support, indicating good discriminant validity. Taken together, these results support the construct validity of the scales. Results from this study also establish concurrent validity given that more positive attitudes towards sex during pregnancy were linked to higher sexual satisfaction and better sexual function (for most subscales as well as total score) for both pregnant women and their male partners, consistently with prior evidence (Fisher & Gray, 1988). These results demonstrate that the Portuguese versions of the scales can be used to assess couple members' levels of attitudes towards sex during pregnancy with adequate psychometric properties.

As predicted, partners scores on the MSP and the PSP were interdependent, giving emphasis to the assessment of both couple members' attitudes, a central aspect allowed by the use of the MSP/PSP scales. This result supports the hypothesis of these constructs being non-independent within dyads or, in other words, that one partner's attitudes towards sex during pregnancy likely inform the other's (Jawed-Wessel et al., 2019; Kenny et al., 2006; Rosen et al., 2018), which is relevant for future clinical as well as research advancements.

Still, current results also indicated that, overall, partners in mixed-gender/sex (male/female) couples were likely to present different attitudes towards sex during pregnancy according to their gender. In line with what is known regarding general attitudes toward sex (Geer & Robertson, 2005; Oliver & Hyde, 1993), male partners presented significantly more positive attitudes towards sex during pregnancy than pregnant women. Particularly in the context of pregnancy, women are more likely to be directly affected by the emerging physical changes (e.g., discomfort, perception of fetal

movements) which can further influence their sexual experiences (Corbacioglu et al., 2012) and shape their attitudes towards sex while pregnant. This gender difference in attitudes between male and female partners may partially explain the fact that variability in attitude scores was slightly higher within-dyads (i.e., between the individuals in the couple) than between-dyads (i.e., between the various dyads) and suggests that specific factors may be contributing to differences between women's and men's attitudes towards sex during pregnancy, an aspect which future studies may consider examining. Another remaining question from this study concerns the degree to which expectant partners' (i.e., the pregnant individual and their partner) congruence or agreement in their attitude toward sex during pregnancy poses specific benefits for their sexual well-being across the transition. Since couples' decision to engage or avoid sex during pregnancy is prominently interpersonal, couples' sexual well-being across pregnancy might be better accounted by the combination of *both* partners' attitudes, above and beyond the contribution of each partner's attitudes.

Attitudes comprise both cognitive and affective dimensions but are also assumed to influence one's behavior (Ajzen & Fishbein, 1980; Eagly & Chaiken, 1998; Jawed-Wessel et al., 2019). To further establish attitude's influence on partners' sexual experiences during pregnancy, we sought to test the associations between attitudes towards sex during pregnancy and the frequency with which couple members engaged in a variety of sexual activities. Results of the current study showed only intraindividual effects whereby women and men with a more positive attitude towards sex during pregnancy reported engaging more frequently in sexual behaviors involving women's genital area (i.e., vaginal penetration, manual stimulation by partner, mutual masturbation, and oral sex), whether these included vaginal penetration or not. No partner effects were found, suggesting that, although expectant individuals' attitudes are related to their own sexual behavior, they do not influence their partner's frequency of sexual behaviors above and beyond their partners' own attitudes. Indeed, as proposed by Ajzen & Fishbein (1980), the most proximal predictor of a behavior is our intention to perform it, which, in turn, depends on our own attitude toward that behavior. As such, individual attitudes toward sex during pregnancy may represent a more immediate focus for clinicians who wish to target expectant partners' sexual behavior avoidance/approach during pregnancy.

Current results also support that expectant individuals who refrain from sexual activity during pregnancy might do so because they fear that sexual activity might induce complications to the pregnancy (Bartellas et al., 2000; Beveridge et al., 2018; Jawed-Wessel et al., 2016; Uwapusitanon & Choobun, 2004). Interestingly, the type of sexual activities linked to couple members' attitudes not only comprised vaginal penetration but also included other sexual activities involving the vulvar region (i.e., manual stimulation by the partner, oral sex). This finding is novel and suggests that concerns about sex are likely to be of a wide range and can span from fear of negative obstetric events due to vaginal penetration (e.g., pregnancy loss or harm to the fetus) to concerns caused by other sexual activities that involve stimulation of the vulva (e.g., an infection). On the other hand, and consistent with our predictions, one's own or one's partner attitudes towards sex during pregnancy were not related to the frequency of engaging in other types of sexual behaviors such as caressing, kissing, solo masturbation, anal penetration, nor the use of sex toys, partially replicating previous findings (Jawed-Wessel et al., 2019). Still, we note that couples in this study reported engaging infrequently in some of these sexual behaviors (e.g., anal penetration, use of sexual toys), which is also consistent with previous findings with samples of expectant couples (Jawed-Wessel et al., 2019).

Although the present study provides the first validation of the MSP/PSP to the Portuguese context and offers noteworthy results on how attitudes towards sex relate to couples' sexual experiences during pregnancy, these results need to be interpreted considering a few limitations. The voluntary nature of the participation on a study about sexuality may have led to a selection bias, given that those who agreed to participate may, in fact, be those who feel more involved and satisfied with the pregnancy and with their sexual experiences (Trivedi & Sabini, 1998). Some characteristics of our sample are not representative of all newly expectant couples in Portugal. Although participants' marital status and age for having a first child are in line with the national data, most participants were highly educated. It is possible that higher levels of education might influence the attitudes that individuals present. Also, although this was not defined as an inclusion criterion, all couples who participated in the study were in mixed-gender/sex relationships and predominantly white/Caucasian. Thus, future studies should use the MSP and PSP in more diverse samples in order to further determine how the scale performs for couples

with different characteristics, including same-gender/sex couples and couples with more diverse socioeconomic (e.g., lower education levels, racial and ethnic minorities) characteristics.

Implications for practice and research

The scale MSP/PSP measures attitudes using statements phrased in a negative manner to which individuals are given the opportunity to agree or disagree with, but future studies might want to assess whether using statements phrased in a positive manner might influence the way in which individuals respond. Considering current and prior evidence of validity and reliability of the MSP/PSP, these instruments are valuable resources for researchers and clinical practitioners to assess both couple member's sexual attitudes during the transition to parenthood. The identification of misconceptions and negative attitudes towards sex during pregnancy may be fundamental to better understand the processes involved in both member's adjustment during this period. These attitudes may interact with other relevant factors during pregnancy—such as anxiety, the existence of previous miscarriage(s), or whether one's has experienced complications with the current pregnancy (Jawed-Wessel et al., 2016)—and act as possible mediators and moderators of couple's well-being. Thus, the early assessment of these dimensions may prove helpful to clarify existing worries and concerns and anticipate preventable changes in couples' sexuality while transitioning to parenthood.

Altogether, the present study's results highlight the importance of prenatal care providers to advise expectant couples that sexual activities present no significant risk to their pregnancy, including those that involve penetration. Sexual activity may, in fact, assist couples in maintaining intimacy and relationship quality (McNulty et al., 2015; Yucel & Gassanov, 2010) throughout pregnancy, aspects which have been found to predict couples' positive adjustment postpartum (Lorenz et al., 2020). Researchers and clinicians are presented with a timely opportunity to assess sexual concerns with both members of expectant couples. The use of the MSP/PSP is one way of detecting and targeting such concerns.

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Conflict of Interest

The authors report no conflicts of interest.

Statement of Authorship

Conceptualization, I.M.T., P.J.N.; Methodology, I.M.T., P.J.N.; Investigation, I.M.T., P.J.N.; Writing – Original Draft, I.M.T.; Writing – Review & Editing, I.M.T., J.R.H., N.O.R., P.J.N.; Funding Acquisition, I.M.T., P.J.N.; Supervision, J.R.H., N.O.R., P.J.N.

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CHAPTER V. STUDY 2

**IS EXPECTANT COUPLES' SIMILARITY IN ATTITUDES TO SEX
DURING PREGNANCY LINKED TO THEIR SEXUAL WELL-BEING?
A DYADIC STUDY WITH RESPONSE SURFACE ANALYSIS**

Tavares, I. M., Barros, T., Rosen, N. O., Heiman, J. R., & Nobre, P. J.

Abstract

Despite sexual activity being safe for the majority of expectant couples (i.e., the pregnant individual and their partner), negative attitudes toward having sex during pregnancy are common and are related to lower sexual well-being across this vulnerable life period. Using dyadic response surface analysis in a sample of 254 first-time expectant couples, we examined the degree to which expectant partners demonstrate similar *versus* dissimilar attitudes to sex during pregnancy and whether specific patterns of couples' similarity in attitudes may uniquely contribute to their sexual satisfaction and sexual distress. Couples' more positive attitudes (i.e., the more both partners perceived sexual activity as non-threatening to their pregnancy), rather than partners' similarity in attitudes, were associated with lower sexual distress for both partners and higher sexual satisfaction for male partners. In couples where partners held more dissimilar attitudes, men demonstrated greater distress when their female partner's attitudes were more positive than their own. To promote sexual well-being during pregnancy, interventions should assist couples to attain stronger positive attitudes to sex during pregnancy by targeting concerns about sex in both expectant partners.

Keywords: attitudes to sex, couples, pregnancy, sexual distress, sexual satisfaction

Couples' sexual relationships are likely to change during pregnancy, a period of marked psychosocial adjustment for both the pregnant individual and their partner. Over the course of pregnancy, as much as 90% of women and 83% of men reduce the frequency of their sexual behaviors, including vaginal intercourse (Hyde et al., 1996; Jawed-Wessel & Sevick, 2017; von Sydow, 1999), up to 63% of women and 76% of men report decreased sexual satisfaction (Erol et al., 2007; von Sydow, 1999), and 42% of women report clinically significant sexual distress (i.e., negative emotions about one's own sex life, including frustration, worry, or guilt; Vannier & Rosen, 2017). The experience of sexual difficulties during pregnancy increases the chances of also experiencing sexual problems postpartum (Dawson et al., 2020), which may have critical consequences for couples' later sexual and relationship quality (e.g., Fisher et al., 2015; McNulty et al., 2016). One prevailing factor that may contribute to the sexual changes observed during pregnancy is the experience of misconceptions and anxiety about having sex during pregnancy. Concerns about having sex during pregnancy are commonly expressed by both women and men and are frequently indicated as motives to refrain from sexual activity during pregnancy (Bartellas et al., 2000; Beveridge et al., 2017; Jawed-Wessel et al., 2016; Nakić Radoš et al., 2015). In a systematic review examining the sexuality of expectant couples, these fears were the most frequently provided reason for sexual problems during pregnancy (von Sydow, 1999). However, for most couples – those without specific medical conditions – sexual activities present no significant risk to their pregnancy, including those that involve vaginal penetration (Jones et al., 2011; Klebanoff et al., 1984; Sayle et al., 2001), making these concerns unwarranted.

Attitudes towards Sex During Pregnancy and Couples' Sexual Well-being

Negative attitudes towards sex during pregnancy are characterized by negative beliefs (e.g., having sex might endanger the pregnancy) and the experience of negative affect (e.g., feeling anxious) towards having sex while pregnant (Jawed-Wessel et al., 2016). These attitudes represent an evaluation of sex as potentially harmful to the pregnancy and are largely based on the belief that vaginal intercourse may cause negative obstetric outcomes (e.g., pregnancy loss, membrane rupture, bleeding) or could harm the fetus' or the pregnant partner's health (e.g., injuries, maternal infection). These cognitions, paired

with the concomitant experience of negative emotions (e.g., anxiety), may lead individuals to consider partnered and, especially, penetrative sex as something that should be avoided (Jawed-Wessel et al., 2016).

The type of attitude that each partner holds toward having sex during pregnancy has been found to contribute to dimensions of their sexual well-being, which typically comprises frequent emotional experiences of mutual sexual pleasure—sexual satisfaction—as well as absent or infrequent negative emotions regarding their sexuality—sexual distress. Expectant women and men who report more positive attitudes toward having sex while pregnant also report greater sexual satisfaction during this period (Jawed-Wessel et al., 2019). On the other hand, individuals who express greater fears that sex could harm their pregnancy are more likely to avoid sexual activities as a result and to experience greater sexual distress (Beveridge et al., 2017; Jawed-Wessel et al., 2016, 2019). Although these prior studies indicate a clear contribution of the individual's attitudes to their sexual well-being during pregnancy, the decision that couples make to engage in sex (or not) is embedded in an interpersonal context in which the other person's thoughts and feelings are also relevant (Mark et al., 2020). As such, the couples' sexual adjustment to pregnancy might be affected by the combination of *both* partners' attitudes toward sex, above and beyond the contribution of each person's attitudes (Kenny et al., 2006).

Furthermore, normative roles regarding who initiates sex may also be at play during pregnancy. While men typically assume the role of the initiator of sex, women typically assume the traditional role of being more passive and restrictive of men's sexual advances (Clark & Hatfield, 1989; Hendrick & Hendrick, 1995; Kiefer & Sanchez, 2007; Nobre & Pinto-Gouveia, 2003; O'Sullivan & Byers, 1992). These roles may influence the extent to which both partners adhere to more *versus* less positive attitudes towards sex during pregnancy and are likely to influence the couple's decision either to engage or not engage in sex during this period. Taking a dyadic approach to understanding differences can elucidate the mechanisms underlying these potential gender dissimilarities.

The few studies using a dyadic approach (i.e., assessing both couple members) to examine couples' attitudes toward sex during pregnancy demonstrated mixed findings as to whether partners of pregnant women hold fewer or more concerns about sex during

pregnancy than the pregnant women themselves. Some studies indicate no gender differences between partners' attitudes in mixed-sex/gender couples (Jawed-Wessel et al., 2016, 2019). Another study showed that male partners hold more sexual concerns than those typically reported by pregnant women (Nakić Radoš et al., 2015), although this study did not collect dyadic data and thus could not test for within-dyads differences. However, these studies have examined group sex/gender differences, rather than similarity vs dissimilarity between members of the couple (i.e., whether one partner demonstrates significantly more positive attitudes than the other partner). Sex/gender differences do not inform us as to whether within-couple differences in the magnitude or direction of attitudes to sex matter to each partner's sexual satisfaction and/or distress. As the decision each couple makes about having or not having sex depends on the combination of each partners' attitudes, the degree of similarity between partners might be a better indicator of how expectant couples navigate their motivations for (avoiding) sex.

Similarity in Attitudes between Partners

Interdependence in dyadic processes assumes that, in the context of close relationships, an individual's outcomes are intertwined with the needs, thoughts, and motives of the other person (e.g., Rusbult & Van Lange, 2008). First-time expectant couples are faced with the novel situation of navigating their sexual lives in the context of pregnancy. The combination between both partners' attitudes toward sex during pregnancy, rather than the independent effect of their individual characteristics, may therefore be fundamental to better understand both partners' sexual satisfaction and distress.

Being similar to one's partner on several characteristics and preferences (e.g., demographic variables, physical attractiveness, sexual attitudes) has been linked to greater individual and relational well-being, including satisfaction with life, relationship quality and stability, and importantly, sexual satisfaction (Acitelli, et al., 2001; Arrindell & Luteijn, 2000; Cupach & Metts, 1995; Montoya et al., 2008; Wilson & Cousins, 2003). Partners in romantic relationships are likely to share similar attitudes toward sex (Cupach & Metts, 1995), and social-cognitive theories have proposed that similarity between partners poses

benefits for them individually as well as for their relationship (e.g., Anderson et al., 2003; Lawrance & Byers, 1995). For instance, the theory of emotional convergence proposes that higher similarity between partners is advantageous because it makes them better able to understand each other (Anderson et al., 2003). Individuals whose attitudes are similar may experience comparable cognitions and feelings relative to a specific situation and are therefore more likely to be responsive in the face of a distressing event (Anderson et al., 2003; Gaunt, 2006; Smith et al., 1993), such as the onset of new sexual concerns related to pregnancy. Indeed, aspects such as greater dyadic empathy and perceived partner responsiveness have been found to contribute to couples' greater sexual and relationship satisfaction during the transition to parenthood (Rosen et al., 2016, 2020). Taken together, both interdependence theory and the theory of emotional convergence suggest that when a partner does not present an attitude similar to our own, this difference might be associated with negative feelings (such as confusion and anxiety) because it creates inconsistency and does not validate one's view of the world (Festinger, 1957; Montoya et al., 2008). Through this process, negative affect is elicited and one's beliefs and expectations about the situation (or about the other person's reactions to the situation) are challenged.

Testing (Dis)Similarity in Dyads

When both members of a dyad report similar or congruent scores on a particular variable of interest, dyadic similarity is assumed. In contrast, when partners report dissimilar responses, this incongruent combination is interpreted as dissimilarity. To examine partners' similarity, previous research has resorted to several indexes, including difference scores (i.e., algebraic differences, $X_{\text{female}} - X_{\text{male}}$), discrepancy scores (i.e., absolute or squared differences, $|X_{\text{female}} - X_{\text{male}}|$ or $(X_{\text{female}} - X_{\text{male}})^2$), profile correlations, and interaction terms (i.e., moderate regression analysis). The limitations of these approaches, however, preclude them from answering the question of whether attitude similarity between partners matters for their sexual outcomes (for a detailed discussion, see Gaunt, 2006; Schönbrodt et al., 2018). Among these limitations is the fact that these approaches often assume a linear relationship between predictor and outcome (Edwards, 2007), leaving out the possibility of assessing nonlinear (e.g., curvilinear) relationships. Another

important limitation is that they do not accurately assess the best possible fit between partner's attitudes and each of the examined outcomes, a question to which dyadic response surface analysis (DRSA) provides answers to.

By employing DRSA, we are able to examine several aspects related to (dis)similarity patterns in dyads. Partners can be similar at low levels (i.e., both hold a less positive attitude to sex during pregnancy), at medium-levels, or at high levels (i.e., both hold a very positive attitude to sex during pregnancy). The *degree* of (dis)similarity refers to the magnitude of the difference between partners' attitudes. For instance, in the case of dissimilarity between partners, a greater *degree* of dissimilarity denotes a greater absolute difference between both individuals' scores on a variable, in such a way that the greater the difference, the more both partners differ on their attitudes (e.g., one partner holds extremely positive attitudes, whereas the other partner holds extremely negative attitudes). Another relevant aspect examined by DRSA is the *direction* of this dissimilarity, which refers to the member of the dyad who presents the highest *versus* the lowest score on the examined variable (e.g., in same-sex/gender couples where partners show significantly dissimilar attitudes, pregnant women hold lower and their partners hold higher scores, or vice-versa). By testing these aspects while taking into account within-dyad interdependence and the estimation of non-linear effects (Schönbrodt et al., 2018), DRSA assesses whether and which patterns of correspondence between partners' own ratings of sexual attitudes in pregnancy are associated with each partners' sexual satisfaction and sexual distress.

The current study

In the current study, we sought to extend the existing literature in several ways. Using a dyadic design, we first assessed the degree of similarity *versus* dissimilarity that expectant couples (i.e., the pregnant individual and their partner) demonstrated in attitudes toward sex during pregnancy. Second, we examined whether couples' degree and direction of similarity/dissimilarity in attitudes was associated with each partner's sexual satisfaction and sexual distress by employing DRSA. Considering prior evidence, it is possible that couples who are similar at more positive levels of attitudes may experience better sexual outcomes than couples who are similar at less positive levels of

attitudes. But it is also possible that couples' overall level of attitudes matters more to their sexual outcomes than being similar. Given that no prior studies tested this question, we did not pose specific hypotheses regarding strict/broad similarity patterns (Humberg et al., 2019), i.e., whether similarity matters above and beyond the overall level of couples' attitudes. These patterns were therefore assessed in an exploratory manner. Still, based on prior research (Anderson et al., 2003; Beveridge et al., 2017, Jawed-Wessel et al., 2016, 2019), we expected that when both partners hold more positive attitudes to sex during pregnancy, then both members of the couple would also experience greater sexual well-being (higher satisfaction and lower sexual distress) compared to when both partners hold less positive attitudes. Regarding dissimilarity, we expected that larger degrees of dissimilarity between partners would be linked to poorer outcomes relative to smaller degrees of dissimilarity. Whether expectant partners' sexual outcomes are significantly different depending on who is the higher vs lower partner on attitudes was examined in an exploratory manner.

Method

Participants

Inclusion criteria for eligible couples were: 1) age over 18; 2) able to read and write in Portuguese; 3) in a committed relationship with each other for at least six months; 4) one partner currently pregnant with their first child (i.e., had not previously given birth or had any other biological children). Exclusion criteria included: 1) suffering from severe clinical conditions (i.e., psychiatric or medical pathology likely to interfere with the pregnancy) assessed by self-report as well as clinical charts when available; 2) pregnancy over 24 weeks; 3) high-risk or multiple pregnancy. The exclusion of participants based on these criteria was due to the fact that couples dealing with interfering medical conditions, high-risk pregnancies, or in later stages of pregnancy are likely to experience more prominent changes to their sex lives during pregnancy (e.g., Bartellas et al., 2000; Jawed-Wessel & Sevic, 2017; von Sydow, 1999) and these would thus constitute potential confounding variables.

The final sample comprised 254 first-time expectant couples who ranged in age from 19 to 47 years old (women: $M = 29.90$, $SD = 4.75$; men: $M = 31.56$, $SD = 4.85$). Of

the initially recruited sample ($n = 610$), 182 potential interested couples were not enrolled (i.e., declared to be uninterested after hearing about the study or withdrew at the initial stage of the survey). A total of 35 potential participants ($n = 29$ women; $n = 6$ partners) were excluded after screening because they did not meet the inclusion criteria. Of the eligible sample of couples ($n = 393$), 120 couples had only one partner responding to the survey, 17 couples had missing data for one partner representing more than 20% of a measure (Newman, 2003), and 2 couples had experienced pregnancy loss between screening and enrollment; these participants were not included in the final sample. Compared to their included counterparts, participants who responded to the survey without the participation of their partners were younger, were more likely to report history of recurrent pregnancy loss, reported a lower household income, and higher levels of depressive symptoms. No significant differences were found for any other individual (e.g., educational level, psychiatric/physical health status or history) or relational (e.g., relationship status and duration, living with partner, dyadic adjustment) aspects. Although the study was advertised as inclusive of couples of all genders and identities, all couples were mixed-gender/sex². Sociodemographic characteristics of the sample are presented in Table I.

There is no established consensus regarding required sample sizes for DRSA, as the necessary sample size depends on the (co)variance estimates and effect sizes (i.e., actor and partner effects) of the model and, to date, no power analysis tool exists for DRSA. Therefore, we followed recommendations for non-dyadic RSA models combined with simulation results using the Actor Partner Interdependence Model (APIM) power calculator (Ackerman et al., 2016). Recommendations for non-dyadic RSA models suggest a sample size of at least $n = 200$ individuals so that a single parameter would explain the additional variance when all other parameters are held constant in a squared difference model (Schönbrodt et al., 2018). Recommendations also suggest a sample size of at least two times the size that would be necessary to detect linear effects of the predictors (Aiken & West, 1991). A power simulation using APIMPower (Ackerman et al., 2016)

²No participants identified as gay/lesbian, and all were currently in a mixed-gender/sex relationship. For this reason, we do not refer to participants collectively as heterosexual but describe couples as being in mixed-gender/sex relationships.

indicated that one would need a minimum of 121 dyads to have adequate power (i.e., 0.80) to detect medium ($r = .25$) actor and partner effects in a standard APIM. The current sample size ($n = 254$ dyads) exceeds the minimum criteria of both recommendations.

Table 1
Sample Sociodemographic Characteristics (N = 508 Individuals; 254 Couples)

| Characteristics | Women | | Men | |
|--|----------------|---------|----------------|---------|
| | M or n (Range) | SD or % | M or n (Range) | SD or % |
| Age (years) | 29.90 (19–41) | 4.75 | 31.56 (20–47) | 4.85 |
| Education (years) | | | | |
| ≤ 9 | 19 | 7.5% | 39 | 15.5% |
| 10 – 12 | 82 | 32.3% | 108 | 42.0% |
| > 12 | 153 | 60.2% | 107 | 42.5% |
| Professional status | | | | |
| Employed | 213 | 83.9% | 233 | 91.7% |
| Unemployed | 32 | 12.6% | 15 | 5.9% |
| Student | 9 | 3.5% | 6 | 2.4% |
| Household income (€/month) | | | | |
| 0 – 629 | 19 | 7.5% | 15 | 5.9% |
| 630 – 1,259 | 84 | 33.1% | 78 | 30.7% |
| 1,260 – 2,514 | 128 | 50.3% | 129 | 50.8% |
| 2,515 – 5,029 | 21 | 8.3% | 30 | 11.8% |
| ≥ 5,030 | 2 | 0.8% | 2 | 0.8% |
| Self-identified sexual orientation | | | | |
| Exclusively heterosexual | 236 | 92.9% | 242 | 95.3% |
| Predominantly heterosexual | 16 | 6.3% | 10 | 3.9% |
| Bisexual | 2 | 0.8% | 2 | 0.8% |
| Relationship status | | | | |
| Married | 101 | 39.8% | — | — |
| Common law | 72 | 28.3% | — | — |
| Dating | 81 | 31.9% | — | — |
| Living with partner | | | | |
| Yes | 236 | 92.9% | — | — |
| No | 18 | 7.1% | — | — |
| Relationship length (months) | 87.65 (6–261) | 55.77 | — | — |
| Weeks pregnant | 22.64 (20–24) | 1.23 | — | — |
| Planned pregnancy | | | | |
| Yes | 203 | 79.9% | — | — |
| No | 51 | 20.1% | — | — |
| Obstetric history | | | | |
| Infertility | 15 | 5.9% | — | — |
| Recurrent pregnancy loss | 0 | 0% | — | — |
| Fetal malformation | 2 | 0.8% | — | — |
| Neonatal death | 4 | 1.6% | — | — |
| Experience of any complications during pregnancy | | | | |
| Yes | 15 | 5.9% | — | — |
| No | 239 | 94.1% | — | — |

Procedure

First-time expectant couples were recruited from June 2018 to September 2020 as part of a larger study on sexuality and relationships during the transition to parenthood. Some results of the larger study have been previously published (Tavares et al., 2021) but did not focus on dyadic similarity in attitudes toward sex during pregnancy. Participants were recruited at regularly scheduled clinical appointments to gynecologists in an obstetrics outpatient unit ($n = 207$ couples, 82%) as well as through online/social media advertisements and study flyers posted in the community (i.e., pregnancy-related services, clinic and hospital bulletin boards; $n = 47$ couples, 18%). Participants recruited through community/media advertisements completed all the materials online. Participants enrolled in the obstetrics outpatient unit were recruited through gynecologists' referral. After their gynecological appointment, potentially eligible couples were invited to speak directly to the study coordinator present on-site who described the study. If interested and eligible, participants were asked to complete the survey online, which was sent to both partners separately to their own email addresses. Upon following the URL link, participants provided informed consent online before beginning the survey. When one member of the couple completed the survey, the participant was asked to provide the other couple member's e-mail address as well as a couple identifying code. This information was stored in a secure database, separate from their survey responses, and was used to link both couple members' data once both had completed the survey. The other member was then e-mailed a questionnaire link to the survey and was asked to include the couple identifier code so that both partners' data could be linked. Three attention-check items were included throughout the survey (Maniaci & Rogge, 2014). If participants did not respond correctly to at least two of these three items, they would be excluded from the sample; no participants were excluded due to this criterion. Couple members were instructed to complete their surveys independently from each other and within four weeks after receiving it. To promote couples' participation and engagement with the study, all participants who had not yet completed the survey received phone call (at 2-3 days and at 2 weeks after the survey was sent) and email (at 1 week and at 3 weeks) reminders. Each couple was compensated with a 10€ gift card as part of the larger study and, after completion of the study, individuals received a list of resources related to sexuality and

relationships during the transition to parenthood. The study received approval by the ethical review boards at the Faculty of Psychology and Educational Sciences at the University of Porto and at the Centro Materno-Infantil do Norte.

Measures

Sample characteristics. Both partners reported on relevant sociodemographic data (e.g., age, education, household income, relationship status and duration). Each partner responded to these items individually.

Attitudes towards sex during pregnancy. The Maternal and Partner Sex during Pregnancy Scales (MSP/PSP; Jawed-Wessel et al., 2016) are self-report, unidimensional measures that assess attitudes of pregnant women and their sexual partners toward sex during pregnancy. The MSP/PSP comprises an assessment of cognitive (e.g., “Having sex can cause a miscarriage”) as well as affective (e.g., “I feel anxious about having sex because of the pregnancy”) aspects related to having sex during pregnancy. Respondents are asked to report on their experiences using 6 (MSP) and 8 items (PSP) scored on a 6-point scale (1 = *strongly agree* to 6 = *strongly disagree*). Items on each scale are averaged to obtain a global attitude score. Total scores range from 1 to 6, with higher scores indicative of a more positive attitude toward having sex during pregnancy. This measure has demonstrated good psychometric properties (Jawed-Wessel et al., 2016; Tavares et al., 2021) and showed good internal consistency in the current sample ($\alpha_{\text{women}} = .74$, $\alpha_{\text{men}} = .83$).

Frequency of sexual activities. Frequency of engaging in solo or partnered sexual activities was assessed on a six-point rating scale (1 = *never* to 6 = *at least once a day*) by asking participants how often in the preceding four weeks they engaged in vaginal penetration, solo masturbation, manual stimulation by partner, mutual masturbation, oral sex, kissing, caressing, anal penetration, and use of sex toys. Scores range from 1 to 6, with higher scores indicative of higher frequencies.

Sexual Satisfaction. Respondents completed the Global Measure of Sexual Satisfaction (GMSEX), a widely used, valid and reliable self-report measure of sexual satisfaction in relationships (Lawrance & Byers, 1995; Pascoal et al., 2013). GMSEX

comprises five 7-point bipolar scales in which participants assess the sexual relationship with their partner (*Good/Bad, Pleasant/ Unpleasant, Positive/Negative, Satisfying/Unsatisfying, and Valuable/Worthless*). Total scores range from 5 to 35, with higher scores indicative of greater sexual satisfaction. Reliability in the current study was excellent ($\alpha_{\text{women}} = .96$, $\alpha_{\text{men}} = .97$).

Sexual distress. The well-validated Female Sexual Distress Scale (FSDS; Derogatis et al., 2002) is a self-report measure that assesses distress relative to one's sexual life in the last month. The FSDS uses 13-items rated on 5-point scales (e.g., "How often did you feel distressed about your sex life?", 0 = *never* to 4 = *always*). Total scores range from 0 to 52, with higher scores denoting greater sexual distress. A total score greater than 11 for women and greater than 19.5 for men is considered indicative of clinically significant distress associated with sexual problems (Derogatis et al., 2002; Santos-Iglésias et al., 2018). The FSDS has demonstrated good psychometric properties and showed excellent internal consistency in our sample ($\alpha_{\text{women}} = .95$, $\alpha_{\text{men}} = .94$).

Data Analysis

Descriptive statistics were calculated with the Statistical Package for the Social Sciences (SPSS v26.0). To examine our hypotheses about how similarity in attitudes towards sex during pregnancy relate to expectant partners' sexual satisfaction and sexual distress we used DRSA, an approach that builds on the actor-partner interdependence model (APIM; Kenny et al., 2006) and employs polynomial regression to plot the associations in a three-dimensional space using response surface analysis (RSA; Edwards, 2007; Humberg et al., 2019). The DRSA models as well as the surface plots were estimated in R (R Core Team, 2017; Schönbrodt et al., 2018) using the maximum likelihood estimator and the full information maximum likelihood for missing data treatment. The de-identified data and syntax for the DRSA analyses are available at: <https://osf.io/myh7n/>

As per Shanock and colleagues' guidelines (2010), we first centered the variables (i.e., MSP and PSP scores) around the midpoint of the scale (i.e., 3.5) and created squared versions of these centered variables as well as a product term (i.e., the interaction between pregnant woman's scores and partners' scores on attitudes). These five variables

(woman's attitude, man's attitudes, squared versions of women and men attitudes, and their interaction), were entered as predictors of each partners' sexual satisfaction and sexual distress (see Figure 1).

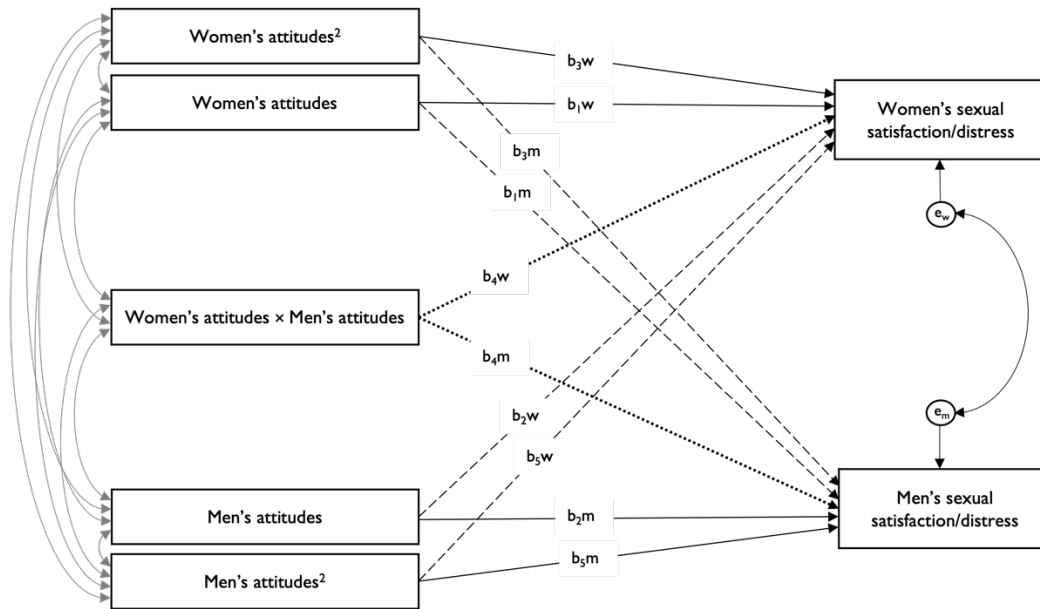


Figure 1. Dyadic polynomial regression model testing for similarity effects between expectant partners' attitudes to sex during pregnancy and both partners' sexual satisfaction and sexual distress. Solid lines represent actor effects, dashed lines represent partner effects, and dotted lines represent statistical partner interactions.

The DRSA uses these polynomial regression coefficients to calculate four response surface parameters ($a1$, $a2$, $a3$, and $a4$). These parameters permit the creation of the three-dimensional response surface plot, a graphical representation that illustrates the level of each partners' outcome (i.e., sexual satisfaction and sexual distress) for different combinations of both partners' attitudes. The $a1$ surface value tests for the slope of the *line of congruence* (LOC, i.e., the line where couples are perfectly similar at different levels of attitudes). A significant and positive $a1$ indicates that couples with more positive attitudes report *higher* levels of sexual satisfaction/distress than couples with less positive attitudes, whereas a significant and negative $a1$ indicates that partners' more positive attitudes are associated with *lower* sexual satisfaction/distress compared to less positive attitudes. We expected $a1$ to be significant and positive for sexual satisfaction and significant and negative for sexual distress, for both partners. The $a2$ parameter tests for a nonlinear effect along the LOC. No previous research is available to support hypotheses

regarding a nonlinear effect of the LOC, but the a_2 surface value further informs about potentially dissimilar effects on extreme values of similarity. A significant a_2 would indicate that similarity at extreme levels of attitudes has different effects than similarity at mid-levels (i.e., nonlinear effect) for expectant partners' sexual satisfaction and sexual distress.

The a_3 and a_4 coefficients provide complementary information about the effects of attitude dissimilarity on expectant couples' sexual satisfaction and distress. These parameters test two aspects of the *line of incongruence* (LOIC, i.e., the line where couples are most dissimilar at different levels of attitudes): the slope (i.e., the direction of dissimilarity; a_3) and the curvature (the degree of dissimilarity; a_4). The a_3 provides information as to whether attitude dissimilarity in one direction—the pregnant individual holds more positive attitudes toward sex during pregnancy than the partner—is better than in the other direction—the partner has more positive attitudes than the pregnant individual—for couple's sexual well-being. Positive a_3 values would indicate that when one's own attitude is more positive than a partner's attitude, that person will report a higher outcome compared to when a partner's attitude is more positive than their own, whereas negative a_3 values would indicate that when a partner's attitude is more positive than one's own attitude, that person will report a higher outcome compared to when one's own attitude is more positive. A significant a_4 would indicate whether, overall, sexual well-being increases or decreases more sharply as attitudes between partners diverge. We anticipated that a larger attitude dissimilarity would be linked to poorer sexual well-being relative to smaller degrees of dissimilarity and, as such, we expected a_4 to be significant and negative for sexual satisfaction (i.e., sexual satisfaction would decrease as the degree of attitude dissimilarity increases) and significant and positive for sexual distress (i.e., sexual distress would increase as the degree of attitude dissimilarity increases).

Evidence of similarity patterns (i.e., when similarity between partners matters more to their sexual well-being than the couples' overall level of attitudes) cannot be inferred from surface values in isolation. To determine that similarity between partners is linked to the best sexual well-being (higher satisfaction and lower distress) above and beyond the overall level of attitudes for the couple, several conditions must be satisfied (Humberg et

al., 2019). Strict and broad similarity patterns should satisfy additional conditions; for interpretation of evidence on strict/broad similarity effects, see Humberg et al. (2019). For an overview of the RSA method and interpretation of the $a1-a4$ coefficients, see Barranti et al. (2017) and Schönbrodt et al. (2018).

Results

Preliminary analyses

We first inspected the percentage of similar *versus* dissimilar dyads. To do so, we followed current guidelines (Shanock et al., 2010) and standardized scores for each predictor variable (MSP and PSP) across genders and then computed the difference between the two standardized scores. Those dyads with an absolute difference larger than 0.5 z-points between male and female scores were considered a ‘dissimilar couple’ (Shanock et al., 2010). Of the 254 couples in the current sample, 31.6% showed similarity in attitudes scores, whereas 68.4% demonstrated dissimilarity in attitudes towards sex during pregnancy (34.1% of couples had pregnant women reporting more positive attitudes than men and 34.3% of couples had men reporting more positive attitudes than pregnant women). We also examined the existence of multivariate outliers using Cook’s distance (Schönbrodt et al., 2018; Bollen & Jackman, 1985) and detected none. Therefore, we proceeded to test our key predictions.

Descriptive statistics and correlations for all study variables are displayed in Table 2. All within-dyads scores were positively correlated at moderate to high levels, suggesting within-dyads interdependence. Moderate to strong correlations were also found for all between-partner scores indicating that, for pregnant women and their male partners alike, attitudes to sex during pregnancy were significantly associated with sexual satisfaction (positively) and sexual distress (negatively).

Dyadic Response Surface Analysis

Table 3 presents the results of the dyadic polynomial regression coefficients and the surface tests; the surface parameters are the key tests of our predictions. Figures 2 and 3 show the response surface plots, depicting how combinations of actor’s (on the x-axis) and partner’s (on the y-axis) attitudes toward sex during pregnancy relate to women’s and men’s sexual satisfaction and sexual distress (on the z-axis), respectively.

Table 2
Descriptive Statistics and Bivariate Correlations Among the Study Variables (N = 254 Couples)

| Variable | 1 | 2 | 3 |
|------------|--------------|--------------|--------------|
| 1. MSP/PSP | .43** | .24** | -.31** |
| 2. GMSEX | .32** | .56** | -.60** |
| 3. FSDS | -.42** | -.55** | .40** |
| Range–W | 1.83–6.0 | 13–35 | .0–40 |
| Range–M | 2.25–6.0 | 5–35 | .0–35 |
| Mean–W | 4.24 | 30.34 | 8.46 |
| Mean–M | 4.61 | 29.38 | 6.22 |
| SD–W | .90 | 5.01 | 9.05 |
| SD–M | .81 | 5.53 | 7.18 |
| Skewness–W | -.21 | -1.08 | 1.21 |
| Skewness–M | -.53 | -1.02 | 1.36 |
| Kurtosis–W | -.55 | .55 | .64 |
| Kurtosis–M | -.34 | 1.02 | 1.47 |

Note. Within-dyads correlations are represented on the diagonal (in bold), within-women correlations are represented above the diagonal, and within-men correlations are represented below the diagonal. W = women, M = men.

** $p < .01$

Table 3
Dyadic Polynomial Regression Coefficients and Response Surface Parameters of Both Partners' Attitudes towards Sex during Pregnancy on Sexual Satisfaction and Sexual Distress (N = 254 Couples)

| Outcome | Dyadic Polynomial Regression Coefficients | | | | | | Response Surface Parameters | | | |
|---------------------|---|------------------------------|-------------------------------|---------------|-----------------|---------------|-------------------------------|---------------|----------------------------|----------------|
| | b_0 | b_1W | b_2M | b_3W^2 | $b_4W \times M$ | b_5M^2 | $a1$ | $a2$ | $a3$ | $a4$ |
| Sexual satisfaction | | | | | | | | | | |
| Women | 28.80 (.62)*** | 1.51 (.76)* | .02 (.85) | -.11 (.37) | -.31 (.63) | .48 (.47) | 1.54 (1.09) | .06 (.57) | 1.49 (1.20) | .68 (1.16) |
| Men | 26.83 (.73)*** | 1.52 (.85)* | 1.36 (.88) | -.23 (.36) | -.19 (.71) | .24 (.52) | 2.88 (1.20)** | -.18 (.60) | .16 (1.23) | .20 (1.31) |
| Sexual distress | | | | | | | | | | |
| Women | 11.63 (1.08)** * | -3.55 (1.33)* * | -.22 (1.56) | .32 (.60) | .55 (.94) | -.72 (.81) | -3.77 (1.88)* | .15 (1.08) | -3.33 (2.20) | -.94 (1.68) |
| Men | 10.44 (1.01)** * | -.45 (.85) | -3.87 (1.20)** * | .07 (.41) | -.08 (.69) | .21 (.64) | -4.32 (1.34)** * | .20 (.62) | 3.42 (1.60) * | .36 (1.35) |

Note. Polynomial regression coefficients ($b_1 - b_5$) are unstandardized b-weights but can be interpreted as standardized β -weights due to the prior pooled-standardization across partners. Standard errors are provided for all coefficients in brackets. Response surface parameters ($a1 - a4$) are calculated using coefficients $b_1 - b_5$; it is based on $a1 - a4$ parameters that our hypotheses are examined. W = woman, M = men.

* $p < .05$, ** $p < .01$, *** $p < .001$

Sexual satisfaction

Results from the DRSA for sexual satisfaction showed a significant positive $a1$ surface value for men (see Table 3) and no significant surface values for women. Thus, for women, attitude similarity between partners was not linked to their own sexual satisfaction. Men's response surface pattern indicated that men's sexual satisfaction was significantly different when couple members matched at higher versus lower levels of positive attitudes (see Figure 2B). Men's sexual satisfaction was higher in couples where both partners matched on more positive attitudes toward sex during pregnancy than in couples where both partners matched on less positive attitudes toward sex during pregnancy. Since the surface value $a4$ was not significantly different from zero, we found no evidence that the degree of dissimilarity in attitudes between partners was significantly linked to higher or lower sexual satisfaction.

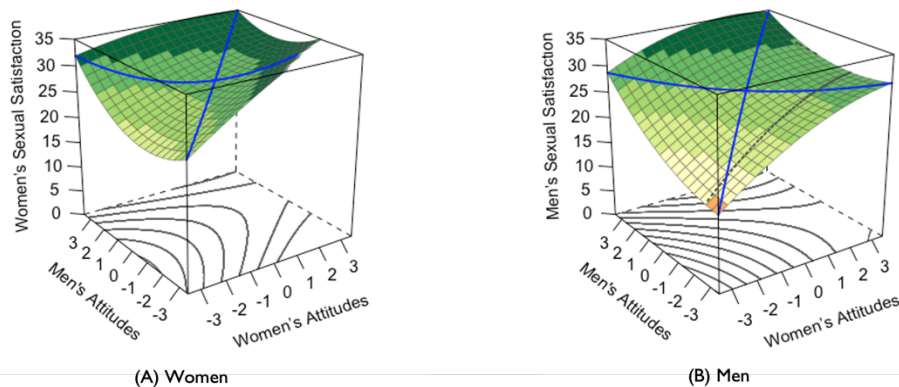


Figure 2 (A–B). Dyadic response surface plots for the association between a person's own and his or her partner's attitudes to sex during pregnancy and sexual satisfaction. Sexual satisfaction for all possible combinations of perfect similarity between partners' attitudes is depicted on the blue vertical line (i.e., the line of congruence, LOC) that connects the front corner (the similar low/low combination) to the back corner (the similar high/high combination) of the cube. The surface above the LOC reveals how sexual satisfaction behaves for varying values of $X = Y$; the pattern here, with the top end at a higher value of sexual satisfaction, indicates that greater similarity in higher positive attitudes is associated with higher sexual satisfaction than similarity in lower positive attitudes ($a1$). The LOC is best represented by a linear, and not curvilinear, association ($a2$).

Sexual distress

The DRSA on sexual distress indicated a significant negative $a1$ for both women and men (see Table 3). As expected, this value suggests that both women and men reported lower sexual distress when both members of the couple held more positive attitudes compared to couples where both partners held less positive attitudes to sex during pregnancy (see Figures 3A–B). Additionally, a significant positive $a3$ was found for men indicating that, for men’s sexual distress, the *direction* of dissimilarity between partners’ attitudes mattered. When couple members presented dissimilar attitudes, men reported significantly higher sexual distress when their female partners held more positive attitudes than them, compared to when they held more positive attitudes toward sex during pregnancy than their female partners (see Figure 3B).

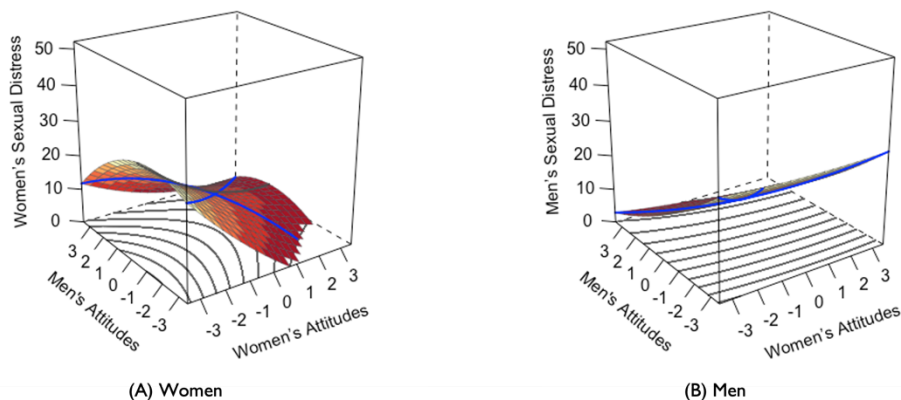


Figure 3 (A–B). Dyadic response surface plots for the association between a person’s own and his or her partner’s attitudes to sex during pregnancy and sexual distress. In relation to our results for $a1$, the line of congruence—that connects the front corner (the similar low/low combination) to the back corner (the similar high/high combination) of the cube—reflects the association between attitude similarity and sexual distress. The top end (front most corner) of this line is at a higher value of sexual distress. This indicates that partners’ greater similarity in lower positive attitudes is associated with greater sexual distress than partners’ similarity in higher positive attitudes. This response surface interpretation reflects the same pattern of results for women’s and men’s sexual distress; in both cases this line is depicted by a linear, and not a curvilinear, association ($a2$). The line of incongruence—that connects the left corner (the dissimilar high/low combination) to the right corner (the dissimilar low/high combination) of the cube—depicts sexual distress for all possible combinations of perfect dissimilarity between partners’ attitudes. For men, the slope of the line of incongruence ($a3$) indicates that the right side is higher than the left side; this suggests that men’s distress is higher when women’s attitudes are more positive than their own.

Ruling out alternative explanations

We conducted an additional set of analyses to test whether confounding variables that might be related to expectant partners' levels of sexual satisfaction and sexual distress during pregnancy could better account for our effects. We assessed the association between our outcome variables and potential sociodemographic and contextual covariates including age, education level, household income, relationship duration, pregnancy weeks, and experience of self-reported complications with the pregnancy. None of these factors correlated with the dependent variables at $> .30$. As prior research indicates that age (Haavio-Mannila, & Kontula, 1997), relationship length (Schmiedeberg, & Schröder, 2016), and pregnancy complications (Shaffir, 2006) may be particularly linked to couples' sexual satisfaction and/or distress, we re-ran all analyses while controlling for these variables. All of the observed effects for sexual satisfaction and sexual distress remained significant, indicating that our effects were not driven by these contextual factors.

We also assessed whether the observed effects were explained, at least partially, by couples' frequency of sexual activities (in the preceding four weeks). For between-dyads activities such as vaginal penetration, oral sex, mutual masturbation, anal penetration, kissing and caressing (i.e., same frequency for both couple members) we used the average between both partners' scores as a couple-level variable. For activities such as manual stimulation by the partner, solo masturbation, and use of sex toys (i.e., frequency of sexual behavior varies both between and within dyads) we used partners' individual reports. Only three specific types of sexual activity, all partnered, were significantly related with both partners' attitudes as well as with their sexual satisfaction and sexual distress: vaginal penetration, masturbation by partner, and mutual masturbation. The remaining sexual activities were either inconsistently or unrelated to predictor and outcome variables. As such, we re-ran the main analyses while controlling for frequency of vaginal penetration, masturbation by partner, and mutual masturbation. The inclusion of these variables in the model additionally explained 12.7% of women's and 13.1% of men's variance in sexual satisfaction (total variance explained: 20%, 25.7% for women and men, respectively) and 5.1% of women's and 3.6% of men's variance in sexual distress (total variance explained: 15.7%, 21.7% for women and men, respectively).

Upon controlling for frequency of sexual activities on the DRSA model of sexual satisfaction, the previously significant a_1 parameter for men was no longer significant ($b = .66$, $SE = 1.17$, $p = .58$). This result indicates that, for men, part of the association between similarity with their partners at higher levels of attitudes and their own greater sexual satisfaction was a result of increased frequency of vaginal penetration and increased frequency of masturbation by their female partners. For the DRSA model of sexual distress, the previously significant a_3 effect for men remained significant ($b = 3.35$, $SE = 1.63$, $p = .04$), indicating that the effects of direction of attitude dissimilarity on men's sexual distress were not driven by how frequently couples have sex. Women's a_1 ($b = -1.46$, $SE = 1.98$, $p = .46$) and men's a_1 ($b = -2.87$, $SE = 1.51$, $p = .06$) ceased to be significant, suggesting that, for both partners, similarity at higher *versus* lower levels of attitudes ceased to be associated with own levels of sexual distress the more frequently couples had sex.

Discussion

In a large sample of first-time expectant couples, and employing DRSA, we demonstrated that, in couples where both partners hold more positive (*versus* less positive) attitudes toward sex during pregnancy, women and men were less distressed and men were more satisfied with their sexual lives during pregnancy. The current findings were robust to contextual factors such as age, relationship duration, and the experience of pregnancy complications, and are consistent with previous research indicating that positive attitudes to sex during pregnancy are linked to greater individual sexual well-being (Jawed-Wessel et al., 2016, 2019). At the same time, the current dyadic results extend past research by demonstrating that having *both* expectant partners perceiving sexual activity as less threatening may be beneficial for the sexual well-being of the couple. Couples in which both partners shared more positive attitudes toward sex during pregnancy experienced greater sexual well-being, a finding that is in accordance with social-cognitive models such as the theory of emotional convergence (Anderson et al., 2003; Gaunt, 2006), and that poses relevant clinical implications.

Whether it is the pregnant individual or their partner who views sex as more harmful to their pregnancy has been tentatively examined in prior research (Jawed-Wessel

et al., 2016, 2019; Nakić Radoš et al., 2015), but these effects are better clarified by using advanced models of couple similarity. We found that in a third of couples (34.1%), pregnant women reported more positive attitudes than men, in another third (34.3%) men reported more positive attitudes than pregnant women, while another third of couples (31.6%) reported very similar attitudes. This finding is novel and reinforces the importance of expecting variability in expectant couples' concerns and cognitions about sex while pregnant (Beveridge et al., 2017; Nakić Radoš et al., 2015). In mix-gender/sex couples, it may be equally possible for both partners to disagree on the concerns about sex during pregnancy—on either direction—as it is for the pregnant women to present the same level of concerns as their partner. As such, an assessment of *both* partners' concerns about potential negative outcomes of sex during pregnancy is advisable.

A central purpose of this study was to examine whether the levels of similarity in expectant couples' attitudes to sex during pregnancy were related to each partner's levels of sexual satisfaction and distress. Overall, current findings do not support the idea that individuals who are similar to their partner in attitudes toward sex during pregnancy are more satisfied and less distressed than those who are dissimilar but, instead, indicate that it is the overall *level* of attitudes for the couple that matters to both partners' sexual well-being. In the case of couples who share similar attitudes, as expected, having both members of a couple share more positive attitudes toward sex during pregnancy was relevant for both partners' sexual well-being. Specifically, both partners experienced lower sexual distress and men experienced greater sexual satisfaction. Couples who share positive attitudes (which include more positive beliefs and feelings about having sex while pregnant) may be more congruent in how they adapt their sexual activities in the context of pregnancy as well as in their efforts to cope with novel, potentially distressing events (e.g., bleeding after penetration, women's perception of intense contractions after orgasm). Furthermore, partners who share comparable cognitive-emotional responses to a novel sexual situation, as is sex during pregnancy, are more likely to be responsive to the other's concerns and to offer validation and support in ways that may be more in line with the other partner's needs and expectations (Anderson et al., 2003; Rosen et al., 2016, 2020), thereby increasing satisfaction and reducing the impact of negative sexually-related feelings toward sex that can emerge across this period.

An exception to this pattern was found for pregnant women's sexual satisfaction that, unlike our expectation, was not related to the similarity between partners on attitudes. Indeed, the APIM results support that pregnant women's sexual satisfaction is associated with their own level of attitudes (intrapersonal effects) but was not associated with those of their partners (no interpersonal effects). During pregnancy, women typically experience a greater number of changes (e.g., tiredness, breast tenderness, changes in physical appearance) that may affect their sexuality both physically and psychologically (Johnson, 2011; Pauls et al., 2008; Trutnovsky et al., 2006). Our results suggest that women's sexual satisfaction during pregnancy might be more strongly affected by their experienced individual changes—such as physiological changes, body image concerns due to the emerging bodily alterations, and their own attitudes to sex (Johnson, 2011; Pauls et al., 2008)—and less informed by their similarity to their partners' attitudes.

A novel finding of this work concerns the effect of expectant couples' attitude dissimilarity on men's sexual distress. Minimal research has dedicated attention to sexual distress in expectant couples, although distress is a necessary marker for sexual dysfunction and an important indicator of concerning sexual changes. Prior studies assessing pregnant women's sexual distress found it to be prevalent (e.g., Vannier & Rosen, 2017) but fewer studies have examined male partners' sexual distress. We found that, in couples where partners showed dissimilar attitudes toward sex during pregnancy, it was not the *magnitude* of dissimilarity that mattered for their sexual well-being, but rather the *direction* of this dissimilarity. Men demonstrated greater distress when women's attitudes were more positive than their own, compared to when their own attitudes were more positive than those of women. In other words, this finding indicates that, for men, their own levels of sexual distress during pregnancy are related to which partner demonstrates the least positive attitudes toward having sex. Men who hold less positive attitudes feel more anxious about having sex and believe it to have undesirable consequences (e.g., "Having sex can cause a miscarriage"). When their partners do not endorse these attitudes to the same extent and feel more comfortable about engaging in sex than them, men may feel they are the "gatekeeper" of sex during this period. These men may feel negative responses to their partners' attempts to engage in sex (e.g., they may feel pressured to comply or feel guilty about declining sex; Sutherland et al., 2015) or

they even might consider that the responsibility to avoid negative sexual outcomes and to safeguard the women's and baby's well-being is predominantly on them. Another possibility is related to the sexual beliefs widely reported by men, namely concerning the pressure to perform (e.g., "A real man has sexual intercourse very often") and to guarantee women's sexual satisfaction (e.g., "A man who doesn't sexually satisfy a woman is a failure"; Nobre & Pinto-Gouveia, 2003). If these men endorse such typical masculine beliefs about sex, then they might be prone to experience higher sexual distress when their female partner is more willing to have sex despite the pregnancy, as they might feel it is more difficult and stressful to decline sex. In any case, these couples' attitude discrepancy might lead men to experience greater negative affect toward sex (e.g., worry, guilt, frustration, anger) during this life period. Although this finding indicates that being dissimilar to one's partner on attitudes to sex during pregnancy matters for men's sexual distress during pregnancy, it should be noted that this is only the case for those couples where members report significant differences in attitudes between partners.

Demonstrating more positive attitudes to sex during pregnancy was also linked, for both couple members, to higher frequencies of partnered sexual activities such as vaginal penetration, mutual masturbation, and masturbation by one's partner, partially corroborating prior research findings (Jawed-Wessel et al., 2019). Interestingly, we found that, in the case where couples match at more positive levels of attitudes, the increased frequency of specific sexual behaviors (i.e., vaginal penetration and expectant women masturbating male partners more frequently) contributed to explain men's greater levels of satisfaction. Promoting these behaviors in tandem with targeting couples' attitudes toward sex during pregnancy might therefore prove beneficial to increase men's sexual satisfaction during this period. Having sex more frequently also helped to lessen the effect of less positive attitudes on higher sexual distress for both partners, suggesting that couples who hold less positive attitudes but nonetheless engage more frequently in sex are likely to report lower sexual distress during this period. Finally, in the particular case where women hold more positive attitudes to sex than their male partners, men's greater sexual distress was unrelated to how frequently they have sex.

Strengths and limitations

Current results are valuable as they result from a large sample of couples and from the use of a novel analytical approach that simultaneously examines both the magnitude and direction of differences, which permits going beyond the limited approach of testing difference scores (Edwards, 2007). Still, this work is not without limitations. First, the current study was aimed at describing these relationships in a cross-sectional manner. Although attitudes are theorized as cognitive-affective dimensions that inform an individual's evaluation of a specific idea or situation (e.g., Ajzen & Fishbein, 1977; Eagly & Chaiken, 1993), the current study cannot confirm causality between attitude discrepancy and couples' sexual satisfaction and distress. Causal links may be tested, for instance, using longitudinal designs, and further studies might want to examine additional mediators of the pathway between these variables (e.g., frequency of sexual activities, frequency of occurrence of negative events such as bleeding after penetration, perceived partner responsiveness), which will inform theory and clinical protocol development. Also, future studies might want to examine whether it is the joint importance of cognition and affect as a global attitude toward sex that matters, as our study suggests, or whether there are attitudinal subdimensions (i.e., particular cognitions and affective responses) that prove the most relevant. Second, most sociodemographics of our sample are in line with characteristics of couples who are having a first child, including in the Portuguese national context (i.e., age, marital status, and socioeconomic status), but an exception to that is participants' relatively high education level, which may influence the attitudes they reported. Also, our sample consisted of couples in mixed-gender/sex relationships who were not distressed at clinical levels and who were mostly sexually satisfied; therefore ceiling effects may limit response variance. Finally, we did not specifically assess strict dyadic invariance between the MSP/PSP scales in the current work, and therefore cannot exclude the possibility of results being partially explained by measurement model differences. Future studies might want to extend the examination of this questions to couples with more diverse socioeconomic (e.g., sexual, racial and ethnic minorities, and of lower socio-economic status) and obstetric (e.g., couples struggling with fertility) characteristics and in both satisfied and distressed relationships.

Implications

A remaining question from this study concerns the ways in which attitudes toward sex during pregnancy might longitudinally affect sexual well-being from pregnancy to postpartum. This question is relevant since previous work has found that better sexual well-being during pregnancy seems to protect against sexual difficulties postpartum in women (Dawson et al., 2020). The attitudes that couples present toward their sex life while pregnant might constitute a factor that, if targeted early, may help to alleviate or prevent these negative longitudinal trajectories. From a clinical perspective, this study provides relevant information on the interpersonal effects that these attitudes might have on both partners' sexual well-being. Worries and concerns related to sex are pervasive during pregnancy but are still rarely discussed with health professionals (Jawed-Wessel & Sevick, 2017). Interest in sex and sexual activity may assist couples in maintaining intimacy and relationship quality (Cao et al., 2019; Cheung et al., 2008; Fisher et al., 2015; McNulty et al., 2016), which in turn may contribute to a positive adjustment postpartum and ultimately benefit both the partners and the child's well-being. Clinician advice has the potential to debunk inaccurate information that contributes to couples' negative attitudes and to change how women and their partners integrate sexual interactions and intimacy over the course of their pregnancy. Given the current evidence of the negative effects on both partners' sexual well-being, clinicians are encouraged to target pregnant women's as well as their partner's concerns about sex during pregnancy. Clinicians should strive to address sexual concerns in *both* couple members as part of their routine assessment protocols and these should be normalized by sharing valid information (e.g., a couple with a low-risk pregnancy should not expect negative obstetric outcomes from having sex; sexual activity will not harm the baby nor endanger the pregnant women's health). The current findings contribute to support evidence-based sexual education, assessment, and intervention during the transition to parenthood and highlight that the inclusion of both members of the couple may be fundamental in this process.

Conclusions

We demonstrated that couples' more positive attitudes, rather than partners' similarity in attitudes, were associated with lower sexual distress for both pregnant

women and their partners and higher sexual satisfaction for male partners during pregnancy. The development of interventions promoting sexual satisfaction and reducing sexual distress during pregnancy should consider targeting attitudes to sex in *both* expectant partners, considering an interpersonal approach.

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Conflict of Interest

The authors report no conflicts of interest.

Statement of Authorship

Conceptualization, I.M.T., P.J.N.; Methodology, I.M.T., P.J.N.; Investigation, I.M.T., P.J.N.; Writing – Original Draft, I.M.T.; Writing – Review & Editing, I.M.T., J.R.H., N.O.R., P. J.N.; Funding Acquisition, I.M.T., P.J.N.; Supervision, J.R.H., N.O.R., P.J.N.

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CHAPTER VI. STUDY 3

SEXUAL WELL-BEING AND PERCEIVED STRESS IN COUPLES TRANSITIONING TO PARENTHOOD: A DYADIC ANALYSIS

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Abstract

Background/Objective: The transition to parenthood encompasses several psychological and relational changes that might contribute to couples' high levels of stress postpartum. Although common across the postpartum, couples' sexual changes are frequently overlooked.

Method: We surveyed 255 mixed-sex new parent couples to examine the associations between sexual well-being—sexual satisfaction, desire, and postpartum sexual concerns—and perceived stress postpartum. Couples completed self-report questionnaires assessing perceived stress and sexual well-being.

Results: For both mothers and fathers, greater sexual satisfaction was associated with their partners' lower perceived stress and, for fathers, this was also associated with their own lower perceived stress. For mothers, greater partner-focused sexual desire was associated with their own lower perceived stress whereas, for fathers, greater partner-focused sexual desire was associated with their partners' higher perceived stress. In addition, greater solitary sexual desire and postpartum sexual concerns were associated with both parents' own higher perceived stress.

Conclusions: This study highlights the association between sexual well-being and couples' postpartum stress, suggesting that more positive sexual experiences are linked to lower perceptions of stress across this vulnerable period. Couples' sexual well-being may be an important target for interventions aimed at helping postpartum couples cope with stress.

Keywords: couples, cross-sectional descriptive study, perceived stress, postpartum, sexual well-being

The transition to parenthood is a demanding and stressful life transition that may place couples at risk for psychological and relational problems (Da Costa et al., 2019; Doss & Rhoades, 2017; Vismara et al., 2016). Novel challenges arise during this transition (e.g., breastfeeding, fatigue/sleep deprivation, parenting decisions, couple members' changing roles and responsibilities) which may create an intense threat or demand on the individual and/or couple (Doss & Rhoades, 2017). Depending on individual, relational, or contextual factors, such challenges might be perceived as exceeding one's coping resources, thus affecting individual or dyadic functioning in a process designated as "stress" (Ben-Zur, 2019; Lazarus & Folkman, 1984). Increased stress postpartum is associated with mothers' decreased sensitivity to and engagement with their infants' cues (Clowtis et al., 2016; Shin et al., 2008) and to mothers' and fathers' postpartum depression (Da Costa et al., 2019; Vismara et al., 2016). Stress has also been found to hinder couples' relationship functioning and longevity (Randall & Bodenmann, 2017).

Sexual well-being during the transition to parenthood

The postpartum period also impacts couples' sexual well-being, but changes to the sexual relationship during the transition to parenthood are a commonly overlooked challenge. Sexual well-being is defined as a global state of physical, mental, and social well-being regarding sexuality (World Health Organization, 2002). After childbirth, dimensions of couples' sexual well-being that are commonly affected include sexual satisfaction, sexual desire, and event-specific (i.e., postpartum) sexual concerns, such as worries about the impact of physical recovery from childbirth on sexuality or when to safely resume intercourse (Ahlborg et al., 2005; McBride & Kwee, 2017; Schlagintweit et al., 2016).

New parents' experience reduced sexual satisfaction relative to pre-pregnancy levels. Specifically, one third to half of first-time parents report feeling dissatisfied with their sex lives at 6 to 8 months postpartum (Ahlborg et al., 2005; Yildiz, 2015). New mothers also commonly report reduced sexual desire in the first year postpartum in comparison to pre-pregnancy (McBride & Kwee, 2017). Some studies show no changes in new fathers' sexual desire over the course of this transition (Radoš et al., 2015), while others indicate a decline in fathers' sexual desire (Condon et al., 2004). Moreover, many new parents report novel sexual concerns that are specific to the postpartum. Prior

cross-sectional studies indicate that almost 90% of new parents endorsed at least 10 postpartum sexual concerns during the first year postpartum and that each concern was associated with a moderate degree of distress in mothers and fathers alike (Pastore et al., 2007; Schlagintweit et al., 2016). Still, not all couples experience negative sexual changes, with 30% to 50% of couples reporting sustained or even increased sexual satisfaction across the transition relative to pre-pregnancy (e.g., Ahlborg et al., 2008), denoting the marked variability of couples' postpartum sexual experiences.

Sexual well-being and stress

Cumulative research efforts have identified several positive determinants of overall well-being (e.g., Sapranaviciute-Zabazlajeva, et al., 2018; Schönfeld et al., 2017; Wersebe et al., 2017). Sexual well-being in particular has been found to have wide-reaching benefits including for overall well-being and quality of life, marital quality and stability, and mental health (e.g., Diamond & Huebner, 2012; Sánchez-Fuentes et al., 2014; Stephenson & Meston, 2015). There is also some evidence for an association between sexual well-being and the regulation of stress (Ein-Dor & Hirschberger, 2012).

In the general context of couples' relationships, some studies indicate that self-reported stress correlates positively with sexual difficulties and negatively with sexual satisfaction and sexual activity (Bodenmann et al., 2007), whereas others indicate a positive relation between stress and levels of sexual activity (Burri & Carvalheira, 2019; Morokoff & Gilliland, 1993). This latter finding has led some authors to propose that positive sexual relationships may be especially important to reduce tension and deal with stress.

Theoretical models suggest that greater sexual well-being might be a protective factor for lower stress (theory of emotional capital; Feeney & Lemay, 2012) and that poorer sexual well-being may be a risk factor for heightened stress (transactional model of stress; Lazarus & Folkman, 1984). The theory of emotional capital (Feeney & Lemay, 2012) suggests that partners who accumulate greater “emotional capital”—a series of positive, emotionally shared experiences, such as positive sexual interactions—are less reactive to relationship stressors and threats than couples with lower emotional capital (Walsh et al.,

2016). Thus, couples with greater sexual well-being in the transition to parenthood might be more protected against the experience of stress.

Alternatively, the transactional model posits that stress results when the demands of a situation are perceived to exceed an individual's resources to cope with those demands (Ben-Zur, 2019; Lazarus & Folkman, 1984). The resources needed to maintain a satisfying postpartum sex life may be perceived as especially taxing given novel sexual (e.g., desire discrepancy, pain) and general challenges (e.g., fatigue, parenting decisions) of this life transition, resulting in heightened postpartum stress. Taken together, both theories suggest that sexual well-being may have implications for new parents' experience of stress.

Sexual well-being, stress, and the transition to parenthood

Despite evidence that the transition to parenthood is a time of high variability in stress and sexual well-being, studies that assess the relationship between these aspects are scarce. A longitudinal study found that new mother's greater parenting stress at 6 months postpartum predicted both mothers' and fathers' lower sexual satisfaction at 12 months postpartum (Leavitt et al., 2017). In one cross-sectional study, mothers' postpartum stress and sexual desire were not associated (Hipp et al., 2012) but, in partners of women who gave birth, postpartum stress was linked to their own low sexual desire (van Anders et al., 2013).

These somewhat mixed findings might be attributable to several important limitations of the prior research. First, these studies have not considered various dimensions of couples' sexual well-being, but rather typically assess only one dimension of sexual well-being in isolation (e.g., Hipp et al., 2012; Leavitt et al., 2017; van Anders et al., 2013). Therefore, the relative influence of sexual factors has not been examined, and the potential differential effects of partners' sexual well-being dimensions, such as sexual desire (dyadic, i.e., interest in behaving sexually with a partner, *versus* solitary, i.e., interest in behaving sexually by oneself; Moyano et al., 2017) or postpartum sexual concerns are still largely unknown. Also, prior studies tend to favor only one partners' perspective (e.g., Hipp et al., 2012; van Anders et al., 2013). Few studies have taken couple interdependence into account to examine how one parent's sexual well-being is associated with the other

parent's experience of stress, despite initial evidence of cross-partner effects (e.g., Leavitt et al., 2017). Our study aims to address these prior limitations.

Current study

The purpose of this study was to examine whether important indicators of postpartum sexual well-being (sexual satisfaction, sexual desire, and sexual concerns specific to postpartum) were associated with perceived stress in a sample of first-time parent couples. We hypothesized that an individual's greater sexual well-being would be associated with both couple members' lower postpartum stress (Figure 1). To rule out alternative hypotheses, we also examined whether our observed effects could be accounted for by other variables present during the postpartum period and that past research has linked to sexual changes or increased stress across the transition (child age, breastfeeding, maternal fatigue, and pain intensity during intercourse; e.g., McBride & Kwee, 2017) or that are interdependent with couples' sexual well-being (relationship satisfaction and duration; McNulty et al., 2016; Sánchez-Fuentes et al., 2014). Therefore, we also tested our hypotheses when controlling for these relevant covariates. As postpartum sexual changes are common, findings from this study will contribute to an improved understanding of their particular associations with couples' stress. This information may ultimately prove relevant for clinicians helping new parents cope with stress.

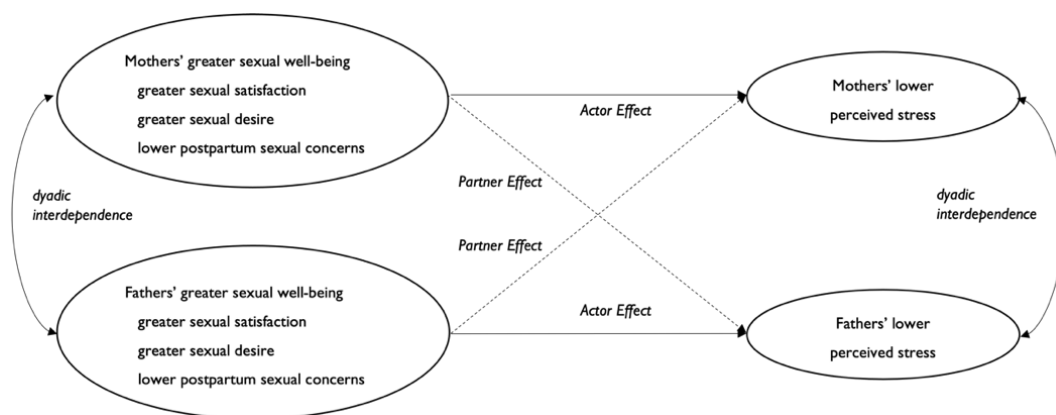


Figure 1. Conceptual model of the hypothesized associations between couples' sexual well-being and perceived stress postpartum. Solid lines represent actor effects, dashed lines represent partner effects.

Method

Participants

This study included 255 mixed-sex couples. All couples were first-time parents to a singleton child aged three to 12 months at the time of participation, who was born healthy and at term (37 to 42 weeks gestation). Figure 2 depicts information on participant's inclusion flow. Socio-demographic and psychosocial characteristics of study participants are presented in Table 1.

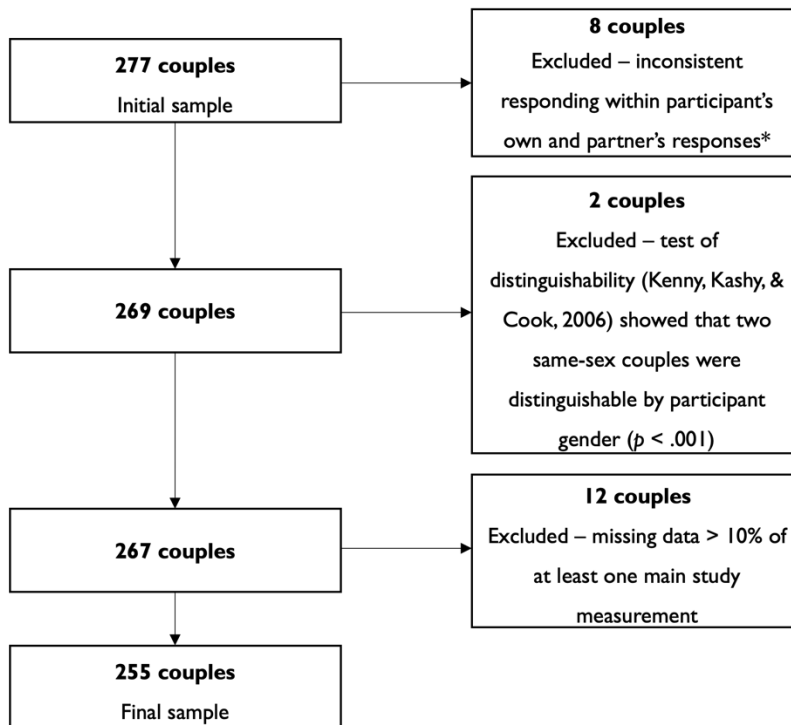


Figure 2. Flow diagram of participants' inclusion. *To confirm eligibility, several sociodemographic items in the survey overlapped with the eligibility criteria and were compared with participants' own (and their partners') responses. This process led to the exclusion of 8 couples due to either inconsistent responding within a participant (i.e., responses on the sociodemographic items that violated the selection criteria; $N = 4$) or inconsistent responding between partners (e.g., woman and partner reported different ages of the child; $N = 4$).

Table 1
Descriptive Characteristics of the Sample (N = 255 unless otherwise stated)

| | Women | | Men | | t (Cohen's d) |
|--|----------------|---------|------------|---------|----------------|
| | M (Range) | SD or % | M (Range) | SD or % | |
| Age (years) | 27.20 (20) | 3.31 | 28.93 (40) | 4.05 | 5.28*** (.47) |
| Country of residence | | | | | |
| United States | 219 | 85.9% | — | — | |
| Canada | 36 | 14.1% | — | — | |
| Biological sex | | | | | |
| Female | 255 | 100.0% | | | |
| Male | | | 255 | 100.0% | |
| Relationship status | | | | | |
| Married | 229 | 89.8% | — | — | |
| Common law | 8 | 3.1% | — | — | |
| Dating | 18 | 7.1% | — | — | |
| Relationship duration (months; N = 253) | 47.11 (0–191) | 28.13 | — | — | |
| Relationship satisfaction (N = 254; 255) | 109.98 (0–161) | 27.86 | 112.41 | 26.77 | 1.00 |
| Infant age (months) | 6.69 (3–12) | 2.47 | — | — | |
| Breastfeeding (yes) | 153 | 60.0% | | | |
| Mode of delivery (N = 207) | | | | | |
| Vaginal | 137 | 57.8% | | | |
| Cesarean | 68 | 28.7% | | | |
| Maternal fatigue (N = 220) | 4.59 (2–7) | 1.13 | | | |
| Frequency of intercourse in past 4 weeks (N = 172) | | | | | |
| Less than once a month | 2 | 1.2% | | | |
| About once a month | 18 | 10.5% | | | |
| 2-3 times a month | 32 | 18.6% | | | |
| Once a week | 51 | 29.7% | | | |
| Multiple times a week | 69 | 40.1% | | | |
| Pain intensity during intercourse | 3.76 (0–9) | 2.96 | | | |
| Perceived stress (N = 254) | 24.09 (0–56) | 6.63 | 21.45 | 7.73 | -4.13*** (.37) |
| Sexual satisfaction (N = 254) | 25.27 (5–35) | 6.60 | 26.58 | 6.13 | 2.32* (.21) |
| Postpartum sexual concerns | 78.99 (20–140) | 23.90 | 76.31 | 24.30 | -1.23 |
| Partner-focused sexual desire | 28.08 (0–54) | 9.15 | 35.16 | 7.51 | 9.55*** (.85) |
| Solitary sexual desire | 4.96 (0–31) | 4.61 | 6.33 | 4.98 | 3.22** (.29) |

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Cohen's d is shown when significant differences were found.

Instruments

Background questionnaire. Each participant self-reported their age, country of residence, biological sex, relationship status and duration. Mothers also reported on their baby's age at the time of participation, breastfeeding status, mode of delivery, frequency of intercourse in the past four weeks, pain intensity during intercourse, and average level of energy on a typical postpartum day.

Couples Satisfaction Index (CSI). The well-validated 32-item CSI (Funk & Rogge, 2007) was used to assess relationship satisfaction (e.g., "Please indicate the degree of happiness, all things considered, of your relationship"). Most items are scored on a 6-point rating scale except one global item that is scored on a 7-point scale. Higher scores indicate greater satisfaction (Cronbach's α of .97 for mothers and fathers in the present sample).

Global Measure of Sexual Satisfaction (GMSEX). The GMSEX is a valid and reliable measure of sexual satisfaction in relationships (Lawrance & Byers, 1995). GMSEX comprises five 7-point bipolar scales (e.g., unpleasant–pleasant), with higher scores indicating greater sexual satisfaction. Reliability in the current study was high (Cronbach's $\alpha_{\text{mothers}} = .91$; Cronbach's $\alpha_{\text{fathers}} = .90$).

Perceived Stress Scale (PSS). The PSS is a widely used, valid, and reliable self-report measure of global stress (Cohen et al., 1983). Current level of perceived stress is assessed using 14 items (e.g., "In the last month, how often have you found that you could not cope with all the things that you had to do?"). Responses are assessed in a 5-point rating scale (from 0 = *never* to 4 = *very often*). Scores range from 0 to 56. Higher scores indicate greater perceived stress. The PSS demonstrated acceptable to good reliability in the present study (Cronbach's $\alpha_{\text{mothers}} = .75$; Cronbach's $\alpha_{\text{fathers}} = .82$).

Postpartum Sexual Concerns Questionnaire–Revised (PSCQ–R). This 20-item self-report questionnaire was used to assess postpartum sexual concerns (Schlagintweit et al., 2016). Participants rated each sexual issue on a 7-point scale (e.g., "Are you concerned about your frequency of intercourse after childbirth?" from 1 = *not at all concerned* to 7 = *extremely concerned*). The global score corresponds to the level of distress associated with

postpartum sexual concerns, with higher total scores indicating greater distress. In this study, the scale presented high reliability scores (Cronbach's $\alpha_{\text{mothers}} = .92$; Cronbach's $\alpha_{\text{fathers}} = .93$).

Sexual Desire Inventory–2 (SDI-2). This 14-item questionnaire assesses interest in sexual activity, including one's thoughts on approaching or being responsive to sexual stimuli, in a Likert-type response format (Spector et al., 1996). Higher total scores indicate greater sexual desire. The SDI-2 comprises three subscales: partner-focused dyadic sexual desire, dyadic sexual desire for an attractive other person (DSD-A), and solitary sexual desire (SDD; Moyano et al., 2017). In the current study, only the DSD-P (e.g., "How strong is your desire to engage in sexual activity with a partner?") and SDD (e.g., "How strong is your desire to engage in sexual behavior by yourself?") were used. Previous studies revealed high internal consistency and concurrent evidence of validity (Moyano et al., 2017). In the current sample, the subscales demonstrated acceptable to high reliability (DSD-P: Cronbach's $\alpha_{\text{mothers}} = .83$, Cronbach's $\alpha_{\text{fathers}} = .76$; SSD: Cronbach's $\alpha_{\text{mothers}} = .92$, Cronbach's $\alpha_{\text{fathers}} = .82$).

Procedure

This cross-sectional descriptive study (Montero & León, 2007) received approval from the research ethics board of the last author's institution. Prior studies using this sample and examining predictors of new parents' sexual well-being (viz., sexual satisfaction, sexual desire, postpartum sexual concerns) have been published (Muise et al., 2017; Rosen et al., 2016, 2017; Schlagintweit et al., 2016), but none examining new parents' perceived stress. North American participants were recruited from September 2014 to May 2015 using online sources as part of a larger, cross-sectional online study on sexuality and relationships during the transition to parenthood. After providing informed consent and prior to beginning the survey, participants completed a screening questionnaire to assess eligibility. Upon completion of the survey, participants provided their partner's e-mail address. The partner was then e-mailed a questionnaire link generated by the survey software comprising a unique couple identifier that allowed data to be linked once both members completed the survey. Both members of each couple were required to complete the survey within four weeks of each other. After completing

the survey, individuals received a list of online resources related to sexuality and relationships during the transition to parenthood and were compensated with a \$15 gift card.

Data Analysis

Missing data representing 10% or less of a single measure was replaced by the mean of the scale for that particular person (Tabachnick & Fidell, 2013). The actor-partner interdependence model (APIM) was estimated using multilevel modelling, where partners were nested within couples (Kenny et al., 2006). Dyads were distinguishable by gender [$\chi^2(10) = 65.63, p < .001$]. A two-level model with fixed effects and separate intercepts for mothers and fathers was used to examine the associations between mother's and father's sexual well-being and their own (i.e., actor effects) and their partner's (i.e., partner effects) perceived stress. This model included all predictors simultaneously to assess each predictor's association with postpartum stress while controlling for the other predictors. Finally, additional analyses were conducted to control for potential confounding effects of variables related to postpartum stress (e.g., relationship satisfaction). All predictor variables were grand-mean centered before conducting the analyses.

Results

Preliminary analyses

Descriptive statistics for new mothers' and fathers' perceived stress and all predictor variables are presented in Table 1. Student *t* tests indicated that fathers reported higher sexual satisfaction, partner-focused sexual desire, and solitary sexual desire than mothers, but postpartum stress was higher for mothers than for fathers. No significant differences were found between partners on postpartum sexual concerns.

Correlations among study variables are presented in Table 2. Partners' scores were significantly correlated for all variables, $ps < .01$. A moderate correlation between partners' stress was found, suggesting within-dyads interdependence (Kenny et al., 2006). All within-dyads scores were positively correlated at moderate to high levels, except for DSD-P scores, which were negatively correlated at low levels. Between-partner correlations indicated that mother's perceived stress significantly correlated with all of

their own sexual well-being domains except DSD-P; fathers' perceived stress significantly correlated with all of their own sexual well-being domains.

Table 2
Correlations Between Perceived Stress and the Predictor Variables

| | Correlations | | | | |
|----------------------------------|--------------|--------------|--------------|---------------|--------------|
| | 1 | 2 | 3 | 4 | 5 |
| 1. Perceived stress | .45** | -.25** | .28** | -.10 | .32** |
| 2. Sexual satisfaction | -.45** | .61** | .01 | .42** | -.04 |
| 3. Postpartum sexual concerns | .47** | -.10 | .71** | .13* | .57** |
| 4. Partner-focused sexual desire | -.13** | .43** | -.05 | -.13** | .40** |
| 5. Solitary sexual desire | .55** | -.14* | .61** | .08 | .69** |

Note. Values on the diagonal (in bold) represent within-dyads correlations, values above the diagonal represent within-women correlations, and values below the diagonal represent within-men correlations.

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

Dyadic associations between sexual well-being and perceived stress

Results from the multilevel APIM are depicted in Table 3. This analysis yielded a statistically significant model explaining 20% of the variance of mothers' perceived stress and 48% of fathers' perceived stress. In line with our predictions, sexual well-being was associated with levels of stress in both members of the couple. When fathers reported greater sexual satisfaction, both they (actor effect) and their partners (i.e., mothers; partner effect) experienced lower perceived stress. When mothers reported greater sexual satisfaction, this was unrelated to their own levels of stress (actor effect) but was associated with fathers' lower perceived stress (partner effect). When fathers and mothers endorsed highly distressing postpartum sexual concerns, they also reported greater levels of stress (actor effects), but no partner effects emerged. Regarding sexual desire, distinct patterns of results were found for partner-focused desire and solitary desire. Fathers' partner-focused desire was not associated with their own or their partner's stress, but mothers' greater levels of partner-focused desire were associated with their own lower levels of stress (actor effect). Conversely, for both mothers and fathers, greater solitary desire was associated with their own higher levels of stress (actor effects; see Figure 3).

Table 3

Actor-partner Interdependence Model of Sexual Well-being on Perceived Stress Postpartum

| | Perceived stress | | | |
|-------------------------------|------------------|-----------|-----------|----------|
| | <i>b</i> | <i>SE</i> | <i>df</i> | <i>t</i> |
| Sexual satisfaction | | | | |
| Actor effects | | | | |
| Mother | -.06 | .08 | 245 | -.75 |
| Father | -.38*** | .08 | 245 | -4.67 |
| Partner effects | | | | |
| Mother | -.22** | .09 | 245 | -2.63 |
| Father | -.16* | .08 | 245 | -2.12 |
| Postpartum sexual concerns | | | | |
| Actor effects | | | | |
| Mother | .05* | .02 | 245 | 2.03 |
| Father | .09*** | .02 | 245 | 3.67 |
| Partner effects | | | | |
| Mother | -.04 | .02 | 245 | -1.64 |
| Father | -.04 | .02 | 245 | 1.89 |
| Partner-focused sexual desire | | | | |
| Actor effects | | | | |
| Mother | -.13* | .05 | 245 | -2.57 |
| Father | .05 | .06 | 245 | .87 |
| Partner effects | | | | |
| Mother | .08 | .06 | 245 | 1.29 |
| Father | .01 | .05 | 245 | .18 |
| Solitary Sexual Desire | | | | |
| Actor effects | | | | |
| Mother | .47** | .15 | 245 | 3.12 |
| Father | .51*** | .12 | 245 | 4.40 |
| Partner effects | | | | |
| Mother | .11 | .12 | 245 | .93 |
| Father | .17 | .14 | 245 | 1.22 |

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

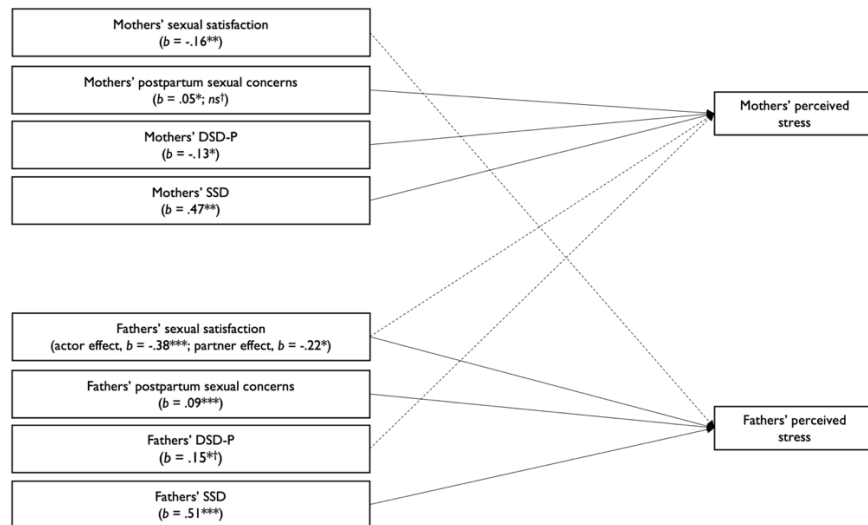


Figure 3. Actor-partner Interdependence Model of sexual well-being on perceived stress postpartum. Only significant effects are presented. Solid lines represent actor effects, dashed lines represent partner effects. DSD-P = Dyadic sexual desire (partner); SSD = Solitary sexual desire. †Effects altered upon controlling for relationship satisfaction. * $p < .05$, ** $p < .01$, *** $p < .001$.

Ruling out alternative explanations

Additional analyses were conducted to control for potential confounding effects of variables related to postpartum stress. We analysed the association between perceived stress with potential covariates (child age, breastfeeding, maternal fatigue, relationship satisfaction and duration, and pain intensity during intercourse). Only pain intensity during intercourse ($r_{\text{mothers}} = .35$; $r_{\text{fathers}} = .44$) and relationship satisfaction ($r_{\text{mothers}} = -.50$; $r_{\text{fathers}} = -.58$), $p_s < .01$, correlated significantly with perceived stress in both partners at $r > .30$. These variables were therefore entered as covariates into the main analyses. Pain intensity during intercourse did not significantly alter the observed pattern of findings; however, two effects differed when relationship satisfaction was controlled for. The previously significant actor effect of mothers' sexual concerns on stress ceased to be significant ($b = .04$, $SE = .02$, $t_{244} = 1.67$, $p = .096$) and a partner effect emerged such that fathers' higher partner-focused desire was associated with mothers' higher perceived stress ($b = .15$, $SE = .06$, $t_{244} = 2.45$, $p < .05$). The inclusion of both covariates additionally explained 12% of mothers' and 6% of fathers' variance in postpartum stress.

Discussion

This study examined the relationship between three key dimensions of postpartum sexual well-being—sexual satisfaction, sexual desire, and postpartum sexual concerns—and perceived stress in first-time parent couples. Significant associations were found for each sexual predictor which, taken together, indicated that greater sexual well-being was uniquely associated with new parents' lower perceived stress, even when controlling for other factors relevant to postpartum stress (i.e., relationship satisfaction, pain during intercourse).

When mothers and fathers reported greater sexual satisfaction, fathers reported lower stress. When fathers were more sexually satisfied, mothers' stress was also lower, but mothers' sexual satisfaction was not linked to their own stress. These results are consistent with previously reported negative associations between both partners' sexual satisfaction and fathers' stress postpartum (Leavitt et al., 2017). After childbirth, mothers' often cope with specific stressors related to birth and their bodies (e.g., breastfeeding, body image, genital healing) that may impact their sexuality differently from their partners'

(McBride & Kwee, 2017). Our findings suggest that, while coping with these stressors, mothers' may use fathers' sexual satisfaction as a proximal cue for their own lower stress through a partner-oriented coping process (Kenny et al., 2006). Fathers' greater sexual satisfaction might also relate to their own behaviors towards the mother (e.g., showing more affection, being more empathic; Rosen et al., 2016), which could contribute to mothers' feeling less overburden and stress. These findings are consistent with emotional capital theory (Feeney & Lemay, 2012), suggesting that partners who are more sexually satisfied are better able to cope with the novel changes and responsibilities of new parenthood, as evidenced by their lower stress.

Greater sexual concerns specific to the postpartum period were also associated with one's own greater feelings of stress for both mothers and fathers, further denoting the adverse impact that sexual concerns may pose to new parents' overall well-being (Schlagintweit et al., 2016; Vannier et al., 2018). This result is in line with the transactional model of stress, which suggests that given the contextual challenges of postpartum, sexual changes might be perceived as exceeding couples' coping resources, resulting in heightened stress (Ben-Zur, 2019). For mothers, sexual concerns ceased to associate with their own stress when relationship satisfaction was taken into account, suggesting that greater relationship satisfaction might be driving this effect for mothers. This effect is not surprising considering previous evidence linking sexual concerns and mothers' relationship satisfaction postpartum (Schlagintweit et al., 2016) and the interdependence between sexual and relationship dimensions (McNulty et al., 2016; Sánchez-Fuentes et al., 2014). As new parents cope with many novel challenges across the postpartum, sexual concerns that are often novel (e.g., the impact of breastfeeding on breasts and on vaginal dryness) and in some cases unexpected (e.g., changes in self or partners' sexual perception now that they are parents) might be taxing on new parents' coping resources.

Previous research has observed inconsistent associations between new parents' sexual desire and postpartum stress (Hipp et al., 2012; van Anders et al., 2013), but these studies examined sexual desire as a unidimensional construct perhaps obscuring more nuanced relationships. We addressed this limitation by examining whether sub-dimensions of sexual desire—sexual desire that is partner-focused vs. solitary—exerted distinct

associations with new parents' stress. Findings indicated that fathers' partner-focused desire was not linked to stress levels, but when mothers reported greater partner-focused desire, they also reported lower stress. This finding contrasts with Hipp and colleagues' (2012) study that found no association between mothers' sexual desire and postpartum stress. The equivocal results could be attributable to methodologic differences, since Hipp and colleagues examined general sexual desire, i.e., not partner-focused desire, and retrospectively assessed women who had given birth within the last seven years.

When controlling for relationship satisfaction, unexpectedly, fathers' greater partner-focused desire was associated with mothers' greater stress. It is possible that new mothers may interpret fathers' greater desire as an obligation or pressure to engage in sexual activity, or even feel guilty about declining sexual activity (Sutherland et al., 2015), which can be perceived as stressful. Another concurrent explanation for this result concerns the degree of desire discrepancy between partners. Mothers, who reported lower desire than fathers, may feel more at ease with their own (lower) levels of partner-focused desire because they meet their expectations for the postpartum (i.e., decreased desire after childbirth may be seen as normative due to attributions such as recovering from pregnancy and childbirth, breastfeeding, or fatigue). However, they may feel less content with their partners' desire towards them which, by being higher than their own, may violate their postpartum expectations (Roy et al., 2014), leading to lower satisfaction (Sutherland et al., 2015; Rosen et al., 2017) and greater stress.

Regarding solitary desire, when mothers and fathers reported greater desire to engage sexually by themselves, they also reported heightened stress, while no partner effects emerged. It might be that solitary desire covaries positively with stress because it can be used as a coping mechanism during this stressful transition, especially because solitary sexual activity doesn't require individuals to integrate their partners' needs. Sex can indeed serve to regulate stress (Ein-Dor & Hirschberger, 2012) and both men and women endorse stress reduction as a motive for sex (Meston & Buss, 2007).

Current results additionally extend prior research by demonstrating that sexual well-being explained more of the overall level of perceived stress for fathers than mothers. One possible reason for this difference is that men, more than women, use sex

to provide relieve from stress (Meston & Buss, 2007). Another feasible explanation is that mothers, as the partner who gave birth, typically face a greater number of challenges (e.g., physical recovery, breastfeeding) that affect them both physically and psychologically (McBride & Kwee, 2017) and which contribute to their overall levels of stress. Taken together, these findings suggest a critical role of sexual well-being in fathers' experience of stress postpartum, while denoting that mothers may benefit from greater support adjusting to the many competing demands after childbirth, including sexual ones.

The findings of this study should be considered in light of the following limitations. This study was correlational and we cannot determine the direction of causality. Although our hypotheses draw from prior theoretical and empirical research (e.g., Feeney & Lemay, 2012; Lazarus & Folkman, 1984), as noted, the reverse direction of effects is also plausible, in such a way that greater stress postpartum leads to poorer sexual well-being in these couples. Future longitudinal studies should explore these temporal associations. Data were collected online using self-reports, and thus participation was limited to couples with access to online resources and who were interested in completing a study of this nature. All couples who participated in this study were in intimate, mixed-sex relationships, and were first-time parents to a healthy infant who was born at term. It is unknown whether results generalize to more diverse samples or to those who are faced with additional stressors (e.g., same-sex couples, adoptive parents, parents to an infant born preterm).

From a bigger picture perspective, and despite these limitations, this study highlights the interdependence between couple members' experiences and the critical role of unique aspects of sexual well-being for understanding how couples perceive postpartum stress. This knowledge may be particularly useful for prevention and treatment efforts with new parent couples, by emphasizing the importance of considering both partners and identifying specific targets for intervention. Adding to previous treatments noting the importance of targeting postpartum sexual well-being (McBride et al., 2016), education and interventions aimed at helping new parents cope with stress are encouraged to integrate sexual well-being as an important component.

To help couples navigate the potential stressful character of this transition, professionals are advised to foster dyadic, in addition to individual, sexual well-being. One

way of doing so is by providing couples with relevant information about postpartum sexuality, along with effective strategies to discuss and deal with their sexual worries, and their need to engage, or not engage, in sex (Muise et al., 2017). Communicating about sexual issues can be a difficult task for many couples (Sanford, 2003) but is often beneficial for both partners' sexual and relational satisfaction (Jones et al., 2018; Rancourt et al., 2017). Therefore, enhanced knowledge of what to expect regarding sexual changes postpartum, coupled with better communication about one's sexual concerns, could normalize new parents' experiences, facilitate feelings of increased adjustment postpartum, and ultimately promote effective strategies to deal with them.

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Conflict of Interest

The authors report no conflicts of interest.

Statement of Authorship

Conceptualization, I.M.T., N.O.R., P.J.N.; Methodology, I.M.T., H.E.S., N.O.R.; Investigation, I.M.T., H.E.S., N.O.R.; Writing – Original Draft, I.M.T.; Writing – Review & Editing, I.M.T., H.E.S., N.O.R., P.J.N.; Funding Acquisition, I.M.T., H.E.S., N.O.R., P. J.N.; Supervision, N.O.R., P.J.N.

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CHAPTER VII. STUDY 4

LONGITUDINAL ASSOCIATIONS BETWEEN RELATIONSHIP AND SEXUAL WELL-BEING IN COUPLES TRANSITIONING TO PARENTHOOD

Tavares, I. M., Rosen, N. O., Heiman, J. R., & Nobre, P. J.

Abstract

Objective: To examine the bidirectional links between relationship quality and sexual well-being (i.e., sexual satisfaction, sexual distress) across the transition to parenthood.

Background: There is limited understanding of the dynamic between relational and sexual well-being as couples adjust to new parenthood, despite this being a vulnerable period for couples' relationships.

Method: We assessed new parent couples ($N = 257$) across four time-points (two prenatal) from mid-pregnancy through six months postpartum. Parallel dyadic latent growth curve modelling was employed to examine the associations between trajectories of perceived relationship quality, sexual satisfaction, and sexual distress.

Results: New parents' declines in relationship quality were associated with declines in own and partners' sexual satisfaction and with increases in own sexual distress. Mothers' prenatal relationship quality and sexual distress predicted subsequent changes in own sexual distress and fathers' relationship quality, respectively.

Conclusion: Changes to new parents' relational and sexual well-being mutually influence each other over time. The impact of the transition on couples' relationships is partly determined by own and partners' prenatal factors, to which clinicians and researchers can attend to early on.

Implications: Cross-domain links between relational and sexual well-being should be considered in research and clinical practice. Current results can guide prevention programs targeting new parents' relational and sexual well-being.

Keywords: dyadic/couple data; postpartum; relationship quality; sexual distress; sexual satisfaction; transition to parenthood

The transition to parenthood—often referred to as the period between pregnancy through postpartum—is experienced by nearly 90% of all committed couples and is considered one of the most vulnerable life periods for couples' relationships (Don & Mickelson, 2014; Kluwer, 2010). New parents often experience decreased relationship quality (i.e., lower feelings of happiness and higher levels of conflict) and sexual well-being (i.e., lower sexual satisfaction and higher sexual distress; Mitnick et al., 2009; Rosen et al., 2020). Despite relational and sexual well-being being highly interdependent, little is known about the extent to which these dimensions change together across this transition, or the degree to which changes in one dimension are causally linked to changes in the other. Does a poorer overall relationship in pregnancy precede subsequent declines in sexual well-being? Or, conversely, does greater sexual well-being in pregnancy protect couples against decreases in relationship satisfaction? Using a dyadic, longitudinal approach, we aimed to assess the bidirectional links between relationship and sexual well-being (i.e., whether they are causally linked over time). Examining these associations will contribute to refining models of relationship change across the transition to parenthood. This information also has clinical relevance as it can guide prevention programs to focus on the most relevant predictors of change rather than solely on the negative outcomes.

Relationship Well-being across the Transition to Parenthood

After a baby is born, novel challenges such as less time together as a couple, unequal division of household labor and childcare, and navigating new roles and responsibilities have the potential to increase couples' levels of stress and relationship conflict (Doss & Rhoades, 2017). Although many couples are able to maintain well-being in their relationships across the transition to parenthood (Leonhardt et al., 2021; ter Kuile et al., 2021), as much as 79% of new mothers and 51% of partners report at least a moderate decline in perceived positive aspects of their relationships (Don & Mickelson, 2014; Mitnick et al., 2009). The vulnerability of this life stage for couples' relationships is confirmed by a meta-analysis (Mitnick et al., 2009) and a systematic review (Doss & Rhoades, 2017), which demonstrated an average decline in relationship quality across this period. When examining factors that contribute to how steep this decline may be, the

influence of partner-related factors is dominant (Don & Mickelson, 2014), supporting the adoption of a dyadic approach to understanding new parents' well-being.

Longitudinal studies suggest that a stronger couple relationship in pregnancy can protect couples from the forthcoming challenges of this transition. Couples who report a better prenatal relationship (e.g., lower levels of conflict, better communication) tend to show smaller declines in relationship quality post-birth (Kluwer, 2010; Shapiro et al., 2000). This is consistent with theoretical models of adaptation to stress, such as the vulnerability-stress-adaptation model (Karney & Bradbury, 1995), which state that in the face of a significant stressor, as is this transition, the quality of the interactions between partners helps them cope with relationship stressors, facilitates connection and intimacy, and is therefore protective of relationships over time (Karney & Bradbury, 1995; Shapiro et al., 2000). Notwithstanding, a better prenatal relationship has also been shown to predict the steepest declines in relationship functioning (Doss & Rhoades, 2017). Although apparently contradictory, these findings suggest that other dimensions of change that concurrently challenge couples' relationships across this period might interact with couples' initial relationship to predict relationship well-being over time.

Sexual Well-being across the Transition to Parenthood

As they transition from partners to parents, new mothers and partners experience marked changes to their sex life, with as many as 36% to 46% of new parents describing themselves as sexually dissatisfied and over 90% endorsing more than 10 (of 20) postpartum sexual concerns (Schlagintweit et al., 2016), such as reduced time and energy for sexual activity and larger desire discrepancies between partners. Still, these changes may come as a surprise for many, given that only 18% of couples report receiving any information about expected sexual changes across this period (Barrett et al., 2000). The sudden and rapid nature of sexual changes across this transition together with the lack of information on how to deal with them can contribute to the fact that sexual experiences are often less satisfying and accompanied by sexual distress (i.e., negative emotions about one's sex life such as worry, frustration, guilt) for new mothers and partners (Derogatis et al., 2002; Rosen, Dawson, et al., 2020).

Studies following couples from pregnancy to up to one-year postpartum have confirmed that, on average, new mothers' and partners' sexual satisfaction significantly declines, whereas sexual distress significantly increases, and more so for mothers than for partners (Dawson et al., 2021; Rosen et al., 2020). This may be due to the fact that, as the birthing parent, mothers are greatly affected by the biological (e.g., physiological changes of pregnancy, birth, and postpartum), psychological (e.g., depression, fatigue), and social (e.g., cultural expectations) challenges of the transition. Notably, a positive sexual relationship with one's partner might pose important benefits for individuals and couples across this period. Sexual well-being is strongly implicated in overall health and quality of life—including lower anxiety, depression, and stress (Diamond & Huebner, 2012)—and is one of the top five predictors of long-term relationship satisfaction (Joel et al., 2020). Theoretical models of how partners navigate relationship threats, such as the theory of emotional capital (Walsh et al., 2017), suggest that sexual well-being may be especially important for couples to navigate stressful periods for their relationships because partners who accumulate greater “emotional capital”—a series of positive, emotionally shared experiences, such as positive sexual interactions—are less reactive to relationship stressors than couples with lower emotional capital. This buffering effect of sexual well-being has been supported by empirical data, with couples with greater sexual well-being coping better with stress, reporting greater intimacy and a stronger bond between partners, including those in the transition to parenthood (Joel et al., 2020; Rosen et al., 2017, 2018; Tavares et al., 2019).

Bidirectional Associations between Relationship and Sexual Well-being in Couples

Several theoretical models of relational and sexual well-being argue for robust directional relationships between these constructs (e.g., social exchange models of relationship satisfaction, the interpersonal exchange model of sexual satisfaction) and these links are supported by cross-sectional and longitudinal studies examining individuals and couples who are not in the transition to parenthood (Blumenstock & Papp, 2017; Joel et al., 2020; Lawrance & Byers, 1995). Cross-sectional studies sampling new parents confirm these findings by showing that individuals and couples who report an overall more

positive relationship in pregnancy or at postpartum also show better indices of sexual well-being at that time-point, with evidence of both individual and dyadic effects (Ramsdell et al., 2020; Rosen et al., 2018; Schlagintweit et al., 2016). Surprisingly, there is little longitudinal research examining how these dimensions influence each other over time and we are unaware of any studies that examined this question in first-time parent couples, who are more vulnerable to changes.

Some initial studies have attempted to clarify how sexual and relational well-being relate to each other across the transition to parenthood and have demonstrated a mixed pattern of results. A metacontent analysis of studies has supported longitudinal links between a better sexual relationship in pregnancy and a better overall evaluation of the relationship at 4 months and 3 years after childbirth (Von Sydow, 1999). There is also evidence of links in the other direction, with aspects of the couples' relationship (i.e., satisfaction with the division of labor) at six months postpartum predicting greater sexual satisfaction at 12 months postpartum for new mothers and fathers, although this study only examined intraindividual effects (Maas et al., 2018). In a recent longitudinal study with new mothers, greater relationship satisfaction in pregnancy reduced the odds of women having marked sexual functioning problems at three months postpartum (Dawson, Vaillancourt-Morel, et al., 2020). In contrast, new parent couples with a better prenatal relationship showed a greater decline in sexual frequency across the transition, whereas sexual frequency was unaltered in couples with lower quality relationships (Lorenz et al., 2020). Although this study sampled couples, only intraindividual, and not dyadic effects, were reported. Also, participants were assessed only twice (in pregnancy and at six months postpartum), impeding a more nuanced examination of the interpersonal links between relational and sexual dimensions over time. Importantly, these two latter studies assessed specific sexual dimensions (i.e., sexual functioning and sexual frequency) which may not accurately reflect new parents' sexual well-being. For new parents, sexual well-being may expand beyond the *frequency* of sex and the ability to respond sexually, and be more closely related to the overall *quality* of sexual experiences. As such, other indices—such as sexual satisfaction and sexual distress—may be more reliable indicators of new parents' sexual well-being, but are still to be examined.

The Current Study

Given the evidence reviewed above, bidirectional links between relationship and sexual well-being are to be expected across the transition to parenthood, with these dimensions likely changing together over time. Furthermore, one's own and partners' initial sexual and relationship well-being may interact in such a way that one may alleviate or, conversely, exacerbate changes to the other dimension. Beyond the existence of intraindividual effects (i.e., when one's indicator is associated with one's own outcome), dyadic effects (i.e., when one's indicator is associated with the partner's outcome) are put forward by prior research sampling couples who are not in the transition to parenthood (cross-sectionally and longitudinally) and new parent couples (cross-sectionally only), anticipating that dyadic effects should also be expected in a longitudinal assessment of new parents.

First, the current study aimed to 1) model mothers' and fathers' average trajectories (i.e., intercepts and slopes) in relationship quality, sexual satisfaction, and sexual distress from pregnancy to 6-months postpartum. We hypothesized that: H1a) mothers' and fathers' initial levels of relationship quality, sexual satisfaction, and sexual distress (i.e., intercepts) would be positively linked; and H1b) over time, mothers' and fathers' relationship quality and sexual satisfaction would significantly decline (i.e., negative slopes), whereas sexual distress would significantly increase (i.e., positive slopes). Second, we aimed to 2) examine these trajectories in parallel, while testing the associations between couples' trajectories based on the Actor-Partner Interdependence Model (APIM). We expected that: H2a) mothers' and fathers' initial relationship quality would be positively linked to own and partner's initial sexual satisfaction, and negatively linked to own and partners' initial sexual distress; and that H2b) change over time (i.e., slopes) in mothers' and fathers' own relationship quality would be significantly associated with own and partners' change in sexual satisfaction and sexual distress. Finally, we aimed to 3) test each of these variables' intercept (i.e., relationship quality, sexual satisfaction, and sexual distress) as a predictor of the trajectory of the other dimensions (i.e., bidirectionality). Given the exploratory nature of the analyses concerning the direction of these effects, no a priori predictions were made as to whether mothers' and fathers' greater initial

relationship quality would predict own and partners' higher vs lower degree of change in sexual satisfaction and distress or the other way around (i.e., whether greater initial levels of sexual satisfaction and distress would predict own and partners' higher vs lower degree of change in relationship quality over time).

Methods

Participants

First-time parent couples were recruited mid-pregnancy (between 20 and 24 weeks, $M = 22.8$ weeks, $SD = 1.48$). To be eligible, both members of the couple were required to: (1) be over 18 years of age; (2) be in a committed relationship with each other for at least six months; and (3) be fluent in Portuguese. One member of the couple was required to (4) currently have an uncomplicated, singleton pregnancy; and (5) have not given birth previously. Participants who self-reported currently suffering from a severe unmanaged medical or psychiatric illness were excluded. The final sample comprised 257 first-time expectant couples who ranged in age from 19 to 47 years old (mothers: $M = 29.92$, $SD = 4.74$; fathers: $M = 31.61$, $SD = 4.87$). All participants who gave birth self-reported their gender/sex as woman/female and all partners self-identified as man/male; we therefore refer to these participants collectively as “mothers” and “fathers”, respectively. Most mothers (93%) and fathers (95%) identified as exclusively heterosexual, 6% of mothers and 4% of fathers identified as predominantly heterosexual, 1% of mothers identified as predominantly lesbian, and 1% of fathers identified as bisexual. Although the study was advertised as inclusive of couples of all genders and identities, all participants were currently in a mixed-gender/sex relationship. Most couples were married or common-law (68%) and 32% of couples were dating. Relationship duration was on average 7 years, ranging from 6 to 255 months ($M = 87.5$ months, $SD = 55.5$ months). Nearly 7% of mothers and 15% of fathers completed 9 years of education, 32% of mothers and 42% of fathers completed 12 years of education, whereas 61% of mothers and 43% of fathers had some form of higher education. Monthly household income ranged from less than €1,050 (27% of mothers, 20% of fathers), 1,050€–2,095€ (49% of mothers, 55% of fathers), to over 2,095€ (24% of mothers, 25% of fathers). Most couples described their pregnancy as planned (80%). Only a minority of mothers reported previous obstetric

complications (e.g., infertility, recurrent pregnancy loss; 8%). See Supplemental Figure I for a flow chart of recruitment and enrollment, including retention rates.

Procedure

Recruitment occurred either in-person at regularly scheduled clinical appointments to gynecologists in an obstetrics outpatient unit (81%) or via community (i.e., pregnancy-related services, hospital bulletin boards) or online advertisements (19%), as part of a larger study on couples' relationships during the transition to parenthood. Participants recruited through advertisements completed all materials online. Participants enrolled in the obstetrics outpatient unit were recruited through gynecologists' referral. After the study was described to potential participants, those who were interested and eligible were invited to complete the survey online, which was sent to both partners separately to their own email addresses. All individuals provided informed consent online before participating. Data were obtained from both couple members at 4 time-points: baseline, 20-weeks pregnancy; T2, 32-weeks pregnancy; T3, 3-months postpartum; and T4, 6-months postpartum. Mothers and fathers reported on sociodemographic information at baseline; relationship quality, sexual satisfaction, and sexual distress were collected at all time-points. After receiving each survey, couple members were given 4 weeks to complete it. To promote couples' longitudinal participation, retention strategies included reminder phone calls and reminder emails. Each couple was compensated with a 10€ gift card at every other time-point and, at the end of the study, all participants received a list of resources related to sexuality and relationships during the transition to parenthood. The study was approved by the ethical review boards at the Faculty of Psychology and Education Sciences at the University of Porto and at the Centro Materno-Infantil do Norte.

Measures

Relationship quality. The widely used 14-item Dyadic Adjustment Scale–Revised (DAS-R; Busby et al., 1995) was used at all time-points as a self-report measure of global relationship quality. Items are scored using varying response anchors and tap into cognitive, behavioral, and emotional aspects of the relationship, with greater scores indicating greater relationship quality (range 0 to 69). Whereas specific subscales of the

DAS-R can be used, the full-scale scores have demonstrated higher construct and predictive validities and higher reliability (Crane et al., 2000). In the current study, total DAS-R scores showed good internal consistency across time-points ($\alpha_{\text{mothers}} = .84-.87$, $\alpha_{\text{fathers}} = .79-.87$).

Sexual satisfaction. At each time-point, sexual satisfaction was assessed using the Global Measure of Sexual Satisfaction (GMSEX), a widely used, valid and reliable self-report measure of sexual satisfaction in relationships (Lawrance & Byers, 1995). Higher scores denote greater sexual satisfaction (range 5 to 35). The GMSEX has been used to assess sexual satisfaction in pregnant and postpartum samples (Rosen, Dawson, et al., 2020). In the current sample, this measure showed excellent internal consistency ($\alpha_{\text{mothers}} = .95-.96$; $\alpha_{\text{fathers}} = .96-.97$).

Sexual distress. The Female Sexual Distress Scale-Revised (FSDS-R) was used to assess distress relative to one's sex life in the preceding four weeks at each time-point. This 13-item self-report measure is validated for use in women and men (Derogatis et al., 2002; Santos-Iglesias et al., 2018) and has been used in pregnancy and postpartum samples (Rosen, Dawson, et al., 2020). Total scores range from 0 to 52; higher scores signal greater sexual distress. Excellent internal consistency was found in this sample ($\alpha_{\text{mothers}} = .95-.96$; $\alpha_{\text{fathers}} = .94$).

Data Analysis

To test our first objective of examining mothers' and fathers' trajectories of relationship quality, sexual satisfaction, and sexual distress, we conducted unconditional dyadic latent growth curve models (DLGCMs) within a structural equation model. This approach allows us to examine dyadic patterns of change over time by combining the principles of Growth Mixture Modeling and of the APIM (Jung & Wickrama, 2008; Kenny et al., 2006). The DLGCMs test actor effects (i.e., the link between one's own intercept—that is, the initial level of a variable at baseline—and one's own slope—that is, change over time—controlling for partner effects) and partner effects (i.e., the link between one's own intercept and their partner's slope controlling for actor effects). Dyad members were distinguished based on the person who gave birth (i.e., mother) versus the person who did not give birth (i.e., fathers). Time frame was weighted across time-points with the

intercept representing the first time-point (0, 3, 8, 11; assessed in months). Thus, the slope value indicates the unit change per month between baseline (mid-pregnancy) and T4 (6-months postpartum). Because each couple member could have a distinct type of trajectory, we tested a series of increasingly complex growth models (i.e., linear, quadratic) and selected the optimal type of trajectory based on evidence of best model fit. Good model fit was evidenced by several fit indices: a Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) of at least 0.95, a Root Mean Square Error of Approximation (RMSEA) of 0.06 or less, and a statistically non-significant Chi-Square value (Hu & Bentler, 1999). Adequate model fit was indicated by less stringent criteria (e.g., CFI \geq 0.90, TLI \geq 0.90, and RMSEA \leq 0.08; Marsh et al., 2004). Significant differences between mothers' and fathers' intercepts and slopes for each outcome variable were examined within the unconditional DLGCMs using Wald χ^2 tests.

To examine our second and third goals of exploring the bidirectional links between the previously identified trajectories (i.e., relationship quality and each sexual well-being outcome), we estimated parallel DLGCMs (one model each for sexual satisfaction and sexual distress). Because the parallel DLGCM permits the assessment of two dyadic growth trajectories simultaneously, this approach allows the examination of the link between mothers' and fathers' growth parameters (i.e., intercept and slope) across trajectories (Aim 2). The parallel model also provides information on the directionality of effects (e.g., whether initial relationship quality predicts subsequent change in sexual satisfaction and/or sexual distress and vice versa) because the intercepts temporarily precede the slopes (Aim 3). All models were estimated with *MPlus* version 8.6 (Muthén & Muthén, 1998-2017) using the maximum likelihood estimator. Full information maximum likelihood estimation was used within the DLGCMs to estimate missing data due to attrition over time (Enders & Bandalos, 2001). De-identified data and syntax for all analyses are available on the Open Science Framework (<https://osf.io/x43vkl/>).

Results

Descriptive statistics and correlations among study variables are presented in Table I. The APIM associations between mothers' and fathers' growth parameters are indicated

by covariances between couple members' outcomes (reported as correlation coefficients) and are shown in Tables 2 (unconditional DLGCMs) and 3 (parallel DLGCMs).

Table 1
Descriptives and correlations among the study variables (N = 257 couples)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1 RQ Baseline | .56** | .48** | -.43** | .80** | .48** | -.36** | .74** | .48** | -.25** | .64** | .36** | -.21** |
| 2 SS Baseline | .44** | .56** | -.60** | .40** | .69** | -.43** | .41** | .63** | -.27** | .35** | .58** | -.29** |
| 3 SD Baseline | -.39** | -.56** | .40** | -.36** | -.50** | .70** | -.44** | -.48** | .55** | -.38** | -.38** | .54** |
| 4 RQ 32-weeks | .69** | .39** | -.35** | .53** | .51** | -.38** | .76** | .44** | -.25** | .65** | .37** | -.22** |
| 5 SS 32-weeks | .26** | .53** | -.42** | .39** | .41** | -.44** | .46** | .54** | -.26** | .38** | .50** | -.22** |
| 6 SD 32-weeks | -.29** | -.35** | .66** | -.35** | -.38** | .24** | -.39** | -.34** | .54** | -.38** | -.31** | .60** |
| 7 RQ 3-months | .71** | .41** | -.40** | .67** | .32** | -.33** | .59** | .58** | -.34** | .76** | .45** | -.37** |
| 8 SS 3-months | .37** | .59** | -.40** | .36** | .50** | -.38** | .57** | .41** | -.42** | .53** | .68** | -.39** |
| 9 SD 3-months | -.33** | -.38** | .58** | -.36** | -.29** | .67** | -.54** | -.57** | .35** | -.33** | -.33** | .71** |
| 10 RQ 6-months | .66** | .39** | -.42** | .62** | .24** | -.24** | .76** | .41** | -.45** | .45** | .50** | -.36** |
| 11 SS 6-months | .22** | .56** | -.38** | .31** | .39** | -.30** | .47** | .72** | -.50** | .52** | .43** | -.49** |
| 12 SD 6-months | -.29** | -.38** | .63** | -.34** | -.37** | .64** | -.51** | -.51** | .74** | -.54** | -.55** | .34** |
| Mothers' M | 55.09 | 30.34 | 8.52 | 54.94 | 29.47 | 8.03 | 53.28 | 28.64 | 10.60 | 52.90 | 28.32 | 9.88 |
| Mothers' SD | 7.80 | 5.00 | 9.23 | 7.41 | 5.46 | 8.95 | 8.47 | 5.66 | 10.06 | 8.75 | 5.99 | 10.27 |
| Partners' M | 54.07 | 29.42 | 6.20 | 54.81 | 28.71 | 5.72 | 52.87 | 27.64 | 7.02 | 53.37 | 27.46 | 6.73 |
| Partners' SD | 7.30 | 5.52 | 7.17 | 6.81 | 5.50 | 6.70 | 8.23 | 6.33 | 7.55 | 8.57 | 6.58 | 7.61 |

Note. Values on the diagonal represent within-dyads correlations, values above the diagonal represent within-mothers correlations, and values below the diagonal represent within-partners correlations. RQ = relationship quality, SS = sexual satisfaction, SD = sexual distress.

** $p < .01$

Changes in Relationship Quality from Pregnancy to Postpartum (H1a & H1b)

In addressing our first aim, which was to describe the trajectories of relational and sexual well-being from mid-pregnancy to 6-months postpartum, the unconditional linear DLGCM for relationship quality provided good fit indices. A comparison between models revealed no significant improvement in model fit upon inclusion of the quadratic term, favoring the linear model (see Table 2). In line with H1a, mothers' and fathers' intercepts

were positively associated, indicating that mothers with higher relationship quality in pregnancy were likely to have partners who also reported higher relationship quality in pregnancy. At baseline, mothers' perceived relationship quality was significantly higher than fathers', Wald $\chi^2(1) = 4.14, p = .042$. Supporting H1b, relationship quality decreased over time for mothers' and fathers' (see Figure 1A) at a similar rate between partners, Wald $\chi^2(1) = 3.27, p = .071$. Mothers' and fathers' rate of change in relationship quality were not related to their own nor to their partners' intercept at baseline, indicating that the longitudinal declines were not dependent on own nor partners' initial levels. Over time, mothers' and fathers' rate of change were significantly associated with each other, indicating that partners' levels of relationship quality were changing together over time.

Changes in Sexual Satisfaction from Pregnancy to Postpartum (H1a & H1b)

The linear DLGCM for sexual satisfaction demonstrated good fit to the data. The comparison between models favored the linear model (see Table 2). At baseline, mothers' sexual satisfaction was positively linked to fathers' sexual satisfaction, such that mothers with greater initial sexual satisfaction had partners who also reported higher initial sexual satisfaction, supporting H1a. Mothers' sexual satisfaction at baseline was significantly higher than fathers', Wald $\chi^2(1) = 9.19, p = .002$. Consistent with H1b, both mothers' and fathers' sexual satisfaction decreased significantly from pregnancy to postpartum (see Figure 1B) at a similar rate between partners, Wald $\chi^2(1) = 0.06, p = .805$. Mothers' rate of change in sexual satisfaction over time was negatively linked to their own initial sexual satisfaction, meaning that mothers who were more sexually satisfied at baseline showed a weaker decrease in sexual satisfaction, and was not linked to fathers' initial sexual satisfaction nor fathers' rate of change. Fathers' rate of change in sexual satisfaction over time was not associated with their own or mothers' initial levels of sexual satisfaction in pregnancy or with mothers' rate of change over time.

Changes in Sexual Distress from Pregnancy to Postpartum (H1a & H1b)

Both unconditional linear and quadratic DLGCMs for sexual distress showed good fit to the data. As the comparison between models showed no significant improvement in model fit upon introduction of the quadratic term, we selected the most parsimonious solution—the unconditional linear DLGCM (see Table 2). Initial levels of sexual distress

were positively associated between couple members, such that mothers with greater levels of sexual distress at baseline were likely to have partners who also reported greater initial sexual distress, supporting H1a. Mothers' sexual distress at baseline was significantly higher than fathers', Wald $\chi^2(1) = 17.88, p < .001$. In line with H1b, mothers' and fathers' sexual distress increased significantly from pregnancy to postpartum (see Figure 1C) at a similar rate between partners, Wald $\chi^2(1) = 1.39, p = .239$. Mothers' rate of change over time was negatively linked to their initial sexual distress, such that mothers with greater sexual distress at baseline showed slower increases in sexual distress from pregnancy to postpartum. Actor effects for fathers and all other partner effects were not significant, indicating that one's own level of sexual distress at baseline was not related to own rate of change (for fathers only) nor to partners' rate of change in sexual distress over time (for both mothers and fathers).

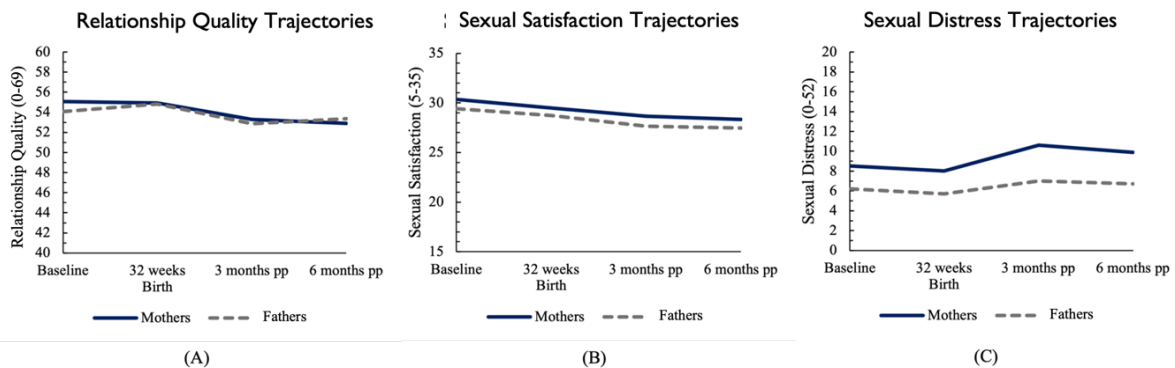


Figure 1 (A–C). Trajectories of relationship quality (A), sexual satisfaction (B), and sexual distress (C), from midpregnancy to 6-months postpartum for mothers and fathers.

Table 2

Unconditional DLGCM goodness-of-fit indices, means, variances, and standardized (STDYX) coefficients for APIM relationships among the study variables (N = 257 couples)

| | χ^2 | df | $\Delta\chi^2$ | CFI | TLI | RMSEA | AIC | BIC |
|-----------------------------|--------------------|-----------------|----------------|--------------------|------------------|--------------------|------------------|-------|
| Relationship quality | | | | | | | | |
| Linear | 37.39* | 18 | — | 0.98 | 0.97 | 0.07 | 10577 | 10669 |
| Quadratic | 36.13** | 16 | 1.26 | 0.98 | 0.97 | 0.07 | 10580 | 10679 |
| Sexual satisfaction | | | | | | | | |
| Linear | 37.74** | 18 | — | 0.98 | 0.96 | 0.07 | 9979 | 10071 |
| Quadratic for mothers | 37.48** | 12 | 0.26 | 0.97 | 0.94 | 0.08 | 9986 | 10099 |
| Sexual distress | | | | | | | | |
| Linear | 33.60* | 18 | — | 0.98 | 0.97 | 0.06 | 11197 | 11290 |
| Quadratic | 31.17* | 16 | 2.43 | 0.98 | 0.97 | 0.06 | 11199 | 11298 |
| | Means | Variances | | Mothers' intercept | Mothers' slope | Fathers' intercept | Fathers' slope | |
| Relationship quality | | | | | | | | |
| Mothers' intercept | 55.21 (0.47)*** | 49.11 (5.23)*** | | — | -.19 (0.11) | .67 (0.06)*** | .20 (0.15) | |
| Mothers' slope | -0.20 (0.04)*** | 0.16 (0.04)*** | | — | — | -.15 (0.13) | .80 (0.21)*** | |
| Fathers' intercept | 54.36 (0.43)*** | 34.88 (4.64)*** | | — | — | — | .26 (0.21) | |
| Fathers' slope | -0.11 (0.04)* | 0.12 (0.05)** | | — | — | — | — | |
| Sexual satisfaction | | | | | | | | |
| Mothers' intercept | 30.31 (0.31)*** | 21.37 (2.50)*** | | — | -.32 (0.10)** | .65 (0.06)*** | .02 (0.14) | |
| Mothers' slope | -0.19 (0.03)*** | 0.12 (0.03)*** | | — | — | -.06 (0.13) | .01 (0.19) | |
| Fathers' intercept | 29.41 (0.32)*** | 18.81 (2.91)*** | | — | — | — | -.05 (0.17) | |
| Fathers' slope | -0.18 (0.04)*** | 0.11 (0.04)** | | — | — | — | — | |
| Sexual distress | | | | | | | | |
| Mothers' intercept | 8.26 (0.55)*** | 62.51 (7.51)*** | | — | -.29 (0.10)** | .44 (0.07)*** | -.03 (0.15) | |
| Mothers' slope | 0.16 (0.06)** | 0.43 (0.09)*** | | — | — | -.03 (0.11) | -.03 (0.15) | |
| Fathers' intercept | 5.92 (0.42)*** | 32.26 (4.23)*** | | — | — | — | -.02 (0.18) | |
| Fathers' slope | 0.08 (0.04)* | 0.10 (0.04)* | | — | — | — | — | |

Note. For sexual satisfaction, the unconditional DLGCM with quadratic terms for mothers and fathers did not converge; we present the best fitting quadratic solution, which included a quadratic term for mothers only. * $p < .05$, ** $p < .01$, *** $p < .001$

Bidirectionality of Changes in Relationship Quality and Sexual Satisfaction (H2a & H2b)

After identifying the best fitting growth curve for each outcome for mothers and fathers, we estimated parallel DLGCMs to assess co-occurrence (Aim 2) and

bidirectionality (Aim 3) between trajectories. The parallel model for relationship quality and sexual satisfaction demonstrated good fit indices (see Table 3). We only describe here the APIM associations between relationship quality and sexual satisfaction; all other APIM effects are described in the unconditional models above. Supporting H2a, mothers' and fathers' initial relationship quality in pregnancy was positively associated with their own and with their partners' initial levels of sexual satisfaction (actor and partner effects). We then examined whether mothers' and fathers' relationship quality and sexual satisfaction slopes were occurring in parallel. The degree to which mothers' and fathers' relationship quality decreased over time was significantly and positively associated with the degree to which their own and their partners' sexual satisfaction also decreased over time (actor and partner effects). These results support H2b by indicating that, for both mothers and fathers, changes to relationship quality and to sexual satisfaction over time are positively linked at the individual and at the couple level.

Finally, to address Aim 3, which was to test for bidirectionality, we examined whether relationship quality in pregnancy predicted the rate of change in sexual satisfaction from pregnancy to postpartum. Initial relationship quality did not significantly predict how mothers' and fathers' sexual satisfaction changed over time. Regarding the other direction of associations (i.e., whether sexual satisfaction at baseline predicted changes in relationship quality over time) we found that, likewise, initial levels of sexual satisfaction did not significantly predict mothers' and fathers' rate of change in relationship quality.

Bidirectionality of Changes in Relationship Quality and Sexual Distress (H2a & H2b)

The parallel DLGCM for relationship quality and sexual distress provided good fit indices (See Table 3). Concerning the associations between relationship quality and sexual distress at baseline, we found that mothers' and fathers' initial relationship quality were significantly and negatively linked to their own and to their partners' initial sexual distress (actor and partner effects), supporting H2a. We then assessed whether changes in relationship quality were occurring in parallel with changes in sexual distress. The degree to which mothers' and fathers' relationship quality decreased over time was significantly

associated with the degree to which their sexual distress increased over time (actor effects) but was not significantly related to how their partners' sexual distress changed over time (*ns* partner effects). These results partially corroborate H2b by showing evidence of actor, but not partner effects.

Finally, to examine bidirectionality (Aim 3), we assessed whether initial levels of relationship quality were related to change in sexual distress from pregnancy to postpartum. A steeper rate of change in mothers' sexual distress over time was linked to mothers' own greater initial relationship quality but was not linked to fathers' initial relationship quality. These results denote that, for mothers, higher levels of relationship quality in pregnancy predicted greater rates of change (i.e., faster increases) in sexual distress over time. Fathers' rate of change in sexual distress over time was not associated with own nor mothers' relationship quality at baseline. As for the reverse direction of associations (i.e., between levels of sexual distress at baseline and change in relationship quality over time), mothers' change in relationship quality was not significantly related to their own nor to fathers' baseline levels of sexual distress. Fathers' change in relationship quality over time was not related to their own but was negatively related to mothers' baseline levels of sexual distress. These results indicate that, for mothers and fathers alike, changes to relationship quality over time were not dependent on their own initial levels of sexual distress in pregnancy. In terms of partner effects, mothers' higher sexual distress in pregnancy predicted slower decreases in fathers' relationship quality over time.

Table 3

Parallel DLGCM goodness-of-fit indices and standardized (STDYX) coefficients for APIM relationships among the study variables (N = 257 couples)

| | χ^2 | df | CFI | TLI | RMSEA |
|-----------------------|-----------------------|-------------------|-----------------------|-------------------|-------|
| RQ and SS | 115.11** | 76 | 0.98 | 0.97 | 0.05 |
| RQ and SD | 109.80** | 76 | 0.98 | 0.98 | 0.04 |
| | SS Mothers' intercept | SS Mothers' slope | SS Fathers' intercept | SS Fathers' slope | |
| RQ and SS | | | | | |
| RQ Mothers' intercept | .55 (0.06)*** | .00 (0.11) | .37 (0.07)*** | .07 (0.12) | |
| RQ Mothers' slope | -.10 (0.12) | .62 (0.15)*** | -.10 (0.12) | .35 (0.17)* | |
| SS Mothers' intercept | — | — | — | — | |
| SS Mothers' slope | — | — | — | — | |
| RQ Fathers' intercept | .41 (0.07)*** | .00 (0.11) | .54 (0.08)*** | -.01 (0.15) | |
| RQ Fathers' slope | .14 (0.14) | .39 (0.19)* | .31 (0.19) | .59 (0.20)** | |
| SS Fathers' intercept | — | — | — | — | |
| SS Fathers' slope | — | — | — | — | |
| | SD Mothers' intercept | SD Mothers' slope | SD Fathers' intercept | SD Fathers' slope | |
| RQ and SD | | | | | |
| RQ Mothers' intercept | -.47 (0.06)*** | .21 (0.10)* | -.28 (0.07)*** | -.15 (0.14) | |
| RQ Mothers' slope | -.14 (0.13) | -.39 (0.16)* | -.11 (0.12) | -.13 (0.19) | |
| SD Mothers' intercept | — | — | — | — | |
| SD Mothers' slope | — | — | — | — | |
| RQ Fathers' intercept | -.33 (0.07)*** | .05 (0.10) | -.51 (0.07)*** | -.04 (0.16) | |
| RQ Fathers' slope | -.32 (0.14)* | -.20 (0.17) | -.26 (0.17) | -.76 (0.25)** | |
| SD Fathers' intercept | — | — | — | — | |
| SD Fathers' slope | — | — | — | — | |

Note. RQ = relationship quality, SS = sexual satisfaction, SD = sexual distress.

* $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

This study is the first to our knowledge to examine the longitudinal associations between mothers' and fathers' relationship quality, sexual satisfaction, and sexual distress across the transition to parenthood. We specifically assessed whether changes in these dimensions were evolving together from pregnancy to 6-months postpartum and whether prenatal levels of relationship quality predicted the subsequent trajectory of sexual well-being, and vice-versa. We observed average declines in mothers' and fathers' relationship quality and sexual satisfaction, as well as increases in sexual distress. Changes to new parents' relationship quality were occurring together with changes in own sexual distress and with changes in own and partners' sexual satisfaction, from pregnancy to 6-months postpartum (i.e., they were influencing each other over time). Further, relationship quality and sexual distress trajectories could be predicted by initial prenatal levels of each other, with distinct predictors being relevant for each couple member. These findings support

the idea that the impact of the transition is partly determined by prenatal relational factors, to which clinicians and researchers can attend to early on.

In pregnancy, and for both couple members, better relationship quality showed robust links to their own and their partners' greater sexual well-being (higher sexual satisfaction and lower sexual distress). These links, and the significant interdependence between partners' reports, are in line with prior cross-sectional studies indicating that individuals and couples who are highly satisfied with their sexual relationships and experience little to no sexual distress also view their overall relationships as more satisfying and of higher quality. Indeed, our results reinforce that a relationship of greater perceived quality is also importantly linked to greater sexual well-being in pregnancy, a period when couples face increased challenges to their relationships (Diamond & Huebner, 2012; Joel et al., 2020; Rosen et al., 2017).

Still, the direction of influence between these dimensions over time is a largely unanswered question, particularly for new parent couples who face a range of normative but potentially distressful changes to their sexual and relational experiences (Mitnick et al., 2009; Rosen, Dawson, et al., 2020). When examining couples' trajectories of relationship and sexual well-being in isolation, our findings replicate prior research by evidencing average declines in relationship quality and sexual satisfaction and increases in sexual distress for both mothers and fathers, highlighting the potential vulnerability of this period for new parents' relationships (Dawson et al., 2021; Mitnick et al., 2009; Rosen, Dawson, et al., 2020). These trajectories may be explained by the range of novel changes couples experience, such as less time together as a couple, changes in roles in the relationship (e.g., balancing the maternal/paternal and sexual parts of the self), as well as reduced availability for sex (e.g., lack of time, energy, and privacy).

Although we might expect that these dimensions of change are related over time in new parents (Blumenstock & Papp, 2017; Byers, 2005), no study until now had considered the concurrent evolution of these dimensions across the transition to parenthood. As anticipated, we found that trajectories of relationship and sexual well-being were moving together from pregnancy to 6-months postpartum for both mothers and fathers. This means that the degree to which mothers' and fathers' relationship quality

decreased over time was being reciprocally influenced by the degree to which their own and their partners' sexual satisfaction also decreased over time, as well as by the degree to which their own (but not their partners') sexual distress increased over time. These findings add to a sparse body of research examining how sexual and relational dimensions relate to each other longitudinally (Blumenstock & Papp, 2017; Byers, 2005) and indicate that the interpersonal dynamic changes occurring in new parents' sexual and relational dimensions importantly contribute to how each other vary across this transition, with changes in one dimension potentiating changes to the other.

We further tested whether prenatal levels of mothers' and fathers' sexual and relational well-being were predictive of their own and their partners' subsequent pattern of changes. Overall, the pace at which relationship quality decreased from pregnancy to 6-months postpartum was not dependent on own or partners' initial levels of sexual satisfaction and, likewise, declines in sexual satisfaction were not dependent on own nor partners' prenatal perceived quality of their relationship. Although relational and sexual quality interrelate proximately over time, as described above, longitudinal changes to these dimensions do not seem to depend on prenatal levels of each other. Rather, situational challenges which are more prominent after mid-pregnancy and which challenge new parents' relational and sexual adjustment (e.g., division of household labor and childcare, navigating their new roles in the relationship, or lack of time and energy for sex at postpartum) may be more important contributors to the co-occurring observed declines. Still, women who were more satisfied with their sexual lives prenatally showed weaker declines in sexual satisfaction over time. This buffering effect is in line with theories of how couples navigate relationship stressors (Walsh et al., 2017), and highlights that mothers who accumulate more satisfying prenatal sexual experiences are better able to navigate the subsequent challenges the transition imposes to their sexual lives (e.g., physiological changes birth and postpartum, breastfeeding, changes to sexual function).

We also found evidence of a protective function of *some* amount of prenatal sexual distress in women against subsequent declines in their own sexual and in their partners' relational well-being. Women who reported greater prenatal levels of sexual distress showed a smaller rate of increase in their own sexual distress over time. Additionally,

fathers whose partners reported greater prenatal sexual distress showed slower rates of decline in their own relational quality. These findings speak to the notion that the experience of some amount of sexual distress—but still at non-clinical levels—might serve to protect women against marked increases in own sexual distress later on, as well as contribute to their partners' maintenance of perceived relational quality across this transition. It might be that demonstrating some worries and concerns about sexuality during pregnancy reflects a greater value placed by women on their sexual lives. This may prompt women to put more effort into actively managing the normative sexual changes of the transition, ultimately resulting in lower sexual distress at postpartum. As for fathers, they may interpret mothers' concerns and worries about sexuality in a positive manner—such as a sign of the importance women attribute to their sexual lives or of their investment in the relationship—which helps them to maintain a more positive evaluation of their overall relationship across this period. Nevertheless, our sample of couples, on average, demonstrated good levels of relationship and sexual satisfaction, with sexual distress below clinical levels over time. It is possible that, in samples of higher-risk couples, the direction of these effects might change and potentially be moderated by other dimensions (e.g., frequency of sexual difficulties, attitudes and beliefs toward sex during pregnancy, perceived partner responsiveness), which may predispose them for more severe sexual and relational problems.

Interestingly, we found that mothers who reported higher perceptions of relationship quality prenatally were more likely to show greater increases in sexual distress over time. In other words, sexual changes occurring through 6-months postpartum were perceived as being more concerning for women who started the transition with higher perceptions of how good their relationship was than for women who perceived their relationships as being of lower quality—but still at satisfying ranges—for whom sexual changes were not as distressing. One possible explanation as to why these women may have interpreted sexual changes as more concerning relates to the fact that these women may have been used to very satisfying sexual relationships, as corroborated by the cross-sectional findings reporting positive links between relational and sexual quality (Byers, 2005; Joel et al., 2020). As such, these women may hold overly positive expectations for their ability to navigate the challenges occurring during the

transition, including sexual ones (e.g., expecting that their sexual lives will quickly return to what they were before). Indeed, most couples hold positive expectations regarding the impacts of the transition to their relationships (Lawrence et al., 2007) and very few (18%) expectant or new parents receive information regarding possible changes to their sexual lives following childbirth (Barrett et al., 2000). When faced with unexpected and novel sexual experiences (e.g., mismatches in sexual desire, persistent changes to own sexual function; Schlagintweit et al., 2016), women who hold more positive prenatal evaluations of their relationships may feel unprepared to deal with them and may resort to negative attributions as to why they are experiencing such changes, such as stable (e.g., “This problem will never go away”) or partner (e.g., “This is *his* fault”) attributions (Vannier et al., 2018). As anticipated by theories of unmet expectations and of sexual well-being in relationships (Lawrance & Byers, 1995; Lawrence et al., 2007), this experience would lead to heightened levels of bother and concern. Future studies may specifically test the impact of couples’ prenatal expectations on the trajectories of new mothers’ sexual well-being. If this finding is replicated, one path for intervention might be targeting prenatal relationship indicators (e.g., women’s unrealistic prenatal expectations) as to prevent later sexual distress for women.

Strengths and Limitations

This study addressed an important gap in the literature by identifying the co-occurrence of changes in new parents’ relational and sexual well-being across the transition to parenthood, and whether prenatal levels in one dimension predict the trajectory of change in the other. Strengths of this study include the large sample size, the prospective longitudinal design, and sampling both couple members during a critical life period such as the transition to parenthood. Despite its contribution, findings should be interpreted considering some limitations. The current sample was representative of the demography of the Portuguese population having a first child, namely regarding age range, marital status, and socioeconomical status (INE, 2011), but it includes a large proportion of couples with relatively higher education. Despite the diversity of recruitment methods, which were inclusive in terms of diversity in gender/sex, all couples were in mixed-sex/gender relationships. Also, this was largely a low-risk sample, with parents being

mostly satisfied with their relationships and with their sexual experiences, and generally not distressed at clinical levels. We might expect rate of change over time to be larger and the bidirectional influence between relational and sexual domains to be stronger in samples including a greater proportion of high-risk couples; we encourage future studies to replicate these results in higher-risk samples and with a greater heterogeneity in gender, sexual orientation, and socioeconomic status. The current work suggests that there may exist a moderately high, optimal level of sexual satisfaction and sexual distress that may be the most beneficial for new parents' subsequent adjustment, at least in low-risk samples. For mothers, an overly positive prenatal couple relationship may pose some vulnerability for their subsequent adjustment, but it is unclear what mechanisms are driving these findings. Future research may seek to better understand the observed patterns of change by including potential mediators and/or moderators (e.g., realistic prenatal expectations, attributions of unexpected changes, perceived partner responsiveness). Finally, there was significant variability in changes to relationship and sexual well-being over time for mothers and fathers, in line with prior research (Don & Mickelson, 2014; Rosen, Dawson, et al., 2020). This indicates that not all partners experienced the same trajectory and magnitude of change. Thus, future research may use group-based modeling to further capture the ability of relationship and/or sexual prenatal factors to predict trajectories of improving, worsening, and stable change in mothers' and fathers' outcomes.

Implications

New parents are typically receptive to intervention and education on aspects of their relationships (Halford, 2004) and, as such, targeting risk factors and promoting protective factors at an early stage could interrupt less desirable trajectories for both partners' relational and sexual well-being. This should be a central goal of prevention programs for new parents, for which the current findings pose important implications. First, relationship and sexual changes are strongly interconnected from pregnancy to 6-months postpartum, which is typically the most critical period for couples' relationships. Most practitioners intervening with couples are likely to encounter those with coexisting sexual and relationship concerns, making it highly relevant that interventions focus on the

link between relational and sexual processes. Models of relationship change across the transition to parenthood (e.g., Kluwer, 2010) are also advised to incorporate cross-domain interactions. Second, future clinical and research efforts may benefit from focusing on the identified predictors of change (e.g., protective role of greater prenatal sexual satisfaction and sexual distress for low-risk women's sexual and relational postpartum well-being; protective role of women's prenatal sexual distress for fathers' postpartum relational well-being) to better understand new parents' negative outcomes and adaptation processes across this period. For instance, an increased awareness of potential postpartum sexual challenges at pregnancy (but not at clinical levels) might trigger more concern about the sexual relationship early on, which may have subsequent benefits for couples' ability to navigate challenges when they arise. By identifying factors that predict new parent couples' well-being in such a critical period as the transition to parenthood, the current work contributes to a much-needed body of research on the promotion of the well-being of the couple and of the family as a whole.

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Conflict of Interest

The authors report no conflicts of interest.

Statement of Authorship

Conceptualization, I.M.T., P.J.N.; Methodology, I.M.T., P.J.N.; Investigation, I.M.T., P.J.N.; Writing – Original Draft, I.M.T.; Writing – Review & Editing, I.M.T., J.R.H., N.O.R., P. J.N.; Funding Acquisition, I.M.T., P.J.N.; Supervision, J.R.H., N.O.R., P.J.N.

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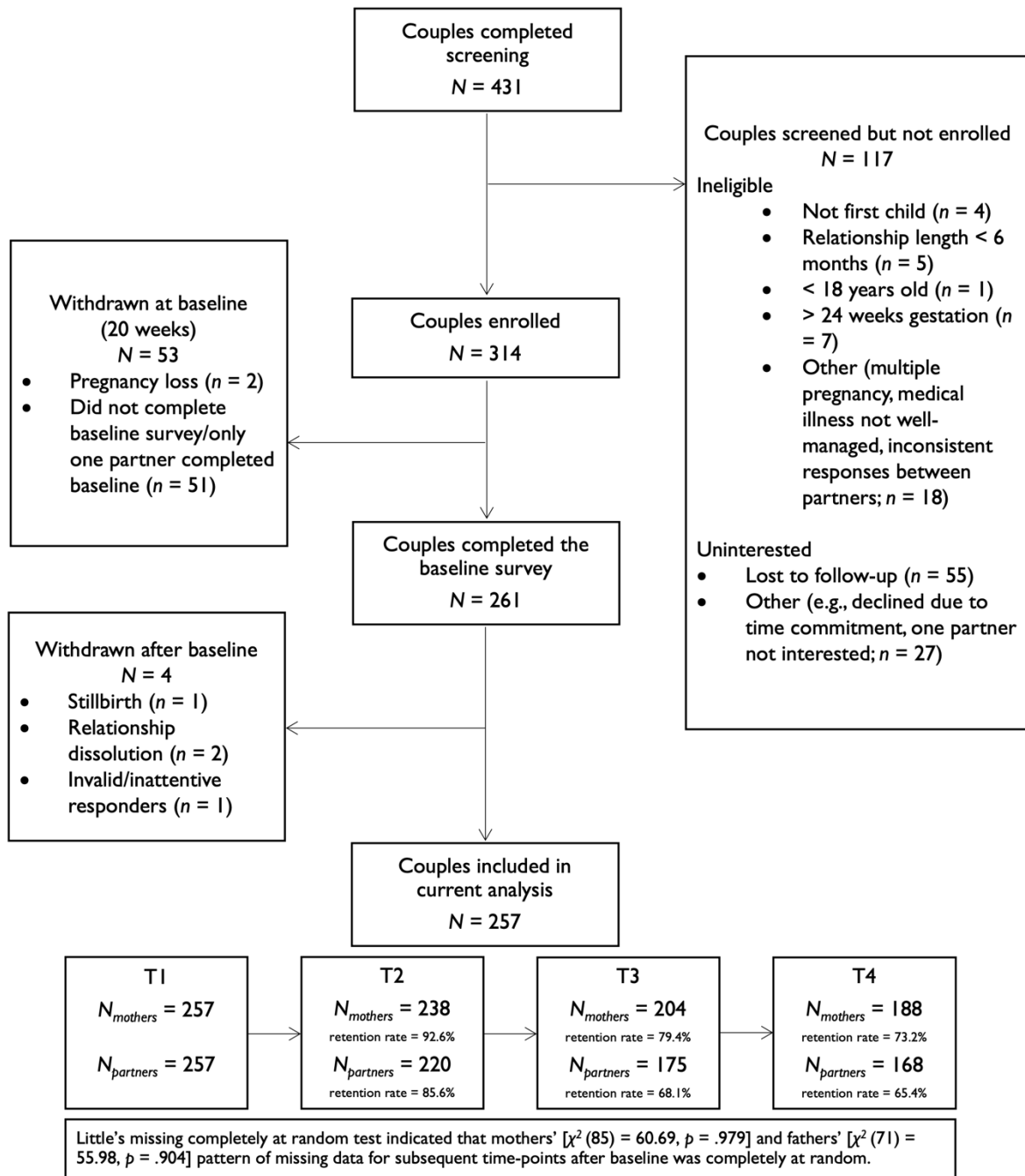
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Supplemental Figure 1. Flow chart of couples' recruitment.

CHAPTER VIII. STUDY 5

BIOPSYCHOSOCIAL PREDICTORS OF COUPLES' TRAJECTORIES OF SEXUAL FUNCTION AND SEXUAL DISTRESS ACROSS THE TRANSITION TO PARENTHOOD

Tavares, I. M., Rosen, N. O., Heiman, J. R., & Nobre, P. J.

Abstract

The prevailing narrative about sexual declines during the transition to parenthood is largely based on studies assessing the *average* couple, but there is increasing evidence of variability in the sexual well-being of new parents. We sought to establish distinct subgroups of couples based on sexual function and sexual distress trajectories and examine biopsychosocial risk and protective factors of these trajectories. A prospective cohort of 257 first-time parent couples reported on sexual function and sexual distress from 20-weeks pregnancy (baseline) to 6-months postpartum across 4 time-points. Biopsychosocial factors were assessed at baseline and 3-months postpartum. Dyadic latent class growth analysis identified two distinct sexual function classes (high, 85%; discrepant, 15%) and three sexual distress classes (low, 77%; moderate, 12%; discrepant, 11%). We identified biomedical (vaginal delivery, perineal tear, breastfeeding) and psychosocial (fatigue, stress, anxiety, depression, attitudes towards sex during pregnancy, relationship quality, perceived partner support) factors that can be assessed at critical time-points (i.e., 20-weeks pregnancy and 3-months postpartum) to identify high-risk couples. Current results indicate that the course of change in sexual well-being for new parents is heterogenous, with most new parents retaining high function and low distress and only a minority showing trajectories in which mothers, but not fathers, experience clinically significant and persistent levels of low sexual function and high sexual distress. These results may facilitate more nuanced approaches to the assessment and intervention of new parents' sexual well-being.

Keywords: dyadic; longitudinal; pregnancy; postpartum; sexual well-being

Sexual well-being can be defined as a state of physical, emotional, and social well-being in relation to sexuality (Mitchell et al., 2021; World Health Organization, 2010) and comprises two major components: the experience of unimpaired sexual function (e.g., desire, arousal, orgasm, absence of pain) and the lack of sexual distress (i.e., negative emotions associated with one's sexual life). Sexual well-being is linked to better mental and physical health over the entire life course and is one of the five most robust contributors to the quality of romantic relationships (Joel et al., 2020; Mitchell et al., 2021).

Specific life periods represent stages of high vulnerability for sexual well-being and one such period is the transition to parenthood—the period ranging from pregnancy up to 12 months postpartum—where new parents (as individuals) and new parent couples (as dyads) experience marked biopsychosocial changes that impact their sexuality (Fitzpatrick et al., 2021; McBride & Kwee, 2017). While a subset of new parents may fare well across the transition, others experience significant disruptions to their sexual well-being that might require clinical attention (Dawson et al., 2021; Rosen et al., 2020). The identification of distinct trajectories of sexual well-being and of factors that predict these patterns of change in new parents is essential to early assessment and intervention of high-risk couples during this critical period. Using a dyadic, longitudinal, group-based modeling approach, the objective of the current study was to ascertain unique dyadic trajectories of two core dimensions of sexual well-being—i.e., sexual function and sexual distress—across the transition to parenthood and to examine biopsychosocial variables associated with couples' membership in such trajectories.

Sexual Function and Sexual Distress across the Transition to Parenthood

Changes to sexual function across the transition to parenthood are commonly reported by new parents (Fitzpatrick et al., 2021). However, referring to these difficulties alone as sexual dysfunction is inappropriate as it can lead to the pathologization of a common experience. For instance, new mothers and partners can experience changes to sexual function which are common (e.g., differences in sexual desire) and that may not translate into clinical levels of sexual distress (Rosen et al., 2020). It is also possible for couples to experience clinically significant sexual distress due to other factors than changes to their sexual function (e.g., distress related to fears and negative attitudes about

having sex during pregnancy; Tavares et al., 2021). Therefore, the concomitant presence of both clinically significant sexual distress and sexual function problems—two necessary markers of sexual dysfunction—is central to identify those couples who are most vulnerable across this period.

Cross-sectional and longitudinal studies have shown that, from pregnancy through postpartum, both mothers and partners experience marked changes to their sexual function. In pregnancy, as much as 36% to 88% of mothers and 19% to 47% of partners report sexual function difficulties (for a review, see Fitzpatrick et al., 2021). After childbirth, the prevalence of mothers and partner who report sexual function problems has been found to range from 10% to 83% and from 12% to 45%, respectively. Interestingly, sexual distress prevalence rates differ between couple members, with between 47% to 57% of mothers, compared to only 8% to 12% of partners, reporting clinically significant sexual distress across the first postpartum year (Fitzpatrick et al., 2021). These prevalence rates indicate that sexual changes are, overall, common experiences for both new parents. However, they do not inform on whether the course of change for central markers of sexual well-being—such as sexual function and sexual distress—follow one uniform trajectory (i.e., homogeneity) among couples or whether there are groups of couples who follow unique and distinctive trajectories (i.e., heterogeneity) and, in this case, which groups are at heightened risk for experiencing sustained sexual difficulties.

Recent longitudinal studies have started to uncover some heterogeneity in couples' sexual well-being trajectories and found that, indeed, many couples are able to maintain their sexual well-being across the transition, with clinically significant sexual difficulties being experienced by only a subset of couples. Rosen and colleagues (2020) followed 203 new parent couples from mid-pregnancy to one year postpartum and observed two unique trajectories of sexual distress. One trajectory captured couples (76%) who were not experiencing clinically significant sexual distress throughout the transition. In this group of couples, mothers showed an overall increase in sexual distress over time but, at one year postpartum, both partners' levels of distress were still below the clinical range. A different trajectory captured couples (24%) who experienced a stable discrepancy in sexual distress over time (i.e., partners consistently reported different levels of distress).

In this group, mothers' sexual distress was in the clinical range from pregnancy to one year postpartum, while partners' sexual distress was consistently below clinical cut-offs.

As for sexual function, only one study, to our knowledge, has examined group-based trajectories across the transition to parenthood, and did so by only sampling new mothers (Dawson, Vaillancourt-Morel, et al., 2020). This study revealed that mothers' sexual function followed three distinct trajectories, which differed based on the severity of sexual function problems at postpartum and on their degree of improvement over time. The majority (52%) of women reported minimal sexual function problems at three months postpartum and improved the least over time, a third of women (35%) reported moderate sexual function problems and improved the most over time, and 13% of women reported marked sexual function problems at three months postpartum and showed minimal improvement over time. These results reinforce the heterogeneity in sexual experiences across the transition to parenthood, but this study solely translates mothers', rather than couples' experiences. Examining these trajectories at the couple level and considering sexual function and sexual distress simultaneously is valuable given emerging evidence that partners also experience consequences to their sexual function from pregnancy to postpartum and that changes in sexual function and distress are highly interdependent between couple members (Chew et al., 2021; Dawson et al., 2021; Fitzpatrick et al., 2021).

A Biopsychosocial Framework of New Parent Couples' Sexual Well-being

The question of what makes some couples retain high sexual well-being (i.e., high sexual function and low sexual distress) across the transition to parenthood while others evidence marked sexual difficulties has been examined by prior researchers based on a biopsychosocial framework. As supported by models of sexual function (e.g., Basson, 2000; Cranston-Cuevas & Barlow, 1990) and by recent conceptualizations of postpartum couples' sexual well-being (Dawson, Vaillancourt-Morel, et al., 2020; Fitzpatrick et al., 2021; McBride & Kwee, 2017), new parents face a range of biological, psychological, and relational changes that impact their sexual function and sexual distress.

Biological factors include those related to hormonal changes of pregnancy and postpartum (e.g., breastfeeding) and those related to the characteristics of the birth (e.g., epidural, induction, mode of delivery, episiotomy, degree of perineal tear). Current evidence on the

contribution of biological factors to new parents' sexual well-being does not support a strong influence, with results showing non-significant or minimal effects of biomedical aspects on both partners' sexual function more generally and on specific sexual problems more particularly (e.g., pain during vaginal intercourse; Rosen et al., 2021). Some factors (i.e., vaginal delivery with perineal tearing, episiotomy, breastfeeding) have shown some consistency in increasing the risk, albeit slightly, of mothers experiencing poorer sexual function (e.g., poorer overall sexual function, increased genital pain, decreased desire and arousal) at six months postpartum and at later time-points, cross-sectionally (Fitzpatrick et al., 2021), but biomedical factors did not influence women's trajectory of sexual function across the transition, when assessed longitudinally (Dawson, Vaillancourt-Morel, et al., 2020).

Psychological factors have shown a stronger contribution to both partners' sexual function and sexual distress across the transition to parenthood. The change in roles and routines that comes with the birth of a child are typically accompanied by heightened stress and fatigue, which have in turn been found to negatively influence both parents' sexual well-being, cross-sectionally and longitudinally. Mothers who report greater fatigue at three months postpartum are more likely to follow trajectories involving marked and moderate sexual function problems across the transition rather than a trajectory of minimal sexual problems (Dawson, Vaillancourt-Morel, et al., 2020). Mothers and partners who experience greater stress at postpartum are more likely to experience greater sexual function difficulties (e.g., dyspareunia, lower desire) at that time-point and beyond (Alligood-Percoco et al., 2016; Tavares et al., 2019). There is also robust evidence supporting the contribution of mood (i.e., anxiety, depression) to sexual function and distress (Atlantis & Sullivan, 2012; Cranston-Cuebas & Barlow, 1990; Norton & Jehu, 1984). Cross-sectional and longitudinal studies have linked greater anxiety and depression symptoms to greater sexual distress and sexual function difficulties, for both the birthing individual (Asselmann et al., 2016; Dawson et al., 2021) and the non-birthing partner (Dawson, Strickland, et al., 2020; Dawson, Vaillancourt-Morel, et al., 2020). Furthermore, couples who demonstrate more positive attitudes to having sex during pregnancy—i.e., less fears and negative beliefs about the potential negative impacts of sex on their baby's and on the mothers' health—show better sexual function and lower distress relative to

couples who hold less positive attitudes to sex during pregnancy (Beveridge et al., 2018; Tavares, Barros, et al., 2021; Tavares, Heiman, et al., 2021).

These psychological factors (e.g., low mood, fatigue, fears and negative attitudes about sex during pregnancy) may interfere with sexual function by deviating one's focus of attention away from sexual cues or by inhibiting the experience of pleasure (Barlow, 1986; Cranston-Cuebas & Barlow, 1990). Because these psychological factors can also induce negative cognitions and affect (e.g., nonsexual or negative thoughts, anhedonia) that promote avoidance of sexual activity, they can contribute to more persistent sexual difficulties over time (Tavares et al., 2020) and, ultimately, to higher sexual distress.

Lastly, social and relational factors—including poor relationship quality and low perceived social support from one's partner—are thought to inhibit sexual well-being by reducing feelings of intimacy and connectedness between partners (Basson, 2000; McBride & Kwee, 2017). These relational factors have all been associated with poorer sexual well-being, including in new parents (Dawson, Vaillancourt-Morel, et al., 2020; Lorenz et al., 2020), emphasizing the important interpersonal nature of the sexual relationship. Couples with interpersonal dynamics of lower quality may be less able to deal with the demands of the transition to their sexual lives (Fitzpatrick et al., 2021; Shapiro et al., 2000), and it is thus likely that couples who have a strong prenatal bond to their partner will show reduced odds of experiencing trajectories characterized by lower sexual function and heightened sexual distress. However, no study to date has examined prevalence of membership in sexually high-risk classes (i.e., couples who experience clinically significant changes to sexual function and clinically significant sexual distress) nor which factors are associated with couples' membership in these classes. This information is essential for the early detection of couples who are more vulnerable to sustained sexual problems across this period.

The Current Study

This study aimed to improve current understanding of couples' sexual function and sexual distress across the transition to parenthood by prospectively assessing new parent couples and by employing group-based modeling, rather than assessing average trajectories (Foran & Kliem, 2015; Jung & Wickrama, 2008). Prior studies have typically sampled individuals rather than couples, employed correlational or retrospective

approaches and, if prospective, focused solely on average change and not on the existent variability within sexual well-being outcomes trajectories. It is particularly noteworthy that no study has examined sexual function and sexual distress concomitantly in both new parents, although these are central markers of sexual dysfunction. Sexual distress, in particular, has received little attention in the context of couples' postpartum sexual well-being.

As such, the goals of the current study were threefold: 1) to identify subgroups (i.e., classes) of dyadic sexual function and sexual distress trajectories from mid-pregnancy to 6-months postpartum; 2) to establish the prevalence of simultaneous membership (i.e., overlap) in the identified sexual function and distress trajectories; and 3) to identify biopsychosocial factors that were associated with membership in the distinct sexual well-being trajectories. Although several potential risk and protective factors underlying mothers' and partners' sexual well-being have been previously identified, no study has established whether particular biopsychosocial factors might be more relevant for a subsection of couples (i.e., high risk couples) and which can therefore be specifically targeted in future early assessment and interventions. Given prior research, we hypothesized that first-time couples' sexual function and sexual distress would exhibit multiple distinct trajectories, although the exact number of classes for each outcome is exploratory. Based on models of sexual well-being in the postpartum period and existing literature (Basson, 2000; Fitzpatrick et al., 2021; McBride & Kwee, 2017), we hypothesized that biopsychosocial factors (i.e., biomedical risk factors, fatigue, stress, depression, anxiety, less positive attitudes to sex during pregnancy, as well as lower levels of relationship quality and perceived partner support) would be associated with those trajectories that captured couples' poorer sexual function and higher sexual distress over time.

Method

Participants

Couples who were expecting their first child were recruited during pregnancy ($M = 22.8$ weeks, range = 20–24 weeks, $SD = 1.48$) from June 2019 to April 2021. The inclusion criteria for both members of the couple included: (a) being in a committed romantic relationship with each other for at least six months; (b) being over 18 years of

age; and (c) being able to read and write in Portuguese. One member of the couple was additionally required to: (d) currently have an uncomplicated, singleton pregnancy; and (e) have not given birth previously. Participants who self-reported currently suffering from a severe unmanaged medical or psychiatric illness were ineligible. Figure 1 depicts a flowchart of participant recruitment and attrition. Two hundred and fifty-seven couples were eligible to be included in the current analyses (see Figure 1), a sufficient sample size to detect small groups of subpopulations within a sample (Foran & Kliem, 2015). All participants who gave birth described their gender/sex as woman/female and all partners self-identified as man/male; we therefore refer to these participants collectively as “mothers” and “fathers”, respectively. Participants ranged in age from 19 to 47 years old (mothers: $M = 29.92$, $SD = 4.74$; fathers: $M = 31.61$, $SD = 4.87$) and were in a relationship for an average of seven years ($M = 87.5$ months, range = 6–255 months, $SD = 55.5$ months). The majority of couples (68%) was married or common-law and 32% of couples were dating. All participants were currently in a mixed-gender/sex relationship, although the study was inclusive of couples of all genders and identities. Most mothers (93%) and fathers (95%) identified as exclusively heterosexual, 6% of mothers and 4% of fathers identified as predominantly heterosexual, 1% of mothers identified as predominantly lesbian, and 1% of fathers identified as bisexual. Around 61% of mothers and 43% of fathers had some form of higher education, 32% of mothers and 42% of fathers completed 12 years of education, and 7% of mothers and 15% of fathers completed 9 years of education. Monthly household income ranged from less than €1,050 (27% of mothers, 20% of fathers), 1,050€–2,095€ (49% of mothers, 55% of fathers), to over 2,095€ (24% of mothers, 25% of fathers). Most couples described their pregnancy as planned (80%) and few (8%) reported prior fertility complications (e.g., infertility, recurrent pregnancy loss).

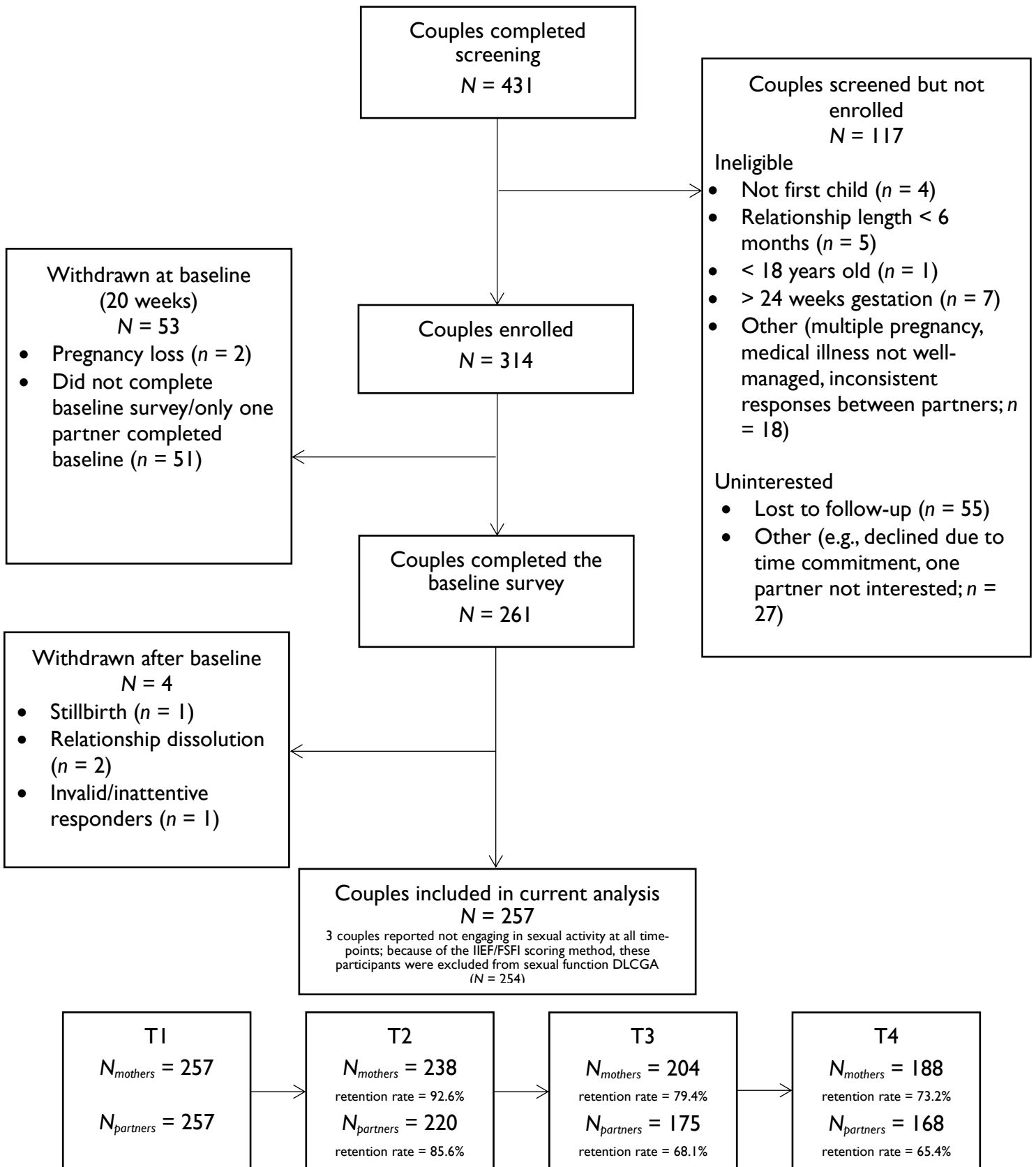


Figure 1. Participants' recruitment flow.

Procedure

Participants were recruited either in-person during their routine appointments at a large obstetrics outpatient unit in Portugal (81%) or via community (i.e., hospital bulletin boards, pregnancy-related services) or online advertisements (19%), as part of a larger study on couples' relationships during the transition to parenthood. Participants recruited through advertisements completed all materials online. For in-person recruitment, participants were recruited through gynecologists' referral and those who were interested and eligible were invited to speak to the study coordinator (either in person or via telephone) who described the aims and procedures of the study and confirmed eligibility. Couples were invited to complete the surveys online, which were separately sent to each partners' email address. All individuals gave informed consent online before accessing the first survey. Data were obtained from both couple members at four time-points, two pre- and two postnatal: 20-weeks pregnancy (T1, baseline), 32-weeks pregnancy (T2), 3-months postpartum (T3), and 6-months postpartum (T4). Couple members were given four weeks to complete each survey. Retention strategies to promote participation included reminder e-mails one week prior to receiving each follow-up survey (i.e., an e-mail including educational information on fetus or infant development at that time-point), as well as reminder emails and/or phone-calls if they did not complete a survey within 48–72 hours and at one and three weeks after receiving it. After participation of both couple members, then each couple was compensated with a 10€ voucher at every other time-point of the study. The study was approved by the ethical review boards at the Faculty of Psychology and Education Sciences of the University of Porto and at the Centro Materno-Infantil do Norte.

Measures

Mothers and fathers reported on sociodemographic information at baseline. All participants reported on their sexual well-being at all time-points. Labor and delivery characteristics were collected via chart review (i.e., epidural, induction, mode of delivery, episiotomy, and degree of perineal tearing), when available, and/or at the 3-months postpartum survey (i.e., breastfeeding). The psychological and social variables were evaluated at both baseline and 3-months postpartum. We used time-invariant predictors because these factors can be assessed at relevant time-points (i.e., pregnancy, early

postpartum) and are therefore of greater clinical utility for identifying risk/protective factors for persistent sexual difficulties.

Sexual function. At each time-point, mothers' and fathers' sexual function in the prior four weeks was assessed using the well-validated 19-item Female Sexual Function Index (FSFI; Rosen et al., 2000) and 15-item International Index of Erectile Function (IIEF; Rosen et al., 1997), respectively. As per current recommendations, women and men indicating no sexual activity in the preceding four weeks did not receive a total score for that time-point to prevent artificially low scores, which would indicate absence of sexual activity rather than sexual difficulties (Meston et al., 2020; Meyer-Bahlburg & Dolezal, 2007). Total scores resulting from this scoring method range from 7.2 to 36 for FSFI, IIEF total scores range from 15 to 75; higher scores denote better sexual function. Both the FSFI and the IIEF have previously demonstrated strong psychometric properties (Rosen et al., 1997, 2000) and have been used to assess sexual function in pregnant and postpartum samples (Dawson et al., 2021). In the current sample, both measures showed excellent internal consistency at all time-points ($\alpha_{\text{mothers}} = .96-.98$ for the FSFI; $\alpha_{\text{fathers}} = .93-.96$ for the IIEF). To permit sexual function scores to be comparable across participants, FSFI scores were re-scaled to the same metric as the IIEF using the following adjustment: $[(\chi - 2) \times (75/34)]$ (Dawson et al., 2021). Sexual function trajectories were interpreted based on established cut-offs for the FSFI denoting clinically significant problems with sexual function (i.e., < 26.55 , adjusted score < 54.15 ; Wiegel et al., 2005). For the IIEF, clinical cut-offs have not been established but a total score lower than 55 is used as indicative of clinically significant problems with sexual function, as this cut-off has been demonstrated to successfully differentiate men with and without a diagnosis of sexual dysfunction (Forbes et al., 2014; Rosen et al., 1997).

Sexual distress. At all time-points, the Female Sexual Distress Scale-Revised (FSDS-R; Derogatis et al., 2008) was used to assess distress relative to one's sex life in the preceding four weeks. This 13-item self-report measure is validated for use in women and men with good psychometric properties (Derogatis et al., 2008; Santos-Iglesias et al., 2018) and has been used to measure sexual distress during pregnancy and postpartum (Dawson, Vaillancourt-Morel, et al., 2020). Total scores range from 0 to 52, with higher scores being indicative of greater sexual distress. This measure showed excellent internal

consistency at all time-points in this study ($\alpha_{\text{mothers}} = .95-.96$; $\alpha_{\text{fathers}} = .94$). Sexual distress trajectories were interpreted following established cut-offs denoting clinically significant sexual distress (i.e., > 11 for women, > 19.5 for men; Derogatis et al., 2008; Santos-Iglesias et al., 2018).

Biomedical factors. Six dichotomous (0 = no; 1 = yes) biomedical factors related to labor and delivery characteristics were examined: epidural, induction of labor, vaginal delivery, episiotomy, perineal tear, and breastfeeding at 3-months postpartum. Data were coded as missing for those who answered “unsure/do not know.”

Psychological factors. At baseline and at 3-months postpartum, participants reported on their average daily energy level using a single item (1 = high energy to 7 = extreme fatigue) used in prior research (Dawson, Vaillancourt-Morel, et al., 2020), as well as on anxiety, depression, and perceived stress. Anxiety was measured with the valid and reliable 7-item Anxiety Subscale of the Hospital Anxiety and Depression Scale (HADS-A; Zigmond & Snaith, 1983), wherein higher scores denote a more severe presence of anxiety symptoms in the past four weeks (range = 0–21). The HADS-A showed strong indices of internal consistency ($\alpha_{\text{mothers}} = .79-.84$, $\alpha_{\text{fathers}} = .77-.83$). Depressive symptoms were assessed with the well-validated Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987). This 10-item scale is a widely used screening tool for depression designed to particularly target populations at pregnancy and postpartum. Higher scores reflect greater depressive symptoms in the prior week (range = 0–30). Internal consistency of the EPDS in the current study was excellent ($\alpha_{\text{mothers}} = .85-.86$; $\alpha_{\text{fathers}} = .82-.85$). Participants also reported on the degree to which they perceived situations in their lives as stressful in the prior four weeks using the well-validated 14-item Perceived Stress Scale (PSS; Cohen et al., 1983), wherein higher scores indicate higher perceived stress (range = 0–40). The PSS showed strong internal consistency in our sample ($\alpha_{\text{mothers}} = .90-.91$; $\alpha_{\text{fathers}} = .87-.88$). Attitudes toward sex during pregnancy were assessed using the Maternal and Partner Sex during Pregnancy Scales (MSP/PSP; Jawed-Wessel et al., 2016) at baseline, in which participants report their rate of agreement with cognitive and affective aspects related to having sex during pregnancy (e.g., “Having sex can cause a miscarriage”). Higher scores indicate a more positive attitude toward having sex during pregnancy (range = 1–6). The scale was reliable for mothers ($\alpha = .74$) and fathers ($\alpha = .83$).

Social factors. Relational variables were collected at baseline and at 3-months postpartum. Relationship quality was assessed with the well-validated 14-item Dyadic Adjustment Scale–Revised (DAS-R; Busby et al., 1995), that includes a comprehensive evaluation of different dimensions of the quality of the relationship with a partner. Higher scores reflect higher perceived relationship quality (range = 0–69). The scale was reliable for both mothers ($\alpha = .85$) and fathers ($\alpha = .80$). The perception of social support individuals receive from their partners was assessed with the 4-item Multidimensional Scale of Perceived Social Support–Significant Other subscale (MSPSS-SO; Zimet et al., 1988). Higher scores indicate higher perceived partner support (range = 1–7). In this sample, the MSPSS-SO showed excellent internal consistency ($\alpha_{\text{mothers}} = .93$; $\alpha_{\text{fathers}} = .92$).

Data Analyses

De-identified data and syntax for the analyses are available on the Open Science Framework at https://osf.io/wabfk/?view_only=b80534a86fa043f9b7c45695db316d6c. Analyses were conducted with MPlus v8.6 (Muthén & Muthén, 1998-2017) using the maximum likelihood estimator. Full information maximum likelihood estimation was employed to estimate missing data due to attrition over time (Enders & Bandalos, 2001).

Couples' trajectories of sexual function and sexual distress were examined using dyadic latent class growth analysis (DLCGA; Foran & Kliem, 2015; Jung & Wickrama, 2008), a type of mixture modelling that captures heterogeneity in couples' longitudinal patterns by identifying "hidden groups" of couples who share similar responses (i.e., latent classes). Each latent class represents a qualitatively unique dyadic trajectory of an outcome over time. We conducted one DLCGA for each sexual outcome and, for each model, a total of eight variables was assessed simultaneously (i.e., mothers' and fathers' reports in sexual function and sexual distress across the four time-points). Time frame was weighted by months (0, 3, 8, 11) with the intercept representing the first time-point. Variances of the intercepts and slopes were assumed to be invariant (i.e., constrained to zero) within classes but allowed to vary across classes (Grimm et al., 2016). The selection of the optimal number of classes was performed according to several criteria: (a) good model fit as evidenced by the lowest Akaike Information Criterion (AIC), Bayesian information criteria (BIC), and sample-size-adjusted BIC (SABIC), entropy values closer to one (indicating better precision in distinguishing between different classes), a significant Lo-

Mendell-Rubin likelihood ratio test (LMR-LRT), and a significant bootstrap likelihood ratio test (BLRT; Nylund et al., 2007); (b) being the best fitted model in a row of three subsequent models in which model fit worsened (van de Schoot et al., 2017); and (c) parsimony, interpretability, and size of classes (at least 5% of the sample in each class; Nylund et al., 2007). Models were run with 500 start values, using the best 50 for final optimization. When a final solution was selected, it was then replicated with 1,500 random start values with the best 150 retained to ensure it replicated without issue. There is no established method for calculating the required sample size for the current analysis (Ferguson et al., 2019), but a sample size of at least 500 individuals is recommended to detect the correct number of latent classes using adjusted fit statistics (Nylund et al., 2007).

Second, to examine overlap in membership in the identified classes of sexual function and sexual distress, we conducted dual trajectory analyses (Jones & Nagin, 2007) by regressing the sexual function trajectories onto the sexual distress trajectories. This approach allows us to examine the posterior probabilities of group membership across classes (i.e., the likelihood of a couple being part of two given classes simultaneously), which indicates whether couples' membership in a particular sexual function class is significantly more or less likely to correspond to membership in a particular sexual distress class.

Finally, to examine whether biopsychosocial variables account for significant differences between sexual function and sexual distress classes, we used the BCH method, named after Bolck et al., 2004. The BCH method tests for significant differences between the established classes based on auxiliary variables (i.e., predictors) and, compared to alternative methods of estimating differences in latent classes according to auxiliary variables, the BCH is preferable because it employs weighted multiple group analysis, therefore avoiding shifts in latent class membership of the identified trajectories because the groups of classes (i.e., latent classes) are known (Bakk et al., 2013; Vermunt, 2010).

Results

Below, we report results of the DLGCAs for sexual function and sexual distress by first describing the average trajectories for each outcome (i.e., the dyadic single class solution) followed by the number of classes and pattern of change within each class

resulting from the final selected DLGCA. Model fit indices of the estimated DLGCAs are shown in Table 1 and the trajectories are depicted in Figures 2 and 3.

Table 1
Fit indices and final class solutions for the dyadic latent class growth analyses ($n = 257$ couples)

| | Class proportions | LL | AIC | BIC | SABIC | LMR-LRT p value | BLRT p value | Entropy |
|-----------------|-------------------------|-----------------|-----------------|-----------------|-----------------|--------------------------------|---------------------------------|-------------|
| Sexual function | | | | | | | | |
| 1 class | 1.00 | -5200.60 | 10433.20 | 10489.80 | 10439.08 | NA | NA | NA |
| 2 class | .15/.85 | -5089.58 | 10221.15 | 10295.44 | 10228.86 | $p < .05$ | $p < .001$ | .885 |
| 3 class | .49/.10/.41 | -5047.20 | 10146.41 | 10238.38 | 10155.95 | $p = .185$ | $p < .001$ | .743 |
| 4 class | .73/.11/.04/.12 | -5013.71 | 10089.41 | 10199.07 | 10100.79 | $p = .490$ | $p < .001$ | .858 |
| 5 class | .46/.10/.07/.02/.35 | -4979.03 | 10030.06 | 10157.41 | 10043.28 | $p = .365$ | $p < .001$ | .805 |
| Sexual distress | | | | | | | | |
| 1 class | 1.00 | -5941.07 | 11914.14 | 11970.93 | 11920.20 | NA | NA | NA |
| 2 class | .83/.17 | -5726.58 | 11495.16 | 11569.69 | 11503.11 | $p < .001$ | $p < .001$ | .954 |
| 3 class | .77/.12/.11 | -5612.18 | 11276.37 | 11368.64 | 11286.22 | $p = .018$ | $p < .001$ | .947 |
| 4 class | .64/.10/.22/.04 | -5567.54 | 11197.08 | 11307.10 | 11208.82 | $p = .644$ | $p < .001$ | .899 |
| 5 class | .05/.26/.08/.54/.08 | -5522.33 | 11116.65 | 11244.42 | 11130.29 | $p = .196$ | $p < .001$ | .905 |
| 6 class | .08/.25/.05/.50/.04/.08 | -5492.04 | 11066.08 | 11211.59 | 11081.61 | $p = .549$ | $p < .001$ | .891 |

Note. LL = model log likelihood; AIC = Akaike information criterion; BIC = Bayesian information criterion; SABIC = sample adjusted BIC; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test; BLRT = bootstrap likelihood ratio test; NA = not applicable. The final class solution is depicted in bold.

Dyadic Trajectories of Sexual Function

The average trajectory of sexual function showed that mothers (intercept = 61.44, $SE = 0.63$, $p < .001$; $EST_s = -.64$, $SE = 0.11$, $p < .001$) declined in sexual function from pregnancy to 6-months postpartum, whereas fathers' sexual function did not significantly change over time (intercept = 66.13, $SE = 0.39$, $p < .001$; $EST_s = -.06$, $SE = 0.06$, $p = .272$). The DLGCAs indicated significant heterogeneity in trajectories (see Table 1), with the best fitting model being the two-class solution (see Figure 2). The two-class solution showed good fit indices alongside significant LMR-LRT and BLRT, the highest entropy value, and sufficient membership in each class. Class 1 (*Discrepant Sexual Function—Mothers Clinically Low*) included 15% of couples ($n = 38$) who were experiencing a sexual function discrepancy between partners throughout the transition, with mothers' functioning being lower than fathers' and at clinical levels from mid-pregnancy to 6-months postpartum. In this class, mothers' sexual function at baseline was in the clinically significant range (46.63, $SE = 3.25$, $p < .001$) and showed a significant decrease over time ($EST_s = -1.40$, $SE = 0.38$, $p < .001$), thus being at clinical levels at all time-points. Fathers' sexual function intercept was high and at non-clinical levels (62.41, $SE = 1.63$, $p < .001$) and remained stable over time ($EST_s = -.39$, $SE = 0.30$, $p = .183$). Class 2 (*High Sexual Function*) included 85% of

couples ($n = 216$) who reported relatively high levels of sexual function throughout the transition. In this class, mothers' ($63.79, SE = 0.59, p < .001$) and fathers' ($66.70, SE = 0.42, p < .001$) sexual function intercept was not in the clinically significant range. Mothers' sexual function significantly decreased between mid-pregnancy and 6-months postpartum ($EST_s = -.46, SE = 0.11, p < .001$) but was still at non-clinical levels at all time-points, while fathers' sexual function was stable over time ($EST_s = -.002, SE = 0.05, p = .966$).

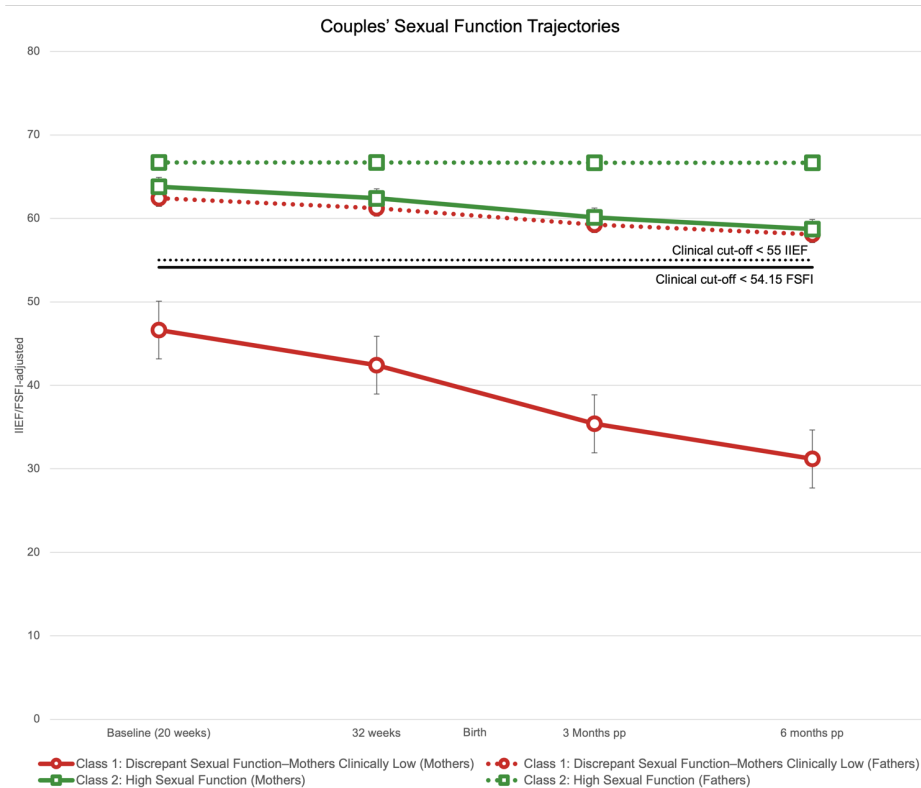


Figure 2. Dyadic trajectories of sexual function from mid-pregnancy to 6-months postpartum ($n = 254$ couples). Solid lines represent mothers' trajectories and dashed lines represent fathers' trajectories. Error bars based on the 95% CI are not visible if smaller than the markers.

Dyadic Trajectories of Sexual Distress

The average trajectory of sexual distress indicated that mothers (intercept = $8.13, SE = 0.55, p < .001; EST_s = .19, SE = 0.06, p = .002$) increased in sexual distress over time, while fathers (intercept = $5.90, SE = 0.41, p < .001; EST_s = .05, SE = 0.148, p = .08$) did not show significant changes in sexual distress from mid-pregnancy to 6-months postpartum. Similar to sexual function, we found heterogeneity in trajectories of sexual distress when estimating DLGCAs (see Table 1). All fit indices indicated that the best fitting model was

the three-class solution (see Figure 3), with the three subsequent models (i.e., four-classes, five-classes, six-classes) all showing worse fit indices and insufficient class membership (i.e., <5% sample in at least one class). Class 1 (*Low Sexual Distress*) included 77% of couples ($n = 197$) who reported low levels of sexual distress across the transition. In this class, mothers' sexual distress intercept was 4.66 ($SE = 0.37, p < .001$) and increased over time ($EST_s = .25, SE = 0.07, p < .001$), but was still at non-clinical levels at 6-months postpartum. Fathers' sexual distress intercept was 3.73 ($SE = 0.39, p < .001$) and did not show significant change over time ($EST_s = .05, SE = 0.05, p = .25$). Class 2 (*Moderate Sexual Distress*) included 12% of couples ($n = 32$) in which both partners were experiencing moderate levels of sexual distress across the transition. In this class, mothers' sexual distress intercept was in the clinically significant range (12.27, $SE = 1.99, p < .001$) while fathers' intercept was not (17.04, $SE = 1.77, p < .001$). Although both mothers' ($EST_s = -.13, SE = 0.19, p = .48$) and fathers' ($EST_s = .29, SE = 0.24, p = .21$) sexual distress did not show significant change over time, both partners' sexual distress levels approached clinical cut-off values at 6-months postpartum. Class 3 (*Discrepant Sexual Distress—Mothers Clinically Elevated*) included 11% of couples ($n = 28$) who were experiencing a sexual distress discrepancy between partners, with mothers' distress being higher than fathers' from mid-pregnancy to 6-months postpartum. Mothers' sexual distress at baseline was high and in the clinically significant range (25.48, $SE = 1.14, p < .001$) and continued to be so at all time-points, while fathers' sexual distress intercept was low and at non-clinical levels (7.56, $SE = .92, p < .001$). In this class, both mothers' ($EST_s = .08, SE = 0.18, p = .67$) and fathers' ($EST_s = .14, SE = 0.10, p = .16$) sexual distress remained stable over time.

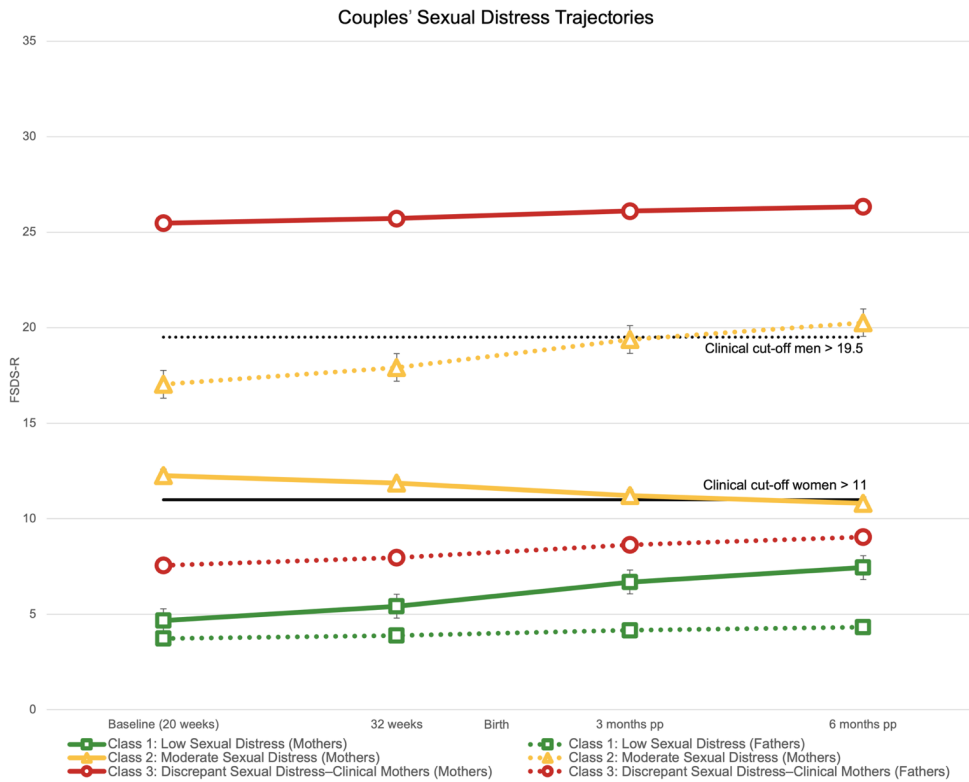


Figure 3. Dyadic trajectories of sexual distress from mid-pregnancy to 6-months postpartum (n = 257 couples). Solid lines represent mothers' trajectories and dashed lines represent fathers' trajectories. Error bars based on the 95% CI are not visible if smaller than the markers.

Overlap in Classes of Sexual Function and Sexual Distress

To assess the overlap in couples' membership across classes, we conducted dual trajectory analyses by regressing the established sexual function trajectories onto the established sexual distress trajectories. Table 2 depicts the probabilities of couples in each sexual distress class being part of each of the sexual function classes. Figure 4 depicts the percentage of couples from the total sample that overlapped in each of the six class combinations.

The odds ratio results indicated that membership in the *Discrepant Sexual Function—Mothers Clinically Low* class was significantly associated with increased odds of membership in the *Moderate Sexual Distress* class compared to membership in the *Low Sexual Distress* (OR = 7.55, 95% CI [1.78, 32.07], $p < .01$) and *Discrepant Sexual Distress—Mothers Clinically Elevated* (OR = 56.71, [14.84, 216.73], $p < .001$) classes. Membership in

this sexual function class was also significantly associated with reduced odds of membership in both the *Low Sexual Distress* ($OR = .02, [.01, .07], p < .001$) and *Discrepant Sexual Distress—Mothers Clinically Elevated* ($OR = .13, [.03, .56], p < .01$) classes.

Table 2
Estimated posterior probabilities from the dual trajectory analysis (n = 257 couples)

| | | Sexual distress classes | | |
|-------------------------------|--|-----------------------------------|--|---|
| | | Class 1 Low Sexual Distress | Class 2 Moderate Sexual Distress | Class 3 Discrepant Sexual Distress—Mothers Clinically Elevated |
| Sexual function classes | Class 1 Discrepant Sexual Function—Mothers Clinically Low | .06 | .77 | .30 |
| | Class 2 High Sexual Function | .95 | .23 | .70 |

Note. Values indicate the posterior probability that each of the three sexual distress classes falls into one of the two sexual function classes (e.g., the .95 posterior probability means that for couples that were part of the low sexual distress class, there was a 95% likelihood they would also be part of the high sexual function class).

As for membership in the *High Sexual Functioning* class, this was significantly associated with increased odds of membership in the *Low Sexual Distress* class compared to membership in the *Moderate Sexual Distress* ($OR = 7.50, [2.42, 23.24], p < .001$) and in the *Discrepant Sexual Distress—Clinical Mothers* ($OR = 56.68, [14.85, 216.40], p < .001$) classes. Membership in this sexual functioning class was also significantly associated with decreased odds of membership in both the *Moderate Sexual Distress* ($OR = .02, [.01, .07], p < .001$) and *Discrepant Sexual Distress—Clinical Mothers* ($OR = .13, [.04, .41], p < .01$) classes when compared to one another.

As for membership in the *High Sexual Function* class, this was significantly associated with increased odds of membership in the *Low Sexual Distress* class compared to membership in the *Moderate Sexual Distress* ($OR = 7.50, [2.42, 23.24], p < .001$) and in the *Discrepant Sexual Distress—Mothers Clinically Elevated* ($OR = 56.68, [14.85, 216.40], p < .001$) classes. Membership in this sexual function class was also significantly associated with decreased odds of membership in both the *Moderate Sexual Distress* ($OR = .02, [.01, .07], p < .001$) and *Discrepant Sexual Distress—Mothers Clinically Elevated* ($OR = .13, [.04, .41], p < .01$) classes.

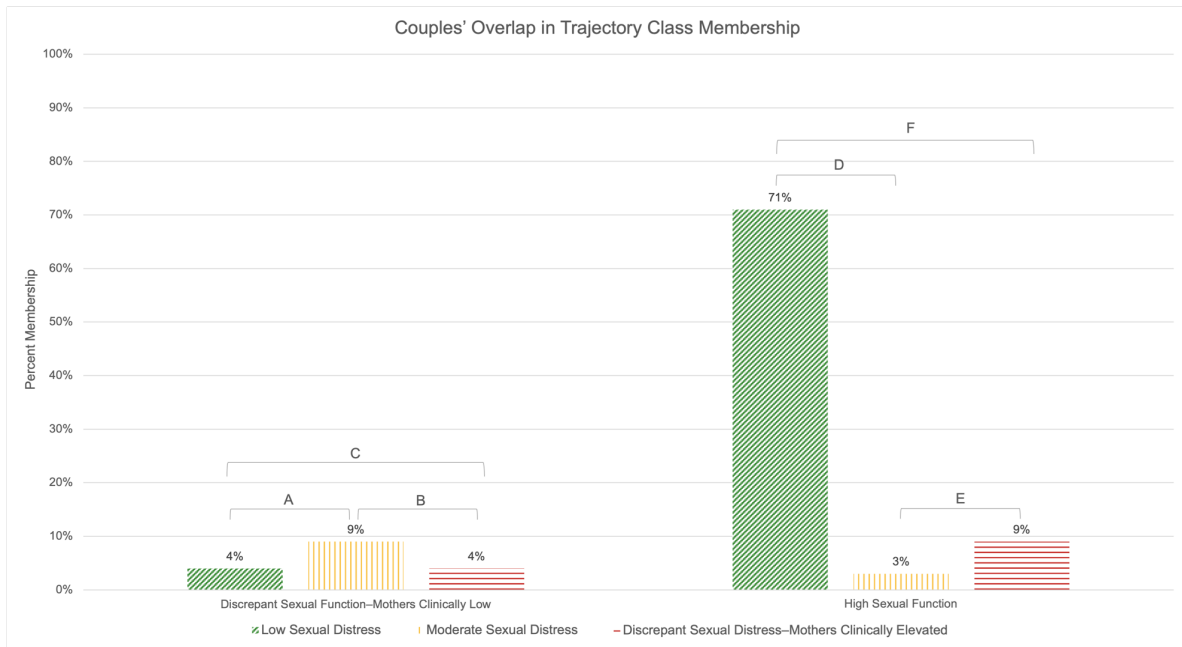


Figure 4. Couples' overlap into each of the nine sexual well-being class combinations (n = 257 couples).

Biomedical and Psychosocial Differences across Classes

We tested how biological, psychological, and social/relational variables differed between classes of sexual function and of sexual distress. Psychosocial predictors were significantly and positively correlated (i.e., interdependent) between partners ($r_s = .15$ to $.65$) and, within-person, they were only weakly correlated between baseline and 3-months postpartum ($r_s = .16$ to $.18$). Full results of the BCH analyses are shown in Tables 3 and 4.

For sexual function, there were significant differences across classes for three biomedical factors: vaginal deliveries, perineal tearing, and breastfeeding were significantly higher in couples in the *Discrepant Sexual Function—Mothers Clinically Low* class compared to those in the *High Sexual Function* class. For psychological factors, couples in the *Discrepant Sexual Function—Mothers Clinically Low* class reported higher scores for mothers' and fathers' fatigue, as well as higher scores for mothers' stress, anxiety, and depression at baseline (20 weeks pregnancy) and at 3-months postpartum relative to couples in the *High Sexual Function* class. Furthermore, mothers in the *Discrepant Sexual Function—Mothers Clinically Low* class reported significantly less positive attitudes to sex during pregnancy relative to women in the *High Sexual Function* class. For relational factors, couples in the *Discrepant Sexual Function—Mothers Clinically Low* class had mothers and fathers reporting lower relationship quality and lower perceived partner support both at pregnancy and 3-

months postpartum relative to couples in the *High Sexual Function* class, except for fathers' reports of perceived partner support at 3-months postpartum which did not differ between sexual function classes (see full results in Table 3).

For sexual distress, only one biological factor, i.e., breastfeeding at 3-months postpartum, showed significant differences between classes, such that more women in the *Discrepant Sexual Distress—Mothers Clinically Elevated* class were breastfeeding at 3-months postpartum than in the *Low Sexual Distress* class. The most consistent differences between sexual distress classes were found for psychological and relational factors, with almost all mothers' and fathers' variables revealing significant differences. Overall, couples in the *Low Sexual Distress* class were those in which mothers and fathers reported lower baseline and 3-months postpartum levels of fatigue, stress, anxiety, and depression, more positive attitudes toward sex during pregnancy (assessed at baseline), as well as higher levels of relationship quality and perceived partner responsiveness (both at baseline and at 3-months postpartum) relative to couples in the other classes. Couples in the *Moderate Sexual Distress* class had fathers reporting higher stress, anxiety, and depression scores both at baseline and at 3-months postpartum, relative to both other sexual distress classes (see full results in Table 4).

Table 3
Biomedical and psychosocial differences across couples' sexual function class membership (n = 2,54 couples)

| | (a) Discrepant Sexual Function—Mothers Clinically Low (15%, n = 38) | (b) High Sexual Function (85%, n = 216) | Range | χ^2 | p value |
|--|--|--|------------|----------------------------|----------------------------|
| Biological | | | | | |
| Epidural Induction | 0.94 (0.04) 0.38 (0.09) | 0.94 (0.02) 0.53 (0.04) | 0-1 0-1 | < 0.01 2.05 | .994 .152 |
| Vaginal delivery | 0.84 (0.07)^b 0.52 (0.10) | 0.67 (0.04)^a 0.50 (0.04) | 0-1 0-1 | 4.10 0.04 | .043 .849 |
| Episiotomy | 0.58 (0.10) ^b 0.92 (0.05)^b | 0.29 (0.04)^a 0.79 (0.03)^a | 0-1 0-1 | 6.47 4.31 | .011 .038 |
| Perineal tear | | | | | |
| Breastfeeding (3 months postpartum) | | | | | |
| Psychological | | | | | |
| Fatigue M (20 weeks) | 4.20 (0.17)^b | 3.47 (0.07)^a | 1-7 | 15.35 | < .001 |
| Fatigue F (20 weeks) | 3.40 (0.18)^b | 2.76 (0.07)^a | 1-7 | 10.87 | .001 |
| Fatigue M (3 months postpartum) | 4.61 (0.22)^b | 3.53 (0.08)^a | 1-7 | 20.31 | < .001 |
| Fatigue F (3 months postpartum) | 3.65 (0.22)^b | 3.11 (0.09)^a | 1-7 | 4.62 | .032 |
| Stress M (20 weeks) | 19.56 (1.14)^b | 13.93 (0.43)^a | 0-40 | 20.10 | < .001 |
| Stress F (20 weeks) | 15.32 (0.92) | 13.56 (0.46) | 0-40 | 2.72 | .099 |
| Stress M (3 months postpartum) | 21.26 (1.50)^b | 15.11 (0.52)^a | 0-40 | 14.06 | < .001 |
| Stress F (3 months postpartum) | 14.36 (1.25) | 14.45 (0.60) | 0-40 | < 0.01 | .951 |
| Anxiety M (20 weeks) | 6.43 (0.63)^b | 4.51 (0.23)^a | 0-21 | 7.72 | .005 |
| Anxiety F (20 weeks) | 4.76 (0.47) | 3.92 (0.21) | 0-21 | 2.48 | .115 |
| Anxiety M (3 months postpartum) | 6.86 (0.86)^b | 4.47 (0.22)^a | 0-21 | 6.87 | .009 |
| Anxiety F (3 months postpartum) | 4.87 (0.58) | 4.39 (0.31) | 0-21 | 0.50 | .481 |
| Depression M (20 weeks) | 8.25 (0.72)^b | 6.02 (0.30)^a | 0-30 | 7.61 | .006 |
| Depression F (20 weeks) | 5.22 (0.53) | 4.56 (0.25) | 0-30 | 1.21 | .272 |
| Depression M (3 months postpartum) | 9.26 (0.92)^b | 5.49 (0.29)^a | 0-30 | 14.29 | < .001 |
| Depression F (3 months postpartum) | 5.18 (0.68) | 4.88 (0.35) | 0-30 | 0.14 | .704 |
| Positive attitudes to sex M (20 weeks) | 3.83 (0.15)^b | 4.33 (0.06)^a | 1-6 | 8.70 | .003 |
| Positive attitudes to sex F (20 weeks) | 4.48 (0.15) | 4.65 (0.06) | 1-6 | 1.20 | .274 |
| Social | | | | | |
| Relationship quality M (20 weeks) | 47.62 (1.99)^b | 56.48 (0.45)^a | 0-69 | 18.00 | < .001 |
| Relationship quality F (20 weeks) | 50.64 (1.59)^b | 54.78 (0.47)^a | 0-69 | 5.89 | .015 |
| Relationship quality M (3 months) | 45.18 (2.19)^b | 54.97 (0.54)^a | 0-69 | 17.82 | < .001 |
| Relationship quality F (3 months) | 48.29 (2.35)^b | 53.97 (0.60)^a | 0-69 | 5.19 | .023 |
| Perceived partner support M (20 weeks) | 5.37 (0.13)^b | 5.81 (0.04)^a | 1-7 | 9.21 | .002 |
| Perceived partner support F (20 weeks) | 5.20 (0.20)^b | 5.65 (0.05)^a | 1-7 | 4.52 | .034 |
| Perceived partner support M (3 months) | 5.22 (0.18)^b | 5.76 (0.05)^a | 1-7 | 7.72 | .005 |
| Perceived partner support F (3 months) | 5.10 (0.26) | 5.40 (0.09) | 1-7 | 1.16 | .282 |

Note. M = mother, F = father. Standard errors are in parenthesis. Bolded information indicates significant effects. p values indicate the overall significant difference between the classes. Superscripts denote those classes which are significantly different from the reference class (p < .05). For dichotomous predictors, the reference group were women who endorsed or experienced the predictor (i.e., yes = 1). More intense colors denote classes with the highest score, less intense colors denote classes with the lowest score.

Table 4
Biomedical and psychosocial differences across couples' sexual distress class membership (n = 257 couples)

| | (a) Low Sexual Distress (77%, n = 197) | (b) Moderate Sexual Distress (12%, n = 32) | (c) Discrepant Sexual Distress—Mothers Clinically Elevated (11%, n = 28) | Range | χ^2 | p value |
|---|---|---|--|-------------|--------------|-----------------|
| Biological | | | | | | |
| Epidural | 0.94 (0.02) | 0.96 (0.04) | 0.92 (0.06) | 0–1 | 0.46 | .795 |
| Induction | 0.51 (0.04) | 0.46 (0.11) | 0.52 (0.10) | 0–1 | 0.23 | .890 |
| Vaginal delivery | 0.70 (0.04) | 0.77 (0.09) | 0.67 (0.10) | 0–1 | 0.82 | .664 |
| Episiotomy | 0.50 (0.04) | 0.48 (0.10) | 0.54 (0.10) | 0–1 | 0.20 | .904 |
| Perineal tear | 0.29 (0.04) ^b | 0.55 (0.11) ^a | 0.40 (0.11) | 0–1 | 5.21 | .074 |
| Breastfeeding (3 months postpartum) | 0.78 (0.03)^c | 0.89 (0.07) | 0.96 (0.04)^a | 0–1 | 11.64 | .003 |
| Psychological | | | | | | |
| Fatigue M (20 weeks) | 3.46 (0.07)^{bc} | 3.95 (0.22)^a | 4.00 (0.18)^a | 1–7 | 10.62 | .005 |
| Fatigue F (20 weeks) | 2.75 (0.07)^c | 3.07 (0.18) | 3.25 (0.17)^a | 1–7 | 8.44 | .015 |
| Fatigue M (3 months postpartum) | 3.56 (0.09)^{bc} | 4.21 (0.21)^a | 4.17 (0.26)^a | 1–7 | 11.38 | .003 |
| Fatigue F (3 months postpartum) | 3.07 (0.09)^b | 3.93 (0.25)^a | 3.45 (0.21) | 1–7 | 11.53 | .003 |
| Stress M (20 weeks) | 13.78 (0.45)^{bc} | 17.06 (1.21)^a | 19.04 (1.10)^a | 0–40 | 22.93 | <.001 |
| Stress F (20 weeks) | 12.85 (0.44)^b | 19.77 (1.16)^{ac} | 13.74 (0.96)^b | 0–40 | 30.16 | <.001 |
| Stress M (3 months postpartum) | 14.72 (0.52)^{bc} | 19.56 (1.69)^a | 21.59 (1.37)^a | 0–40 | 26.13 | <.001 |
| Stress F (3 months postpartum) | 13.90 (0.60)^b | 20.16 (1.27)^{ac} | 12.38 (1.16)^b | 0–40 | 23.84 | <.001 |
| Anxiety M (20 weeks) | 4.26 (0.23)^{bc} | 6.83 (0.68)^a | 6.18 (0.65)^a | 0–21 | 17.69 | <.001 |
| Anxiety F (20 weeks) | 3.60 (0.21)^b | 6.69 (0.50)^{ac} | 3.92 (0.44)^b | 0–21 | 31.63 | <.001 |
| Anxiety M (3 months postpartum) | 4.40 (0.24)^c | 5.69 (0.70) | 6.92 (0.84)^a | 0–21 | 10.20 | <.001 |
| Anxiety F (3 months postpartum) | 4.03 (0.29)^b | 8.45 (0.75)^{ac} | 3.39 (0.58)^b | 0–21 | 33.14 | <.001 |
| Depression M (20 weeks) | 5.77 (0.31)^{bc} | 7.97 (0.75)^a | 8.50 (0.79)^a | 0–30 | 15.14 | .001 |
| Depression F (20 weeks) | 4.05 (0.24)^{bc} | 7.19 (0.66)^{ac} | 5.43 (0.58)^{ab} | 0–30 | 21.94 | <.001 |
| Depression M (3 months postpartum) | 5.36 (0.30)^{bc} | 8.43 (0.99)^a | 8.63 (0.85)^a | 0–30 | 19.40 | <.001 |
| Depression F (3 months postpartum) | 4.52 (0.34)^b | 8.13 (0.87)^{ac} | 4.44 (0.85)^b | 0–30 | 15.03 | <.001 |
| Positive attitudes to sex M (20 weeks) | 4.36 (0.06)^{bc} | 3.89 (0.15)^a | 3.92 (0.18)^a | 1–6 | 11.44 | .003 |
| Positive attitudes to sex F (20 weeks) | 4.73 (0.06)^b | 3.96 (0.14)^{ac} | 4.56 (0.13)^b | 1–6 | 25.37 | <.001 |
| Social | | | | | | |
| Relationship quality M (20 weeks) | 56.59 (0.51)^{bc} | 51.54 (1.72)^a | 49.35 (1.30)^a | 0–69 | 31.07 | <.001 |
| Relationship quality F (20 weeks) | 55.34 (0.49)^{bc} | 48.13 (1.51)^{ac} | 52.58 (1.24)^{ab} | 0–69 | 22.13 | <.001 |
| Relationship quality M (3 months) | 55.19 (0.55)^{bc} | 48.74 (2.53)^a | 46.91 (1.77)^a | 0–69 | 23.98 | <.001 |
| Relationship quality F (3 months) | 54.35 (0.61)^b | 45.72 (2.76)^a | 50.81 (1.75) | 0–69 | 11.73 | .003 |
| Perceived partner support M (20 weeks) | 5.85 (0.04)^{bc} | 5.39 (0.17)^a | 5.44 (0.13)^a | 1–7 | 15.12 | .001 |
| Perceived partner support F (20 weeks) | 5.66 (0.05)^b | 5.23 (0.18)^a | 5.40 (0.20) | 1–7 | 6.47 | .039 |
| Perceived partner support M (3 months) | 5.79 (0.05)^c | 5.34 (0.22) | 5.24 (0.18)^a | 1–7 | 11.46 | .003 |
| Perceived partner support F (3 months) | 5.39 (0.10) | 5.09 (0.22) | 5.36 (0.26) | 1–7 | 1.50 | .472 |

Note. M = mother, F = father. Standard errors are in parenthesis. Bolded information indicates significant effects. p values indicate the overall significant difference between the classes. Superscripts denote those classes which are significantly different from the reference class (p < .05). For dichotomous predictors, the reference group were women who endorsed or experienced the predictor (i.e., yes = 1). More intense colors denote classes with the highest score, less intense colors denote classes with the lowest score.

Discussion

The current study followed a large cohort of first-time parent couples prospectively from mid-pregnancy to 6-months postpartum and revealed that a majority of couples followed trajectories of maintaining high sexual function and low distress, whereas a substantial minority of couples followed trajectories characterized by sexual function and distress difficulties. We observed two unique trajectories for sexual function: 85% of couples retained high sexual function over time, whereas 15% of couples demonstrated discrepant sexual function between partners, with mothers showing declining and clinically low levels of sexual function across the whole period, while fathers did not. For sexual distress, we observed three distinct trajectories: 77% of couples retained low sexual distress over time, 12% of couples demonstrated moderate and stable sexual distress, and 11% of couples showed discrepant sexual distress between partners, with mothers showing clinically elevated and stable levels of sexual distress while fathers had low and stable levels of sexual distress. Belonging to these distinct trajectories was predicted by biomedical (vaginal delivery with perineal tearing, breastfeeding), psychological (fatigue, stress, mood, attitudes to sex during pregnancy), and relational factors (relationship quality, perceived partner support) assessed at relevant time-points for screening and intervention (i.e., 20-weeks pregnancy and 3-months postpartum). The observed heterogeneity in trajectories of sexual function and sexual distress—the central markers of sexual dysfunction—is pertinent for conceptualizing first-time couples' postpartum sexual well-being and adds to a growing body of research demonstrating that negative sexual changes are not common across the transition (Fitzpatrick et al., 2021), but there are particular groups of couples who are at heightened risk for sustained sexual difficulties across this period.

In line with prior evidence that the birthing parent shows heightened risk of sexual difficulties across this period (Fitzpatrick et al., 2021), our results indicated that only the expectant/birthing parent (mothers), and not their partners (fathers), showed average declines in sexual function and increases in sexual distress from mid-pregnancy to 6-months postpartum. The transition may be more difficult for women because of the distinct changes related to birth and their bodies (e.g., body image, childbirth, breastfeeding) that may impact their sexuality differently from their partners' (McBride &

Kwee, 2017), but also because of a series of gendered roles and expectations. Outside of the perinatal period, it is women that are usually expected to, and that do perform, most of the household labor, relational labor (e.g., relationship maintenance, family management), and childcare (Erickson, 2005; Robertson et al., 2019). This inequitable division of chores is linked to women's heightened psychological distress (Barnett & Shen, 1997) and may become more salient during the transition to parenthood. Moreover, due to a pervasive and heteronormative focus on women's appearance (van Anders et al., 2021), women might feel pressured to maintain their physical appearance during pregnancy and to quickly bounce back to their prior physical form after childbirth. As women, and their male partners, adhere to and internalize these unrealistic beauty norms, women can feel more dissatisfied with their body appearance and present lower sexual self-esteem (van Anders et al., 2021), which can in part explain the average decline in women's sexual function (e.g., women's sexual desire may decrease if contingent upon whether they think they are desirable) and average increase in women's sexual distress (e.g., both women and their partners may have unattainable expectations about women's physical changes across the transition).

Our results are consistent with the only study examining subgroups of perinatal sexual function over time (which only included mothers, and not partners; Dawson, Vaillancourt-Morel, et al., 2020), as we found that women who demonstrate clinically low sexual function at postpartum are likely to already report clinically low levels of sexual function in pregnancy. This is particularly relevant for intervention efforts, as an early screening of sexual function during pregnancy can help to identify those women who are more likely to subsequently suffer from more severe declines to their sexual function across the postpartum. As described above, women's poorer sexual function, even during pregnancy, might be associated with gendered factors such as self- and/or partner-imposed body-objectification and an unequal division of labor within the couple (van Anders et al., 2021), factors which might be exacerbated in the transition and that are worth screening for early on. Current findings for sexual distress are also in line with the only study that has examined its course in new parent couples (Rosen et al., 2020). We replicated the previously identified dyadic classes of sexual distress (i.e., low sexual distress, discrepant sexual distress) and with similar distributions (76% vs 77%, 24% vs 11%), but we identified

an additional class of couples (i.e., moderate sexual distress, 12%). This additional class may result from differences in sample size between the two studies (203 vs 257 couples), as our large sample size may have allowed for a better identification of classes that include a smaller portion of couples.

Contrary to the prevailing narrative about negative sexual experiences during the transition to parenthood, we found that only a minority of couples, and mostly mothers, experienced marked declines to sexual function and increases to sexual distress across the transition, and not necessarily together. In fact, when looking at the probability of couples belonging to a combination of each sexual function and distress classes simultaneously, most new parents (71%) showed trajectories characterized by low sexual distress together with high sexual function, with only a subsection of couples (4%) demonstrating clinically relevant trajectories of low sexual function paired with high sexual distress in mothers (i.e., high risk couples). Although one could anticipate a strong overlap between couples' discrepant sexual function and discrepant sexual distress, this was not the case. Instead, we found that those couples who belonged to the most concerning class of sexual distress (i.e., *Discrepant Sexual Distress—Mothers Clinically Elevated* class, where mothers showed heightened and stable levels of sexual distress across the whole period, while partners did not) were more likely to present high sexual function, with a probability of 70%, than to report sexual function difficulties (i.e., belong to the *Discrepant Sexual Function—Mothers Clinically Low* class, where mothers' sexual function, but not fathers', was clinically low), with a probability of 30%. Yet, couples who belonged to the *Moderate Sexual Distress* class (in which both partners experienced moderate and stable sexual distress across the transition) were more likely to belong to the *Discrepant Sexual Function—Clinically Low Mothers* class, with a 77% probability, than to the *High Sexual Function* class (where neither mothers nor fathers reported relevant sexual function difficulties), with a 23% probability.

Although these overlaps were observed in a small percentage of cases—as the greatest proportion of couples presented non-clinical levels of sexual function and distress—this indicates that specific subclinical groups of couples might deserve particular attention (viz., couples where mothers present high sexual distress despite none of the partners has clinically significant sexual function difficulties, or couples where mothers',

but not fathers' sexual function is impaired and, yet, both partners feel moderately distressed). Altogether, these results suggest that mothers' and fathers' sexual distress across the transition to parenthood may stem from various dimensions of change (e.g., body image, anxiety about having sex while pregnant, postpartum change in roles in the couple) rather than only from changes to their sexual function. This also highlights the critical role of both partners' experiences to new parents' sexual well-being. As such, rather than focusing on strictly assessing sexual function or on establishing a diagnosis of sexual dysfunction, which will be obtained only in a minority of cases, professionals working with new parents may alternatively focus on targeting both partners' sources of sexual distress across this period. This is highly relevant considering that, compared to the 4% of couples in which women would be considered as having sexual dysfunction, about one in four mothers in our sample (i.e., 23%) experienced either subclinical (i.e., moderate) or clinical and stable levels of sexual distress and one in ten fathers (i.e., 12%) experienced subclinical and stable levels of sexual distress across the whole transition period.

One of the central goals of this study was to test whether the identified subgroups of couples differed in terms of their biopsychosocial characteristics. In contrast to other recent prior research (Dawson, Vaillancourt-Morel, et al., 2020; Rosen et al., 2020), this study provides some evidence of the contribution of biomedical factors to couples' sexual trajectories, namely having experienced a vaginal birth with perineal tearing and breastfeeding at 3-months postpartum. Women with clinical levels of sexual function across the transition (i.e., those in the *Discrepant Sexual Function—Mothers Clinically Low* class) reported greater rates of vaginal delivery and perineal tear, findings which are consistent with prior cross-sectional research showing that these birth characteristics may increase the risk of the birthing parent experiencing lower genital arousal and poorer sexual function at 6-months postpartum and beyond (Cappell et al., 2020; Fitzpatrick et al., 2021). These differences may be partly explained by the physiological changes that happen after a vaginal birth, which may have a detrimental impact on sexual function by posing some damage to the physiological structures involved in the regulation of vaginal vasocongestion (e.g., the autonomic pelvic nerves in the inferior hypogastric plexus; Giuliano et al., 2002). Still, these same women were already showing clinical levels of

poorer sexual function at mid-pregnancy, which only worsened across the postpartum. As such, it might not be the type and characteristics of labor that, in isolation, favor a steeper decline in women's sexual outcomes, but rather that those women who already demonstrate clinical levels of sexual problems at pregnancy are at heightened risk for the potential negative consequences of this mode of delivery, a factor that should be considered in pre-birth assessments. Furthermore, women in classes characterized by clinical levels of sexual function and sexual distress (i.e., *Discrepant Sexual Function—Mothers Clinically Low* and *Discrepant Sexual Distress—Mothers Clinically Elevated*) also reported greater rates of breastfeeding at 3-months postpartum. This result gives support to breastfeeding as a risk factor for sexual distress and low sexual function, which may be partly due to the specific hormonal (e.g., high prolactin and oxytocin levels) and physical characteristics of lactation occurring for the birthing parent. Indeed, bottle-feeding women tend to present lower levels of sexual problems and are likely to resume intercourse sooner after childbirth (Rowland et al., 2005), whereas those who breastfeed tend to experience more sexual concerns such as vaginal dryness, dyspareunia, increased nipple sensitivity, and decreased arousal (LaMarre et al., 2003).

Concerning psychological factors, we found that *High Sexual Function* and *Low Sexual Distress* couples had, overall, mothers and fathers who reported more positive attitudes towards having sex during pregnancy (i.e., less fears and negative beliefs about the potential negative impacts of sex on the baby's and on the pregnant partners' health) and who experienced the lowest levels of fatigue, stress, anxiety, and depression both at baseline and at 3-months postpartum. A few exceptions were found for sexual function classes which, apart from fatigue, differed only based on mothers', but not fathers', reports. The contribution of these psychological factors to the longitudinal regulation of new parents' sexual well-being aligns with our predictions and is in accordance with cognitive-motivational and information-processing models of sexual response (Barlow, 1986; Basson, 2000; Cranston-Cuevas & Barlow, 1990). As such, preventative efforts should be able to identify expectant couples with a greater presence of these negative psychological factors, as early as in mid-pregnancy (e.g., including a brief screening of mood, or of negative attitudes to sex while pregnant) (Dawson, Strickland, et al., 2020; Tavares, Heiman, et al., 2021).

As for relational factors, mothers and fathers from the *Low Sexual Distress and High Sexual Function* classes showed higher levels of relationship quality and perceived partner support (at baseline and at 3-months postpartum) relative to couples in all other classes, in line with our predictions. The only exception was observed for the level of support fathers reported receiving from mothers at 3-months postpartum, which did not significantly differ across sexual function or sexual distress classes. A reason as to why this was observed might be because this is a timing where fathers might be highly engaged in providing, rather than receiving support to their female partners who may be struggling with aspects such as physical recovery or breastfeeding, and that this may occur irrespectively of the couples' prior and current sexual experiences. In sum, the current results indicate that couples with a strong prenatal bond show trajectories characterized by greater sexual functioning and lower sexual distress across the transition and support the buffering effect of higher quality interpersonal dynamics to help couples navigate the demands that the transition imposes to their lives, including sexually (Dawson, Vaillancourt-Morel, et al., 2020; Fitzpatrick et al., 2021; Shapiro et al., 2000). This is in contrast with some findings of sexual frequency that show the opposite effect (Lorenz et al., 2020), denoting that aspects of the relationship with one's partner might not show similar links to all aspects of sexual well-being.

This is the first study, to our knowledge, that identified specific groups of new parent couples based on their trajectories of the critical markers of sexual dysfunction (i.e., sexual function and sexual distress). Strengths of our study include the recruitment of a large cohort of first-time parents in mid-pregnancy across four time-points with high retention of participants to 6-months postpartum. The study was designed to assess predictors at time-points which reflect periods of routine appointments and opportunities for screening, thus providing useful information for professionals working with expectant and new parents. Although we did not follow couples beyond the 6-months postpartum period, the current results align with prior studies that assessed couples until 12-months after postpartum (Rosen et al., 2020). A limitation of this study is that sexual function and distress were self-assessed by participants, and we did not perform a clinical assessment. Also, the scoring of the FSFI/IIIEF removes people who were not sexually active in the prior month, which limits the interpretability of the current findings only to those couples

who are sexually active across the transition. The current sample was representative of the demography of the Portuguese population having a first child, namely regarding age range, marital status, and socioeconomical status (INE, 2011), but it included a large proportion of couples with relatively higher education and predominantly white/Caucasian. Despite the diversity of recruitment methods, which were inclusive in terms of diversity in gender/sex, all couples were in mixed-sex/gender relationships. It is possible that a more diverse sample in terms of sexual, racial/ethnic, socio-economic, and obstetric (e.g., infant health complications, multiparity) characteristics may yield different trajectories.

Conclusion

This study provides evidence that couples' sexual adjustment (i.e., sexual function, sexual distress) during the transition to parenthood follows different courses for specific subsamples of the population. The majority of couples followed trajectories of high sexual function and low sexual distress (85% and 77%), whereas 15% and 11% of couples followed trajectories in which mothers, but not fathers, experienced clinically significant levels of low sexual function and high sexual distress from mid-pregnancy to 6-months postpartum, respectively. We also identified critical time-points (i.e., 20-weeks pregnancy and 3-months postpartum) to assess risk and protective biomedical and psychosocial factors to screen those individuals and couples at heightened risk for sexual dysfunction across this transition. Results from this study enhance knowledge of the heterogeneity of couples' sexual function and sexual distress across pregnancy and postpartum, which may contribute to better evaluation and treatment during such a critical, although normative, life transition.

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Conflict of Interest

The authors report no conflicts of interest.

Statement of Authorship

Conceptualization, I.M.T., P.J.N.; Methodology, I.M.T., P.J.N.; Investigation, I.M.T., P.J.N.; Writing – Original Draft, I.M.T.; Writing – Review & Editing, I.M.T., J.R.H., N.O.R., P. J.N.; Funding Acquisition, I.M.T., P.J.N.; Supervision, J.R.H., N.O.R., P.J.N.

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CHAPTER IX. SUMMARY, IMPLICATIONS, AND CONCLUSIONS

I. Summary

The research described within this thesis examined cross-sectional and longitudinal patterns of sexual well-being in couples transitioning to parenthood and elucidated on protective and risk factors involved in the development of sexual difficulties across this life period. Sexual well-being includes the integration of biological, psychological, and relational components and is directly and indirectly related to overall well-being and health across the entire life course (Diamond & Huebner, 2012; Mitchell et al., 2021; World Health Organization, 2002). Much of the research focused on the transition to parenthood has focused on other well-being and health-related aspects of new parents (e.g., postpartum depression, parental competence, diet, exercise) and has neglected the examination of sexual well-being, despite its central contribution to the quality, longevity, and stability of new parents' relationships, which is ultimately beneficial to the overall well-being of their families during this life transition.

Much of the foundational research on sexual well-being across this period typically focused on intraindividual effects by sampling individuals (typically the birthing parent) rather than couples (Fitzpatrick et al., 2021). While examining intraindividual mechanisms during pregnancy and postpartum is important (e.g., because the pregnant/birthing partner is the most vulnerable parent and is typically most accessible to health services), this approach does not reveal the important interindividual processes and mechanisms contributing to these intraindividual outcomes. Moreover, because most prior studies employ cross-sectional or retrospective approaches, over time effects between intra- and inter-individual factors have received little attention, but these are central to inform evidence-based practices and reliable theoretical advances.

Informed by a dyadic research design and by theoretical models of sexual and relational functioning (e.g., cognitive-motivational models of sexual response, the interpersonal exchange model of sexual satisfaction, the vulnerability-stress-adaptation model), the five empirical studies described in this thesis examined psychological and relational processes and mechanisms contributing to the sexual adjustment of first-time parents. We employed cross-sectional designs to examine processes at specific moments

in time (e.g., early-pregnancy, mid-pregnancy, postpartum) as well as longitudinal prospective designs to uncover longitudinal effects. In sum, the results suggest that there are targetable individual (e.g., cognitive and emotional aspects such as attitudes towards sex during pregnancy) and relational aspects (e.g., relational quality, perceived social support from one's partner) that can contribute to the onset and course of sexual difficulties for new parents. At the same time, and adding to other current research, our findings indicate that there is some contribution of biological aspects (e.g., characteristics of birth, breastfeeding) to the development of sexual difficulties across the transition, and particularly for the birthing parent. These findings are particularly promising for increasing our understanding of mechanisms underlying sexual adjustment of couples across this transition, and for early assessment and intervention specifically targeting couples who are at heightened risk of developing sexual difficulties.

In Studies 1 and 2, we tested whether negative attitudes toward sex during pregnancy—which are characterized by negative beliefs (e.g., having sex might endanger the pregnancy) and the experience of negative affect (e.g., feeling anxious) toward having sex while pregnant—are a risk factor for lower sexual well-being in pregnancy. To test this hypothesis, we sampled couples with low-risk pregnancies and no comorbidities that would justify these concerns about sex and tested the links between attitudes and several indices of sexual well-being (e.g., sexual frequency, sexual satisfaction, sexual distress). As expected, we found that the type of attitude each partner holds toward having sex during pregnancy contributed to dimensions of their sexual well-being. First, in Study 1, we found that these cognitive and affective dimensions affected expectant partners' sexual behavior. Results of this study showed intraindividual effects whereby women and men with a more positive attitude towards sex during pregnancy reported engaging more frequently in sexual behaviors involving women's genital area (such as vaginal penetration, manual stimulation by partner, mutual masturbation, and oral sex), whether these included vaginal penetration or not. Still, attitudes were not related to the frequency of other types of sexual behaviors that did not involve women's genital area (such as caressing, kissing, solo masturbation, anal penetration, nor the use of sex toys). Notably, no partner effects were found, suggesting that negative attitudes represent an intrapersonal risk factor for expectant individuals' lower sexual well-being. This has implications for preventative

efforts of clinicians working with this population, as attitudes toward sex during pregnancy can be an immediate focus early on during pregnancy (e.g., by providing reliable information that debunks myths such as that sexual activity might induce complications to the pregnancy).

Still, couples' decision to engage or avoid sex during pregnancy is prominently interpersonal and, thus, it is relevant to consider whether the degree to which expectant partners' agreement in their attitude toward sex during pregnancy poses specific benefits for their sexual well-being. This question was examined in Study 2 using a novel technique to assess (dis)similarity in dyads (i.e., Dyadic Response Surface Analysis). The findings of this study reinforced the idea that variability in expectant couples' sexual experiences should be expected: in a third of couples (34.1%) pregnant women reported more positive attitudes than men, in another third of couples (34.3%) men reported more positive attitudes than pregnant women, while another third of couples (31.6%) partners reported very similar attitudes. Couples' more positive attitudes (i.e., the more both partners perceived sexual activity as non-threatening to their pregnancy), rather than partners' similarity in attitudes, were associated with lower sexual distress for both partners and higher sexual satisfaction for male partners. In couples where partners held more dissimilar attitudes, men demonstrated greater distress when their female partner's attitudes were more positive than their own. It should be of note that these findings were robust to contextual factors such as age, relationship duration, and the experience of pregnancy complications. Consistent with models of relational adjustment and with prior research (Anderson et al., 2003; Rosen et al., 2017; Rosen, Williams, et al., 2020), one potential explanation for this findings is that partners who share comparable cognitive-emotional responses to a novel sexual situation, as is sex during pregnancy, are more likely to be responsive to the other's concerns and to offer validation and support in ways that are more in line with the other partner's needs and expectations, thereby increasing satisfaction and reducing the impact of negative sexually-related feelings toward sex that can emerge across this period. When integrating the findings of these two studies, the evidence indicates that attitudes exert an influence on how likely it is for each expectant partner to engage in sexual activities (i.e., intraindividual effects), whereas the resulting sexual satisfaction and/or sexual distress associated with their sexual experiences during

pregnancy is influenced by the interpersonal context in which these behaviors occur, with both expectant partners benefiting from *both* partners holding more positive attitudes to sex during pregnancy.

In Studies 3 to 5 we made use of different designs (i.e., cross-sectional and longitudinal) and methodological approaches (i.e., average-based and group-based modelling) to examine biopsychosocial risk and protective factors associated with couples' postpartum sexual well-being. Study 3 sampled couples during a critical adjustment period (i.e., from 3 to 12 months postpartum) to test the patterns of association between three key dimensions of postpartum sexual well-being (i.e., sexual satisfaction, sexual desire, and postpartum sexual concerns) and one central index of new parents' overall well-being, i.e., perceived stress. As expected, the findings of these study are in line with theories of individual and relational adjustment to stress (e.g., vulnerability-stress-adaptation model, Karney & Bradbury, 1995; Lazarus & Folkman, 1984; the theory of emotional capital theory, Feeney & Lemay, 2012) by indicating that new parent couples who demonstrate greater indices of sexual well-being are also those couples who report lower perceived stress during this vulnerable period. These results underscore the interrelation between sexual well-being and overall well-being, particularly in periods of heightened individual and relational demands. Despite specific patterns of association emerged for each of the assessed sexual outcomes, greater sexual well-being was consistently associated with new parents' lower perceived stress even when controlling for other factors relevant to postpartum stress (e.g., child age, breastfeeding, maternal fatigue). Still, this study was limited in the sense that it solely offers a cross-sectional perspective on these associations, deterring us from ascertaining the direction of causality between sexual well-being and stress. Although our hypotheses were drawn from prior theoretical and empirical research (e.g., Feeney & Lemay, 2012; Lazarus & Folkman, 1984), as noted, the reverse direction of effects is also possible, such that greater stress postpartum leads to poorer sexual well-being. A subsequent study (Study 5) was dedicated to further examining this research question in a longitudinal manner.

Based on the previously identified gaps in the understanding of the interrelation between sexual and relational changes across the transition, Study 4 examined the

bidirectionality of these changes over time from mid-pregnancy to 6-months postpartum. With a mixed set of prior results to base our hypothesis upon, we intended to add knowledge to the currently unresolved question of whether having a positive couples' relationship prenatally may in fact protect couples from experiencing detrimental sexual changes across the transition, and vice-versa. Results from this study indicated that new parents' declines in relationship quality were indeed bidirectionally associated with declines in own and partners' sexual satisfaction and with increases in own sexual distress (i.e., these dimensions were reciprocally influencing each other across the transition). These findings add to a sparse body of research examining how sexual and relational dimensions relate to each other longitudinally (Blumenstock & Papp, 2017; Byers, 2005) and indicate that the interpersonal dynamic changes occurring in new parents' sexual and relational dimensions importantly contribute to how each other vary across this transition, with changes in one dimension potentiating changes to the other. Importantly, new parents' relationship quality and sexual distress trajectories could be predicted by initial prenatal levels of each other, with distinct predictors being relevant for each couple member. We found evidence of a protective function of *some* amount of women's prenatal sexual distress against subsequent declines in their own sexual and in their partners' relational well-being. These findings speak to the notion that the experience of some amount of sexual distress—but still at non-clinical levels—might serve to protect women against marked increases in own sexual distress later on, as well as contribute to their partners' maintenance of perceived relational quality across this transition (e.g., because holding some worries and concerns about sexuality during pregnancy can reflect a greater value placed by women on their sexual lives). Furthermore, we found that mothers who reported higher perceptions of relationship quality prenatally were more likely to show greater increases in sexual distress over time. We discuss these findings in the context of theories of how prenatal expectations influence outcomes across the transition (e.g., theory of violated expectations; Delmore-Ko et al., 2000; Mellers et al., 1997) and one possible explanation as to why these women may have interpreted sexual changes as more concerning relates to the fact that these women may have been used to very satisfying sexual relationships, as corroborated by the cross-sectional findings reporting positive links between relational and sexual quality (Byers, 2005; Joel et al.,

2020). As such, these women may hold overly positive expectations for their ability to navigate the challenges occurring during the transition, including sexual ones (e.g., expecting that their sexual lives will quickly return to what they were before). This needs to be replicated in future research which specifically tests the impact of couples' prenatal expectations on the trajectories of new mothers' sexual well-being. If this finding is replicated, one path for intervention might be targeting prenatal relationship indicators (e.g., women's unrealistic prenatal expectations for the couples' relationship across the transition) as to prevent later sexual distress for women. In sum, results from this study substantiate cross-domain links between sexual and relational processes and underline that the impact of the transition on couples' relationships is partly determined by own and partners' prenatal factors, to which clinicians and researchers can attend to early on.

Finally, in Study 5, we built upon the results reported in all prior studies, as well as on accumulated evidence on the potential contributions of biomedical, psychological, and relational factors to couples' sexual well-being in the perinatal period, with the aim of providing a group-based, comprehensive model of the trajectories and determinants of new parents' sexual function and sexual distress from pregnancy to postpartum. Using a large cohort of couples assessed across 4 time-points from mid-pregnancy (i.e., 20-weeks) to 6-months postpartum, the results of this study show that couples' sexual adjustment (i.e., sexual function, sexual distress) during the transition to parenthood follows different courses for specific subsamples of the population. Specifically, we observed two distinct classes for sexual function (high, 85%; discrepant, 15%) and three classes for sexual distress (low, 77%; moderate, 12%; discrepant, 11%). Notably, and in contrast to the prevailing (average-based) notion that most couples suffer from marked negative declines in their sexual well-being from pregnancy to postpartum, we found that the majority of couples followed trajectories of high sexual function and low sexual distress (85% and 77%, respectively). In contrast, only a minority of couples (15% and 11%) followed trajectories in which mothers, but not fathers, experienced clinically significant levels of low sexual function and high sexual distress from mid-pregnancy to 6-months postpartum. We also identified relevant time-points (i.e., 20-weeks pregnancy and 3-months postpartum) to assess risk and protective biomedical and psychosocial factors to screen those individuals and couples at heightened risk for sexual dysfunction across this

transition, ranging from biomedical (vaginal delivery with perineal tear, breastfeeding), psychological (fatigue, mood, stress, attitudes to sex during pregnancy), and relational (relationship quality, perceived partner support) aspects. Findings from this study provide more nuanced information about new parents' sexual function and distress from pregnancy to postpartum, which may facilitate early assessment and intervention efforts.

2. Implications and future directions

The suite of studies included in this thesis have implications across two related areas. First, the specific intrapersonal and interpersonal mechanisms identified (e.g., dyadic interdependence, longitudinal bidirectionality) pose theoretical advancements as they may aid in conceptualizing within- and between-couple differences in sexual well-being during critical life periods such as the transition to parenthood. Second, the resulting findings from this body of work may have clinical utility in the development of evidence-based interventions for the sexual well-being of new parent couples, which are critically needed.

2.1. Refinement of models of sexual well-being: the importance of the interpersonal context

Overall, our conclusions highlight the need for adopting an interpersonal perspective in the theoretical conceptualization of sexual well-being, according to which a successful adjustment to critical periods in life, such as the transition to parenthood, is assumed to be the product of several intra- and inter-personal factors from multiple dimensions of new parents' experiences (i.e., biological, psychological, and relational; Fitzpatrick et al., 2021). Consequently, research efforts focusing on singular intra-personal causal factors might be ineffective in advancing the comprehension of new parents' sexual experiences across this period, as these trajectories are the result of the accumulation of a wide range of interacting factors at both the individual and dyadic levels. In other words, the interpersonal context in which new parents experience changes to their own sexual lives should be considered as an ongoing and active force partly responsible for determining their intrapersonal outcomes. As such, rather than an individual problem, sexual difficulties across this period may rather indicate a negative pattern of reciprocal and complex influences between the individual's and their partner's experiences (Dewitte, 2014;

Fitzpatrick et al., 2021; Kluwer, 2010; Muise et al., 2018), to which future studies and theoretical conceptualizations must attend.

2.2. Development of empirically-based interventions to promote sexual well-being across the transition to parenthood

The current findings support the commonality and variability of sexual changes for new parents but, still, new mothers and fathers often feel unprepared to deal with them. Most new parent couples lack easily accessible, reliable information on the common sexual changes associated with pregnancy and postpartum. Sexual topics are frequently unaddressed by care providers, either due to discomfort or insufficient knowledge (Abdool et al., 2009; Barrett et al., 2000; Johnson, 2011). Indeed, less than 20% of couples report receiving any information about what to expect regarding changes to their sexual relationship across this period and only 15% of women discuss these concerns with their care providers (Barrett et al., 2000). This is even more striking because, unlike changes to other domains of new parents' well-being, challenges to their sexual well-being are still neglected by most prenatal care programs. Programs for couples transitioning to parenthood typically focus on promoting parenting skills or improving couples' relationships more generally and, typically, do not include both members of the couple (Petch & Halford, 2008). To our knowledge, there is only one program targeting sexual well-being and it included mothers, not couples (McBride et al., 2017), and the authors did not test its efficacy. Yet, having access to reliable and evidence-based information is fundamental for couples to establish realistic expectations and to successfully manage the sexual changes likely to occur across the transition.

The studies presented in this thesis uncovered a range of risk and protective factors, from several domains (i.e., psychological, relational), which are associated with changes to sexual well-being in the transition to parenthood for both partners, and this knowledge may be translated into evidence-based prevention programs. For instance, programs can target expectant partners' attitudes to having sex while pregnant through activities such as myth busting of beliefs (e.g., having sex while pregnant can cause a

miscarriage) with the aim of promoting more positive attitudes in *both* partners. These programs can also inform couples of the potential benefits of maintaining positive sexual experiences during the transition (e.g., lower postpartum stress) and can provide couples with psychoeducation about what to expect over time (e.g., inform on the prevalence and diversity of trajectories of sexual well-being from pregnancy to postpartum), as well as target factors, as early as possible, which are most relevant to maintaining couples' sexual well-being (e.g., mood, attitudes to sex during pregnancy, relationship quality, perceived partner support). For individual clinicians, it might be beneficial to screen for the identified risk and protective factors at relevant time-points (i.e., early/mid pregnancy, early postpartum) using, for instance, brief screening measures to expectant/new mothers and fathers, as well as monitor for change based on the identified factors. All in all, a fundamental takeaway from the current set of studies is that the experiences of both partners are relevant for new parents' individual sexual well-being across the transition to parenthood, making it highly relevant that both couple members are included in perinatal appointments and assessments.

3. Strengths and limitations

This work addressed an important gap in the literature by providing a multidimensional and couple-centered examination of new parents' sexual well-being across a critical, yet normative, life period. Strengths of this set of studies include the large sizes of samples that are particularly difficult to target and follow over time, the use of both cross-sectional and prospective longitudinal designs that permitted us to answer complementary questions, and sampling both couple members during a vulnerable life period such as the transition to parenthood. Indeed, the advanced statistical analysis procedures employed across the described studies offer considerable advantages relative to prior studies. They allowed us to overcome important limitations of the current literature, such as the fact that most studies solely look at intra-individual and not interindividual effects (for which we used dyadic approaches as well as the examination of patterns of similarity *versus* dissimilarity within couples), examine questions at particular points in time (for which we used longitudinal approaches), or explore average-based rather than group-based patterns of change (for which we employed both average- and

group-based approaches). It should be noted that gathering evidence using reports of both partners in a couple across several time-points is unusual in the current research panorama. This approach is time-consuming and requires a continuous monitoring of participants' report validity (in our case, at each pregnancy trimester and, after birth, at each three postpartum months) and longitudinal retention rates. Such an approach is even more challenging during critical life periods such as pregnancy and postpartum and, thus, resorting to different recruiting methods (i.e., in-person, online) and strategies (i.e., reminder phone-calls and e-mails, timely infographics to promote retention of couples) was essential to overcoming these methodological challenges and permitted the robustness and novelty of these studies.

Despite its contribution, findings reported in the current thesis should be interpreted considering some limitations. Across studies, the voluntary nature of the participation on studies about sexuality may have led to a selection bias, given that those individuals and couples who agreed to participate may, in fact, be those who feel more involved and satisfied with their sexual experiences (Trivedi & Sabini, 1998). In terms of the representativity of our samples, most sociodemographics of participants were in line with characteristics of couples who are having a first child (i.e., age, marital status, and socioeconomic status), but an exception to that was participants' relatively high education level. Also, and although the recruitment of our samples was inclusive to couples of all genders and identities, samples comprised couples in mixed-gender/sex relationships and predominantly white/Caucasian who, overall, were not distressed at clinical levels and who were mostly sexually satisfied; therefore ceiling effects may limit response variance. Future studies should strive to include more diverse samples in order to further answer these research questions in couples with different characteristics, including same-gender/sex couples and couples with more diverse socioeconomic (e.g., lower education levels, racial and ethnic minorities) characteristics. Finally, we mainly assessed global dimensions of sexual well-being, but important event-level processes that contribute to the observed findings were not examined. A logical subsequent step for future research is to inform on whether and which specific event-level factors and processes (e.g., particular cognitions and affective responses to critical sexual events during pregnancy and/or postpartum) are most relevant to understanding and targeting the complex intra- and inter-personal

mechanisms leading to greater sexual adjustment in the perinatal period. Because of our methodological approaches, we were not able to assess such event-level dimensions. Building upon the current findings, other methodologies (such as, for instances, daily diary methods) will be able to further understand the role of potentially relevant and finer dimensions embedded in couples' interpersonal context.

4. Conclusions

The ability to experience and maintain positive sexual relationships strongly influences one's overall health and well-being across the entire life course and is one of the most critical contributors to the quality and stability of romantic relationships. Specific life periods represent stages of high vulnerability for sexual well-being and one of such periods is the transition to parenthood, given the marked biopsychosocial changes that new parents (as individuals) and new parent couples (as dyads) need to navigate (Don & Mickelson, 2014; Kluwer, 2010; McBride & Kwee, 2017). As suggested by prior theoretical and research efforts, the interpersonal context of romantic relationships provides a context of unique and crucial influence on one's own experiences (e.g., Dewitte, 2014; Muise et al., 2018), but its role on determining new parent couples' sexual well-being has still been largely unexplored. The current research contributes to further understanding the paths through which within- and between-couple processes contributes to explain variability in one's own and in partner's sexual well-being from pregnancy to postpartum. The findings presented in this thesis can provide directions for decoding the unique, though interdependent, roles of new parents' relationships to the development of sexual difficulties from pregnancy to postpartum. Furthermore, the results elucidate the reciprocal influences between sexual and relational dimensions of couple's relationships across this period of marked interpersonal challenges and the complex interplay among distinct dimensions of sexual well-being across time. Finally, this work also enlightens which individuals (i.e., the pregnant/birthing parent *versus* the non-birthing parent) and couples are at most risk for perinatal sexual well-being difficulties by identifying biological, psychological, and relational factors which are most relevant to determine specific trajectories of couples' sexual well-being across this life period.

Taken together, the current set of findings have implications for the conceptualization of sexual well-being through an interpersonal framework, as well as for the development of couple-based interventions, including multiple promising directions for future research. The identification of empirically-supported mechanisms is a central contribution of this thesis as it will lead to the refinement of existing models of sexual adjustment during critical life periods, which will in turn result in the development of empirically-based interventions to promote sexual well-being of new parents. Notably, prevention and treatment options focused on new parent couples' sexual well-being are remarkably scarce but critically needed. Overall, the current findings attest that taking an interpersonal approach to sexuality is necessary, given that sexual outcomes are strongly influenced by contextual and relational processes.

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