A MULTI-METHOD INVESTIGATION OF PREGNANCY LOSS AND SEXUAL WELL-BEING IN COUPLES

by

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Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy

at

Dalhousie University
Halifax, Nova Scotia
June 2024

For Susan, Elaine, and Teddy.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Pregnancy loss affects 1 in 4 women and is linked with poorer overall health and relationship outcomes. Sexual well-being (e.g., satisfaction, desire, distress) may also suffer post-loss. Given the limits of prior work, questions of whether pregnancy loss is linked with lower sexual well-being, what predicts sexual well-being post-loss, and how sexual well-being changes across time post-loss, remain unanswered. In my dissertation, I aimed to answer such questions. Couples, composed of women and gender diverse individuals who were pregnant when a recent pregnancy loss occurred (within the last 4 months) and men, women, and gender diverse partners who were not pregnant, provided data through four monthly surveys. In Study 1, a cross-sectional group- and couples-comparison, I found that both partners in couples with a recent pregnancy loss (n = 103 couples) were less sexually satisfied than their control counterparts—couples with no history of pregnancy loss (n =120 couples). However, I found no differences between the two groups in sexual desire, problems with sexual function, or sexual frequency. Surprisingly, men, women, and gender diverse individuals who were not pregnant at the time of the loss had lower sexual distress than their control counterparts. Women and gender diverse individuals who were pregnant when the loss occurred had lower levels of sexual desire post-loss than their partners, but did not differ from them in sexual satisfaction, problems with sexual function, or sexual distress. In Study 2, a couples-study (n = 109) on links between perinatal grief and sexual well-being, I found that when either partner reported greater than typical perinatal grief, both couple members reported lower than typical sexual satisfaction and sexual desire, and higher than typical sexual function problems and sexual distress. Those with the highest average perinatal grief had the lowest average sexual satisfaction and the highest average sexual function problems and sexual distress. In Study 3, a longitudinal study on changes in sexual well-being and perinatal grief in couples (n = 132), I found that from 10 to 25 weeks post-loss, both couple members' sexual satisfaction increased, and their sexual desire remained stable. Sexual distress decreased only for partners who were not pregnant when the loss occurred. Both couple members' perinatal grief decreased. Perinatal grief levels at 10 weeks post-loss did not predict sexual well-being trajectories. My dissertation provides evidence that pregnancy loss is associated with lower sexual satisfaction and greater differences between partners in sexual desire and that higher perinatal grief may be a risk factor for lower sexual well-being. It also provides evidence that sexual satisfaction, sexual desire, and sexual distress improve or stay the same from 10 to 25 weeks post-loss. Sexual well-being may change in response to the balance of couples' post-loss demands and resources, and that perinatal grief could relate to poorer sexual well-being by negatively influencing meanings around sex. Clinicians should regularly discuss sexual well-being with both couple members after their losses and invite them to discuss how meanings around sex may have changed post-loss. They should also screen them for and discuss perinatal grief to assess for impacts to sexual well-being.

LIST OF ABBREVIATIONS AND SYMBOLS USED

α	Significance level alpha or Cronbach's alpha reliability
β	Standardized beta coefficient
Δ	Change
χ^2	Chi-squared
ω	Omega reliability
AFAB	Assigned female at birth
B	Unstandardized regression coefficient
BIPOC	Black, Indigenous and People of Color
CDN	Canadian dollar
CFI	Comparative fit index
CI	Confidence interval or credible interval
CI_{95}	95% credible interval
d	Cohen's d effect size
df	Degrees of freedom
FIML	Full-information-maximum-likelihood
GDI	Gender diverse individuals
GMSEX	Global Measure of Sexual Satisfaction
IWK	Izaak Walton Killam
M	Mean
N	Population sample size
n	Sample size

NP	Not pregnant
OSF	Open Science Framework
P	Pregnant
p	P-value for significance testing
PGS	Perinatal Grief Scale
PPP	Posterior predictive p-value
r	Pearson product-moment correlation coefficient
R^2	Variance explained
RMSEA	Root mean square error of approximation
SD	Standard deviation
SDI	Sexual Desire Inventory
SDS-SF	Sexual Distress Scale—Short Form
SFEQ	Sexual Function Evaluation Questionnaire
SRMR	Standardized root mean square residual
UK/U.K.	United Kingdom
USA/US/U.S.	United States of America
z	z-value test statistic

ACKNOWLEDGEMENTS

I thank each participant in the Acknowledging Loss Outcomes and Experiences (ALOE) study. Your willingness to share your time and experiences after a pregnancy loss is inspiring.

To every member of the ALOE team—Brenna Bagnell, Eva Cohen, Kathleen Nesbitt-Daly, Lucy Coady, KJ Goruk, Laurie Beauvilliers, Maria Belen Field, Sundus Saqib, Emily Olsen, Jared Kay, Enrique Riveroll, and Erika Dorey—I thank each of you for your work on the study. Your tenacity and creativity made our long recruitment journey successful in the end.

Gill Hyslop and Heather Oliveira, thank you for your wisdom, time-saving magic, positivity, and humor as staff in the Couples and Sexual Health Lab. You made research and work in the lab a joy.

Heather Cockwell and Katherine Péloquin—thank you for your ideas, guidance, and work as collaborators on the ALOE study. The study was more fruitful and functional because of my opportunities to collaborate with both of you.

To my lab mates in the Couples and Sexual Health Lab, thank you for your friendship during the thrills (and at times the slog) of our graduate studies together. Kat Merwin, Meghan Rossi, Justin Dubé, Grace Schwenck, Grace Wang, and Justin Shimizu—one treasure I will take away from Dalhousie is my memories of our times together.

I also thank those who were postdocs in the Couples and Sexual Health Lab during my time there. Inês Tavares, Charlie Belu, Jackie Huberman, Sam Dawson, and

Katrina Bouchard—thank you for your insights, advice, and encouragement along my academic journey.

As well, thank you Sean Mackinnon and Sherry Stewart for your generous guidance and feedback as my committee members. I am grateful for your cheers for me along my path.

Natalie Rosen, thank you, thank you, and thank you for everything you have done for me. I am indebted to you for your constant and caring mentorship. Our time together at Dalhousie, and the growth I have experienced under your tutelage, are dear to me.

And finally, to my wife Susan Allsop, I am so lucky to have your companionship and love. Life is a joyful adventure with you. Thank you for being with me through every twist, turn, and magnificent view.

CHAPTER 1: INTRODUCTION

Having a strong and satisfying sexual relationship and feeling positive about one's sexuality is key to relationship quality and to individual well-being (De Graaff et al., 2016; Diamond & Huebner, 2012; Impett et al., 2014; Lo & Kok, 2016). Yet, many people face challenges as they strive for well-being in terms of their sexuality and sexual relationship. Estimates from population studies indicate that persistent problems with sexual function are reported by 50% of women and 40% of men, and clinical levels of distress about sex are reported by 10% of all people (Mitchell et al., 2013). Such sexual challenges present a public health burden that costs societies hundreds of millions of dollars annually. Although Canadian estimates are difficult to find, in the U.K., sexual dysfunctions result in over $100 million annually in direct costs and lost productivity (Balon, 2017). A large, growing body of research has provided evidence that two reproductive contexts—the transition to parenthood (pregnancy and postpartum) in those becoming parents for the first time, and infertility—are periods where sexual well-being of both members of a couple is at risk of declining (El Amiri et al., 2021; Fitzpatrick et al., 2021; Jawed-Wessel & Sevick, 2017; Péloquin et al., 2024; Starc et al., 2019). However, the related reproductive context of pregnancy loss has received very little attention, despite the fact that 1 in 4 women experience a pregnancy loss and that pregnancy loss includes substantial health and relationship difficulties (Diamond & Diamond, 2016). This oversight has left questions unanswered that are crucial for efficacious treatment of couples' sexual well-being post-loss. These questions include if pregnancy loss is linked with diminished sexual well-being, what predicts sexual well-

being after a pregnancy loss, and how sexual well-being changes across time post-loss. Through my dissertation, I aimed to understand how the sexual well-being of couples who have had a recent pregnancy loss compared to the sexual well-being of couples who have not and if perinatal grief was a risk factor for lower sexual well-being. I also aimed to understand how sexual well-being changed across time post-loss and the potential role of perinatal grief in such changes.

In the following section, I describe sexual well-being and its predictors and provide an overview of sexual well-being during reproductive contexts. Then, I review pregnancy loss and its associated difficulties, key theories that underlie my dissertation, and provide a description of why pregnancy loss could be a time of reduced sexual well-being for couples. I next discuss perinatal grief and why it could be a risk factor for lower sexual well-being. A section on how sexual well-being might change across time after a pregnancy loss and the potential role of perinatal grief in such changes follows. Finally, I describe my three dissertation manuscripts, which include a cross-sectional group- and couples-comparison of post-loss sexual well-being, a dyadic study of links between perinatal grief and sexual well-being, and a longitudinal study of changes in sexual well-being and perinatal grief in couples.

1.1 Sexual Well-Being

Drawing on the definition provided by Muise et al. (2010), I define sexual well-being as an individual's cognitive and affective evaluation of their sexual life across multiple positive and negative dimensions. Notably, the operationalization of sexual well-being has varied in the literature, with little agreement as to what should be included

across psychological, social, biological, behavioral, and cultural dimensions (for review, see Mitchell et al., 2021). In my dissertation, I focus on satisfaction, desire, function problems, distress, and frequency aspects of sexual well-being because of their centrality and frequent application towards understanding couple sexual relationships.

Although consensus on sexual well-being's definition has not been reached, scholars widely agree it is central to health and relationships. Those with higher quality sexual well-being are less likely to develop disease, more likely to live longer, and tend to have better mental health and higher quality of life (De Graaff et al., 2016; Diamond & Huebner, 2012; Lo & Kok, 2016). They also tend to have relationships that last longer and are higher in quality (Impett et al., 2014). Given these health and relationship benefits, it is unsurprising that the World Health Organization considers individuals' sexual behaviors and sexual experiences, which are close parallels of sexual well-being, to be central to the human experience (World Health Organization, 2010).

Sexual well-being is more than a lack of dysfunction or disease (World Health Organization, 2010) as it includes multiple positive and negative dimensions (Dubé et al., 2020). Sexual satisfaction refers to one's evaluation of the balance between rewards and costs of a sexual relationship (Lawrance & Byers, 1995). Sexual desire is interest in sexual activity, and primarily manifests on a cognitive-motivational rather than behavioral or biological level (Spector et al., 1996). Sexual function problems are difficulties with various areas of sex such as orgasm, arousal, pain; such problems stem from biological, psychological, and social factors (Mitchell et al., 2022). Sexual distress is concern and worry about one's sexual function or relationship (Santos-Iglesias et al.,

2020). Sexual frequency is how often sexual activity occurs; higher levels of it predict higher relationship satisfaction, albeit positive links have not been observed when sexual frequency is greater than once a week (Muise et al., 2015).

Although these dimensions of sexual well-being are correlated, they are unique conceptually (as per the definitions above) and empirically. There are many examples in the literature of distinct patterns of associations between facets of sexual well-being and various outcomes. For example, it is more common to have low sexual satisfaction than high sexual distress, and people may have low sexual desire but not feel distressed or unsatisfied about it (Mitchell et al., 2013). As well, sexual desire, but not sexual satisfaction, has been linked with infertility-related emotional stressors (El Amiri et al., 2021). Further, sexual satisfaction is more strongly associated with relationship commitment than sexual frequency (Joel et al., 2020). Finally, individuals continue to engage in sexual activity even when sexual function (Elmerstig et al., 2008; Reed et al., 2012) or sexual desire (Lundin & Elmerstig, 2015) are low—potentially to become pregnant (Lundin & Elmerstig, 2015) or to connect with their partner or avoid disappointing them (Muise et al., 2013; Rosen et al., 2015). These unique patterns make it essential to consider multiple domains of sexual well-being in research to fully support health and overall well-being and relationships.

For those in romantic relationships, although sexual well-being is an individual, subjective experience, it is linked with a partner's sexual well-being (Impett et al., 2014). For instance, in a study of mixed-sex couples, men reported higher sexual satisfaction when their female partners had higher sexual function, and women reported higher sexual

satisfaction when their male partners had lower sexual distress (Velten & Margraf, 2017). Such findings are part of the increasing emphasis on the relational context of sexuality since the turn of the 21st century, as described by Impett and colleagues (2014). Even so, many studies of sexual well-being neglect this relational context by using data from only one couple member (Francisco et al., 2014; Hasanpour et al., 2019; Zhang, 2018). Such practices commonly persist even though "the dyad is arguably the fundamental unit of interpersonal interaction and interpersonal relations" (Kenny et al., 2006, p. 1) and dyadic data, or data from both couple members, is an ideal tool to understand relationships (Kenny et al., 2006). Ultimately, studies that seek to understand sexual well-being among couples, and to benefit their health and relationships, should feature dyadic data and consider multiple domains of sexual well-being.

1.2 Predictors of Sexual Well-Being

Although a comprehensive review is beyond the scope of my dissertation, I highlight some key biological, psychological, and social and relational processes that predict higher or lower sexual well-being.

First, biological factors play a key role in sexual well-being. As one example, health promotion practices relate to higher sexual well-being. Indeed, higher sleep quality (Saxey et al., 2021) and regular exercise (Fergus et al., 2019) are linked with higher sexual satisfaction and higher sexual function, respectively. Those with disease (e.g., cancer; Maiorino et al., 2016) or disability (e.g., multiple sclerosis; Firdolas et al., 2013) also have reported lower sexual function compared to controls. Further, use of certain

common medications (e.g., selective serotonin reuptake inhibitors; Atmaca, 2020) has been linked with greater levels of sexual dysfunction.

Second, scholars have identified numerous psychological factors which predict sexual well-being. Higher sexual satisfaction, higher sexual function, higher sexual desire, and/or lower sexual distress have been predicted by higher emotion regulation, a strong sense of self, not attributing the cause of sexual difficulties to oneself, higher self-esteem, positive sexual beliefs, attitudes, and expectations about sex, a lack of cognitive distraction or negative cognitions during sex, and lower sexual guilt (Brotto et al., 2016; Dubé et al., 2024; Mark & Lasslo, 2018; Santos-Iglesias et al., 2018; Schnarch, 2009). Notably, one of the more robust predictors of sexual well-being is poorer mental health, such as depression and anxiety, which is consistently linked to lower sexual satisfaction and sexual function (e.g., Bradford & Meston, 2006; De Graaff et al., 2016; Karakose et al., 2023).

Finally, social and relational processes also linked with sexual well-being. Higher sexual satisfaction, higher sexual desire, higher sexual function, and/or lower sexual distress have been linked with the following: autonomy in one's relationship and opportunities for growth and variety, secure attachment with a partner, fidelity, having a responsive and non-hostile partner, higher overall relationship satisfaction, emotional intimacy, and communication quality, a similar personality with a partner, not having a partner with sexual dysfunction or illness, not having overly controlling or permissive parents growing up, a lack of childhood abuse, and realistic societal body and beauty

standards (Brotto et al., 2016; del Mar Sánchez-Fuentes et al., 2014; Hay et al., 2024; Kahalon et al., 2024; Mark & Lasslo, 2018; Santos-Iglesias et al., 2018).

1.3 Reproductive Contexts and Sexual Well-Being

Beyond interest in understanding biological, psychological, and social/relational factors and their roles in sexual well-being, there has been growing interest in particular contexts that can increase the risk for declines in sexual well-being for individuals and couples. One such area of interest is reproductive contexts, which include the transition to parenthood, infertility and medically assisted reproduction, and pregnancy loss. Understanding sexual well-being difficulties during reproductive contexts is essential to promote the quality of life for couples and any children born to them. Indeed, sexual well-being is closely tied to health and relationship quality for adults (Diamond & Huebner, 2012), and adult health and relationship quality are linked to positive development for children, including fewer behavior problems and less internalizing for children in their first 2 years of life (Hughes et al., 2020). I briefly review the two areas scholars on reproductive contexts have focused on, including (1) pregnancy and the transition to parenthood and (2) infertility.

For couples, the transition to parenthood, which includes pregnancy and the first year postpartum, often includes challenges and changes to sexual well-being. Systematic reviews and recent longitudinal work have indicated that couples face declines in sexual desire, sexual satisfaction, and sexual activity during pregnancy, which persist until 12 months after childbirth (Jawed-Wessel & Sevick, 2017; Rosen et al., 2020; Schwenck et al., 2020; von Sydow, 1999). There is evidence of resilience, however: within one year

postpartum, couples typically return to (or close to) pre-pregnancy levels of various sexual well-being domains (Rosen et al., 2020).

Couples who face infertility are also at risk of reduced sexual well-being. Across the systematic reviews on this topic that I am aware of, each confirms infertility and its treatment are linked with lower sexual well-being (Péloquin et al., 2024; Starc et al., 2019; Wischmann, 2013; Wischmann, 2010), including lower sexual satisfaction, sexual desire and sexual function, and higher sexual distress (Péloquin et al., 2024). Couples facing infertility can experience disruptions to their sexual well-being because of its associated physical, mental, and emotional strain (El Amiri et al., 2021), as well as financial stress and decreased quality of life (Allsop, Péloquin, et al., 2023). Also, when sexual activity and sexual relationships become outcome-focused on fertility goals during treatment, it can detract from close sexual relationships (Lundin & Elmerstig, 2015). Unsurprisingly, women and men in fertility treatment or about to begin it have reported lower sexual function compared to controls (Marci et al., 2012).

Altogether, couples who are expecting or in the first year postpartum, or who are facing difficulties with becoming pregnant, face challenges which can diminish their sexual well-being. What about when couples can become pregnant but then experience a pregnancy loss? There has been a growing body of research devoted to understanding sexual well-being and its predictors during pregnancy and the transition to parenthood and in infertility, including my own works (Allsop et al., 2022; Allsop, Leavitt, Yorgason, et al., 2021; Allsop, Péloquin, et al., 2023; Huberman et al., 2022; Rossi et al.,

2023; Schwenck et al., 2022). Unfortunately, knowledge on sexual well-being after pregnancy loss has been sorely neglected.

1.4 Overview of Pregnancy Loss

1.4.1 Prevalence, Consequences, and Predictors of Pregnancy Loss

Before exploring what is known about sexual well-being after a pregnancy loss, I review pregnancy loss broadly. In my dissertation, I define pregnancy loss as a pregnancy that does not result in a fetus or infant showing signs of life after birth (live birth) and is inclusive of early pregnancy losses (miscarriage) and later pregnancy losses (stillbirth). That 1 in 4 women experience a pregnancy loss during their lives (Diamond & Diamond, 2016) and that 15% to 20% of all pregnancies are lost (Puscheck, 2018) make pregnancy loss a common experience.

Beyond being common, pregnancy loss challenges health and relationships (Diamond & Diamond, 2016) in biological, psychological, and social/relational ways. In terms of biological challenges, women and gender diverse individuals who were pregnant may experience bleeding, surgery, and side effects from treatment after a pregnancy loss (Jurkovic et al., 2013). Regarding psychological challenges, women who experience a pregnancy loss are at higher risk of anxiety disorders (risk ratio = 2.14) and depressive disorders (risk ratio = 1.75) compared to women who do not, as indicated by a meta-analysis of 29 studies (Herbert et al., 2022). Additional psychological challenges of pregnancy loss include grief (Potvin et al., 1989) and trauma (Diamond & Diamond, 2016). With respect to social and relational challenges, given that prenatal attachments develop during pregnancy (Close et al., 2020), a pregnancy loss could include distress

from attachment bonds being broken. Further, women are at heightened risk of their relationship ending as compared to women who experience a live birth (Gold et al., 2010; Shreffler et al., 2012).

Compounding these challenges, both couple members often have their struggles ignored or invalidated by medical professionals, friends, family, and their partners (Lang et al., 2011). For instance, in a study of fathers' experiences, men who were not pregnant when a loss occurred reported feeling that their struggles with grief were ignored by their health systems and that attention from healthcare providers was given only to their partners (Camacho-Ávila et al., 2023). Invalidation of both couple members' pregnancy loss challenges is seemingly paradoxical—pregnancy loss is very common, so why is it so often ignored? Focusing on women's grief experiences, Markin (2016) suggested that a desire to avoid the difficult realities of pregnancy loss may explain this paradox: "…It is perhaps precisely because miscarriage is so common, random, and disturbing that society has gone to such great lengths to disenfranchise and silence a woman's grief after miscarriage" (p. 352). That pregnancy loss is largely disregarded by society and healthcare systems, despite its common and difficult nature, underscores the need for research on it to promote health and relationship quality post-loss.

Scholars have identified a variety of factors that predict outcomes linked with pregnancy loss. In a systematic review, Farren et al. (2018) identified several factors linked with the severity or likelihood of having depression, anxiety, acute stress disorder, or posttraumatic stress disorder after early pregnancy loss. These included younger age, prior history of mental health challenges, lower relationship quality and satisfaction,

lower levels of spousal support, being single at the time of the loss, having no or fewer children, a history of infertility or prior miscarriage, longer gestation, a pregnancy conceived via IVF, detecting a viable fetus earlier in the pregnancy, an unplanned pregnancy, and a sense of personal responsibility for the loss. In other work, scholars have found links between lower quality mental health for women post-loss and lower education levels, less satisfaction with primary care physicians, and more stress and negative life events (Rowlands & Lee, 2010). As well, higher post-loss relationship satisfaction has been linked to more openness and communication between partners (Kielek-Rataj et al., 2020). Adjustment regarding perinatal grief has also been considered by scholars, with higher perinatal grief being linked with higher levels of self-criticism for women, lower levels of marital adjustment for men, later gestational age, and greater time between the loss and a subsequent conception (Franche, 2001; Kielek-Rataj et al., 2020). Altogether, pregnancy loss includes numerous challenges to health and well-being outcomes, and these outcomes are linked to a wide variety of physical, mental, and social and relational factors. As I will discuss, the consequences and predictors of pregnancy loss also vary across partners and gender.

1.4.2 Pregnancy Loss and Partner and Gender Differences

There have been a variety of partner differences found in works on pregnancy loss, with women generally reporting poorer post-loss well-being than men. For instance, du Fosse et al. (2021) found that women with unexplained recurrent pregnancy loss reported a greater need for supportive care post-loss than their male partners. This finding may be related to another partner difference, where a large body of work indicates that

women experience elevated depressive symptoms post-loss (Herbert et al., 2022) but evidence for higher depressive symptoms post-loss for men is inconclusive (Lewis & Azar, 2015). Likewise, in an older landmark study, women reported higher grief post-loss than men (Stinson et al., 1992). As well, social support has been found to buffer against posttraumatic stress symptoms for men post-loss but not for women (Levy & Avitsur, 2022). As another example, perinatal grief has been linked with higher levels of self-criticism for women but not men, even as it has been linked with lower marital adjustment post-loss for men only (Franche, 2001). Of note, the studies on partner differences I reviewed here featured data from only one couple member. Without dyadic studies which directly compare both partners' outcomes, the validity of conclusions regarding partner differences in health and well-being after a pregnancy loss is uncertain.

Importantly, prior works have attributed observed partner differences post-loss to gender itself (du Fosse et al., 2021; Levy & Avitsur, 2022; Stinson et al., 1992) and not to sex. Such conclusions regarding gender are based on dividing couples by the physical burdens of pregnancy loss, yet such attributions predominantly come from samples of mixed-sex, cisgender couples (e.g., du Fosse et al., 2021). Attributing differences to gender (social constructed identities and expressons/behaviors of women and girls, men and boys, and gender diverse individuals; Canadian Institutes of Health Research, 2023) with such data conflates gender with sex (biological and physiological differences related to chromosomes and hormones; Brotto & Galea, 2022). Among mixed-sex couples of cis-gender women and men, being a woman also means facing the post-loss biological challenges that come with being female (e.g., treatment; Jurkovic et al., 2013) that do not

come with being a man and being male. Paralleling gender with whether or not someone was pregnant when a loss occurred also neglects that same-sex couples and gender diverse individuals also experience pregnancy loss. In line with van Anders (2015) and Brotto and Galea (2022), I have used a gender-additive approach to studying the unique challenges and needs of each partner after a pregnancy loss. One part of an inclusive approach is to include same-sex couples and mixed-sex couples in a sample and to refer to couple members who experience a pregnancy loss as women and gender diverse individuals who were pregnant when a loss occurred or as men, women, and gender diverse individuals who were not pregnant when a loss occurred. Taking such an approach in my dissertation avoids conflating sex and gender and makes it so that any observed partner differences in my analyses and subsequent conclusions can accurately be attributed to the experience of being pregnant or not when the loss occurred. With such an approach, my dissertation can be more applicable to gender diverse individuals and same-gender/sex couples. Such efforts could help practitioners be more inclusive in their treatment models, with benefits to couple members' health and relationships.

1.5 Theories for Understanding Sexual Well-Being

To provide context for my later discussion of pregnancy loss and sexual well-being, I describe four theoretical frameworks that were central to the development of my dissertation. These frameworks include Family Systems Theory, the Biopsychosocial Model, the Family Adjustment and Adaptation Response Model, and Symbolic Interactionism Theory. I describe each in turn and how they informed my dissertation.

1.5.1 Family Systems Theory

The notion that "the whole is greater than the sum of its parts" is at the heart of Family Systems Theory. According to this theory, to understand the individual, one must also understand the relationships they share with those who are in their family, broadly construed (Smith & Hamon, 2012). Moreover, under this theory, individuals are best understood in relation to the other(s) in their family (Smith & Hamon, 2012), making the involvement of multiple family members in research essential to understanding any one individual. Another aspect of this theory is the idea of boundaries, where families regulate which ideas and outside individuals are allowed into their family system. Within a family, there can be subsystems, such as the couple, with boundaries around these subsystems as well (Smith & Hamon, 2012). In monogamous couples, the couple subsystem has the greatest relevance for understanding sexual well-being among couple members because sexual relationships are bounded between them alone. Indeed, one's relationship with one's partner plays a central role in sexual well-being (Impett et al., 2014) and individuals tend to define their sexuality in relation to how they are viewed by their partner and how their partner views themself (Schnarch, 2009). In line with the Actor-Partner Interdependence Model (Kashy & Kenny, 2000), the interdependent nature of sexual well-being between partners gives rise to cross-partner effects (also called cross-over effects) and co-dependence of sexual well-being between couple members. For example, women with no sexual problems themselves whose partners had premature ejaculation difficulties have reported lower levels of sexual function than women whose partners did not have a sexual problem (Jern et al., 2020). Of note, cross-partner

predictors of sexual well-being are not limited to sexual variables themselves, but include a variety of intrapersonal (e.g., depression; Karakose et al., 2023) and interpersonal factors (e.g., communication quality; Yoo et al., 2014).

Accordingly, Family Systems Theory has implications for understanding pregnancy loss and sexual well-being in my dissertation. Under this theory, although women and gender diverse individuals who were pregnant at the time of the loss are the ones who face physical health challenges specific to the loss itself, the sexual well-being of both couple members could be at risk given sexual well-being's interdependent nature (Schnarch, 2009). Likewise, when men, women, and gender diverse individuals who were not pregnant at the time of loss feel invisible to healthcare providers post-loss (Camacho-Ávila et al., 2023), any subsequent negative emotions for them could be linked to both couple members' lower sexual well-being. Thus, given one couple member's unique pregnancy loss challenges could relate to both partners' sexual well-being, data from both partners, and the consideration of cross-partner effects, are essential when studying pregnancy loss. Moreover, in line with this theory, any clinical recommendations related to improving one couple member's sexual well-being post-loss should target not just that individual, but the relationship they share with their partner. Altogether, based on Family Systems Theory, sexual well-being after pregnancy loss is best understood by considering the processes that are specific to an individual, their partner, and the relationship they share. I thus emphasize a couple-level systems perspective in my dissertation.

1.5.2 The Biopsychosocial Model

The Biopsychosocial Model emphasizes that there are biological, psychological, and social/relational processes that are linked with well-being (Engel, 1977). This model was originally applied to expand understanding of illness and dysfunction, such as where diabetes and schizophrenia were emphasized as having more than just biological precursors to be addressed using a medical model. Instead, under this model, these two disorders were recognized as also having psychological correlates (e.g., whether an individual feels distressed) and social correlates (e.g., societal reactions to the illness/dysfunction) that should be addressed altogether with biological precursors (Engel, 1977).

The biopsychosocial model has also been applied to sexual processes. Sexual dysfunctions such as female sexual interest/arousal disorder, premature ejaculation, and genito-pelvic pain/penetration disorder, involve an interplay between the body, the mind, and one's relationship (Barlow et al., 2021). Hence, this model has been applied to various sexual dysfunctions to enhance understanding of etiology and possible targets of intervention. For example, Paquet et al. (2018) used the Biopsychosocial Model and found that when women diagnosed with a vulvovaginal pain condition had higher levels of anxiety and depression than they usually do (a psychological predictor), they reported greater levels of pain on days of sexual activity (a biological well-being outcome). Although being featured in research on sexual dysfunction, the biopsychosocial model also has relevance to facets of sexual well-being such as sexual satisfaction. For instance, Allsop, Leavitt, Yorgason, et al. (2021) simultaneously predicted sexual satisfaction for

couples during pregnancy with biological (physical symptoms, chronic illness), psychological (depressive symptoms), and social factors (relational satisfaction, marital power, attachment behaviors, conflict resolution ability). They found that wives' depressive symptoms during pregnancy was uniquely related to lower sexual satisfaction for both couple members after accounting for all other biopsychosocial factors.

Beyond connecting biopsychosocial well-being predictors and outcomes, this model emphasizes how biological changes occur alongside psychological and social/relational ones during reproductive transitions. For instance, taking a biopsychosocial approach, pregnancy is not just a biological process related to conception and fetal development; it involves changes to psychological and social/relational processes for couples. Indeed, besides the physical stressors women experience during the latter half of pregnancy, such as fatigue or nausea (Silveira Santiago et al., 2013), couples have reported relationship changes, such as declines in affectionate behaviors (Tavares et al., 2024). Infertility treatment is another context when biological changes occur alongside psychological and social/relational ones. For instance, 68% of individuals in a sample undergoing fertility treatment reported that their marital communication was strained because of infertility (Nyarko & Amu, 2015). Altogether, the Biopsychosocial Model underscores that well-being outcomes and periods of biological change have not just biological parallels, but psychological and social/relational ones as well.

The Biopsychosocial Model is useful for understanding couples' pregnancy loss and sexual well-being experiences. Pregnancy loss involves biological challenges such as

bleeding, surgery, and side effects from treatment post-loss (Jurkovic et al., 2013). Pregnancy loss is also accompanied by psychological challenges such as depression and anxiety (Herbert et al., 2022) and grief (Setubal et al., 2021), as well as social/relational challenges like an increased risk of separation and divorce post-loss (Gold et al., 2010; Shreffler et al., 2012). And as biological, psychological, and social/relational factors are central to the quality of sexuality and sexual relationships (Barlow et al., 2021), biopsychosocial disruptions to well-being could be linked negatively to sexual well-being. Moreover, cross-partner links between one partner's biopsychosocial processes post-loss and the other partner's sexual well-being would be likely under this model given the interdependence of sexual well-being between partners (Impett et al., 2014), including within reproductive contexts (Allsop, Leavitt, Yorgason, et al., 2021). Thus, I draw accordingly from the Biopsychosocial Model in my dissertation to understand sexual well-being and the dynamic period of pregnancy loss.

1.5.3 The Family Adjustment and Adaptation Response Model

In the Family Adjustment and Adaptation Response model, Patterson (2002) suggests that when a family's "demands" (stressors and strains that call for familial change) are greater than their "capabilities" (resources and coping ability handle those demands) they undergo a period of change (i.e., a crisis) where they must rebalance demands and capabilities. These crisis periods can lead to changes in a family's structure, roles, and interaction patterns (Patterson, 1988), which could affect sexual relationships. For instance, this theory has been used to identify links among newly married couples between higher levels of economic pressure and lower sexual satisfaction (Wikle et al.,

2020). Relatedly, it has also been applied to find links between greater distress from the COVID-19 pandemic and lower physical and emotional intimacy and greater loneliness among cohabiting couples (Cornelius et al., 2022).

In the context of this theory, prior to a pregnancy loss, couples already face substantial demands related to the pregnancy itself (e.g., expectations of having a child, physical strain) and those which are separate (e.g., work, school, family responsibilities). Then, when a pregnancy loss occurs, the biopsychosocial stressors of the loss—such as physical recovery (Jurkovic et al., 2013), anxiety and depression (Herbert et al., 2022), grief (Potvin et al., 1989), trauma (Diamond & Diamond, 2016), loss of prenatal attachments (Close et al., 2020), invalidation of one's loss (Camacho-Ávila et al., 2023; Lang et al., 2011), and the threat of relationship dissolution (Gold et al., 2010; Shreffler et al., 2012)—could pile up on prior demands and overwhelm a couple. And, in line with prior work on couples' sexual outcomes that employed the Family Adjustment and Adaptation Response Model (Wikle et al., 2020), too many demands after a pregnancy loss in the non-sexual realm may ultimately spill over to adversely impact a couple's sexual relationship.

1.5.4 Symbolic Interactionism Theory

Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993) provides clues as to why pregnancy loss experiences could be linked with lower sexual well-being. This theory suggests that we interpret the world and our interactions through the meaning, or symbolism, that we give them. In its early days from the 1930s to 1950s, prior to when it became formally known as "Symbolic Interactionism Theory" (Blumer,

1969), this theory was applied extensively to understanding how sense of self develops and the meaning of social interactions (Smith & Hamon, 2012). In recent times it has been applied to study meanings about pregnancy loss: Sawicka (2017) used it to understand the ambiguous nature of grief after a pregnancy loss in a content analysis of data from women participating in support groups post-loss. It has also been applied to study sexuality, such as when Hanna-Walker et al. (2021) used it to underscore that meanings stem from interactions and experiences when developing a measure of sexual meaning using data from a sample of women, men, and gender diverse individuals.

Although this theory has guided scholars when exploring meanings about pregnancy loss and sexual well-being separately, I argue it can be extended and applied to explore them together. Under Symbolic Interactionism Theory, an individual's experiences can change the symbolism that underlies their view of the world and their interactions, with changes to their thoughts and behaviors. For instance, if someone had a favorite movie that they enjoyed watching with a friend, but that friend passed away, the movie may become a painful reminder of their friend's death and be subsequently avoided. Likewise, shared sexual experiences, which for many hold positive meaning like bonding or commitment (Olmstead et al., 2017), can symbolize pain and fear of the loss itself after a pregnancy loss (Camacho-Ávila et al., 2023; Jaffe & Diamond, 2011) with adverse consequences for sexual well-being (Camacho-Ávila et al., 2023).

1.6 Evidence that Sexual Well-Being is at Risk Post-Loss

There is evidence from seven empirical studies, which together are limited both in their design and their quantity, that couples who experience a pregnancy loss are at risk

of lower sexual well-being compared to their peers. Swanson et al. (2003) found that most women in their sample reported lower sexual intimacy after a miscarriage than before based on self-reported, retrospective comparisons. This finding was drawn from quantitative data coded from open-responses at 1-week and 6-weeks post-loss from women (N = 185) who had experienced a miscarriage (a pregnancy loss before the 20th week of pregnancy). In a cross-sectional study, couples who had experienced recurrent miscarriage (N = 30 couples)—defined as 2–3 or more losses before the 20th week of pregnancy—retrospectively reported how their sexuality had changed after 3 months or more since their most recent miscarriage. Both couple members reported lowered sexual desire and sexual satisfaction (Serrano & Lima, 2006). In a cross-sectional study, Hasanpour et al. (2019) found that women with recurrent miscarriage (n = 124) reported lower sexual function and lower sexual intimacy than women in a control group (n = 124). In another cross-sectional study, Francisco et al. (2014) found that pregnant women with a history of recurrent miscarriage (n = 55 women) reported lower sexual function than pregnant women without such a history (n = 50 women) but observed no differences between the groups on sexual desire. Similarly, Zhang et al. (2016) used cross-sectional data to find that men whose partners experienced recurrent miscarriage (n = 236) reported lower sexual function than a control sample of men whose partners had not (n = 236). Further, men (N = 11) have reported decreases in sexual arousal and sexual desire post-loss in qualitative interviews where they discussed sexual changes from before and after they and their partner had a pregnancy loss (Camacho-Ávila et al., 2023). In another qualitative study of mothers (n = 151) and couples (n = 21 mothers and 21 fathers),

participants reported some positive changes to their sexual well-being beside the negatives, such as increased closeness and expression of love (DeFrain et al., 1996).

Beyond the prior works that support the notion that pregnancy loss may be linked with lower sexual well-being, Patterson's (2002) Family Adjustment and Adaptation Response Model supports such an idea. Under this model, both couple members' sexual well-being is likely reduced during the "crisis" period after a pregnancy loss, where couples are attempting to rebalance their resources to meet the new demands of pregnancy loss. Such thinking aligns with prior works that have found (recurrent) miscarriage is linked with lower sexual satisfaction, sexual intimacy, and sexual function post-loss (Camacho-Ávila et al., 2023; Francisco et al., 2014; Hasanpour et al., 2019; Serrano & Lima, 2006; Swanson et al., 2003; Zhang et al., 2016). Nevertheless, despite the importance of sexual well-being to health and relationships, and that pregnancy loss puts health and relationships at risk, whether pregnancy loss is linked with lower sexual well-being remains unclear because of limits in the designs and quantity of prior works.

1.6.1 Limitations of Prior Research

On first glance after a review of studies on pregnancy loss and sexual well-being, the conclusion that pregnancy loss is linked to lower sexual well-being would seem supported. However, these studies' key limitations make such a conclusion premature. First, five of them focused on the rare experience of recurrent miscarriage (Francisco et al., 2014; Hasanpour et al., 2019; Serrano & Lima, 2006; Swanson et al., 2003; Zhang et al., 2016), which only 0.5% to 2.3% of women experience (for review see Rasmark et al.,

2017). In contrast, 25% of all women have a pregnancy loss during their lives (Diamond & Diamond, 2016).

Second, five of the studies focused on only two aspects of sexual well-being (Camacho-Ávila et al., 2023; DeFrain et al., 1996; Hasanpour et al., 2019; Swanson et al., 2003; Zhang et al., 2016) and one of them focused on only one aspect (Francisco et al., 2014), which neglects that sexual well-being has multiple positive and negative dimensions (Dubé et al., 2020) that relate to unique health and relationship outcomes. In the quantitative studies in this area, sexual function was studied three times (Francisco et al., 2014; Hasanpour et al., 2019; Zhang et al., 2016), sexual intimacy twice (Hasanpour et al., 2019; Swanson et al., 2003), and sexual satisfaction (Serrano & Lima, 2006) and sexual desire (Francisco et al., 2014) have each been studied once. Despite sexual distress's role as a diagnostic criterion of sexual dysfunction (American Psychiatric Association, 2013), it has never been studied after a pregnancy loss to my knowledge.

Third, five studies included data from individuals (Camacho-Ávila et al., 2023; Francisco et al., 2014; Hasanpour et al., 2019; Swanson et al., 2003; Zhang et al., 2016) and only two studies included dyads (DeFrain et al., 1996; Serrano & Lima, 2006). Consequently, the couples' context of pregnancy loss and sexual well-being (Jaffe & Diamond, 2011) has been largely neglected.

Fourth, studies have not focused on recent loss experiences. Two studies included participants up to 6 months post-loss (Francisco et al., 2014; Zhang et al., 2016), three studies included participants up to a year or later (Camacho-Ávila et al., 2023; DeFrain et al., 1996; Serrano & Lima, 2006), and one study did not report how long ago

participants' losses were (Hasanpour et al., 2019). Only one study focused on recent losses, with participants joining within 5 weeks after their miscarriages (Swanson et al., 2003). Thus, claims about risks to sexual well-being post-loss from prior studies are subject to recall biases (see Bolger et al., 2003).

Furthermore, because studies on differences and changes in sexual well-being post-loss are limited in quantity—only seven in total outside of my dissertation—the requisite replication of findings that comes from a large body of research and which is necessary to confirm trends, is absent. Further, the number of studies in this area reduces to three if counting only studies that did not focus on recurrent miscarriage, which includes a pair of qualitative studies (Camacho-Ávila et al., 2023; DeFrain et al., 1996) and one quantitative study (Swanson et al., 2003). For comparison, there were 115 empirical studies on sexuality during pregnancy and after childbirth from 1950 to 2017 (Jawed-Wessel & Sevick, 2017; von Sydow, 1999). The dearth of research on pregnancy loss and sexual well-being underscores the need for work in this area to inform education and treatment models.

Finally, it is not clear from prior literature to what extent pregnancy loss may relate to differences between both partners in their sexual well-being post-loss, especially since the same sexual well-being outcomes have not been studied for both partners across studies. For example, although studies on sexual function have been done with men and women, with evidence of ramifications of recurrent miscarriage to both partners' sexual function (Francisco et al., 2014; Hasanpour et al., 2019; Zhang et al., 2016), sexual intimacy has been studied in women alone. At minimum, studying the same sexual well-

being outcomes in both partners is necessary to provide a case for partner differences, and ideally, data from both partners should be compared. The only such study to compare differences between partners using dyadic data came from Serrano and Lima (2006), who found that women reported lower sexual desire after recurrent miscarriage than men. In that study, the authors also found a link between higher perinatal grief and negative perceived changes in sexual relationships after recurrent miscarriage for men but not for women; however, how this association was tested was problematic (for details, see section 1.7). Because dyadic studies have not been conducted on sexual well-being and pregnancy loss specifically (just recurrent miscarriage has been studied), there is altogether little basis for claiming there are differences between partners in their sexual well-being after a pregnancy loss.

Thus, the first goal of my dissertation was to provide a study that compares sexual well-being between those with and without a recent pregnancy loss and between both partners, and to do so focused on the interdependent nature of sexual well-being among couple members, on pregnancy loss broadly and not just recurrent miscarriage, and on several sexual well-being domains (Study 1). With such a study, practitioners and couples will better know what to expect sexually post-loss to the benefit of treatment models.

1.7 Predictors of Sexual Well-Being Post-Loss

If pregnancy loss is indeed linked with lower levels of sexual well-being for couples, a logical next step is to understand what practitioners and affected couples can target to promote sexual well-being during this time. To my knowledge, there are only two studies that have considered potential predictors of sexual well-being post-loss. One

was by Azin et al. (2020), who found in a cross-sectional study that higher depression predicted lower sexual function in a sample of women facing recurrent miscarriage (N = 130). However, the study was limited because it did not collect data from both couple members nor on multiple sexual well-being aspects, and it focused on recurrent miscarriage only.

The other empirical, cross-sectional study on risk or protective factors of post-loss sexual well-being included a sample of 30 mixed-sex couples (Serrano & Lima, 2006). The authors found that men with higher perinatal grief self-reported negative changes to their sexual relationships, whereas women reported no such links, and both partners did not report links between the stress of recurrent miscarriage and changes to their sexual relationships. Importantly, the evidence for the link between men's perinatal grief and changes to their sexual relationships was limited, as it was based on bivariate correlations that did not consider the interdependence of both partners' scores (Kenny et al., 2006) and was based on self-reported changes rather than repeated assessments across time (Bolger et al., 2003). The authors of the study also did not consider links between perinatal grief and the stress of pregnancy loss and multiple sexual well-being aspects. Their sample was also very small, making it possible to observe only very large effects. They also focused on recurrent miscarriage, which is rare compared to pregnancy loss (Diamond & Diamond, 2016; Rasmark et al., 2017). Altogether, given the limitations of the two prior studies on risk or protective factors of post-loss sexual well-being, additional work is essential to understand what predicts sexual well-being after pregnancy loss broadly, and not just after recurrent miscarriage.

1.8 Perinatal Grief as Risk Factor for Lower Sexual Well-Being

Given pregnancy loss's unique challenges, identifying a risk or protective factor of sexual well-being that is specific to this event may be ideal for informing effective treatment. Based on prior empirical work and theory, I suggest that one potential factor is grief after a pregnancy loss, known as perinatal grief.

Perinatal grief includes symptoms such as depression, loneliness, fear, guilt, irritability, and feeling afraid to love (Potvin et al., 1989). Perinatal grief involves components that are biological (e.g., feeling physically ill), psychological (e.g., depression), and social/relational (e.g., irritability with family and friends; Potvin et al., 1989). Perinatal grief is uniquely challenging because of how pregnancy losses are regarded by an individual and by society. After a pregnancy loss, individuals grapple with ambiguous feelings about the loss itself, where they question just who or what they are grieving for (Lang et al., 2011). They also face having their perinatal grief disenfranchised, where people in their social networks, such as medical providers, friends, family, and romantic partners, ignore, minimize, or invalidate their losses and grief (Lang et al., 2011; Markin, 2016).

Despite perinatal grief being a common, expected reaction to pregnancy loss (Badenhorst & Hughes, 2007), it is associated with adverse health and relationship outcomes. Higher levels of perinatal grief have been linked with less marital support and marital satisfaction, as well as more mental health complications and dissatisfaction with one's role in life (for review, see Setubal et al., 2021). However, despite there being over 67 articles measuring perinatal grief (Setubal et al., 2021), to my knowledge, only

Serrano and Lima (2006) have considered its potential association with sexual well-being. Nevertheless, they focused on recurrent miscarriage and without considering multiple aspects of sexual well-being, the interdependence of both partners' scores, or longitudinal data, and they had a very small sample; thus, further exploration of perinatal grief and sexual well-being is necessary.

Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993) may inform why perinatal grief and sexual well-being could be related. In line with this theory, perinatal grief could be linked to changes in how individuals interpret their world and relationships, including negative shifts in the symbolism of sexuality. Grieving involves relearning who one is and what one's relationships mean (Attig, 2011). And because the relearning process disrupts one's sense of self—which is key to shaping sexuality and sexual relationships (Schnarch, 2009)—elevated perinatal grief is likely to disrupt multiple aspects of sexual well-being post-loss. Moreover, because one's sense of self is often formed in relation to one's partner's sense of self (Schnarch, 2009), negative cross-partner links between perinatal grief and sexual well-being are possible.

Evidently, perinatal grief could be a risk factor for lower sexual well-being, where someone with higher perinatal grief (or a partner with higher perinatal grief) compared to a peer may be likely to have lower sexual well-being. Moreover, perinatal grief and sexual well-being could be processes that fluctuate within a single individual during "life as it is lived" (Bolger et al., 2003, p. 579): someone who is going through a time where they or their partner have higher perinatal grief than they usually do could have lower sexual well-being than usual as well. Thus, besides testing if those with the highest

perinatal grief have the lowest sexual well-being, a second goal of my dissertation is to test if couple members' perinatal grief and sexual well-being are linked month-to-month within individuals (Study 2). Such an investigation could help identify a target for interventions focused on promoting sexual well-being post-loss.

1.9 Longitudinal Trajectories of Sexual Well-Being Post-Loss

Another key piece of missing information in the literature is how sexual well-being changes across time post-loss. No studies, to my knowledge, have explored how any domain of sexual well-being may change after a pregnancy loss using longitudinal data. Further, whether perinatal grief plays a role in such changes remains untested. Altogether, such information is vital to enable practitioners to inform couples on what patterns of change in sexual well-being they might expect post-loss, which can reduce their stress regarding post-loss sexual expectations.

There is empirical evidence to support the notion that both couple members may see improvements in various domains of sexual well-being post-loss. For example, in the study by Swanson et al. (2003), the proportion of women in the study claiming their sexual relationship was "as it was" before the miscarriage occurred grew across 1-week (15%), 6-weeks (43%), 4-months (44%), and 1-year post-loss (55%). However, this finding was limited, as it was based on coding done by the authors from an open-response question, "how has your miscarriage affected your sexual relationship." This question was problematic as it did not require participants to specify if their sexual relationship was better or worse than before the loss or to what degree it was different. Moreover, the study used data from only women who were pregnant, neglecting both couple members'

experiences. Further evidence comes from the fact that perinatal grief has been found to decrease post-loss for couples (Volgsten et al., 2018). If grief and sexual well-being are linked, as I have suggested, then sexual well-being could improve post-loss as perinatal grief decreases.

Theory also supports the idea that sexual well-being may improve post-loss for couples. In line with the Family Adjustment and Adaptation Response Model (Patterson, 2002), as time passes, couple members may find new resources to meet the demands of the pregnancy loss on their sexual well-being. For example, the positive benefits (e.g., new affection and empathy) that some people find from sex after a pregnancy loss (Camacho-Ávila et al., 2023) could serve as a new resource. Couple members may also find that healthcare providers, therapists, and support groups are valuable resources. That said, I know of no estimates on how commonly individuals access such resources outside of emergency department visits, which are common (for review, see Watson et al., 2019), but may reflect urgent care immediately post-loss rather than continued care across time. Altogether, as couples gain new resources that counterbalance their demands (Patterson, 2002), improvements in their sexual well-being may follow.

In line with the prior hypotheses related to perinatal grief and sexual well-being, one factor that may predict the degree to which couples' sexual well-being improves post-loss is perinatal grief. Per Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993), perinatal grief could integrate pain and fear of the loss with couple members' sexual activity, resulting in sexuality being viewed negatively (Attig, 2011; Jaffe & Diamond, 2011; Schnarch, 2009) and hindering improvements in sexual well-

being. Thus, people with the highest levels of perinatal grief early after their pregnancy losses could see less improvement in their sexual well-being across time than their peers. Indeed, the "demands" of perinatal grief (Patterson, 2002) on sexual well-being could be higher for such individuals. Given the relational contexts of perinatal grief (Attig, 2011) and sexual well-being (Impett et al., 2014), cross-partner links between perinatal grief and sexual well-being trajectories are likely.

In sum, couple members are likely to experience improvements in their sexual well-being across time after a pregnancy loss, and the perinatal grief of both partners could explain why some individuals' sexual well-being improves less than others. Thus, a third goal of my dissertation was to use longitudinal data to examine if growth trajectories of various sexual well-being domains indicated improvements in the sexual well-being of both couple members (Study 3). I was also interested in if higher levels of either partner's perinatal grief at baseline predicted less improvement across time in either partner's sexual well-being.

1.10 Summary and Overview of Studies

The overall aims of my dissertation was to examine (a) if couples have lower sexual well-being post-loss compared to controls, (b) what the potential role of perinatal grief in sexual well-being is during the post-loss period, and (c) how sexual well-being changes across time post-loss, if at all, and whether perinatal grief is related to changes across time in sexual well-being post-loss. My three dissertation manuscripts used cross-sectional or longitudinal data from the Acknowledging Loss Outcomes and Experiences study (ALOE). In the ALOE study, both members of couples who had experienced a

pregnancy loss in the last 4 months independently completed a baseline survey and three follow-ups monthly. I designed the study to address the limits of prior works, including their focus on the rare experience of recurrent miscarriage and on few domains of sexual well-being (especially sexual function and no attention to sexual distress which is key to determining sexual dysfunction). I also aimed to address that prior works lacked dyadic data, did not focus on a recent pregnancy loss, and lacked longitudinal data. Accordingly, in the ALOE study, individuals participated regardless of how many losses they had experienced, completed validated assessments of multiple positive and negative domains of sexual well-being, participated together with their partner, completed their baseline surveys shortly after their losses (10 weeks on average), and provided longitudinal data until about 25 weeks post-loss on average, thus allowing me to capture experiences in the first 6 months post-loss when perinatal grief is the strongest (Tseng et al., 2017).

In my first study, which was preregistered, I compared levels of sexual well-being between couples with and without a recent pregnancy loss. For my second study, I used longitudinal data to examine the extent that monthly fluctuations in perinatal grief and in sexual well-being were linked, and if those with the highest average levels of perinatal grief had the lowest average levels of sexual well-being. This study was not preregistered given the lack of prior research in this area. Last, in my third study, which was again preregistered, I examined how sexual well-being changes from 10 to 25 weeks post-loss and the potential role of perinatal grief at 10 weeks post-loss in predicting such changes. I present the manuscripts of these three studies in separate chapters in my dissertation

(Chapters 2–4). In Chapter 5, I summarize my dissertation's results and discuss limitations, future directions, and theoretical and clinical implications of my research.

1.10.1 Aims and Hypotheses of Chapter 2

In my dissertation's first manuscript, I present the findings of the cross-sectional, dyadic study from ALOE where I compared sexual well-being levels (sexual satisfaction, sexual desire, sexual function problems, sexual distress, sexual frequency) between couples (n = 103) who had experienced a recent pregnancy loss and a control sample of couples (n = 120) who had never experienced a pregnancy loss. I also compared sexual well-being levels between members of the couple.

My aim was to understand if individuals who experience a pregnancy loss are at risk of lower sexual well-being and if such risks differ between couple members. I hypothesized that both couple members would report lower sexual well-being (i.e., lower sexual satisfaction and desire; higher levels of sexual function problems and sexual distress) compared to their control counterparts. Also, I hypothesized that women and gender diverse individuals who were pregnant when the loss occurred (referred to in that study as gestational individuals) would report lower sexual well-being than men, women, and gender-diverse individuals who were not pregnant when the loss occurred (referred to that in that study as partners of gestational individuals; see General Discussion regarding changes in terms). I further hypothesized that any significant within-couple differences in sexual well-being in the pregnancy loss sample would be larger than corresponding within-couple differences in sexual well-being in the control sample. Finally, I hypothesized that couples in the pregnancy loss sample would report lower sexual

frequency compared to couples in the control sample. I analyzed the data using multi-group structural equation modeling.

1.10.2 Aims and Hypotheses of Chapter 3

In my dissertation's second manuscript, I present the findings of a longitudinal, dyadic study from ALOE (N = 109 couples) where I examined how the perinatal grief of each couple member was associated with the sexual well-being (sexual satisfaction, sexual desire, sexual function problems, sexual distress) of both couple members. I examined associations at a month-to-month level (comparing individuals to themselves) and when considering average levels across the study period (comparing peoples' averages to those of other people).

My aim was to identify if perinatal grief is a risk factor for lower sexual well-being for both couple members after a recent pregnancy loss. I hypothesized that when an individual reported greater than typical levels of perinatal grief (i.e., relative to their own average across all time-points), they and their partner would report lower than typical levels of sexual satisfaction and sexual desire, and higher than typical levels of sexual function problems and sexual distress. Also, I hypothesized that when an individual reported greater overall levels of perinatal grief (i.e., relative to other people), they and their partner would have lower than average levels of overall sexual satisfaction and sexual desire and higher than average levels of overall sexual function problems and sexual distress. I analyzed the data using multilevel structural equation modeling in line with the Actor-Partner Interdependence Model (Kashy & Kenny, 2000).

1.10.3 Aims and Hypotheses of Chapter 4

In my dissertation's third manuscript, I present another set of findings of a longitudinal, dyadic study from ALOE (N = 132 couples) where I examined how sexual well-being (sexual satisfaction, sexual desire, sexual distress), and perinatal grief changed for both couple members from 10 to 25 weeks post-loss. I also examined how each couple member's perinatal grief at 10 weeks post-loss predicted trajectories of both partners' sexual well-being outcomes.

My aim was to understand how sexual well-being changes across 4 months after a recent pregnancy loss and if perinatal grief might predict such changes. I hypothesized that sexual satisfaction and sexual desire of both partners would increase over time (i.e., across a 4-month period post-loss) and that sexual distress and perinatal grief of both partners would decline. I also hypothesized that higher baseline levels of both partners' perinatal grief would be linked with a weaker increase (less positive slopes) in both partners' sexual satisfaction and sexual desire, and a weaker decrease (less negative slopes) in both partners' sexual distress. Further, I hypothesized that the associations of the previous hypothesis would hold in the presence of covariates, including weeks pregnant when the loss occurred, number of lifetime losses, and the presence of other children. I analyzed the data using growth curve modeling in a dyadic, multilevel structural equation model framework.

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CHAPTER 2: WHAT DOES A PREGNANCY LOSS MEAN FOR SEX? COMPARING SEXUAL WELL-BEING BETWEEN COUPLES WITH AND WITHOUT A RECENT LOSS

The manuscript prepared for this study is presented below. Readers are advised that David B. Allsop, under the supervision of Dr. Natalie Rosen, was responsible for the preparation and execution of this study. He was the lead on the initial draft of the manuscript and received and incorporated feedback from his coauthors. The manuscript underwent peer-review, and required one revision, which David led the response to, prior to the manuscript's acceptance in *Archives of Sexual Behavior* on September 1, 2023. The version presented in this dissertation differs slightly from the published manuscript (e.g., updated language for clarity). The full reference for this manuscript is:

Allsop, D. B., Huberman, J. S., Cohen, E., Bagnell, K. B., Péloquin, K., Cockwell, H., & Rosen, N. O. (2023). What does a pregnancy loss mean for sex? Comparing sexual well-being between couples with and without a recent loss. *Archives of Sexual Behavior*. https://doi.org/10.1007/s10508-023-02697-1

2.1 Abstract

It is unclear whether sexual well-being, which is an important part of individual and relational health, may be at risk for declines after a pregnancy loss given the limits of prior work. Accordingly, in a cross-sectional study, we used structural equation modeling to (1) compare sexual well-being levels—satisfaction, desire, function, distress, and frequency—of both partners in couples who had experienced a pregnancy loss in the past four months ($N = 103$ couples) to their counterparts in a control sample of couples with no history of pregnancy loss ($N = 120$ couples), and (2) compare sexual well-being levels of each member of a couple to one another. We found that gestational individuals and their partners in the pregnancy loss sample were less sexually satisfied than their control counterparts but did not differ in sexual desire, problems with sexual function, nor sexual frequency. Surprisingly, we found that partners of gestational individuals had *less* sexual distress than their control counterparts. Only in the pregnancy loss sample, gestational individuals had lower levels of sexual desire post-loss than their partners but did not differ in sexual satisfaction, problems with sexual function, nor sexual distress. Our results provide evidence that a recent pregnancy loss is associated with lower sexual satisfaction and greater differences between partners in sexual desire, which may be useful information for clinicians working with couples post-loss. Practitioners can share these findings with couples who may find it reassuring that we did not find many aspects of sexual well-being to be related to pregnancy loss at about three months post-loss.

Keywords: Pregnancy loss; Sexual relationships; Sexual well-being; Couples; Miscarriage; Gestational individuals

2.2 Introduction

Pregnancy loss, also known as miscarriage or spontaneous abortion, is traumatic for many, and can be detrimental to the psychological and relational well-being of individuals who experience the loss (Diamond & Diamond, 2016). The negative effects of pregnancy loss are far reaching as approximately 15–20% of pregnancies are lost (Puscheck, 2018) and as many as 25% of women experience one or more pregnancy losses during their lives (Diamond & Diamond, 2016). A limited number of studies provide evidence that pregnancy loss may also negatively relate to aspects of couples' sexual relationships such as intimacy, sexual functioning, and sexual satisfaction (Francisco et al., 2014; Hasanpour et al., 2019; Serrano & Lima, 2006; Swanson et al., 2003; Zhang et al., 2016). Disruptions to the sexual relationship have important implications for those facing pregnancy loss, as maintaining a strong sexual relationship promotes positive relationship quality and longevity (Impett et al., 2014), and better emotional regulation and coping in times of stress (Diamond & Huebner, 2012). However, the conclusion that couples' sexual relationships are negatively associated with pregnancy loss is premature as existing studies have (1) focused on couples facing the rare experience of having multiple losses, (2) lacked tests of how pregnancy loss relates to all facets of sexual well-being—sexual satisfaction, desire, function, distress, and frequency—which together provide a holistic picture of couple sexual relationships (Rosen et al., 2020), and (3) focused only on the person who physically experienced the loss rather than both members of the couple, thus ignoring the relational context of the loss and of sexuality (Diamond & Diamond, 2016). Accordingly, we aimed to compare

various facets of sexual well-being among couples who experienced a pregnancy loss in the last four months to the sexual well-being of couples who had never experienced a pregnancy loss. In so doing, we hoped to gain a more comprehensive picture of how pregnancy loss may be linked to couples' sexual relationships.

2.2.1 Pregnancy Loss and Sexual Well-Being

The potential associations between pregnancy loss and a couple's sexual relationship may be understood through Patterson's (2002) Family Adjustment and Adaptation Response Model. Patterson suggests that when a family interprets their demands (i.e., stressors and strains that call for familial change) as outweighing their capabilities (i.e., resources and coping ability to handle those demands), they undergo a period in which they adapt by re-balancing demands and capabilities, referred to as a crisis. This crisis period can lead to changes in family structure, roles, and patterns of interactions (Patterson, 1988), which may ultimately affect sexual relationships. For example, the physical and psychological stress of pregnancy loss may pile up on top of prior challenges—like tension around expectations of having a child or the demands of work, school, and family—to the degree that couples feel overwhelmed. Indeed, results from a meta-analysis of 29 studies found that women who have experienced a pregnancy loss are at increased risk for anxiety and depressive disorders compared to women who have not (Herbert et al., 2022), which exemplifies the disruptive negative emotions that can follow pregnancy loss. An accumulation of stressors and negative emotions in response to pregnancy loss may spill over to a couple's sexual relationship. Grief after a pregnancy loss is most severe in the first six months post-loss (see Brier, 2008, for

review), which may make "crises" more likely to occur for couples during this time. This model has been used to understand declines in sexual well-being during other challenging life events such as financial stress and sexual satisfaction in new marriages (Wikle et al., 2020), and physical and emotional intimacy among cohabiting couples during the COVID-19 pandemic (Cornelius et al., 2022).

Preliminary empirical work provides evidence that couples' sexual relationships are indeed associated with pregnancy loss during what may be a "crisis" period for couples. To our knowledge, there are only five empirical, correlational studies on the associations between pregnancy loss and sexual well-being. These studies have provided evidence that women who experience a pregnancy loss tend to have lower sexual intimacy based on self-reported changes after the loss (Swanson et al., 2003) or when compared to other women who have not experienced a loss (Hasanpour et al., 2019), and that women report lower sexual satisfaction when comparing their own experiences before and after a loss (Serrano & Lima, 2006). Women who have experienced a pregnancy loss also report lower sexual function than control groups (Francisco et al., 2014; Hasanpour et al., 2019) and partners similarly report lower sexual function than partners in couples who have not experienced a pregnancy loss (Zhang et al., 2016). There is mixed evidence that pregnancy loss relates to lower sexual desire for women based on comparisons to women who have not had repeated losses (Francisco et al., 2014) and women's and partners' self-reports (Serrano & Lima, 2006). For couples who have experienced a pregnancy loss, sexual interactions may evoke traumatic memories of the loss, which could lead to avoidance of sexual activity, create a sense of isolation and

distance between partners (Jaffe & Diamond, 2011), and ultimately result in lower sexual well-being. Indeed, in their qualitative study of fathers and later pregnancy loss (23+ weeks gestation), Camacho-Ávila et al. (2023) found that arousal and sexual desire faded for fathers because of grief and that fathers reported their memories and fears about pregnancy loss negatively impacted their sexuality. Similar sentiments were expressed by couples in a broader study of parental loss and sexuality (Dyregrov & Gjestad, 2011).

Existing knowledge suggesting that sexual well-being is associated with pregnancy loss is limited in three key respects. First, the five existing correlational studies[1] relied on samples who experienced multiple pregnancy losses (typically three or more) before the 20th week of pregnancy (Francisco et al., 2014; Hasanpour et al., 2019; Serrano & Lima, 2006; Swanson et al., 2003; Zhang et al., 2016). Focusing on multiple pregnancy losses limits the generalizability of findings about pregnancy loss and sexual well-being as only 1% of couples experience multiple pregnancy losses to this degree (Zhang et al., 2016), while 25% of all women experience a pregnancy loss during their lives (Diamond & Diamond, 2016). Second, research lacks information about how pregnancy loss is associated with unique dimensions of sexual well-being, which include sexual satisfaction (how rewarding sex is), sexual desire (interest in sex), sexual frequency (how often sex happens), sexual function (degree of sexual problems with

[1] Readers are advised that at the time of this chapter's publication in Archives of Sexual Behavior, there were five published studies to my knowledge. However, as described in the General Introduction of my dissertation, there is now evidence from seven empirical studies that couples who experience a pregnancy loss are at risk of lower sexual well-being compared to their peers.

climaxing, arousal, pain, enjoyment, erectile difficulties, vaginal dryness, etc.), and sexual distress (concern and worries about sex; Dubé et al., 2020). These dimensions are conceptually and empirically distinct from one another (see Rosen et al., 2020). For instance, infertility-related emotional stressors have been found to be associated with one's own levels of sexual desire but not sexual satisfaction (El Amiri et al., 2021). As another example, sexual satisfaction is more strongly associated with commitment in relationships than is sexual frequency (Joel et al., 2020). Finally, there is ample evidence suggesting that individuals continue to engage in sexual activity even when sexual function (Elmerstig et al., 2008; Reed et al., 2012) or sexual desire (Lundin & Elmerstig, 2015) are low—possibly because they want to become pregnant (Lundin & Elmerstig, 2015), or to connect with their partner or avoid disappointing them (Muise et al., 2013; Rosen et al., 2015). To our knowledge, sexual distress has not been examined post-pregnancy loss and there is mixed evidence regarding the impacts to sexual desire. Sexual frequency has been examined in a study of parents' sexuality across several loss types (including stillbirth, sudden infant death syndrome, and other illnesses and accidents), where one-third of parents reported decreased levels of sexual activity after their loss (Dyregrov & Gjestad, 2011). Thus, there is some initial evidence that sexual frequency may decline after pregnancy loss, with potential consequences for life satisfaction (Muise et al., 2015) and health (Cao et al., 2020).

Third, prior studies on the associations between pregnancy loss and sexual well-being have often lacked perspectives from both members of the couple. A lack of dyadic data neglects the relational context of the loss despite both partners' being

psychologically impacted (Diamond & Diamond, 2016; Serrano & Lima, 2006), and that the sexual experiences of both partners after a pregnancy loss are interrelated but may also differ in important ways (see Diamond & Diamond, 2016). Only one study to our knowledge has compared the sexual experiences of partners to each other post-loss. In this study, Serrano and Lima (2006) found that women reported lower sexual desire than their partners following recurrent miscarriage; this study did not examine the other facets of sexual well-being. Comparing the experiences of both members of a couple could shed light on similarities and differences in experiences post-loss that may inform interventions aimed at supporting couples.

Gestational individuals, or women and individuals assigned female at birth (AFAB) who were pregnant when a loss occurred, may face unique challenges compared to their partners that result in poorer relative sexual well-being. The physical tolls of a pregnancy loss for gestational individuals can include bleeding, surgery, and side effects from treatment post-loss (Jurkovic et al., 2013). Further, prenatal-fetal attachments tend to be stronger for gestational individuals than non-gestational individuals (Close et al., 2020), which may trigger more intense and chronic grief reactions for gestational individuals (Markin, 2016). In line with Patterson (1988), gestational individuals' unique physical and psychological challenges may pile up beyond those of their partner, ultimately putting them at greater risk for poorer sexual well-being post-loss (e.g., Serrano & Lima, 2006). Given these challenges would be present only for couples who have had a pregnancy loss, its plausible that any between-partner, sexual well-being

differences in couples who have had a pregnancy loss would be larger than any between-partner, sexual well-being differences in couples with no history of pregnancy loss.

2.3 Current Study

In sum, the demands of pregnancy loss may lead to an adjustment period which can strain couples' sexual relationships (Patterson, 2002). Prior research provides preliminary support that pregnancy loss is associated with poorer sexual well-being, and that gestational individuals have poorer sexual well-being than their partners. Accordingly, in a preregistered, cross-sectional study of couples experiencing a recent pregnancy loss and control couples with no history of pregnancy loss, we tested four hypotheses: (1) gestational individuals and partners of gestational individuals would each report poorer levels of sexual well-being (i.e., lower sexual satisfaction, function, and desire; higher sexual distress) compared to their control counterparts, that is, control AFAB individuals and partners of control AFAB individuals, (2) gestational individuals would report poorer levels of sexual well-being compared to partners of gestational individuals, (3) any significant within-couple differences in the pregnancy loss sample would be larger than within-couple differences in the control sample, and (4) couples in the pregnancy loss sample would report lower sexual frequency compared to couples in the control group.

2.4 Method

2.4.1 Participants

A sample of couples who experienced a pregnancy loss in the last four months and a control sample of couples who had never experienced a pregnancy loss were

recruited from Canada, the USA, the UK, and Australia for the current study. Eligibility criteria for the pregnancy loss sample included (1) having access to the Internet, a personal email address, a device to complete surveys, and being fluent in English (2) being at least 18 years of age, (3) being in a relationship for at least one year, (4) experiencing a pregnancy loss within four months of their first outreach (e.g., email) to the research team about the study, (5) having both partners know about the pregnancy prior to the loss, (6) not having the pregnancy be the result of an elective, non-medically recommended abortion, (7) not having the pregnancy result in a live birth (i.e., no signs of life after delivery), (8) not having sexual functioning of either partner impaired by a self-reported major untreated mental or physical illness and/or the treatment of such illness throughout the time of participation, and (9) not undergoing fertility treatment at the time of the loss or while participating. Regarding this last criterion, there is evidence, albeit mixed (Furukawa et al., 2012), that those undergoing fertility treatment are at risk for adverse changes to sexual well-being (Dong et al., 2022; Lundin & Elmerstig, 2015). Thus, to avoid conflated results, we excluded those undergoing fertility treatment from the study. Participants were included regardless of how many pregnancy losses they had in the past.

Eligibility criteria for the control sample included criteria (1)–(3) of the pregnancy loss sample and (4) cohabitating for at least six months, (5) not currently being pregnant, breastfeeding, within one year postpartum, or undergoing fertility treatment, and (6) not self-reporting a major medical or psychiatric illness that is not well-managed

(e.g., untreated and/or unstable symptoms).[2] Of the 299 and 190 couples screened for the pregnancy loss and control samples, respectively, 103 couples from the pregnancy loss sample and 151 couples from the control sample met eligibility criteria and were enrolled in the study. The 31 couples in the control sample who indicated that they had experienced a pregnancy loss during their lifetime were excluded to avoid confounding results (17.9% of full control sample). This brought the final size of the control sample to 120 couples. A figure detailing the recruitment flow for each sample (Supplemental Figs. 1 and 2) can be found on the study's Open Science Framework (OSF) page at https://doi.org/10.17605/osf.io/z427u.

Sociodemographic characteristics of the samples are presented in Table 2.15.1 (see supplemental material for details on measures). In summary, participants in both samples were on average in their early 30s, made between $60,000 and $100,000 per year in household income, identified primarily as cisgender, and had the largest proportions of participants identify as White with smaller proportions identifying with other races/ethnicities. Couples in the pregnancy loss sample were predominantly in mixed-sex, female–male relationships, highly represented the USA and Canada with some Australia and UK representation, and were predominantly in married relationships. Couples in the control sample were largely in mixed-sex, female–male relationships with some couples in same-sex, female-female relationships, primarily

[2] The control sample data came from a broader study. Thus, there are some differences in eligibility criteria between the samples, such as the required relationship duration.

represented Canada with some representing the USA, and were mostly in married relationships with substantive portions in engaged and dating relationships.

2.4.2 Procedure

The pregnancy loss and control samples were, respectively, drawn from two larger longitudinal studies on sexuality and sexual relationships. There are no current publications using data from either of the two samples. For both samples, only data from the baseline (first) surveys were utilized in the current study. Both samples were recruited online via social media (e.g., Facebook, Instagram, Reddit) and in-person (e.g., posters at medical facilities, reviewing patient charts, word of mouth) from July 2021 to July 2022 (pregnancy loss) and from February 2021 to July 2021 (control). Study advertisements encouraged participation from people of all bodies, gender identities, and sexual orientations. At the time of writing (March 2023), the data collection is ongoing for the pregnancy loss sample; however, data for the current study were collected in full by July 30, 2022, as noted in our pre-registration on OSF. Participants were screened via a phone call with a research assistant or through a screening survey hosted on Qualtrics prior to participation to ensure they met eligibility criteria. After providing informed consent at the start of the survey, participants in both samples completed a survey independent of their partners which included validated, online questionnaires. The survey was sent via email and hosted on Qualtrics. Surveys expired after one month and participants received reminders to complete their surveys.

Those in the pregnancy loss sample completed their surveys on average at 9.71 weeks post-loss ($SD = 5.36$ weeks). Most couples in the pregnancy loss sample

reported losses between 3 and 15 weeks gestation ($N = 85$, 82.6% of pregnancy loss sample), some reported losses between 16 and 25 weeks gestation ($N = 8$, 7.8% of pregnancy loss sample), and others reported losses between 26 and 41 weeks gestation ($N = 9$, 8.7% of pregnancy loss sample).[3] Couples in the pregnancy loss sample received up to $178 CDN ($89 each) in online gift cards or electronic cash payments for participating in the full study. Couples in the control sample received up to $126 CDN ($63 each) in online gift cards or electronic cash payments for participating in the full study. The differences in compensation between the samples reflected the time required to complete their surveys.

2.4.3 Measures

Sexual Satisfaction. Sexual satisfaction was assessed using the Global Measure of Sexual Satisfaction (GMSEX; Lawrance & Byers, 1995). Participants responded to the prompt "How would you describe your overall sexual relationship with your partner during the last 4 weeks?" on a 7-point Likert scale regarding five bipolar pairs of words (e.g., "very bad" and "very good"; "very unsatisfying" and "very satisfying"). The construct was modeled as a latent variable and higher scores reflect greater sexual satisfaction. The GMSEX has shown strong psychometric properties in clinical samples, such as among couples seeking medically assisted reproduction (Arpin et al., 2019), and in community samples (Mark et al., 2014), and has been validated for use among men and women (Mark et al., 2014). The scale displayed good reliability in the current study

[3] Percentages do not add to 100% as one couple was missing information on the number of weeks pregnant when the loss occurred.

(gestational individuals $\omega = .92$; partners of gestational individuals $\omega = .94$; control AFAB individuals $\omega = .94$; partners of control AFAB individuals $\omega = .95$).

Sexual Desire. Sexual desire was assessed using the Dyadic Sexual Desire subscale of the Sexual Desire Inventory (SDI-2; Spector et al., 1996). As indicated by Moyano et al. (2017), this subscale includes seven questions about an individual's desire for partnered sexual activity (e.g., "During the last month, how often would you have liked to engage in sexual activity with a partner"). Items were rated on several 8-point or 9-point scales with the low anchor indicating lower sexual desire (e.g., "not at all," "no desire," "not at all important") and the high anchor indicating high sexual desire (e.g., "more than once a day," "strong desire," "extremely important"). The construct was modeled as a latent variable and higher scores reflect greater desire for sexual activity with one's partner. The SDI-2 has shown strong psychometric properties among clinical (Rosen et al., 2018) and control samples (Moyano et al., 2017), and the Dyadic Sexual Desire subscale of this measure displayed good reliability in the current study (gestational individuals $\omega = .90$; partners of gestational individuals $\omega = .81$; control AFAB individuals $\omega = .93$; partners of control AFAB individuals $\omega = .89$).

Sexual Function. Sexual function was assessed using one item from the Problem Distress subscale of the Sexual Function Evaluation Questionnaire (SFEQ; Mitchell et al., 2022). This subscale was chosen given the focus of the study on understanding distressing sexual difficulties following pregnancy loss. As indicated by Mitchell and colleagues (2022), the Problem Distress item is calculated by taking the maximum score of five subitems related to pain, difficulty reaching climax, climaxing too quickly,

vaginal dryness, or erectile difficulties. These subitems first ask participants about their experiences in the past month (e.g., “In the last month, did you experience physical pain as a result of sex?”) with possible responses being “yes,” “no,” or options to report they did not have sex in the last month. If participants answer “yes,” they are asked “How did you feel about this?” where response options are on a 4-point Likert scale (1 = *Not at all distressed* to 4 = *Very distressed*). If they answer “no,” participants receive a score of zero for a particular item and if they indicated they did not have sex in the last month the subitem is marked as missing. The maximum of the subitems is then calculated after the subitems are scored.[4] Higher scores reflect greater levels of distressing sexual function problems.

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[4] Initially, in line with Mitchell et al. (2022) and our pre-registration, we utilized the full Problem Distress subscale of the Sexual Function Evaluation Questionnaire. In addition to the max score item we describe, the full subscale includes three other items relating to lacking interest, enjoyment, and excitement/arousal during sex. Per the pattern provided by Mitchell et al. (2022), we attempted to model this construct as a latent variable. Reliability was good for gestational individuals (ω = .79), partners of gestational individuals (ω = .77), and control AFAB individuals (ω = .77). However, reliability was poor for partners of control AFAB individuals (ω = .42) (and poorer yet for control partners who indicated their sex was male: ω = .36). Upon further inspection, we observed that the three items relating to lacking interest, enjoyment, and enjoyment/arousal were heavily kurtotic and skewed toward no concern at all (a score of zero) and were poorly correlated with one another and the max item (r = .11–.48). Rather than exclude control partners because their subscale had poor reliability, we decided to directly compare the four groups on the maximum score item, which was neither skewed nor kurtotic and adequately represented our aim to examine problems in sexual function and we had separately measured sexual desire. It is plausible the Problem Distress subscale of the SFEQ works best when men and individuals assigned male at birth have a specific sexual stressor or problem (like pregnancy loss) but not as well when they do not have a specific problem (i.e., are part of a control sample); this subscale may work well for women and AFAB regardless of if they have a specific stressor/problem or not. The subscale was originally validated among a clinical sample, and more work with this scale among community samples may be insightful.

Sexual Distress. Sexual distress was assessed using the Sexual Distress Scale—Short Form (SDS-SF; Santos-Iglesias et al., 2020). Participants indicated how often a sexual problem bothered or caused them distress over the last four weeks regarding five items (e.g., "worried about sex"). Items were rated on a 5-point scale (0 = *never* to 4 = *always*). The construct was modeled as a latent variable and higher scores reflect greater sexual distress about one's overall sexual relationship. The SDS-SF has shown strong psychometric properties among clinical (Santos-Iglesias et al., 2020) and community samples (Gauvin et al., 2022). The scale displayed good reliability in the current study (gestational individuals $\omega = .89$; partners of gestational individuals $\omega = .90$; control AFAB individuals $\omega = .89$; partners of control AFAB individuals $\omega = .90$).

Sexual Frequency. As in prior research (e.g., Rosen et al., 2020), sexual frequency was assessed using a single item, "During the past 4 weeks, how often did you and your partner engage in any sexual activity defined as oral sex, manual stimulation (touching genitals), intercourse with vaginal penetration, intercourse with anal penetration." The item was rated on a 7-point rating scale (0 = *not at all* to 6 = *more than once a day*). Higher scores reflect more frequent sexual activity. Given the high correlation between partner's scores (pregnancy loss sample $r = .66$, control sample $r = .77$), both partners' scores were modeled as indicators of a latent construct to create a couple sexual frequency variable (Galovan et al., 2016).

2.5 Data Analysis

Our hypotheses and data analysis plan were preregistered on the study's OSF page (https://doi.org/10.17605/osf.io/z427). Deidentified data, syntax, and output files of

analyses have been posted at this link to promote transparency and replicability of findings. We conducted a series of multiple-group analyses in Mplus (version 8.6; Muthén & Muthén, 1998-2017) to test our hypotheses, with separate models for sexual satisfaction, desire, distress, and frequency. We analyzed the data via separate models because it was not feasible given our sample sizes to combine the many model parameters across outcomes (e.g., factor loadings, intercepts, (residual) variances, and other parameters for five outcomes across four subgroups) into a single model and still have our model converge. First, we conducted measurement invariance testing for all multi-item constructs (i.e., not sexual function or sexual frequency) before comparing means on sexual well-being constructs between and among the pregnancy loss and control samples. It is only possible to test measurement invariance when multiple items are used to assess a construct. In line with Putnick and Bornstein (2016), we tested for measurement invariance to establish that group differences could be attributed to structural differences (i.e., where one group has higher or lower levels than another) rather than measurement differences (i.e., where one group views a construct in a different way than another group). This process first entailed testing for metric invariance—where each indicator (e.g., one of the five sexual satisfaction items) relates to the overall construct (e.g., sexual satisfaction) in a similar way (i.e., its factor loading) for the groups being compared (i.e., gestational individuals, partners of gestational individuals, control AFAB individuals, and partners of control AFAB individuals). Metric invariance is indicated by change in comparative fit index (Δ CFI) between the configural model (unconstrained) and metric model (factor loadings constrained to be the

same across groups) not worsening more than 0.01 (Cheung & Rensvold, 2002). The next step in this process was testing for scalar invariance, where intercepts are constrained to be the same across groups. Scalar invariance is indicated by Δ CFI between a metric model and scalar model not worsening more than 0.01 (Cheung & Rensvold, 2002). In these models, the interdependence of the scores from both members of the couple were accounted for by allowing residuals from items that were answered by both partners to correlate with one another (Kenny et al., 2006). Further details on our approach to model specification and measurement invariance testing can be found in the study pre-registration on OSF page. Missing data were handled via full-information maximum-likelihood estimation. Principal components, which were generated through the PcAux package (Lang et al., 2020) in R (R Core Team, 2022), were included as auxiliary variables in the models to help estimate missing data (Howard et al., 2015). There were few missing data points overall (average data percent present across all variables = 99%, minimum present = 92%). We considered a model to adequately fit the data when the model comparative fit index (CFI) was greater than .90, model root mean square error of approximation (RMSEA) was less than .08, model standardized root mean square residual (SRMR) was less than .10, and when normed χ^2 (χ^2 divided by degrees of freedom) was 3 or less (Hair et al., 2010). Given that χ^2 tests are prone to type II error in models that are complex or have large samples (Hair et al., 2010), we rely on the other fit indices we described to evaluate model fit (but report the results of χ^2 tests for reference). A table with means, standard deviations, and correlations among all study variables is provided as Supplemental Table 2 on the study's OSF page.

Next, as the test of our main hypotheses, we compared sexual well-being means between groups, as illustrated in Supplemental Figure 3 (see OSF), performing five comparison tests per outcome (except couple sexual frequency). In reference to Hypothesis 1, tests 1–2 assessed differences in sexual well-being means between (1) gestational individuals and control AFAB individuals and (2) partners of gestational individuals and partners of control AFAB individuals. In reference to Hypothesis 2, tests 3–4 assessed the difference in sexual well-being means between (3) gestational individuals and partners of gestational individuals and (4) control AFAB individuals and partners of control AFAB individuals. In reference to Hypothesis 3, the last test (5) assessed if the difference between gestational individuals and partners of gestational individuals was different from the difference between control AFAB individuals and partners of control AFAB individuals. Test five provided a benchmark to see whether any significant within-couple differences in the pregnancy loss sample were larger than the within-couple differences in the control sample. The five tests were conducted for all outcomes except for sexual frequency because sexual frequency was modeled as a couple-level variable. In reference to Hypothesis 4, mean couple sexual frequency levels were compared between those in the pregnancy loss sample and those in the control sample.

All mean comparison tests were done by defining new parameters using the "model constraint" command in Mplus (e.g., Allsop et al., 2020; Schwenck et al., 2022) that formally compared the means of the groups in line with our hypotheses. We applied the Holm–Bonferroni method (Holm, 1979) to adjust the *p* values of tests 1–4 for

multiple comparisons within each outcome using an open source calculator developed by Gaetano (2013).

As detailed in the study pre-registration, power was estimated via an Monte Carlo power simulation conducted in Mplus (see Wang & Wang, 2019). Results of this power analysis indicated that, given our sample sizes, there was 89.5% power to detect a mean difference of Cohen's $d = .283$ between (1) gestational individuals and partners of gestational individuals and (2) between control AFAB individuals and partners of control AFAB individuals and 88.2% power to detect a mean difference of Cohen's $d = .407$ between (3) gestational individuals and control AFAB individuals and (4) partners of gestational individuals and partners of control AFAB individuals. In sum, the current project had high power to detect small to medium size mean differences between groups (Cohen, 1988).[5]

2.6 Results

2.6.1 Measurement Invariance Testing

All multi-item measures were scalar invariant. Specifically, ΔCFI between the configural and metric models was not more than .01 for all outcomes (sexual satisfaction: ΔCFI = .008; sexual desire: ΔCFI = .010; sexual distress: ΔCFI = .004), and similarly, Δ

[5] The original power analysis as posted on the study's OSF page assumed a sample size of 105 for the pregnancy loss sample and 128 for the control sample. The numbers reported in this paragraph came from an updated power analysis run on October 21, 2022, which used the exact same model parameters as before, but updated the sample sizes for the pregnancy loss and control samples respectively to 103 and 120, which are the actual sample sizes used in the current study. This updated power analysis is also posted on the OSF page. Differences in expected and actual sample sizes are a result of data cleaning.

CFI between the metric and scalar models was not more than .01 for all outcomes (sexual satisfaction: ΔCFI = .008; sexual desire: ΔCFI = .008; sexual distress: ΔCFI = .007). Therefore, it was appropriate to make group comparisons for all models with multi-item measures.

The final models acceptably fit the data (Hair et al., 2010) for sexual satisfaction ($\chi^2(73) = 103.471$, $p = .011$; $\chi^2/df = 1.42$; CFI = .983; RMSEA = .061, 95% CI [.030, .087]; SRMR = .210), sexual desire ($\chi^2(165) = 209.159$; $\chi^2/df = 1.27$; $p = .011$; CFI = .973; RMSEA = .049, 95% CI [.025, .068]; SRMR = .144), and sexual distress ($\chi^2(73) = 103.284$, $p = .011$; $\chi^2/df = 1.42$; 1.41; CFI = .975; RMSEA = .061, 95% CI [.000, .000]; SRMR = .120).[6] There are no fit indices to report for sexual function problems and sexual frequency because the models were fully saturated.

2.6.2 Mean Differences Between Pregnancy Loss and Control Samples

Sexual well-being means for both samples are provided in Table 2.15.2 and plotted in Figure 2.16.1. In line with our hypothesis, gestational individuals reported

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[6] For sexual satisfaction, sexual desire, and sexual distress, CFI, RMSEA, and normed χ^2 were in typically accepted ranges, but SRMR was too high (less than .10 is recommended; Hair, et al, 2010). This result may be an artifact of the "reliability paradox" (Hancock & Mueller, 2011), where a latent factor with low factor loadings (poor reliability) may have better model fit than a latent factor with high factor loadings (good reliability). For example, Ximénez and colleagues (2022) found that SRMR tends to be higher when standardized factor loadings are high (close to 1); the factor loadings for indicators of sexual satisfaction (GMSEX), sexual desire (SDI-2), and sexual distress (SDS-SF) were predominantly high (~ .7–.9). Considering (1) this reliability paradox, (2) the fact that CFI, RMSEA and normed χ^2 were acceptable for all models, and (3) and that SRMR can be high because it is not adjusted for model complexity (especially relative to RMSEA), we proceeded with caution to test mean differences between groups on these outcomes.

significantly lower levels of sexual satisfaction than control AFAB individuals as Holm–Bonferroni-adjusted $p < .001$. With a Cohen's effect size of $d = .59$, this difference is considered medium-sized (Cohen, 1988). Additionally, partners of gestational individuals reported significantly lower levels of sexual satisfaction than partners of control AFAB individuals as Holm–Bonferroni-adjusted $p = .009$, and Cohen's d indicated a small- to medium-sized difference of $d = .42$. In contrast to our hypothesis, there were no statistically significant differences between groups in terms of sexual desire, nor problems in sexual function (exact p values of all group comparisons are provided in Supplemental Table 1). Similarly, there was no evidence to support our hypothesis that couples in the pregnancy loss sample would report lower sexual frequency compared to couples in the control group. Further in direct opposition to our hypothesis, partners of gestational individuals reported significantly lower levels of sexual distress than partners of control AFAB individuals as Holm–Bonferroni-adjusted $p = .036$, which would be considered a small-sized difference with Cohen's (1988) $d = .37$. Gestational individuals did not report significantly different levels of sexual distress than control AFAB individuals.

2.6.3 Mean Differences Between Partners

There was some evidence to support our hypothesis regarding within-couple differences in sexual well-being. In line with our expectations regarding the pregnancy loss sample, gestational individuals reported significantly lower levels of sexual desire than partners of gestational individuals as Holm–Bonferroni-adjusted $p < .001$. This difference between gestational individuals and partners of gestational individuals on

sexual desire was itself significantly different than the difference between control AFAB individuals and partners of control AFAB individuals on sexual desire as $p = .004$. Control AFAB individuals also did not report significantly lower levels of sexual desire than partners of control AFAB individuals as Holm–Bonferroni-adjusted $p = .450$. The difference in sexual desire between gestational individuals and partners of gestational individuals would be considered a large-sized difference as its effect size is Cohen's $d = .84$ (Cohen, 1988). Contrary to our hypothesis, gestational individuals did not report significantly lower levels of sexual satisfaction, function, nor distress than partners of gestational individuals. In line with our expectations regarding the control sample, control AFAB individuals did not report significantly different levels of sexual satisfaction, function, or distress compared to partners of control AFAB individuals.

2.7 Discussion

This is the first study we are aware of to compare levels of five distinct dimensions of sexual well-being between both members of a couple who have experienced a recent pregnant loss to both members of a control sample who have not experienced such a loss. In line with our hypothesis, we found that gestational individuals—women and those AFAB who were pregnant at the time of the loss—and their partners reported lower levels of sexual satisfaction than their control counterparts. We found that partners of gestational individuals unexpectedly reported *lower* levels of sexual distress than partners of control AFAB individuals, and that individuals in the pregnancy loss sample did not differ from those in the control sample with respect to sexual function, sexual desire, or sexual frequency. We also found that gestational

individuals reported lower levels of sexual desire than their own partners, and that this sexual desire gap was larger than the gap in sexual desire between the two partners in the control sample, who we found did not differ in their levels of sexual desire. We did not observe any other differences in sexual well-being within couples in either sample. Couples experiencing pregnancy loss may find it reassuring that we did not find many aspects of sexual well-being to be related to pregnancy loss, suggesting that such couples may be able to come together and continue to invest in their intimacy during a time of shared grief and adjustment.

2.7.1 Pregnancy Loss Is Associated with Poorer Sexual Satisfaction

We found that both members of couples who had experienced a recent pregnancy loss had lower levels of sexual satisfaction than those in couples who had not. This finding aligns with prior work, which has found that having repeated pregnancy losses is associated with lower levels of sexual satisfaction for women (Serrano & Lima, 2006). During sex, memories of a pregnancy loss may arise for either partner (Jaffe & Diamond, 2011), which may disrupt both partners' satisfaction from sex. Also, grief could negatively bias evaluations such that one sees more costs than rewards from the sexual relationship (Lawrance & Byers, 1995). Grief may also pile up on other demands, creating stress that spills over to sexual encounters between partners (Patterson, 1988) and makes sex less fulfilling. Because pregnancy loss relates to poorer sexual satisfaction for both members of a couple, couples may be at risk for negative implications to their relationship longevity (Gold et al., 2010). Per Gravensteen et al. (2018) and Mekosh-Rosenbaum and Lasker (1995), couples are likely not at risk for poorer relationship

satisfaction following pregnancy loss. Indeed, women who have had a pregnancy loss are at heightened risk of their relationship ending compared to women who have had a live birth (Gold et al., 2010), and dissatisfaction with sex has been linked with marital instability (Hill et al., 2017). Thus, couples and practitioners should attend not only to physical needs post-loss, like physical recovery, but also to nurturing sexual satisfaction.

Practitioners can share that pregnancy loss is associated with lower levels of sexual satisfaction for both members of a couple. Sharing this trend may underscore that changes to sexual satisfaction are a common experience. Clinicians should be prepared to offer intervention to promote sexual satisfaction. For instance, clinicians can promote intimacy by helping partners share their experiences post-loss with one another (Bois et al., 2016). Clinicians could also encourage couples to explore together how various aspects of pregnancy loss like grief, unmet expectations, and physical recovery may be interfering with their sexual satisfaction.

2.7.2 Pregnancy Loss Is Not Associated with Lower Sexual Desire, Function, Distress, or Frequency

In contrast to sexual satisfaction, we found no evidence that those who experienced pregnancy loss had lower levels of sexual desire, higher levels of sexual function problems or sexual distress, or lower sexual frequency relative to couples who had not suffered a recent pregnancy loss. Sexual satisfaction is thought to be a more interpersonal construct as it centers on perceptions of the positive and negative aspects of one's sexual relationship (Lawrance & Byers, 1995). In contrast, sexual function (Rosen et al., 2000), sexual desire (van Anders et al., 2021), and sexual distress (Stephenson &

Meston, 2010) focus on perceptions of one's own personal sexual experiences and feelings, and sexual frequency is a concrete assessment of sexual activity or behavior. Thus, aspects of sex which are more intraindividual or objective may be less sensitive to some of the challenges faced on a relational level after pregnancy loss, like sexual satisfaction.

We maintain the possibility that those with and without a pregnancy loss may differ in the levels of their sexual function problems or sexual desire. For instance, *p*-values for between-group differences in sexual desire were close to corrected cutoffs for statistical significance (see Supplemental Table 1 on the study's OSF page). Nevertheless, that we did not detect such differences may indicate they are small and potentially not clinically meaningful. That our results were inconclusive regarding whether pregnancy loss was associated with more problems with sexual function or lower sexual desire contrast with prior work where pregnancy loss has been linked with both lower sexual function (Francisco et al., 2014; Hasanpour et al., 2019; Zhang et al., 2016) and lower sexual desire (Francisco et al., 2014; Serrano & Lima, 2006). Sampling differences may account for this contrast as our sample included many couples who had only experienced one loss in their lifetimes (56% of couples) and excluded those undergoing fertility treatment. In contrast, prior work only included those with repeated losses and did not exclude those undergoing fertility treatment. These sampling differences are important because couples experiencing repeated losses may cognitively distance themselves from their pregnancy to protect themselves from the potential pain of a future loss (Serrano & Lima, 2006). It is possible that those with multiple losses

similarly distance themselves from their sexuality and sexual relationships, which could disrupt their arousal patterns and bodily function as well as their interest in sex. In line with (Patterson, 1988), if couples experiencing multiple losses are also undergoing fertility treatment, then their stressors—like disruptions to intimacy via emotional, mental, and physical tolls of treatment (El Amiri et al., 2021) and disruptions to sexual well-being via financial burden of treatment (Allsop, Péloquin, et al., 2023)—may pile up and further diminish sexual desire and sexual function. Ultimately, a first pregnancy loss that does not occur in conjunction with fertility treatment may be less disruptive to a couple's sexual desire and function as compared to having multiple losses and undergoing fertility treatment.

Another possibility for why our findings contrast with prior work is that lower levels of sexual satisfaction, sexual desire, and sexual function were conflated in prior studies whereas these facets were measured separately in the current study. Both the Female Sexual Function Index (Rosen et al., 2000) and the International Index of Erectile Function (Rosen et al., 1997) used in prior studies include items about satisfaction with sex, sexual desire, as well as other aspects of sexual function (e.g., orgasm, pain) within the overall total scores. Thus, the findings of the current study may only contrast with prior work because sexual function and sexual desire were measured separately from sexual satisfaction (Dubé et al., 2020). Future research is needed to clarify why sexual satisfaction, but not other facets of sexual well-being, are seemingly adversely associated with pregnancy loss.

2.7.2 Pregnancy Loss Is Associated with Lower Sexual Distress for Partners

In opposition to our hypothesis, we found that partners of gestational individuals in couples who had experienced a pregnancy loss reported *lower* levels of sexual distress post-loss than partners of control AFAB individuals who had never experienced a pregnancy loss. It is possible that following the loss, partners of gestational individuals can positively reframe the stress of pregnancy loss, as others have done after traumatic events (e.g., stroke survivors; Ostwald et al., 2009), to limit their sexual distress. In line with the Family Adjustment and Adaptation Response Model (Patterson, 1988, 2002), positive reframing may be helpful because it redirects resources to meet other demands. In other words, partners of gestational individuals may focus less on sex than before the loss and more on other aspects of their lives, like managing grief and supporting their partner, which reduces their worries or concerns about the sexual relationship (and any potential changes to it) during this time. Future research could test these ideas in a qualitative study by interviewing partners of gestational individuals to explore how the coping mechanisms they use post-loss may affect their sexuality and sexual relationships.

2.7.3 Pregnancy Loss Is Associated with Greater Sexual Desire Differences Within Couples

In line with our hypothesis, we found that gestational individuals reported lower levels of sexual desire than their partners after a pregnancy loss. This difference in sexual desire between gestational individuals and partners of gestational individuals was larger than in the control sample where we found no sexual desire differences between partners. Taken together, these findings point to pregnancy loss being linked with greater

disparities in sexual desire between gestational individuals and their partners. Gestational individuals may tend to report lower sexual desire than their partners because they carry heavier physical burdens (Jurkovic et al., 2013) and psychological burdens (Markin, 2016) post-loss than their partners. Future research could examine to what extent and at what point post-loss this increased desire discrepancy between gestational individuals and their partners may resolve.

Practitioners can share that pregnancy loss is seemingly associated with greater differences in sexual desire between a gestational and non-gestational partner. This information could provide a springboard to discuss that while sexual desire differences between partners occur for all couples (Schnarch, 2009), they may become more pronounced after a pregnancy loss. Couples might benefit from reflecting on whether they can relate to this experience, and the emotional or relational impact for their relationship, if any.

2.7.4 Theoretical Implications

We suggest theoretical implications based on our study. The findings of our study align with Patterson's (1988, 2002) Family Adjustment and Adaptation Model, in that the shared couple-level demand of pregnancy loss seems to be linked with lower levels of sexual satisfaction and greater disparities in sexual desire between partners during a period of adjustment. When being used to study sexual well-being previously, to our knowledge this model has only been applied among samples in normative life situations or normative life transitions, such as adjusting to a relationship after marriage (Wikle et

al., 2020). The current study extends this model by applying it to understanding how a significant life stressor—pregnancy loss—relates to sexual well-being.

2.7.5 Limitations and Future Directions

One core limitation of the current study is that, while the pregnancy loss and control samples shared various characteristics, they also differed in several traits. The samples' differences could potentially be attributed to these known factors, such as gender proportions (more same-sex couples in control sample), relationship statuses (more married couples in pregnancy loss sample), and nationalities (more Canadians and no Australians or Britons in control sample). In the dearth of research on pregnancy loss and sexual well-being, intersections between the (known) traits that differ between the samples with other sociodemographic and biopsychosocial characteristics are complex and not well understood. It is also possible that third variables that were not assessed in the current study contributed to the observed differences or suppressed non-observed differences.

We acknowledge several other important limitations of the current study. First, generalizability is limited as all couples came from primarily English-speaking countries (and most were from Canada and the USA). Next, while there was a relatively large proportion of same-sex couples in the control sample (16.7% of couples), the proportion of same-sex couples in the pregnancy loss sample was small (2.9%); generalizability of the study's findings to same-sex couples who experience a pregnancy loss thus may be limited. Further, in both the pregnancy loss and control samples, there were small proportions of transgender individuals and Black, Indigenous and People of Color

(BIPOC) individuals. Because these groups have less equitable access to quality health care as compared to cisgender and White individuals, respectively (Bradford et al., 2013; Institute of Medicine (US) Committee on Understanding and Eliminating Racial Ethnic Disparities in Health Care, 2003), they may be at greater risk for poorer sexual well-being outcomes post-loss. Future works can explore these and other communities' (e.g., individuals with disabilities) experiences to understand whether health disparities differentially relate to health and relationship outcomes post-loss and to promote tailored care. Generalizability is also limited as most couples had losses that occurred before the 20th week of pregnancy and surveys were taken on average at about 10 weeks post-loss. Accordingly, practitioners should emphasize that the implications of the current study are most applicable for couples whose losses came midway through the 2nd trimester of pregnancy and reflect trends from experiences at about 3 months post-loss. Next, the sample was a convenience sample, and thus self-selection bias may have influenced the results; it is possible that those in the pregnancy loss sample reported different sexual well-being than their peers who did not participate in the study. For instance, couples who were more distressed post-loss or whose relationships were more disrupted may have been less likely to participate. Also, being able to use a multi-item assessment of problems in sexual function would have increased confidence in findings surrounding sexual function. Finally, looking forward, it would be worthwhile to explore longitudinally how patterns of sexual well-being change over time post-loss, and how these patterns are potentially associated with the time elapsed since a loss, the number of

weeks pregnant when the loss occurred, and whether a couple has had one or multiple losses.

2.7.6 Conclusions

In conclusion, the results of this study provide evidence that couples who have experienced a recent pregnancy loss on average do not tend to report lower levels of sexual desire, greater problems in sexual function, nor greater sexual distress compared to couples who have not experienced a recent loss. In addition, the results of the study provide evidence that partners of gestational individuals tend to be less distressed about sex post-loss than partners of control AFAB individuals. Practitioners can share these findings with couples who may find it reassuring that we did not find many aspects of sexual well-being to be related to pregnancy loss. However, sexual satisfaction was lower for both members of couples who had experienced a recent loss and differences in sexual desire between partners were more pronounced in couples after pregnancy loss, with gestational individuals having lower sexual desire than their partners. This study was the first we are aware of to simultaneously examine five distinct facets of sexual well-being utilizing data from both members of a couple, and to focus on pregnancy losses broadly instead of the relatively rare experience of having multiple losses. The findings of the study can be used to help clinicians and couples better understand sexual experiences post-loss.

2.8 Supplementary Information

Funding: This study was funded by an award given to David Allsop and Natalie Rosen from the IWK Health Centre (Project No. 1026674) and an award given to Natalie

Rosen from the Social Sciences and Humanities Research Council of Canada (Grant No. 435-2017-0534).

2.9 Data Availability

The data and materials for this study can be found at https://doi.org/10.17605/osf.io/z427.

2.10 Conflict of Interest

The authors have no known conflicts of interest to disclose.

2.11 Ethical Approval

Procedures for the control sample were approved by the Research Ethics Board at Dalhousie University, and those for the pregnancy loss sample were approved by the Research Ethics Board at the IWK Health Centre in Halifax, Nova Scotia. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

2.12 Informed Consent

Informed consent was obtained from all individual participants included in the study.

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2.14 Tables

Table 2.14.1 *Sociodemographic Characteristics of the Samples*

	N (%) or *M* (*SD*; actual range)			
	Pregnancy Loss Sample (*N* = 103 couples)		Control Sample (*N* = 120 couples)	
Variable	Gestational individuals	Partners	AFAB individuals	Partners
Age (years)	31.22 (4.32; 20–41)	32.30 (4.62; 22–44)	32.82 (9.16; 19–64)	33.74 (9.72; 18–67)
Sex				
Male	0 (0.0)	100 (97.1)	0 (0.0)	97 (80.8)
Female	103 (100)	3 (2.9)	120 (100)	20 (16.7)
Gender[a]				
Man	0 (0.0)	100 (97.1)	2 (1.7)	96 (80.0)
Woman	101 (98.1)	1 (1.0)	112 (93.3)	18 (15.0)
Non-binary/Additional[b]	1 (1.0)	3 (2.9)	9 (7.5)	6 (5.0)
Transgender identity				
Transgender	0 (0.0)	4 (3.9)	3 (2.5)	4 (3.3)
Cisgender	98 (96.1)	94 (95.1)	110 (91.7)	106 (88.3)
Additional/prefer not to answer	4 (3.9)	5 (4.9)	7 (5.8)	7 (5.8)
Relationship status[a,c]				
Married	84 (81.6)	79 (76.7)	51 (42.5)	53 (44.2)
Engaged	10 (9.7)	10 (9.7)	20 (16.7)	22 (18.3)
Dating	2 (1.9)	1 (1.0)	26 (21.7)	20 (16.7)

	N (%) or *M* (*SD*; actual range)			
	Pregnancy Loss Sample (*N* = 103 couples)		Control Sample (*N* = 120 couples)	
Variable	Gestational individuals	Partners	AFAB individuals	Partners
Race/Ethnicity[a]				
Québécois or French Canadian	2 (1.9)	2 (1.9)	6 (5)	5 (4.2)
English Canadian	34 (33)	34 (33)	77 (64.2)	78 (65)
White	48 (46.6)	43 (41.7)	58 (48.3)	58 (48.3)
American	37 (35.9)	31 (30.1)	18 (15)	19 (15.8)
South/East/Southeast Asian	4 (3.9)	3 (2.9)	5 (4.2)	6 (5.0)
Western/Eastern European	12 (11.7)	12 (11.7)	11 (9.2)	9 (7.5)
Black/African American	5 (4.9)	2 (1.9)	3 (2.5)	1 (0.8)
Australian	4 (3.9)	5 (4.9)	0 (0.0)	0 (0.0)
Additional[d] (each < 4.9% of each subsample)	7 (6.8)	10 (9.7)	13 (10.8)	10 (8.3)
Country of residence				
United States	43 (41.8)		16 (13.3)	
Canada	47 (45.6)		104 (86.7)	
Australia	5 (4.9)		0 (0.0)	
United Kingdom	8 (7.8)		0 (0.0)	
Household Income[e]	6.39 (2.74; 1–11)		5.19 (2.40; 1–11)	
Relationship length (years)	7.55 (3.98; 1.08–18.92)		9.06 (7.71; 1–41)	
Number of children	0.54 (0.81; 0–4)		0.74 (1.21; 0–6)	

	N (%) or *M* (*SD*; actual range)			
	Pregnancy Loss Sample (*N* = 103 couples)		Control Sample (*N* = 120 couples)	
Variable	Gestational individuals	Partners	AFAB individuals	Partners
Children living in home	0.48 (0.71; 0–3)		0.58 (1.14; 0–6)	
Couple relationship type				
Same-sex (female–female)	3 (2.9)		20 (16.7)	
Mixed-sex (female–male)	100 (97.1)		97 (80.8)	
Weeks pregnant when loss occurred[f]				
3 to 5	13 (12.6)		—	
6 to 10	43 (41.7)		—	
11 to 15	29 (28.2)		—	
16 to 20	2 (1.9)		—	
21 to 25	6 (5.8)		—	
26 to 30	4 (3.9)		—	
36 to 41	5 (4.9)		—	
Weeks since loss[f]	9.71 (5.36; 1.14–24.86)		—	
Pregnancy losses in last four months[e]				
1	92 (89.3)		—	
2	9 (8.7)		—	
3	1 (1.0)		—	
Pregnancy losses in lifetime[f]				

	N (%) or *M* (*SD*; actual range)			
	Pregnancy Loss Sample (*N* = 103 couples)		Control Sample (*N* = 120 couples)	
Variable	Gestational individuals	Partners	AFAB individuals	Partners
1	56 (54.4)		—	
2	30 (29.1)		—	
3	4 (3.9)		—	
4	7 (6.8)		—	
5 or more	6 (5.8)		—	

Note. M = mean. *N* = number of participants. *SD* = standard deviation. % = percentage of sample. Percentages do not add always add to 100% (and counts do not add to 103 or 120) due to missing data. The pregnancy loss sample includes gestational individuals assigned female at birth (AFAB) that were pregnant during the loss and partners of gestational individuals. The control sample includes control AFAB individuals (who were statistically compared with gestational individuals) and partners of control AFAB individuals (who were statistically compared to partners of gestational individuals).

[a]Participants could endorse multiple categories on this item.

[b]Categories are combined to avoid identifying participants.

[c]Partners may have reported different relationship statuses due to missing data or disagreement about relationship status.

[d]Includes the following: Indigenous, First Nations, Métis, or Inuit; African; Middle Eastern/Central Asian; Latin American; Hispanic; Latino/a/x; Biracial/Multiracial; Native Hawaiian/Pacific Islander; and write-in categories.

[e]Options included 1 *($0–$19,999*), 2 (*$20,000–$39,999*), 3 *($40,000- $59,999*), 4 *($60,000–$79,000*), 5 *($80,000–$99,999*), 6 *($100,000–$119,999*), 7 (*$120,000–$139,999*), 8 *($140,000–$159,999*), 9 (*$160,000–$179,999*), 10 (*$180,000–$199,999*), and 11 (*$200,000 and over*).

[f]Reported by gestational partner.

Table 2.14.2 *Means, Standard Deviations, and Mean Differences on Sexual Well-Being Outcomes*

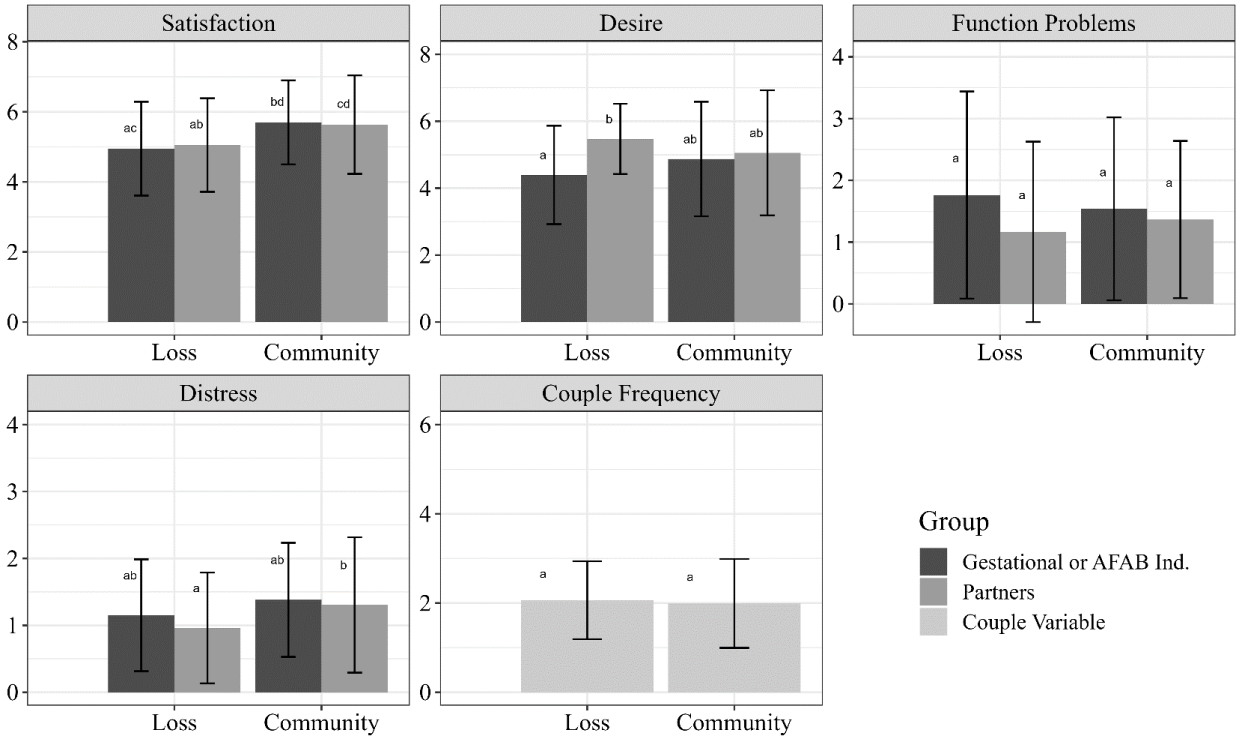
	Mean (Standard Deviation)			
	Pregnancy Loss Sample (N = 103 couples)		Control Sample (N = 120 couples)	
Sexual Outcome	Gestational individuals	Partners	AFAB individuals	Partners
Satisfaction	4.95 (1.34)^{ac}	5.05 (1.33)^{ab}	5.70 (1.20)^{bd}	5.63 (1.41)^{cd}
Desire	4.40 (1.47)^{a}	5.47 (1.05)^{b}	4.87 (1.71)^{ab}	5.06 (1.87)^{ab}
Function Problems	1.76 (1.68)^{a}	1.17 (1.46)^{a}	1.54 (1.48)^{a}	1.37 (1.27)^{a}
Distress	1.15 (0.84)^{ab}	0.96 (0.83)^{a}	1.38 (0.85)^{ab}	1.30 (1.01)^{b}
Couple Sexual Frequency per Month	2.06 (0.87)^{a}		1.99 (0.99)^{a}	

Note. The pregnancy loss sample includes gestational individuals assigned female at birth (AFAB) that were pregnant during the loss and partners of gestational individuals. The control sample includes control AFAB individuals (who were statistically compared with gestational individuals) and partners of control AFAB individuals (who were statistically compared to partners of gestational individuals). Within each sexual outcome, differing superscripts indicate groups significantly differ at $p < .05$ (p-values corrected via Holm-Bonferroni method) whereas shared superscripts indicate no significant differences between groups. For example, in terms of sexual satisfaction, gestational individuals (ac) differ from control AFAB individuals (bd), as they do not share a superscript, but gestational individuals do not differ from partners of

gestational individuals (ab) or partners of control AFAB individuals (cd) as the superscripts “a” or “c” are respectively shared between gestational individuals and these groups.

2.15 Figures

Figure 2.15.1 *Mean Levels and Differences in Sexual Well-Being Outcomes*



Note. C = Control; Ind = individuals. The pregnancy loss sample includes gestational individuals assigned female at birth (AFAB) that were pregnant during the loss and partners of gestational individuals. The control sample includes control AFAB individuals (who were statistically compared with gestational individuals) and partners of control AFAB individuals (who were statistically compared to partners of gestational individuals). Error bars represent plus or minus one standard deviation from mean. Within each sexual outcome, differing superscripts indicate groups significantly differ at $p < .05$ (p-values corrected via Holm-Bonferroni method) whereas shared superscripts indicate no significant differences between groups. For example, in terms of sexual satisfaction, gestational individuals (ac) differ from control AFAB individuals (bd), as

they do not share a superscript, but gestational individuals do not differ from partners of gestational individuals (ab) or partners of control AFAB individuals (cd) as the superscripts “a” or “c” are respectively shared between gestational individuals and these groups.

2.16 Transition to Study 2

In Study 1 (Chapter 2), my aim was to understand whether and to what extent sexual well-being is lower after a pregnancy loss, and whether there are differences between couple members in their sexual well-being levels. I compared sexual well-being between couples in the ALOE study who had experienced a recent pregnancy loss and couples in a control sample who had never experienced a pregnancy loss. I further compared sexual well-being between the two couple members in the ALOE study, and tested whether these within-couple differences were themselves larger than the within-couple differences in the control sample.

I found evidence that sexual well-being is at risk in some ways. Both couple members who had experienced a recent pregnancy loss reported lower sexual satisfaction compared to their control counterparts. Also, women and gender diverse individuals who were pregnant when the loss occurred reported lower sexual desire than men, women, and gender diverse individuals who were not pregnant. Moreover, this within-couple difference was larger than the sexual desire difference between the two couple members in the control sample. Thus, there was evidence that pregnancy loss was linked to greater sexual desire discrepancies between partners. Contrary to my expectations, I observed no between-partner or between-group differences in sexual function problems or sexual frequency. Also, unexpectedly, men, women, and gender diverse individuals who were not pregnant when the loss occurred reported lower sexual distress than their control counterparts.

Although I contributed knowledge on how sexual well-being compared between couples with and without a recent pregnancy loss in my first dissertation study, the risk and protective factors of post-loss sexual well-being remained unclear. Identifying such factors is key to informing practitioners regarding what to target post-loss to support sexual well-being. As detailed in the Introduction to my dissertation (1.7 Predictors of Sexual Well-being Post-loss), to my knowledge there have been only two empirical, quantitative studies that considered possible predictors (Azin et al., 2020; Serrano & Lima, 2006). Briefly, Azin et al. (2020), found in a cross-sectional study that higher depression predicted lower sexual function for a sample of women experiencing recurrent miscarriage ($N = 130$). However, that study did not include data from both couple members or on multiple sexual well-being aspects, and focused on recurrent miscarriage, which is rare compared to pregnancy loss (Diamond & Diamond, 2016; Rasmark et al., 2017). Serrano and Lima (2006), in a small cross-sectional study of couples ($N = 30$ couples), found that men with higher perinatal grief self-reported negative changes in their sexual relationships whereas women reported no such links. However, this link was based on bivariate correlations that did not consider the interdependence of both partners' scores (Kenny et al., 2006) and on self-reported changes rather than repeated assessments (Bolger et al., 2003). As well, the authors did not consider links between perinatal grief and multiple sexual well-being aspects (Dubé et al., 2020) and focused on recurrent miscarriage, making the study apply narrowly. They also had a very small sample, making it possible only for them to observe very large effects.

Given the limits of the two prior studies on risk or protective factors of post-loss sexual well-being, I was interested in doing more work in this area. As I considered what could be a key risk factor of sexual well-being, I revisited perinatal grief, partly because scholars had consistently identified perinatal grief as a correlate of adjustment to pregnancy loss, with 67 publications on perinatal grief until 2018 (Setubal et al., 2021), indicating its relevance in this context. The evidence for links between perinatal grief and sexual well-being from the limited study by Serrano and Lima (2006) was reinforced by prior theorizing that grief-like symptoms, such as guilt, could interfere with sexual well-being (Jaffe & Diamond, 2011). And, given that perinatal grief is a challenge unique to pregnancy loss because it is invalidated from society and affected individuals themselves (Lang et al., 2011; Markin, 2016), higher perinatal grief seemed a likely predictor of lower sexual well-being post-loss. Accordingly, in Study 2 (Chapter 3), my aim was to test if individual perinatal grief was linked with lower sexual well-being for both couple members.

My outcomes in Study 2 included sexual satisfaction, sexual desire, sexual function problems, and sexual distress, which together captured two positive and two negative dimensions of sexual well-being. Notably, I considered sexual frequency as a sexual well-being outcome in Study 1 but did not examine it in Study 2, as I realized it may not be a good indicator of sexual well-being in this context. People engage in sexual activities for numerous reasons that can be independent of their sexual well-being (Vannier & O'Sullivan, 2010). For example, sexual frequency can be regimented post-loss to meet fertility goals; 76.6% of couples try to become pregnant again after an early

pregnancy loss (Schliep et al., 2016). Also, sexual frequency could be altered because of medical recommendations to avoid sexual intercourse shortly post-loss (American College of Obstetricians and Gynecologists Committee on Practice Bulletins—Gynecology, 2018). Thus, in Study 2, I examined links from perinatal grief to sexual satisfaction, sexual desire, sexual function problems, and sexual distress. Using data from four monthly assessments, I considered how perinatal grief and sexual well-being fluctuate together across time within an individual (within-person) and if perinatal grief indicates who is most likely to have lower sexual well-being post-loss (between-person). For reference, I chose to not preregister the study's hypotheses to maintain flexibility in my analytical approach when exploring novel connections between perinatal grief and sexual well-being in an understudied area.

2.16.1 References

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CHAPTER 3: LONGITUDINAL EFFECTS OF PERINATAL GRIEF ON SEXUAL WELL-BEING FOR COUPLES AFTER A PREGNANCY LOSS

The manuscript prepared for this study is presented below. Readers are advised that David B. Allsop, under the supervision of Dr. Natalie Rosen, was responsible for the preparation and execution of this study. He was the lead on the initial draft of the manuscript and received and incorporated feedback from his coauthors. The manuscript is under review at *Journal of Family Psychology.* The full reference for this manuscript is:

Allsop, D. B., Nesbitt-Daly, K., Péloquin, K., Cockwell, H., & Rosen, N. O. (revision requested). Longitudinal effects of perinatal grief on sexual well-being for couples after a pregnancy loss. *Journal of Family Psychology*.

3.1 Abstract

Pregnancy loss disrupts couples' sexual well-being, which is crucial to health and relationship quality, yet it is unclear what predicts sexual well-being post-loss. Symbolic Interactionism Theory and prior literature point to perinatal grief as one potential predictor. Thus, our objective was to examine how perinatal grief of either couple member relates longitudinally to both couple members' sexual well-being after a pregnancy loss. We conducted multilevel structural equation modeling assessing whether fluctuations in perinatal grief were associated with fluctuations in sexual well-being for oneself and one's partner among 109 couples who experienced a pregnancy loss in the last four months and who completed four monthly surveys (within-person comparisons). We also tested whether those with the highest average perinatal grief had the lowest average sexual well-being (between-person comparisons). When either partner reported greater than typical perinatal grief, both couple members reported lower than typical sexual satisfaction and sexual desire, and higher than typical sexual function problems and sexual distress. Those with the highest average perinatal grief had the lowest average sexual satisfaction and highest average sexual function problems and sexual distress. Higher perinatal grief may be a risk factor for lower sexual well-being post-loss. Couples who grieve pregnancy loss effectively may better manage sexual challenges. Practitioners can screen couples for perinatal grief as they assess impacts to sexuality, refer them to grief resources to promote sexual well-being, and invite them to discuss how meanings around sex may have changed post-loss.

Keywords: sexual satisfaction, sexual function, perinatal grief, couples, spontaneous abortion.

3.2 Introduction

"There is no greater agony than bearing an untold story inside you"—Maya Angelou.

Pregnancy loss can be one of life's most difficult experiences, the implications of which stretch to various facets of one's health and well-being. This experience is common; 25% of women lose a pregnancy (Diamond & Diamond, 2016). One challenge of pregnancy loss is maintaining sexual well-being. Sexual well-being—which includes sexual satisfaction (rewards of sex, like connection), sexual desire (interest in sexual activity), sexual function (e.g., no problems with orgasm, arousal, pain), and low sexual distress (concerns and worries about the sexual relationship; see Dubé et al., 2020)—promotes overall health and relationship quality (Diamond & Huebner, 2012). However, sexual well-being is disrupted after a pregnancy loss for both affected partners (Allsop, Huberman, et al., 2023) and such declines may put health and relationships at risk. Indeed, women who have a pregnancy loss face increased risks of divorce and higher rates of depression and anxiety compared to women who do not (Herbert et al., 2022; Shreffler et al., 2012), and face the strains of post-loss recovery (e.g., bleeding, surgery, treatment side effects; Jurkovic et al., 2013). Yet, it is unclear what factors predict sexual well-being post-loss. Perinatal grief, or grief after a pregnancy loss, may be one such factor. Scholars have suggested that grief-like symptoms such as guilt may interfere with sexual well-being and relationships (Jaffe & Diamond, 2011), but these connections have never been empirically tested. Theory-driven studies on the potential links between perinatal grief and sexual well-being would inform grief interventions to improve couples' sexual well-being post-loss. Thus, in the current study, we build on Symbolic

Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993) to examine links between perinatal grief and sexual well-being using a longitudinal design.

3.2.1 Sexual Well-Being After Pregnancy Loss

Sexual well-being encompasses more than a lack of dysfunction or disease (World Health Organization, 2010) by including multiple positive and negative domains of sexuality. Researchers and clinicians have theorized about and tested the distinction between sexual domains: for instance, as considered in the interpersonal exchange model of sexual satisfaction, satisfaction with sex is the balance between rewards and costs in a sexual relationship (Lawrance & Byers, 1995); the incentive-motivation model of sexual desire suggests that desire emerges from arousal after exposure to meaningful sexual stimuli (Agmo & Laan, 2023); and the biopsychosocial model of sexual function problems emphasizes that disruptions to sexual response are influenced by biological, psychological, and social factors (Mitchell et al., 2022). Although correlated, empirical evidence also differentiates between the facets of sexual well-being. For example, population estimates show that low sexual satisfaction is much more common than high sexual distress and that low desire is not necessarily experienced as distressing or unsatisfying (Mitchell et al., 2013).

Despite being few in number, studies do provide evidence that sexual well-being is disrupted after pregnancy loss. Compared to those with no history of pregnancy loss, women who experience multiple pregnancy losses and men whose partners had multiple pregnancy losses reported lower levels of sexual intimacy and satisfaction, respectively, and both reported lower sexual function (e.g., Hasanpour et al., 2019; Zhang et al., 2016).

Women who experienced multiple losses also reported lower sexual desire (Francisco et al., 2014). These studies were limited in their focus on the rare experience of having three or more losses, only using data from one couple member, and focusing on only one or two aspects of sexual well-being. In Chapter 2 of my dissertation, I addressed these limitations by comparing five aspects of sexual well-being between couple members who had a pregnancy loss in the last 4 months and control couples who had never had a pregnancy loss. I found that individuals in couples who had a recent pregnancy loss had lower sexual satisfaction compared to those in couples with no history of loss. I did not find any differences in sexual desire or sexual frequency and found that sexual distress was unexpectedly lower for partners of those who had been pregnant compared to their control counterparts. However, when comparing partners to one another, women and gender diverse individuals who were pregnant before the loss had lower sexual desire than their partners, a difference which was not observed in the control couples—indicating a greater desire discrepancy between partners post-loss, which is itself a risk factor for lower sexual and relationship satisfaction (for review, see Girard, 2019). Taken together, there is evidence that pregnancy loss includes risks to unique sexual well-being domains, suggesting that considering each domain is essential to addressing sexuality in research and treatment post-loss.

3.2.2 Perinatal Grief and Sexual Well-Being

The relationship between sexual well-being and pregnancy loss can be understood through Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993). This theory has guided scholars when exploring meanings about pregnancy loss and sexual

well-being separately (Hanna-Walker et al., 2021; Sawicka, 2017). We argue it can be extended and applied to explore pregnancy loss and sexual well-being together. A key assumption of Symbolic Interactionism Theory is that people interact with the world based on the meaning, or symbolism, behind those interactions (LaRossa & Reitzes, 1993). Thus, shared sexual experiences can hold positive meanings, such as symbolizing pleasure or commitment (Olmstead et al., 2017). However, after a pregnancy loss, sex may lose this positive symbolism because sex shifts toward symbolizing physical or emotional pain that evokes fears and memories of the loss (Camacho-Ávila et al., 2023; Jaffe & Diamond, 2011), with negative consequences to sexuality (Camacho-Ávila et al., 2023).

One key mechanism that may explain a negative shift in the symbolism of sex is perinatal grief. Perinatal grief—that is, grief associated with a pregnancy loss—includes a variety of symptoms, such as depression, loneliness, fear, guilt, irritability, and feeling unsafe to love (Potvin et al., 1989). This type of grief is uniquely challenging: it can be both ambiguous, where one questions who or what they are grieving for and how to grieve, and disenfranchised, where one's loss and grief is ignored or even invalidated by medical professionals, acquaintances, extended family, and one's partner (Lang et al., 2011). Such challenges may be especially relevant if the loss occurred at an earlier gestational age. Despite perinatal grief being a common and understandable reaction to pregnancy loss (Badenhorst & Hughes, 2007), it is difficult psychologically. In line with Attig (2011), the psychological difficulties of perinatal grief include not only relearning how one interacts with and views one's world and relationships, but relearning one's very

sense of self. Indeed, when grieving, "we sense that we can never be the same persons we were prior to our loss . . . such a disorienting blow tears at the very fabric of [us]" (Attig, 2011, pp. 134, 141). And, because one's sense of self shapes sexuality and sexual relationships (Schnarch, 2009), the relearning of the self that occurs because of perinatal grief may also shape sexual well-being.

A prior cross-sectional study sets the stage that higher perinatal grief may be related to lower sexual well-being. Serrano and Lima (2006), using data from a sample of 30 mixed-sex couples, found that men with higher perinatal grief self-reported negative changes to their sexual relationships, whereas women reported no such links. Importantly, evidence for the link between men's perinatal grief and changes to their sexual relationships was limited as it was based on bivariate correlations that did not consider the interdependence of both partners' scores (Kenny et al., 2006). The results were also based on self-reported changes rather than repeated assessments across time (Bolger et al., 2003). The authors of the study did not consider links between perinatal grief and the stress of pregnancy loss and multiple sexual well-being aspects. Their sample was small, making it possible for them to observe only very large effects. They also focused on recurrent miscarriage, which is rare compared to pregnancy loss (Diamond & Diamond, 2016; Rasmark et al., 2017). Altogether, given this study's limitations, additional work is needed to understand perinatal grief's potential role in post-loss sexual well-being.

3.2.3 The Couple Context of Perinatal Grief and Sexual Well-Being

Beyond relating to one's own lower sexual well-being, perinatal grief may also

relate to lower sexual well-being for one's partner. In line with Symbolic Interactionism Theory, the meaning and symbolism of one's self is formed in the context of a couple relationship (Schnarch, 2009). By implication, couple members may feel hesitant or detached from their sexuality and sexual relationship because perinatal grief has transformed these aspects of their lives into symbols of pain and loss. Such negative symbolism may relate to—or build upon—their partner's (already) diminished sense of self and ultimately lower a partner's sexual well-being. Alternatively, as grief diminishes one couple member's sexual well-being, it may detract from the sexual well-being of their partner given the dyadic context of sexuality. There has been only one limited dyadic study of perinatal grief and sexual well-being (Serrano & Lima, 2006); however, related studies provide evidence of the potential for cross-partner effects. For example, individuals in community samples with greater depression, lower emotional stability, and poorer emotion regulation—all aspects of perinatal grief (Potvin et al., 1989)—have respectively been found to have partners with lower sexual satisfaction (Karakose et al., 2023), lower sexual function (Velten et al., 2019), and lower sexual desire (Dubé et al., 2024). Taken together, both theory and the limited prior research suggest one's own perinatal grief may have implications for one's partner's sexual well-being.

An inclusive approach to studying couple-level experiences with pregnancy loss is to distinguish members of a couple based on who was pregnant when the loss occurred (women and gender diverse individuals who were pregnant) and who was not (men, women, and gender diverse individuals who were not pregnant). This approach acknowledges that couples with diverse sexual and gender/sex identities report the same

challenges of pregnancy loss (Wojnar, 2007). Such an approach also recognizes that both members of a couple carry unique burdens. For example, those who were pregnant may face the physical demands of post-loss bleeding, surgery, and side effects from treatment (Jurkovic et al., 2013) whereas those who were not pregnant may face feeling that their grief is less important or ignored (Camacho-Ávila et al., 2023). Given these distinct perspectives, it is possible that some links between perinatal grief and sexual well-being could be significant for one partner but non-significant for the other; however, given the sparse nature of research on this topic, we did not make formal hypotheses about differences in the significance of these links.

3.2.4 Current Study

In the current study, we extended prior research on perinatal grief and sexual well-being by integrating associations across time, by including data from both members of a couple who had a recent pregnancy loss, and by examining multiple aspects of sexual well-being. We also sought to use Symbolic Interactionism Theory to link highly relevant, yet previously unconnected, experiences for couples (i.e., grief and sexuality), thus underscoring the theory's value in integrating the interconnectedness of various domains of family life in research and practice. Because perinatal grief is strongest in the first six months post-loss (Tseng et al., 2017), our sample focused on couples who had a pregnancy loss about two months prior (on average) and who we followed monthly for four months. Importantly, in our study design we considered two contexts. First, we considered the within-person level, where we compared people to themselves. By testing associations at this level, we could identify whether times of higher than usual perinatal

grief in one's own life were linked with times of lower than usual sexual well-being for oneself and one's partner. Thus, we hypothesized (H1) that when individuals reported greater than typical levels of perinatal grief (i.e., relative to their own average across all time-points), they and they partners would report lower than typical levels of sexual satisfaction and sexual desire, and higher than typical levels of sexual function problems and sexual distress.

Second, we considered the between-person level, where we compared people to other people. By testing associations at this level, we could identify if people with higher levels of perinatal grief, relative to their peers, also reported lower sexual well-being. Thus, we hypothesized (H2) that when individuals reported greater overall levels of perinatal grief (i.e., relative to other people), they and their partners would have lower than average levels of overall sexual satisfaction and sexual desire and higher than average levels of overall sexual function problems and sexual distress. As pregnancy loss occurs in the context of a variety of individual and couple factors that may be relevant to their sexual well-being—including weeks pregnant when the loss occurred, weeks since the loss, number of lifetime losses, the presence of other children, and age—we tested if our effects of interest held when controlling for such covariates.

3.3 METHOD

3.3.1 Participants and Procedure

We recruited couples who experienced a pregnancy loss in the last four months from Canada, the U.S., the U.K., Australia, and New Zealand. Individuals were eligible to participate if they and their partner (1) had internet access, an email, a device to

complete surveys and were fluent in English, (2) were at least 18 years or age, (3) had been in a relationship for at least a year, (4) had one member of the couple experience a pregnancy loss in the last four months of their first contact with our research team, (5) knew about the pregnancy before the loss, (6) did not have their pregnancy end because of an elective, non-medically recommended abortion, (7) did not have their pregnancy result in a live birth (i.e., no signs of life after delivery), (8) did not have their sexual functioning impaired by a self-reported major untreated mental or physical illness, and/or the treatment of that illness while participating, and (9) were not undergoing fertility treatment when the loss occurred or while participating in the study. Although one member of the couple had to physically experience the pregnancy loss, people of all bodies, gender identities, and sexual orientations were otherwise eligible. Of the 280 couples screened for eligibility, we enrolled 109 who met our criteria (see Transparency and Openness section). Sociodemographics for the sample are in Table 3.9.1.

Data collection was part of a larger study on pregnancy loss and sexual relationships. The sole prior manuscript from this dataset (Chapter 2) examined sexual well-being differences between couples with and without a recent pregnancy loss using couples' baseline data. In comparison, the current manuscript examined associations between perinatal grief and sexual well-being and used additional data collected since the previous manuscript (follow-up surveys and more participants); the two studies overlap in the sexual well-being measures. We collected data for the current study in full between July 1, 2021, and February 1, 2023; the required sample size was determined by a power analysis (see supplemental materials on Open Science Framework (OSF) page,

https://doi.org/10.17605/osf.io/z597d). Given our sample size of 109 couples, and an α of .05, we estimated we had 93% to 95% power to detect medium-sized, within-person actor effects of β = .20, and 87% to 90% power to detect small-sized, within-person partner effects of β = .18 (Acock, 2014). We also estimated that we had 90% power to detect medium-sized, between-person actor or partner effects of β = .26 (Acock, 2014). Thus, we had high power to detect small-to-medium size standardized regression effects.

We recruited participants online (e.g., Facebook, Instagram, Reddit) and in-person (e.g., posters at medical facilities and in the community, reviewing patient charts from a collaborating local fertility clinic). Research assistants first screened interested individuals to confirm their eligibility, either through a phone call or a survey hosted on Qualtrics (with a follow-up phone call if further information was required). Then, eligible participants provided informed consent and independently completed validated, online questionnaires sent via email that were also hosted on Qualtrics. Participants had one month to complete their surveys and received reminders via phone and email. Participants completed four monthly surveys. Only the survey responses where a couple continued to meet eligibility criteria (e.g., not pregnant, not undergoing fertility treatment) were included in the analysis; however, because all couples met eligibility criteria in their first surveys, we used at least some data from all 109 couples. For example, if a couple member reported they were pregnant in their third survey, only data from the first and second surveys for both couple members were included in the analysis, data from their third surveys were marked as missing, and missing data from both members' third and fourth surveys were subsequently handled via full-information-

maximum-likelihood (FIML). Retention was, respectively, 89.9%, 78.0%, and 68.8% for the second through fourth surveys. (Retention equaled one minus the cumulative number of couples who did not continue to meet eligibility criteria divided by the total number of couples). We compensated couples up to $178 CDN ($89 individually) in gift cards or electronic cash payments for their participation. The research ethics board at the IWK Health Centre in Halifax, Nova Scotia approved the study.

3.3.2 Measures

Perinatal Grief. We assessed perinatal grief using the short Perinatal Grief Scale (PGS; Potvin et al., 1989). Participants rated 32 items on perinatal grief (e.g., "I am grieving for the baby") on a 5-point Likert (0 = *strongly agree,* 5 = *strongly disagree*). We modeled the construct as a latent variable (see Figure 3.10.1 and 3.4.1 Step 1: Measurement Models), and higher scores reflected greater grief. The short PGS has been validated (Setubal et al., 2021), and we found evidence of excellent reliability: respective ω for participants who were and were not pregnant = .98 and .98 (within-person) and .97 and .98 (between-person). In line with Yang et al. (2010), for feasibility given this scale's many items, we first took mean scores of its three validated subscales (active grief, difficulty coping, despair), after which these three subscales were entered in as indicators of a latent construct. Such a process commonly results in high reliability (Little et al., 2022).

Sexual Satisfaction. We assessed sexual satisfaction with the Global Measure of Sexual Satisfaction (GMSEX; Lawrance & Byers, 1995). Participants answered the question: "How would you describe your overall sexual relationship with your partner

during the last 4 weeks?" on a 7-point Likert scale for five bipolar pairs of words (e.g., *very bad* to *very good*). We modeled the construct as a latent variable, and higher scores reflected greater satisfaction. The GMSEX has strong psychometric properties (Mark et al., 2014), and excellent reliability: respective ω for participants who were and were not pregnant = .91 and .91 (within-person) and .99 and .99 (between-person).

Sexual Desire. We assessed sexual desire using the Dyadic Sexual Desire subscale of the Sexual Desire Inventory (SDI-2; Spector et al., 1996). This subscale includes seven items on desire for partnered sexual activity (e.g., "During the last month, how often would you have liked to engage in sexual activity with a partner"). Participants rated items on 8- or 9-point scales, where low anchors indicated low sexual desire (e.g., *not at all*, *no desire*) and high anchors indicated high sexual desire (e.g., *more than once a day*, *strong desire*). We modeled the construct as a latent variable, and higher scores reflected greater desire for partnered sexual activity. The SDI-2 has shown strong psychometric properties (Allsop, Huberman, et al., 2023), and we found evidence of good reliability: respective ω for participants who were and were not pregnant = .89 and .90 (within-person) and .91 and .93 (between-person).

Sexual Function Problems. We assessed sexual function problems using the Problem Distress subscale of the Sexual Function Evaluation Questionnaire (SFEQ; Mitchell et al., 2022). We modeled the construct as a latent variable and higher scores reflected greater distressing sexual function problems. Given this measure is relatively new, published psychometric properties outside of its initial validation study are not available; however, it displayed good psychometric properties in its initial validation,

such as correlating as expected with clinician diagnoses of sexual dysfunctions (Mitchell et al., 2022). We found evidence of good reliability: respective ω for participants who were and were not pregnant = .87 and .87 (within-person) and .96 and .96 (between-person).

Sexual Distress. We assessed sexual distress using the Sexual Distress Scale – Short Form (SDS-SF; Santos-Iglesias et al., 2020). This scale includes five items on the frequency of bothersome or distressing sexual problems in the last four weeks (e.g., "How often did you feel worried about sex?"). Participants rated items on a 5-point scale (0 = *never* to 4 = *always*). We modeled the construct as a latent variable and higher scores reflected greater sexual distress. The SDS-SF has shown strong psychometric properties (Allsop, Huberman, et al., 2023), and we found evidence of excellent reliability: respective ω for participants who were and were not pregnant = .95 and .95 (within-person) and .97 and .99 (between-person).

Covariates. We assessed potential covariates with single items including number of weeks pregnant when the loss occurred, the number of weeks since the pregnancy loss (at the start of the study), whether a couple has child(ren) or not (1 = yes, 0 = no), the number of lifetime pregnancy losses experienced by women and GDI who were pregnant, and age of the participant.

3.4 Data Analysis

We used multilevel structural equation modeling to analyze our data in Mplus (Muthén & Muthén, 1998-2017). We distinguished dyads based on who was pregnant when the loss occurred (i.e., women and gender diverse who were pregnant) and who was

not pregnant (i.e., men, women, and gender diverse who were not pregnant). Descriptive statistics are in Table 3.9.2.

3.4.1 Step 1: Measurement Models

First, we constructed separate dyadic measurement models (see diagram in supplemental materials) for each of our primary constructs (i.e., perinatal grief, sexual satisfaction, sexual desire, sexual function problems, sexual distress) to eliminate measurement error. We modeled constructs separately, as it was not feasible given our sample size to combine the many model parameters across outcomes into a single model. We modeled latent factors for each partner at within- and between-person levels, and used latent-mean centering to center observed variables (Asparouhov & Muthén, 2018). Thus, we obtained unbiased estimates of within-subject effects (i.e., monthly fluctuations) and between-person effects (i.e., average levels across four months; these are analogous to random intercepts). We tested for and found that all measures met or exceeded metric measurement invariance between partners, based on the criteria that CFI should not decline more than .01 between different stages of measurement models (Leitgob et al., 2023). Thus, we could attribute differences in unstandardized regression coefficients between partners to structural differences rather than measurement differences (Leitgob et al., 2023). On average across all time points and variables, 74% of data were present (range = 65% to 100%). We handled missing data via full-information maximum likelihood (FIML) and included a principal component auxiliary variable in the model (Howard et al., 2015) that we generated through the PcAux package (Version 0.0.0.9014; Lang et al., 2020) in R (Version 4.2.0; R Core Team, 2022). Our models

adequately fit the data, as described in Supplemental Material.

3.4.2 Step 2: Structural Models

We tested our hypotheses in step two of our analysis, where we modeled associations between perinatal grief and our outcomes (all sexual well-being outcomes together simultaneously) in structural models (see Figure 3.10.2) informed by the actor-partner interdependence model (Kashy & Kenny, 2000). Model 1 included perinatal grief as a predictor and, at the within-person level, time since the loss, which we included to detrend the data (McNeish & Hamaker, 2020). Model 2 added our covariates as predictors at the between-person level (because our covariates only varied between-person, we did not included them at the within-person level); given both partners' ages were highly correlated ($r = .70$, $p < .001$), we used a common-fate approach to model averaged couple age (Galovan et al., 2016) to avoid introducing multicollinearity into the models. In both Model 1 and 2, we used factor scores that were extracted from measurement models in place of latent variables to reduce the number of parameters to enable model convergence (Yang et al., 2010). We used Asparouhov and Muthén's (2022) selective procedure to incorporate random slopes into our models. Ultimately, we kept one random slope in our final models—the association between the perinatal grief of women and gender diverse individuals who were pregnant and their own sexual desire—given it was the only random slope to have meaningful slope variance, where the z-value of its variance was greater than three (Asparouhov & Muthén, 2022). We estimated the structural models via Bayesian estimation given the models' complexity (Muthén, 2010). Fit indices, including the Posterior Predictive P-Value (PPP), which is a common

Bayesian model fit index, are not currently available in Mplus for the types of models we ran. However, the PPP was available from a baseline model we constructed, with no random slopes, on which we based our final models. The PPP of this baseline model was .329, which indicated good model fit as it exceeded .050 (Asparouhov & Muthén, 2017). Given our final models closely resembled this well-fitting baseline model, we had confidence our final models adequately fit the data. We considered regression coefficients (*B*) to be significant if their 95% credibility intervals (CI's) did not include zero. At the within-person level, a significant coefficient indicated that month-to-month fluctuations in an outcome and predictor varied together. At the between-person level, a significant coefficient indicated that variations in average levels (across the four surveys) of an outcome and predictor varied together.

3.4.3 Transparency and Openness

We report how we determined our sample size, and our study measures on the study's OSF page. All data, analysis code, and output are on that page. Data were analyzed in Mplus 8.6 (Muthén & Muthén, 1998-2017). The study's design and analysis were not preregistered.

3.5 Results

3.5.1 Model 1 (No Covariates at Between-Person Level)

Table 3.9.3 presents the results of Model 1 examining within- and between-person associations between perinatal grief and sexual outcomes, accounting for time since the loss as a covariate at the within-person level but without covariates at the between-person level.

Within-Person Effects: Monthly Fluctuations in Perinatal Grief and Sexual Well-Being. In support of hypothesis one, when participants who were pregnant (P) reported greater than typical perinatal grief (i.e., their grief was higher at one month relative to the average across all four months), they and partners—participants who were not pregnant (NP)—reported the following: lower than typical sexual satisfaction (P: B = -1.00, CI_{95} [-1.19, -.78]; NP: B = -0.50, CI_{95} [-0.69, -0.31]), lower than typical sexual desire (P: B = -1.02, CI_{95} [-1.22, -0.84]; NP: B = -0.26, CI_{95} [-0.41, -0.12]), higher than typical sexual function problems (P: B = 0.87, CI_{95} [0.74, 1.02]; NP: B = 0.47, CI_{95} [0.33, 0.60]), and higher than typical sexual distress (P: B = 0.81, CI_{95} [0.67, 0.95]; NP: B = 0.40, CI_{95} [0.28, 0.53]). Also in support of our hypothesis, when participants who were not pregnant reported greater than typical perinatal grief, they and their partners reported lower than typical sexual satisfaction (NP: B = -1.23, CI_{95} [-1.45, -1.03]; P: B = -1.00, CI_{95} [-1.23, -0.78]), lower than typical sexual desire (NP: B = -0.39, CI_{95} [-0.41, -0.12]; P: B = -0.51, CI_{95} [-0.70, -0.33]), higher than typical sexual function problems (NP: B = 0.59, CI_{95} [0.45, 0.73]; P: B = 0.48, CI_{95} [0.34, 0.63]), and higher than typical sexual distress (NP: B = 0.70, CI_{95} [0.56, 0.84]; P: B = 0.43, CI_{95} [0.28, 0.57]).

Per Sullivan and Feinn (2012), fluctuations in both partners' perinatal grief and time since the loss explained medium to large proportions of variance in fluctuations in our outcomes, including both partners' sexual satisfaction (R^2_P = .60, CI_{95} [.54, .66]; R^2_{NP} = .56, CI_{95} [.50, .63]), sexual desire (R^2_P = .57, CI_{95} [.51, .63]; R^2_{NP} = .26, CI_{95} [.19, .33]), sexual function problems (R^2_P = .63, CI_{95} [.56, .68]; R^2_{NP} = .52, CI_{95} [.45, .59]), and sexual distress (R^2_P = .57, CI_{95} [.50, .63]; R^2_{NP} = .53, CI_{95} [.46, .59]). In sum, after

controlling for the number of weeks since the loss, an individual's own greater than typical perinatal grief related to their own and their partner's lower than typical sexual satisfaction and sexual desire and higher than typical sexual function problems and sexual distress.

Between-Person Effects: Comparing People to Other People. In support of hypothesis two, we observed that when participants who were pregnant reported higher average perinatal grief across the study period, they and their partners, as compared to those in other couples who reported lower average perinatal grief, reported the following: lower average sexual satisfaction (P: B = -0.58, CI_{95} [-0.82, -0.35]; NP: B = -0.61, CI_{95} [-0.95, -0.26]), higher average sexual function problems (P: B = 0.41, CI_{95} [0.27, 0.55]; NP: B = 0.27, CI_{95} [0.14, 0.40]), and lower average sexual distress (P: B = 0.36, CI_{95} [0.23, 0.48]; NP: B = 0.20, CI_{95} [0.05, 0.34]). Also, when participants who were pregnant reported higher average perinatal grief, they reported lower average sexual desire (B = -0.49, CI_{95} [-0.87, -0.08]). In contrast, for participants who were not pregnant, we observed fewer associations between average perinatal grief and average sexual well-being. Their own higher average levels of perinatal grief were related to higher average sexual distress for themselves (B = 0.40, CI_{95} [0.22, 0.58]) and their partners (B = 0.23, CI_{95} [0.08, 0.39]), but were unrelated to all other facets of sexual well-being. (Credibility intervals of these null findings are available in output files on the study's OSF page). Per Sullivan and Feinn (2012), both partners' average perinatal grief explained small to medium proportions of variance in average levels our outcomes, including both partners' sexual satisfaction (R^2_P = .25, CI_{95} [.12, .39]; R^2_{NP} = .13, CI_{95} [.04, .26]), sexual desire

(R^2_P = .08, CI_{95} [.01, .20]; R^2_{NP} = .02, CI_{95} [.00, .10), sexual function problems (R^2_P = .31, CI_{95}[.16, .46]; R^2_{NP} = .16, CI_{95} [.05, .30]), and sexual distress (R^2_P = .40, CI_{95} [.25, .54]; R^2_{NP} = .30, CI_{95} [.17, .45]).

3.5.2 Model 2 (Covariates at Between-Person Level)

Below, we present the results of Model 2 examining the same associations as Model 1 but adding controls at the between-person level (i.e., weeks pregnant at loss, weeks since the loss when a couple began the study, whether a couple has child(ren) or not, the number of lifetime pregnancy losses experienced by participants who were pregnant, and couple age; see Supplemental Table 2 for full details). Because no controls were added at the within-person level from Model 1 to Model 2, the within-person results are the same between models. At the between-person level, we found that three of the nine significant between-person associations were no longer significant when we included covariates in the between-person model. Specifically, the average perinatal grief of participants who were pregnant was no longer significantly related to their own average sexual desire (B = -0.41, CI_{95} [-0.96, 0.12]); the average sexual satisfaction of their partners (B = -0.52, CI_{95} [-1.04, 0.04]); nor the average sexual distress of their partners (B = 0.21, CI_{95} [-0.02, 0.49]). Thus, the other six associations from Model 1 remained statistically significant in Model 2 when covariates were included. In sum, after including covariates in our model, we found at the between-person level that greater average perinatal grief of participants who were pregnant, and to a lesser extent average perinatal grief of participants who were not pregnant, related to one or both partners' lower average sexual satisfaction, and greater sexual function problems or sexual distress.

To understand why some associations between average perinatal grief of participants who were pregnant and sexual well-being became non-significant in Model 2, we inspected the correlations between these participants' average perinatal grief and the covariates. Of note, zero was included in all the 95% credible intervals of the correlations between the covariates and perinatal grief of participants who were pregnant. However, higher levels of average perinatal grief for participants who were pregnant were almost significantly linked to a higher number of weeks pregnant when the loss occurred (r = .16, CI_{95} [-0.04, 0.35]) and to a higher number of pregnancy losses experienced (r = .16, CI_{95} [-0.04, 0.35]). Thus, these two covariates seemed to be the strongest explanations for why some associations became non-significant between the models with and without covariates.

3.6 Discussion

Guided by Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993), we tested the associations between perinatal grief and sexual well-being using dyadic, longitudinal data. At the within-person level, we found all possible actor and partner links. Higher than typical perinatal grief (i.e., higher than an individual normally had) was linked with lower than typical sexual satisfaction and sexual desire, and higher than typical sexual function problems and sexual distress for both couple members. At the between-person level, we found that women and gender diverse individuals who were pregnant with higher perinatal grief levels (than their peers) had lower sexual satisfaction levels, higher sexual function problem levels for them and their partner, and higher sexual distress levels. We also found that men, women, and gender diverse individuals

who were not pregnant with higher perinatal grief levels had lower sexual distress levels for them and their partner. Whereas prior scholars have found qualitative evidence that men who were not pregnant reported negative effects on their sexuality due to perinatal grief (Camacho-Ávila et al., 2023), our study extends this literature by being the first to (1) empirically test associations between perinatal grief and sexuality, (2) consider such links for multiple domains of sexual well-being, (3) use longitudinal data, (4) focus on recent pregnancy losses, and (5) include data from both couple members. Our study also (6) illustrates for family scientists and practitioners how Symbolic Interactionism Theory can be used to link fundamental, yet distinct, areas of family life (i.e., sexuality and grief), which may serve as a springboard for future research and practice with this framework. We provide the first empirical basis for targeting perinatal grief to potentially benefit couples' sexual relationships during the vulnerable time after a pregnancy loss.

3.6.1 Links Between Perinatal Grief and Sexual Well-Being

As hypothesized, regarding monthly fluctuations, we found that greater than typical perinatal grief—both for women and gender diverse individuals who were pregnant and for men, women, and gender diverse individuals who were not pregnant—related to both partners' lower than typical sexual satisfaction and sexual desire, and higher than typical sexual function problems and sexual distress. These associations were strong, with fluctuations in perinatal grief explaining large proportions of variance in fluctuations in both partners' sexual well-being. That we found all possible actor and partner effects, and that the size of these effects were relatively similar between couple members, affirms the dyadic context of pregnancy loss and sexuality (Jaffe & Diamond,

2011) and emphasizes involving both couple members in treatment.

Also in line with our hypotheses, after controlling for relevant covariates (i.e., weeks pregnant at loss, weeks since loss, if a couple has children or not, number of lifetime losses, and age), we found that women and gender diverse individuals who were pregnant with the highest levels of perinatal grief, compared to other people, had the lowest sexual satisfaction, the highest levels of sexual function problems for themselves and their partners, and had partners with the highest levels of sexual distress. We also found that men, women, and gender diverse individuals who were not pregnant with the highest levels of perinatal grief had the highest levels of sexual distress and so did their partners. Together, such findings provide evidence that perinatal grief is a risk factor for lower sexual satisfaction and for higher sexual function problems and sexual distress, which aligns with pregnancy loss being a risk factor for poorer mental health (Herbert et al., 2022) and divorce (Shreffler et al., 2012). The link between perinatal grief of women and gender diverse individuals who were pregnant and their own sexual desire became non-significant after adding controls into our model. Potentially, this change in significance could indicate an indirect association for participants who were pregnant. Specifically, based on our models with and without controls, a higher number of weeks pregnant when a loss occurred and having experienced more pregnancy losses could relate to higher average perinatal grief levels and in turn relate to lower average sexual desire levels. Future research which tests such a notion may provide an empirical basis for considering these characteristics in individualized treatment approaches.

The observed associations between perinatal grief and sexual well-being at both

the within- and between-person levels can be understood through Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993). Specifically, for individuals after a pregnancy loss, sex can become a painful, fear-inducing reminder of the loss (Camacho-Ávila et al., 2023; Jaffe & Diamond, 2011); negative changes in the meaning of sex could occur as one's sense of self, which shapes sexuality and sexual relationships (Schnarch, 2009), becomes disoriented when grieving (Attig, 2011). This negative symbolic shift may be exacerbated during times of heightened perinatal grief, which could then relate to poorer well-being in each domain of sexuality, though the potential mechanisms for affecting each domain may be distinct. Specifically, as per the interpersonal exchange model of sexual satisfaction (Lawrance & Byers, 1995), perinatal grief may increase the costs of sex by incorporating reminders of the loss into sexuality such that they outweigh the benefits of sex, and ultimately diminish sexual satisfaction. In line with the Sexual Incentive Motivation Model (Agmo & Laan, 2023), perinatal grief could draw thoughts toward the psychological and emotional difficulties of the pregnancy loss, thus making it more difficult to attend to sexual cues that would stimulate arousal and subsequent desire. Perinatal grief could diminish sexual function because it is characterized by emotional instability, a psychological factor which itself is related to poorer sexual function, albeit outside of pregnancy loss contexts (Velten et al., 2019). Finally, in line with Camacho-Ávila et al. (2023) as couple members view sex more negatively potentially due to perinatal grief, and in turn anticipate negative feelings and memories about the loss arising when they consider or engage in sexual activity, they may become more worried and distressed about sex. Altogether, these strong, negative

links between perinatal grief and multiple domains of sexual well-being could have negative implications for health and relationship quality (Diamond & Huebner, 2012).

When comparing people to other people, we found five significant associations (both actor and partner) between the perinatal grief of women and gender diverse individuals who were pregnant and both partners' sexual well-being, but only two such associations for the perinatal grief of partners who were not pregnant. These findings contrast with what we found regarding monthly fluctuations, where we observed all possible actor and partner associations. Whereas the highs of perinatal grief and the lows of sexual well-being that occur month-to-month seem to be experienced widely, those with the highest perinatal grief were not always those who had the lowest sexual well-being. In terms of our finding more effects for the partner who was pregnant at the between-person level relative to the partner who was not pregnant, it is possible that gender could play a role here given that most participants in our sample who were pregnant identified as women and their partners identified as men. Per Meana and Nunnink (2006), who found that women have greater levels of cognitive distraction during sex than men (Cohen's $d = .28$), intrusive thoughts of the loss during sex may distract from pleasure and bonding after a pregnancy loss more so for women than men. In turn, such intrusive thoughts for women may manifest in broader risks to sexuality and sexual relationships for couples as women and/or their partners potentially view sex as more negative, experience emotional instability, and worry about their sexuality. Importantly, Meana and Nunnink's data were from a non-clinical, college-based sample of individuals rather than couples; thus, future work on potential gendered partner

differences in levels of distraction during sex after a pregnancy loss is needed.

3.6.2 Clinical Implications

Our results support the practice of clinicians screening couples for clinical levels of perinatal grief using the Perinatal Grief Scale (Potvin et al., 1989) and then assessing impacts to sexual well-being and offering intervention accordingly. Healthcare professionals might begin treatment by validating a couple's sexual difficulties and providing resources to support them with grieving. We found links between perinatal grief and sexual well-being among couples with any number of losses and after we controlled for the number of losses; thus, practitioners should provide couples with grief resources regardless of how many pregnancy losses they have had. Therapists could take a symbolic interactionism perspective (Blumer, 1969; LaRossa & Reitzes, 1993) by inviting couple members to share with one another if (and how) meanings around sex have changed. Such discussion may help couple members recognize changes in themselves and their relationship and promote healing via emotional intimacy. Therapists could also invite couples to consider their sexual relationship not as a symbol of pain and loss, but as a symbol of coping with pain and loss via pleasure and bonding. Given the couple context of their losses, practitioners should involve both couple members in treatment even if only one couple member meets clinical levels of perinatal grief.

3.6.3 Limitations and Future Directions

We recognize several limitations of our study. First, our sample had few same-gender/sex couples and few gender/sex diverse individuals, came from primarily English-speaking countries (especially Canada and the USA), was relatively affluent, and had few

individuals who identified as Black, Indigenous, or people of color (BIPOC). Thus, the generalizability of our findings may be limited; more work on perinatal grief and sexual well-being in the contexts of inequitable healthcare access and discrimination would inform care for those at marginalized intersections of identity (Institute of Medicine, 2003). Second, we focused on associations between sexual well-being and general perinatal grief, rather than specific domains of perinatal grief such as active grief, difficulty coping, and despair (Potvin et al., 1989). Although appropriate for an initial study, studying how specific aspects of perinatal grief relate to sexual outcomes could illuminate what parts of grief experiences to target post-loss. Third, we used a convenience sampling approach; those with more difficult recoveries post-pregnancy-loss may have been less willing to participate. Fourth, as guided by theory and prior research, our interpretations were rooted in perinatal grief preceding sexual well-being; however, because our data and analytical approach were correlational, future research should test the temporal order of these constructs. Finally, we focused on perinatal grief when it tends to be the strongest (i.e., in the first six months post-loss). Future studies, which look further out in time, may be helpful in terms of elucidating any between-person differences and potential links between persistent grief and couples' sexual well-being.

3.7 Conclusions

We found that higher perinatal grief related to four different facets of lower sexual well-being among couples at within- and between-person levels. Both fluctuations in perinatal grief from typical levels and experiencing higher perinatal grief on average across four months related to less positive and more negative sexual outcomes for both

members of a couple experiencing a recent pregnancy loss. Such results can inform better support for couples' sexual relationships post-loss; sexual health and well-being are crucial for overall health and relationship quality (Diamond & Huebner, 2012). Because "effective grieving brings us new resiliency" (Attig, 2011, p. 143), couples who grieve effectively after a pregnancy loss may find strength and healing in the wake of their sexual challenges.

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3.9 Tables

Table 3.9.1 *Sociodemographic Characteristics of the Sample (N = 109 couples)*

		N (%) or *M* (*SD*; actual range)	
Variable		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
Age (years)		31.58 (4.19; 20–41)	33.03 (4.73; 23–46)
Sex	Male	0 (0.0)	98 (89.9)
	Female	105 (96.3)	5 (4.6)
	Indeterminant or intersex	0 (0.0)	1 (0.9)
Gender[a]	Man	0 (0.0)	100 (91.7)
	Woman	101 (92.7)	1 (0.9)
	Non-binary	3 (2.8)	4 (3.7)
Transgender identity	Transgender	2 (1.8)	4 (3.7)
	Cisgender	96 (88.1)	93 (85.3)
	Additional/unsure/prefer not to answer	6 (5.5)	7 (6.5)
Relationship status[a,b]	Married	84 (77.1)	81 (74.3)
	Engaged	11 (10.1)	9 (8.3)
	Dating	2 (1.8)	0 (0.0)
Race/Ethnicity[a,c]	White	48 (44.0)	45 (41.3)
	English Canadian	35 (32.1)	37 (33.9)
	American	35 (32.1)	27 (24.8)
	Western/Eastern European	14 (12.8)	14 (12.8)
	Australian	5 (4.6)	7 (6.4)
	South/East/Southeast Asian	5 (4.6)	4 (3.7)
	Black/African American	5 (4.6)	2 (1.8)

Variable		*N* (%) or *M* (*SD*; actual range)	
		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
	Additional race/ethnicities[c]	8 (6.8)	9 (8.3)
Country of residence	Canada	50 (45.9)	
	United States	39 (35.8)	
	United Kingdom	9 (8.3)	
	Australia	6 (5.5)	
	New Zealand	1 (0.9)	
Household Income[d]		6.45 [~$100,000 to $119,999] (2.72; 1–11)	
Relationship length (years)		7.67 (4.22; 1.08–19.13)	
Number of children		0.60 (0.95; 0–6)	
Couple relationship type	Same-sex (female–female)	5 (4.6)	
	Mixed-sex (female–male)	97 (89.0)	
	Mixed-sex (female–indeterminant or intersex)	1 (0.9)	
Weeks pregnant when loss occurred[e]	2 to 5	14 (12.8)	
	6 to 10	51 (46.8)	
	11 to 15	26 (23.9)	
	16 to 20	2 (1.8)	
	21 to 25	5 (4.6)	

Variable		*N* (%) or *M* (*SD*; actual range)	
		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
	26 to 30	3 (2.8)	
	36 to 40	3 (2.8)	
Weeks since loss[e]		9.83 (5.59; 1.14–24.86)	
Pregnancy losses in last three months[e]	1	95 (87.2)	
	2	8 (7.3)	
	4	1 (0.9)	
Pregnancy losses in lifetime[e]	1	58 (53.2)	
	2	26 (23.9)	
	3	7 (6.4)	
	4	8 (7.3)	
	5 or more	6 (5.5)	

Note. M = mean. *SD* = standard deviation. *GDI* = gender diverse individuals. % = percentage of sample. Total of percentages may be less than 100% (and total of counts may be less than 109) due to missing data. [a]Multiple select item; [b]Partners may have reported different relationship statuses due to missing data or disagreement; [c]Includes the following (each was endorsed less than 1.9% of the time): Québécois or French Canadian; Indigenous, First Nations, Métis, or Inuit, African; Middle Eastern/Central Asian; Latin American; Hispanic; Biracial/Multiracial; and write-in categories; [d]Options included 1 *($0–$19,999*), 2 (*$20,000–$39,999*), 3 *($40,000–$59,999*), 4 *($60,000–$79,000*), 5 *($80,000–$99,999*), 6 *($100,000–$119,999*), 7 (*$120,000–$139,999*), 8 *($140,000–$159,999*), 9 (*$160,000–$179,999*), 10 (*$180,000–$199,999*), and 11

(*$200,000 and over*); [e]Reported by women and GDI who were pregnant.

Table 3.9.2 *Standard Deviations, Intraclass Correlations (Diagonal), and Correlations Among Factor Scores at Within-Person (Below Diagonal) and Between-Person Levels (Above Diagonal)*

Variable	1	2	3	4	5	6	7	8	9	10
1. Satisfaction-P	.34	.79**	.65**	.22*	-.75**	-.61**	-.73**	-.66**	-.51**	-.31**
2. Satisfaction-NP	.70**	.54	.47**	.24*	-.60**	-.65**	-.47**	-.51**	-.36**	-.18
3. Desire-P	.73**	.63**	.61	.02	-.47**	-.27**	-.56**	-.40**	-.28**	-.15
4. Desire-NP	.40**	.48**	.38**	.74	-.14	-.24*	-.12	-.09	-.10	-.01
5. Function P-P	-.75**	-.66**	-.67**	-.41**	.28	.78**	.70**	.54**	.57**	.30**
6. Function P-NP	-.65**	-.67**	-.58**	-.48**	.69**	.26	.44**	.47**	.38**	.04
7. Distress-P	-.70**	-.63**	-.65**	-.35**	.73**	.53**	.29	.69**	.62**	.48**
8. Distress-NP	-.61**	-.64**	-.57**	-.45**	.63**	.66**	.69**	.36	.44**	.52**
9. Grief-P	-.73**	-.65**	-.74**	-.46**	.77**	.67**	.73**	.65**	.63	.45**
10. Grief-NP	-.72**	-.73**	-.66**	-.49**	.69**	.68**	.66**	.70**	.73**	.55
Within-person										
SD	0.89	0.79	0.73	0.44	0.61	0.51	0.57	0.51	0.39	0.35
Between-person										
SD	0.64	0.85	0.91	0.75	0.38	0.30	0.36	0.38	0.51	0.39

Note. * $p < .05$; ** $p < .01$. *N* within-person = 436 monthly observations; *N* between-person = 109 couples. *SD* = standard deviation, Satisfaction = sexual satisfaction, desire = sexual desire, Function P = sexual function problems, Distress = sexual distress, Grief = perinatal grief, P = women and gender diverse individuals who were *P*regnant, NP = men, women, and gender diverse individuals who were *N*ot *P*regnant. Means are at or near zero (.00–.01) because they were specified as centered, latent variables, thus they are not included in this table; however, a table with means derived from averaged, non-latent

scores is included on the study's OSF page.

Table 3.9.3 *Results of Multilevel Structural Equation Model with Perinatal Grief Predicting Sexual Well-Being at the Within-Person and Between-Person Levels*

	Within-person							
	Satisfaction		Desire		Function Problems		Distress	
	P	NP	P	NP	P	NP	P	NP
Perinatal grief								
P	**-1.00***	**-0.50***	**-1.02*[a]**	**-0.26***	**0.87***	**0.47***	**0.81***	**0.40***
	(-0.44)	**(-0.25)**	**(-0.51)**	**(-0.23)**	**(0.56)**	**(0.36)**	**(0.55)**	**(0.30)**
NP	**-1.00***	**-1.23***	**-0.51***	**-0.39***	**0.48***	**0.59***	**0.43***	**0.70***
	(-0.39)	**(-0.54)**	**(-0.27)**	**(-0.31)**	**(0.28)**	**(0.40)**	**(0.26)**	**(0.47)**
Weeks since loss	0.00	0.00	0.00	0.00	0.00	0.00	**0.01***	0.00
	(0.02)	(0.02)	(-0.02)	(-0.03)	(-0.04)	(-0.06)	**(0.08)**	(0.01)
R^2	.60	.56	.57	.26	.63	.52	.57	.53

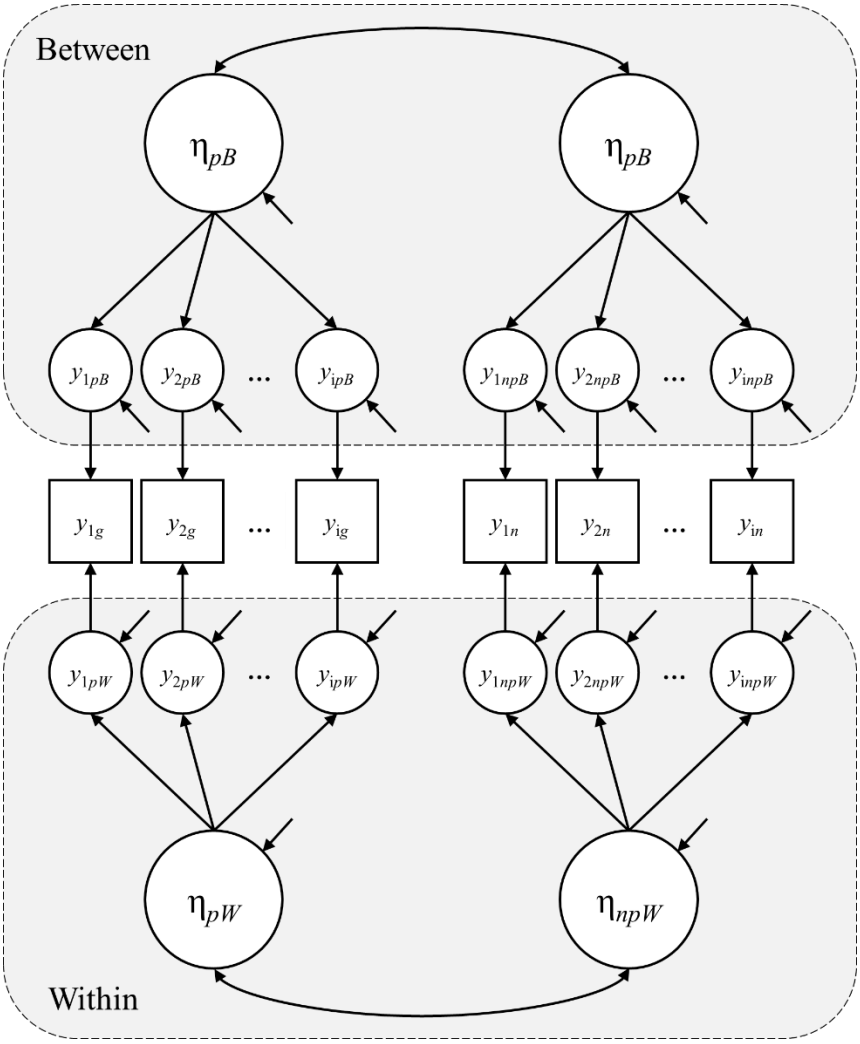
	Between-person							
	Satisfaction		Desire		Function Problems		Distress	
	P	NP	P	NP	P	NP	P	NP
Perinatal grief								
P	**-0.58***	**-0.61***	**-0.49***	-0.19	**0.41***	**0.27***	**0.36***	**0.20***
	(-0.44)	**(-0.34)**	**(-0.26)**	(-0.12)	**(0.52)**	**(0.43)**	**(0.48)**	**(0.25)**
NP	-0.16	-0.02	-0.06	0.10	0.06	-0.12	**0.23***	**0.40***
	(-0.09)	(-0.01)	(-0.02)	(0.05)	(0.05)	(-0.15)	**(0.24)**	**(0.39)**
R^2	.25	.13	.08	.02	.31	.16	.40	.30

* $p < .05$. Standardized regression coefficients in parenthesis. Statistically significant

regression coefficients bolded. *N* within-person = 436 monthly observations; *N* between-person = 109 couples. P = women and gender diverse individuals who were *P*regnant, NP = men, women, and gender individuals who were *N*ot *P*regnant. [a] Modeled as a random slope.

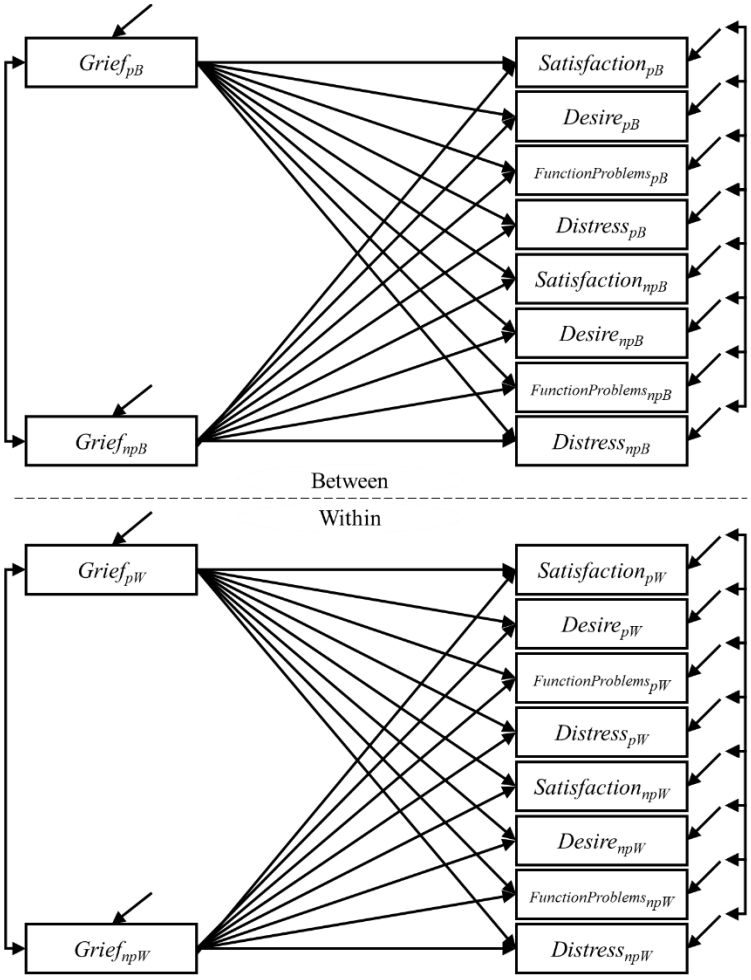
3.10 Figures

Figure 3.10.2 *Example Multilevel Dyadic Measurement Model*



Note. Upper portion depicts the between-subjects factor models; middle portion depicts latent mean centering; lower portion depicts the within-subjects factor models. *B* = between-subjects, *W* = within-subjects, *p* = women and gender diverse individuals who were *P*regnant, *np* = men, women, and gender diverse individuals who were *N*ot *P*regnant, η = latent factor with *y* variables as indicators. Residual covariances, intercepts, and auxiliary variables not shown for parsimony.

Figure 3.30.2 *Conceptual Model of Perinatal Grief Predicting Sexual Well-Being Outcomes*



Note. The upper portion depicts the between-person model and lower portion depicts the within-person model. *B* = between-person, *W* = within-person, *p* = women and gender diverse individuals who were *P*regnant, *np* = men, women, and gender diverse individuals who were *N*ot *P*regnant. Covariates and random slopes not shown for parsimony.

3.11 Transition to Study 3

In Study 2 (Chapter 3), my aim was to understand to what extent perinatal grief predicted sexual well-being for couples after a recent pregnancy loss. I tested whether higher than typical perinatal grief levels for an individual (relative to their own average) related to lower than typical sexual well-being for them and their partner. I also tested whether individuals with higher average levels of perinatal grief across the study period (relative to their peers) had lower average sexual well-being and had partners with lower average sexual well-being.

I found evidence of links between higher perinatal grief and lower sexual well-being. When either partner reported greater than typical perinatal grief, both couple members reported lower than typical sexual satisfaction and sexual desire, and greater than typical sexual function problems and sexual distress. Thus, monthly fluctuations in perinatal grief were tied to monthly fluctuations in sexual well-being. Also, women and gender diverse individuals who were pregnant who had the highest average perinatal grief levels reported the lowest average sexual satisfaction levels, the highest sexual function problem levels for them and their partner, and the highest average sexual distress levels. Moreover, men, women, and gender diverse individuals who were not pregnant who had the highest average perinatal grief levels reported the highest average sexual distress levels for them and their partner. Thus, building on evidence from Study 1 that couples are at risk for lower sexual satisfaction and greater sexual desire discrepancies post-loss compared to controls (but not higher function problems or sexual distress, nor lower sexual frequency), Study 2 added evidence that higher perinatal grief is linked to lower

levels of several sexual well-being domains. Specifically, higher perinatal grief was linked with lower sexual satisfaction and sexual desire, and higher sexual function problems and sexual destress, both for oneself and for one's partner.

Despite their contributions to the literature, Studies 1 and 2 did not examine how sexual well-being might change in the months after a pregnancy loss. Indeed, Study 1 was cross-sectional, and although Study 2 was longitudinal, it focused on predicting month-to-month variability in sexual well-being post-loss rather than understanding its systematic changes (Bolger et al., 2003), as are captured through growth models (Wang & Wang, 2019). Knowledge of whether various sexual well-being domains improve, remain stable, or decline after a pregnancy loss is essential for practitioners to inform couples' expectations about post-loss sexual well-being. I know of no prior longitudinal studies in the field that examined such changes. Accordingly, in Study 3, I examined both couple members' sexual well-being trajectories, including sexual satisfaction, sexual desire, and sexual distress. Further, building on my work in Study 2 on perinatal grief, I examined whether individuals with higher perinatal grief levels shortly after the pregnancy loss (relative to their peers) had less growth in their sexual well-being for themselves and their partners. To provide context about perinatal grief beyond the single prior study that included only two points of observation (Volgsten et al., 2018), in Study 3, I also examined couple members' perinatal grief trajectories. To provide transparency in my work, I preregistered my hypotheses in Study 3 on the Open Science Framework.

In Study 1, I found no differences in sexual function problems or sexual frequency between couple members with and without a recent pregnancy loss, which

provided evidence these constructs may be less likely to change post-loss. Thus, to be parsimonious in Study 3, my sexual well-being outcomes included the trajectories of both couple members' sexual satisfaction, sexual desire, and sexual distress, which altogether captured positive and negative aspects of sexual well-being (Dubé et al., 2020).

3.11.1 References

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CHAPTER 4: TRAJECTORIES OF SEXUAL WELL-BEING AND LINKS WITH GRIEF AFTER A RECENT PREGNANCY LOSS: A DYADIC LONGITUDINAL STUDY

The manuscript prepared for this study is presented below. Readers are advised that David B. Allsop, under the supervision of Dr. Natalie Rosen, was responsible for the preparation and execution of this study. He was the lead on the initial draft of the manuscript and received and incorporated feedback from his coauthors. The manuscript underwent peer-review, and required one revision, which David led the response to, prior to the manuscript's acceptance in *The Journal of Sexual Medicine* on June 18, 2024. The full reference for this manuscript is:

Allsop, D.B., Péloquin, K., Cockwell, H., & Rosen, N. O. (in press). Trajectories and links between sexual well-being and grief after a recent pregnancy loss: A dyadic longitudinal study. *The Journal of Sexual Medicine*.

4.1 Abstract

Background. Pregnancy loss affects 1 in 4 women and is linked with poorer overall health and relationship outcomes. Despite sexual well-being's importance to health, how sexual well-being changes across time after a pregnancy loss, and what might predict such changes, like perinatal grief, has never been examined, leaving practitioners and couples without knowledge of what to expect sexually post-loss.

Aims. We aimed to (1) examine how sexual satisfaction, sexual desire, sexual distress, and perinatal grief change from 10 to 25 weeks post-loss for both couple members and (2) examine if perinatal grief levels at 10 weeks post-loss predict trajectories of sexual well-being outcomes.

Methods. Women and gender diverse individuals who were pregnant when a pregnancy loss occurred (within the last 4 months) and men, women, and gender diverse partners who were not pregnant (N = 132 couples) independently completed four monthly assessments of sexual well-being and perinatal grief.

Outcomes. Sexual satisfaction, sexual desire, sexual distress, perinatal grief.

Results. Dyadic Growth modeling indicated that, from 10 to 25 weeks post-loss, both couple members' sexual satisfaction increased, and their sexual desire remained stable, sexual distress decreased for partners who were not pregnant when the loss occurred but remained stable for partners who were pregnant, and both couple members' perinatal grief decreased. Perinatal grief levels at 10 weeks post-loss did not predict sexual well-being trajectories over time.

Clinical Implications. Given sexual well-being's dynamic nature, clinicians should regularly discuss sexuality with both couple members after their losses. As part of such discussions, clinicians could reassure couples about the recovery of their sexual relationships by sharing that, on average, sexual satisfaction, sexual desire, and sexual distress tend to improve or stay the same (rather than worsen) from 10 to 25 weeks post-loss. They can also share with couples that perinatal grief tends to decrease during this time and is unrelated to the trajectories of their sexual outcomes.

Strengths and limitations. This is the first study, to our knowledge, to examine how sexual well-being changes across time after a pregnancy loss and perinatal grief's role in such changes. The results may not generalize broadly as most couples were in mixed-gender/sex relationships, identified as White, and were relatively affluent.

Conclusions. From 10 to 25 weeks post-loss, both couple members tend to experience improvements in their overall sexual well-being and declines in their perinatal grief. Early perinatal grief levels and subsequent sexual well-being trajectories are seemingly unrelated.

Keywords. spontaneous abortion, pregnancy loss, miscarriage, sexual satisfaction, sexual desire, sexual distress, grief, perinatal grief, couples

4.2 Introduction

Pregnancy loss is common, affecting 1 in 4 women during their lives (Diamond & Diamond, 2016). Women[1] who have experienced pregnancy loss, compared to women who have not, face risks to their psychological and relationship well-being, such as higher symptoms of anxiety and depression and greater rates of relationships dissolution (Herbert et al., 2022; Shreffler et al., 2012). Sexual well-being has varying definitions (Mitchell et al., 2021), but frequently includes (Dubé et al., 2020) sexual satisfaction (how rewarding sex is relative to its costs; Lawrance & Byers, 1995), sexual desire (interest in sexual activity; Spector et al., 1996), and sexual distress (concern and worry about one's sexual relationship; Santos-Iglesias et al., 2020), and is a less-explored area of potential difficulty. The limited available studies suggest that pregnancy loss puts women at risk of lower quality sexual satisfaction (Hasanpour et al., 2019; Serrano & Lima, 2006), and overall sexual function (i.e., overall levels of difficulties with sexual response including sexual desire, arousal, orgasm, and pain; Francisco et al., 2014; Hasanpour et al., 2019), and puts their partners at risk of poorer sexual function (Zhang et al., 2016) and reduced sexual desire (Camacho-Ávila et al., 2023). However, these studies focused on the rare experience of recurrent miscarriage, which includes having three repeated miscarriages and affects 0.5% to 2.3% of women (for review see Rasmark

1. In our sample, couple members who were pregnant when a loss occurred included women and gender diverse individuals whereas prior works we cite included women only. Similarly, in our sample, couple members who were not pregnant when a loss occurred included men, women, and gender diverse individuals but the works we cite included men only. In our literature review and the reporting of our own sample, we endeavored to accurately represent the samples studied.

et al., 2017) or mostly used data from only one couple member, which does not consider the shared context of the loss or of sexuality. Nevertheless, recent evidence indicates that members of couples who experienced a recent pregnancy loss reported lower sexual satisfaction and greater sexual desire discrepancies between couple members compared to members of couples with no history of pregnancy loss (Chapter 2). Further, couples also face the difficulties of perinatal grief, or grief after a pregnancy loss, which is linked to lower sexual satisfaction, lower sexual desire, and higher sexual distress for both couple members (Chapter 3). Despite these recent studies, to our knowledge researchers have not examined how sexual well-being changes over time after a pregnancy loss, and what might predict such changes, such as perinatal grief. Such knowledge is essential for enabling practitioners to informing what couples what they might expect sexually post-loss, and for guiding them as they plan when and how to intervene to promote couples' sexual well-being during this difficult period. Thus, the first aim of our study was to examine how sexual satisfaction, sexual desire, and sexual distress changed across four months following a recent pregnancy loss for both members of a couple. The second aim was to examine how perinatal grief changed across this period and whether perinatal grief levels predicted sexual well-being trajectories over time.

Although sexual satisfaction (how rewarding sex is relative to its costs; Lawrance & Byers, 1995), sexual desire (interest in sexual activity; Spector et al., 1996), and sexual distress (concern, worry, and negative emotions about one's sexual relationship; Santos-Iglesias et al., 2020) are correlated, they are conceptually distinct. Because each facet reflets a unique subjective experience rooted in different intra- and interpersonal

processes (Rosen et al., 2020), each facet can be linked with distinct outcomes. For example, based on population estimates, low sexual satisfaction is common, whereas high sexual distress is not (Mitchell et al., 2013). As well, low sexual desire is not necessarily distressing or unsatisfying for individuals (Mitchell et al., 2013). As another example specific to pregnancy loss, individuals in couples who experienced a pregnancy loss in the last 4 months have reported lower sexual satisfaction but not lower sexual desire or higher sexual distress than those with no history of a pregnancy loss (Allsop, Huberman, et al., 2023). In addition, members of couples who had a pregnancy loss differed from their partner on sexual desire (i.e., those who were pregnant had significantly lower sexual desire than their partners), but not sexual satisfaction or sexual distress (Chapter 2) Couples' sexual satisfaction, sexual desire, and sexual distress could therefore each follow a trend of improving post-loss as couples recover from the loss and its emotional difficulties (e.g., grief, Volgsten et al., 2018) and physical demands (e.g., post-loss bleeding, surgery, side effects of treatment; Jurkovic et al., 2013), yet could do so in distinct ways both across facets of sexual well-being and between members of the couple. Currently, there is evidence that sexual well-being is likely to be lower shortly post-loss than before the loss, as evidenced by comparisons of sexual well-being between pregnancy loss and control samples (Allsop, Huberman, et al., 2023; Chapter 2; Hasanpour et al., 2019; Zhang et al., 2016). Yet, given the lack of longitudinal research on sexual well-being and pregnancy loss, including studies with data from both couple members, the trajectories of sexual well-being post-loss for couples are unknown.

Further, given the lack of longitudinal research, studies have not considered potential predictors of sexual well-being trajectories, which may be useful targets for intervention. Perinatal grief may be one such predictor. Perinatal grief includes symptoms such as depression, loneliness, fear, guilt, irritability, and feeling afraid to love (Potvin et al., 1989). One study using data from 103 women who experienced an early pregnancy loss and their male partners found that perinatal grief declined from one week to four months post-loss for both women and men Volgsten and colleagues (Volgsten et al., 2018). This study included only two time points and did not include couples whose losses occurred after 21 weeks gestation, thus limiting knowledge of potential non-linear changes in sexual well-being and of later loss experiences. Higher perinatal grief has also been linked to lower levels of sexual satisfaction and sexual desire and higher levels of sexual distress and sexual function problems (Chapter 3). These links were found when considering intrapersonal experiences (if someone who had higher perinatal grief than they usually did also had lower sexual well-being than usual) and when considering comparisons across individuals (someone who had higher average levels of their perinatal grief had lower average levels of their sexual well-being compared to others in the sample; Chapter 3).

In line with Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993) and prior theorizing that grief-like symptoms could interfere with sexuality (Jaffe & Diamond, 2011), perinatal grief could interfere with improvement in sexual well-being over time following a loss because of cognitive associations between the pain of their loss and sexuality. Specifically, grief can be disorienting and change how one views oneself

(Attig, 2011), and likewise views of the self affects one's sexuality and sexual relationships (Schnarch, 2009). Thus, changes to self-views because of perinatal grief could be linked with negative changes to sexual well-being over time or interfere with improvements. More severe perinatal grief may hinder one's capacity to reap potential benefits from one's sexual relationship (e.g., intimacy, pleasure) resulting in a lack of growth in sexual rewards and desire and the potential persistence of sexual worries and concerns. Importantly, perinatal grief is highest at 1 month post-loss, declines at similar rates from 1 to 3 months and 3 to 6 months post-loss, and then remains relatively stable from 6 to 12 months post-loss (Tseng et al., 2017). Thus, sampling couples' experiences in the first 6 months post-loss is optimal for observing potential links between perinatal grief and sexual well-being.

Changes to sexual well-being after a pregnancy loss may have broader implications for couples' coping and adjustment; sexuality is a central part of the human experience (World Health Organization, 2010) and sexual well-being is linked positively to overall health and relationship quality (Diamond & Huebner, 2012). Thus, information on such changes is essential for healthcare providers—who are a key first contact for couples after a pregnancy loss—to give effective intervention early after a pregnancy loss. Accordingly, in the current study, we tested the hypothesis that: (1) sexual satisfaction and sexual desire of both partners will increase over time (i.e., across a 4-month period post-loss); (2) sexual distress and perinatal grief of both partners will decline over time; and (3) higher baseline levels of both partners' perinatal grief will be linked with a weaker increase (less positive slopes) in both partners' sexual satisfaction

and sexual desire and a weaker decrease (less negative slopes) in both partners' sexual distress.

Characteristics of the loss and other demographics could play a role in sexual well-being post-loss: higher gestational age may add physical recovery demands that impact sexual well-being; prior pregnancy losses are known to increase the risk of poorer mental health in subsequent pregnancies (Blackmore et al., 2011) and such effects might spillover to current sexual well-being; the presence of children is a consideration given that couples' sexual well-being changes before and after having children (Rosen et al., 2020). Thus, we tested the hypothesis that (4) the associations of Hypothesis 3 will hold in the presence of covariates, including weeks pregnant when the loss occurred, number of lifetime losses, and the presence of other children.

Of note, although we expected improvements post-loss in all aspects of sexual well-being (increases in sexual satisfaction and sexual desire; declines in sexual distress), we were interested in whether changes in these aspects could be significantly different from zero for one aspect but not another, and/or for one partner but not the other. However, given the little longitudinal research on pregnancy loss and sexual well-being, we did not make formal hypotheses about potential differences in the significance of these changes between aspects of sexual well-being or between partners.

4.3 Materials and Methods

4.3.1 Participants and Procedure

Couples who experienced a pregnancy loss in the last 4 months were recruited from community and online sources from Canada, the United States, the United

Kingdom, Australia, and New Zealand. Recruitment included online methods (especially personalized messages from a team of undergraduate students to account/group admins on Instagram, Facebook, Twitter, and Reddit asking them to share our study materials) and in-person approaches (most predominantly, posters at a hospital and fertility clinic). Individuals were eligible to participate if they and their partner (1) had internet access, an email address, a device to complete online surveys, and were fluent in English, (2) were at least 18 years of age, (3) had been in a romantic relationship together for at least a year, (4) had one member of the couple experience a pregnancy loss in the last four months of their first contact with our research team, (5) both partners knew about the pregnancy before the loss, (6) did not have their pregnancy end because of an elective, non-medically recommended abortion, (7) did not have their pregnancy result in a live birth (i.e., no signs of life after delivery), (8) did not have their sexual functioning impaired by a self-reported major untreated mental or physical illness, and/or the treatment of that illness while participating, and (9) were not undergoing fertility treatment when the loss occurred or while participating in the study. Details on recruitment flow and statistical power (supplemental material), and prior publications with the dataset (pre-registration) are provided on the study's Open Science Framework (OSF) page (https://doi.org/10.17605/osf.io/65hsc). We used the full sample, except those who participated in the cross-sectional study only (see supplemental material on OSF). Of note, for the current sample and outcomes, we had high power (90%) to detect small to medium sized slope values (aim 1) and medium sized actor and partner effects from

perinatal grief intercepts to sexual well-being outcomes (aim 2). See Table 4.9.1 for sociodemographics.

This study was part of a larger project on pregnancy loss and sexual relationships. Data were collected from July 1, 2021, to August 10, 2023. For reference, the data used in this chapter is the same dataset used in Chapter 3, except that it includes additional participants. After providing informed consent, participants took a baseline survey and three follow-up surveys independently from their partner. Surveys were associated with individual email addresses and participants were instructed to respond without consulting their partner. After completing their baseline survey, participants were sent the follow-ups one, two, and three months after completing the baseline survey (i.e., regardless of when they completed a subsequent survey); participants were allowed four weeks to complete each survey. On average, participants completed the four surveys respectively at 10-, 16-, 20-, and 25-weeks post-loss. Of the 405 couples screened for eligibility via phone or a screening survey on Qualtrics, 160 met eligibility criteria, of whom 147 had both partners complete their baseline surveys. Of these 147 couples, 15 participated prior to when the follow-up surveys were included as part of the study; thus, the current study uses data from 132 couples (for further details, see study OSF page). Although baseline data from all 132 couples were used, only follow-up responses where a couple continued to meet eligibility criteria (e.g., were not pregnant, were not undergoing fertility treatment) were included in the analysis; missing data were handled accordingly (see analysis section). For the follow-ups, retention (one minus *n* couples not meeting eligibility criteria divided by *n* total couples) was 87.1% at 1 month, 75.8% at 2 months,

and 66.7% at 3 months. The two reasons that a couple's follow-ups were not retained were that a couple became pregnant (40 total couples: 17 at 1-month follow-up, 12 at 2-month follow-up, 11 at 3-month follow-up) or underwent medically assisted reproduction (4 total couples: 3 at 3-month follow-up, 1 at 4-month follow-up). We compensated couples $178 CDN ($89 individually) for their participation. The research ethics board at the IWK Health Centre in Halifax, Nova Scotia approved the study.

4.3.2 Measures

Sexual Satisfaction. Sexual Satisfaction was assessed with the Global Measure of Sexual Satisfaction (GMSEX; Lawrance & Byers, 1995). Participants answered, "How would you describe your overall sexual relationship with your partner during the last 4 weeks?" on a 7-point Likert scale for five bipolar pairs of words (e.g., *very bad* and *very good*). The mean of the items was taken, and higher scores reflected greater sexual satisfaction. This measure has shown strong psychometric properties (Mark et al., 2014) and we found evidence of excellent reliability for participants who were pregnant (α across time points = .91–.93) and participants who were not (α across time points = .93–.96).

Sexual Desire. Sexual Desire was assessed using the Dyadic Sexual Desire subscale of the Sexual Desire Inventory (SDI-2; Spector et al., 1996). This subscale includes seven items on desire for partnered sexual activity (e.g., "How strong is your desire to engage in sexual activity with a partner?"). Participants rated items on 8- or 9-point scales, where low anchors indicated low sexual desire (e.g., *not at all*, *no desire*) and high anchors indicated high sexual desire (e.g., *more than once a day*, *strong desire*).

The mean of the items was taken, and higher scores reflected greater desire for partnered sexual activity. This measure has shown strong psychometric properties (Allsop, Huberman, et al., 2023) and we found evidence of excellent reliability for participants who were pregnant (α across time points = .88–.91) and participants who were not (α across time points = .85–.88).

Sexual Distress. Sexual Distress was assessed using the Sexual Distress Scale—Short Form (SDS-SF; Santos-Iglesias et al., 2020). This scale includes five items on the frequency of bothersome or distressing sexual problems in the last four weeks (e.g., "How often did you feel worried about sex?"). Participants rated items on a 5-point scale (0 = *never* to 4 = *always*). The mean of the items was taken, and higher scores reflected greater sexual distress. This measure has strong psychometric properties (Rosen et al., 2018) and we found evidence of excellent reliability for participants who were pregnant (α across time points = .89–.91) and participants who were not (α across time points =.88–.93)

Perinatal Grief. Perinatal Grief was assessed using the short Perinatal Grief Scale (PGS; Potvin et al., 1989). Participants rated 32 items on perinatal grief (e.g., "I am grieving for the baby") on a 5-point Likert scale (1 = *strongly agree,* 5 = *strongly disagree*). Items were reversed-scored where required and the mean of the items was taken, and higher scores reflected more intense grief. This measure has been validated (Setubal et al., 2021) and we found evidence of excellent reliability for participants who were pregnant (α across timepoints = .95–.96) and participants who were not (α across timepoints = .95–.96). (Details on all measures are on the study's OSF page).

Covariates. Covariates were single-item measures, including the number of weeks pregnant when the loss occurred, the number of lifetime pregnancy losses experienced (for women and gender diverse individuals who were pregnant when the loss occurred), and whether a couple has child(ren) or not (1 = yes, 0 = no).

4.4 Data Analysis

We preregistered the study's hypotheses on the study's OSF page and posted our de-identified data and analysis files there. To test hypotheses 1 and 2, we constructed four separate dyadic growth curve models for each sexual well-being facet (i.e., satisfaction, desire, distress) and perinatal grief. We treated dyads as distinguishable based on who was pregnant when the pregnancy loss occurred, referred to as women and gender diverse individuals who were pregnant, and who was not pregnant when the loss occurred, referred to as men, women, and gender diverse individuals who were not pregnant. This approach reflects the genders of our participants and our efforts to use gender-additive language which is both inclusive and preserves the experiences of womanhood and manhood (see Brotto & Galea, 2022). We estimated all models in Mplus (8.6; Muthén & Muthén, 1998-2017) and used a multilevel framework that accounted for heterogeneity in survey completion times by regressing time since the loss on outcome variables (e.g., some couples completed the study from 1 to 4 months post-loss whereas others

completed it from 3 to 6 months post-loss).[2] To explore non-linear changes in our outcomes, we initially included quadratic slope terms in our models; however, because terms were all non-significant, we subsequently removed them for parsimony. We used a Bayesian estimator in our models given their complexity. Model fit statistics are not available for the types of models we ran, we therefore do not report them. We included principal components as auxiliary variables in the models to handle missing data (Howard et al., 2015) (average data present across all variables across 4 surveys of data = 74%, minimum present = 73%). Also, we centered our time variable such that intercept values represented participants' scores when they did their baseline (first) survey (about 10 weeks post-loss, on average). We included random effects for both intercepts and slopes in our models. As an example, variance in a random parameter (a specific random intercept or random slope) for partners who were pregnant indicated that, for any given partner who was pregnant, their parameter differed (varied) from the same parameter of partners who were pregnant in other couples. A similar interpretation would exist for a

2. As proposed in our pre-registration, we initially tried constructing single-level growth models that used a special feature of Mplus known as "TSCORES", which provides accurate estimates of latent growth trajectories despite variation in survey response times. However, unexpectedly, the single-level models utilizing this TSCORES capability had difficulty converging. We could have made single-levels models that did not use this feature, but this would have ignored heterogeneity in the time from their losses when individuals finished their surveys and would have biased our estimates. Thus, we took an alternative approach, where we constructed growth models in a multilevel structural equation model framework that enabled us to (a) account for heterogeneity in survey responses times, and (b) have our models converge. Besides this change to our preregistered analysis approach, the steps in our analysis matched those outlined in our pre-registration.

specific parameter for a partner who was not pregnant, with the comparison being partners who were not pregnant in other couples.

To test hypothesis 3, we combined each of the three sexual well-being growth curve models with the perinatal grief growth curve model and regressed both partners' sexual well-being slopes on both partners' perinatal grief intercepts (three combined models in total). To test hypothesis 4, we added our covariates into the models as predictors of sexual well-being slopes.[3]

4.5 Results

Briefly, in terms of sociodemographics (see Table 4.9.1), participants who were pregnant all indicated their sex as female and their gender identity as woman (97%) or non-binary (2.3%). Participants who were not pregnant indicated their sex as male (95.5%), female (3.8%), and indeterminant or intersex (0.8%), and their gender identity as man (97%), woman (0.8%), non-binary (1.5%), or additional gender identities (1.5%). On average, participants were in their early 30's and had been together with their partner for 7.73 years (*SD* = 4.24). The largest proportion of couples experienced losses before the 16th week of pregnancy (84.8%), with some (13.6%) having losses later, up until 36 to 41 weeks. For just over half of couples (58.3%), this pregnancy loss was their first. Totals of sociodemographic characteristics are not always 100% due to missing data or because an item was a multi-select question.

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3. We did not include covariates when examining changes in slopes (Hypothesis 1 and 2) given we were interested in the raw (rather than adjusted) growth trajectories across time.

4.5.1 Hypothesis 1: Increases in Sexual Satisfaction and Sexual Desire

In support of our first hypothesis, we found that sexual satisfaction of both partners significantly increased across the four monthly surveys. On average, participants who were pregnant and participants who were not pregnant respectively had sexual satisfaction levels of 4.95 and 5.02 (on a 1 to 7 scale) at 10 weeks post-loss, and respectively experienced a .03 and .02 unit increase in their sexual satisfaction each week after the pregnancy loss (increases of 0.45 and 0.30 units over the study period). Thus, on average from 10 to 25 weeks post-loss, participants who were pregnant grew from 66% to 73% of the maximum sexual satisfaction level, while participants who were not pregnant grew from 67% to 72%[4]. As detailed in Table 4.9.2, we found meaningful variability in sexual satisfaction intercepts for both couple members and for the sexual satisfaction slope of participants who were pregnant, but not their partners who were not pregnant. (Using Bayesian estimation, variances are always statistically significant; as per Asparouhov and Muthén (2022), Z-values of random variability coefficients that are greater than three indicate meaningful variability). Thus, initial sexual satisfaction levels and increases in sexual satisfaction for participants who were pregnant differed across couples. Note that the increases varied in their magnitude but were still primarily increases rather than decreases given the small size of the slope variance relative to the slope itself.

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[4] These percentages represent the Percent of Maximum Possible (POMP), which is a useful metric for communicating how close one's score is to the highest possible scoring threshold. As described by Cohen et al. (1999), POMP = [(observed score – minimum possible score)/(maximum possible score – minimum score)] × 100.

Contrary to our hypothesis, we found that the sexual desire of both partners did not significantly change across the four monthly surveys. On average, we found that participants who were pregnant and participants who were not pregnant respectively had sexual desire levels of 4.29 and 5.26 (on a 0 to 8 scale) at 10 weeks post-loss and that both couple members experienced no changes in their sexual desire each week after the pregnancy loss. For both couple members, we found meaningful variability in sexual desire intercepts and sexual desire slopes. Thus, initial sexual desire levels and changes to sexual desire differed across couples. Note that sexual desire changes were still primarily near zero given the small size of the slope variances relative to the slopes themselves.

4.5.2 Hypothesis 2: Declines in Sexual Distress and Perinatal Grief

In support of our second hypothesis, we found that the sexual distress of participants who were not pregnant significantly declined across the four monthly surveys (on average, 10 to 25 weeks post-loss); however, contrary to our hypothesis, the sexual distress of participants who were pregnant did not change. On average, participants who were pregnant and participants who were not pregnant respectively had sexual distress levels of 1.14 and 0.97 (on a 0 to 4 scale) at 10 weeks post-loss, and participants who were not pregnant experienced a .01 unit decrease in their sexual distress each week after the pregnancy loss (a decrease of 0.15 units over the study period). Thus, on average from 10 to 25 weeks post-loss, participants who were not pregnant decreased from 24% to 21% of the maximum sexual distress level. We found meaningful variability in sexual distress intercepts of both couple members and for the sexual distress slope of participants who were pregnant, but not for the slope of

participants who were not pregnant. Thus, initial sexual distress levels and changes in sexual distress for participants who were pregnant differed across couples. Note that the changes varied in their magnitude but were still near zero rather than increases or decreases given the small size of the slope variance relative to the slope itself.

Also, in support of our second hypothesis, we found that the perinatal grief of both partners significantly declined across the four monthly surveys (see Figure 4.10.1). On average, participants who were pregnant and partners who were not pregnant had perinatal grief levels of 2.65 and 2.09 (on a 1 to 5 scale) at 10 weeks post-loss and experienced a .03 and .01 unit decrease in their perinatal grief each week after the pregnancy loss, respectively (decreases of 0.45 and 0.15 units over the study period). Thus, on average from 10 to 25 weeks post-loss, participants who were pregnant decreased from 41% to 30% of the maximum perinatal grief level, while participants who were not pregnant decreased from 27% to 24%. We found meaningful variability in perinatal grief intercepts of both couple members but not for the perinatal grief slopes of either couple member. Thus, initial perinatal grief levels of the two couple members differed across couples, whereas declines in perinatal grief over time of the two couple members were experienced similarly for all couples.

4.5.3 Hypothesis 3 and 4: Perinatal Grief Intercepts as Predictors of Sexual Well-Being Slopes

Our results did not support Hypothesis 3, where we expected that perinatal grief intercepts would predict sexual well-being slopes. As detailed in Table 4.9.3, neither

couple member's perinatal grief intercepts were associated with either couple member's slopes for sexual satisfaction, sexual desire, or sexual distress.

Our results also did not provide a basis for testing Hypothesis 4, where we expected that associations between perinatal grief intercepts and sexual well-being slopes would hold in the presence of covariates. Given there were no significant links found in Hypothesis 3, Hypothesis 4 is inconclusive (see Table 4.9.3 for details).

4.6 Discussion

In the current study, we examined whether sexual well-being and perinatal grief improved across a 4-month period for both members of a couple after a recent pregnancy loss and whether both couple members' higher levels of perinatal grief at 10 weeks post-loss were linked with less improvement in their sexual well-being from 10 to 25 weeks post-loss. From 10 to 25 weeks post-loss, both couple members' sexual satisfaction increased, and their sexual desire remained stable. Further, sexual distress decreased for partners who were not pregnant when the loss occurred but evidence of declines in sexual distress for partners who were pregnant was inconclusive. Both couple members' perinatal grief decreased. Unexpectedly, perinatal grief levels at 10 weeks post-loss did not predict sexual well-being trajectories. This study is the first to our knowledge to document patterns of change in couples' sexual well-being after a recent pregnancy loss and to consider the role of perinatal grief in such changes. Previous conceptualizations of pregnancy loss experiences have emphasized understanding them through describing the experiences around (unmet) expectations of having children and of parenthood (Diamond & Diamond, 2016). Given our findings, such theoretical models could consider not just

reproductive expectations, but expectations related to sexual well-being, too. Findings can guide practitioners as they discuss with couples what they might expect sexually post-loss.

4.6.1 Changes in Sexual Well-Being and Perinatal Grief from 10 to 25 Weeks Post-Loss

Both Couple Members' Sexual Satisfaction Increased. On average, at 10-weeks post-loss, both couple members had moderate sexual satisfaction, which showed a linear increase to 25-weeks post-loss, as we expected. Based on credible intervals of sexual satisfaction slopes, individuals in the population who are pregnant when a pregnancy loss occurs would generally be expected to experience a 3% to 12% increase in sexual satisfaction. Individuals in the population who are not pregnant when a loss occurs would be generally expected to experience a 0.3% to 11% increase in sexual satisfaction.

Because participants' sexual satisfaction levels at 25-weeks post-loss were similar to those in community samples (Chapter 2; Schwenck et al., 2020), it is plausible that the increased sexual satisfaction for both couple members reflected a return to their baseline levels before the loss. In qualitative work, some individuals have reported finding new positive meanings from sex after a pregnancy loss (Schwenck et al., 2023) such as "greater bonding, affection and empathy…and defined their sexual relationships as more satisfying than before losing the infant" (Camacho-Ávila et al., 2023, p. 41). Thus, it is also possible that couples' sexual satisfaction increased post-loss because they found new rewards and connection from sex as they healed together from this experience.

Lack of Evidence for Change in Both Couple Members' Sexual Desire. On average, at 10-weeks post-loss, women, and gender-diverse individuals who were pregnant when the loss occurred and men, women, and gender-diverse individuals who were not pregnant had moderate sexual desire. Past this time point, there was insufficient evidence to claim an increase in both couple members' sexual desire. Based on credible intervals of sexual desire slopes, individuals in the population who are pregnant when a pregnancy loss occurs would generally be expected to experience changes ranging from a 1% decline to a 6% increase in sexual desire. Individuals in the population who are not pregnant when a loss occurs would generally be expected to experience changes ranging from a 5% decline to a 2% increase in sexual desire. Participants' sexual desire levels at 25-weeks post-loss were similar to those in a community sample (Chapter 2).

This lack of an average increase in sexual desire was surprising—we expected that sexual desire would be lower at 10-weeks post-loss than at 25-weeks post-loss given the substantial physical and emotional tolls of pregnancy loss that occur shortly after a loss yet ease with time (Jurkovic et al., 2013; Volgsten et al., 2018). Because our study was of couples in committed relationships who were both willing to participate, our sample may have been biased toward more relationally satisfied couples. More satisfied partners may be more likely to feel supported by and close to one another during their healing post-loss, which may have helped them maintain stable sexual desire (or protect against its declines). Indeed, sexual desire is rooted in cognitive-motivational factors (Spector et al., 1996) like the relational context of one's romantic relationship (Brotto & Smith, 2014). Future work could formally investigate the potential roles of relational

contexts (e.g., relationship satisfaction, partner responsiveness and engagement) in maintaining sexual desire after pregnancy loss.

Partners Who Were Not Pregnant Declined in Their Sexual Distress. On average, at 10-weeks post-loss, both couple members had low sexual distress, which remained the same until 25-weeks post-loss for women and gender diverse individuals who were pregnant and showed a linear decrease to 25-weeks post-loss for men, women, and gender diverse individuals who were not pregnant. Based on credible intervals of sexual distress slopes, individuals in the population who are not pregnant when a pregnancy loss occurs would generally be expected to experience a 1% to 9% decline in sexual distress. In contrast, individuals in the population who are pregnant when a loss occurs would generally be expected to experience changes ranging from a 9% decline to a 2% increase in sexual distress.

Similar to sexual satisfaction, it is possible that the decreased sexual distress for partners who were not pregnant were a return to their baseline levels before the loss occurred; sexual distress levels in community samples were similar to the levels reported at the final time-point in our study (Chapter 2; Schwenck et al., 2020). Partners who were not pregnant may have felt less distressed about sex across time as they had reassurances that things were alright for them sexually (e.g., the partner who was pregnant was physically recovering, they may have resumed regular partnered sexual activity), which is consistent with their sexual satisfaction also increasing during this period. In contrast, for those who were pregnant, their levels of sexual distress reported at 10-weeks post-loss may not have declined on average as they may have had more worries and concerns

related to getting pregnant again. Becoming pregnant again soon after a pregnancy loss is common: 76.6% of couples who have an early pregnancy loss try to become pregnant again within 3 months (Schliep et al., 2016), and this could contribute to maintaining some degree of sexual distress among those who were previously pregnant. Also, for an individual who was pregnant, concern that their body was unable to carry a pregnancy to term may have translated to concern about their body during sex, thus maintaining sexual distress. Altogether, that sexual satisfaction, sexual desire, and sexual distress did not all follow similar patterns of change post-loss aligns with the notion that these facets are distinct (Dubé et al., 2020; Rosen et al., 2020) and clinicians should ask about each one.

Both Couple Members' Perinatal Grief Declined. On average, at 10-weeks post-loss, women and gender-diverse individuals who were pregnant when the loss occurred and men, women, and gender-diverse individuals who were not pregnant had medium and low perinatal grief, respectively, which showed linear declines to 25-weeks post-loss, as we expected. Based on credible intervals of perinatal grief slopes, individuals in the population who are pregnant when a pregnancy loss occurs would be generally expected to experience a 6% to 13% decrease in perinatal grief. Individuals in the population who are not pregnant when a loss occurs would be generally expected to experience a 2% to 11% decrease in perinatal grief. Per the perinatal grief categorization provided by Lasker and Toedter (2000, p. 354), perinatal grief levels at the final time-point in our study for partners who were pregnant and partners who were not would be considered average and just below average, respectively.

Our finding that both couple members' perinatal grief declined from 10 to 25 weeks post-loss aligns with similar findings by Volgsten and colleagues (2018) who found that perinatal grief declined from one week to four-months post-loss. By including 4 time-points, our results indicate that perinatal grief follows a linear (rather than quadratic) pattern of change, which indicates that changes to perinatal grief, on average, follow a consistent pattern of decline. In addition, our study was inclusive of those who had late pregnancy losses, which improves our study's generalizability. Referencing the Dual Process Model of Coping with Bereavement (Stroebe & Schut, 2016), as time elapses, people may shift away from maladaptive (e.g., avoidance) and towards more adaptive (e.g., reappraisal) coping that allows them to feel more control over their loss, which could help them heal from their grief (Reynolds & Gruhn, 2023, p. 7).

4.6.2 Perinatal Grief at 10-weeks Post-Loss Was Not Linked with Changes in Sexual Well-Being

Contrary to what we expected, both couple members' higher levels of perinatal grief at 10 weeks post-loss were not linked with changes from 10 to 25 weeks post-loss in either couple members' sexual satisfaction, sexual desire, or sexual distress. Based on Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993) and prior theorizing about grief and sexuality (Jaffe & Diamond, 2011), we had expected that couple members' levels of perinatal grief shortly after their loss would set the stage for future changes in their sexual well-being. These inconclusive results could be because our measure of perinatal grief (Potvin et al., 1989) only captured individual grief processes rather than processes that also consider the partner's grief or the couple overall.

Indeed, couple-level grief processes—such as how well one's partner supports one's grief or the extent that couple members grieve together—may be a key to understanding changes in sexual well-being given that sexual well-being is a dyadic process (Impett et al., 2014). Future research could test this possibility by replicating the current study with a measure of grief focused on couple interactions.

Importantly, we do not suggest that perinatal grief and sexual well-being are entirely unrelated, but rather that their association might depend on the degree to which they vary together at the same point in time. Prior work has indicated that couple members' higher average levels of perinatal grief (across a four-month period) was significantly related to both couple members' lower average levels of sexual well-being (Chapter 3). Moreover, monthly fluctuations in perinatal grief and sexual well-being were similarly linked (Chapter 3). Thus, someone who has lower perinatal grief in a given week may experience higher sexual well-being in that week; but as the current data suggests, someone who has lower perinatal grief at just one time point early on after their pregnancy loss may not see a sustained linear increase in sexual well-being that continues for months. In practice, rather than addressing perinatal grief all at once, couples likely need to address perinatal grief regularly to see improvements to sexual well-being.

4.6.3 Limitations and Future Directions

First, the generalizability of our study is limited as our sample came from primarily English-speaking countries (especially Canada and the USA), was relatively affluent, and had few individuals who identified as Black, Indigenous, or people of color. Also, our sample had few same-sex/gender couples (and no couples with only men),

limiting our generalizability to such couples who may face additional financial and treatment challenges because of greater use of reproductive technologies (Flynn, 2023) and inequitable healthcare (e.g., Bradford et al., 2013). Second, because participants on average completed their first and final surveys between 10-weeks and 25-weeks post-loss, respectively, our findings and conclusions do not generalize to experiences outside this timeframe. For instance, given our sample time frame, we could not effectively consider potential links between perinatal grief immediately post-loss (where it is strongest; Tseng et al., 2017) and sexual well-being. Third, because we did not have data on participants' pre-loss levels of sexual well-being, our suggestions that increases in sexual satisfaction (for both couple members) and declines in sexual distress (for men, women, and gender diverse individuals who were not pregnant) occurred because of returns to pre-loss levels was based on data published with community samples and should be interpreted cautiously. Besides addressing such limitations, future research might examine alternative predictors of change in sexual satisfaction and sexual distress after a pregnancy loss. For example, they could test if characteristics of patient-practitioner interactions (e.g., experiences of validation) and relationship-oriented variables such as empathy (see Schnarch, 2018) are linked with greater improvements in sexual well-being post-loss (Brown et al., 2003).

4.6.4 Implications and Conclusions

From 10 to 25 weeks post-loss, both couple members' sexual satisfaction tends to increase while their sexual desire tends to remain the same overall, while sexual distress tends to decrease for men, women, and gender-diverse individuals who were not pregnant

at the time of the loss. Practitioners could reassure couples about the recovery of their sexual relationships by sharing that, on average post-loss, there are improvements in sexual satisfaction (both couple members) and sexual distress (partners) while sexual desire does not worsen (for both couple members). They can also share that both couple members' perinatal grief tends to decrease.

Healthcare providers rarely discuss sexual well-being with patients (Zhang et al., 2020), and bringing it up may be even harder after a pregnancy loss due to worry about whether the timing is appropriate. Nevertheless, as patients generally prefer that practitioners initiate discussions of sexuality with them rather than the reverse (Zhang et al., 2020), practitioners should not shy away from raising this topic with couples post-loss, and should go beyond simply discussing contraception and when a couple can attempt to become pregnant again. Practitioners should attend to couples' sexual relationships regardless of how many pregnancy losses they have had and consider the experiences of both couple members rather than the experiences of just women and gender-diverse-individuals who were pregnant when the loss occurred (Chapter 2). Given the importance of sexual well-being to health and relationship quality (Diamond & Huebner, 2012), as practitioners integrate discussions with couples about sexual well-being and its associated changes after a pregnancy loss into treatment models, they may see couple members' quality of life improve.

Conflict of Interest. The authors report no conflicts of interest.

Acknowledgements. This study was funded by an award given to David B. Allsop and Natalie O. Rosen from the IWK Health Centre (Project No. 1026674) and an

award given to Natalie O. Rosen from the Social Sciences and Humanities Research Council of Canada (Grant No. 435-2017-0534). We thank Gillian Hyslop, Heather Oliveira, Brenna Bagnell, Eva Cohen, Kathleen Nesbitt-Daly, and Lucy Coady for their assistance with data collection as well as the couples who participated in this research.

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4.8 Tables

Table 4.8.1 *Sociodemographic Characteristics of Sample*

		N (%) or *M* (*SD*; actual range)	
Variable		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
Age (years)		31.55 (4.23; 20–42)	32.97 (4.66; 23–46)
Sex	Male	0 (0.0)	126 (95.5)
	Female	132 (100.0)	5 (3.8)
	Indeterminant or intersex	0 (0.0)	1 (0.8)
Gender	Man	0 (0.0)	128 (97.0)
(multi-select item)	Woman	128 (97.0)	1 (0.8)
	Non-binary	3 (2.3)	2 (1.5)
	Additional gender identities	0 (0.0)	2 (1.5)
Transgender	Transgender	2 (1.5)	4 (3.0)
identity	Cisgender	121 (91.7)	119 (90.2)
	Additional/unsure/prefer not to answer	8 (6.1)	9 (6.8)
Relationship	Married	103 (78.0)	103 (78.0)
status[a]	Engaged	11 (8.3)	10 (7.6)
(multi-select item)	Dating	2 (1.5)	0 (0.0)
Race/Ethnicity	White	61 (46.2)	56 (42.4)
(multi-select item)	English Canadian	42 (31.8)	45 (34.1)
	American	45 (34.1)	41 (31.1)
	Western/Eastern European	15 (11.4)	14 (10.6)
	Australian	7 (5.3)	8 (6.1)

		N (%) or *M* (*SD*; actual range)	
Variable		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
	South/East/Southeast Asian	6 (4.5)	6 (4.5)
	Black/African American	5 (3.8)	2 (1.5)
	Additional race/ethnicities[b]	14 (10.6)	11 (8.3)
Country of residence	Canada	58 (43.9)	
	United States	52 (39.4)	
	United Kingdom	12 (9.1)	
	Australia	8 (6.1)	
	New Zealand	2 (1.5)	
Household Income	$0–$19,999	1 (0.8)	
	$20,000–$39,999	9 (6.8)	
	$40,000- $59,999	12 (9.1)	
	$60,000–$79,000	16 (12.1)	
	$80,000–$99,999	11 (8.3)	
	$100,000–$119,999	21 (15 .9)	
	$120,000–$139,999	10 (7.6)	
	$140,000–$159,999	20 (15.2)	
	$160,000–$179,999	5 (3.8)	
	$180,000–$199,999	12 (9.1)	
	$200,000 and over	15 (11.4)	
Relationship length (years)		7.73 (4.24; 1.08–22.25)	
Number of children		0.66 (0.94; 0–6)	

		N (%) or *M* (*SD*; actual range)	
Variable		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
Couples with children	Have child(ren)	59 (44.7)	
	Do not have child(ren)	73 (55.3)	
Couple relationship type	Same-sex (female–female)	5 (3.8)	
	Mixed-sex (female–male)	126 (95.5)	
	Mixed-sex (female–indeterminant or intersex)	1 (0.8)	
Weeks pregnant when loss occurred[c]	2 to 5	19 (14.4)	
	6 to 10	63 (47.7)	
	11 to 15	30 (22.7)	
	16 to 20	3 (2.3)	
	21 to 25	6 (4.5)	
	26 to 30	4 (3.0)	
	31 to 35	1 (0.8)	
	36 to 41	4 (3.0)	
Weeks since loss at baseline[c]		10.27 (6.09; 1.08–28.93)	
Pregnancy losses in last three months[c]	1	119 (90.2)	
	2	11 (8.3)	
	3	1 (0.8)	
Pregnancy losses in lifetime[c]	1	77 (58.3)	
	2	27 (20.5)	
	3	10 (7.6)	

Variable		*N* (%) or *M* (*SD*; actual range)	
		Women and GDI who were pregnant	Men, women, and GDI who were not pregnant
	4	10 (7.6)	
	5 or more	8 (6.1)	

Note. M = mean. *SD* = standard deviation. *GDI* = gender diverse individuals. % = percentage of sample. Total of percentages may be less than 100% (and total of counts may be less than 109) due to missing data. [a]Partners may have reported different relationship statuses due to missing data or disagreement about relationship status; [b]Includes the following (each was endorsed less than 1.9% of the time): Québécois or French Canadian; Indigenous, First Nations, Métis, or Inuit, African; Middle Eastern/Central Asian; Latin American; Hispanic; Biracial/Multiracial; and write-in categories; [c]Reported by women and GDI who were pregnant.

Table 4.8.2 *Intercept and Slope Values of Perinatal Grief and Sexual Well-Being*

		Intercept (10-weeks post-loss)	Intercept variance	Slope (weekly change)	Slope variance
	Couple member	Estimate 95% CI Z	Estimate 95% CI Z	Estimate 95% CI Z	Estimate 95% CI Z
Sexual satisfaction	Pregnant	4.952 [4.703,5.203] 39.616	1.432 [0.947,2.082] 4.887	0.029 [0.011,0.048] 3.222	0.005 [0.003,0.009] 5.000
	Not pregnant	5.021 [4.775,5.270] 40.168	1.414 [0.966,2.063] 4.996	0.022 [0.001,0.043] 2.000	0.006 [0.003,0.010] 3.000
Sexual desire	Pregnant	4.292 [3.994,4.550] 30.225	2.038 [1.460,2.845] 5.725	0.012 [-0.007,0.032] 1.200	0.007 [0.004,0.011] 3.500
	Not pregnant	5.261 [5.030,5.484] 45.748	1.511 [1.063,2.112] 5.535	-0.007 [-0.023,0.009] -0.875	0.004 [0.002,0.007] 4.000
Sexual distress	Pregnant	1.139 [0.974,1.310] 13.092	0.736 [0.494,1.112] 4.600	-0.009 [-0.025,0.005] -1.125	0.004 [0.002,0.006] 4.000
	Not pregnant	0.968 [0.824,1.128] 12.571	0.525 [0.348,0.802] 4.565	-0.013 [-0.025,-0.002] -2.167	0.002 [0.001,0.003] 2.000
Perinatal grief	Pregnant	2.650	0.647	-0.025	0.001

Couple member	Intercept (10-weeks post-loss)	Intercept variance	Slope (weekly change)	Slope variance
	Estimate	Estimate	Estimate	Estimate
	95% CI	95% CI	95% CI	95% CI
	Z	Z	Z	Z
Not pregnant	[2.502,2.800]	[0.476,0.895]	[-0.033,-0.017]	[0.001,0.002]
	34.868	6.047	-6.250	~0.000
	2.085	0.546	-0.013	0.001
	[1.946,2.221]	[0.403,0.753]	[-0.021,-0.006]	[0.001,0.001]
	30.662	6.205	-3.250	~0.000

Note. N = 132 couples. Pregnant = women and gender diverse individuals who were pregnant when the loss occurred; Not pregnant = men, women, and gender diverse individuals who were not pregnant when the loss occurred; CI = credible interval, Z = Z statistic. The bolded values are (1) significant coefficients (intercepts and slopes) where CIs does not include zero, and (2) meaningful coefficients where Z-values of greater than three are considered practically meaningful (intercept variances and slope variances). The coefficients are listed to three decimal places given the unit of change, weeks, is relatively small, and listing them to two decimal places would obscure the results.

Table 4.8.3 *Perinatal Grief Levels at Ten Weeks Post-Loss (Intercepts) and Covariates as Predictors of Sexual Well-Being Slopes*

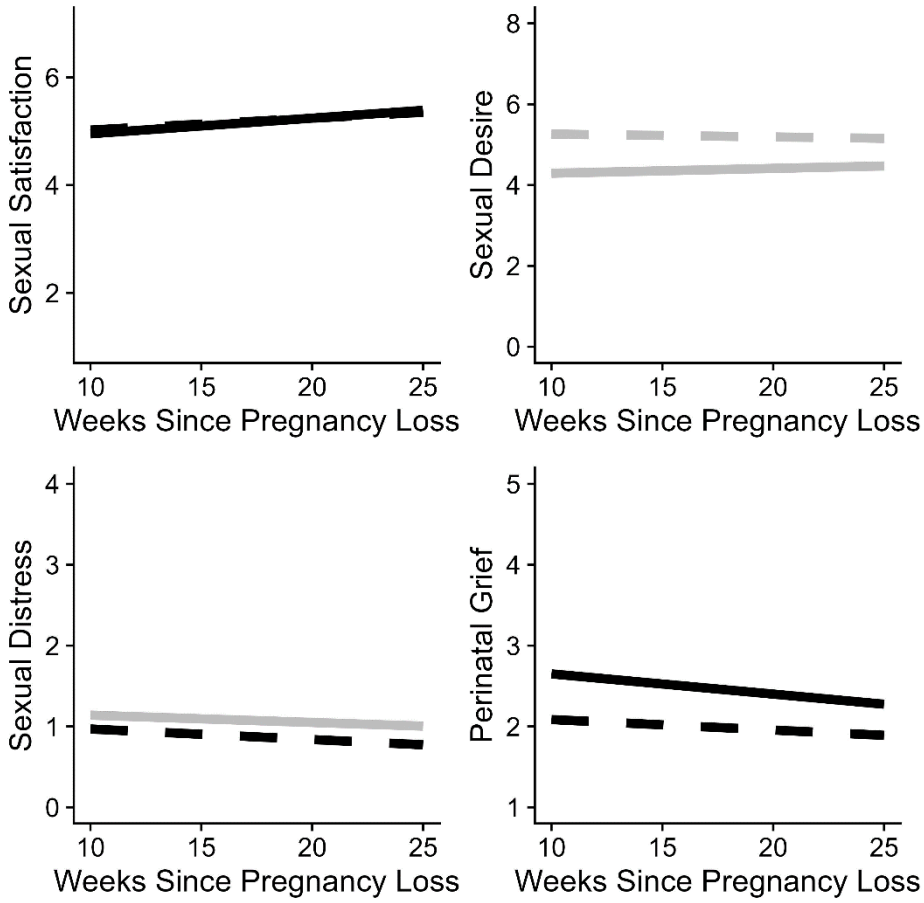
	Sexual satisfaction slope		Sexual desire slope		Sexual distress slope	
	Pregnant	Not pregnant	Pregnant	Not pregnant	Pregnant	Not pregnant
Model with no covariates						
Perinatal grief						
Person who was pregnant	.02	.02	.01	-.01	.00	.00
	[-.02,.06]	[-.02,.06]	[-.03,.05]	[-.04,.02]	[-.03,.03]	[-.02,.02]
Person who was not pregnant	.01	-.02	-.01	.03	-.01	-.01
	[-.03,.05]	[-.06,.03]	[-.05,.04]	[-.01,.06]	[-.04,.03]	[-.03,.02]
R^2	.07	.03	.03	.06	.03	.04
	[.00,.24]	[.00,.16]	[.00,.12]	[.00,.22]	[.00,.13]	[.00,.20]
Model with covariates						
Perinatal grief						
Person who was pregnant	.01	.02	.01	-.01	.00	.00
	[-.03,.05]	[-.02,.06]	[-.03,.05]	[-.05,.02]	[-.03,.03]	[-.03,.02]
Person who was not pregnant	.01	-.02	-.01	.03	-.01	-.01
	[-.03,.05]	[-.06,.03]	[-.05,.04]	[-.01,.06]	[-.04,.03]	[-.04,.02]
Weeks pregnant when the loss occurred	.00	.00	.00	.00	.00	.00
	[.00,.00]	[.00,.00]	[.00,.00]	[.00,.00]	[.00,.00]	[.00,.00]
Number of lifetime losses experienced	.00	-.01	.00	.01	.00	.00
	[-.01,.02]	[-.02,0]	[-.01,.01]	[-.01,.02]	[-.01,.01]	[-.01,.01]
Couple has children	-.01	-.02	.00	-.01	.00	.00
	[-.04,.03]	[-.06,.02]	[-.04,.04]	[-.04,.03]	[-.03,.03]	[-.03,.02]

	Sexual satisfaction slope		Sexual desire slope		Sexual distress slope	
	Pregnant	Not pregnant	Pregnant	Not pregnant	Pregnant	Not pregnant
R^2	.08 [.02,.21]	.11 [.03,.27]	.06 [.01, .16]	.10 [.02,.26]	.07 [.02,.18]	.10 [.02,.28]

Note. N = 132 couples. Pregnant = women and gender diverse individuals who were pregnant when the loss occurred; Not pregnant = men, women, and gender diverse individuals who were not pregnant when the loss occurred. The coefficients are unstandardized and 95% credible intervals are shown in brackets.

4.9 Figures

Figure 4.9.4 *Average Perinatal Grief and Sexual Well-being Trajectories for Participants Who Were Pregnant When the Loss Occurred (Solid) and Not Pregnant (Dashed)*



Note. N = 132 couples. The statistically significant slope trajectories are shown in black while non-significant slopes are shown in gray. Pregnant = women and gender diverse individuals who were pregnant when the loss occurred; Not pregnant = men, women, and gender diverse individuals who were not pregnant when the loss occurred.

CHAPTER 5: DISCUSSION

The goal of my dissertation was to understand how the sexual well-being of couples who have had a recent pregnancy loss compares to the sexual well-being of couples who have not, if perinatal grief is a risk factor for lower sexual well-being, and how sexual well-being changes across time post-loss and the potential role of perinatal grief in such changes. In the following General Discussion chapter, I summarize the results of my dissertation, discuss its strengths and limitations, explore future directions for research, and provide theoretical and clinical implications of my work.

In the first manuscript of my dissertation (Study 1, Chapter 2), I used dyadic, multi-group structural equation modeling to cross-sectionally compare sexual well-being levels of both partners in couples with a recent pregnancy loss (10-weeks post-loss on average) to one another and to their counterparts in a control sample of couples with no history of pregnancy loss. I found both couple members in the pregnancy loss sample were less sexually satisfied than their control counterparts but did not differ from controls in sexual desire, problems with sexual function, or sexual frequency. Surprisingly, men, women, and gender diverse individuals who were not pregnant at the time of the loss had lower sexual distress than their control counterparts. Women and gender diverse individuals who were pregnant when the loss occurred reported lower levels of sexual desire post-loss than their partners but did not differ from their partners in sexual satisfaction, problems with sexual function, or sexual distress. Together, these findings provide evidence that pregnancy loss is a risk factor for lower sexual satisfaction and greater differences in sexual desire between couple members.

Given that I found pregnancy loss was linked with lower levels of some aspects of sexual well-being in Study 1, I was interested in identifying a risk factor unique to pregnancy loss that could predict sexual well-being. Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993) and prior research (Serrano & Lima, 2006) pointed to perinatal grief as one potentially salient predictor. I expected more intense perinatal grief would be linked with lower sexual well-being for both couple members.

Accordingly, my second dissertation manuscript (Study 2, Chapter 3) involved using dyadic multilevel structural equation modeling and longitudinal data to test whether fluctuations in perinatal grief were linked with fluctuations in sexual well-being for oneself and a partner post-loss (i.e., within-person differences), and whether those with the highest average perinatal grief had the lowest average sexual well-being (i.e., between-person differences). I found that when either partner reported higher perinatal grief than their average across 4 months, both couple members reported lower sexual well-being than their average across 4 months. Specifically, they reported lower than typical sexual satisfaction and sexual desire, and higher than typical sexual function problems and sexual distress. Those whose average perinatal grief levels (averaged across 4 months) were higher than their peers reported the lowest average sexual satisfaction levels and the highest average sexual function problems and sexual distress levels (also averaged across 4 months). My second manuscript provides evidence that elevated perinatal grief is a risk factor for lower sexual well-being than what one usually experiences and lower than usual sexual well-being for one's partner as well.

Building on Studies 1 and 2, I was interested in examining longitudinal changes in sexual well-being after a pregnancy loss, given that the knowledge from such a novel

examination could reduce couples' stress post-loss by informing their post-loss expectations. I expected both couple members' sexual well-being would improve post-loss given pregnancy loss's physical (Jurkovic et al., 2013) and emotional difficulties (Volgsten et al., 2018) tend to ease with time. In line with Study 2, I also expected perinatal grief to be a barrier to such improvements.

Thus, in my third manuscript (Study 3, Chapter 4), I used dyadic growth modeling to longitudinally examine how sexual satisfaction, sexual desire, sexual distress, and perinatal grief changed across 4 months for both couple members (on average from 10 to 25 weeks post-loss) and if perinatal grief levels at 10 weeks post-loss (on average) predicted the trajectories of sexual well-being outcomes. I found that, from 10 to 25 weeks post-loss, both couple members' sexual satisfaction increased, their sexual desire remained stable, and sexual distress decreased for partners who were not pregnant when the loss occurred but remained stable for partners who were pregnant. Moreover, both couple members' perinatal grief decreased over time. I also found perinatal grief levels at 10 weeks post-loss unexpectedly did not predict sexual well-being trajectories over time. Altogether, this manuscript provided evidence that sexual satisfaction, sexual desire, and sexual distress improve or stay the same from 10 to 25 weeks post-loss, irrespective of the level of perinatal grief they experienced when they entered the study.

5.1 Strengths and Limitations

To complement the specific strengths and limitations described in the three studies of my dissertation, below I discuss the dissertation's strengths and limitations more broadly.

5.1.1 Strengths

5.1.1.1 Study Design

My dissertation has two noteworthy strengths in its design. First, it used dyadic data. Of the eight prior studies on pregnancy loss and sexual well-being, the only studies to use dyadic data were by DeFrain et al. (1996) and Serrano and Lima (2006). These studies included 30 couples and 21 couples, respectively, making them underpowered to detect partner effects, which tend to be smaller in magnitude than actor effects. My dissertation included a final sample size of 132 couples, with each of my three studies using data from 100 or more couples from this larger sample, making my dissertation the largest study of couples, pregnancy loss, and sexual well-being to date. Dyadic data is the ideal tool for studying couples (Kenny et al., 2006) as it acknowledges the interdependent nature of couple members' sexuality (Impett et al., 2014) and makes it possible to consider partner effects, that is, how an individual's experiences are linked to their partner's outcomes (Kenny et al., 2006). In my dissertation, I used a dyadic dataset which was sufficiently powered (as evidenced in power analyses for each study). I was thus able to directly compare sexual well-being between couple members and to their control counterparts (Study 1). As well, I was able to test for actor and partner links between the perinatal grief of either couple member with all aspects of both couple members' sexual well-being (Study 2). Additionally, I was able to examine both partners' post-loss sexual well-being trajectories (Study 3). Altogether, such tests represent novel research developments and underscore how pregnancy loss relates to the experiences of both couple members (Diamond & Diamond, 2016), including their sexual well-being. Historically, women have been the focus of studies on (recurrent) miscarriage and sexual

well-being, potentially because they have physical burdens post-loss (Jurkovic et al., 2013) that their partners do not. Such a focus is a rare contrast to the underrepresentation of women in health research (Liu & Mager, 2016). Rather than saying more studies should be done on men's post-loss experiences, I suggest more work on pregnancy loss with both couple members with consideration for the unique experiences of both partners. Such studies can illuminate both couple members' post-loss sexual well-being experiences and support treatment models that take a couple-focused approach.

Second, my dissertation used longitudinal data, which provided several benefits. In Study 2, I used longitudinal data to examine how monthly fluctuations in perinatal grief related to monthly fluctuations in sexual well-being for both couple members. Through such testing, I was able to identify perinatal grief as a factor that varies within individuals (see Bolger et al., 2003) as they recover post-loss and that could potentially be targeted by practitioners to promote couples' sexual well-being. As well, in Study 3, I examined longitudinal trends in sexual well-being across time post-loss. By examining trends across time in multiple aspects of sexual well-being for both couple members, I was able to provide new information providers can use to inform post-loss sexual well-being expectations of couples. Given only one of the eight prior studies on pregnancy loss and sexual well-being used longitudinal data (Swanson et al., 2003), my longitudinal findings represent key contributions to this area.

5.1.1.2 Sample

I note three strengths related to my dissertation's sample. First, instead of only sampling those who experienced recurrent miscarriage, as most prior studies on sexual well-being and pregnancy loss have done, I sampled individuals regardless of how far

along their pregnancies were when they were lost and how many losses they previously had. Recurrent miscarriage is rare (experienced by 0.5% to 2.3% of women; Rasmark et al., 2017) while pregnancy loss is common (experienced by 25% of women; Diamond & Diamond, 2016). As well, recurrent miscarriage, by definition, focuses on early losses (miscarriage) rather than later ones (stillbirth). My focus on pregnancy loss regardless of gestational age at the time of the loss or the number of prior losses resulted in a sample with a range of loss experiences. Indeed, in Study 3, which included my full sample, there were 15 couples who had pregnancy losses after 20 weeks gestation; although this group was comparatively small (11% of my sample), their proportion aligned with the incidence of earlier and later losses found in the population (American College of Obstetricians and Gynecologists and the Society for Maternal Fetal Medicine, 2020; American College of Obstetricians and Gynecologists Committee on Practice Bulletins—Gynecology, 2018). As well, in Study 3, my sample was quite evenly split between couples reporting on a first pregnancy loss and those reporting on a second or greater loss. With its broad focus on earlier and later pregnancy loss, and any number of losses, my dissertation may have wider relevance and enhanced generalizability than prior studies. In fact, in Study 2, I found links between perinatal grief and sexual well-being among couples even after controlling for the number of weeks pregnant at the time of the loss and the number of lifetime losses. And in Study 3, these same control variables did not uniquely predict levels of sexual well-being trajectories. Thus, there was support for my decision to include individuals in my dissertation with a diverse set of loss experiences to enhance generalizability.

Second, my sample did not include those who were undergoing infertility treatment at the time of their pregnancy losses. To my knowledge, my dissertation is the first to make such an exclusion in pregnancy loss and sexual well-being research. That my dissertation is the first to do so is surprising given infertility and its treatment are linked to lower sexual well-being (Allsop, Péloquin, et al., 2023; El Amiri et al., 2021; Péloquin et al., 2024; Starc et al., 2019) and 15% of patients have a miscarriage after medically assisted reproduction (Li et al., 2021). Thus, my design choice to exclude those undergoing infertility treatment gives more confidence in my dissertation's results: any links between sexual well-being and pregnancy loss are not confounded by infertility and infertility treatment. Albeit, however, such a choice meant that the potentially compounding difficulties of pregnancy loss and infertility for sexual well-being remain unexplored and that my findings may not extend to those who face these two challenges (for further discussion, see 5.4 Future Research Directions).

Third, I sampled couples who had experienced a pregnancy loss within the past 4 months and the average time participants began providing data was at about 3 months post-loss. In contrast, of the eight prior studies in this area, three studies included participants up to 6 months post-loss (Azin et al., 2020; Francisco et al., 2014; Zhang et al., 2016), three studies included participants up to a year or later (Camacho-Ávila et al., 2023; DeFrain et al., 1996; Serrano & Lima, 2006), and one study did not report how long ago participants' losses were (Hasanpour et al., 2019); only one study focused on recent losses, with participants joining that study within 5 weeks post-loss (Swanson et al., 2003). Collecting data as events are unfolding, which in my dissertation was the early months post-loss, can reduce recall bias (Bolger et al., 2003). The early months post-loss

may represent a key intervention point, as couples could be requesting help from healthcare providers during this time. Thus, this study design decision is well-suited to inform earlier intervention.

5.1.1.3 Inclusivity

Another strength of my dissertation was my efforts toward inclusivity, of which I highlight two aspects. First, I recruited same-sex couples alongside mixed-sex couples and included gender diverse individuals alongside women and men. I did so because the physical and emotional burdens of pregnancy loss are experienced across gender identity and relationship partnerships and are not restricted to mixed-sex, cisgender couples. To my knowledge, no studies on pregnancy loss and sexual well-being have included same-sex couples or gender diverse individuals in their samples, albeit this apparent exclusion may be because researchers did not assess sex and gender appropriately. Regardless, limited sociodemographic information in prior studies makes diversity regarding sex and gender in the literature unclear. Outside of pregnancy loss, sex and gender diverse individuals are known to face discrimination in healthcare systems (e.g., Bradford et al., 2013); they could face similar disadvantage after a pregnancy loss, such as insensitivity or hostility from medical providers when seeking post-loss treatment (see Bradford et al., 2013). In my dissertation, I endeavored to make participation for sex and gender diverse individuals inclusive and non-discriminatory, such as by replacing gendered phrases such as “him” or “her” in my measures with gender neutral language (e.g., “them”). My study advertisements also specifically welcomed participation from such individuals via text (e.g., “this study is inclusive to individuals of all bodies, gender identities, and sexual orientations”) and imagery (e.g., intentionally not using images of people in study ads so

that participants would not self-exclude by comparing themselves to those pictured). Such efforts aligned with best practices on how to consider sex and gender in research (Centre for Gender & Sexual Health Equity, 2022-2024). By being inclusive of same-sex couples and gender diverse individuals, future research can help reduce the health and healthcare disparities these groups experience (Erves et al., 2017) and ensure they feel welcome and included in research and practice supporting individuals post-loss.

Second was that I used gender neutral or gender-additive language to refer to participants (Women's Health Research Institute, 2024). Initially, in Study 1, I used gender-neutral language to refer to couple members as gestational individuals or as partners of gestational individuals. I did so to acknowledge the fact that couple members who were pregnant at the time of the loss included those with multiple gender identities, as did couple members who were not pregnant. Such language was precise regarding reproductive capacity, but disregarded the fact that, for many, such capacity is often linked to the experiences of womanhood or manhood (Brotto & Galea, 2022). Thus, in Studies 2 and 3, I updated my language to a gender-additive approach based on participants' reported gender identities. Such an approach allowed me to accurately represent participants' reproductive capacities and their gender identities simultaneously. I therefore referred to couple members as women and gender diverse individuals who were pregnant when a loss occurred or as men, women, and gender diverse individuals who were not pregnant when the loss occurred. As the first research on pregnancy loss and sexual well-being to take a gender-additive approach, my dissertation provides an example of inclusive terminology, and demonstrated how my notions regarding inclusivity evolved, with potential benefits to future gender/sex diverse participants. Such

benefits might include encouragement to providers and researchers to expand their work beyond cis-gender, mixed sex-couples to gender/sex diverse couples. Such expansion may promote more equitable access to healthcare for gender/sex diverse individuals, with benefits to their health and quality of life.

5.1.1.4 Theoretical Grounding

A final strength of my dissertation is that it was grounded in theory. Through my dissertation, I conceptualized couples' sexual well-being and pregnancy loss experiences through four distinct yet complementary theories. These theories included Family Systems Theory (Smith & Hamon, 2012), the Biopsychosocial Model (Engel, 1977), the Family Adjustment and Adaptation Response Model (Patterson, 2002), and Symbolic Interactionism Theory (Blumer, 1969; LaRossa & Reitzes, 1993). Prior to my dissertation, authors on the topic of sexual well-being and pregnancy loss indicated their work was guided by theory in only in one of the eight studies (Swanson et al., 2003), making scholarship on this topic overwhelmingly atheoretical. Being theoretically grounded is essential in research, as it enhances the detail and accuracy through which phenomena can be understood and through which events and changes can be predicted (Smith & Hamon, 2012). It also allows processes to be approached from different perspectives, which gives nuanced understanding of them (Smith & Hamon, 2012). By rooting my dissertation in theory, I offer complementary yet unique perspectives detailing why pregnancy loss may include challenges and changes to sexual well-being and why perinatal grief may predict sexual well-being. Theory is also useful for inviting new questions, where future works can confirm or refute a theory and its application (Smith & Hamon, 2012); thus, in my dissertation I offer new theoretically grounded pathways for

research (e.g., see section 5.4 Future Research Directions). In sum, by demonstrating how four theories that can be used to study pregnancy loss and sexual well-being, I provide a conceptual and theoretical springboard for future research and clinical work in this area.

5.1.2 Limitations

5.1.2.1 Study Design

One key limitation is that I did not collect data from before the pregnancy loss. This limitation means that my ability through my dissertation to weigh whether couples' sexual well-being is likely to be lower post-loss than before is based only on comparisons to community samples who have not experienced a loss. My first dissertation study followed a quasi-experimental design (Berk, 2013; Harris et al., 2006), where sexual well-being was compared between a group having received the "intervention" of a recent pregnancy loss and a control group. Moreover, my two samples (with and without a recent pregnancy loss) were alike in key respects. Specifically, their data were collected over the same timeframe using similar recruitment methods and participants in both samples responded to identical measures of sexual well-being. Also, the two samples shared some similar sociodemographic characteristics (e.g., similar relationship length, number of children), albeit they differed in other areas (e.g., more Canadians and same-sex couples in the control sample). Thus, bias related to differences in the two samples was mitigated. With such a design, I was able to provide evidence that having a recent pregnancy loss is linked to some changes to sexual well-being post-loss. Nevertheless, without measurements of pre-loss levels of sexual well-being, such a quasi-experimental design is susceptible to external validity threats regarding whether change actually occurred for the "experimental" group (Harris et al., 2006). A longitudinal design that

measured sexual well-being levels before and after a pregnancy loss would have no such biases by allowing for pre- and post-loss comparisons of sexual well-being within the same individuals across time. However, pregnancy losses are generally unexpected for couples, and so it is difficult to plan research that captures pre-loss experiences. To address this research difficulty, researchers could use existing or collect new large-scale panel (i.e., longitudinal) studies of couples in their reproductive years and include measurements of both pregnancy loss and sexual well-being. However, because panel studies are typically done in yearly intervals, a two-year interval is the minimum available timeframe to capture changes to sexual well-being; such an interval may be too long to understand dynamics related to sexual well-being. Thus, panel studies on pregnancy loss and sexual well-being with intervals shorter than a year would be more ideal to capture changes in pre- and post-loss sexual well-being.

5.1.2.2 Sample

One limitation of my dissertation is its lack of generalizability due to the composition of my sample. My sample featured data from couples in primarily English speaking, Western countries, especially Canada and the United States. Yet, because pregnancy loss is experienced universally, there could be distinct cultural factors that exacerbate or ease the difficulties of post-loss sexual well-being. For instance, in rural Eastern Uganda, women with multiple or repeated stillbirths have reported being ridiculed by family and society; as well, husbands in this region, with the encouragement of their families, have divorced their wives over repeated stillbirths (Kiguli et al., 2015). Such rejection of women over pregnancy loss could bring ramifications to couples' post-loss sexual well-being. As another example, in Southeast and South Brazil, couples who

had experienced a pregnancy loss noted how spirituality helped them make sense of their losses (Vescovi et al., 2022). Given that spirituality can provide meaning to sexuality (Allsop, Leavitt, Clarke, et al., 2021; Leonhardt et al., 2021), various spiritual beliefs that exist across cultures may moderate how pregnancy loss is linked with sexual well-being.

Also, within the Western sample of my dissertation, individuals who identified as Black, Indigenous, or People of Color (BIPOC) were underrepresented relative to their representation in the population. Based on data from a multi-select race and ethnicity question, no single ethnic or racial group of individuals from BIPOC populations composed more than 5% of the sample (e.g., South/East/Southeast Asian ~ 5% of the sample; Black/African American ~ 3%); in contrast, over 40% of the sample identified as White and another 30% identified as English Canadian. Such underrepresentation of BIPOC individuals made it so that any potential health and healthcare disparities they face after pregnancy loss (e.g., Shorter et al., 2021) could not be explored directly (e.g., comparisons across race/ethnicity were not feasible due to limited power). Altogether, cultural aspects related to reproductive contexts and expectations emphasize the need for work on pregnancy loss and sexual well-being in non-Western samples and across race and ethnicity.

Moreover, even as my dissertation included same-sex couples and gender diverse individuals, which was a strength, because relatively few same-sex couples participated (5 female-female couples, or 3.8% of the sample, and 1 female-indeterminant/intersex couple, or 0.8% of the sample) as well as a few transgender and non-binary individuals (less than 4% of the sample), I could not uniquely explore these groups' post-loss sexual well-being experiences. Given financial strain during medically assisted reproduction is

linked to lower sexual well-being (Allsop, Péloquin, et al., 2023), same-sex couples and gender diverse individuals who utilize treatment to become pregnant may face additional stressors to their sexual relationships after a pregnancy loss as they face financial strains with continued treatment costs. Because of the limited number of same-sex couples and gender diverse individuals in my dissertation data, I cannot inform such possibilities, and recommend specific studies focused on same-sex couples and their pregnancy loss experiences.

Additionally, data collection during my dissertation was based on convenience sampling rather than random sampling, which may have biased my results. Specifically, society's taboos regarding pregnancy loss and its difficult nature (Markin, 2016) could make it difficult to discuss one's post-loss experiences. Potentially, those who felt more comfortable with the pregnancy loss may have been more willing to participate. This comfort may have reflected a trend of being willing to discuss their experiences with healthcare providers, therapists, and friends and family. Such willingness may have provided them with resources that promoted their healing (Patterson, 2002) and biased my results by diminishing negative links or changes to sexual well-being that result from pregnancy loss. As well, those who are willing to participate in sex research have reported greater levels of attributes that promote sexuality (e.g., positive sexual attitudes, less sexual guilt and fear and sexual inhibition) compared to those less willing to participate (for review, see Dawson et al., 2019). However, they also have reported greater levels of sexual trauma and there is mixed evidence they report greater sexual dysfunction as well (Dawson et al., 2019). Thus, couples with stronger post-loss sexual relationships may have been more likely to participate in my research, which may have

biased sexual well-being upward in my sample. Importantly, individuals are more willing to participate in sexuality research that involves surveys, like my dissertation, than that which includes invasive procedures such as measuring genital response (see Dawson et al., 2019), so any potential bias towards better sexual well-being in my research may not be large. Nevertheless, future work can rely on random sampling approaches, potentially by sampling registers of reproductive aged individuals (e.g., new marriage records), to reduce participation bias as much as possible.

5.1.2.3 Measurement

In my dissertation, I assessed perinatal grief using the Perinatal Grief Scale (Potvin et al., 1989), which has been validated and extensively used by researchers (Setubal et al., 2021). However, this scale focuses on individual experiences of perinatal grief, rather than those tied to the couple relationship. Given the couples context of pregnancy loss (Diamond & Diamond, 2016), there may be dyadic aspects of perinatal grief that could explain sexual well-being beyond those focused on the individual. Although seven validated perinatal grief scales exist (Setubal et al., 2021), each of these are individual- rather than couple-focused, which means the dyadic aspects of perinatal grief are unstudied. In line with prior work on disenfranchised grief (Lang et al., 2011), scholars have considered future use of scales that capture dyadic aspects of perinatal grief, such as the extent an individual's partner supports or rejects their perinatal grief (Yorgason et al., 2023). Such scales would be suited to 3-level models, which would feature an analysis of a combined score from both couple members' perinatal grief. Potentially, such models may help uncover whether couples who are more supportive of both couple members' perinatal grief may also be those couples with heightened intimacy

and sexual well-being. Moreover, couple-focused perinatal grief processes may in fact be linked with long-term sexual well-being trajectories in contrast to individual-focused perinatal grief, which I found was seemingly not linked with trajectories of sexual well-being (Study 3). Thus, future work could develop and validate couple-focused measures of perinatal grief and then consider links between them and couple members' sexual well-being.

5.2 Theoretical Implications

Besides demonstrating four theories that can be used to understand pregnancy loss and sexual well-being in future work (see section 5.1.1.4 Theory), my dissertation supports and expands theory in specific ways. I highlight two key theoretical contributions.

5.2.1 Post-Loss Sexual Well-Being as a Period of Rebalance Under the Family Adjustment and Adaptation Response Model

One theoretical implication of my dissertation is that the notion of rebalance in Patterson's (2002) Family Adjustment and Adaptation Response Model could be extended to pregnancy loss and sexual well-being experiences. One tenet of this model is that when a family's capabilities are outweighed by the demands they face, they are out of balance and undergo a "crisis" period that can include changes to family structure, roles, and interaction patterns (Patterson, 1988). In my dissertation, I argued that shortly after a pregnancy loss, the demands of the loss may have piled up for couples such that demands spill over and diminish their sexual well-being. I also suggested that couples' sexual well-being improves post-loss, which under this model may be because couples are rebalancing resources with demands as time passes.

This notion of rebalance was supported by findings in my dissertation from Study 1 and Study 3, particularly those related to sexual satisfaction. In Study 1, I examined whether pregnancy loss was linked with lower sexual well-being at 10 weeks post-loss, on average. At this time point, I observed that both couple members reported lower levels of sexual satisfaction than controls whereas they did not generally differ from controls on other sexual well-being domains. Under the Family Adjustment and Adaptation Response Model, the post-loss period could have been a time when resources and demands were out of balance for most couples given how recent most couples' losses were (10-weeks post-loss on average). This imbalance could have resulted in stress on the couple relationship and corresponding strains on the relational domains of sexual well-being like sexual satisfaction. Then, in Study 3, I examined how sexual well-being changes from 10 to 25 weeks post-loss. I observed that sexual satisfaction increased for both couple members, such that at 25 weeks post-loss, both couple members' sexual satisfaction levels were like those in community samples (Schwenck et al., 2020), in what possibly may have been returns to baseline sexual satisfaction. Per the Family Adjustment and Adaptation Response Model, when a couple rebalances the demands of pregnancy loss with their resources, a rebalance of sexual satisfaction to baseline levels could occur as well. My dissertation supported the notion of rebalance under the Family Adjustment and Adaptation Response Model, thus providing a basis for empirically testing rebalance as a predictor of changes to sexual relationships after a pregnancy loss, as I discuss in the Future Research Directions section of my dissertation (Section 5.4).

5.2.2 Understanding Post-Loss Sexual Well-Being via Perinatal Grief and Symbolic Interactionism Theory

Another theoretical implication of my dissertation is expanding Symbolic Interactionism Theory by suggesting that its tenet that individuals' experiences can change how they symbolize and interpret the world around them (Blumer, 1969; LaRossa & Reitzes, 1993) could inform links between perinatal grief and post-loss sexual well-being. Specifically, I integrated work by Schnarch (2009) linking a strong sense of self to how individuals symbolize sexuality and sexual relationships with work by Attig (2011) noting the tendency of grief to disrupt one's sense of self. I found evidence that elevated perinatal grief of both couple members was linked with both partners' lower sexual satisfaction and sexual desire, and both partners' higher levels of sexual function problems and sexual distress.

Prior to my dissertation, scholars had theorized and provided evidence that couple members could view their sexuality and sexual relationships more negatively after a pregnancy loss or recurrent miscarriage than before (Camacho-Ávila et al., 2023; Swanson et al., 2003). However, no prior studies to my knowledge had theoretically considered how such changes in symbolism could occur. That I found such widespread links between perinatal grief of one partner and both partners' sexual well-being in my second dissertation study supports the possibility that perinatal grief could be linked with negative post-loss changes in the symbolism of sexuality and sexual relationships. Thus, there is a theoretical foundation for future empirical testing of this possibility (see section 5.4 Future Research Directions).

5.3 Clinical Implications

I offer several clinical implications based on my dissertation's findings. First, healthcare providers should discuss sexual well-being with couples after a pregnancy loss. In Study 1 of my dissertation, I observed that pregnancy loss was linked with lower sexual satisfaction and greater sexual desire discrepancies between couple members. In line with the Biopsychosocial Model (Engel, 1977), these findings underscore that beyond addressing biological concerns for contraception with couples, which has been the sole emphasis related to sexuality of some official post-loss treatment guides (see American College of Obstetricians and Gynecologists Committee on Practice Bulletins—Gynecology, 2018), practitioners should address the psychological and relational aspects of sexual well-being. During their conversations with couples after their pregnancy losses, providers could ask them what sexual concerns they have, if any, and provide resources on mental health and grief (Allsop & Rosen, 2024). Importantly, given patients' expressed desire for practitioners to bring up sexual topics rather than for patients to do so (Zhang et al., 2020), providers should take the lead with conversations about sexual well-being post-loss and avoid assuming couples will bring up sexual well-being on their own if it is concerning to them.

Building on the previous recommendation, healthcare providers should address pregnancy loss and sexual well-being with couples regardless of how many pregnancy losses they have had (Allsop & Rosen, 2024). Indeed, one contribution of my dissertation was indicating couples who had a single pregnancy loss faced threats to their sexual well-being—not just those who had three losses and thus met criteria for recurrent miscarriage, as have been the focus of prior literature (Francisco et al., 2014; Hasanpour et al., 2019;

Serrano & Lima, 2006; Swanson et al., 2003; Zhang et al., 2016). Currently, even though the 25% of women who experience a pregnancy loss (Diamond & Diamond, 2016) face its associated health and relationship risks (Diamond & Diamond, 2016; Gold et al., 2010; Herbert et al., 2022; Jurkovic et al., 2013; Setubal et al., 2021; Shreffler et al., 2012), it is agreed professionally to intervene with individuals only after three losses (Branch & Heuser, 2010)—even as only 0.5% to 2.3% of women experience losses to this degree (Rasmark et al., 2017). Intervening with couples even after they have only one pregnancy loss will avoid perpetuating the unhelpful practice of minimizing couples' struggles post-loss (Markin, 2016). Underscoring this recommendation is the fact that, even after controlling for the number of prior losses, perinatal grief continued to be linked with sexual well-being (Chapter 3), and that the number of prior losses did not uniquely predict sexual well-being trajectories (Chapter 4). Although care for couples after a pregnancy loss should be universal, future work should nevertheless consider if those with multiple losses face additional risks to sexual well-being and thus need extra support.

Another clinical implication of my dissertation is to involve both partners in treatment models of sexual well-being post-loss. My three dissertation studies complement and extend prior dyadic works (DeFrain et al., 1996; Serrano & Lima, 2006) by indicating that both couple members can experience changes to their sexual well-being after a pregnancy loss. I also found it was not just one's own elevated perinatal grief that was linked with lower sexual well-being for oneself, but a partner's perinatal grief as well. Taking a Family Systems Theory perspective (Smith & Hamon, 2012), when any one couple member presents sexual concerns post-loss, treatment models that target both

partners' sexual well-being and its associated factors will be more effective than models that target one partner alone. As well, that men have reported feeling ignored or neglected by health systems after a pregnancy loss (Camacho-Ávila et al., 2023) underscores that involving men, women, and gender diverse individuals who were not pregnant when a loss occurred is essential to meet the unique needs of a couple (see Allsop & Rosen, 2024).

Given that I found when one couple member's perinatal grief was elevated, both partners reported lower than typical sexual well-being, my dissertation provides evidence that couple members who proactively address their grief may find benefits to their sexual well-being. Certainly, perinatal grief is not something to pathologize (Badenhorst & Hughes, 2007). However, just as there are times in life when the pain process is normal and expected yet efforts are made to reduce pain (e.g., after exercise, during and after childbirth), efforts can be made to support the perinatal grief process as well. After a pregnancy loss, practitioners can screen for perinatal grief with brief instruments, such as the Perinatal Grief Scale (Potvin et al., 1989), to assess potential risks to sexual well-being. Then, in line with clinical recommendations by Diamond and Diamond (2016), practitioners can normalize and discuss couple members' perinatal grief, including how it is common for individuals to not be sure who or what they are grieving for (Lang et al., 2011). Referrals to support groups, grief-focused practitioners, and other resources to support couple members' perinatal grief can also be provided.

Clinicians might also invite couple members to share their reproductive and sexual "stories" with one another. Reproductive stories, which were proposed by Diamond and Diamond (2016), involve couple members creating a storyline with a

clinician around the chapter in their lives regarding their expectations with having a baby and what the loss means to them and to their partner. In light of evidence of changes to sexual well-being post-loss from my dissertation, I build on Diamond and Diamond (2016) by suggesting clinicians help couples to incorporate sexuality into their reproductive story. Given my findings that perinatal grief is a risk factor for lower sexual well-being, narrative models of treatment could include having both couple members describe how views of their selves have changed from before and after the loss (if it all). Narrative models could also include couples describing the potential role of grief in such changes, and any corresponding links to sexual well-being. Such an approach takes a Symbolic Interactionism Theory perspective (Blumer, 1969; LaRossa & Reitzes, 1993) by comparing symbolism related to one's identity from before and after a pregnancy loss. Altogether, a narrative treatment model could promote self-awareness for individuals and intimacy between partners, with benefits to their sexual well-being.

5.4 Future Research Directions

The topic of sexual well-being and pregnancy loss has received little attention in research and needs to be studied further to provide an enhanced understanding of couples' post-loss experiences and needs. I provide several directions for future study.

Building directly on my dissertation, future work can consider the mechanisms whereby couple members may experience lower sexual satisfaction post-loss and greater sexual desire discrepancies between partners, as found in Study 1. As well, future research can explore what mechanisms explain the links between perinatal grief and sexual well-being, as found in Study 2, and whether changes in one mediate changes in the other. Future work can also explore processes that explain trajectories across time in

sexual well-being, as found in Study 3. Understanding these mechanisms can inform how exactly sexual well-being can become at risk and later recover post-loss, which can inform when and how to intervene with couples after their pregnancy losses. Potentially, under the Family Adjustment and Adaptation Response Model (Patterson, 2002), "overload" may be one such mechanism. Stroebe and Schut (2016) have noted that when individuals experience overload—where they feel like their resources are insufficient to meet demands (which is also one aspect of perceived stress; Nielsen et al., 2016)—they may recover less effectively from their losses. Thus, it may be valuable to formally measure overload, resources, and demands, and test for longitudinal links between these constructs and couple members' sexual well-being post-loss. Such tests may provide a basis for interventions focused on reducing overload to rebalance demands and resources (Patterson, 2002) and promote healing to couple members' sexual well-being post-loss.

To a limited extent, my dissertation provides some evidence for a link between overload and sexual well-being, though future research should test it formally. In Study 2, I studied links between perinatal grief and sexual well-being. Perinatal grief is a "demand" (Patterson, 2002) that is unique to and brought on solely by pregnancy loss (Lang et al., 2011), which may overload couples physically, emotionally, and socially (Engel, 1977; Setubal et al., 2021) such that their resources are insufficient to cope. Indeed, as described by Stroebe and Schut (2016), during a period where an individual is overloaded, they may be more likely to be doing the energy-draining work of grief that involves confronting the loss. Thus, periods of higher perinatal grief may correlate with times of higher overload (Stroebe & Schut, 2016), with potential negative links to sexual well-being like those I observed in Study 2.

As well, future research can consider pregnancy loss, infertility, and sexual well-being. Infertility and its treatment are associated with lower sexual well-being (Allsop, Péloquin, et al., 2023; El Amiri et al., 2021; Péloquin et al., 2024; Starc et al., 2019). Given this fact, in my dissertation, couples who were undergoing fertility treatment when their losses occurred were ineligible to participate. This exclusion enabled me to focus on pregnancy loss and sexual well-being without infertility and its treatment as potential confounds of my results. Nevertheless, this choice excluded couples who become pregnant with infertility treatment and then faced pregnancy loss. Such couples are underrepresented in research given that 15% of patients who conceive with medically assisted reproduction have a miscarriage later (Li et al., 2021). For couples who conceive with infertility treatment but then have a pregnancy loss, the joint stressors of infertility and of pregnancy loss may have substantial ramifications for sexual well-being. For instance, links between lower quality of life during medically assisted reproduction and lower sexual well-being (Allsop, Péloquin, et al., 2023) may be exacerbated if treatment is initially successful with conception, but then results in disappointment and grief after a pregnancy loss. Future work could explore such notions.

Another area for future consideration is links between financial predictors and sexual well-being after pregnancy loss. The total health service cost for an early pregnancy loss has been found to range from $508 to $3,826 CDN and indirect costs in the form of lost work productivity for women after early pregnancy loss range from $730 to $889 CDN (for review, see Quenby et al., 2021). Despite such financial costs, to my knowledge, no empirical studies examining links between financial burdens and post-loss sexual well-being exist. In community and clinical contexts outside pregnancy loss,

financial difficulties and stressors have been linked to lower sexual well-being (e.g., Allsop, Péloquin, et al., 2023; Saxey et al., 2021). Potentially, financial difficulties may be a risk factor for lower post-loss sexual well-being, where financial stress heightens negative emotion after a pregnancy loss, with ramifications to the quality of sexual well-being for couple members. Researchers can investigate such a notion through studies focused on individuals with lower incomes. In contrast to the relatively affluent couples of the ALOE study, such individuals may be more likely to experience ramifications from financial stressors to sexual well-being.

Additionally, research should evaluate best practices for patient-provider interactions to promote couples' sexual well-being post-loss. Over half of individuals seeking care post-loss have reported stigma and minimization of their losses from providers (Watson et al., 2019), and individuals may face similar neglect when seeking care for post-loss sexual challenges. A study examining the implications of health care provider invalidation for couple members' sexual well-being, and on other practices such as provider empathy, follow-up, and provision of referrals and resources to couples (Watson et al., 2019), could inform treatment models and best practices for working with couples after a pregnancy loss. As well, studies on what percent of couples receive information on sexual well-being post-loss from healthcare providers could call attention to the discrepancy between professional recommendations to address sexuality after pregnancy (American College of Obstetricians and Gynecologists Presidential Task Force on Redefining the Postpartum Visit and the Committee on Obstetric Practice, 2018) but no mention of sexuality in recommendations related to pregnancy loss (American College of Obstetricians and Gynecologists Committee on Practice

Bulletins—Gynecology, 2018). Ideally, given individuals with lived experience are key to identifying barriers to research participation (for review, see McCarron et al., 2021), such individuals should be consulted to ensure that collecting data about consultations with healthcare providers does not unduly burden participants' post-loss recovery.

Furthermore, another logical future direction would be an intervention study designed to test the efficacy of a treatment to promote sexual well-being for couple members after a pregnancy loss (e.g., a randomized controlled trial with a waitlist control group). To my knowledge, there are no post-pregnancy loss interventions for couples that are focused on sexuality. However, scholars have identified effective interventions for improving perinatal grief through treatment studies, such as cognitive behavioral therapy or mindfulness approaches (Dolan et al., 2022; Fernandez-Ferez et al., 2021). Potentially, such interventions could be adapted by including a module about sexuality. A brief psychoeducation or cognitive behavioral therapy-based intervention which targets perinatal grief may be a fruitful intervention given the widespread links I found in my dissertation between either partner's perinatal grief with both couple member's sexual well-being. Based on recent findings (Dawson et al., 2022), using brief video-based psychoeducation, even videos which are less than five minutes long, could be an effective starting point to help couples improve perinatal grief and sexual well-being together.

I also note future directions which I suggested in an expert review article together with Dr. Natalie Rosen (Allsop & Rosen, 2024) that I have not touched on thus far in my dissertation. These future directions include more basic research on post-loss sexual well-being, such as risk and protective factors of sexual well-being, post-loss coping and adaptive mechanisms, and any differences between those with one or multiple losses. As

well, future works can study sexual well-being among those who experience later losses (in my sample, only 14% of couples had losses after 15-weeks gestation) and study sexual well-being across a longer time frame post-loss than the 4 months covered in my dissertation. Altogether, there remains little research overall on post-pregnancy loss sexual well-being, making new research in this area essential to knowing how to support couples after a pregnancy loss.

5.5 Conclusions

Pregnancy loss is difficult and common for individuals and couples. Yet it has been unclear to what extent sexual well-being is at risk post-loss, what factors predict sexual well-being during this period (such as perinatal grief), and how sexual well-being might change across time post-loss. I used cross-sectional and longitudinal data from couples who had a pregnancy loss in the previous 4 months to address these research gaps. Specifically, I compared multiple aspects of sexual well-being between couples with a recent pregnancy loss and a control sample, examined if perinatal grief is a risk factor for lower sexual well-being, and modeled changes across time in sexual well-being and perinatal grief in the early months post-loss. I provided the first evidence based on group comparisons that couple members who on average had a pregnancy loss 10 weeks prior had lower sexual satisfaction and increased sexual desire discrepancies between partners than controls. Yet, I also found that they did not have greater sexual function problems, higher sexual distress, or lower sexual frequency than their control counterparts. As well, I provided the first evidence that when either partner reported higher perinatal grief than their average across 4 months, both couple members also reported lower sexual well-being than their average across 4 months, including lower

than typical sexual satisfaction and sexual desire, and higher than typical sexual function problems and sexual distress. I also found that those whose average perinatal levels (averaged across 4 months) were higher than their peers reported the lowest average sexual satisfaction levels and the highest average sexual function problems and sexual distress levels. Additionally, I provided the first empirical study of sexual well-being trajectories after a pregnancy loss. This study provided evidence of improvements from 10 to 25 weeks post-loss in sexual satisfaction for both couple members as well as in sexual distress for men, women, and gender diverse individuals who were not pregnant when the loss occurred, but no changes in their sexual desire for either member of the couple. This study also provided evidence that although perinatal grief declined for both couple members over time, sexual well-being trajectories were not significantly associated with earlier perinatal grief.

Together, the findings of my dissertation underscore the need for practitioners and researchers to give focused and sustained attention to both couple members and their sexual well-being and perinatal grief after a pregnancy loss. As researchers and practitioners provide such attention, they might help to stem the tide of ignorance and invalidation that pervades professional and societal attitudes toward pregnancy loss and its difficulties and promote the health and relationships for affected couples.

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