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Is Expectant Couples' Similarity in Attitudes to Sex during Pregnancy Linked to Their Sexual Well-being? A Dyadic Study with Response Surface Analysis

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ABSTRACT

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

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

significant risk to their pregnancy, including those that involve vaginal penetration (Jones et al., 2011; Klebanoff et al., 1984; Sayle et al., 2001), making these concerns unwarranted.

Attitudes Toward Sex during Pregnancy and Couples' Sexual Well-being

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

The type of attitude that each partner holds toward having sex during pregnancy has been found to contribute to dimensions of their sexual well-being, which typically comprises frequent emotional experiences of mutual sexual pleasure–sexual satisfaction—as well as absent or infrequent negative emotions regarding their sexuality–sexual distress. Expectant women and men who report more positive attitudes toward

having sex while pregnant also report greater sexual satisfaction during this period (Jawed-Wessel et al., 2019). On the other hand, individuals who express greater fears that sex could harm their pregnancy are more likely to avoid sexual activities as a result and to experience greater sexual distress (Beveridge et al., 2017; Jawed-Wessel et al., 2016, 2019). Although these prior studies indicate a clear contribution of the individual's attitudes to their sexual well-being during pregnancy, the decision that couples make to engage in sex (or not) is embedded in an interpersonal context in which the other person's thoughts and feelings are also relevant (Mark et al., 2020). As such, the couples' sexual adjustment to pregnancy might be affected by the combination of *both* partners' attitudes toward sex, above and beyond the contribution of each person's attitudes (Kenny et al., 2006).

Furthermore, normative roles regarding who initiates sex may also be at play during pregnancy. While men typically assume the role of the initiator of sex, women typically assume the traditional role of being more passive and restrictive of men's sexual advances (Clark & Hatfield, 1989; Hendrick & Hendrick, 1995; Kiefer & Sanchez, 2007; Nobre & Pinto-Gouveia, 2006; O'Sullivan & Byers, 1992). These roles may influence the extent to which both partners adhere to more *versus* less positive attitudes toward sex during pregnancy and are likely to influence the couple's decision either to engage or not engage in sex during this period. Taking a dyadic approach to understanding differences can elucidate the mechanisms underlying these potential gender dissimilarities.

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

Similarity in Attitudes between Partners

Interdependence in dyadic processes assumes that, in the context of close relationships, an individual's outcomes are intertwined with the needs, thoughts, and motives of the other person (e.g., Rusbult & Van Lange, 2008). First-time expectant couples are faced with the novel situation of

navigating their sexual lives in the context of pregnancy. The combination between both partners' attitudes toward sex during pregnancy, rather than the independent effect of their individual characteristics, may therefore be fundamental to better understand both partners' sexual satisfaction and distress.

Being similar to one's partner on several characteristics and preferences (e.g., demographic variables, physical attractiveness, sexual attitudes) has been linked to greater individual and relational well-being, including satisfaction with life, relationship quality and stability, and importantly, sexual satisfaction (Acitelli et al., 2001; Arrindell & Luteijn, 2000; Cupach & Metts, 1995; Montoya et al., 2008; Wilson & Cousins, 2003). Partners in romantic relationships are likely to share similar attitudes toward sex (Cupach & Metts, 1995), and social-cognitive theories have proposed that similarity between partners poses benefits for them individually as well as for their relationship (e.g., Anderson et al., 2003; Lawrance & Byers, 1995). For instance, the theory of emotional convergence proposes that higher similarity between partners is advantageous because it makes them better able to understand each other (Anderson et al., 2003). Individuals whose attitudes are similar may experience comparable cognitions and feelings relative to a specific situation and are therefore more likely to be responsive in the face of a distressing event (Anderson et al., 2003; Gaunt, 2006; Smith et al., 1993), such as the onset of new sexual concerns related to pregnancy. Indeed, aspects such as greater dyadic empathy and perceived partner responsiveness have been found to contribute to couples' greater sexual and relationship satisfaction during the transition to parenthood (Rosen et al., 2017, 2020). Taken together, both interdependence theory and the theory of emotional convergence suggest that when a partner does not present an attitude similar to our own, this difference might be associated with negative feelings (such as confusion and anxiety) because it creates inconsistency and does not validate one's view of the world (Festinger, 1957; Montoya et al., 2008). Through this process, negative affect is elicited and one's beliefs and expectations about the situation (or about the other person's reactions to the situation) are challenged.

Testing (Dis)similarity in Dyads

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

between predictor and outcome variables (Edwards, 2007), leaving out the possibility of assessing nonlinear (e.g., curvilinear) relationships. Another important limitation is that they do not accurately assess the best possible fit between partner's attitudes and each of the examined outcomes, a question to which dyadic response surface analysis (DRSA) provides answers to.

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

The Current Study

In the current study, we sought to extend the existing literature in several ways. Using a dyadic design, we first assessed the degree of similarity *versus* dissimilarity that expectant couples (i.e., the pregnant individual and their partner) demonstrated in attitudes toward sex during pregnancy. Second, we examined whether couples' degree and direction of similarity/dissimilarity in attitudes was associated with each partner's sexual satisfaction and sexual distress by employing DRSA. Considering prior evidence, it is possible that couples who are similar at more positive levels of attitudes may experience better sexual outcomes than couples who are similar at less positive levels of attitudes. But it is also possible that couples' overall level of attitudes matters more to their sexual outcomes than being similar. Given that no prior studies tested this question, we did not pose specific hypotheses regarding strict/broad similarity patterns (Humberg et al., 2019), i.e., whether similarity matters above and beyond the overall level of couples' attitudes. These patterns were therefore assessed in an exploratory manner. Still, based on prior research (Anderson et al., 2003; Beveridge et al., 2017; Jawed-Wessel et al., 2016, 2019), we expected that when both partners hold more positive attitudes to sex during pregnancy, then both members of the couple would also experience greater sexual well-being (higher satisfaction and lower sexual distress) compared to when both partners hold less positive attitudes. Regarding dissimilarity, we

expected that larger degrees of dissimilarity between partners would be linked to poorer outcomes relative to smaller degrees of dissimilarity. Whether expectant partners' sexual outcomes are significantly different depending on who is the higher *vs* lower partner on attitudes was examined in an exploratory manner.

Method

Participants

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

The final sample comprised 254 first-time expectant couples who ranged in age from 19 to 47 years old (women: $M = 29.90$, $SD = 4.75$; men: $M = 31.56$, $SD = 4.85$). Of the initially recruited sample ($n = 610$), 182 potential interested couples were not enrolled (i.e., declared to be uninterested after hearing about the study or withdrew at the initial stage of the survey). A total of 35 potential participants ($n = 29$ women; $n = 6$ partners) were excluded after screening because they did not meet the inclusion criteria. Of the eligible sample of couples ($n = 393$), 120 couples had only one partner responding to the survey, 17 couples had missing data for one partner representing more than 20% of a measure (Newman, 2003), and 2 couples had experienced pregnancy loss between screening and enrollment; these participants were not included in the final sample. Compared to their included counterparts, participants who responded to the survey without the participation of their partners were younger, were more likely to a report history of recurrent pregnancy loss, reported a lower household income, and higher levels of depressive symptoms. No significant differences were found for any other individual (e.g., educational level, psychiatric/physical health status or history) or relational (e.g., relationship status and duration, living with partner, dyadic adjustment) aspects. Although the study was advertised as inclusive of couples of all genders and identities, all couples were mixed-gender/sex.¹ Sociodemographic characteristics of the sample are presented in Table 1.

There is no established consensus regarding required sample sizes for DRSA, as the necessary sample size depends on the (co) variance estimates and effect sizes (i.e., actor and partner effects)

¹No participants identified as gay/lesbian, and all were currently in a mixed-gender/sex relationship. For this reason, we do not refer to participants collectively as heterosexual but describe couples as being in mixed-gender/sex relationships.

Table 1. Sample sociodemographic characteristics (N = 508 individuals; 254 couples).

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

of the model and, to date, no power analysis tool exists for DRSA. Therefore, we followed recommendations for non-dyadic RSA models combined with simulation results using the Actor Partner Interdependence Model (APIM) power calculator (Ackerman et al., 2016). Recommendations for non-dyadic RSA models suggest a sample size of at least $n = 200$ individuals so that a single parameter would explain the additional variance when all other parameters are held constant in a squared difference model (Schönbrodt et al., 2018). Recommendations also suggest a sample size of at least two times the size that would be necessary to detect linear effects of the predictors (Aiken & West, 1991). A power simulation using APIMPower (Ackerman et al., 2016) indicated that one would need a minimum of 121 dyads to have adequate power (i.e., 0.80) to detect medium ($r = .25$) actor and partner effects in a standard APIM. The current sample size ($n = 254$ dyads) exceeds the minimum criteria of both recommendations.

Procedure

First-time expectant couples were recruited from June 2018 to September 2020 as part of a larger study on sexuality and relationships during the transition to parenthood. Some

results of the larger study have been previously published (Tavares et al., 2021) but did not focus on dyadic similarity in attitudes toward sex during pregnancy. Participants were recruited at regularly scheduled clinical appointments to gynecologists in an obstetrics outpatient unit ($n = 207$ couples, 82%) as well as through online/social media advertisements and study flyers posted in the community (i.e., pregnancy-related services, clinic and hospital bulletin boards; $n = 47$ couples, 18%). Participants recruited through community/media advertisements completed all the materials online. Participants enrolled in the obstetrics outpatient unit were recruited through gynecologists' referral. After their gynecological appointment, potentially eligible couples were invited to speak directly to the study coordinator present on-site who described the study. If interested and eligible, participants were asked to complete the survey online, which was sent to both partners separately to their own e-mail addresses. Upon following the URL link, participants provided informed consent online before beginning the survey. When one member of the couple completed the survey, the participant was asked to provide the other couple member's e-mail address as well as a couple identifying code. This information was stored in a secure database, separate from their survey responses,

and was used to link both couple members' data once both had completed the survey. The other member was then e-mailed a questionnaire link to the survey and was asked to include the couple identifier code so that both partners' data could be linked. Three attention-check items were included throughout the survey (Maniaci & Rogge, 2014). If participants did not respond correctly to at least two of these three items, they would be excluded from the sample; no participants were excluded due to this criterion. Couple members were instructed to complete their surveys independently from each other and within four weeks after receiving it. To promote couples' participation and engagement with the study, all participants who had not yet completed the survey received phone call (at 2–3 days and at 2 weeks after the survey was sent) and e-mail (at 1 week and at 3 weeks) reminders. Each couple was compensated with a 10€ gift card as part of the larger study and, after completion of the study, individuals received a list of resources related to sexuality and relationships during the transition to parenthood. The study received approval by the ethical review boards at the Faculty of Psychology and Educational Sciences at the University of Porto and at the Centro Materno-Infantil do Norte.

Measures

Sample Characteristics

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

Attitudes Toward Sex during Pregnancy

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

Frequency of Sexual Activities

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

Sexual Satisfaction

Respondents completed the Global Measure of Sexual Satisfaction (GMSEX), a widely used, valid and reliable self-report measure of sexual satisfaction in relationships (Lawrance & Byers, 1995; Pascoal et al., 2013). GMSEX comprises five 7-point bipolar scales in which participants assess the sexual relationship with their partner (*Good/Bad*, *Pleasant/ Unpleasant*, *Positive/Negative*, *Satisfying/Unsatisfying*, and *Valuable/Worthless*). Total scores range from 5 to 35, with higher scores indicative of greater sexual satisfaction. Reliability in the current study was excellent ($\alpha_{\text{women}} = .96$, $\alpha_{\text{men}} = .97$).

Sexual Distress

The well-validated Female Sexual Distress Scale-Revised (FSDS-R; Derogatis et al., 2008) is a self-report measure that assesses distress relative to one's sexual life in the last month. The FSDS-R uses 13-items rated on 5-point scales (e.g., "How often did you feel distressed about your sex life?," 0 = *never* to 4 = *always*). Total scores range from 0 to 52, with higher scores denoting greater sexual distress. A total score greater than 11 for women and greater than 19.5 for men is considered indicative of clinically significant distress associated with sexual problems (Derogatis et al., 2008; Santos-Iglésias et al., 2018). The FSDS-R has demonstrated good psychometric properties and showed excellent internal consistency in our sample ($\alpha_{\text{women}} = .95$, $\alpha_{\text{men}} = .94$).

Data Analysis

Descriptive statistics were calculated with the Statistical Package for the Social Sciences (SPSS v26.0, SPSS Inc, Chicago, IL). To examine our hypotheses about how similarity in attitudes toward sex during pregnancy relate to expectant partners' sexual satisfaction and sexual distress we used DRSA, an approach that builds on the APIM (Kenny et al., 2006) and employs polynomial regression to plot the associations in a three-dimensional space using response surface analysis (RSA; Edwards, 2007; Humberg et al., 2019). The DRSA models as well as the surface plots were estimated in R (R Core Team, 2017; Schönbrodt et al., 2018) using the maximum likelihood estimator and the full information maximum likelihood for missing data treatment. The de-identified data and syntax for the DRSA analyses are available at: https://osf.io/myh7n/?view_only=2e24554328204361ad0a3788b08a5b79

As per Shanock et al.'s (2010) guidelines, we first centered the variables (i.e., MSP and PSP scores) around the midpoint of the scale (i.e., 3.5) and created squared versions of these centered variables as well as a product term (i.e., the interaction between pregnant woman's scores and partners' scores on attitudes). These five variables (woman's attitude, man's attitudes, squared versions of women and men attitudes, and their interaction) were entered as predictors of each partners' sexual satisfaction and sexual distress (see Figure 1).

The DRSA uses these polynomial regression coefficients to calculate four response surface parameters ($a1$, $a2$, $a3$, and $a4$). These parameters permit the creation of the three-dimensional response surface plot, a graphical representation that illustrates the level of each partners' outcome (i.e., sexual satisfaction and

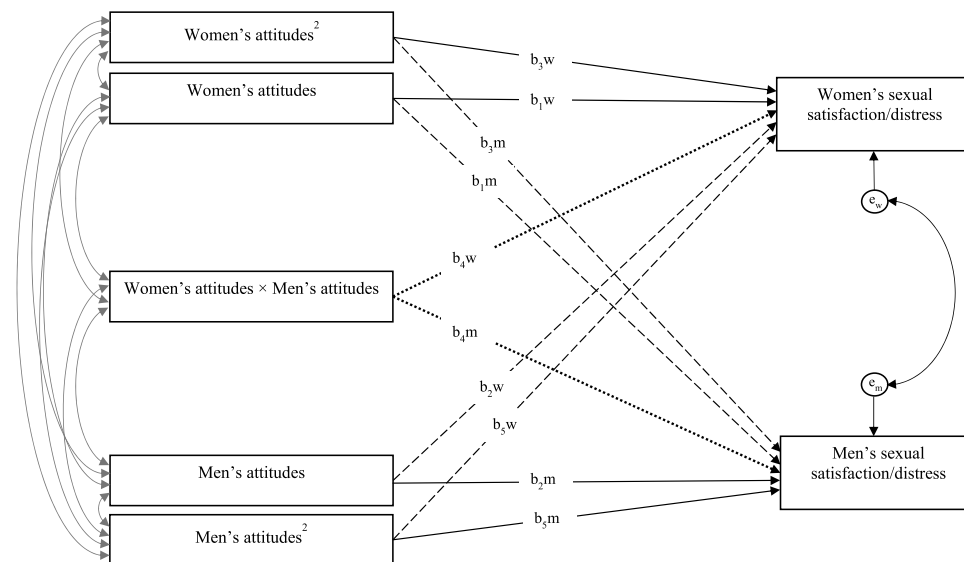


Figure 1. Dyadic polynomial regression model testing for similarity effects between expectant partners' attitudes to sex during pregnancy and both partners' sexual satisfaction and sexual distress. Solid lines represent actor effects, dashed lines represent partner effects, and dotted lines represent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

sexual distress) for different combinations of both partners' attitudes. The $a1$ surface value tests for the slope of the *line of congruence* (LOC, i.e., the line where couples are perfectly similar at different levels of attitudes). A significant and positive $a1$ indicates that couples with more positive attitudes report *higher* levels of sexual satisfaction/distress than couples with less positive attitudes, whereas a significant and negative $a1$ indicates that partners' more positive attitudes are associated with *lower* sexual satisfaction/distress compared to less positive attitudes. We expected $a1$ to be significant and positive for sexual satisfaction and significant and negative for sexual distress, for both partners. The $a2$ parameter tests for a nonlinear effect along the LOC. No previous research is available to support hypotheses regarding a nonlinear effect of the LOC, but the $a2$ surface value further informs about potentially dissimilar effects on extreme values of similarity. A significant $a2$ would indicate that similarity at extreme levels of attitudes has different effects than similarity at mid-levels (i.e., nonlinear effect) for expectant partners' sexual satisfaction and sexual distress.

The $a3$ and $a4$ coefficients provide complementary information about the effects of attitude dissimilarity on expectant couples' sexual satisfaction and distress. These parameters test two aspects of the *line of incongruence* (LOIC, i.e., the line where couples are most dissimilar at different levels of attitudes): the slope (i.e., the direction of dissimilarity; $a3$) and the curvature (the degree of dissimilarity; $a4$). The $a3$ provides information as to whether attitude dissimilarity in one direction – the pregnant individual holds more positive attitudes toward sex during pregnancy than the partner – is better than in the other direction – the partner has more positive attitudes than the pregnant individual – for couple's sexual well-being. Positive $a3$ values would indicate that when one's own attitude is more positive than a partner's attitude, that person will report a higher outcome compared to when a partner's attitude is more positive than their own, whereas negative $a3$ values would indicate that when a partner's

attitude is more positive than one's own attitude, that person will report a higher outcome compared to when one's own attitude is more positive. A significant $a4$ would indicate whether, overall, sexual well-being increases or decreases more sharply as attitudes between partners diverge. We anticipated that a larger attitude dissimilarity would be linked to poorer sexual well-being relative to smaller degrees of dissimilarity and, as such, we expected $a4$ to be significant and negative for sexual satisfaction (i.e., sexual satisfaction would decrease as the degree of attitude dissimilarity increases) and significant and positive for sexual distress (i.e., sexual distress would increase as the degree of attitude dissimilarity increases).

Evidence of similarity patterns (i.e., when similarity between partners matters more to their sexual well-being than the couples' overall level of attitudes) cannot be inferred from surface values in isolation. To determine that similarity between partners is linked to the best sexual well-being (higher satisfaction and lower distress) above and beyond the overall level of attitudes for the couple, several conditions must be satisfied (Humberg et al., 2019). Strict and broad similarity patterns should satisfy additional conditions; for interpretation of evidence on strict/broad similarity effects, see Humberg et al. (2019). For an overview of the RSA method and interpretation of the $a1$ – $a4$ coefficients, see Barranti et al. (2017) and Schönbrodt et al. (2018).

Results

Preliminary Analyses

We first inspected the percentage of similar *versus* dissimilar dyads. To do so, we followed current guidelines (Shanock et al., 2010) and standardized scores for each predictor variable (MSP and PSP) across genders and then computed the difference between the two standardized scores. Those dyads with an absolute difference larger than 0.5 z-points

between male and female scores were considered a ‘dissimilar couple’ (Shanock et al., 2010). Of the 254 couples in the current sample, 31.6% showed similarity in attitudes scores, whereas 68.4% demonstrated dissimilarity in attitudes toward sex during pregnancy (34.1% of couples had pregnant women reporting more positive attitudes than men and 34.3% of couples had men reporting more positive attitudes than pregnant women). We also examined the existence of multivariate outliers using Cook’s distance (Bollen & Jackman, 1985; Schönbrodt et al., 2018) and detected none. Therefore, we proceeded to test our key predictions.

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

Table 2. Descriptive statistics and bivariate correlations among the study variables (N = 254 couples).

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

Within-dyads correlations are represented on the diagonal (in bold), within-women correlations are represented above the diagonal, and within-men correlations are represented below the diagonal. W = women, M = men. ***p* < .01.

Dyadic Response Surface Analysis

Table 3 presents the results of the dyadic polynomial regression coefficients and the surface tests; the surface parameters are the

Table 3. Dyadic polynomial regression coefficients and response surface parameters of both partners’ attitudes toward sex during pregnancy on sexual satisfaction and sexual distress (N = 254 couples).

Outcome	<i>b</i> ₀	<i>b</i> ₁ W	Dyadic polynomial regression coefficients				Response surface parameters			
			<i>b</i> ₂ M	<i>b</i> ₃ W ²	<i>b</i> ₄ WxM	<i>b</i> ₅ M ²	<i>a</i> ₁	<i>a</i> ₂	<i>a</i> ₃	<i>a</i> ₄
Sexual satisfaction										
Women	28.80 (.62)***	1.51 (.76)*	.02 (.85)	-.11 (.37)	-.31 (.63)	.48 (.47)	1.54 (1.09)	.06 (.57)	1.49 (1.20)	.68 (1.16)
Men	26.83 (.73)***	1.52 (.85)*	1.36 (.88)	-.23 (.36)	-.19 (.71)	.24 (.52)	2.88 (1.20)**	-.18 (.60)	.16 (1.23)	.20 (1.31)
Sexual distress										
Women	11.63 (1.08)***	-3.55 (1.33)**	-.22 (1.56)	.32 (.60)	.55 (.94)	-.72 (.81)	-3.77 (1.88)*	.15 (1.08)	-3.33 (2.20)	-.94 (1.68)
Men	10.44 (1.01)***	-.45 (.85)	-3.87 (1.20)***	.07 (.41)	-.08 (.69)	.21 (.64)	-4.32 (1.34)***	.20 (.62)	3.42 (1.60)*	.36 (1.35)

Polynomial regression coefficients (*b*₁ – *b*₅) are unstandardized b-weights but can be interpreted as standardized β-weights due to the prior pooled-standardization across partners. Standard errors are provided for all coefficients in brackets. Response surface parameters (*a*₁ – *a*₄) are calculated using coefficients *b*₁ – *b*₅; it is based on *a*₁ – *a*₄ parameters that our hypotheses are examined. W = women, M = men.

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

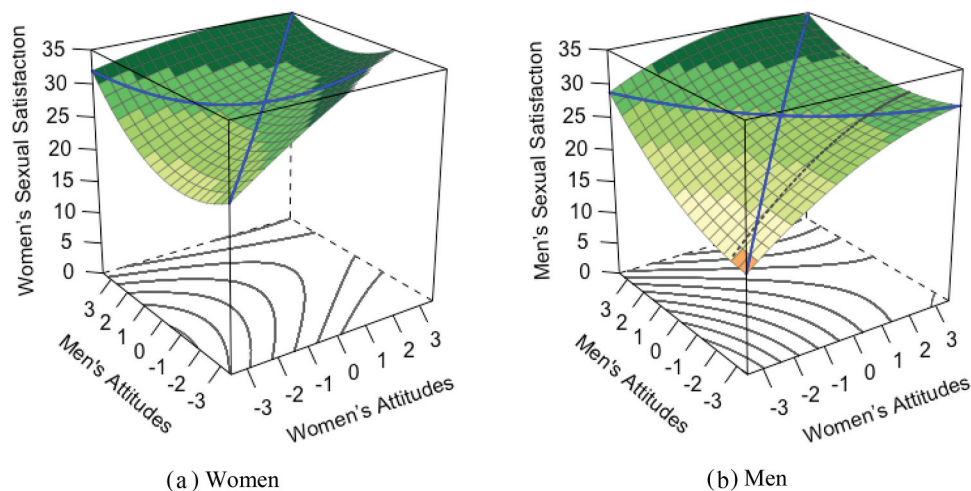


Figure 2. (a, b) Dyadic response surface plots for the association between a person’s own and his or her partner’s attitudes to sex during pregnancy and sexual satisfaction. Sexual satisfaction for all possible combinations of perfect similarity between partners’ attitudes is depicted on the blue vertical line (i.e., the line of congruence, LOC) that connects the front corner (the similar low/low combination) to the back corner (the similar high/high combination) of the cube. The surface above the LOC reveals how sexual satisfaction behaves for varying values of X = Y; the pattern here, with the top end at a higher value of sexual satisfaction, indicates that greater similarity in higher positive attitudes is associated with higher sexual satisfaction than similarity in lower positive attitudes (*a*₁). The LOC is best represented by a linear, and not curvilinear, association (*a*₂).

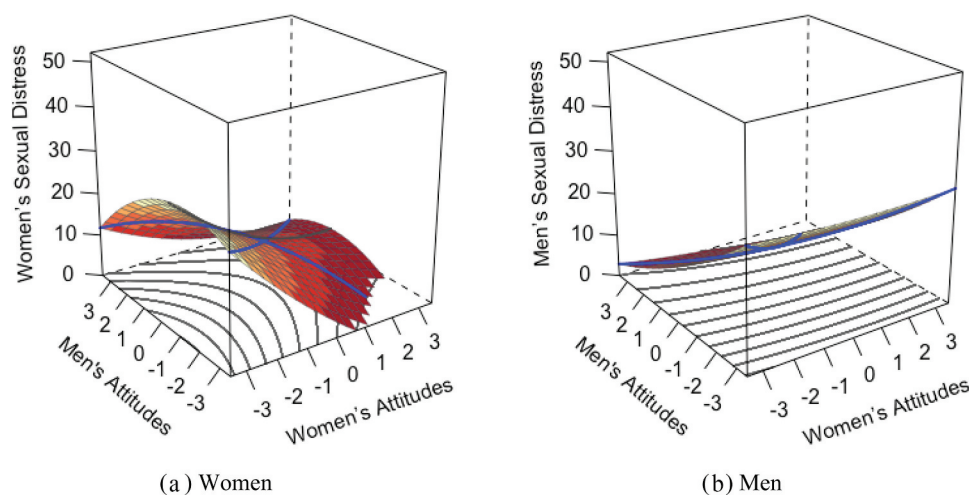


Figure 3. (a, b) Dyadic response surface plots for the association between a person's own and his or her partner's attitudes to sex during pregnancy and sexual distress. In relation to our results for $a1$, the line of congruence—that connects the front corner (the similar low/low combination) to the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

key tests of our predictions. Figures 2 and 3 show the response surface plots, depicting how combinations of actor's (on the x-axis) and partner's (on the y-axis) attitudes toward sex during pregnancy relate to women's and men's sexual satisfaction and sexual distress (on the z-axis), respectively.

Sexual Satisfaction

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

Sexual Distress

The DRSA on sexual distress indicated a significant negative $a1$ for both women and men (see Table 3). As expected, this value suggests that both women and men reported lower sexual distress when both members of the couple held more positive attitudes compared to couples where both partners held less positive attitudes to sex during pregnancy (see Figure 3(a,b)). Additionally, a significant positive $a3$ was found for men

indicating that, for men's sexual distress, the direction of dissimilarity between partners' attitudes mattered. When couple members presented dissimilar attitudes, men reported significantly higher sexual distress when their female partners held more positive attitudes than them, compared to when they held more positive attitudes toward sex during pregnancy than their female partners (see Figure 3(b)).

Ruling Out Alternative Explanations

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

We also assessed whether the observed effects were explained, at least partially, by couples' frequency of sexual activities (in the preceding four weeks). For between-dyads activities such as vaginal penetration, oral sex, mutual masturbation, anal penetration, kissing and caressing (i.e., same frequency for both couple members) we used the average between

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

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

Discussion

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

(Anderson et al., 2003; Gaunt, 2006), and that poses relevant clinical implications.

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

A central purpose of this study was to examine whether the levels of similarity in expectant couples' attitudes to sex during pregnancy were related to each partner's levels of sexual satisfaction and distress. Overall, current findings do not support the idea that individuals who are similar to their partner in attitudes toward sex during pregnancy are more satisfied and less distressed than those who are dissimilar but, instead, indicate that it is the overall *level* of attitudes for the couple that matters to both partners' sexual well-being. In the case of couples who share similar attitudes, as expected, having both members of a couple share more positive attitudes toward sex during pregnancy was relevant for both partners' sexual well-being. Specifically, both partners experienced lower sexual distress and men experienced greater sexual satisfaction. Couples who share positive attitudes (which include more positive beliefs and feelings about having sex while pregnant) may be more congruent in how they adapt their sexual activities in the context of pregnancy as well as in their efforts to cope with novel, potentially distressing events (e.g., bleeding after penetration, women's perception of intense contractions after orgasm). Furthermore, partners who share comparable cognitive-emotional responses to a novel sexual situation, as is sex during pregnancy, are more likely to be responsive to the other's concerns and to offer validation and support in ways that may be more in line with the other partner's needs and expectations (Anderson et al., 2003; Rosen et al., 2017, 2020), thereby increasing satisfaction and reducing the impact of negative sexually-related feelings toward sex that can emerge across this period.

An exception to this pattern was found for pregnant women's sexual satisfaction that, unlike our expectation, was not related to the similarity between partners on attitudes. Indeed, the APIM results indicate that pregnant women's sexual satisfaction is associated with their own level of attitudes (intrapersonal effects) but was not associated with those of their partners (no interpersonal effects). During pregnancy, women typically experience a large number of changes (e.g.,

tiredness, breast tenderness, changes in physical appearance) that may affect their sexuality both physically and psychologically (Johnson, 2011; Pauls et al., 2008; Trutnovsky et al., 2006). Our results suggest that women's sexual satisfaction during pregnancy might be more strongly affected by their experienced individual changes – such as physiological changes, body image concerns due to the emerging bodily alterations, and their own attitudes to sex (Johnson, 2011; Pauls et al., 2008) – and less informed by their similarity to their partners' attitudes.

A novel finding of this work concerns the effect of expectant couples' attitude dissimilarity on men's sexual distress. Minimal research has dedicated attention to sexual distress in expectant couples, although distress is a necessary marker for sexual dysfunction and an important indicator of concerning sexual changes. Prior studies assessing pregnant women's sexual distress found it to be prevalent (e.g., Vannier & Rosen, 2017) but fewer studies have examined male partners' sexual distress. We found that, in couples where partners showed dissimilar attitudes toward sex during pregnancy, it was not the *magnitude* of dissimilarity that mattered for their sexual well-being, but rather the *direction* of this dissimilarity. Men demonstrated greater distress when women's attitudes were more positive than their own, compared to when their own attitudes were more positive than those of women. In other words, this finding indicates that, for men, their own levels of sexual distress during pregnancy are related to which partner demonstrates the least positive attitudes toward having sex. Men who hold less positive attitudes feel more anxious about having sex and believe it to have undesirable consequences (e.g., "Having sex can cause a miscarriage"). When their partners do not endorse these attitudes to the same extent and feel more comfortable about engaging in sex than them, men may feel they are the "gatekeeper" of sex during this period. These men may feel negative responses to their partners' attempts to engage in sex (e.g., they may feel pressured to comply or feel guilty about declining sex; Sutherland et al., 2015) or they even might consider that the responsibility to avoid negative sexual outcomes and to safeguard the women's and baby's well-being is predominantly on them. Another possibility is related to the sexual beliefs widely reported by men, namely concerning the pressure to perform (e.g., "A real man has sexual intercourse very often") and to guarantee women's sexual satisfaction (e.g., "A man who doesn't sexually satisfy a woman is a failure"; Nobre & Pinto-Gouveia, 2006). If these men endorse such typical masculine beliefs about sex, then they might be prone to experience higher sexual distress when their female partner is more willing to have sex despite the pregnancy, as they might feel it is more difficult and stressful to decline sex. In any case, these couples' attitude discrepancy might lead men to experience greater negative affect toward sex (e.g., worry, guilt, frustration, anger) during this life period. Although this finding indicates that being dissimilar to one's partner on attitudes to sex during pregnancy matters for men's sexual distress during pregnancy, it should be noted that this is only the case for those couples where partners report significant differences in attitudes.

Demonstrating more positive attitudes to sex during pregnancy was also linked, for both couple members, to higher

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

Strengths and Limitations

The current findings are valuable as they result from a large sample of couples and from the use of a novel analytical approach that simultaneously examines both the magnitude and direction of differences, which permits going beyond the limited approach of testing difference scores (Edwards, 2007). Still, this work is not without limitations. First, the current study was aimed at describing these relationships in a cross-sectional manner. Although attitudes are theorized as cognitive-affective dimensions that inform an individual's evaluation of a specific idea or situation (e.g., Ajzen & Fishbein, 1977; Eagly & Chaiken, 1998), the current study cannot confirm causality between attitude discrepancy and couples' sexual satisfaction and distress. Causal links may be tested, for instance, using longitudinal designs, and further studies might want to examine additional mediators of the pathway between these variables (e.g., frequency of sexual activities, frequency of occurrence of negative events such as bleeding after penetration, perceived partner responsiveness), which will inform theory and clinical protocol development. Also, future studies might want to examine whether it is the joint importance of cognition and affect as a global attitude toward sex that matters, as our study suggests, or whether there are attitudinal subdimensions (i.e., particular cognitions and affective responses) that prove the most relevant. Second, most sociodemographics of our sample were in line with characteristics of couples who are having a first child, including in the Portuguese national context (i.e., age, marital status, and socioeconomic status), but an exception to that was participants' relatively high education level, which may influence the attitudes they reported. Also, our sample consisted of couples in mixed-gender/sex relationships who were not distressed at clinical levels and who were mostly sexually satisfied; therefore ceiling effects may limit response variance. Finally, we did not specifically assess strict dyadic invariance between the MSP/PSP scales in the current work, and therefore cannot exclude the

possibility of results being partially explained by measurement model differences. Future studies might want to extend the examination of this questions to couples with more diverse socioeconomic (e.g., sexual, racial and ethnic minorities, and of lower socio-economic status) and obstetric (e.g., couples struggling with fertility) characteristics and in both satisfied and distressed relationships.

Implications

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

Conclusions

We demonstrated that couples' more positive attitudes, rather than partners' similarity in attitudes, were associated with lower sexual distress for both pregnant women and their partners and higher sexual satisfaction for male partners during pregnancy. The development of interventions promoting sexual satisfaction and reducing sexual distress during pregnancy should consider targeting attitudes to sex in *both* expectant partners, considering an interpersonal

approach.

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