

## **An Examination of Psychosocial Processes Related to Quality of Life in Pregnancy**

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Perinatal anxiety and potential protective processes are often poorly understood compared to other types of perinatal distress. The present study investigated the relationship between perinatal anxiety and quality of life or life satisfaction in a pregnant sample. Psychological flexibility and self-compassion were examined as moderators of these associations. COVID-19 and other external factors were examined on an exploratory basis. Results indicate significant correlations between perinatal anxiety and satisfaction with life, as well as psychological flexibility and perinatal anxiety; proposed interaction effects were not significant. This study may enhance understanding of these processes and contribute to the growing field of reproductive psychology.

*Keywords:* perinatal anxiety, self-compassion, psychological flexibility, quality of life, COVID-19, moderation analysis

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Pregnancy is often regarded as a beautiful time in a person's life. Yet, one-fourth of pregnant women meet the criteria for a psychological disorder, with one-twelfth of those women experiencing it for the first time during that pregnancy (Marchesi et al., 2016; Vesga-López et al., 2008). Perinatal mood and anxiety disorders (PMADs) are not currently recognized as individual diagnostic classifications in the *Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (DSM-5-TR)* but are referred to as specifiers of depressive disorders like major depressive disorder with peripartum onset. This specifier applies to a mood episode where symptoms occur during pregnancy and in the first four weeks following childbirth (American Psychiatric Association, 2022). PMADs are not only lacking diagnostic recognition despite their unique features that stem beyond depression, but they are also poorly researched and understood overall. Accurate estimates of the prevalence of these disorders are also lacking. However, recent research has suggested that the prevalence of PMADs, as well as severe mental illness (SMI) during and after pregnancy, has significantly increased in the United States over the past decade (McKee et al., 2020).

## **Psychological Conditions Observed in Pregnant and Postpartum Women**

### **Perinatal Depression, Baby Blues, and Postpartum Depression**

Perinatal depression is one of the most common psychological conditions noted in pregnancy, with around one in every seven women being affected (Kendig et al., 2017). It is estimated that around 20% of perinatal women in the United States experience symptoms of depression (Goodman, 2019; O'Hara & Wisner, 2014). Some of the symptoms seen in individuals with perinatal depression (and postnatal depression) include low and depressed mood, feelings of inadequacy and hopelessness, fatigue or sleep disturbance, anhedonia, additional fears or anxieties, and possibly the development of suicidal or infanticidal thoughts in severe cases (Bass & Bauer, 2018; Goodman, 2019; McKelvey & Espelin, 2018). Another experience involving depressive features is postpartum blues (also referred to as baby blues), which are considered to be relatively common (estimated to impact anywhere between 30-75% of postpartum women) and appear

within the first few weeks of delivery, given the significant changes in hormones, sleep, stress, and overall lifestyle changes, and dissipate relatively soon in the postpartum period (Accortt & Wong, 2017; Putri & Putri, 2022). Less common but still relatively prevalent, postpartum depression is estimated to occur in 13% - 20% of postpartum women and involves depressive symptoms that do not resolve after a few weeks in the early postpartum period (Bass & Bauer, 2018).

### **Anxiety in Pregnancy**

Perinatal anxiety often involves uncontrollable worry related to pregnancy, birth, the infant's health, changes in the mother's body, and one's ability to parent (Ayers et al., 2015; Marchesi et al., 2016). Despite being common, with estimates suggesting anywhere from 4%–39% (Marchesi et al., 2016) and 15%–25% (Dennis et al., 2017) of pregnant women experiencing significant levels of anxiety, most women do not seek treatment for their symptoms (Accortt & Wong, 2017). Many women do not qualify for formal diagnoses such as generalized anxiety disorder, panic disorder, or obsessive-compulsive disorder, but perinatal anxiety still can involve significant emotional distress, which can negatively impact maternal behaviors (Accortt & Wong, 2017). Various risk factors are correlated with perinatal anxiety, including younger age, single marital status, lower maternal education, comorbid psychological conditions, poorer maternal physical health, and limited access to social support (Bödecs et al., 2013; Borri et al., 2008; Faisal-Cury & Menezes, 2007; Giardinelli et al., 2012; Ibanez et al., 2012; Leach et al., 2017). Some of the consequences of untreated perinatal anxiety include an increased likelihood of developing preterm birth, possible later development of postpartum depression, lower sense of self-confidence in the mother, and poorer adherence to medical guidance (Accortt & Wong, 2017; Bauer et al., 2016; Kendig et al., 2017). Similar to perinatal anxiety, perinatal OCD often involves anxious, intrusive thoughts about fear of accidentally harming the fetus or infant and is estimated to occur in up to 15% of pregnant women and women in the first six months postpartum (Fairbrother et al., 2021; Wenzel & Kleiman, 2015). In general, perinatal anxiety is examined less often in research in comparison to postpartum depression. Unfortunately, research on

postpartum depression is already limited, so the literature on perinatal anxiety appears to be especially lacking.

### **Impact of Perinatal Mood and Anxiety Disorders**

Despite how common perinatal mood and anxiety disorders are, it is estimated that up to 50% of women experiencing these problems are never identified, so true prevalence rates are likely much higher than what is documented in research (Accortt & Wong, 2017; Gjerdingen & Yawn, 2007). These women must be identified because there are numerous consequences associated with untreated perinatal mood and anxiety disorders, not only for the mother but also for the child, the partner, and the family. This includes physical repercussions such as adverse birth outcomes and complications like preterm birth and low birth weight, increased risk for preeclampsia, and intrauterine growth restriction (Accortt & Wong, 2017; Armstrong, 2007; Davalos et al., 2012; Grote et al., 2010; Qiu et al., 2009).

Untreated perinatal mood and anxiety disorders can also greatly impact a mother's various relationships due to possible lower motivation to bond with the child because of preoccupation with personal distress, difficulties with romantic partners, and increased hesitancy to reach out for social support (Muzik & Borovska, 2010; Paris et al., 2009). Some studies have even shown that untreated perinatal mood and anxiety disorders can be associated with long-term negative impacts on offspring, including poorer physical, mental, and emotional health at and after birth, later conduct problems, and an impact even on the overall quality of life in the next generation (Bauer et al., 2016).

It is also crucial to highlight the fact that suicide is now considered to be a leading cause of death in the maternal population, with 20% of postpartum deaths resulting from suicide (Kendig et al., 2017; Khalifeh et al., 2016; Lindahl et al., 2005). The unfortunate reality is that many of these disorders are stigmatized, which may contribute to women not seeking help or treatment, even though these psychological disorders can be mitigated with various types of pharmacological and therapeutic interventions (Accortt & Wong, 2017).

### **Biopsychosocial Factors Related to Perinatal Distress**

Research has highlighted various biopsychosocial factors that may influence the likelihood of developing perinatal mood and anxiety disorders, as well as general perinatal distress. Social support has been demonstrated to predict health-related quality of life (emotional, mental, and physical health satisfaction) in pregnant and postpartum women in that those with higher levels of social support also endorsed higher levels of health-related quality of life (Emmanuel et al., 2012). Lack of social support has also been correlated with a higher risk of developing significant anxiety throughout pregnancy (Giardinelli et al., 2012; Leach et al., 2017). Social support has also been shown to play a mediating role in the association between perinatal anxiety and life satisfaction in that social support may buffer the negative impact of perinatal anxiety on overall satisfaction with life (Yu et al., 2020).

Research has also emphasized the fact that previous psychiatric history is associated with an increased likelihood of developing perinatal mood and anxiety disorders (Leach et al., 2017; Tambelli et al., 2019). In particular, previous history of depression and anxiety has been correlated with higher levels of perinatal and postpartum distress (Tambelli et al., 2019). In addition to having a history of psychological distress, the experience of negative life events has been associated with a higher likelihood of experiencing perinatal anxiety and general distress (Tambelli et al., 2019). Some negative life experiences noted in the literature related to pregnancy include younger age and unexpected pregnancy, pregnancy-related complications, previous pregnancy losses, and poor general health (Leach et al., 2017; Tambelli et al., 2019; Vesga-López et al., 2008).

Even though there is literature that examines various factors that can contribute to the development of perinatal anxiety and related distress, the number of examined factors is somewhat limited. There also appears to be a dearth of research on protective factors identified in other areas of research on general anxiety and distress that ought to be examined more closely with the perinatal population. Some research has suggested that interventions like acceptance and commitment therapy (ACT, see Hayes et al., 2006) are effective psychological treatments for the pregnant population, yet there is a serious lack of research on the role of acceptance and related processes in this population (Bonacquisti et al., 2017; Waters et al., 2020). Research on

anxiety and distress more broadly has examined these processes that appear to protect individuals from experiencing severe psychological distress. Some of the processes highlighted in research that can be targeted in interventions like ACT are self-compassion and psychological flexibility.

### **Protective Processes: Self-Compassion and Psychological Flexibility**

The concepts of self-compassion and psychological flexibility have gained significant attention in research within clinical psychology, given that the processes can be directly targeted and promoted in various therapeutic interventions such as ACT (Hayes et al., 2006) and compassion-focused therapy (Gilbert, 2010). Self-compassion is referred to as the experience of embracing “one’s own suffering, experiencing feelings of caring and kindness toward oneself, taking an understanding and non-judgmental attitude toward one’s inadequacies and failures, and recognizing that one’s own experience is part of the common human experience” (Neff, 2003, p. 224). The core processes of self-compassion include:

1. Self-kindness, which relates to the idea of being understanding, compassionate, warm, and gentle to one’s failures or difficulties;
2. Common humanity, which refers to the fact that it is part of the human experience to fail and be faced with hardship;
3. Mindfulness, which is the ability to welcome all present moment experiences (those experienced as both positive and negative) without judgment (Muris et al., 2016; Neff, 2003). Research suggests that engaging in self-compassion may reduce anxiety levels through how one perceives and relates to levels of distress (Luo et al., 2019).

Psychological flexibility is “the ability to fully contact the present moment and the thoughts and feelings it contains without needless defense and, depending upon what the situation affords, persisting or changing in behavior in the pursuit of goals and values” (Hayes et al., 2006, p. 7). Psychological flexibility is often considered to be related to a person’s ability to confront, cope with, and tolerate psychological distress, and it is correlated with lower levels of anxiety and other forms of psychopathology (Berryhill et al., 2018; Kashdan & Rottenberg, 2010; Masuda & Tully, 2012; Panayiotou et al., 2014). Masuda and Tully (2012) suggest that this inverse correlation comes about through the willingness to experience distressing

private events rather than fight them, an important aspect of psychological flexibility.

Both psychological flexibility and self-compassion are processes that appear to assist individuals in coping with psychological distress, stressful environments, and complex thoughts and emotions (Berryhill et al., 2018). Knowing this, it is possible that psychological flexibility and self-compassion can serve as protective factors against severe psychopathology, including in the perinatal population.

### **Self-Compassion and Psychological Flexibility in the Perinatal Population**

Self-compassion and psychological flexibility appear to be associated with lower levels of psychological distress, and recent research has noted similar findings within the perinatal population. A recent study found that a sample of women with higher levels of self-compassion and psychological flexibility experienced fewer depressive and anxiety symptoms (Monteiro et al., 2019). The researchers suggested this may be because these women were more likely to accept their private events (e.g., thoughts and feelings) rather than avoid them. Other researchers have also found in perinatal samples that women with higher endorsements of depression and anxiety had significantly lower levels of self-compassion (Felder et al., 2016). When looking at postpartum women, higher levels of self-compassion have also been strongly associated with a lower likelihood of developing postpartum depression or anxiety (Mahurin-Smith & Beck, 2022). Recent research has even highlighted that interventions that foster the growth of intimate partner relationship satisfaction and self-compassion in couples who are expecting a baby may diminish levels of perinatal depression (Kumar et al., 2022).

There appears to be a lack of research looking specifically at the relationship between psychological flexibility and perinatal anxiety. Previous research has found that psychological inflexibility was predictive of early postpartum depressive symptoms in mothers with medically vulnerable infants (Stotts et al., 2019). Very recently, Prokopowicz et al. (2022) found that low levels of psychological flexibility may be predictive of the development of anxiety disorders in the immediate postpartum period.

## COVID-19 and Perinatal Anxiety

It is crucial to note that levels of maternal depression and anxiety have increased significantly since the start of the COVID-19 pandemic (Lebel et al., 2020; Moyer et al., 2020; Nanjundaswamy et al., 2020). In 2020, expecting mothers suddenly became concerned about the risk of exposure to the virus on the fetus, the safety of having partners in the delivery room, possible transmission of the virus through breastfeeding, and potential greater susceptibility to getting COVID-19 given the higher risk of respiratory infections during pregnancy (Chen et al., 2020; Diamond et al., 2020; Nanjundaswamy et al., 2020; Zhang et al., 2020). A recent study conducted by Moyer et al. (2020) looked at factors associated with changes in anxiety since the start of the pandemic and found that pregnant women reported significantly higher levels of stress connected to pandemic-related concerns. Some of the stressors identified included fear of losing childcare, concern about getting infected with the virus, fear of losing a job or an income, worries about food running out, concern about going to in-person doctors' visits, and fear about delivering a baby in the hospital. Even in the years following the pandemic, research has demonstrated increased levels of depression and anxiety in perinatal populations that are likely associated with pandemic-related distress (Zhang et al., 2022).

### The Present Study

Empirical research has primarily focused on maternal depression. However, perinatal anxiety is another significant form of psychological distress that ought to be better understood given its clear correlation with poor outcomes related to maternal physical health, mother-infant bond, and other important aspects of mothers' lives (Leach et al., 2017; Muzik & Borovska, 2010). The processes of psychological flexibility and self-compassion appear to be protective against psychopathology and severe distress in other populations. However, there is still a lack of research that focuses on these constructs, specifically in the context of perinatal anxiety. The present study aimed to better understand the relationship between perinatal anxiety and perceived quality of life while also considering potential influences of the processes of self-compassion and psychological flexibility on this relationship using moderation analyses.



## Hypotheses

**Hypothesis 1a:** Perinatal anxiety and quality of life will be negatively correlated. It is predicted that individuals who endorse lower levels of perinatal anxiety will report higher levels of quality of life.

**Hypothesis 1b:** It is also predicted that individuals who endorse lower levels of perinatal anxiety will report higher levels of overall or global life satisfaction.

**Hypothesis 2:** Self-compassion and perinatal anxiety will also be negatively correlated. Those with higher levels of self-compassion will report lower levels of perinatal anxiety. This is predicted because even if participants experience average or expected levels of perinatal anxiety, higher levels of self-compassion may allow individuals to better tolerate this distress, such that it does not exacerbate symptoms to the levels seen in anxiety disorders.

**Hypothesis 3:** Psychological flexibility and perinatal anxiety are predicted to be negatively correlated. Those with higher levels of psychological flexibility will report lower levels of perinatal anxiety for the same reasons as noted in Hypothesis 2.

**Hypothesis 4:** Levels of psychological flexibility will change the association between perinatal anxiety and perceived quality of life as well as the association between perinatal anxiety and life satisfaction. Despite the endorsement of some perinatal anxiety, higher levels of psychological flexibility may allow individuals to accept and better confront their distress rather than attempt to avoid the anxiety, which in turn, may be associated with higher levels of quality of life and overall life satisfaction.

**Hypothesis 5:** Levels of self-compassion are also predicted to change the association between perinatal anxiety and perceived quality of life, as well as the association between perinatal anxiety and life satisfaction. It is anticipated that individuals with higher levels of self-compassion will be better able to embrace their private experiences without judgment, which will likely contribute to higher levels of quality of life and overall life satisfaction.

## Method

### Participants

A statistical power analysis was conducted using G\*Power to determine the number of participants the researcher would likely need to detect significant moderation effects. The G\*Power analysis used a linear multiple regression: fixed model,  $R^2$  deviation from zero statistical tests ( $F$  tests test family) with a 0.15 effect size, 0.05 an error probability, 0.8 power (1-b error probability), and three predictors (self-compassion, psychological flexibility, and the interaction). The estimated sample size with the abovementioned parameters was 77 participants, but the researcher sought to include 120 final participants to increase the study's power.

Participants between ages 25 and 40 in their second and third trimesters of pregnancy were recruited using the online resource Amazon Mechanical Turk (MTurk) beginning in November 2022 and ending in January 2023. The age range of 25–40 was selected to rule out additional anxiety that may be due to young pregnancy or geriatric pregnancy, which are often considered to be higher-risk pregnancies that may lead to heightened levels of anxiety. On average, it took participants about 14 minutes to complete the survey ( $M = 13.61$ ,  $SD = 8.48$ ).

The MTurk service allows researchers to distribute surveys to individuals affiliated with this service (“MTurk workers”) who complete various surveys for small monetary incentives. After a participant selects a survey, they can complete it and submit their responses for review by the researcher. All participants were also provided with a random survey code (using a random code generator in Qualtrics) that allowed for anonymous confirmation that surveys collected in Qualtrics matched those accepted in MTurk. Participants who had their data accepted were paid \$0.90 for their participation in the study..

A total of 238 participants had their surveys accepted by the researcher in MTurk for final review. Participants and their data were again reviewed and removed from the final dataset if they were not between the ages of 25 and 40, there was clear evidence of the participant taking the survey more than once, there was evidence of inconsistent or random responding or other obvious signs of lack of engagement with the survey, an inaccurate survey code that did not match survey codes collected in MTurk, or if the

participants spent less than five minutes on the survey. The final number of participants included in the data analysis was 107 individuals.

Statistical analysis of demographic variables demonstrated that the present study's sample consisted mostly of female-identifying (99.1%), White (87.9%), heterosexual (74.8%), married (77.6%), and middle-class (89.7%) individuals. The sample had an age range of 25–40 ( $M = 29.93$ ,  $SD = 4.595$ ). Most of the sample indicated they had a bachelor's degree (72.9%), and most were geographically located in the Midwestern United States (40.2%). Just over half (54.2%) of the sample reported that they did not have previous children before the current pregnancy, and a sizeable percentage of the sample indicated that they felt they currently had access to adequate/acceptable levels of social support (42.1%). Just over half (54.2%) of the respondents reported that they have had previous experience with mental health services, while 43.0% reported that they have not, and 2.8% preferred not to answer this question. See Tables 1 and 2 for additional information about the sample's demographic characteristics.

**Table 1***Demographics of Participants*

Variable		N	%
Mean Age (SD)		M = 29.93 (4.595)	-
Gender			
	Female	106	99.1
	Other	1	0.9
Ethnicity			
	American Indian	5	4.7
	Asian	5	4.7
	Black/African American	2	1.9
	White	94	87.9
	Other	1	0.9
Location			
	Midwest	43	40.2
	Northeast	16	15.0
	Southeast	23	21.5
	Southwest	11	10.3
	West	14	13.1
SES			
	Lower Class	6	5.6
	Middle Class	96	89.7
	Upper Middle	4	3.7
	Upper Class	1	0.9
Marital Status			
	In a Relationship	24	22.4
	Marrried/Domestic Partnership	83	77.6
Sexual Orientation			
	Heterosexual	80	74.8
	Lesbian	1	0.9
	Gay	1	0.9
	Bisexual	25	23.4
Education			
	Some High School	1	0.9
	High School or Equivalent (GED)	8	7.5
	Bachelor's Degree	78	72.9
	Master's Degree	19	17.8
	Doctoral Degree	1	0.9

**Table 2***Other Demographics*

Variable		<i>N</i>	%
Previous Children	Yes	49	45.80
	No	58	54.20
Previous Mental Health Services	Yes	58	54.20
	No	46	43.00
	Prefer not to answer	3	2.80
Access to Social Support	Fair	25	23.40
	Adequate	45	42.10
	Excellent	37	34.60

**Measures****Quality of Life Scale**

The Quality of Life Scale (QOLS; Burckhardt & Anderson, 2003) was utilized to gather information about satisfaction with various life aspects. This 16-item self-report measure assesses participants' experience of fulfillment of their needs and desires (Burckhardt & Anderson, 2003). John Flanagan originally developed the QOLS in the 1970s, and the measure was later adapted in 2003 for use with other populations, including those with chronic illness (Burckhardt & Anderson, 2003). The QOLS asks questions related to the following areas: material and physical well-being; interpersonal relationships (e.g., family, spouse); social, community, and civic activities; personal development and fulfillment; recreation; and independence. Flanagan did not report internal consistency reliability estimates (in his original work in the 1970s). Later studies looking specifically at chronic illness populations found that the QOLS demonstrated sufficient internal consistency with alpha coefficients ranging between .82 and .92 and high test-retest reliability over 3-weeks ( $r = .78$  to  $r$

= .84) (Burckhardt & Anderson, 2003). The estimate of internal consistency for the present study's sample was  $\alpha = .96$ .

### **Satisfaction With Life Scale**

The Satisfaction With Life Scale (SWLS; Diener et al., 1985) is a 5-item self-report measure used as a global measure of the overall life satisfaction of the participants. The SWLS has been shown to demonstrate good internal consistency ( $\alpha = .87$ ) and test-retest reliability (correlation of .82) across two months (Magyar-Moe, 2009). The present study's sample yielded excellent internal consistency ( $\alpha = .91$ ) for the SWLS.

### **The Perinatal Anxiety Screening Scale**

The Perinatal Anxiety Screening Scale (PASS; Somerville et al., 2014) is a 31-item self-report instrument that assesses acute anxiety and adjustment, general worry and specific fears, perfectionism, control and trauma, and social anxiety in the maternal population. The PASS has demonstrated strong internal consistency ( $\alpha = .96$ ), adequate test re-test reliability ( $r = .74$ ), and adequate convergent validity, with its global scores significantly correlated with the Depression Anxiety Stress Scale (DASS) anxiety subscale ( $r = .78$ ), DASS stress subscale ( $r = .81$ ); the Edinburgh Postnatal Depression Scale (EPDS)–Anxiety subscale ( $r = .74$ ); the State-Trait Anxiety Inventory (STAI)–State ( $r = .75$ ); STAI-Trait ( $r = .83$ ); Beck Depression Inventory (BDI) ( $r = .81$ ); and the EPDS total score ( $r = .82$ ) (Somerville et al., 2014; Somerville et al., 2015). The internal consistency for the present study's sample was  $\alpha = .96$ , which is deemed excellent.

### **The Self-Compassion Scale–Short Form**

The Self-Compassion Scale–Short Form (SCS-SF; Raes et al., 2011) is a 12-item self-report measure that assesses self-compassion levels and measures six specific components: (Self-Kindness, Common Humanity, Mindfulness, Self-Judgment, Isolation, and Over-Identification). The SCS-SF is deemed to have acceptable internal consistency with  $\alpha \geq .86$  and a nearly perfect correlation with the SCS long form ( $r \geq .97$ ) (Raes et al.,

2011). The present study's sample demonstrated good internal consistency ( $\alpha = .86$ ).

### **The Acceptance and Action Questionnaire**

The Acceptance and Action Questionnaire (AAQ-2; Bond et al., 2011) is a 7-item questionnaire that measures the constructs of acceptance, psychological flexibility, and experiential avoidance. The AAQ-2 has coefficients that are deemed to be in the acceptable range (.78–.88) and test-retest reliabilities that are also acceptable at .81 and .79. The AAQ-2 also appears to demonstrate acceptable discriminant validity (Bond et al., 2011). The current sample demonstrated excellent internal consistency on the AAQ-2 ( $\alpha = .93$ ).

### **Demographic Questionnaire**

This questionnaire allowed participants to share relevant demographic information such as age, race, ethnicity, gender identity, sexual orientation, level of highest education, marital status, socioeconomic status, access to social support, previous/current experience with mental health services, and number of children not including the current pregnancy.

### **Free-Response Items**

Participants were also given the option to comment on the following questions in a free-response format:

- Do you believe the COVID-19 pandemic has or has not impacted your emotional well-being during pregnancy? If so, please explain below:
- Are there any other factors that have or may have impacted your overall emotional well-being during pregnancy? If yes, please briefly describe below:

### **Procedure**

Prior to data collection, the Institutional Review Board (IRB) of the principal investigator's university approved the present study, and an intellectual property agreement to use the PASS for the study was signed by the examiners for the authors of the PASS (Somerville et al., 2014). As

discussed, participants were recruited utilizing Amazon Mechanical Turk (MTurk). Through MTurk, participants were given access to the title and a brief description of the purpose of the survey. Participants who indicated interest were then presented with an online consent form with additional information about the study, relevant resources, researcher contact information, the option to opt-out at any time, and inclusion criteria for participation in the study (i.e., age, second or third trimester of pregnancy, and being able to speak and comprehend English, as the survey was only available in English). Participants who consented to participate in the study were then presented with additional qualification questions that assessed inclusion criteria. Participants who passed through the qualification questions then completed the following measures in order: the Quality of Life Scale (QOLS; Burckhardt & Anderson, 2003), the Perinatal Anxiety Screening Scale (PASS; Somerville et al., 2014), the Self-Compassion Scale-Short Form (SCS-SF; Raes et al., 2011), the Satisfaction with Life Scale (SWLS; Diener et al., 1985), the Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011), and a demographic questionnaire developed by the researchers. After completing the measures, participants were prompted with the free-response questions to help elucidate associations between constructs and experiences related to COVID-19.

Individuals finished participating in the study by obtaining a copy of a debriefing form and a randomly generated survey code that they then placed into MTurk to submit their results and become eligible to receive payment for completing the study.

## Results

The data were analyzed using IBM Statistical Package for the Social Sciences (SPSS), Version 27.0. The PROCESS plug-in (Hayes, 2022) was employed for formal moderation analyses. Prior to formal data analysis, responses were reviewed for missing data and random responses. Given that bootstrapping methods, robust to violations in assumptions, were employed, data were analyzed without having to meet assumptions of linear regression.

Parametric and nonparametric correlations (Pearson's  $r$ , point-biserial, and Spearman's rho, depending on the nature of the variable), as well as independent samples  $t$ -tests for the categorical variable of race, were



conducted to better understand potential relationships between demographic and criterion variables and to determine if any covariates needed to be controlled for in the hypothesis testing and supplemental analyses. There were no significant associations between demographic variables and the outcome variables, so there was no need to include any demographics as covariates for the remainder of the analyses.

Descriptive statistics were examined to better understand the participants' responses to the various surveys (Table 3). With regard to overall levels of perinatal anxiety, participants scored between 3 and 87 ( $M = 48.36$ ;  $SD = 17.43$ ). Scores on the PASS are interpreted by severity ranges of minimal anxiety symptoms (score of 0–20), mild-moderate anxiety symptoms (21–41), and severe anxiety levels (42–93), which suggests that the mean score of this sample fell in the severe anxiety level range. When examining levels of quality of life as measured by the QOLS, the current study's sample had a mean quality of life score of 78.57 ( $SD = 16.42$ ), which was below average. In terms of life satisfaction, the current sample had a mean score of 25.58 ( $SD = 6.17$ ), indicating endorsements of life satisfaction that fall just between the slightly satisfied and satisfied ranges. The current sample's mean score for levels of self-compassion was 3.06 ( $SD = .27$ ), which indicates moderate levels of self-compassion. Lastly, the current sample had a mean score of 29.30 ( $SD = 8.68$ ) for psychological flexibility levels, indicating clinically elevated levels of psychological inflexibility.

**Table 3***Descriptive Statistics on Measure Totals*

Variable	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>	Descriptor
1. QOLS Total	107	25	107	78.57	16.42	Below Average
2. PASS Total	107	3	87	48.36	17.43	Severe
3. SCS-SF Total	107	2.5	4.08	3.06	0.27	Moderate
4. SWL Total	107	10	35	25.58	6.17	Slightly Satisfied - Satisfied
5. AAQ Total	107	7	45	29.30	8.68	Clinically Elevated

A correlation matrix was produced to test initial hypotheses and to better understand relationships between the processes of perinatal anxiety, self-compassion, psychological flexibility, quality of life, and overall life satisfaction (Table 4). The first hypothesis predicted that perinatal anxiety and quality of life would be negatively correlated. The correlation was negative but not significant,  $r = -.10$ ,  $p = .31$ . That being said, a small to medium negative significant correlation was found between perinatal anxiety and overall satisfaction with life, indicating that participants who reported lower levels of perinatal anxiety reported higher overall satisfaction with life,  $r = -.24$ ,  $p = .01$ . Regarding Hypothesis 2, there was no significant correlation between levels of self-compassion and perinatal anxiety,  $r = -.16$ ,  $p = .09$ . However, Hypothesis 3 was supported in that there was a large, positive significant correlation between psychological inflexibility and perinatal anxiety,  $r = .53$ ,  $p < .001$ , indicating that those reporting higher levels of psychological inflexibility endorsed higher levels of perinatal anxiety.

**Table 4***Correlation Matrix of Main Study Variables*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. QOLS Total Score	78.57	16.42				
2. PASS Total Score	48.36	17.43	-.10			
3. SCS-SF Total	3.06	.28	.02	-.16		
4. SWL Total Score	25.58	6.17	<b>.59**</b>	<b>-.24*</b>	.12	
5. AAQ Total Score	29.30	8.68	-.10	<b>.53**</b>	<b>-.27**</b>	<b>-.27**</b>

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

The remaining hypotheses were tested by running separate moderation analyses via hierarchical regression using the PROCESS plug-in for SPSS. Moderation model 1 was utilized with 95% confidence intervals and 10,000 bootstrapping samples. This moderation analysis allowed us to examine whether varying levels of self-compassion and psychological flexibility would change the relationship between perinatal anxiety and quality of life. The  $R^2$  change value and related statistics were analyzed to determine whether there were significant interaction effects. The first two moderation analyses examined the hypothesis predicting that levels of psychological flexibility would change the association between perinatal anxiety and quality of life, and overall life satisfaction (see Table 5 in Appendix). There were no significant interaction effects found in the first two moderation analyses, indicating that psychological flexibility was not a significant moderator of the association between perinatal anxiety and quality of life,  $R^2$  change = .002,  $b$  = .0041, 95% CI [-0.01, 0.21],  $SE$  = .0085,  $p$  = .63; or satisfaction with life,  $R^2$  change = .01,  $b$  = .0038, 95% CI [-.0022, 0.0099],  $SE$  = .0031,  $p$  = .21. The last two moderation analyses examined the hypothesis that levels of self-compassion would change the association between perinatal anxiety and quality of life and overall life satisfaction (See Table 6 in appendix). As with the previous moderation analyses, there were no significant interaction effects found, which suggests that self-compassion was also not a significant moderator of the association between perinatal anxiety and quality of life,  $R^2$  change = .0070,  $b$  = -.26,

95% CI [-0.86, 0.34],  $SE = .30$ ,  $p = .39$ ; or satisfaction with life,  $R^2$  change = .0030,  $b = -.06$ , 95% CI [-0.28, 0.16],  $SE = .11$ ,  $p = .57$ .

### **Commentary on Free-Responses**

Supplemental data were examined on an exploratory basis to understand more about the potential influence of COVID-19 on distress during pregnancy and other factors that may impact overall well-being during pregnancy. Participants were given the choice to comment on one or both free-response prompts about factors that may or may not have impacted participants' well-being during pregnancy. In total, 44 participants responded to one or both of the prompts. The first free-response question examined specifically the potential impact that the COVID-19 pandemic may have had on overall well-being during pregnancy. Some themes within this free-response include fears of COVID-19 being a dangerous virus and impacting the health of the mother and baby if the mother became infected, beliefs that being fully vaccinated against COVID-19 helped improve levels of distress and worries about contracting the virus, and concerns that the lockdown and social distancing made regular check-ups/appointments with OB/GYNs more challenging. Other participants reported heightened fear, loneliness, sadness, stress, and anxiety throughout the COVID-19 pandemic that impacted overall well-being. Other factors with COVID-19 that were discussed included loss of job and financial support after the lockdown and how support from friends and family helped significantly.

When asked about other factors that may or may not have impacted overall well-being during pregnancy, participants said that support from family and friends was tremendously helpful. Other factors that appeared to have more of a negative impact include being overweight or in poorer health, morning sickness, additional fatigue, mood swings or crying spells, increased appetite, body aches, and physical swelling. Other participants noted that it was challenging to have less attention on the mother and more attention on the baby or pregnancy, that financial issues created significantly more stress, and that being fearful or uncertain about medical treatment increased overall levels of anxiety during pregnancy. Other factors identified as negatively impacting overall well-being during pregnancy include additional fears that something bad may happen during the pregnancy, grief or loss of a family member and previous history of mental illness.

## Discussion

This study sheds some light upon perinatal anxiety and psychosocial processes that may impact overall emotional well-being and quality of life in the pregnant population—a population that is unfortunately understudied and underserved when it comes to psychological research and interventions. It is estimated that up to 50% of women experiencing problems such as anxiety and depression in pregnancy are never identified due to limitations with appropriate screening procedures or resources and tremendous stigma related to expressing mental health concerns as a mother or pregnant individual (Accortt & Wong, 2017; Gjerdingen & Yawn, 2007). It is imperative to better understand the psychological concerns and needs of pregnant women. Despite evidence of potential consequences, most available research has focused primarily on perinatal and postpartum depression, and there is limited research on the psychosocial processes of self-compassion and psychological flexibility, which have been established as protective processes against severe psychopathology in other populations (Berryhill et al., 2018).

The present study aimed to look at perinatal anxiety and its relationship to quality of life and explore the potential role of the psychosocial processes of self-compassion and psychological flexibility on this relationship using moderation analyses. In general, the sample had a mean level of perinatal anxiety that fell in the severe anxiety range, which seems to be higher than what has been seen in previous research with nonclinical populations. Recent research with the PASS has included both antenatal and postnatal individuals, where participants were analyzed in separate groups based on their severity rating. Somerville et al. (2015) found that most participants (in a sample of participants with and without previous/current mental health diagnoses) fell in the minimal anxiety range ( $N = 201$ ;  $M = 13.37$ ,  $SD = 7.74$ ), while 121 of the 410 participants fell in the mild-moderate range ( $M = 30.44$ ,  $SD = 13.65$ ). Only 88 fell into the severe anxiety range ( $M = 52.99$ ,  $SD = 15.67$ ). This suggests that a significant portion of the participants in the current study endorsed higher levels of perinatal anxiety than what is to be expected based on previous research. This may be, in part, because the description of this survey indicated that researchers would be examining perinatal anxiety specifically, increasing the likelihood that MTurk workers who completed the survey were both pregnant and experiencing heightened

anxiety and had more of an interest in completing this survey rather than one that did not specify the particular psychological processes of interest.

The current sample also reported lower than expected levels of quality of life, and life satisfaction ranges fell mostly between the slightly satisfied and satisfied ranges. The significantly high levels of endorsed perinatal anxiety in the current sample may explain the lower endorsement of quality of life on the QOLS. The average total score for healthy populations is around 90 (no *SD* reported), which suggests the current study's sample endorses quality of life levels that are a bit below average (Burckhardt & Anderson, 2003). Previous research on quality of life (QOLS) mean scores for the general female population in Norway was 84.1 (*SD* = 12.5), and those with disease or other health problems were  $81 \pm 12.8$  (Truong et al., 2020). Pregnancy can also come with co-occurring medical problems or discomforts, which may explain why the current sample's mean score is closer to the mean score seen in the Norway study of a female population with disease or other health problems (Truong et al., 2020). A previous study examining satisfaction with life in pregnant women found a mean score of 28.73 (*SD* = 5.76) for women aged 30 and younger and a mean score of 29.22 (*SD* = 4.89) for pregnant women over the age of 30 (Yu et al., 2020).

Levels of self-compassion in the current study largely reflected what has been documented in previous research with the perinatal population: the mean score of self-compassion fell in the moderate range. Previous research on perinatal depression and self-compassion found that women before an intervention had a mean score of 2.56 (*SD* = .62), which also suggests moderate levels of self-compassion (Townshend & Caltabiano, 2019). Lastly, the current sample had a mean score of psychological flexibility that was in the clinically elevated range, which suggests higher levels of psychological inflexibility within this sample. Previous research has noted mean scores of 17.34 (*SD* = 4.37) and 18.53 (*SD* = 7.52) for nonclinical populations (Bond et al., 2011). This higher level of inflexibility may be related to the higher levels of distress and endorsed perinatal anxiety reported by the participants.

With regard to the hypotheses, it was anticipated that perinatal anxiety and quality of life would be negatively correlated in that those who endorsed lower levels of perinatal anxiety would report higher levels of quality of life as measured by the QOLS. It was also predicted that those endorsing lower

levels of perinatal anxiety would report higher overall life satisfaction as measured by the SWLS. These hypotheses were partially supported in that perinatal anxiety and quality of life were negatively correlated, though the finding was not significant. However, a small to medium negative significant correlation was found between perinatal anxiety and overall life satisfaction, indicating that those endorsing lower levels of perinatal anxiety report higher overall satisfaction with life. This may suggest that participants were more likely to report lower levels of quality of life in areas specified on the QOLS that can be greatly impacted by pregnancy, such as physical well-being and fitness, interpersonal relationships, having/rearing children, and engaging in civic duties. When asked more generally about overall life satisfaction, those less preoccupied with emotional and psychological distress endorsed significantly higher levels of overall satisfaction with life.

It was also predicted that those with higher levels of both self-compassion and psychological flexibility would report lower levels of perinatal anxiety. No significant results were found when it came to self-compassion. However, there was a large, positive, significant correlation between psychological flexibility and perinatal anxiety, suggesting that those with higher levels of psychological inflexibility report higher levels of perinatal anxiety. It may be that individuals who are less able to confront, accept, and tolerate anxiety and related distress and instead engage in any means to avoid this distress, in turn, may be more likely to experience disordered levels of anxiety. Pregnant individuals may regularly experience some level of perinatal anxiety. However, if one is better able to confront the distress, remain present, and engage in values-consistent activity even when faced with these emotional challenges, they may experience anxiety in a much more adaptive way than individuals who typically try to actively avoid these private events and experiences of distress.

Moderation analyses were also employed to better understand the potential influence psychological flexibility and self-compassion had on the relationship between perinatal anxiety and quality of life or life satisfaction. Neither hypothesis was supported in that neither psychological flexibility nor self-compassion was found to be a significant moderator of the association between perinatal anxiety and quality of life or satisfaction with life. Psychological flexibility, self-compassion, quality of life, and life

satisfaction may be so complex and somewhat similar in terms of what elements make up these constructs that it could be challenging to find significant interaction effects.

This study also highlighted valuable information related to the impact of COVID-19 on pregnancy and other factors that may contribute to overall well-being while pregnant. These meaningful reflections emphasized the fear, uncertainty, and potential dangers that pregnant women face when it comes to COVID-19, as well as other general life circumstances such as mood and physical changes, loss of loved ones, and loss of employment or financial stability, levels of social support, and the overall tremendous life adjustment that comes with childbirth that can greatly impact overall well-being during pregnancy.

### **Limitations**

Despite having some interesting and unexpected findings, this study has several salient limitations. To start, the MTurk population may have included participants who are particularly interested in participating in research or in economic circumstances where they use MTurk to make some additional money, which may have led to some potential bias or response that is not necessarily reflective of the general population. The MTurk method of data collection also presented with numerous complications in that it appeared that many of the MTurk workers who attempted to receive compensation for participation in the study appeared to be computer bots (based on unusually rapid and random responding and disorganized, incomprehensible text within the free-response sections) or individuals who took surveys numerous times even when not eligible. Given this complication, the researchers had to implement numerous methods and criteria to ensure that the final sample only included legitimate participants.

Another limitation is that this study included several self-report surveys where the average time to complete the study with adequate levels of attention was about 20-25 minutes. This may have increased the possibility of fatigue and lower engagement. The free-responses were also placed at the end, which may have decreased the likelihood of people responding after a lengthy survey. One of the demographic questions also asked if participants had any previous experiences with mental health services but did not specifically ask about current experience with mental health. This may have



affected some of the responses; someone with current but not previous experiences with services may have said no, which does not fully reflect their openness and receipt of services.

Further, the study relied on self-report measures, which may not fully reflect participants' experiences given various response biases and contextual factors already discussed. Along similar lines, this population was rather homogeneous in that most participants were female-identifying, white, well-educated individuals from the Midwestern United States, limiting the ability to generalize findings to more diverse populations. It is also important to emphasize that this study was correlational, meaning no conclusions about directionality or causality may be drawn.

This survey data was also gathered towards the end of 2022 and the start of 2023. As was the case throughout the heart of the pandemic, the state and impact of COVID-19 were variable from person to person. It is hard to know how much of an influence COVID-19 had (or did not have) on the data and its relevance to participants and their emotional experiences at the time of data collection, especially given the just-mentioned factors that may have contributed to some participants not responding to the related open-ended questions.

### **Implications and Future Directions**

The present study served to contribute to the research area of reproductive health psychology, which unfortunately has a dearth of research and understanding of perinatal mood and anxiety disorders that stem beyond depression. It also brings awareness to psychosocial processes that may be protective factors or may be valuable targets for future evidence-based psychological interventions for those struggling with perinatal mental health. Given the demonstrated relationships between perinatal anxiety and satisfaction with life and perinatal anxiety and psychological flexibility, it seems that interventions such as acceptance and commitment therapy (ACT), which focuses on contact and awareness of the present moment, committed action in line with values despite experiences of emotional distress, and acceptance rather than avoidance of emotional experiences and private events, would be greatly beneficial to this population.

Given this, future research with multimodal forms of assessment is imperative to further examine related processes and potential interventions that foster them. These could be compared with other evidence-based treatments, such as cognitive behavioral and dialectical behavior therapy, emphasizing slightly different processes. Lastly, given the potential role that shame, and stigma may play within this population, where there is tremendous societal pressure to be a seemingly perfect mother, it would be especially interesting to include a measure of stigma towards imperfection as a mother or even stigma toward needing mental health services more broadly. Additional research would help clarify the meaning behind these psychosocial processes and how they may influence perinatal mental health and overall quality of life. Further research would also serve to understand this underserved and understudied health population better and increase awareness of the need for more mental health follow-ups and interventions that may greatly improve or at least support individuals during their pregnancy experience. By developing a greater understanding and insight into this distress, as well as knowledge of how to best help these individuals, it may be possible to change the statistic of having up to 50% of expecting mothers suffering in silence (Accortt & Wong, 2017; Gjerdingen & Yawn, 2007).

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## Appendix

Table 5

*Partial Output for PROCESS Macro for Simple Moderation (Model 1 - Psychological Flexibility as the Moderator)*

<u>Quality of Life</u>						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	78.24	1.73	45.11	.0000	74.80	81.68
PASSTotal	-0.05	0.11	-0.46	0.65	-0.27	0.17
AAQTotal	-0.11	0.22	-0.51	0.61	-0.55	0.32
Int_1	0.0041	0.0085	0.48	0.63	-0.01	0.21

Note. Outcome variable (Y) = QOLSTotal; Focal Predictor (X) = PASSTotal; Moderating Variable (W) = AAQTotal; INT\_1 = PASSTotal x AAQTotal

<u>Satisfaction with Life</u>						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	25.27	0.62	40.51	.0000	24.04	26.51
PASSTotal	-0.04	0.04	-1.06	0.29	-0.12	0.04
AAQTotal	-0.12	0.08	-1.51	0.13	-0.28	0.04
Int_1	0.0038	0.0031	1.26	0.21	-0.0022	0.0099

Note. Outcome variable (Y) = SWLTotal; Focal Predictor (X) = PASSTotal; Moderating Variable (W) = AAQTotal; INT\_1 = PASSTotal x AAQTotal



**Table 6**

*Partial Output for PROCESS Macro for Simple Moderation (Model 1 - Self-Compassion as the Moderator)*

<u>Quality of Life</u>						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	78.37	1.61	48.59	.00	75.18	81.57
PASSTotal	-0.09	0.09	-0.92	0.36	-0.27	0.10
SCSSFTotal	-2.04	6.70	-0.30	0.76	-15.32	11.24
Int_1	-0.26	0.30	-0.86	0.39	-0.86	0.34

*Note.* Outcome variable (Y) = QOLSTotal; Focal Predictor (X) = PASSTotal; Moderating Variable (W) = SCSSFTotal; INT\_1 = PASSTotal x SCSSFTotal

<u>Satisfaction with Life</u>						
	Coefficient	SE	<i>t</i>	<i>p</i>	LLCI	ULCI
Constant	25.53	0.59	43.26	.00	24.36	26.70
PASSTotal	-0.08	0.03	-2.33	0.02	-0.15	-0.01
SCSSFTotal	1.35	2.45	0.55	0.58	-3.51	6.21
Int_1	-0.06	0.11	-0.58	0.57	-0.28	0.16

*Note:* Outcome variable (Y) = SWLTotal; Focal Predictor (X) = PASSTotal; Moderating Variable (W) = SCSSFTotal; INT\_1 = PASSTotal x SCSSFTotal