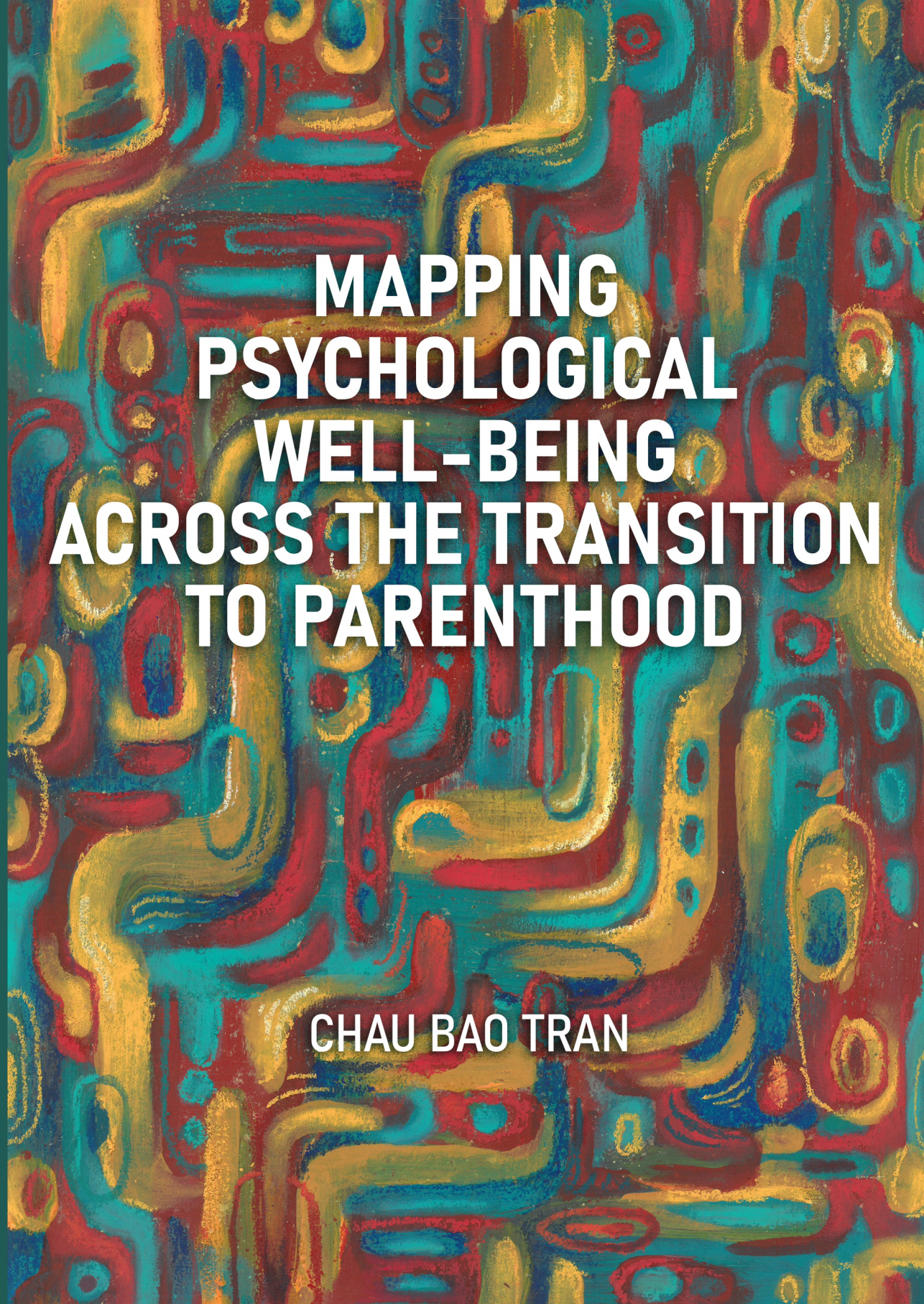

MAPPING PSYCHOLOGICAL WELL-BEING ACROSS THE TRANSITION TO PARENTHOOD
CHAU BAO TRAN

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ISBN: 9789465346489

Layout design and printing by: Proefschrifmaken || www.proefschrifmaken.nl

Cover design (original artwork, mixed media on paperboard) by:

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"The artwork reflects its themes of abstraction, tracking, and mapping. It explores how individual elements connect to form broader systems and patterns. The work emphasizes how seemingly separate parts are intrinsically linked within a larger whole."

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MAPPING PSYCHOLOGICAL WELL-BEING ACROSS THE TRANSITION TO PARENTHOOD

Proefschrift ter verkrijging van de graad van doctor aan Tilburg University op gezag van de rector magnificus, prof. dr. W.B.H.J. van de Donk, in het openbaar te verdedigen ten overstaan van een door het college voor promoties aangewezen commissie in de Aula van de Universiteit op vrijdag 23 oktober 2026 om 13.30 uur

door

Chau Bao Tran

geboren te Ho Chi Minhstad, Vietnam

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CHAPTER 1

Introduction

The transition to parenthood is one of the most common yet profound life events that adults experience. While normative and often planned, the transition is characterized by significant adjustment across multiple domains, from core identities to social relationships and daily routines, and has been demonstrated to shape new parents' psychological well-being. Understanding how this transition affects well-being is important not only for research on adult development and the promotion of optimal well-being trajectories, but also for informing governments and policymakers on how best to support new parents during this critical life stage.

CONCEPTUALIZING PSYCHOLOGICAL WELL-BEING

Central to this dissertation is the question of what it means to be psychologically well. The multidimensional approach adopted here is grounded in the foundational distinction between hedonic and eudaimonic well-being (Ryan & Deci, 2001). Hedonic well-being focuses on happiness and pleasure, and is typically assessed through subjective well-being which encompass both affective experiences (emotions and moods) and cognitive evaluations of satisfaction with life or life domains (Busseri, 2018; Diener, 1984). In practice, however, life satisfaction is often used as a proxy for hedonic well-being more broadly, with comparatively less attention paid to its affective component. The present dissertation treats these as distinct but related indicators, examining both cognitive-evaluative (life satisfaction) and affective (positive and negative affect) dimensions of hedonic well-being.

Eudaimonic well-being, by contrast, emphasizes meaning and purpose as central to psychological thriving, though operationalizations vary across literature. In this dissertation, eudaimonic well-being is conceptualized specifically as meaning in life—the extent to which individuals perceive their lives as coherent, significant, and purposeful (Steger et al., 2006). Research suggests that meaning in life and subjective well-being are sibling constructs: conceptually and empirically related, yet capturing distinct dimensions of psychological functioning and well-being (Lawson & Robins, 2021; Steger, 2017). This supports a complementary rather than interchangeable treatment of hedonic and eudaimonic well-being.

A third dimension considered in this dissertation is self-esteem—an individual's overall evaluation of self-worth (Rosenberg, 1965). Rather than a peripheral construct, self-esteem is increasingly conceptualized as a sibling construct to life satisfaction: related yet distinct, and capturing evaluative judgments of the self rather than of one's life experiences or sense of purpose (Reitz, 2022). Crucially, because parenthood fundamentally alters social roles and identity, it may represent a particularly sensitive period for self-esteem change, making it an important dimension to examine alongside more traditional well-being indicators. Conceptually, while subjective well-being reflects evaluations of life experiences, and

meaning in life reflects perceptions of purpose and coherence, self-esteem reflects evaluative judgments of the self.

Together, these three dimensions—hedonic well-being (affective and cognitive), eudaimonic well-being (meaning in life), and self-esteem—provide a richer and more complete picture of psychological functioning than any single indicator alone, and form the conceptual backbone of the empirical work presented in this dissertation.

How Parenthood Shapes Well-Being: Theoretical Expectations and Empirical Findings

Major life events like the transition to parenthood have long been theorized to shape psychological development, with several overarching theoretical frameworks offering complementary accounts of how and why such change occurs. Life course theory emphasizes how major transitions create turning points that can redirect developmental trajectories, with the timing, social context, and interconnected nature of life events determining their impact on individual development (Elder, 1998). Social investment theory posits that commitment to age-graded social roles (including parenthood) systematically shapes personality and well-being as individuals adapt their behavior and self-concept to succeed in new roles (Roberts & Wood, 2006). Applied to parenthood, specifically, the demands and rewards of raising children may foster changes in traits and well-being that are adaptive to effective parenting. While these macro-level frameworks have primarily focused on stable, long-term developmental trajectories, they leave open the question of the micro-level processes through which such broader shifts might take shape.

More recently, personality developmental scientists have turned attention to these underlying day-to-day processes. The TESSERA framework (Triggering situations, Expectancies, States/State expressions, Reactions, Adjustment; Wrzus & Roberts, 2017) proposes that trait development unfolds through repeated daily experiences that accumulate into lasting change. Life events like parenthood trigger new daily situations (e.g., childcare demands, sleep disruption, altered routines) which activate certain psychological states more frequently. Through repetition and social reinforcement, these temporarily activated states gradually consolidate into stable traits and dispositions. Building on this process-oriented approach, Reitz (2022) presented an integrative framework explicitly linking life events to self-esteem development at both micro- and macro-levels, through a temporal chain of short-term situational processes and psychological states that manifest in lasting trait-level change. Together, these contemporary models provide a mechanistic bridge between the daily experiences of new parenthood and the enduring well-being changes that are at the center of life course and social investment perspectives.

Despite extensive research on how the transition to parenthood affects psychological well-being, empirical findings remain mixed. The most extensive evidence concerns subjective

well-being, which encompasses affective and cognitive well-being. Life satisfaction (global cognitive well-being) trajectories are variable: many studies report an initial increase around the time of childbirth, followed by a gradual decline over subsequent years (Luhmann et al., 2012; Myrskylä & Margolis, 2014), though the duration of this initial increase has been characterized inconsistently—lasting anywhere from just after birth (Dyrdal & Lucas, 2013) to the full first year of parenthood (Asselmann & Specht, 2023). For affective well-being, the available literature—most comprehensively synthesized by Luhmann et al. (2012)—suggests a small but consistent increase in positive affect following the transition, though findings may depend on when during the postpartum period assessments are taken. Relationship satisfaction, a domain-specific cognitive indicator of well-being, tends to show a more consistent decline following the birth of the first child compared to life satisfaction (Bogdan et al., 2022; Keizer & Schenk, 2012; Mitnick et al., 2009). Together, these indicators suggest that the transition carries both gains and costs for subjective well-being, with patterns varying considerably depending on the dimension examined.

Evidence on other well-being dimensions is more limited. To date, only one study has directly examined trajectories of eudaimonic well-being across the transition to parenthood, finding that becoming a parent was associated with increased psychological well-being in new parents (Brandel et al., 2018). Self-esteem trajectories have been somewhat more frequently studied, but findings remain equally inconsistent: some studies report a temporary dip during pregnancy followed by postpartum recovery, others find increases before birth with subsequent declines, and yet others suggest a more continuous increase from pregnancy through early motherhood (Bleidorn et al., 2016; Grundström et al., 2025; van Scheppingen et al., 2018; Wenzel et al., 2021). A recent meta-analysis found no consistent overall effect of the transition on self-esteem (Bühler et al., 2023). Across these lesser-studied dimensions, the scarcity and inconsistency of evidence make it difficult to draw firm conclusions, and extrapolating from the better-studied indicators is problematic given that different well-being components appear to follow distinct trajectories.

Beyond average trends, the mixed pattern of findings across studies has often led researchers to note that individual differences likely play an important role in shaping responses to the transition. In this sense, heterogeneity is frequently invoked as a way of making sense of divergent results—pointing to differences in samples, designs, or well-being measures—rather than being examined directly within studies. True heterogeneity in the sense of explicitly modeled individual differences in well-being change within the same study remains comparatively rare. A smaller set of studies has taken this step, using random effects or latent profile approaches to identify subgroups of parents with distinct trajectories (Bernardi et al., 2017; Don & Mickelson, 2014; Galatzer-Levy et al., 2011; Leonhardt et al., 2022). These studies reveal that not all new parents follow the same trajectory, but they remain the exception rather than the rule. The field has thus only begun to move toward treating

individual differences as theoretically meaningful variation to be modeled and explained, rather than as background noise or a post-hoc account of inconsistent results.

Limitations in the Current Understanding

While past research has generated important insights into well-being change following the transition to parenthood, three interrelated limitations constrain the current state of knowledge.

First, existing research has relied on a **narrow conceptualization of well-being**, focusing predominantly on life satisfaction and relationship satisfaction. While these indicators capture important aspects of subjective well-being, they do not reflect the full complexity of psychological functioning. Dimensions such as meaning in life—long believed by researchers and laypersons alike to be central to the parenthood experience—have received comparatively little empirical attention, and self-esteem trajectories remain inconsistent across the studies that examined them. This is particularly problematic given that different well-being components show distinct trajectories across the transition, making it difficult to extrapolate from well-studied indicators to less-studied ones.

Second, existing research has relied on a **narrow conceptualization of change**, in two related ways. Most studies have focused on documenting average patterns of change, treating variation across studies or well-being domains as indirect evidence of heterogeneity rather than examining it directly within studies. Yet going beyond mean-level change requires attending to at least two distinct aspects of individual differences: between-person heterogeneity in trajectories (whether some parents systematically show different patterns of change than others) and within-person fluctuation (how well-being varies from day to day within the same individual). Explicitly modeling between-person heterogeneity through random effects or latent profile approaches remains uncommon, and the field consequently has limited insight into the patterns and predictors of between-person variability in responses to the transition. Within-person fluctuation has been almost entirely neglected: change has predominantly been studied as shifts in stable trait-level indicators over time, while day-to-day fluctuations in momentary well-being states have received little attention. Studying traits and states simultaneously is essential for capturing the processes through which well-being changes. Crucially, examining how state-level fluctuations unfold during the transition speaks directly to both concerns: daily variability reflects neither a stable trait nor a simple average trajectory, but the lived, moment-to-moment texture of the transition experience itself. The field thus has limited insight into both the variability in how parents change and the dynamic, day-to-day nature of that change.

Third, most existing studies have been characterized by **low temporal resolution**. Much of what we know about well-being trajectories across the transition comes from large-scale panel studies, which offer substantial statistical power and allow broad population trends

to be documented over many years—a genuine and important contribution. However, these studies typically rely on annual or widely spaced assessments, which carry important limitations. Because measurements are spread far apart, it is difficult to determine precisely when within a given interval a change began or ended. More fundamentally, widely spaced assessments are poorly suited to capturing the dynamic nature of the transition itself. The postpartum period is marked by rapid and potentially non-linear shifts in identity, role, and daily life—a pace of change already well recognized in clinical practice where new parents, midwives, and pediatricians routinely track development in weeks and months rather than years. Psychological change during this period may be similarly rapid, yet research designs have rarely matched this resolution. As a result, potentially important patterns, including critical periods of vulnerability or recovery, remain invisible to the methods most commonly used.

Taken together, these three limitations underscore that our current understanding of well-being change across the transition to parenthood remains incomplete. Addressing them requires approaches that capture the multidimensional and temporally nuanced nature of well-being, while explicitly attending to both between- and within-person variability.

Overview of the Dissertation: Research Objectives and Empirical Chapters

The present dissertation addresses these gaps through two related but distinct research streams, united by a shared interest in understanding the transition to parenthood as a major life event with profound implications for psychological well-being.

The first research stream, presented in Chapter 2, takes up two specific gaps within the established Value of Children (VOC) literature. The VOC framework has been influential in explaining fertility decisions—that is, how expectations about the costs and rewards of children shape whether and when people become parents (Fawcett, 1988; Hoffman & Hoffman, 1973). However, direct prospective evidence that VOC actually precede and predict the transition to parenthood remains scarce: to our knowledge, only one study has examined this prospectively (Liefbroer, 2005), while the majority measure VOC retrospectively after people have already become parents—a timing that is itself problematic since the experience of parenthood likely altered the very expectations of the value of children being measured. Beyond fertility decisions, relatively little is known about whether prospective VOC shapes how satisfied and fulfilled parents feel in the years that follow. **Chapter 2** addresses both of these gaps by examining long-term trajectories of family-life satisfaction and parenting pleasure using German longitudinal panel data spanning up to 11 years before and after first childbirth. In addition to examining how pre-transition expectations regarding the value of children shape post-transition well-being trajectories, the chapter investigates how these expectations relate to the likelihood of becoming a parent in the first place. By linking pre-transition expectations to both selection into parenthood and subsequent adaptation, the

chapter sheds light on how the way people think about children before becoming parents shapes their long-term experience of family life.

The second research stream, comprising Chapters 3–5, presents three empirical studies guided by *two overarching objectives*. The first is to comprehensively characterize how psychological well-being unfolds across the transition—across different well-being indicators and levels of analysis, capturing not only mean-level trajectories but also between-person variability and day-to-day fluctuations. The second is to examine how these changes are shaped by theoretically grounded predictors operating across different timescales—from daily fluctuations in whether experiences match expectations to broader contextual factors. Achieving both objectives required data that existing panel studies were not designed to provide, and we therefore designed and implemented a new intensive longitudinal dataset specifically for this purpose—**Project NiMo**—which forms the empirical basis for all three chapters.

Project NiMo (Nieuwe Moeders Dagelijks Leven; Dutch for "New Mothers' Daily Life") followed first-time mothers over ten months between 2022 and 2024, across three assessment waves: mid-late pregnancy, 2–3 months postpartum, and 6 months postpartum. At each wave, the study combined two complementary data collection strategies. A baseline questionnaire assessed multiple psychological well-being dimensions and theoretically relevant predictors, including personality characteristics, parenting-related variables, and contextual factors. This enabled the study of mean-level trajectories, between-person differences in change, and the investigation of potential associated factors at the stable, between-person trait level. In addition, participants completed three brief daily surveys over seven consecutive days, capturing momentary well-being and the situational factors that may drive their day-to-day fluctuations. This enabled the study of within-person dynamics and the daily processes through which well-being unfolds. Together, these two strategies provide the empirical foundation for addressing both overarching objectives outlined.

Chapter 3 investigates multidimensional well-being trajectories across pregnancy and the first postpartum months. The chapter examines affective, cognitive, and eudaimonic aspects of well-being, capturing not only mean-level change across the transition but also between-person variability in trajectories. It further examines intraindividual variability in momentary well-being as a distinct and dynamic characteristic of psychological functioning (Eid & Diener, 1999) that has rarely been studied in the context of the transition to parenthood. Finally, the chapter explores daily contextual factors, including mothers' sleep, infant characteristics, and social influences, that may help explain day-to-day fluctuations in well-being. Together, these analyses provide a comprehensive account of the developmental changes in different psychological well-being dimensions.

Chapter 4 extends the multidimensional perspective to self-evaluative well-being (i.e., self-esteem) and psychological need satisfaction, focusing on the development of self-esteem

and the satisfaction of basic psychological needs for autonomy, competence, and relatedness across the transition. Importantly, the chapter tests competing theoretical perspectives of self-esteem (i.e., self-determination theory by Deci & Ryan, 2012; sociometer theory by Leary & Baumeister, 2000; double perspective theory by Wojciszke et al., 2011) by examining which psychological needs exhibit the strongest link to new mothers' self-esteem at both the trait and state levels. In doing so, the chapter highlights how parenthood may shape identity development and self-concept through changes in perceived competence, autonomy, and social connectedness.

Chapter 5 examines daily expectation–well-being dynamics through daily affective forecasting and assesses how morning expectations relate to same-day well-being experiences. Critically, the chapter moves beyond simply examining expectation valence (i.e., positive or negative) to also model expectation errors (i.e., the discrepancy between expectation and experience). Both forecast valence and forecast error are examined as predictors of daily well-being, allowing the chapter to assess their relative importance. This daily-level perspective complements the long-term expectation processes examined in Chapter 2, together illuminating expectation processes operating across two different timescales.

Together, the two research streams offer complementary perspectives on the transition to parenthood: one examining the expectations people bring to it, the other examining the well-being they experience during it.

Significance and Contributions

Understanding how the transition to parenthood shapes psychological well-being matters both scientifically and practically—yet the picture that emerges from existing research remains incomplete, in part because of how well-being and change have been conceptualized and measured. This dissertation aims to advance that understanding by treating well-being as multidimensional, change as heterogeneous, and the transition itself as a dynamic process that unfolds over multiple timescales.

In doing so, it brings together two perspectives that are rarely combined in the same body of work. The long-term view—how expectations formed years before birth shape who becomes a parent and how fulfilled they feel in the years that follow—speaks to questions of anticipation, selection, and adaptation that are central to life course research. The close-up view—how well-being shifts across pregnancy and the early postpartum months, fluctuates from day to day, and varies between individuals—speaks to the lived texture of the transition in ways that annual panel data cannot capture. Together, they offer a more complete account of the psychological experience of parenthood than either perspective could provide alone.

The specific theoretical and practical implications of these findings are taken up in the General discussion (Chapter 6).

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2

CHAPTER 2

Transition to parenthood: The association between expectations and family-fife satisfaction

This chapter is based on:
Tran, C. B., Ivanova, K., Reitz, A. K., & Stavrova, O. (2024). Transition to parenthood: The association between expectations and family-life satisfaction. *Social Psychological and Personality Science*, 15(8), 908–920. https://doi.org/10.1177/19485506241260570

The study materials and the data can be found at https://www.pairfam.de/en/. The pre-registration and analyses script can be accessed at the project's OSF page: https://osf.io/cpn76/.

Abstract

Parenthood is often assumed to profoundly impact well-being. Yet, few studies have explored how the transition to parenthood relates to parent's family-life satisfaction, and existing research has produced conflicting results. We propose that expected costs and rewards of having children (individual differences in the perceived value of children in one's life) could explain the mixed findings. Following respondents in a nationally representative panel study from Germany up to 11 years (N_{total} = 6,850, $N_{parents}$ = 1,196), we found that positive expectations (i.e., higher reward / lower cost) were associated with a higher likelihood of parenthood. Among parents, negative expectations were associated with lower family-life satisfaction as measured by parenting pleasure and family satisfaction; however, expectations did not predict the trajectory post-birth. This study underlines the role of expectations about being a parent for the transition to parenthood and for family-life satisfaction once a parent.

Keywords: Value of Children, expectations, transition to parenthood, family-life satisfaction

When faced with the decision to have children, people often consider how parenthood will affect their life. Will I still be able to afford my lifestyle? Will I feel younger with my child? These cost and reward expectations of what children might bring are referred to as the Value of Children (VOC; Hoffman & Hoffman, 1973). Consistent with rational choice theory (Hechter & Kanazawa, 1997), the VOC framework posits that the expected psychological value of children predicts whether an individual pursues parenthood. In cross-sectional studies, individual differences in VOC measured after the transition have been associated with the desire to have more children (Mayer & Trommsdorff, 2010) and with larger family size (Nauck, 2007). Yet, empirical evidence on whether VOC expectation is associated with the parenthood transition, that is, the likelihood of becoming a parent, is scant (for one exception, see Liefbroer, 2005).

Beyond influencing the parenthood transition, expectations can also affect parents' well-being during this transition, such as shaping satisfaction with childbirth (Preis et al., 2019) or relationship satisfaction (Mitnick et al., 2022). Existing research on parents' well-being during the transition has focused on parents' general life satisfaction (e.g., Pollmann-Schult, 2014), or on the couple's relationship, such as relationship- or marital satisfaction (Mitnick et al., 2009; Twenge et al., 2003). In this research, we focus explicitly on family-life satisfaction, a domain most directly shaped by the arrival of a new family member. Further, as childbirth is sometimes considered a "family-forming event", family-life satisfaction might become more salient during this transition and shape the evaluation of other aspects of well-being (Krämer & Rodgers, 2020). Finally, in contrast to the narrower construct of relationship- or marital satisfaction, the focus on family-life satisfaction allows us to additionally incorporate the subjective experience of *being a parent*. Thus, we aim to investigate whether VOC expectations not only influence the parenthood transition but also parents' family-life satisfaction.

Value of Children and the Parenthood Transition

The VOC framework (Hoffman & Hoffman, 1973) proposes that the expected *psychological* value of children affects one's desire to have children and, in turn, the parenthood transition. Some studies have connected positive child-value expectations (higher reward / lower cost) with a stronger desire for and intention to have children (Beckman et al., 1983; Miller & Pasta, 1993) and higher fertility outcomes (Nauck, 2007). However, these studies relied on cross-sectional retrospective data that measured VOC after family planning was completed. Yet, people's child-value belief can change as a result of having children, through learning from experiences and adjusting expectations (e.g., Lazarus & Rossouw, 2015). Only by measuring child-value expectations *prior* to the parenthood transition can we assess the role these expectations might play in determining whether the transition will take place. To our knowledge, only one existing study by Liefbroer (2005) has taken this approach of using prenatal VOC measures. Using a five-wave panel survey of Dutch young adults spanning 13 years, Liefbroer (2005) found that VOC expectations predict the parenthood transition.

Following this literature, we expect that negative child-value expectation is associated with lower likelihood of the parenthood transition (H_1).

Parenthood Transition and Family-Life Satisfaction

Well-being has been shown to fluctuate in response to significant life events such as the parenthood transition. A meta-analysis found a significant decrease in life satisfaction after childbirth in 113 independent prospective samples (Luhmann et al., 2013), which was later replicated in other longitudinal studies across various countries (Aassve et al., 2021; Bernardi et al., 2017; Mikucka & Rizzi, 2020; Myrskylä & Margolis, 2014). Comparatively, the literature on parenthood and well-being in the family domain is scant. Existing research in this area has primarily spotlighted the couple, focusing on marital satisfaction (e.g., Kohn et al., 2012) or relationship satisfaction (e.g., Mitnick et al., 2009). However, having a child fundamentally expands the family unit beyond the dyad, rendering it particularly important to understand individuals' experiences that go beyond the relationship with the partner. Here, family-life satisfaction offers a broader approach to assessing parents' satisfaction in the family domain.

Although the existing literature is limited, the relationship between family-life satisfaction and parenthood remains conflicted. While Vanassche and colleagues (2013) documented a lack of relationship between the presence of younger children in the family and parents' family-life satisfaction, the study neither employed a prospective design nor focused on the parenthood transition. On the other hand, using longitudinal data in a sample of 114 couples, Knauth (2000) observed a decrease in family-life satisfaction between pregnancy and 4-months post-birth for both mothers and fathers, with the decrease extending up to 8-months for mothers. Over 7 years, Kramer and Rodgers (2020) tracked life- and 9 different domain satisfactions and concluded that family-life satisfaction increased pre-birth and decreased after. A reason for these mixed findings might be that parenthood affects individuals differently: some individuals' satisfaction with their family life improves, while it deteriorates for others. The present study focuses on one potential source of this inter-individual variability: the role of VOC expectation.

VOC Expectation and Family-Life Satisfaction

Research on expectations and parenthood often focused on how violated expectations (i.e., when reality does not match expectation) affect parents' well-being (e.g., Lazarus & Rossouw, 2015). However, expectation by itself can also influence subjective experiences (Villiger, 2022) in a variety of life domains (Almenberg & Dreber, 2011) (Peerdeman et al., 2016). Drawing from different lines of research, we formulate two opposing predictions on the association between expectations and family-life satisfaction. Though we are unable to test the precise mechanisms, the theoretical arguments presented below allow us to draw concrete hypotheses about the relationship of interest.

Negative Expectations about Children Predict Lower Family-Life Satisfaction

People are known to search for and use information to confirm their existing beliefs and expectations, a phenomenon referred to as confirmation bias (Jones & Sugden, 2001; Nickerson, 1998). Parents of young children have been found to search for and overweigh health information regarding early-childhood vaccination that confirms their existing beliefs (Meppelink et al., 2019). Extending this to the experience of parenthood, parents who held negative expectations about children will tend to search for information confirming these expectations which will result in a negative perception of their parenthood experiences and family-life satisfaction. Here, we hypothesize that higher costs / lower rewards expectations predict lower family-life satisfaction (H_{2a}).

Negative Expectations about Children Predicts Higher Family-Life Satisfaction

Cognitive dissonance theory posits that psychological discomfort occurs when one's behavior is misaligned with one's values or beliefs (Festinger, 1962; Harmon-Jones & Harmon-Jones, 2007). To reduce dissonance, one can change their behavior to opt out of the high-cost event. However, opting out of parenthood is not (really) an option as "[...] once the child arrives, there is no recourse to a resale market nor to a local humane society" (Turchi, 1975, p. 44). In this case, other dissonance reduction methods such as post-decision attitude change can be used (Annu & Dhanda, 2020). Specifically, to make the overall net value of children more positive and in line with their already-made decision of having children, parents might evaluate their parenting experiences as more pleasurable (Eibach & Mock, 2011). Following this literature, we hypothesize that higher costs / lower rewards expectations predict higher family-life satisfaction (H_{2b}).

The Current Study

The current study aimed to examine whether costs and rewards expectations about children are associated with parenthood outcomes. We examined whether positive VOC expectations predict a higher likelihood of parenthood transition (H_1), and whether VOC expectations negatively (H_{2a}) or positively (H_{2b}) predict family-life satisfaction in parents.

METHODS

Dataset

We used data from the Panel Analysis of Intimate Relationships and Family Dynamics (pairfam), release 12.0 (Brüderl et al., 2021), launched in Germany in 2008. Detailed description of the study can be found in Huinink et al. (2011). Data was collected annually from a nationwide random sample of more than 12,000 individuals (referred to as "anchors") of three birth cohorts 1971-73, 1981-83, 1991-93. We used anchor data from waves 1 to 11.

Participants

We selected respondents who had at least 2 assessment waves available, had no biological children at the first assessment, and completed the VOC scale at least once during the observation period (i.e., prior to parenthood transition for parents, or prior to drop-out or censoring at wave 11 for nonparents). For RQ1, we used the full sample (i.e., parents and nonparents), totaling 6,850 respondents of whom 1,196 made the parenthood transition during the observation period. For RQ2, we used the parent subsample. Table 1 summarizes the available number of assessments per respondent in the full- and parent subsample.

Table 1
Number of assessments per respondent

	2	3	4	5	6	7	8	9	10	11
Full sample (N_{total} = 6,850)										
N	1014	731	576	462	394	280	300	514	664	1915
%	14.80	10.67	8.41	6.74	5.75	4.09	4.38	7.50	9.69	27.96
Parent subsample (N_{total} = 1,196)										
N	33	46	42	35	51	45	68	144	168	564
%	2.76	3.85	3.51	2.93	4.26	3.76	5.69	9.53	14.05	47.16

Measures

Value of Children

VOC expectations were measured using the Value of Children scale developed for the pairfam study. The 10-item scale consists of 2 subscales: VOC reward (e.g., "How strongly do you expect that with children you will stay young longer?"), and VOC cost (e.g., "How strongly do you worry that you will be able to afford less with children?"). Respondents answered the items on a 5-point scale from 1 (*Not at all*) to 5 (*Very strongly*). Items were presented in waves 1, 2, 4, 6, 8, and 10. The scale validity was independently validated in prior studies (Fitzner et al., 2007). The average Cronbach's alpha was .80 for VOC cost and .66 for VOC reward[1]. We computed mean scores for each subscale to obtain a VOC cost and a VOC reward score for each participant at each assessment year.

Because we were interested in the effect of *expectations*, we used respondents' most recently available VOC measures that were *at least two years prior* to the transition as our predictors for parents. The two years cut-off ensured that the measure captured the prospective parents' expectations prior to the decision of having a child, as 92% of German couples had a successful pregnancy within one year of trying (Gnoth et al., 2003). For nonparents, the most recently available measures prior to drop-out or censoring were used.

1 Principle component analysis of the 10-item scale using data from wave 1 indicated a 2-factor structure, with items loading onto their corresponding subscale, and no cross-loading higher than .23.

Parenthood Transition

Parenthood was identified using the self-reported number of biological children born at the time of the assessment. Respondents who did not have biological children at the first assessment and had at least one biological child during the observation period were identified as having transitioned into parenthood, and the respective year was coded as the transition year[2]. For parents, observations from two years prior to the parenthood transition onward were included in the analysis, excluding observations after subsequent transitions (i.e., second childbirth onward) in cases where those took place.

Family-life satisfaction

We used two indicators of family-life satisfaction: family satisfaction and parenting pleasure. Family satisfaction is more commonly used and therefore assists in comparison with existing studies, while parenting pleasure provides a more direct measure tapping into the parenting role specifically.

Family Satisfaction. Family satisfaction was measured using the Satisfaction with Different Domains of Life scale (Thönninssen et al., 2021), with one item: "How satisfied are you with the following domains of your life? – Family." Respondents answered the items on a 11-point scale from 0 (*Very dissatisfied*) to 10 (*Very satisfied*). This item was presented in all 11 waves.

Parenting Pleasure. Respondents answered 2 items: "When I am with my child/children there is nothing else I'd rather be doing" and "I look forward to spending time with my child/children" on a 5-point scale from 1 (*Not at all*) to 5 (*Absolutely*). The scale was presented in waves 2, 4, 6, 8, 9, 10, and 11 to parents with children younger than 16[3]. Mean score for the scale was computed for each participant at each assessment wave. The average correlation between the two items was 0.48 (ranging from 0.41 to 0.50).

Covariates

We accounted for respondents' age (linear & quadratic), sex (0 = *Male*, 1 = *Female*), partners status (0 = *No partner*, 1 = *With partner*), (natural log of) net monthly household income, education (no degree, vocational degree, university degree, currently enrolled), and employment status (employed, unemployed, unemployed-student, unemployed-other) as they are potential factors influencing both family-life satisfaction (Diener et al., 2018) and VOC (Hoffman et al., 1978). Covariates were taken in the same year as VOC expectations.

2 Five cases reported a decreasing number of biological children and were not included in the final sample.

3 97 cases reported having no biological children but with a parenting pleasure score (suggesting non-biological children) and were not included in the final sample.

Analytic Strategy

To investigate the effect of VOC expectations on the parenthood transition, we employed logistic regression with cost and reward expectations as independent variables, and parenthood as the dependent variable.

To investigate parents' family-life satisfaction, we explored two main outcomes: satisfaction at the transition year, and satisfaction trajectory post-birth. We did not have a prediction regarding whether VOC expectations will only have short-term or also long-term effect. Testing both allowed a more thorough exploration of the role of VOC expectations.

Satisfaction at the Transition Year

To examine the effect of VOC expectations on family-life satisfaction at the transition year, we used multiple linear regression with cost and reward expectations as independent variables, and parenting pleasure and family satisfaction measured at the transition year as dependent variables. For family satisfaction, in addition to the covariates listed above, we also included baseline family satisfaction (measured at the first assessment) and the number of years between the first assessment and the transition year as additional covariates.

Satisfaction Trajectory After the Transition

Parenting Pleasure. To investigate the effect of VOC expectations on parenting pleasure trajectory post-birth, we employed multilevel modeling to account for the nested structure of the data with cost and reward expectations and time (0 at transition year, negative for the years before, positive for the years after) as independent variables, and parenting pleasure as dependent variable. We included random intercept of individuals and random slope of time.

Family Satisfaction. To examine the effect of VOC expectations on family satisfaction trajectory post-birth and the baseline shift in average family satisfaction, we employed discontinuous change models (Singer & Willett, 2003) with cost and reward expectations as independent variables, and family satisfaction as dependent variable. The model also included the following time indicators:

- Baseline shift: values of 0 for the years before transition and values of 1 in the years after. This coefficient reflects a baseline shift in family satisfaction post-birth (i.e., difference in family satisfaction during the two years before transition versus all the years after the transition).

- Time slope: values of 0 for the years before the transition and increasing for the years after. This coefficient reflects the linear change in family satisfaction following the transition.

We included random slopes of the baseline shift and time slope, and random intercept of individuals to account for individual differences in the estimates. Additionally, interactions between VOC expectations and the baseline shift and time slope were tested.

Each model was specified with (i) only VOC cost, (ii) only VOC reward, and (iii) with both VOC cost and reward as predictors, and with and without covariates. For brevity, only the results from models with *both* VOC costs and VOC rewards as predictors are reported below. Model specifications yielded similar results unless stated otherwise, and details are included in the Supplementary Online Material.

The study materials and the data can be found at https://www.pairfam.de/en/. The study was pre-registered; the pre-registration and analyses script can be accessed at the project's OSF page: https://osf.io/cpn76/. Deviations from the pre-registration are indicated.

Sensitivity Analysis

A sensitivity power analysis using 1,000 simulations with the simr package (Green & MacLeod, 2016) showed that the current sample gave us 80% power (α = .05) to detect a VOC main effect of at least β = 0.075 and interaction effect of at least β = 0.09 (*SD* change per year) with family satisfaction, and main effect of at least β = 0.084 and interaction effect of at least β = 0.027 (*SD* change per year) with parenting pleasure (Table S1 in SOM).

RESULTS

Descriptive Statistics

Table 2 presents the means, standard deviations, and correlations for all respondents at the first assessment. 94.04% of respondents had their first assessment in wave 1, 5.59% in wave 3, and 0.36% in wave 4. The full sample consisted of 46.14% female respondents with M_{age} = 22.02 (*SD* = 7.22), and M_{income} = 2,685.45 euro (*SD* = 1,488.98). 41.76% of respondents reported that they currently have a partner, 37.23% have a vocational degree or higher, and 40.89% reported to be currently employed. The parent subsample consisted of 50.75% female respondents with M_{age} = 26.02 (*SD* = 5.83), and M_{income} = 2,618.28 euro (*SD* = 1,357.63). 76.34% of parents reported that they currently have a partner, 68.70% have a vocational degree or higher, and 68.57% reported to be currently employed.

Table 2

Means, Standard Deviations, and Correlations at First Assessment

Variable	*M*	*SD*	1	2
1. VOC reward	3.56	0.65		
2. VOC cost	2.48	0.74	-.11*** [-.14, -.09]	
3. Family satisfaction	8.52	1.87	.16*** [.14, .18]	-.15*** [-.17, -.12]

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Values in square brackets indicate the 95% CI. For with0-in person correlation, see Table S12 (SOM).

Parenthood Transition

VOC expectations were significant predictors of the likelihood of the parenthood transition (Table 3). For one *SD* increase in cost / reward expectation, respondents were 0.77 times less ($ps < .001$) / 1.20 - 1.23 times more ($ps < .001$) likely to enter parenthood. The results supported our hypothesis (H_1) that negative expectations predict lower likelihood of the parenthood transition.

Table 3

VOC Expectations and the Parenthood Transition

	Model 1			Model 2		
Predictors	***Odds Ratios***	**95% CI**	***p-value***	***Odds Ratios***	**95% CI**	***p-value***
(Intercept)	0.19	0.18 – 0.21	**<.001**	0.01	0.00 – 0.02	**<.001**
VOC cost	0.77	0.72 – 0.82	**<.001**	0.77	0.71 – 0.83	**<.001**
VOC reward	1.20	1.13 – 1.29	**<.001**	1.23	1.14 – 1.33	**<.001**
Covariates		**not included**			**included**	
N		6,774			6,188	

Note. Model 1 does not include covariates; Model 2 includes covariates (age, sex, partner status, income, education, employment status). The coefficients of the covariates can be found in Table S3 (SOM).

Satisfaction at Transition Year

Parenting Pleasure. VOC expectations were significant predictors of parenting pleasure at the transition year (Table 4). For one *SD* increase in cost / reward expectation, parents reported 0.14 – 0.15 *SD* lower (*p*s < .001) / 0.09 – 0.10 *SD* (*p*s < .05) higher in parenting pleasure.

Table 4

VOC Expectations and Parenting Pleasure at Transition Year

	Model 1			Model 2		
Predictors	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***
(Intercept)	0.00	-0.07 – 0.08	.905	0.69	-0.49 – 1.87	.249
VOC cost	-0.14	-0.21 – -0.06	**<.001**	-0.15	-0.22 – -0.07	**<.001**
VOC reward	0.09	0.02 – 0.17	**.015**	0.10	0.03 – 0.18	**.010**
Covariates		**not included**			**included**	
N		717			668	
R^2 / R^2 adjusted		.03 / .02			.06 / .04	

Note. Model 1 does not include covariates. Model 2 includes covariates (age, sex, partner status, income, education, employment status). The coefficients of the covariates can be found in Table S5 (SOM).

Family Satisfaction. In all models tested, cost expectation was a significant predictor of family satisfaction at the transition year. For one *SD* increase in cost expectation, parents reported 0.12 – 0.17 *SD* lower (*p*s < .001) in family satisfaction. In contrast, reward expectation was a less consistent predictor, not reaching significance in the models without covariates[4]. Overall, for one *SD* increase in reward expectation, parents reported 0.06 – 0.11 *SD* higher (*p*s < .05) in family satisfaction. Model coefficients are in Table 5.

4 Further investigation revealed that this could be explained by differences in the sample size between the model with and without covariates (see table note).

Table 5

VOC Expectations and Family Satisfaction at Transition Year

	Model 1			Model 2			Model 3			Model 4		
Predictors	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***
(Intercept)	0.13	0.02 – 0.23	**.025**	0.13	0.02 – 0.25	.022	-0.21	-0.98 – 0.56	.587	-0.20	-0.99 – 0.59	.621
VOC cost	-0.12	-0.18 – -0.06	**<.001**	-0.15	-0.20 – -0.09	<.001	-0.14	-0.20 – -0.08	**<.001**	-0.17	-0.23 – -0.10	<.001
VOC reward	0.04	-0.02 – 0.10	.177	0.06	0.00 – 0.12	.044	0.08	0.02 – 0.14	**.011**	0.11	0.05 – 0.17	<.001
Years between first assessment and transition	-0.03	-0.05 – -0.01	**.007**	-0.03	-0.05 – -0.01	**.006**	-0.03	-0.05 – -0.01	**.003**	-0.03	-0.06 – -0.01	.003
Family satisfaction at first assessment	0.26	0.20 – 0.32	**<.001**	-	-	-	0.26	0.20 – 0.33	**<.001**	-	-	-
Covariates		**not included**			**not included**			**included**			**included**	
N		1134			1137			1022			1024	
R^2 / R^2 adjusted		.10 / .10			.03 / .03			.13 / .12			.07 / .06	

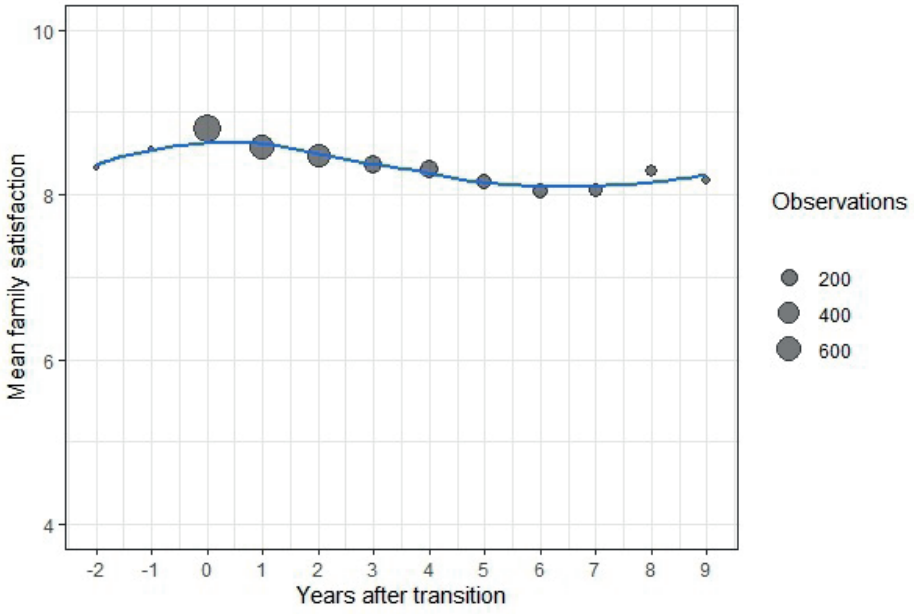
Note. Model 1 and 2 do not include covariates. Model 3 and 4 include covariates (age, sex, partner status, income, education, employment status). Model 2 and 4 do not include baseline family satisfaction as a covariate. The coefficients of the covariates can be found in Table S7 (SOM). Additionally, the difference in VOC reward effect between Model 1 (non-significant) and Model 3 (significant) was due to the difference in sample size (due to missing values on covariates). When fitted Model 1 to the sample used for Model 3, VOC reward was found to be significant.

Satisfaction Trajectory after the Transition

A visual investigation of the raw data of mean family satisfaction per assessment year suggested a nonlinear trajectory of decline post-birth (Figure 1). While the nonlinear trajectory is less evident with parenting pleasure (Figure 2), we still added the quadratic term of the time slope to all models specified. No further deviations from the pre-registration were made.

Figure 1

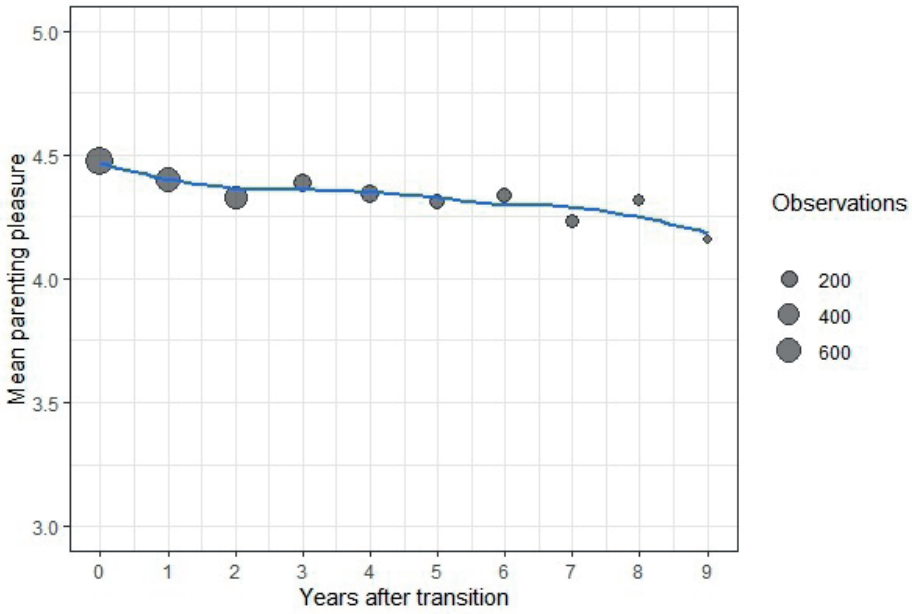
Average Family Satisfaction across the Parenthood Transition (Raw Values)



Note. 95% of parents reported between 4 and 10 on family satisfaction.

Figure 2

Average Parenting Pleasure after the Parenthood Transition (Raw Values)



Note. 95% of parents reported between 3 and 5 on family satisfaction.

Parenting Pleasure. After the transition, parents showed a significant nonlinear declining trajectory of parenting pleasure. We found significant effects of VOC expectations on parenting pleasure in the years following the transition, on average (Table 6). Parents with 1 *SD* higher cost / reward expectation reported 0.11 – 0.13 *SD* lower (*p*s < .001) / 0.07 – 0.13 *SD* higher (*p*s < .05) in parenting pleasure. There was also a significant interaction between reward expectation and time, suggesting that the effect of reward expectations on parenting pleasure became less positive with time.

Table 6

VOC Expectations and Pleasure in Parenting After Transition

	Model 1			Model 2			Model 3			Model 4		
Predictors	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***
(Intercept)	0.13	0.07 – 0.20	**<.001**	0.13	0.07 – 0.20	**<.001**	1.31	0.55 – 2.06	**.001**	1.32	0.56 – 2.08	**.001**
Time	-0.10	-0.14 – -0.05	**<.001**	-0.09	-0.14 – -0.05	**<.001**	-0.11	-0.15 – -0.06	**<.001**	-0.11	-0.15 – -0.06	**<.001**
Time^2	0.01	0.00 – 0.02	**.002**	0.01	0.00 – 0.02	**.003**	0.01	0.01 – 0.02	**<.001**	0.01	0.01 – 0.02	**<.001**
VOC cost	-0.13	-0.18 – -0.08	**<.001**	-0.11	-0.17 – -0.04	**.001**	-0.13	-0.19 – -0.08	**<.001**	-0.12	-0.19 – -0.05	**<.001**
VOC reward	0.07	0.02 – 0.12	**.010**	0.11	0.04 – 0.18	**.001**	0.08	0.02 – 0.13	**.008**	0.13	0.06 – 0.19	**<.001**
Cost × time	-	-	-	-0.02	-0.06 – 0.03	.470	-	-	-	-0.01	-0.06 – 0.03	.598
Cost × time^2	-	-	-	0.00	-0.01 – 0.01	.709	-	-	-	0.00	-0.01 – 0.01	.739
Reward × time	-	-	-	-0.04	-0.09 – -0.00	**.048**	-	-	-	-0.06	-0.10 – -0.01	**.019**
Reward × time^2	-	-	-	0.00	-0.00 – 0.01	.117	-	-	-	0.01	-0.00 – 0.01	.071
Covariates		**not included**			**not included**			**included**			**included**	
N_{inds} / N_{obs}		1048 / 2610			1048 / 2610			954 / 2362			954 / 2362	
Marginal R^2 / Conditional R^2		.03 / .44			.03 / .45			.05 / .44			.05 / .45	

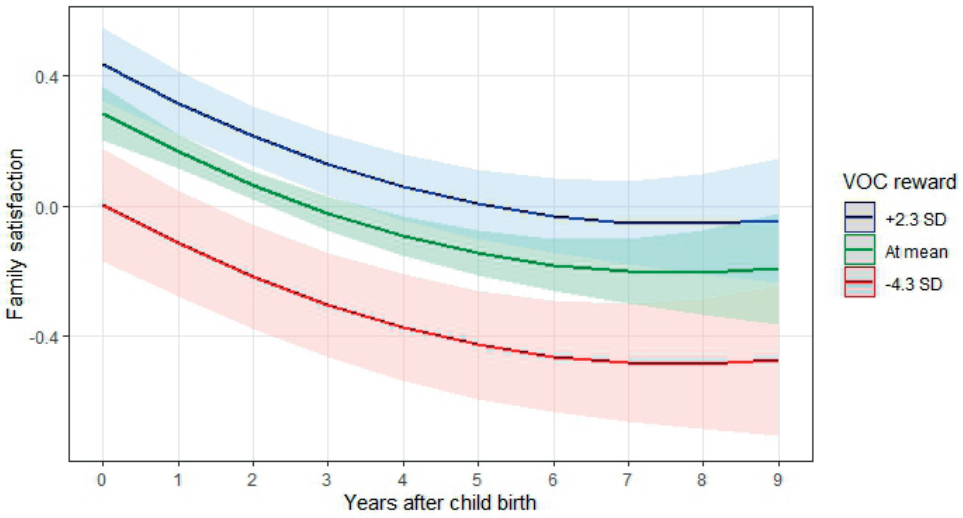
Note. Model 1 and 2 do not include covariates. Model 3 and 4 include covariates (age, sex, partner status, income, education, employment status). The coefficients of the covariates can be found in Table S9 (SOM).

Family Satisfaction. After the transition, parents experienced a significant nonlinear decline in family satisfaction similar to parenting pleasure. Again, we found significant effects of VOC expectations on family satisfaction (Table 7). Parents with 1 *SD* higher cost / reward expectation reported 0.13 – 0.15 *SD* lower (*p*s < .001) / 0.09 – 0.19 *SD* higher (*p*s < .001) in family satisfaction.

At the same time, a comparison of the average family satisfaction in the years before versus after the transition (baseline shift) showed that parents reported on average 0.30 *SD* higher (*p*s < .001) in family satisfaction post-birth compared to the two years before, indicating a positive shift in the baseline level of satisfaction. We found no significant effect of VOC expectations on the baseline shift or the trajectory of family satisfaction: The downward trajectory and the positive baseline shift in family satisfaction were similar for parents regardless of their expectations (Figure 3). Taken together, the results support our hypothesis (H_{2a}) that negative expectations predict lower family-life satisfaction in parents.

Figure 3

Predicted Values of Family Satisfaction after the Parenthood Transition



Note. VOC cost expectation was hold at mean value. VOC reward was plotted at the minimum, mean, and maximum value of our sample.

Table 7

VOC Expectations and Family Satisfaction After Transition

	Model 1			Model 2			Model 3			Model 4		
Predictors	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***	***β***	**95% CI**	***p-value***
(Intercept)	-0.03	-0.08 – 0.03	.333	-0.03	-0.08 – 0.03	.341	-0.04	-0.60 – 0.51	.881	-0.04	-0.59 – 0.52	.895
Baseline shift	0.30	0.22 – 0.38	**<.001**	0.30	0.22 – 0.39	**<.001**	0.30	0.21 – 0.39	<.001	0.30	0.21 – 0.39	**<.001**
Time	-0.12	-0.17 – -0.08	**<.001**	-0.13	-0.17 – -0.08	**<.001**	-0.12	-0.17 – -0.07	<.001	-0.12	-0.17 – -0.07	**<.001**
Time^2	0.01	0.00 – 0.01	**.004**	0.01	0.00 – 0.01	**.003**	0.01	0.00 – 0.01	.024	0.01	0.00 – 0.01	**.019**
VOC cost	-0.13	-0.17 – -0.09	**<.001**	-0.14	-0.19 – -0.09	**<.001**	-0.15	-0.19 – -0.10	<.001	-0.15	-0.21 – -0.10	**<.001**
VOC reward	0.09	0.05 – 0.13	**<.001**	0.15	0.10 – 0.21	**<.001**	0.13	0.09 – 0.17	<.001	0.19	0.13 – 0.24	**<.001**
Cost × baseline shift	-	-	-	0.01	-0.08 – 0.09	.892	-	-	-	-0.00	-0.09 – 0.09	.971
Cost × time	-	-	-	-0.00	-0.05 – 0.04	.883	-	-	-	-0.00	-0.05 – 0.05	.902
Cost × time^2	-	-	-	0.00	-0.00 – 0.01	.524	-	-	-	0.00	-0.00 – 0.01	.429
Reward × baseline shift	-	-	-	-0.07	-0.15 – 0.01	.108	-	-	-	-0.04	-0.13 – 0.05	.344
Reward × time	-	-	-	-0.01	-0.06 – 0.03	.612	-	-	-	-0.02	-0.07 – 0.03	.413
Reward × time^2	-	-	-	-0.00	-0.01 – 0.00	.800	-	-	-	0.00	-0.01 – 0.01	.967
Covariates		**not included**			**not included**			**included**			**included**	
N_{inds} / N_{obs}		1137 / 5773			1137 / 5773			1024 / 5172			1024 / 5172	
Marginal R^2 / Conditional R^2		.04 / .43			.04 / .43			.06 / .43			.06 / .43	

Note. Model 1 and 2 do not include covariates. Model 3 and 4 include covariates (age, sex, partner status, income, education, employment status). The coefficients of the covariates can be found in Table S11 (SOM).

Robustness Check

A robustness check was performed by rerunning all analyses with VOC at the first assessment as predictors. This did not substantially change the results: like the pre-registered analyses, VOC cost remained significant, and the effect of VOC reward differed across models (Table S13 – S16 in SOM). The effects are somewhat smaller when we take the first measures compared to the measure 2 years prior to the transition. It is likely that individual characteristics might be generally more predictive of behavior when measured shortly before the behavior (Balbo et al., 2013).

DISCUSSION

When faced with the life-changing decision of whether to have children, people often wonder about the potential costs and rewards. The present study investigated the effect of these expectations on the parenthood transition. Additionally, we explored two opposing predictions on how these expectations might affect parents' family-life satisfaction using a large nationwide German sample.

Consistent with the VOC framework (Hoffman & Hoffman, 1973), we found that lower VOC cost and higher VOC reward expectations negatively predicted the likelihood of becoming parents. These findings, along with Liefbroer (2005), add to the somewhat limited empirical literature on the role of child-value expectations in fertility decisions. Adopting a broader societal perspective, our findings could explain the decreasing fertility in most European countries (Murray et al., 2018). The view on parenthood seems to become more negative in the recent decades. The shift in parenting norms – namely, the deepening of the intensive parenting attitude (Nomaguchi & Milkie, 2020) – has created a climate where parenting is becoming an increasingly costly activity. Additionally, experts on the subject often concluded that parenthood is detrimental to one's well-being by citing the findings that parents report lower well-being than nonparents and exhibit a decline trajectory after childbirth (Hansen, 2012). While often done to acknowledge the otherwise unnoticed struggles that parents (particularly mothers) go through, these depictions can contribute to the increasingly negative expectations of parenthood. As our study demonstrated, these are in turn related to a lower likelihood of becoming parent.

Consistent with the limited literature on parenthood and family-life satisfaction (Knauth, 2000; Krämer & Rodgers, 2020), we found a declining trajectory of family satisfaction and parenting pleasure post-birth. However, we also found that parents on average reported higher family satisfaction (i.e., 0.3 SD higher) in the years post-birth than in the two years before. This finding is somewhat surprising as previous meta-analyses have connected the parenthood transition with a decrease (marital satisfaction; Twenge et al., 2003) or no change in average well-being (life satisfaction; Bühler et al., 2023). The findings of higher average

and declining trajectory paint a nuanced picture of the effect of parenthood on parents' family-life satisfaction. Specifically, although parents experience a deterioration of family-life satisfaction post-birth, this decrease does not fully nullify the satisfaction gain from parenthood, leading to a still higher average satisfaction compared to before, at least during the study's observation period.

Beyond the parenthood transition, VOC expectations were also associated with parents' family-life satisfaction. In line with *H2a*, we found that parents with more positive child-value expectations tend to be more satisfied with their family life. Child-value expectation not only is associated with the broader family satisfaction but also with the more direct measure of the parenthood, namely, parenting pleasure. These findings suggest that while parenthood is often described by parents as a transformative experience and nothing like they expected, expectations might serve as a sneak-peek for parents into their experiences of parenthood.

Lastly, we found that VOC expectations did not predict the individual differences in family-life satisfaction trajectory and baseline shift. Parents appear to experience the same rate of decline and baseline shift in family-life satisfaction after the transition *regardless* of their expectations. This is somewhat surprising as a previous study reported a steeper rate of decline in marital satisfaction in parents with more positive expectations pre-birth (Lawrence et al., 2007). This discrepancy could be due to the different type of expectations investigated (child-value versus diverse types of expectations), or due to a lack of power to detect the interactions of interest.

Limitations and Future Directions

Although we documented an association between VOC expectations and parents' family-life satisfaction, the mechanism underlying this relationship remains unknown. Individuals with more positive expectations might be better "prepared" for having children: they might be more likely to have a romantic partner, higher education and income, or have a more supportive social network. These parents can potentially experience the transition more positively because of their preparedness. In our analyses, we controlled for some of these factors but cannot fully exclude the possibility that other aspects might impact both VOC expectations and the experience of parenthood.

Drawing from the confirmation bias literature, we proposed that parents with positive expectations might actively seek out and interpret experiences with their child as rewarding, outweigh positive experiences, or selectively recall more positive experiences in retrospect. However, the data and methods used here did not allow us to pinpoint which of these processes explains the association observed, or whether confirmation bias is indeed the underlying mechanism. Other mechanisms could be at work as well. For example, according to the self-fulfilling prophecy research, individuals with more negative expectations may end up behaving in a way that would make their negative expectations come true (Coleman et

al., 1999; Snyder, 1984). In other words, negative expectations might predispose parents to maladaptive behaviors and practices following the transition, resulting in lower family-life satisfaction. Shedding light on these processes represents a potentially important avenue for future research.

Our analyses focused on VOC measured at just one timepoint as a predictor of the parenthood transition and family-life satisfaction. Yet, VOC itself could exhibit changes across the transition. While our data included measures of VOC after the transition as well, their interpretation after childbirth was not straightforward. For example, "How strongly do you worry that you will be able to afford less with children?" could be interpreted by participants as either inquiring about their general perceived cost of children, the specific cost of their current child(ren), or the cost of their current child(ren) plus future (planned or unplanned) children. Due to this uncertainty, we focused narrowly on a snapshot of VOC expectation at least 2 years prior to the transition. A deeper dive into VOC expectations, such as tracking VOC trajectory across the transition or exploring factors predicting VOC, could be a fruitful avenue for future research.

Although the VOC scale was validated in prior research (Fitzner et al., 2007), reliability of the reward subscale was lower in our sample compared to original validation study, while the cost subscale showed good reliability. While cost expectations were found to be significant predictors across all models, reward expectations were less so, specifically in predicting family satisfaction. This could be due to some reward items referring to more long-term evaluations (i.e., two of five items refer to "adult children"), making them more abstract compared to the cost items which focused on short-term judgments. This could result in the reward subscale having less predictive power in the shorter time span. Future studies can consider using a VOC measurement with a more reliable reward subscale to address this issue.

Our study contributes to different lines of research. It adds to the VOC literature on the parenthood transition. While the VOC framework assumes a prospective effect of VOC expectations on the parenthood transition, prior studies mostly focused on parents whose VOC measurements were taken retrospectively in studies using cross-sectional data (Nauck, 2007, 2014). By employing longitudinal methods and measuring VOC prenatally, our study tackles these limitations: even if becoming a parent might affect VOC expectations (which could be an interesting question for future studies), our study unequivocally shows that VOC expectations are associated with the transition to parenthood. Additionally, we expand the current VOC literature which has so far focused on how VOC affects fertility (Nauck, 2014) or intergenerational relations (Oliveira, 2016) by investigating its role in predicting parents' family-life satisfaction.

We also contribute to the literature of individual differences in parents' well-being. Previous research on the parenthood transition from the field of psychology often focuses on broad

personality traits (self-esteem; Bleidorn et al., 2016), while the field of sociology often investigates the impact of socio-demographic factors (Guzzo & Hayford, 2020). Much less is known about the role of between-individual differences in expectations. Except for the studies on *violated* expectations (e.g., Lazarus & Rossouw, 2015), the question of whether cost and reward expectations in and of themselves could color individuals' experiences of the transition has not been addressed before in the context of a major life event.

Our study provides a novel finding showing that although parenthood is associated with a declining family-life satisfaction trajectory, parents are still on average more satisfied with their family life and with parenting post-birth compared to before. By looking at the mean difference and the trajectory together, our findings support the perspective that parents are happier after having children, even though this "happiness gain" likely dissipates in the longer run given the declining trajectory in family-life satisfaction post-birth.

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3

CHAPTER 3

Changes in psychological well-being across the transition to motherhood: Combining longitudinal and experience sampling method

This chapter is based on:
Tran, C. B., Ivanova, K., Stavrova, O., & Reitz, A. K. (2025). Changes in psychological well-being across the transition to motherhood: Combining longitudinal and experience sampling methods. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspp0000573

Pre-registration, analysis code, and anonymized data are available at https://osf.io/jpqzr/. Materials are available at https://osf.io/7kz8f/.

Abstract

Becoming a parent is a major life event associated with changes in psychological well-being. Existing research has often focused on the long-term development of trait well-being, leaving several gaps unaddressed. The current preregistered study employed three waves of intensive longitudinal data, including 7-day experience sampling data per wave, to investigate psychological well-being trajectories across the transition to motherhood. This approach provides novel, detailed insights into the timing of well-being changes (beyond traditional annual assessments), explores developments in different change indicators (mean-level, intraindividual variability, and individual differences), and various well-being components (affective, cognitive, and meaning in life) during this critical life transition. Following 161 first-time Dutch mothers from 20 weeks of pregnancy to 6 months postpartum, we observed increases in positive affect and meaning in life, along with decreases in life and relationship satisfaction that occurred between pregnancy and 2-3 months postpartum, with no significant changes afterward. In contrast, no significant changes in intraindividual variability in well-being (i.e., well-being fluctuations from moment to moment and day to day) were observed throughout the transition. There were both similarities and differences between the trajectories of trait and mean-state measures of different well-being outcomes, and additional exploratory analyses highlighted how various daily predictors (e.g., sleep quality, infant crying) became more (or less) important for mothers' well-being as they moved across the transition. The current study contributes to a better understanding of how the changes in a broad range of well-being components and other parameters unfold across the transition to motherhood.

K*eywords:* psychological well-being, meaning in life, transition to parenthood, experience sampling, intraindividual variability

Becoming a parent is a major life event associated with tremendous changes in new parents' lives. These changes span from making dietary and behavioral adjustments in preparation before the child is born to crafting new daily routines around the child's needs after childbirth. As a result, a growing body of literature has found that the transition period is related to changes in new parents' psychological well-being. A consistent pattern of decreasing cognitive well-being (life and relationship satisfaction) has been reported by several meta-analyses (e.g., Luhmann et al., 2012; Mitnick et al., 2009), as well as by studies analyzing large longitudinal panel data from Western countries (e.g., Le Moglie et al., 2019; Matysiak et al., 2016; Myrskylä & Margolis, 2014). Yet, the reliance on survey panel data that are not tailored to the transition period has left several research gaps unanswered that the current study aims to address.

First, existing research on well-being and parenthood has largely focused on life and relationship satisfaction as these well-being measures are typically assessed in large panel surveys (e.g., Aassve et al., 2021; Myrskylä & Margolis, 2014). In contrast, except for research on personal growth (i.e., discovering new strengths, improving relationships with others, feeling more mature, discovering new opportunities; Taubman – Ben-Ari et al., 2024; Taubman – Ben-Ari & Spielman, 2014), research on how eudaimonic well-being – in particular, perception of meaning in life – develops across the parenthood transition is scarce in comparison. This is problematic as parenthood is believed to be central to one's sense of meaning in life, both by lay people and well-being researchers (see Morse & Steger, 2019). Further, since parenthood appears to impact different aspect of well-being differently (e.g., Luhmann et al., 2012), changes in new parents' sense of meaning in life across the transition cannot simply be extrapolated from the trajectory of other well-being components (e.g., life satisfaction) that have been well-studied, and thus require attention in their own right.

Second, relying on panel data with large time intervals (e.g., one or several years) remains the dominant methodology of examining the transition to parenthood (e.g., Aassve et al., 2021; Richter et al., 2019). While appropriate for the long-term exploration of well-being development across multiple years, this temporal resolution is inadequate to capture the more dynamic period directly surrounding childbirth, namely during pregnancy and the first year postpartum, as the transition may trigger fast, short-term changes that can be non-linear or discontinuous (Bleidorn et al., 2021; Luhmann et al., 2014). The dynamic nature of this period and the need for higher temporal resolution are already widely practiced by new parents, midwives, pediatricians, and other healthcare professionals who measure pregnancy and infant age in months or weeks. Yet, psychological research on new parents has been slow to adopt this practice. Thus, it is important for researchers studying the critical parenthood transition to also strive for the use of data with higher temporal resolution, such as semiannual, quarterly, or monthly assessments, to better understand well-being development and the (more precise) timing of potential changes.

Third, while the long-term stability of well-being (at the mean level) has been well explored, its short-term dynamic characteristics have largely gone unstudied in new parents. Although prominent well-being theories (e.g., set-point theory) tend to conceptualize psychological well-being as a stable construct, affective and cognitive well-being and meaning in life have been shown to exhibit variability at the daily level (Houben et al., 2015; Steger & Kashdan, 2013; Willroth et al., 2020). High daily fluctuations in well-being are associated with lower daily well-being, worse psychological and mental health, and neuroticism (Steger & Kashdan, 2013; Willroth et al., 2020). Thus, new parents whose daily lives are hectic and ever-changing from one moment to the next could be experiencing not only changes in their average well-being but also in the short-term fluctuations of well-being (from henceforth, well-being variability) as well. Correspondingly, life event researchers have also advocated for capturing changes via different indicators (i.e., beyond mean-level) to obtain a more complete picture of psychological development during life transitions (Reitz, 2022).

The present preregistered study aims to contribute to our understanding of well-being changes across the transition to motherhood by using a multi-wave intensive longitudinal study focusing on the period immediately before and after childbirth. First, we aim to obtain an encompassing picture of the different components of well-being development by examining changes in cognitive (i.e., life and relationship satisfaction) and affective (i.e., positive and negative affect) well-being, and sense of meaning in life, measured with both trait and mean-state measurements. Second, we aim to go beyond mean-level changes by also examining changes in well-being variability across the transition to motherhood. Since not all individuals react to life events similarly or to the same degree (Haehner et al., 2024; Reitz et al., 2024), we also test between-individual differences in changes across the transition. Lastly, in additional exploratory analyses, we examined a selection of daily protective and risk factors for new parents' well-being (Kent-Marvick et al., 2022; Kurth et al., 2011; Triantafillou et al., 2019), representing mother's experiences (sleep quality), infant's characteristics (infant crying), and mother's social relationships (family and non-family contacts), and tested their ability to predict well-being at different stages throughout the transition.

Changes in Mean-Level Well-being

The transition to parenthood can lead to changes in traits such as psychological well-being[1] (Bühler et al., 2023). The neo-socioanalytical model posits that, as a major life event, the transition to parenthood brings about new social roles that can trigger personality trait changes in new parents (Roberts & Wood, 2006). According to this model, parenthood comes with a set of societal expectations and norms for how individuals should behave. By investing

1 This distinction between core traits (i.e., the Big Five) and surface characteristics (e.g., well-being) is called into question in a review of existing empirical findings by Kandler et al. (2014). The authors argued for a more integrative model of personality, combining both core traits and surface characteristics, for a more comprehensive understanding of adult personality development. We take this approach and thus treat psychological well-being as a personality trait, without the distinction between core and surface characteristic, and integrated the relevant personality literature on life events and trait changes.

in their new role as parents and adjusting their behaviors to the societal expectations of parents, individuals can change their personality. Further, the sociogenomic model of personality (Roberts & Mroczek, 2008) and the TESSERA model of adult personality development (Wrzus & Roberts, 2017) delineate the mechanisms through which the parenthood transition and life events in general can trigger trait changes. Namely, it is not the transition to parenthood that leads to trait changes directly, but the accumulation of smaller and faster changes in states in daily life. During the transition, new parents experience novel and repeated daily situations as they adopt new behaviors and expectations congruent with their new role, which are assumed to trigger changes in their momentary thoughts, feelings, and behaviors. These momentary sequences of triggers and responses, when repeated over time, may accumulate and manifest into changes in personality. This perspective of trait change as a result of the accumulation of state changes is also echoed in well-being research, such as in the bottom-up theory of well-being (Diener et al., 1999; Diener & Ryan, 2009). Similarly, bottom-up theory suggests that well-being is determined in a bottom-up process, by the accumulation of happy (and a lack of unhappy) moments that new parents experience in their daily life. More recently, the hedonic adaptation prevention (HAP) model proposed that positive seminal change – here, the parenthood transition – leads to smaller, daily positive events which result in positive emotions and aspirations, and thus boost well-being (Sheldon & Lyubomirsky, 2012).

While there are different perspectives as to why and how psychological well-being changes in relation to the parenthood transition, there is consensus that there are indeed changes that occur. Yet, changes in well-being might differ due to the type of measurement used by researchers. There is an ongoing debate on whether aggregated state measurement captures the same construct as traditional global trait measurement (Rauthmann et al., 2019), also termed measurement homomorphy. Whole trait theory (Fleeson & Jayawickreme, 2015) suggested that mean-state and trait measures are simply two different ways to tap into the same construct. Still, others argue that aggregated state measurements are different from the respective trait measurements because they rely on episodic memory drawn from lived experience and are therefore more reflective of actual daily life content (Augustine & Larsen, 2012). Daily measures (and thus mean-state measures) are suggested to also be less likely to be subjected to recall or other memory biases (Napa Scollon et al., 2009). This is an important distinction to explore for the parenthood transition, as the transition and its associated changes might be more reflected in daily experiences, and thus state changes, compared to trait changes. As the bulk of studies on well-being changes during the transition to parenthood have relied largely on trait measures (e.g., Aassve et al., 2021; Myrskylä & Margolis, 2014), we could be underestimating the true level of changes that happen by not capturing state changes. Thus, we measured several well-being components using both trait and aggregate state measures (mean-state) to contribute to this ongoing discussion.

In the following sections, we review the evidence for parenthood effects on different components of psychological well-being.

Positive and Negative Affect

There is ample empirical evidence pointing to an increase in positive affect during the transition to parenthood. For example, in a meta-analysis, Luhmann et al. (2012) reported a persistent small but positive change during the transition in parents' overall affective well-being after childbirth, which they attributed to an increase in positive affect. More recently, Estinfort et al. (2022) also found a slight increase in positive affect between pregnancy and two years postpartum in first-time mothers. Although positive and negative affect are related constructs, they have been shown not to be the exact opposites of one another, and thus should be studied separately (Diener et al., 2018). Yet, studies have rarely examined the effect of the parenthood transition on negative affect. However, some findings suggest that motherhood can elicit an increase in negative emotions such as shame, guilt, and stress (e.g., Caldwell et al., 2021; Law et al., 2021), which could lead to an overall increase in negative affect in first-time mothers.

Relationship Satisfaction

The transition to parenthood is a particularly difficult time for couples, marked by a steep decline in relationship satisfaction (e.g., Luhmann et al., 2012; Mitnick et al., 2009). In a qualitative study, new parents were found to be faced with a loss of individuality, difficulty in managing a fair division of childcare and associated tasks, and managing expectations (Lévesque et al., 2020). Different factors have been found to contribute to this decline, such as anxiety and depressive symptoms during pregnancy, lower levels of constructive communication with the partner (Trillingsgaard et al., 2014), and an increase in partner conflicts (Huss & Pollmann-Schult, 2020). Using data with higher temporal resolution capturing relationship satisfaction at the same temporal marks for all mothers relative to childbirth, van Scheppingen et al. (2018) also reported a peak in relationship satisfaction during pregnancy (around the 30th week) and a steep decline at 6-month postpartum in a Norwegian sample.

Life Satisfaction

Evidence for changes in life satisfaction across the transition to parenthood is mixed. Some research suggests a negative trajectory. Relationship satisfaction is particularly strongly related to life satisfaction during the parenthood transition (Aassve et al., 2021). Given that relationship satisfaction has been found to decline during the transition, it is reasonable to expect a similar decrease in life satisfaction. Indeed, there is substantial empirical evidence suggesting a decreasing trajectory (e.g., Aassve et al., 2021; Bernardi et al., 2017; Dyrdal & Lucas, 2013; Luhmann et al., 2012; Mikucka & Rizzi, 2020). However, from existing research, an increase could be predicted too, depending on the timeframe. While reporting an overall decline, the latter studies also reported an initial, short-lived increase in life satisfaction

after childbirth. However, as these studies employed annual-retrospective panel data (e.g., GSOEP, HILDA, Swiss Household Panel), which have relatively low temporal resolution and do not survey mothers using the same individual developmental time scale (e.g., the first postpartum measure might have taken place 1 month after childbirth for some mothers, but 11 months postpartum for others), it is difficult to determine how short-lived the increase in life satisfaction is. Hence, it is hard to predict whether life satisfaction would peak at 2-month postpartum or 6-month postpartum, or even later, and when the declining trajectory begins.

Meaning in Life

Meaning in life is defined as "the sense made of, and significance felt regarding, the nature of one's being and existence" (Steger et al., 2006, p. 81). The transition to parenthood has been theorized to significantly impact first-time parents' sense of meaning in life. Morse and Steger (2019) suggested that an increase in meaning in life might be the missing component that explains the "parenting paradox" – the mystery behind why people continue to make the decision to have children despite the challenges that parenthood brings and its detrimental effect on happiness (Hansen, 2012). Despite the stressors that may trigger a decline in hedonic well-being, parenting may serve as a source of meaning, contributing to a higher sense of purpose in new parents (S. K. Nelson et al., 2014). Further, parenthood can help individuals define and solidify their role in the world (comprehension), their sense of the purpose and goals as parents (purpose), and their subjective experience of feeling that their lives are important and matter (significance), all of which may contribute to an overall sense of meaning in life (for a review, see Morse & Steger, 2019).

While studies on changes in meaning in life during the parenthood transition are lacking, there are mixed findings from research into related constructs. Brandel et al. (2018) reported an increase in general eudaimonic well-being postpartum during a 6-month period for both mothers and fathers in 50 pregnant couples as measured using Ryff's psychological well-being scale, which, besides purpose in life, includes various components such as environmental mastery and personal growth (Ryff, 1989). Similarly, Bassi et al. (2017) reported an increase in global eudaimonic well-being in 81 Italian mothers (of which 38 were first-time mothers) between pregnancy and 3-6 months post-birth. Taubman Ben-Ari and colleagues (2014) studied new parents' personal growth in the first 2 years postpartum and reported an overall increase in personal growth, as well as identified four distinct trajectories of personal growth, with the majority of new parents experiencing an increase or a stable pattern of personal growth (Taubman – Ben-Ari et al., 2024). In contrast, Estinfort et al. (2022) found a decrease in mothers' eudaimonic well-being between pregnancy and 2-year postpartum that was only significant for multiparous mothers but not for first-time mothers, and Brajsa-Zganec et al. (2023) reported a decrease in flourishing in parents after childbirth.

Changes in Well-being Intraindividual Variability

Intraindividual variability (or variability for short) refers to the within-person short-term fluctuations over a certain period (Costa et al., 2019), which requires repeated measurements (e.g., daily) to be captured effectively. Regarding psychological well-being, affect variability has been the most extensively studied aspect of well-being and found to be distinct from mean-level affect and sufficiently stable to be considered a psychological trait (Eid & Diener, 1999). Further, affect variability has been associated with lower daily mood (e.g., tiredness; Mill et al., 2016), lower emotional stability or higher neuroticism (Hisler et al., 2020), and lower psychological well-being and more psychopathology (Houben et al., 2015). (Intraindividual) variability of other well-being components, such as cognitive well-being and meaning in life, is much less studied in comparison. To date, a few studies have found greater life and marital satisfaction variability to be associated with a maladaptive profile (neuroticism) and worse psychological health (Willroth et al., 2020) and with a higher likelihood of experiencing negative life events (e.g., divorce; Joiner et al., 2024).

As there is limited knowledge on (intraindividual) variability of different well-being components in parents, existing research on how well-being variability changes during the transition to parenthood is scant. There is indirect evidence suggesting that stressful life events such as the parenthood transition can lead to an increase in well-being variability. For instance, de Vries et al. (2023) reported a gradual increase in negative affect variability in adolescents and parents across 100 days during the COVID-19 lockdown as compared to before, presumably due to an increase in stress because of the lockdown measures. A different study reported higher variability in both positive (i.e., love) and negative (i.e., sadness and anger) emotions in individuals who went through relationship dissolution compared to the control sample (Sbarra & Emery, 2005). Relatedly, an increase in perceived stress is associated with more variability in both positive and negative emotions (Wang et al., 2020). While these studies come with significant generalization limitations, they still suggest that stress might play a role in well-being variability. Further, as the daily life of first-time mothers can be very different from one day to another with a lot of unpredictability of how the day unfolds (Francis-Connolly, 2002), it is reasonable to expect an increase in well-being variability as a response to the constant changes in their daily situations. Supporting this notion, some ESM studies have documented that mothers experience greater affect variability while taking care of their children compared to when performing other tasks (Kerr et al., 2021), suggesting that interactions with children are associated with more variability in affect.

Individual Differences in Well-Being Development Across the Transition

There is a growing body of evidence that the magnitude and direction of changes in personality and well-being outcomes associated with major life events, such as the parenthood transition, vary significantly across individuals (Haehner et al., 2024; Reitz et al., 2024; Tran et al., 2024). In a sample of Australian adults assessed annually, O'Leary and colleagues (2020) employed a panel quantile approach and found that while there is a uniform pattern

of well-being changes before childbirth, new parents who started the transition with lower life satisfaction experienced more pronounced changes to their life satisfaction immediately around childbirth. Similarly, in a sample of German parents followed from 4 years before to 4 years after childbirth, three distinct trajectories of life satisfaction were found with a previously unobserved class of new parents (4.3%) who experienced a sustained increase in life satisfaction (Galatzer-Levy et al., 2011). Further, Leonhardt and colleagues (2022) identified four classes of relationship satisfaction trajectories in new parents after childbirth, with 47% of new mothers remaining highly satisfied with their relationship. The remaining new mothers (53%), however, reported declines in their relationship satisfaction at various timepoints between pregnancy and 12-month postpartum.

Factors Potentially Explaining Between-Individual Differences in Daily Well-being

A natural question following from the findings above is what explains the differences between individuals' well-being at different time points across the transition to parenthood. In additional analyses prompted by the feedback received from anonymous reviewers (and thus, not part of the study's original pre-registration), we presented a set of exploratory analyses focusing on explaining between-person differences, focusing on state predictors of new mothers' daily well-being at different timepoints during the transition to motherhood. We selected three factors that have been linked to the well-being of parents and beyond: one representing mothers' experiences (sleep quality), one representing infants' characteristics (infant crying), and one representing social factors (family and non-family contacts).

Sleep satisfaction and duration have been found to decline steeply in new parents, and especially in new mothers (Richter et al., 2019). Importantly, sleep quality has been found to affect daily vitality and well-being (Abrahams et al., 2025; Triantafillou et al., 2019). Not only are the sleeping hours affected, but new parents' waking hours can also be drastically influenced by the baby crying. More infant crying in the first 3 months postpartum was found to increase experiences of fatigue and tiredness in new mothers (Kurth et al., 2011), worsen daily well-being (S. Brand et al., 2014), and can add to the already increased feeling of loneliness and isolation in new parents (Botha et al., 2019; Buecker et al., 2021). Another factor associated with new parents' well-being in prior research is their social life. The increased level of loneliness in new parents (Kent-Marvick et al., 2022) has been proposed to be a result of reduced social contact (Lee et al., 2019), a factor that has been linked with more happiness and less sadness at the daily level (Bernstein et al., 2018). While some studies specifically highlighted interaction with *strong ties* (e.g., family, partner) as beneficial to well-being (e.g., Ram et al., 2014), research into weak ties (e.g., acquaintance, stranger) has surprisingly demonstrated a positive effect on well-being as well (Sandstrom & Dunn, 2014). As interactions with strong and weak ties have been connected to well-being at the daily level, here we explore how they potentially predict new mothers' daily positive and negative affect, life and relationship satisfaction, as well as sense of meaning in life.

The Present Study

The present study examined changes in psychological well-being across the transition to motherhood using a multi-wave intensive longitudinal study. We modeled mean-level (trait and mean-state), intraindividual variability, and individual differences in well-being changes in multiple indicators of psychological well-being: life satisfaction, relationship satisfaction, positive and negative affect, and meaning in life. The study followed first-time Dutch mothers from pregnancy to 6 months postpartum as they made the transition to motherhood by using three measurement bursts of experience sampling data across a total duration of 10 months.

Our first aim was to examine mean-level changes in well-being. By assessing both hedonic and eudaimonic well-being in the same sample of first-time mothers, we aim to extend current research that often focused only on one or a few well-being components and, by doing so, contribute to a broader understanding of well-being changes across the transition. Specifically, we anticipated an increase in positive (H1) and negative affect (H2), an increase in meaning in life (H3), and a decrease in relationship satisfaction (H4) and either an increase (H5a) or decrease (H5b) in life satisfaction. We measured these well-being components using both trait assessments and aggregate state assessments (mean-state) to explore whether the transition affects trait versus mean-state measures differently. Additionally, to ensure that observations in our sample do not represent a normative well-being trajectory, we included a comparison sample of non-mothers with similar demographic characteristics utilizing data from the Dutch Longitudinal Internet studies for the Social Sciences (LISS) panel, a representative Dutch annual panel survey.

Our second aim was to examine changes in intraindividual variability of psychological well-being across the transition to motherhood. The goal was to extend current research that focuses on mean-level while overlooking the dynamic (intraindividual variability) characteristics of well-being. Examining both aspects in conjunction can help us gain a deeper understanding of well-being development during this transition that brings about changes in both longer and shorter timeframes. We predicted an increase in well-being variability across the transition (H6). Due to a lack of prior empirical studies that tracked the transition with a high temporal resolution, we did not have hypotheses regarding the specific timing of well-being changes; i.e., whether any change occurs directly following the transition (i.e., becomes noticeable at 2-month postpartum relative to pregnancy, captured via Wave 1 versus Wave 2 comparison), or whether changes would take longer to manifest (i.e., up to 6 months postpartum; captured via Wave 2 versus Wave 3 and Wave 1 versus Wave 3 comparisons). We tested for the presence of between-individual differences in mean-level well-being and well-being variability trajectories across the transition to motherhood[2].

2 Due to power issue (N = 161), we chose not to statistically test for predictors of between-individual differences in well-being trajectories across the 3 waves.

Lastly, prompted by the feedback received from anonymous reviewers, we explored three daily factors – mother (sleep quality), child (infant crying), and social interactions (family and non-family contacts) – that might predict new mothers' daily well-being at different points during the transition.

METHODS

Sample

The data collection was conducted between 2022 – 2024 following new mothers over 10 months across the transition to motherhood. Wave 1 took place during pregnancy, between 20 weeks and 32 weeks of pregnancy. Wave 2 was conducted after childbirth, between 8 and 12 weeks. Wave 3 occurred at around 6 months postpartum. Dutch-speaking first-time mothers were recruited from the Brabant Study's participant pool, a large longitudinal prospective study of roughly 4000 pregnant women in the Brabant region of the Netherlands (https://www.brabantstudie.nl/; Meems et al., 2020). To qualify for inclusion in the Brabant Study, prospective participants needed to be at least 18 years old, living in the Brabant region, not intending to move in the coming years, and having started their pregnancy guidance with a midwife or a hospital. Additionally, women with multiple pregnancies (e.g., twins) or those who had a chronic condition for which they must take regular medication (e.g., diabetes) could not participate. Inclusion was stopped when the Brabant Study ended their study's inclusion in December 2023.

A sensitivity power analysis (using 1,000 simulations with the simr package (Green & MacLeod, 2016) showed that the smallest effect we could detect with 80% power ($\alpha = .05$) ranged between $\beta = -0.20$ (in case of mean-state positive affect) to $\beta = 0.24$ (in case of trait life satisfaction) for Wave 1 – Wave 2 changes, and ranged between $\beta = -0.25$ (in case of trait life satisfaction) to $\beta = 0.39$ (in case of mean-state meaning in life) for Wave 2 – Wave 3 changes.

The final sample included $N_{W1} = 161$, $N_{W2} = 143$, $N_{W3} = 131$ new mothers, with a mean age of 31.61 ($SD = 3.47$) at the year of childbirth (ranges from 22 to 42). At the first assessment during pregnancy, the average relationship length for those with a partner was 7.43 years, ranging from 1 to 17 years. All participants remained with the same partner throughout the study duration. At 6 months postpartum, 97.7% of new mothers had a paid job, with most new mothers (90.1%) working between 21 and 40 hours. More details on categorical demographic variables can be found in Table 1. The drop-out rates for our study were 11.18% between Wave 1 and Wave 2, and 8.39% between Wave 2 and Wave 3. The compliance rates were 85% in Wave 1, 89.88% in Wave 2, and 90.77% in Wave 3 (Wrzus & Neubauer, 2023).

Table 1
Sample Demographic Characteristics

Characteristics	N	%
Partnership status	161	100%
Have a partner	153	95.03%
Do not have a partner	8	4.97%
Partner gender	153	100%
Male	149	97.39%
Female	4	2.61%
Marital status	161	100%
Married/living together	149	92.55%
In a relationship but not living together	4	2.48%
Divorced/separated	1	0.62%
Single	7	4.35%
Education	161	100%
Primary school	1	0.62%
Secondary/high school	3	1.86%
Senior general secondary education (HAVO)/Pre-university education (VWO)	2	1.24%
Vocational education	30	18.63%
University	125	77.64%
Nationality	161	100%
Dutch	155	96.27%
Dutch/mixed	1	0.62%
European (other than Dutch)	4	2.48%
Central and South American	1	0.62%

Comparison Sample

To explore whether the changes observed in our sample of Dutch new mothers over 10 months are unique to the motherhood transition or more indicative of a normative developmental trend, we utilized the Longitudinal Internet studies for the Social Sciences (LISS) panel, a true probability sample of households in the Netherlands with more than 7500 Dutch individuals, to select a comparison sample (Scherpenzeel, 2011). LISS panel participants are invited to complete surveys that include measures of affective and cognitive well-being comparable to the ones used in our study, with a time interval (roughly one year) that is also comparable to the time lag between Wave 1 and Wave 3 in our study. This renders the LISS panel particularly well-suited to draw the comparison sample from.

Using the LISS data collected in 2022 (T1), we selected a comparison sample of Dutch women using demographic matching criteria that mirrored our primary sample characteristics except for motherhood status. Thus, we selected LISS participants who did *not* have children,

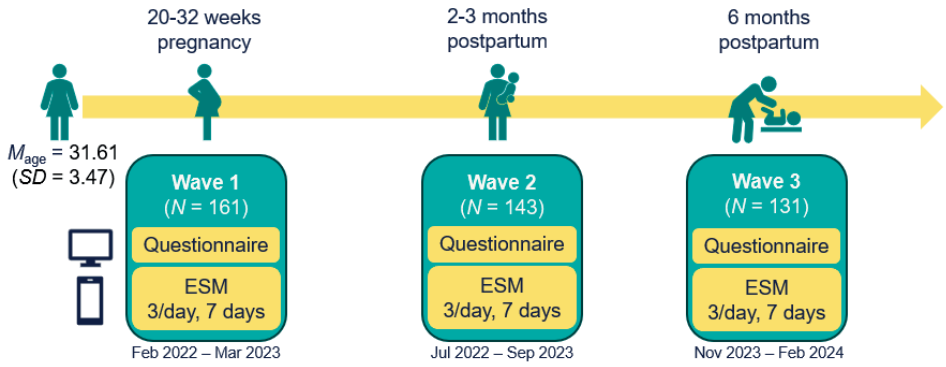
were aged 22 - 42, and were currently in a romantic relationship. This demographic matching approach resulted in a sample of N_{T1} = 166. For T2 (2023), we retained only those participants who reported having been with the same romantic partner for the previous 12 months (N_{T2} = 141), ensuring relationship stability comparable to our primary sample where all participants remained with the same partner throughout the study duration.

Procedure

At each wave, participants were asked to complete two phases. First, they were asked to complete a baseline questionnaire (i.e., an online Qualtrics survey) that took roughly 10 to 15 minutes, which included trait measures of well-being. After the baseline questionnaire completion, participants received a study code to sign up for the ESM phase. Once registered for the ESM phase, participants received their first ESM survey in the morning of the next day. Participants were asked to answer three daily surveys per day for seven days in a row. Figure 1 visualizes the study design timeline for our participants. We used a fixed interval-contingent sampling scheme to reduce participant burden. Participants received notifications every day at 8:00 am, 1:00 pm, and 6:00 pm to answer the morning, afternoon, and evening surveys, respectively. Each survey was open and available for 4 hours after the notification. Participants could choose to answer the survey at any time during the 4-hour window. Participants received reminder notifications 2 hours after the daily survey was made available and 30 minutes before the survey window expired. The daily survey included state measures of well-being. Participants were financially reimbursed for their participation in the ESM surveys at the end of each wave (up to €72) and received an automatically generated personalized report based on their data.

Figure 1

Study Design Timeline



Measures

Trait Well-Being Measures

Trait well-being measures were collected at the beginning of each wave in a baseline survey before the 7-day ESM period. *Trait life satisfaction* was measured with the item "All things considered, how satisfied are you with your life as a whole?" and *trait relationship satisfaction* was measured with the item "All things considered, how satisfied are you with your relationship with your partner?". Participants answered on a scale from *0 = Extremely dissatisfied* to *10 = Extremely satisfied*. *Trait meaning in life* was measured with the 5-item Presence subscale of the Meaning in Life Questionnaire (Steger et al., 2006). Participants answered the items (e.g., "I understand my life's meaning") on a scale from *1 = Strongly disagree* to *7 = Strongly agree*. The scale has a standardized Cronbach's alpha of .81 for Wave 1, .77 for Wave 2, and .84 for Wave 3.

Mean-State Well-Being Measures

Affect. Momentary positive and negative affect were measured three times a day. There were 5 items measuring positive affect ("Right now, I feel happy / calm / proud / loving / grateful") and 7 items measuring negative affect ("Right now, I feel guilty / ashamed / gloomy / nervous / irritated / tired / stressed"). Participants answered on a scale from *1 = Not at all* to *5 = Very much* to what extent they felt these emotions at the moment. Daily positive and negative affect scores were computed by averaging across the 3 assessments per day. Mean-state positive and negative affect scores were computed by aggregating the daily positive and negative affect scores, respectively, across 7 days for each wave. The positive affect items have standardized Cronbach's alphas of .89 for Wave 1, .90 for Wave 2, and .91 for Wave 3. The negative affect items have standardized Cronbach's alphas of .86 for Wave 1, .86 for Wave 2, and .85 for Wave 3.

Meaning in Life. Daily meaning in life was measured once a day in the evening with the question "Today, to what extent have you felt that your life has meaning?". Participants answered on a scale from *1 = Not at all* to *5 = Very much*. Mean-state meaning in life score was computed by aggregating the daily meaning in life scores across 7 days for each wave.

Relationship and Life Satisfaction. Daily relationship satisfaction was measured once a day in the evening with the question "All things considered, how satisfied are you today with your relationship with your partner?", and daily life satisfaction was measured once a day in the evening with the question "All things considered, how satisfied are you today with your life as a whole?". Participants answered on a scale from *0 = Extremely dissatisfied* to *10 = Extremely satisfied*. Mean-state relationship and life satisfaction scores were computed by aggregating the daily relationship and life satisfaction scores, respectively, across 7 days for each wave. The single-item life satisfaction measure has been validated in a prior published study (Cheung & Lucas, 2014).

Well-being Intraindividual Variability Measures

Intraindividual variability scores in positive and negative affect, relationship and life satisfaction, and meaning in life were computed as the standard deviation (*SD*) of their respective daily scores across 7 days for each wave (Houben et al., 2015). Additionally, as a robustness check upon request of an anonymous reviewer, we also computed the mean squared successive differences (*MSSD*) as an alternative operationalization of intraindividual variability. *MSSD* differs from *SD* as it captures both the magnitude of fluctuations and their temporal dependency (the order in which they take place).

Well-being Measures of LISS Panel Comparison Sample

The LISS panel included measures of life satisfaction ("How satisfied are you with the life you lead at the moment?") and relationship satisfaction ("How satisfied are you with your current relationship?"), both answered on a scale of *0 = Not at all dissatisfied* to *10 = Completely satisfied*. A 20-item PANAS scale was also available (Watson et al., 1988), with 10 items capturing positive affect (e.g., proud, inspired) and 10 items capturing negative affect (e.g., ashamed, nervous), answered on a scale of *1 = Not at all* to *7 = Extremely*. Average positive and negative affect scores were computed for each participant. The scale for positive affect had Cronbach's alphas of 0.89 at T1 and 0.87 at T2. The scale for negative affect had Cronbach's alphas of 0.92 at T1 and 0.93 at T2.

Predictors in Exploratory Analyses of Daily Well-being

Sleep quality was measured with the item "I slept well" in the morning survey, and answered on a scale from *1 = Strongly disagree* to *5 = Strongly agree*. Infant crying was measured with the item "Today, my baby was irritable and cried often" in the evening survey, and answered on a scale from *1 = Strongly disagree* to *5 = Strongly agree*. Three times a day, participants reported who they had had contact with (defined as interaction lasting at least 5 minutes) since the previous signal. Every time, the respondent could report the different people they had interacted with, split into two categories: family members (parents, parents in law, siblings, other family members, partner, and child) and non-family members (friend, colleague, supervisor, acquaintance, childcare service provider, and others). Sum scores for the number of different contacts with family and with non-family members were computed at the momentary level as predictors for momentary well-being outcomes (i.e., positive and negative affect) and at the day level as predictors for daily well-being outcomes (i.e., relationship satisfaction, life satisfaction, and meaning in life). A higher score indicates a greater number of different family or non-family members the participant had contact with, reflecting broader social engagement within each category.

Transparency and Openness

The study's design, hypotheses, and analysis plan were preregistered on the Open Science Framework. The pre-registration, pre-registration deviations (Willroth & Atherton, 2024; also included in SOM, Table S7), analysis code, along with the anonymized data with final

transformations of the variables used in the current study, are available at https://osf.io/jpqzr/ (Tran et al., 2025). Materials for the data collection, including other variables collected but not used in the current study, are available at https://osf.io/7kz8f/ (Tran et al., 2024). The data has not been used in any other publications.

Analytic Strategy

Data were analyzed using R, version 4.2.2 (R Core Team, 2022) and the package *lme4* (Bates et al., 2015). Standardized effect sizes were obtained using the package *parameters* (Lüdecke et al., 2020). Data visualization was done with the package *ggplot2* (Wickham, 2016).

For the main pre-registered analyses, we fitted separate multilevel models (waves nested within individuals) with each well-being component as dependent variables for both trait well-being measures (life satisfaction, relationship satisfaction, meaning in life) and mean-state well-being measures (positive affect, negative affect, life satisfaction, relationship satisfaction, meaning in life) to test for changes in mean-level well-being across the transition. For predictors, we created dummy time variables to enable pairwise comparison between waves to explore in more detail when well-being changes occur. The aforementioned models allowed each participant to have their own initial level of well-being (i.e., random intercept). Similarly, we fitted separate multilevel models with each well-being variability measure as the dependent variable to test for changes in well-being variability across the transition. We used the same time predictor as specified above, with the inclusion of mean-level well-being as a control variable. Due to the nature of the predictors (i.e., dummy time variables), no mean-centering was performed. We included participants' age at the year of childbirth as a control variable since it has been linked with well-being in new parents in previous research (Aasheim et al., 2014). In all models tested, age was not found to be a significant predictor of well-being and is thus not reported further.

To directly compare change trajectories between new mothers of our dataset and the control group of women who did not experience the transition to motherhood (drawn from the LISS panel), we first harmonized the well-being outcome measures (i.e., positive affect, negative affect, life satisfaction, relationship satisfaction) across the two groups by using Percent of Maximum Possible scores (POMP; Cohen et al., 1999). We created a binary grouping variable with 0 indicating non-mothers and 1 indicating new mothers. To ensure a comparable timescale with the annual survey design of the LISS panel (12 months), we used only the well-being data of new mothers at Wave 1 (T1) and Wave 3 (T2), which span approximately 10 months. We then fitted multilevel models including fixed effect of time, group membership, and the interaction between time and group membership, allowing participants to have their own intercept. A significant interaction term between time and group indicates that changes in psychological well-being differ significantly between new mothers and non-mothers.

To test for individual differences in well-being change, we added a random slope to the models specified above (with trait/mean-state well-being and well-being variability as outcomes). Due to power limitations, we only tested one random slope (either the Wave 1 – Wave 2 slope or the Wave 2 – Wave 3 slope) in a model at a time. The significance of the random slope was tested with a likelihood ratio test comparing the model with the random slope versus a model without the random slope, using the ranova function in the *lmerTest* package (Kuznetsova et al., 2017). Again, due to the nature of the predictors (i.e., dummy time variables), no mean-centering was performed.

Lastly, we conducted exploratory analyses of three daily factors of the mother (sleep quality), the child (infant crying), and social interactions (family and non-family contacts) that may influence daily well-being throughout the transition. We fitted two sets of multilevel models because infant crying was only measured at Wave 2 and 4, as it was an infant-specific variable that could not be assessed during pregnancy. The first set of models used data from all three waves and included sleep quality and social interaction (i.e., family and non-family contact) as predictors of well-being outcomes. The second set of models was limited to Wave 2 and 3 only, where infant crying data were available, and included sleep quality, social interaction, and infant crying as predictors. All predictor variables were person mean-centered. For well-being outcomes measured at the momentary level (three times a day, i.e., positive and negative affect), we used momentary measures of family and non-family contact, and day-level measures of sleep quality and infant crying as predictors, with random intercepts at the person and day levels. For outcomes measured at the day-level (once a day, i.e., relationship satisfaction, life satisfaction, meaning in life), we used day-level predictors and included a random intercept at the person level. For all specified models, we also controlled for the possible weekend effect (weekend versus workday). Additionally, we included interaction terms of each predictor and time (i.e., the wave variable) to explore whether the magnitude of these associations varied significantly across waves.

RESULTS

Table 2 reports the means, standard deviations, and correlations between the mean-state and trait well-being measures at Wave 1. Table 3 reports the correlations of different well-being components between waves. Overall, the highest autocorrelations of well-being scores were observed between 2 months postpartum and 6 months postpartum.

Table 2

Means, standard deviations, and correlations at Wave 1

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. MS positive affect	3.86	0.53							
2. MS negative affect	1.67	0.47	-.65*** [-.73, -.56]						
3. MS relationship satisfaction	8.72	0.94	.47*** [.33, .59]	-.35*** [-.49, -.20]					
4. MS life satisfaction	7.66	0.99	.70*** [.61, .77]	-.59*** [-.69, -.48]	.50*** [.36, .61]				
5. MS meaning in life	4.01	0.57	.77*** [.69, .83]	-.47*** [-.58, -.34]	.34*** [.19, .47]	.64*** [.53, .72]			
6. Trait relationship satisfaction	8.88	0.96	.31*** [.16, .45]	-.26** [-.40, -.11]	.66*** [.55, .74]	.28*** [.12, .42]	.15 [-.02, .30]		
7. Trait life satisfaction	8.05	1.07	.40*** [.26, .52]	-.39*** [-.51, -.25]	.48*** [.34, .59]	.46*** [.33, .58]	.34*** [.19, .47]	.46*** [.32, .57]	
8. Trait meaning in life	5.35	0.88	.40*** [.26, .52]	-.37*** [-.50, -.23]	.20* [.04, .35]	.31*** [.16, .45]	.53*** [.41, .63]	.21** [.06, .36]	.36*** [.21, .48]

Note. * $p < .05$, ** $p < .01$, ***$p < .001$. Values in square brackets indicate the 95% confidence interval for each correlation. MS = Mean-state. Mean-state meaning in life was measured on a 1-5 scale. Trait meaning in life was measured on a 1-7 scale. Correlations for Wave 2 and Wave 3 can be found in the Supplementary Online Material (SOM, Tables 1S and 2S).

Table 3

Autocorrelations

Variable	W1 – W2	W2 – W3	W1 – W3
MS positive affect	.53***	.71***	.57***
	[.40, .64]	[.61, .79]	[.44, .67]
MS negative affect	.60***	.63***	.64***
	[.48, .70]	[.52, .72]	[.53, .73]
MS relationship satisfaction	.57***	.72***	.59***
	[.44, .68]	[.62, .80]	[.46, .69]
MS life satisfaction	.44***	.64***	.59***
	[.30, .57]	[.52, .73]	[.46, .69]
MS meaning in life	.54***	.73***	.62***
	[.41, .65]	[.63, .80]	[.50, .71]
Trait relationship satisfaction	.57***	.69***	.48***
	[.44, .67]	[.58, .77]	[.33, .61]
Trait life satisfaction	.43***	.45***	.41***
	[.28, .55]	[.30, .57]	[.26, .55]
Trait meaning in life	.43***	.69***	.45***
	[.29, .56]	[.59, .77]	[.30, .58]

Note. * $p < .05$, ** $p < .01$, ***$p < .001$. Values in square brackets indicate the 95% confidence interval for each correlation. MS = Mean-state.

Changes in Trait and Mean-State Psychological Well-Being

Table 4 summarizes the fixed effects of trait and mean-state well-being changes across the transition.

Positive and Negative Affect

In line with H1, there was an increase in mean-state positive affect from pregnancy to 6 months postpartum. Specifically, positive affect increased between pregnancy and 2 months postpartum but did not show any significant changes between 2- and 6-month postpartum. In contrast, there were no significant changes in mean-state negative affect, which is not in line with H2 (Table 4 and Figure 2).

Table 4

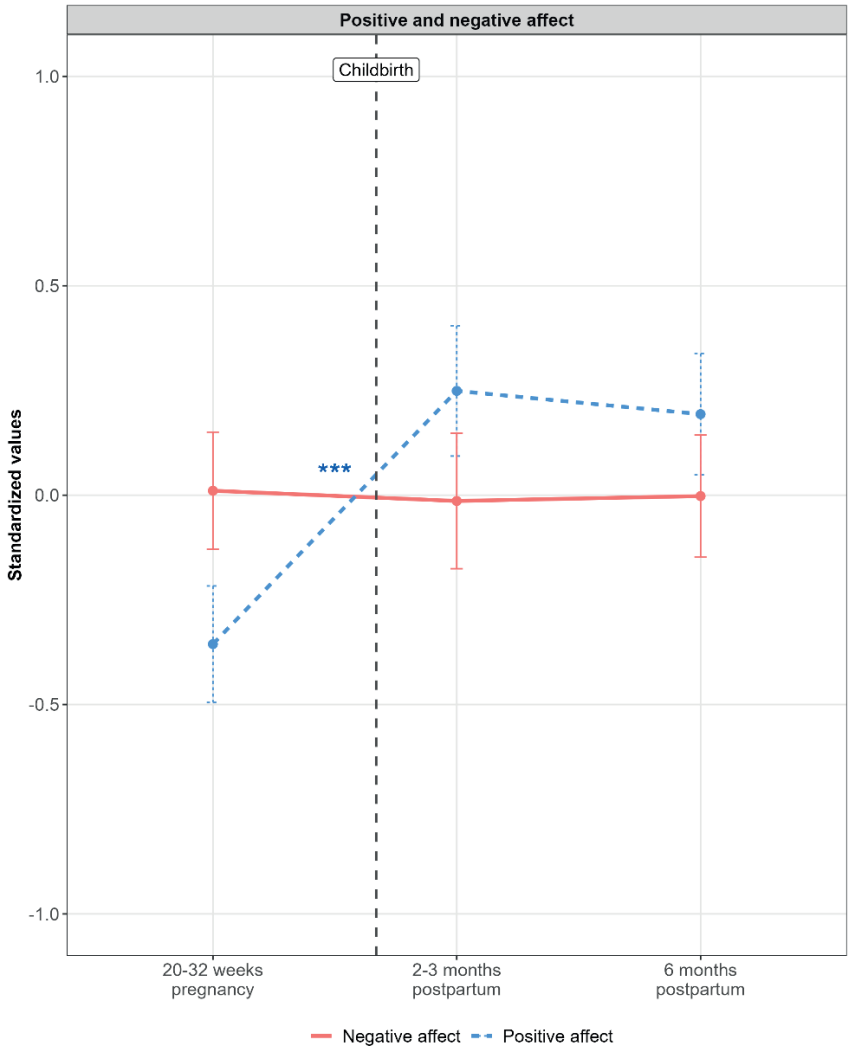
Summary of Mean-State and Trait Well-Being Changes

	Mean-State			Trait		
Predictors	**β**	**95% CI**	***p***	**β**	**95% CI**	***p***
Positive affect						
Intercept	0.25	[0.10, 0.41]	**<.001**	-	-	-
Wave 1	-0.61	[-0.75, -0.47]	**<.001**	-	-	-
Wave 3	-0.06	[-0.21, 0.08]	.406	-	-	-
Negative affect						
Intercept	-0.02	[-0.18, 0.14]	**<.001**	-	-	-
Wave 1	0.05	[-0.10, 0.19]	.522	-	-	-
Wave 3	0.03	[-0.12, 0.17]	.715	-	-	-
Meaning in life						
Intercept	0.11	[-0.05, 0.28]	**<.001**	0.09	[-0.06, 0.25]	**<.001**
Wave 1	-0.29	[-0.43, -0.15]	**<.001**	-0.33	[-0.49, -0.18]	**<.001**
Wave 3	0.03	[-0.12, 0.18]	.699	0.10	[-0.06, 0.26]	.213
Relationship satisfaction						
Intercept	-0.16	[-0.32, 0.00]	**<.001**	-0.04	[-0.20, 0.13]	**<.001**
Wave 1	0.44	[0.30, 0.59]	**<.001**	0.28	[0.13, 0.43]	**<.001**
Wave 3	-0.07	[-0.22, 0.08]	0.376	-0.25	[-0.41, -0.09]	**.002**
Life satisfaction						
Intercept	0.01	[-0.15, 0.18]	**<.001**	0.00	[-0.16, 0.16]	**<.001**
Wave 1	-0.08	[-0.24, 0.08]	.315	0.14	[-0.03, 0.31]	.103
Wave 3	0.04	[-0.12, 0.21]	.598	-0.20	[-0.38, -0.03]	**.025**

Note. β = standardized regression coefficient. Wave 2 is the reference category. Predictors were not centered.

Figure 2

Positive and Negative Affect Across the Transition to Motherhood



Note. * $p < .05$, ** $p < .01$, *** $p < .001$. The error bars represent 95% confidence interval.

Mean-State and Trait Meaning in Life

In line with H3, there was a significant increase in trait meaning in life between pregnancy and 6 months postpartum. Specifically, trait meaning in life increased between pregnancy and 2 months postpartum and did not show any further changes up to 6 months postpartum. Similarly, the same pattern emerged in the mean-state measure of meaning in life (Table 4 and Figure 3).

Mean-State and Trait Relationship Satisfaction

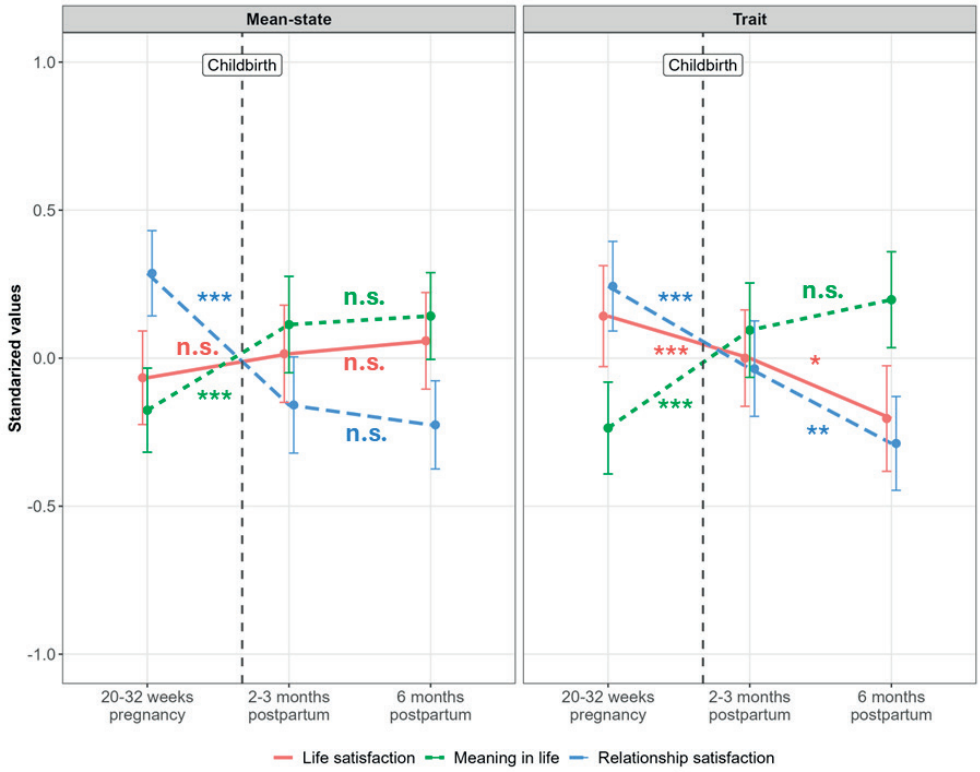
In line with H4, we found a significant decrease in trait relationship satisfaction between pregnancy and 6 months postpartum. Specifically, trait relationship satisfaction decreased between pregnancy and 2 months postpartum, as well as between 2- and 6-months postpartum. A declining pattern was observed with mean-state measure of relationship satisfaction with one difference: Instead of the continuous decline, mean-state relationship satisfaction did not show significant changes between 2- and 6-months postpartum (Table 4 and Figure 3).

Mean-State and Trait Life Satisfaction

In line with H5a, there was a significant decrease in the trait measure of life satisfaction between pregnancy and 6 months postpartum. Specifically, trait life satisfaction did not show significant changes between pregnancy and 2 months postpartum, but decreased between 2- and 6-month postpartum. In contrast, a different trajectory was observed with mean-state measure of life satisfaction: Mean-state life satisfaction did not show any significant changes from pregnancy up to 6 months postpartum (Table 4 and Figure 3).

Figure 3

Mean-state and Trait Relationship Satisfaction, Life Satisfaction, and Meaning in Life Across the Transition to Motherhood



Note. * $p < .05$, ** $p < .01$, *** $p < .001$. The error bars represent 95% confidence interval. A slight jitter was applied to the plot for readability to prevent complete overlapping of data points.

Well-being Trajectory in a Comparable Sample of Non-Mothers

To test whether the well-being trajectories found in our sample of Dutch new mothers are indicative of changes associated with the transition to motherhood, we compared our sample of new mothers with a control sample of Dutch non-mothers.

We found significant differences in well-being changes between mothers and non-mothers (Table 5). Compared to non-mothers, mothers showed significantly greater changes over time: mothers reported a 7.55 percentage points greater increase in positive affect ($t(290) = -5.995$, $p < .001$), a 5.41 percentage points greater decrease in mean-state relationship satisfaction ($t(281) = 6.185$, $p < .001$), a 6.32 percentage points greater decrease in trait relationship satisfaction ($t(287) = 6.461$, $p < .001$), and a 4.05 percentage points greater decrease in trait life satisfaction($t(292) = 3.841$, $p < .001$). For negative affect and mean-state life satisfaction, we found no significant differences in change trajectories between mothers and non-mothers (Table 5). This finding aligns with our earlier results showing no significant changes in these

well-being dimensions among new mothers over time, a pattern that appears to be observed in non-mothers as well. Similar results were found when controlling for age.

Table 5

Well-being Changes of Mothers and Non-Mothers

	Mean-state			Trait		
Predictors	***b***	***S.E.***	***p***	***b***	***S.E.***	***p***
Positive affect						
Time	1.433	1.221	.241	-	-	-
Group	19.674	1.772	**<.001**	-	-	-
Time × Group	6.113	1.753	**<.001**	-	-	-
Negative affect						
Time	2.142	1.253	.089	-	-	-
Group	-3.694	1.780	.039	-	-	-
Time × Group	-2.348	1.800	.193	-	-	-
Relationship satisfaction						
Time	-1.247	0.815	.127	-1.278	0.916	.164
Group	2.884	1.268	.023	4.520	1.313	**<.001**
Time × Group	-4.166	1.196	**<.001**	-5.038	1.339	**<.001**
Life satisfaction						
Time	0.033	0.941	.972	0.043	1.019	.966
Group	3.637	1.448	.012	7.588	1.486	**<.001**
Time × Group	1.438	1.359	.291	-4.089	1.465	**<.001**

Note. Time: 0 = T1 (year 2022), 1 = T2 (year 2023). Group: 0 = non-mothers, 1 = mothers. *b* = unstandardized coefficient (due to the use of percent of maximum possible scores). Predictors were not centered.

Changes in Psychological Well-Being Variability

Table 6 presents the correlations of five well-being variability outcomes in Wave 1. As the literature suggested, well-being variability was positively correlated with negative affect, and negatively correlated with positive affect, life and relationship satisfaction, and meaning in life.

There were no significant changes in well-being variability for all five well-being outcomes (Table 7). As a robustness check, we repeated the analyses using an alternative measure of intraindividual variability, namely, mean square of successive differences (*MSSD*). We found similar result with no significant changes in well-being variability (Table 7), except for changes in meaning in life variability between Wave 1 and Wave 2 (β = -0.24, 95% *CI* = [-0.44; -0.04], p = .021); however, as the respective p-value is relatively high and this is the only significant coefficient, we do not deem it significant enough to alter our overall conclusion. Thus, we did not find evidence in support of H6.

Table 6

Means, Standard Deviations, and Correlations of Intraindividual Variability in Well-being at Wave 1

Variable	*M*	*SD*	*1*	*2*	*3*	*4*	*5*
1. Positive affect variability	0.44	0.19					
2. Negative affect variability	0.35	0.19	.52*** [.40, .63]				
3. Relationship satisfaction variability	0.66	0.52	.31*** [.15, .45]	.23** [.07, .38]			
4. Life satisfaction variability	0.93	0.47	.43*** [.29, .55]	.24** [.09, .39]	.32*** [.17, .46]		
5. Meaning in life variability	0.42	0.26	.46*** [.32, .57]	.25** [.10, .40]	.13 [-.03, .29]	.19* [.03, .34]	
6. MS positive affect	3.86	0.53	-.28*** [-.42, -.13]	.24** [.09, .38]	-.03 [-.19, .13]	-.12 [-.27, .04]	-.23** [-.38, -.08]
7. MS negative affect	1.67	0.47	-.43*** [-.55, -.29]	.63*** [.52, .71]	-.13 [-.29, .03]	-.36*** [-.49, -.21]	-.29*** [-.42, -.13]
8. MS relationship satisfaction	8.72	0.94	-.24** [-.39, -.08]	.20* [.04, .35]	-.49*** [-.60, -.35]	-.25** [-.40, -.09]	-.20* [-.35, -.04]
9. MS life satisfaction	7.66	0.99	-.14 [-.29, .02]	.16 [-.00, .31]	.02 [-.14, .18]	-.26** [-.40, -.11]	-.16 [-.31, .00]
10. MS meaning in life	4.01	0.57	-.20* [-.35, -.05]	.11 [-.05, .27]	-.00 [-.17, .16]	-.13 [-.28, .03]	-.31*** [-.44, -.15]

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Values in square brackets indicate the 95% confidence interval for each correlation. MS = Mean-state. Correlations for Wave 2 and Wave 3 can be found in the Supplementary Online Material (SOM, Table 3S and 4S).

Table 7

Summary of Well-Being Variability Changes (Controlling for Daily Average Well-being)

	SD			*MSSD*		
Predictors	**β**	**95% *CI***	***p***	**β**	**95% *CI***	***p***
Positive affect						
Wave 1	-0.07	[-0.26, 0.12]	.450	-0.10	[-0.29, 0.10]	.339
Wave 3	-0.00	[-0.19, 0.18]	.969	-0.02	[-0.22, 0.17]	.820
Mean positive affect	-0.40	[-0.50, -0.30]	**<.001**	-0.34	[-0.45, -0.24]	**<.001**
Negative affect						
Wave 1	-0.03	[-0.20, 0.13]	.676	-0.03	[-0.23, 0.17]	.744
Wave 3	0.06	[-0.10, 0.23]	.450	-0.10	[-0.30, 0.11]	.355
Mean negative affect	0.60	[0.51, 0.68]	**<.001**	0.46	[0.37, 0.55]	**<.001**
Meaning in life						
Wave 1	-0.12	[-0.30, 0.07]	.224	-0.24	[-0.44, -0.04]	.021
Wave 3	0.10	[-0.09, 0.29]	.296	0.02	[-0.18, 0.23]	.828
Mean meaning in life	-0.35	[-0.45, -0.25]	**<.001**	-0.26	[-0.36, -0.16]	**<.001**
Relationship satisfaction						
Wave 1	-0.15	[-0.33, 0.04]	.125	-0.17	[-0.38, 0.04]	.106
Wave 3	-0.18	[-0.37, 0.01]	.058	-0.13	[-0.34, 0.08]	.212
Mean relationship satisfaction	-0.41	[-0.51, -0.30]	**<.001**	-0.28	[-0.39, -0.18]	**<.001**
Life satisfaction						
Wave 1	0.06	[-0.13, 0.25]	.547	0.12	[-0.08, 0.33]	.241
Wave 3	0.01	[-0.18, 0.21]	.890	0.09	[-0.11, 0.30]	.377
Mean life satisfaction	-0.37	[-0.47, -0.27]	**<.001**	-0.31	[-0.41, -0.21]	**<.001**

Note. β = standardized regression coefficient. Wave 2 (2-3 months postpartum) is the reference category. Wave 1 is at 20 – 32 weeks of pregnancy, Wave 3 is at 6 months postpartum. Predictors were not centered.

Individual Differences in Well-being Trajectories

Due to singularity and convergence issues, we could only test for the significance of the random effect for the well-being change between pregnancy and 2-3 months postpartum (Table 8). We found significant individual differences in change of mean-state positive affect (Figure 4), mean-state and trait relationship satisfaction (Figure 5), and mean-state and trait meaning in life (Figure 6). In contrast, we found no significant individual differences in change of either mean-state negative affect or mean-state and trait life satisfaction. Additionally, there was no significant individual differences in well-being variability change between pregnancy and 2-3 months postpartum with one exception: We found a significant individual difference in relationship satisfaction variability change between pregnancy and 2-3 months postpartum; however, we chose not to interpret this result as the *p*-value is relatively high (.03) and this is the only significant coefficient out of four tests.

Table 8

Individual Differences in Well-Being Changes between Wave 1 and Wave 2

	Mean-State				Trait				(Intraindividual) Variability			
Model	**Log-likelihood**	***AIC***	***df***	***p***	**Log-likelihood**	***AIC***	***df***	***p***	**Log-likelihood**	***AIC***	***df***	***p***
Positive affect												
Model 0	-269.46	552.92			-	-	-	-	con.	con.	con.	con.
Model 1	-274.74	559.47	2	**.005**	-	-	-	-	con.	con.	con.	con.
Negative affect												
Model 0	-197.50	408.99			-	-	-	-	118.93	-223.87		
Model 1	-198.29	406.58	2	.451	-	-	-	-	117.70	-225.40	2	.292
Relationship satisfaction												
Model 0	-522.13	1058.3			-576.54	1167.1			-316.56	647.11		
Model 1	-528.64	1067.3	2	**.001**	-589.48	1189.0	2	**<.001**	-320.07	650.14	2	.030
Life satisfaction												
Model 0	-556.58	1127.2			-640.07	1294.1			-334.12	682.23		
Model 1	-559.88	1129.8	2	.037	-642.47	1294.9	2	.090	-336.88	683.76	2	.063
Meaning in life												
Model 0	-285.14	584.29			-512.62	1039.2			-79.14	172.28		
Model 1	-290.02	590.03	2	**.008**	-512.79	1053.6	2	**<.001**	-80.55	171.09	2	.245

Note. Model 0 = only random intercept. Model 1 = random intercept and random slope for Wave 1 – Wave 2 change. con. = convergence issue. Predictors were not centered.

Figure 4

Average and Individual Change Trajectories in Positive Affect

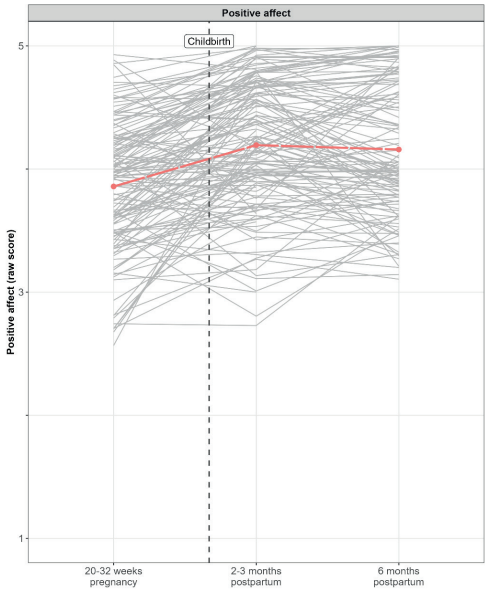


Figure 5

Average and Individual Change Trajectories in Relationship Satisfaction

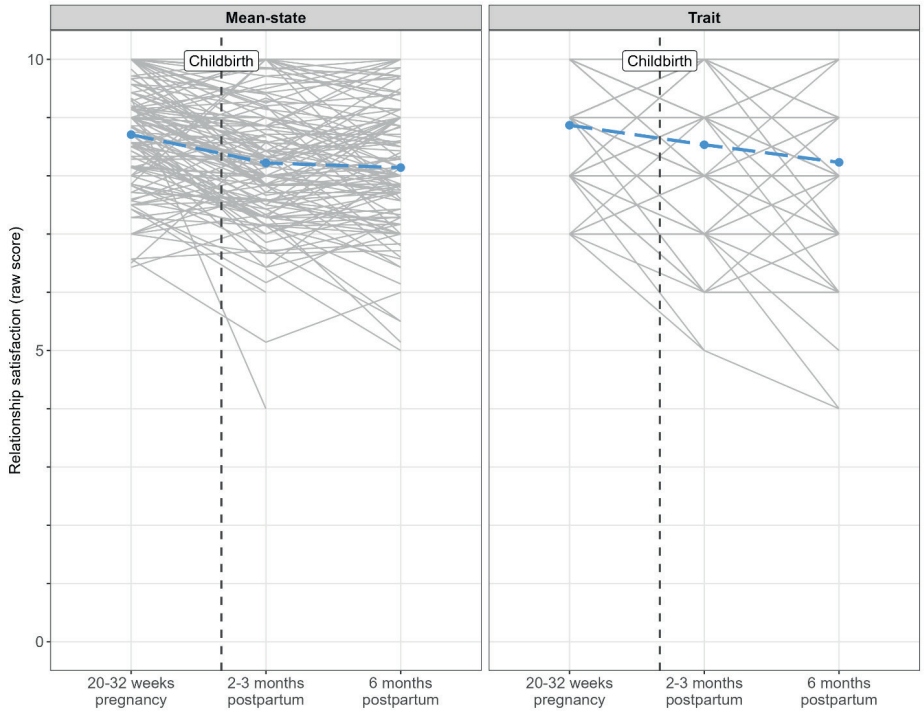
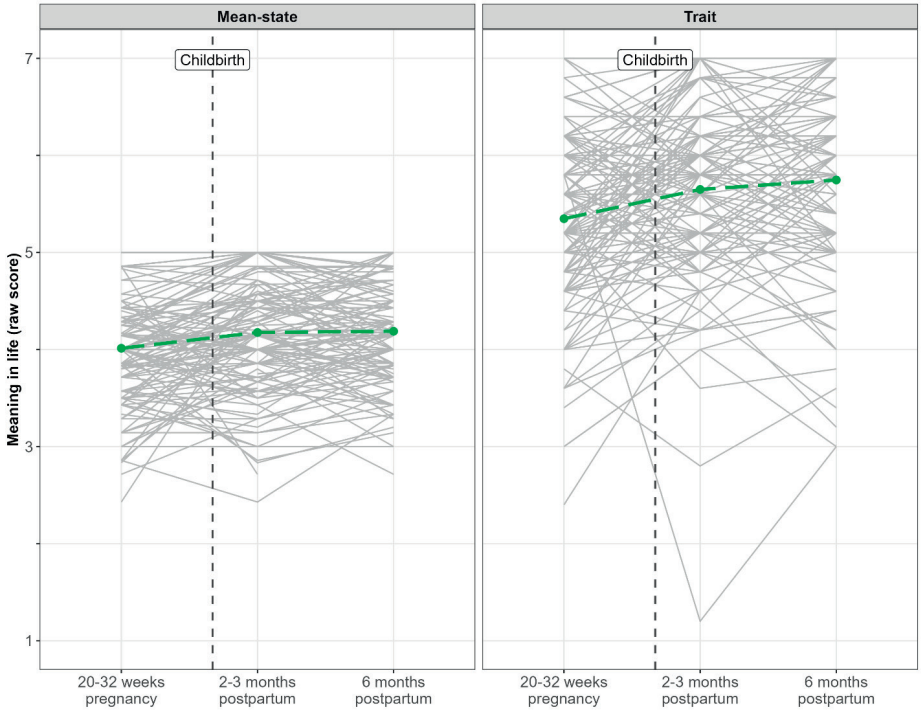


Figure 6

Average and Individual Change Trajectories in Meaning in Life

Note. Mean-state meaning in life was measured on a 1-5 scale. Trait meaning in life was measured on a 1-7 scale.



Exploratory Analysis of Predictors of Daily Well-being

Table 9 presents the means, standard deviations, and correlations of the daily variables in Wave 2 (2-3 months postpartum).

Table 9

Mean, Standard Deviations, and Correlations of Daily Variables in Wave 2

Variable	*M*	*SD*	1	2	3	4
1. Sleep quality	3.51	1.12				
2. Infant crying	2.22	1.14	-.13** [-.17, -.10]			
3. Family contact	2.18	1.05	.01 [-.03, .05]	-.06** [-.09, -.02]		
4. Non-family contact	0.40	0.63	.04* [.00, .08]	.01 [-.02, .05]	.12** [.08, .15]	
5. Positive affect	4.19	0.70	.33** [.29, .36]	-.23** [-.26, -.19]	.09** [.06, .13]	.04* [.00, .08]
6. Negative affect	1.64	0.61	-.33** [-.36, -.29]	.22** [.19, .26]	-.07** [-.11, -.03]	-.00 [-.04, .04]
7. Relationship satisfaction	8.24	1.41	.15** [.08, .21]	-.20** [-.27, -.14]	.11** [.04, .17]	.07 [-.00, .13]
8. Life satisfaction	7.76	1.39	.25** [.19, .31]	-.34** [-.40, -.28]	.10** [.03, .17]	.03 [-.03, .10]
9. Meaning in life	4.16	0.76	.23** [.16, .29]	-.15** [-.22, -.09]	.05 [-.01, .12]	.05 [-.01, .12]

Note. Positive affect, negative affect, and meaning in life were measured on a 1 – 5 scale. Relationship satisfaction and life satisfaction were measured on a 0 – 10 scale. Positive and negative affect were averaged at the daily level. Family and non-family contacts indicate the sum of contacts with different family and non-family members every day. Correlations for Wave 1 and Wave 3 are included in the Supplemental Online Material (SOM, Table 5S and 6S).

Table 10 and Table 11 summarize the results of the multilevel models predicting new mothers' daily well-being across the entire transition period (10 months, from Wave 1 to Wave 3). Table 12 and Table 13 summarize the results of the multilevel models predicting new mothers' daily well-being across the postpartum period (6 months from Wave 2 to Wave 3), which included an additional predictor, infant crying. Due to multiple models being tested (10 models), we only interpret coefficients with a *p*-value smaller than .005 using Bonferroni correction (.05 / 10 = .005).

Across the entire transition period, sleep quality and diverse family contact were consistent predictors of (expectant and new) mothers' daily well-being. Specifically, higher sleep quality was associated with higher positive affect and life satisfaction, and lower negative affect. More diverse family contact was associated with higher positive affect, relationship satisfaction, and life satisfaction.

Two significant interactions of the predictor and wave were found, indicating differences in the strength of the predictors across different waves. Simple slope analyses revealed that diverse non-family contact had a non-significant effect on positive affect in Wave 1 (b = 0.02, SE = 0.01, 95% CI = [-0.01; 0.04]), a significant positive effect in Wave 2 (b = 0.04, SE = 0.02, 95% CI = [0.01; 0.08]), and a significant negative effect in Wave 3 (b = -0.05, SE = 0.01, 95% CI = [-0.08; -0.02]). In addition, diverse family contact was found to have a significant positive effect on life satisfaction in Wave 1 (b = 0.12, SE = 0.03, 95% CI = [0.06; 0.19]), a non-significant effect in Wave 2 (b = -0.00, SE = 0.03, 95% CI = [-0.06; 0.05]), and a significant positive effect in Wave 3 (b = 0.08, SE = 0.03, 95% CI = [0.02; 0.14]).

Table 10

Associations Between Predictors and Daily Positive and Negative Affect Across Three Waves

	Positive Affect			Negative Affect		
Predictors	**β**	**95% *CI***	***p***	**β**	**95% *CI***	***p***
Infant crying	-	-	-	-	-	-
Sleep quality	0.14	[0.11, 0.16]	**<.001**	-0.14	[-0.17; -0.11]	**<.001**
Family contact	0.10	[0.07, 0.13]	**<.001**	-0.01	[-0.04; 0.02]	.499
Non-family contact	0.02	[-0.01, 0.04]	.194	-0.01	[-0.03; 0.02]	.500
Wave 2	0.45	[0.41, 0.49]	**<.001**	-0.01	[-0.05; 0.04]	.799
Wave 3	0.41	[0.37, 0.45]	**<.001**	0.01	[-0.03; 0.05]	.712
Weekend	0.04	[0.02, 0.05]	**<.001**	-0.03	[-0.05; -0.02]	**<.001**
Sleep × Wave 2	-0.03	[-0.06, 0.01]	.202	-0.01	[-0.06; 0.03]	.467
Sleep × Wave 3	-0.03	[-0.07, 0.01]	.150	0.01	[-0.03; 0.05]	.736
Family × Wave 2	-0.05	[-0.09, -0.01]	.019	-0.02	[-0.06; 0.02]	.282
Family × Wave 3	-0.02	[-0.07, 0.02]	.227	0.01	[-0.03; 0.05]	.673
Non-family × Wave 2	0.02	[-0.02, 0.07]	.277	-0.01	[-0.06; 0.03]	.523
Non-family × Wave 3	-0.07	[-0.10, -0.03]	**<.001**	0.04	[0.01; 0.08]	.021

Note. β = standardized regression coefficient. Family and non-family contacts were computed at the momentary level for positive and negative affect outcomes. Wave 1 (pregnancy) is the reference category. All continuous predictors were person mean-centered.

Table 11

Associations Between Predictors and Daily Satisfaction and Meaning in Life Across Three Waves

	Relationship Satisfaction			Life Satisfaction			Meaning in Life		
Predictors	**β**	**95% *CI***	***p***	**β**	**95% *CI***	***p***	**β**	**95% *CI***	***p***
Infant crying	-	-	-	-	-	-	-	-	-
Sleep quality	0.04	[-0.01;0.10]	.148	.13	[0.08;0.19]	**<.001**	0.07	[0.02; 0.13]	.009
Family contact	0.09	[0.03;0.16]	**.004**	.13	[0.07;0.20]	**<.001**	0.08	[0.02; 0.14]	.014
Non-family contact	0.05	[0.00;0.11]	.066	.04	[-0.02;0.10]	.153	0.06	[0.00; 0.11]	.040
Wave 2	-0.38	[-0.46; -0.30]	**<.001**	.05	[-0.04;0.13]	.236	0.24	[0.16; 0.32]	**<.001**
Wave 3	-0.42	[-0.50; -0.33]	**<.001**	.08	[-0.01;0.16]	.095	0.27	[0.18; 0.35]	**<.001**
Weekend	0.03	[-0.01;0.07]	.116	.09	[0.05;0.12]	**<.001**	0.05	[0.01; 0.09]	.009
Sleep × Wave 2	-0.00	[-0.08;0.08]	.961	-.03	[-0.11;0.05]	.501	-0.02	[-0.10; 0.06]	.600
Sleep × Wave 3	-0.04	[-0.12;0.04]	.344	-.10	[-0.19; -0.01]	.025	-0.05	[-0.13; 0.03]	.227
Family × Wave 2	-0.05	[-0.13;0.04]	.277	-.14	[-0.23; -0.05]	**.002**	-0.02	[-0.10; 0.06]	.617
Family × Wave 3	-0.04	[-0.13;0.05]	.365	-.05	[-0.14;0.04]	.289	0.02	[-0.07; 0.11]	.656
Non-family × Wave 2	0.02	[-0.08;0.12]	.714	.02	[-0.09;0.13]	.718	0.01	[-0.09; 0.12]	.775
Non-family × Wave 3	0.01	[-0.07;0.08]	.838	-.05	[-0.13;0.03]	.212	0.00	[-0.07; 0.08]	.955

Note. β = standardized regression coefficient. Family and non-family contacts were computed at the daily level for relationship satisfaction, life satisfaction, and meaning in life outcomes. Wave 1 (pregnancy) is the reference category. All continuous predictors were person mean-centered.

Once the baby was born, a new pattern emerged: Infant crying became the most consistent predictor of new mothers' daily well-being, and sometimes the only significant predictor (i.e., relationship satisfaction and meaning in life). Sleep quality remained a significant predictor of daily affective well-being (both positive and negative affect) and life satisfaction; however, diverse family contact was no longer associated with relationship or life satisfaction.

In the postpartum period, two significant interactions were found. Simple slope analyses revealed that diverse non-family contact had a significant positive effect on positive affect in Wave 2 (b = 0.04, SE = 0.01, 95% CI = [0.01; 0.08]), and a significant negative effect in Wave 3 (b = -0.06, SE = 0.01, 95% CI = [-0.08; -0.03]), which is similar to the finding using all 3 Waves of data. In addition, diverse non-family contact was found to have a non-significant negative effect on negative affect in Wave 2 (b = -0.02, SE = 0.02, 95% CI = [-0.05; 0.01]), and a significant positive effect in Wave 3 (b = 0.03, SE = 0.01, 95% CI = [0.01; 0.06]).

Table 12

Associations Between Predictors and Daily Positive and Negative Affect Postpartum

	Positive Affect			**Negative Affect**		
Predictors	**β**	**95% *CI***	***p***	**β**	**95% *CI***	***p***
Infant crying	-0.11	[-0.14; -0.09]	**<.001**	0.11	[0.08; 0.13]	**<.001**
Sleep quality	0.10	[0.07; 0.13]	**<.001**	-0.13	[-0.16; -0.11]	**<.001**
Family contact	0.05	[0.02; 0.08]	**<.001**	-0.03	[-0.06; 0.00]	0.028
Non-family contact	0.04	[0.01; 0.07]	0.012	-0.03	[-0.06; 0.01]	0.144
Wave 3	-0.04	[-0.08; 0.00]	0.035	0.02	[-0.02; 0.06]	0.434
Weekend	0.02	[0.00; 0.05]	0.026	-0.02	[-0.05; 0.00]	0.037
Infant crying × Wave 3	0.05	[0.00; 0.09]	0.030	-0.05	[-0.09; -0.01]	0.023
Sleep × Wave 3	0.000	[-0.04; 0.04]	0.986	0.01	[-0.03; 0.05]	0.655
Family × Wave 3	0.03	[-0.01; 0.07]	0.163	0.03	[-0.01; 0.07]	0.136
Non-family × Wave 3	-0.09	[-0.13; -0.05]	**<.001**	0.06	[0.02; 0.11]	**0.004**

Note. β = standardized regression coefficient. Family and non-family contacts were computed at the momentary level for positive and negative affect outcomes. Wave 2 (2-3 months postpartum) is the reference category. All continuous predictors were person mean-centered.

Table 13

Associations Between Predictors and Daily Satisfaction and Meaning in Life Postpartum

	Relationship Satisfaction			Life Satisfaction			Meaning in Life		
Predictors	**β**	**95% *CI***	***p***	***β***	**95% *CI***	**p**	**β**	**95% *CI***	***p***
Infant crying	-0.11	[-0.16; -0.06]	**<.001**	-0.22	[-0.27; -0.17]	**<.001**	-0.10	[-0.15; -0.05]	**<.001**
Sleep quality	0.03	[-0.03; 0.09]	0.290	0.09	[0.03; 0.14]	**0.002**	0.05	[-0.01; 0.10]	0.077
Family contact	0.04	[-0.02; 0.10]	0.217	-0.01	[-0.07; 0.05]	0.728	0.06	[0.00; 0.11]	0.039
Non-family contact	0.07	[-0.01; 0.16]	0.072	0.08	[0.00; 0.16]	0.057	0.07	[-0.01; 0.15]	0.072
Wave 3	-0.04	[-0.12; 0.05]	0.372	0.01	[-0.08; 0.09]	0.936	0.02	[-0.06; 0.10]	0.709
Weekend	0.03	[-0.02; 0.07]	0.247	0.07	[0.03; 0.12]	**0.001**	0.03	[-0.01; 0.08]	0.105
Infant crying × Wave 3	0.04	[-0.05; 0.12]	0.410	0.10	[0.02; 0.19]	0.017	0.02	[-0.06; 0.10]	0.623
Sleep × Wave 3	-0.03	[-0.12; 0.05]	0.424	-0.06	[-0.15; 0.02]	0.133	-0.04	[-0.12; 0.04]	0.355
Family × Wave 3	0.01	[-0.08; 0.10]	0.799	0.09	[0.00; 0.18]	0.040	0.04	[-0.04; 0.13]	0.301
Non-family × Wave 3	-0.03	[-0.12; 0.07]	0.582	-0.10	[-0.19; 0.00]	0.045	-0.02	[-0.11; 0.07]	0.619

Note. β = standardized regression coefficient. Family and non-family contacts were computed at the daily level for relationship satisfaction, life satisfaction, and meaning in life outcomes. Wave 2 (2-3 months postpartum) is the reference category. All continuous predictors were person mean-centered.

DISCUSSION

Existing research on psychological well-being changes across the transition to parenthood often focuses on long-term development, such as changes over several years, and primarily examines cognitive and affective well-being components rather than meaning in life. This focus is largely driven by the use of secondary large panel datasets that are not specifically tailored to this transition and often only include measures of hedonic well-being (rather than eudaimonic, such as meaning in life). Yet, the transition to parenthood is expected to be a time of fast changes and meaningful experiences for new parents (Luhmann et al., 2014; Morse & Steger, 2019). In addition, existing life event research predominantly focuses on mean-level changes, although individuals may change differently on both long and short timescales (Reitz, 2022). The present study thus examined changes in psychological well-being indicators and well-being (intraindividual) variability in a sample of first-time Dutch mothers transitioning to motherhood. We used longitudinal and experience sampling data from three measurement bursts across 10 months during the transition, starting from pregnancy to 6 months postpartum.

First, we examined mean-level changes in different psychological well-being components across the transition. The transition generally appeared to be a happy and meaningful time for new mothers: We found increases in positive affect and sense of meaning in life (trait and mean-state measures) between pregnancy and 2 months postpartum. Yet, there were also declines in new mothers' evaluation of their satisfaction: We found a decrease in (trait and mean-state) relationship satisfaction between pregnancy and 2 months postpartum, as well as a decrease in trait relationship and life satisfaction between 2- and 6-months postpartum. Second, we examined changes in well-being (intraindividual) variability of the different psychological well-being components across the transition. Contrary to our expectations, we found no significant changes in any indicators of well-being variability. Besides documenting average trajectories of well-being across the participants, we explored individual differences in mean-level well-being and well-being variability changes across the transition and found that new mothers differed significantly from each other in their experienced trajectory of positive affect, (trait and mean-state) relationship satisfaction, (trait and mean-state) meaning in life, and relationship satisfaction variability between pregnancy and 2-month postpartum. Lastly, we explored the role of three selected factors (mother-related, infant-related, and social factors) in explaining individual differences in new mothers' daily well-being as they go through the transition.

Motherhood Transition as a Positive and Meaningful Experience

Although an increase in positive affect following the transition to parenthood has been documented (Luhmann et al., 2012), existing literature on psychological well-being changes during the transition to parenthood often painted a negative picture of the transition as it focused on new parents' evaluation of their life and different life domains such as partner

relationship (Aassve et al., 2021; Brajša-Žganec et al., 2023). Further, studies that focused on eudaimonic aspects of well-being have largely produced mixed findings (Brajša-Žganec et al., 2023; Brandel et al., 2018; Estinfort et al., 2022; Taubman – Ben-Ari & Spielman, 2014), while studies tracking individuals' changes in meaning in life across the transition are lacking. Yet, the meaning aspect might be particularly important as both lay people and researchers seem to consider meaning in life as a "silver lining" of the transition, believing that new parents experience an increase in the sense of meaning with the arrival of a child (Morse & Steger, 2019). Our findings contribute to this literature by adding to the scant empirical research on the relationship between the transition to parenthood and meaning in life. We found that new mothers reported an increase in the sense of meaning in life between pregnancy and postpartum, which appears to be robust regardless of measurement (i.e., trait or mean-state). This higher sense of meaning could be the result of the meaning-making process that new mothers undergo in the days before and following childbirth, where values and life goals might be re-evaluated and adjusted (Morse & Steger, 2019; Prinds et al., 2014). Taken as a whole, the motherhood transition, while not high in satisfaction with life and (romantic) relationship, is still experienced as a positive and meaningful event by new mothers. While this finding is consistent with some of the prior studies suggesting that parents experience an increase in personal growth following the transition (Taubman – Ben-Ari et al., 2024), this full picture has not fully come to light in prior studies due to the lack of research tracking cognitive, affective, and eudaimonic well-being in the same study. Thus, it is important for future research to capture both hedonic and eudaimonic well-being components in the same study when investigating the parenthood transition to avoid drawing potentially misleading conclusions.

The comparison between new mothers and a control sample of non-mothers taken from the LISS panel revealed significant group differences in well-being trajectories over the 10-months period. These differences align with the specific changes that we observed during the transition to motherhood, suggesting that the changes are indeed attributable to becoming a mother rather than general time-related fluctuation. Specifically, mothers showed a 7.55 percentage point greater increase in positive affect, alongside greater decreases in mean-state relationship satisfaction (5.41 percentage points), trait relationship satisfaction (6.32 percentage points), and trait life satisfaction (4.05 percentage points) relative to the comparison non-mother group. Additionally, both mothers and non-mothers showed similar patterns in negative affect and mean-state life satisfaction, the same well-being components that showed no significant changes in our within-group analyses of the motherhood transition. Taken together, these findings provide evidence that the well-being changes observed in our study are likely associated with the experience of becoming a mother rather than representing normative developmental changes or general fluctuations in well-being over time. The specificity of these group differences (i.e., occurring only for those well-being components that changed during the motherhood transition) further strengthens confidence

in our findings by demonstrating that the observed changes are not likely due to general response biases or methodological limitations.

While the average changes in well-being of new mothers tell a clear story, there is also substantial between-individual heterogeneity in well-being trajectory during the transition. In short, new mothers differ significantly from each other in their well-being trajectory, specifically in positive affect, (trait and mean-state) relationship satisfaction, and (trait and mean-state) meaning in life. This finding is in line with previous research, which has identified between three and four different classes of new parents based on their well-being trajectory across the transition (Galatzer-Levy et al., 2011; Leonhardt et al., 2022). While we were unable to identify distinct trajectory classes or profile groups, we conducted additional exploratory analyses to examine daily and momentary factors that might explain some of this individual variation in new mothers' well-being during the transition. Based on existing literature on factors associated with mothers' trait well-being during the perinatal (Leonhardt et al., 2022; Taubman – Ben-Ari et al., 2024), we selected three factors – one representing mother's experiences (sleep quality), one representing infant's characteristics (infant crying) and one representing mother's social interactions (family and non-family contacts) – and examined their ability to predict new mother's daily well-being as they went through the transition as well as the potential changes in their predictive strength across different timepoints of the transition.

In the first set of analysis employing all three waves of data from pregnancy to 6 months postpartum, sleep quality was consistently associated with higher positive affect and life satisfaction, as well as with lower negative affect; however, it was not found to be associated with relationship quality. This finding is surprising as previous research has reported a positive relationship between sleep and relationship quality (Schlarb et al., 2015). Several factors may explain this discrepancy. First, our study used experience sampling methods to capture real-time associations, whereas previous research often relied on retrospective questionnaires that may be more susceptible to recall biases or global evaluations. Second, new mothers may attribute lower sleep quality during the motherhood transition to the pregnancy or the baby and *not* to their partner, thus mitigating the negative affect (e.g., anger) that accounts for the relationship between poor sleep and lower relationship satisfaction (Audigier et al., 2023). Additionally, the context of the perinatal period may create different dynamics where couples anticipate and normalize sleep disruptions, potentially buffering the typical negative effects of poor sleep on relationship satisfaction found in general populations. Regarding new mothers' social life, daily contact with more various categories of family members was found to predict several aspects of expectant mothers' daily well-being (positive affect, and life and relationship satisfaction), in line with research on relational diversity and well-being (Collins et al., 2022). Thus, it appears that maintaining contact with a variety of family members is beneficial to new mothers' daily well-being throughout the transition to motherhood.

An interesting change occurred when looking at the postpartum period (Waves 2 and 3) and adding infant crying as a predictor of new mothers' daily well-being. Unsurprisingly, infant crying emerged as the most consistent predictor of new mothers' daily well-being, associating with both affective, cognitive, and eudaimonic well-being. While sleep quality maintained its association with new mothers' positive affect, negative affect, and life satisfaction from the earlier analyses, its effect sizes were smaller than those of infant crying. It seems that once the baby is there, the baby's emotional state (expressed and measured via crying) becomes intertwined with the well-being of their mother, likely reflecting not only emotional contagion (e.g., Waters et al., 2017) but also the mothers' sense of responsibility for her infant's comfort and well-being. It is interesting to note that while there is a negative link between infant crying and the mother's well-being, these correlations (ranging from |0.15| to |0.34|) are smaller in comparison to other interpersonal emotion associations, such as the similarity of affect in spouses (Stavrova & Chopik, 2025) which ranged from |0.22| to |0.47|. As it has been argued that the mother-baby bond is the strongest bond (Waters et al., 2017), a larger effect could have been expected. However, these smaller correlations might be demonstrative of the very early stages of the mother-child bonding process taking place in the early postpartum months.

Interestingly, some significant interaction effects between predictors and specific timepoints were observed, indicating that the effect of social contact on new mothers' daily well-being is sensitive to the different developmental milestones across the transition. Diverse family contact was positively associated with life satisfaction during pregnancy and at 6 months postpartum, but not at 2-3 months postpartum. These varying effects might suggest different relevance or accessibility of social interactions at different stages of the motherhood transition. For example, during pregnancy and once mothers have adjusted to their new role and returned to work at 6 months postpartum, diverse family contact might provide valuable social support, which enhances well-being. However, at 2-3 months postpartum (i.e., the intense early adjustment period), the association between family contact and life satisfaction may be less pronounced as mothers focus primarily on immediate caregiving demands and adapting to their new maternal identify (Mercer, 2004; A. M. Nelson, 2003).

Likewise, we also observed interactions between diverse non-family contact and specific timepoints, with diverse non-family contact having a positive effect on new mothers' well-being at 2-3 months postpartum (higher positive affect), but a negative effect on new mothers' well-being at 6 months postpartum (higher negative affect, lower positive affect). Again, these changes in the directionality of the effect suggests possible differences in the nature and quality of non-family contacts during the postpartum period. For instance, contacts with non-family members around 2-3 months postpartum could involve more friends or social acquaintances, and thus are more supportive and caring as they might still focus on the new mothers' recovery and adjustment to motherhood. On the other hand, as the majority of new mothers in our sample have returned to work by 6 months postpartum, non-family contact

at 6 months postpartum might have primarily involved work-relationships (e.g., colleagues, managers, customers). Work-related social interactions can negatively affect mothers' well-being through work-family interference and increased stress (van Rijswijk et al., 2004), as well as through role conflicts between motherhood and professional demands (Byron, 2005), particularly while still adjusting to their new maternal identity (Mercer, 2004). This could be an interesting avenue for future research to further explore the specific type, diversity, and quality of interactions that might characterize different timepoints of the postpartum period to better understand the effects of social interactions on well-being across the motherhood transition.

Motherhood Transition as a Period of Fast Changes

While we found significant changes in psychological well-being in the overall 10-month period of our study, these changes appeared to be discontinuous, driven by a smaller window of fast changes between pregnancy and 2 months postpartum. Further, we discovered that this pattern of fast changes extends to several well-being components, namely, affective well-being (i.e., positive affect), cognitive well-being (i.e., relationship satisfaction), and sense of meaning in life. Prior research has largely overlooked this pattern due to the lack of assessment density around the time of childbirth and limited well-being measures. This pattern of fast changes, followed by a period of no significant changes, is consistent with the developmental perspective that major life events can lead to quick, nonlinear changes in personality traits within a few *months* instead of years (Bleidorn et al., 2021; Luhmann et al., 2014; Reitz, 2022). This suggests an important take-away for our understanding of the trajectory of psychological well-being across the transition to parenthood: Instead of a continuous decline throughout 12 months, psychological well-being changes associated with the parenthood transition seem to be concentrated in the months right before and after childbirth, with virtually no further changes occurring between 2- and 6-months postpartum. Thus, it is important for future research to study this transition using shorter timescales with denser assessment surrounding childbirth (e.g., monthly) to capture the true trajectory of change across this developmentally intense period.

Beyond implications for the timescale used in study designs in this area, our results may also have ramifications for the timing of interventions for first-time parents. While timing has been acknowledged as a factor associated with intervention effectiveness (Refaeli et al., n.d.; Trillingsgaard et al., 2012), interventions for new parents are often only targeting the prenatal versus postnatal period without explicit consideration for the precise timing. Yet, as our results indicated, new mothers' postnatal stage is not a psychologically uniform period, with their psychological well-being being more in flux during the first few months and more stable afterward. Thus, a more careful consideration of an intervention's timing based on its specific methods, content, and goals might help in increasing the intervention efficacy.

Do Trait and Mean-State Psychological Well-Being Measures Capture the Same Thing?

Coming back to the trait versus mean-state measurement discussion (Augustine & Larsen, 2012; Rauthmann et al., 2019), we found that changes were comparable for traits and mean-state measures of some but not other well-being components. For meaning in life, we observed the same trajectory of trait and mean-state across the 10 months of the transition, suggesting that both measures might be tapping into the same construct. Our findings pointing to their similarity in the trajectory seem particularly robust since meaning in life was measured using 2 different instruments (i.e., trait: 5-item scale, mean-state: 1 item). Thus, our findings on meaning in life appeared to support the notion that trait and mean-state measures do converge and show some level of construct equivalence.

Yet another pattern that emerged from our findings is the different trajectories of trait versus mean-state life and relationship satisfaction. Namely, while trait measures of life and relationship satisfaction declined between 2- and 6-month postpartum, there were no significant changes in mean-state measures of life and relationship satisfaction in the same period. This is surprising as trait and mean-state satisfactions were measured using similar instruments. The correlation between trait and mean-state measures of life and relationship satisfaction, as well as meaning in life, in our sample ranged from r = .46 to .66. These correlations are large but do not reach the threshold of .80 - .90 that is commonly used to determine homomorphy (Rauthmann et al., 2019). Thus, these findings call into question whether trait and mean-state measures of life and relationship satisfaction are homomorphous.

The different patterns of findings across different well-being components suggest that some well-being components show higher homomorphy between trait and mean-state measures than others. Namely, it appears that meaning in life shows a stronger equivalence of trait and mean-state constructs compared to cognitive well-being (i.e., life and relationship satisfaction). Similarly, research has found different extents of homomorphy for different personality traits, such as extraversion, conscientiousness, and agreeableness, showing higher homomorphy than openness, honesty/humility, and neuroticism (Rauthmann et al., 2019). Thus, our results suggested that while both trait and mean-state measures of meaning in life are possibly tapping into the same construct, it might not be the case for relationship and life satisfaction. For these cognitive well-being components, it appears that the trait and mean-state instruments are potentially capturing something different from one another.

For cognitive well-being (i.e., life and relationship satisfaction), daily measures may rely on episodic memory and capture different information than global trait measures. Based on the self-discrepancy framework, it has been argued that the difference between mean-state and trait measures could be due to the difference between actual and ought selves (Augustine & Larsen, 2012). For instance, trait measures of life and relationship satisfaction could be

tapping into new mothers' beliefs and perceptions of what a new mother *should* be feeling at this point (prescriptive), while the mean-state measures of life and relationship satisfaction are capturing a less biased picture of how they are *actually* feeling on a day-to-day basis (descriptive). This discrepancy between the prescriptive vs. descriptive reality of motherhood is reasonable since culture-grounded beliefs (i.e., beliefs about how a mother *should* feel) play an important role in shaping individual identity and experiences (McAdams et al., 2021). Further, social disapproval of certain parental life arrangements and practices has been linked to lower parental well-being in prior studies (Stavrova & Fetchenhauer, 2015b, 2015a). Thus, cultures emphasizing a negative narrative of the transition to motherhood can shape first-time mothers' self-perception as being less satisfied, as well as influence their self-narrative surrounding this life transition, more than they can affect how new mothers actually feel in the moment. While we cannot draw such definitive conclusion from our current study, following this interpretation of the results, it is at least possible that "true" changes in new mothers' life and relationship satisfaction might be limited to a decline in relationship satisfaction between pregnancy and 2 months postpartum (when trait and mean-state measures converged). This could be a worthy direction for future research to replicate this study in societies with a more diverse cultural narrative of parenthood, including both negative, neutral, and positive depictions, or to directly measure one's perception of motherhood before family planning.

Additionally, the observed high correlations between the different aspects of mean-state well-being (ranging from |.35| to |.77|), especially in comparison to the respective correlations among the different aspects of trait well-being (ranging from |.21| to |.45|). This raises the question of whether mean-state measures of cognitive, affective, and eudaimonic well-being can still be described as sufficiently distinct from each other (similar to trait well-being) or not. One observation in our data suggests that they can. Specifically, we observed differing trajectories between different aspects of mean-state well-being between pregnancy and 2-3 months postpartum, with some aspects showing an upward and others showing a downward trajectory. Importantly, the trajectories displayed by mean-state measures were similar to the trajectories displayed by the respective trait measures of the same constructs. Thus, while there are higher correlations between mean-state well-being components, likely due to the nature of aggregation of multiple repeated daily measures leading to a loss of variance (Brand & Bradley, 2012), mean-state well-being measures still appear to retain enough uniqueness to show distinct developmental paths across the motherhood transition.

Intraindividual Variability of Psychological Well-Being

In contrast to findings suggesting that (intraindividual) variability in well-being increases when individuals experience more stress (Wang et al., 2020), we did not find significant changes in well-being variability across the transition to motherhood, neither in the main analyses using *SD*-based operationalization of variability, nor in the robustness check analyses using *MSSD*-based operationalization. It is possible that changes in well-being variability occurred at an earlier time in the transition to motherhood, namely, at the beginning of

pregnancy, and thus were not captured by our study. It is also possible that, while there are no changes in well-being (intraindividual) variability on average, individuals could differ in the extent to which their well-being variability changes throughout the transition. While we did not find significant individual differences in most well-being variability outcomes, we did observe a significant amount of between-individual variability in changes of relationship satisfaction variability between pregnancy and 2-3 months postpartum. Thus, it could be the case that some well-being components are more prone to changes in their dynamic characteristics than others. In addition, some new mothers could also be more prone to experience a change in well-being variability than others, such as those who are more vulnerable (e.g., history of depression, unplanned pregnancy, poor postnatal health; Redshaw & Henderson, 2013). It is difficult to draw any definitive conclusion based on our study alone, turning it into a possible area for future research to expand upon and explore.

Future Directions, Strengths, and Limitations

There are multiple strengths in our study. First, by tracking well-being using a more fine-grained (relative to most prior research) timescale with 3 measurement bursts across 10 months, we were able to capture a more detailed picture of psychological well-being changes across the transition to motherhood, revealing that the changes in well-being following the transition are non-linear, where most changes occur in late pregnancy and the first few months postpartum. Second, by measuring multiple well-being components (i.e., affective, cognitive, meaning in life), we demonstrated that the transition does not have a uniform (negative) effect on psychological well-being. Rather, it is accompanied by positive changes in some aspects of well-being and negative changes in others. We thus highlighted the often-neglected increase in sense of meaning that new parents experience with the birth of their first child. Third, by comparing trait and mean-state measures, we contributed to the trait vs. mean-state measurement debate and demonstrated that the transition to parenthood affects trait and mean-state measures of life and relationship satisfaction differently, in line with the prescriptive vs. descriptive framework. In addition, by comparing our sample's well-being trajectories with a sample of Dutch non-mothers with similar age, partnership status, and year of data collection (2022 - 2023), we can be more confident that the observed well-being changes are associated specifically with the motherhood transition instead of being indicative of a normative trend.

Our study also has certain limitations. First, it is unclear to what extent our results can be generalized to parenthood in general, as our sample consisted of Dutch first-time mothers with the majority having a university degree or higher and participating in paid employment. Comparing to the general Dutch population where roughly 80% of mothers with a child younger than 4 years old have a paid job (Centraal Bureau voor de Statistiek (CBS), 2024), our sample had a higher labor market participation rate of up to 97.7% which could be due to the overall high level of education (77.64% having a university degree or higher). Previous research has shown that workers of lower socioeconomic status tend to be happier and less

stressed at work (Damaske et al., 2016). In the Netherlands, highly educated women also reported a higher need for recovery due to work-related fatigue compared to less educated women (Verdonk et al., 2010). Thus, instead of no significant changes in well-being between 2-3 months and 6 months postpartum observed in our sample, there might even be an increase in well-being during this period associated with a return to work in a sample of new mothers with a lower education level. Additionally, as countries differ regarding their policies concerning both the duration of parental / maternity leave and the financial compensation (e.g., the Netherlands provides a fully paid maternal leave of 16 weeks), there might be different developmental trajectories across different countries. Exploring these variations across countries presents an intriguing avenue for future research. Additionally, inclusion of fathers' data would offer a more comprehensive picture of how the parenthood transition affects new parents and allow for a comparison of how the experiences of new fathers and mothers are similar or differ.

Second, while our study design offers a denser assessment design than most previous studies (i.e., 3 assessments in 10 months), an even more granular design would further benefit our understanding of the dynamic nature of the transition, especially during the few months before and after childbirth. Specifically, as we only have one measurement occasion pre-childbirth, changes that could have occurred in early pregnancy could not be detected. Prior research has shown late (vs. early) pregnancy to be associated with higher well-being (Fagbenro et al., 2018), while other studies showed the opposite (Rofé et al., 1993). Additionally, our study findings suggest that the few months directly surrounding childbirth are especially dynamic in terms of new mothers' well-being. Thus, we believe tracking mothers-to-be from early pregnancy with monthly, or even weekly, assessments would represent an important improvement over our current methodology.

Yet, there are obvious challenges for the feasibility of a more intensive study design, which might lead to a lower inclusion rate due to a higher burden on participants and potentially lower compliance during the ESM period. To mitigate some of these problems, future research could consider the addition of less obtrusive data collection techniques, such as utilizing social media posting (Larsen et al., 2015; Mayor & Bietti, 2021) or mobile sensing, a promising method of using sensors available in most smartphones to passively (i.e., without subjects' active participation) obtain information from the subjects' environment, such as acoustic features, screen time, GPS, and accelerometers (Doherty et al., 2014). While this can help mitigate some of the additional burden on participants in ESM studies, there are still significant limitations to the use of mobile sensing in well-being research. For example, many social interactions have been found to only be captured by participants' self-reports instead of mobile sensing (Roos et al., 2023), and acoustic features taken from recordings of direct speech and ambient sounds could not predict participants' mood (i.e., happiness) above chance (Weidman et al., 2020). Additionally, the willingness to participate in research projects with passive data collection such as mobile sensing might be lower, especially for

participants with privacy and security concerns (Keusch et al., 2019; Wenz et al., 2019), leading to potentially more difficulty in reaching certain populations of interest (i.e., new parents). Thus, future research must balance the advantages and disadvantages of different study design aspects (assessment frequency, passive mobile sensing vs. active self-reports, etc.) to maximize study feasibility and the validity of the obtained measures.

Third, our study measured daily life satisfaction, daily relationship satisfaction, and daily meaning in life with a single item each. This decision was made to keep the daily survey as short as possible to reduce participants' burden during a stressful life transition and increase compliance (Eisele et al., 2022), especially as this population of interest is usually not easy to reach. We were successful in our effort and maintained low drop-out rates between waves (around 10%) and high compliance (i.e., 85-90%). Importantly, as the single-item daily life satisfaction has been previously validated (Cheung & Lucas, 2014) and prior research has shown that meaning in life, as well as relationship satisfaction, can be adequately captured using short scales consisting of one to two items (Atroszko et al., 2015; Fülöp et al., 2022; Niehuis et al., 2024; Stavrova & Luhmann, 2016), we are fairly confident in our conclusions, though we acknowledge the need for further validation of short well-being measures in ESM studies.

Lastly, as the scope of our study was to provide the initial documentation of the changes in psychological well-being across the transition using both trait and mean-state (experience sampling) measures, we only performed exploratory analyses (that were not pre-registered) on a limited set of factors (mother's sleep quality, infant crying, and family and non-family contact) that might underlie these changes. We encourage future studies to explore what daily activities (e.g., physical activity; Maher et al., 2013), patterns of social interactions (e.g., time with children; Offer, 2014; Roeters & Gracia, 2016), and cognitive and motivational processes might underlie the documented changes in daily psychological well-being.

CONCLUSION

Is the transition to motherhood associated with positive or negative changes in psychological well-being? Our answer is: It depends. First, it depends on what aspect of psychological well-being is being considered. By assessing various dimensions of well-being (i.e., affective, cognitive well-being, and sense of meaning in life), we found that the transition is not uniformly positive or negative. Instead, it brings both challenges and benefits, with some aspects of well-being improving (i.e., positive affect and meaning in life) while others (i.e., relationship and life satisfaction) decline. Second, it depends on the time frame. Our findings highlight that changes in well-being during the transition to motherhood follow a non-linear pattern, with the most significant shifts occurring in late pregnancy and the early months after birth, with barely any changes in the months after. That those changes occur

rather fast around the transition adds novel insights to the literature that traditionally focuses on longer-term trajectories. Third, changes depend on the instrument used to measure psychological well-being. By comparing trait and mean-state measures of well-being, we found that changes were comparable for some constructs (i.e., eudaimonic well-being) but diverged for others (i.e., cognitive well-being), suggesting that they capture somewhat different psychological experiences. Fourth, changes depend on the type of indicator examined (i.e., average, individual differences, and intraindividual variability). Fifth, our comparison with a demographically matched sample of non0mothers confirmed that these well-being changes are indeed attributable to the motherhood transition rather than general developmental trends, while our exploration of daily factors revealed that infant crying, sleep quality, and social contacts significantly predict mothers' daily well-being, with their effects varying across different stages of the transition. Together, these findings point to the complex nature of well-being changes during the transition to motherhood that can only be fully understood when timing, measurement, and different well-being components are considered in conjunction.

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4

CHAPTER 4

Basic psychological need satisfaction and self-esteem development across the motherhood transition: An intensive longitudinal study

This chapter is based on:
Tran, C. B., Ivanova, K., Reitz, A. K., & Stavrova, O. (2026). *Basic psychological need satisfaction and self-esteem development across the motherhood transition: An intensive longitudinal study*. Manuscript under review.

Pre-registration, analysis code, and anonymized data are available at https://osf.io/y5a8f/overview?view_only=1d966c27cb5c431589e18a732b6409cf.

Materials are available at https://osf.io/7kz8f/.

Theories of self-esteem differ in which psychological experiences most strongly shape self-worth and whether these influences are recalibrated during major life transitions. Drawing on self-determination theory, sociometer theory, and the double-perspective model, this preregistered study examined how self-esteem and basic psychological need satisfaction (autonomy, relatedness, competence) change across the transition to motherhood, which needs are most central to self-esteem, and whether these relationships shift. We analyzed intensive longitudinal data from 159 first-time mothers who completed three waves of 7-day experience sampling from mid-late pregnancy to 6 months postpartum. Early motherhood emerged as a period of growth: self-esteem, relatedness, and competence satisfaction increased across the transition, whereas autonomy satisfaction showed little mean-level change on average with substantial individual variability. All three needs were positively associated with self-esteem at both trait and state levels, with competence satisfaction showed the strongest association. This pattern aligns more closely with competence-primacy accounts of self-esteem (i.e., double-perspective model) than with interpretations emphasizing the primacy of relatedness. Furthermore, the relatedness–self-esteem association strengthened from mid-late pregnancy to postpartum, suggesting that the transition selectively recalibrates the psychological links between need satisfaction and self-esteem. Together, these findings advance theoretical understanding of self-esteem regulation during major life transitions and highlight that such transitions are associated with shifts not only in average levels of psychological well-being, but also in the underlying structure of how basic needs relate to self-esteem.

Keywords: self-esteem, basic psychological needs, transition to motherhood, trait and state, intensive longitudinal design

Abstract

Becoming a mother is a profound life transition that is consequential for women's self-esteem, the global evaluation of one's worth as a person (Rosenberg, 1965). The transition to motherhood is provides a theoretically consequential context for examining self-esteem. According to identity theory, motherhood introduces a new and highly salient role identity that fundamentally reorganizes new mothers' self-concept and the performance standards tied to it (Stryker & Burke, 2000). From a developmental and self-evaluative perspective, such role transitions are developmental phases when domains central to new mothers' sense of self might shift, along with their standards for self-worth, sources of validation, and daily opportunities for success and failure are renegotiated, making self-esteem particularly susceptible to change (Crocker & Wolfe, 2001; Reitz, 2022). Yet, theories of self-esteem disagree about which psychological experiences should matter most during such transitions. Is self-esteem primarily shaped by relational connection, as sociometer theory suggests? Or by competence and achievement, as competence-primacy accounts argue? And do these mechanisms remain stable, or recalibrate as individuals adapt to new roles?

Extending beyond describing self-esteem change, self-determination theory (SDT; Deci & Ryan, 2012) offers an explanatory framework, positing that changes in self-esteem reflect underlying changes in the satisfaction of three basic psychological needs. According to SDT, satisfaction of the basic psychological needs for autonomy, competence, and relatedness is essential for optimal psychological functioning, including one's sense of self-worth. If self-esteem is shaped by these needs, then a transition that differentially alters autonomy, competence, and relatedness should reveal which of these needs is most tightly coupled to self-worth. The transition to motherhood poses distinct challenges to each of these psychological needs: autonomy may be constrained by the demands of infant care, competence may fluctuate as new mothers acquire skills in the parenting role, and relatedness may shift as social and familial relationships are reorganized around the child.

Yet, despite the theoretical relevance of both self-esteem and psychological need satisfaction to the early motherhood transition, surprisingly little is known about how either construct develops across this period. Evidence on self-esteem trajectories remains mixed, and the development of psychological need satisfaction during early motherhood is largely absent in the literature, leaving trajectories of both constructs poorly understood. Compounding this, although psychological need satisfaction has been extensively linked to traditional indicators of psychological well-being, such as affect, depressive symptoms, and life satisfaction (Stanley et al., 2021; Tang et al., 2020), its role in self-esteem development has received comparatively little attention in the context of new motherhood. Thus, how self-esteem and psychological need satisfaction each develop across the transition to motherhood, and whether and how changes in one are linked to changes in the other, remains poorly understood.

A further unresolved question concerns which psychological needs matter most for self-esteem during this transition and theories make different predictions about which need

should be most central to self-esteem. Self-determination theory treats all three needs as equally essential (Deci & Ryan, 2012), yet competing theoretical perspectives suggest otherwise. Sociometer theory (Leary & Baumeister, 2000) proposes that self-esteem is primarily shaped by relatedness, functioning as an internal gauge of social acceptance, whereas the double perspective model (Wojciszke et al., 2011) emphasizes competence as the dominant driver of self-evaluation. Existing research has not been able to adjudicate between these perspectives, particularly in the context of a major life transition in which all three needs could be simultaneously thwarted. Examining the relative strength of associations between self-esteem and each psychological need satisfaction during early motherhood thus offers a rare opportunity to directly pit these competing theoretical accounts against one another. By concentrating challenges to all three needs within a short developmental window, this transition provides a powerful natural context for examining which need is most diagnostic for self-esteem.

In the present study, we address these gaps using intensive longitudinal data collected across the transition to motherhood. Prior research has been limited by a reliance on widely spaced assessment designs that cannot capture the rapid changes occurring in the early postpartum period with precision, nor the day-to-day fluctuations through which need satisfaction and self-esteem may be dynamically linked. By employing a measurement burst design with repeated assessments of self-esteem and need satisfaction in daily life using experience sampling, placed at three distinct assessment points of the transition (mid-late pregnancy, 2–3 months postpartum, and 6 months postpartum), we are able to examine something no prior study has done: whether self-esteem and psychological need satisfaction already show meaningful change within the first few months after birth. Specifically, we investigate how self-esteem and psychological need satisfaction each develop across these timepoints, how they are associated at both the stable trait and fluctuating state levels, and which psychological needs are most strongly linked to self-esteem during this period. In doing so, we move beyond descriptive accounts of self-esteem change and provide a theory-driven examination of competing perspectives on self-esteem during a major developmental transition.

Developmental Changes in Self-Esteem and Basic Psychological Need Satisfaction

Developmental Changes in Self-Esteem

Empirical findings on self-esteem trajectories across the transition to parenthood are strikingly inconsistent. Some studies report a temporary dip during pregnancy followed by postpartum recovery (van Scheppingen et al., 2018), whereas others document increases before birth with declines afterward (Bleidorn et al., 2016; Wenzel et al., 2021), and still others suggest a more continuous increase from pregnancy through early motherhood (Grundström et al., 2025). A recent meta-analysis found no consistent overall effect of the transition to parenthood on self-esteem (Bühler et al., 2023). These mixed findings raise a

fundamental question: does self-esteem reliably change during this transition, or are prior findings obscured by methodological limitations and variation in when and how change is measured?

Inconsistencies in the existing literature may partly stem from two related methodological limitations. First, differences in the timing and spacing of assessments across studies may account for divergent trajectory findings. Second, and more fundamentally, no prior study has used sufficiently dense assessments to capture how rapidly self-esteem may shift around childbirth. Most studies assessed new parents at yearly intervals (Bleidorn et al., 2016; Grundström et al., 2025; Wenzel et al., 2021), with van Scheppingen et al. (2018) being a notable exception, assessing participants three times over a 10 months period between mid-pregnancy through 6 months postpartum. Yet the dynamic nature of this period is already well recognized in practice: new parents, midwives, pediatricians, and other health care professionals routinely track pregnancy and infant development in weeks and months rather than years, reflecting the sheer extent of change occurring in this short window. That psychological research on new mothers has not followed suit is a notable gap. If self-esteem reorganizes as individuals recalibrate their standards of self-worth during major life transitions (Reitz, 2022), then changes may unfold over weeks or months rather than years—a timescale that annual assessments are fundamentally ill-equipped to detect. Sparse assessments risk averaging across distinct phases of adaptation, potentially obscuring whether self-esteem already shifts meaningfully within the first months after birth.

Additionally, because most prior work has relied on large-scale panel studies not designed to capture the parenthood transition, measurements were often not aligned with specific phases of the transition (e.g., exact months of pregnancy or postpartum). This means that participants assessed at "first year postpartum" could be at very different stages of their transition (e.g., 1 month vs. 10 months postpartum), obscuring systematic patterns of change. Taken together, these methodological limitations underscore the need for studies using denser, more precisely timed assessments to better capture how self-esteem and other psychological factors unfold across the early phase of the motherhood transition.

Given the mixed empirical results reviewed above, strong directional predictions about self-esteem change around childbirth are difficult to formulate. The transition to motherhood brings theoretical reasons to expect both decline (i.e., through increased demands, role strain, and disrupted routines) and growth (i.e., through identity integration and the meaning derived from a new caregiving role). Given that self-esteem is positively associated with life satisfaction, and that life satisfaction has been found to decline over a similar pregnancy-to-postpartum period in longitudinal studies of new mothers (Dyrdal et al., 2011; Tran et al., 2025), we tentatively expect that self-esteem will similarly decrease between mid-late pregnancy and 6 months postpartum (H1). At the same time, we remain open to alternative

trajectories, including nonlinear patterns such as a decline followed by postpartum recovery (van Scheppingen et al., 2018).

Finally, past studies often focused on mean-level change without considering heterogeneity in individual trajectories. Major life transitions rarely produce uniform psychological change; rather, individuals differ substantially in the magnitude and direction of self-esteem development (Reitz, 2022). Such variability may help explain the mixed mean-level findings in prior research, as samples that differ in their composition may yield different aggregate patterns (Reitz, 2024). Rather than treating heterogeneity as noise, we examine between-person differences in trajectories to obtain a more comprehensive account of self-esteem development during the transition to motherhood (Reitz, 2023). Identifying variability in trajectories is also essential for understanding whether changes in need satisfaction may account for why some mothers thrive while others struggle. Specifically, we investigate how self-esteem changes across three waves spanning mid-late pregnancy to six months postpartum (approximately 10 months) and whether these trajectories vary across mothers (RQ1).

Developmental Changes in Basic Psychological Need Satisfaction

The transition to motherhood also pressures each of the three basic psychological needs in theoretically distinct and meaningful ways. Because Self-Determination Theory posits that the satisfaction of these needs underlies psychological functioning and self-esteem (SDT; Deci & Ryan, 2012), mapping how autonomy, competence, and relatedness satisfaction evolve during this transition is essential for understanding how self-esteem is regulated during this period.

Autonomy, defined as the need to feel that one's actions are self-directed and personally meaningful, may be threatened by the lifestyle restrictions and constant demands of infant care. Competence, defined as the need to feel effective and capable, may fluctuate as new mothers acquire parenting skills while simultaneously navigating shifting work roles. Relatedness, defined as the need to feel connected and valued by others, may be reshaped as relationships with partners, family, and friends are reorganized around the new family structure, and as mothers form a new attachment to their infant. Because self-esteem is theorized to be shaped by these need experiences, understanding how need satisfaction develops across this transition is an important step toward explaining why self-esteem changes (or fails to change) in new mothers. We therefore examine how basic psychological need satisfaction develops across the motherhood transition and whether mothers differ in these trajectories (RQ2). Because direct evidence on need satisfaction trajectories during this transition is scarce, we draw on adjacent literatures to derive theoretically informed expectations.

Regarding autonomy, research on the motherhood transition remains limited, but converging evidence suggests that motherhood might constrain new mothers' sense of self-direction and control in several ways. Pregnant and postpartum women often report losing a sense of control over their own bodies as physical changes unfold largely outside of their influence (Neiterman & Fox, 2017). Longitudinal evidence further indicates that new mothers have less leisure time for themselves and for social activities (Zheng et al., 2023), reducing opportunities for self-directed activities. Beyond these empirical findings, multiple additional constraints are theoretically plausible, including infant dependency, sleep disruption, rigid daily schedules, and reduced mobility and social participation. Pregnancy and lactation also impose physically and socially reinforced restrictions on bodily autonomy, particularly around dietary choices, substance use, and access to certain medications. Taken together, both the scarce empirical evidence and theoretical reasoning suggest that new mothers' sense of acting in accordance with their own preferences is likely systematically reduced during this transition. We therefore expect that autonomy satisfaction will decline from mid-late pregnancy and six months postpartum (H2a).

Regarding competence, the transition to motherhood introduces substantial uncertainty and novel demands that may challenge mothers' sense of mastery. New mothers frequently must navigate caregiving challenges without clear feedback as infants are largely unpredictable and their needs are often ambiguous and difficult to interpret. Consistent with this, researchers have reported a decline in maternal competence between pregnancy and 4 months postpartum (Esmaelzadeh Saeieh et al., 2017). Yet, a different study found a more complex pattern of an initial decline between pregnancy and 6-week postpartum, followed by an increase at 6 months postpartum, suggesting that maternal competence might increase as new mothers gain experience and confidence in their parenting role over time (Ngai & Chan, 2012). It is worth noting, however, that these studies were conducted in Iranian and Chinese samples respectively and measured *maternal role competence*, whereas the present study assesses general competence satisfaction spanning multiple life domains. Thus, whether gains in parenting confidence translate into or are offset by challenges in other life domains for new mothers remains an open question. Given these competing possibilities, we do not advance a directional hypothesis for competence satisfaction and treat its trajectory as exploratory.

Regarding relatedness, many studies have reported a decline in relationship satisfaction with one's partner across the motherhood transition (Mitnick et al., 2009; Tran et al., 2025). Yet, relatedness extends beyond one's partner to other social relationships as well. In this aspect, researchers have reported a decline in satisfaction with support from others, excluding one's partner, during the first 6 months postpartum in new mothers (McVeigh, 2000). Further, the decline in leisure time spent with friends (Zheng et al., 2023) could also result in a decline in relatedness satisfaction as new mothers have less access to free time for maintaining their social relationships. Given that we are interested in new mothers' general sense of relatedness satisfaction, which captures feelings of connection and closeness across relationships broadly,

we tentatively hypothesize a decline in relatedness satisfaction between mid-late pregnancy and 6 months postpartum, reflecting the documented challenges in maintaining both partner and broader social relationships during this transition, while acknowledging that gains in the mother–infant relationship may offset these strains.

Association Between Basic Psychological Needs and Self-Esteem

Self-determination theory (SDT) proposes that satisfaction of basic psychological needs supports self-esteem, with each of the three needs being equally important: experiencing autonomy, competence, and meaningful connections promotes positive self-evaluations, whereas frustration of these needs undermines self-esteem (Chen et al., 2015; Reitz, 2022). If needs are fundamental precursors to self-esteem, then changes in need satisfaction during the motherhood transition should correspond with changes in self-esteem, with higher (or lower) need satisfaction associated with higher (or lower) self-esteem. Examining this link is an important first step in understanding how supporting mothers' psychological needs may contribute to maintaining or enhancing self-esteem during this period.

A key gap in the literature concerns which specific need domains are most relevant for predicting self-esteem in major life transitions (Reitz, 2022). Different theories imply different answers to this question. While SDT proposes that autonomy, competence, and relatedness all contribute equally to psychological flourishing, competing theories of self-esteem offer different predictions. Sociometer theory proposes that self-esteem functions as a gauge of social inclusion, suggesting that relational connections (i.e., relatedness) should be the primary driver of self-esteem regardless of context (Leary & Baumeister, 2000). Contingencies of self-worth theory (Crocker & Wolfe, 2001) converges on the same prediction but for a different reason: the relative importance of different need domains for self-esteem depends on which life domains are most central to an individual's sense of worth at a given time. Because the transition to parenthood is fundamentally a relational life event (e.g.; Bleidorn et al., 2018), relatedness satisfaction should be particularly strongly linked to self-esteem during this transition period, above and beyond the other need domains.

Finally, the double perspective model (Wojciszke et al., 2011) emphasizes the primacy of competence and achievement in self-esteem evaluation, suggesting that satisfaction of the competence need is most important for self-esteem. Supporting this view, recent research on early-career workers found that fluctuations in competence-related (rather than affiliation-related) daily experiences predicted changes in self-esteem (Reitz et al., 2020). It is notable, however, that this evidence comes from a work context, which may limit its generalizability to the transition to motherhood, a fundamentally relational life event. Yet there are other reasons to believe that competence concerns could remain highly relevant even in this relational transition. A recent scoping review of social norms around motherhood reveals that contemporary motherhood is characterized by high-performance expectations across multiple domains: being attentive and present, securing the child's development, integrating

employment, maintaining an image of being in control, and projecting contentment with motherhood (Schmidt et al., 2023). These expectations reflect the broader cultural phenomenon of intensive mothering, which holds mothers to demanding standards of total dedication, expert knowledge, and child-centered practice (Gauthier et al., 2021). In this sense, a "good mother" is implicitly defined as a high-performing one. These pervasive competence-related norms suggest that feelings of effectiveness and adequacy may remain a strong concern for the modern new mothers throughout the transition, even alongside the centrality of relational experiences.

Across self-esteem frameworks, autonomy is not considered a central determinant of self-esteem. However, two lines of reasoning suggest it may nonetheless be relevant during the motherhood transition. First, emerging evidence indicates that autonomy satisfaction predicts self-esteem development alongside competence and relatedness: Reitz and Olaru (2024) found this pattern using longitudinal data from a population-based panel study of adults in the work context. Second, the transition to motherhood imposes particularly substantial constraints on autonomy, as outlined above, making this transition a meaningful test of whether autonomy becomes more relevant to self-esteem under conditions of heightened constraint. Taken together, autonomy satisfaction may represent an underexplored but meaningful contributor to self-esteem during this transition, potentially extending current theoretical accounts beyond their existing scope.

Together, these competing theoretical perspectives highlight that the transition to motherhood simultaneously challenges all psychological needs which may shape self-esteem: social relationships are reconfigured, maternal competence must be developed, and autonomy may be substantially constrained. This convergence of challenges across multiple psychological domains makes the motherhood transition an ideal natural context for examining which needs most strongly predict self-esteem. We therefore ask: how are basic psychological needs associated with self-esteem across the entire motherhood transition period, and which needs show the strongest link (RQ3)? We hypothesize that all three basic psychological needs satisfaction will be positively associated with self-esteem at both the trait and state levels (H3a). Given the love-related nature of the transition and the converging evidence from sociometer theory and contingency of self-esteem work reviewed above, we tentatively expect relatedness satisfaction to emerge as the most influential predictor of self-esteem in this context (H3b), while remaining open to the possibility that competence satisfaction may prove most influential, consistent with the double perspective model and evidence on the pervasive performance norms surrounding contemporary motherhood.

Examining the need–self-esteem associations at both the trait and state levels is crucial as these levels capture fundamentally different processes. At the trait level, stable between-person differences in average need satisfaction reflect enduring vulnerabilities or resources: mothers who chronically feel disconnected, incompetent, or constrained throughout the

transition may show persistently lower self-esteem. At the state level, daily within-person fluctuations capture the immediate psychological impact of the challenges and experiences that characterize early motherhood as it is actually lived, potentially driving short-term self-esteem regulation and, through repetition and accumulation over time, gradually shaping longer-term trait-level development (Wrzus & Roberts, 2017). Studying both levels is therefore necessary to distinguish between stable individual differences in psychological resources and the dynamic, situational experiences that influence self-esteem on a day-to-day basis.

A further advantage of assessing need satisfaction and self-esteem at the state level is that it captures psychological experiences as they unfold, minimizing the retrospective bias that can affect trait-level self-reports (Schwarz, 2012). Basic psychological needs are indeed highly dynamic, with diary studies showing that a large proportion of the variance in need satisfaction occurs at the within-person state level (Coxen et al., 2021). To date, only one intensive longitudinal study has examined the association between daily need satisfaction and daily self-esteem at the state level, finding that daily autonomy, competence, and relatedness were each positively associated with daily self-esteem under everyday conditions, though without formally testing which need showed the strongest link (Heppner et al., 2008). Whether these associations hold during a major life transition such as the transition to motherhood, a context that differentially pressures each of the three needs, remains an open question.

Developmental Dynamics of Psychological Needs and Self-Esteem across the Motherhood Transition

Major life transitions may not only alter mean levels of psychological experience, but also reorganize the functional relationships among them. The need–self-esteem relationships may not be static, but instead shift as mothers move from pregnancy into the early postpartum period. This period is densely packed with substantial psychological, physical, and social changes, suggesting that the relative salience of competence, autonomy, and relatedness satisfaction for new mothers' self-esteem may vary as they adapt to shifting developmental demands. From a lifespan developmental perspective (Baltes et al., 1999), major life transitions involve a reorganization of existing psychological resources, adjusting their functional weight and interrelationships in response to new developmental demands rather than simply adding new ones. From a self-esteem development perspective, such shifts are expected: self-esteem is shaped by changing contingencies of self-worth across developmental periods, implying that the relative relevance of specific needs for self-esteem may itself change during this transition (Reitz, 2022). If need–self-esteem associations vary across the waves of our study, this would suggest that self-esteem regulation is context-sensitive and dynamically organized.

These dynamic conditions motivate our final research question: do the associations between basic psychological needs and self-esteem, at both the trait and state levels, change across

the early motherhood transition (RQ4)? Put differently, does mothers' self-esteem become more or less contingent on satisfaction in each of the three need domains as the transition unfolds? For instance, the competence–self-esteem relationship may strengthen as maternal role performance becomes increasingly central to self-evaluation, while the relatedness–self-esteem relationship may fluctuate depending on how social support networks evolve. These changes may be visible at the trait level, reflecting gradual reorganization of stable self-worth contingencies, as well as at the state level, reflecting shifts in how sensitively daily self-esteem responds to momentary need experiences. Given the absence of specific theoretical framework and empirical evidence on how the need–self-esteem relationship evolves during major life transitions, and the multiple plausible directions of change, we approach RQ4 exploratorily.

The Present Study

The present study examines self-esteem and basic psychological needs during the transition to motherhood, focusing on both developmental trajectories and daily within-person dynamics. Using data from 159 first-time Dutch mothers assessed from mid-late pregnancy to six months postpartum across three waves, each including a seven-day experience sampling period with three daily surveys, we capture both stable, trait level changes between the waves and daily state fluctuations within the waves. This design allows us to model developmental trajectories, identify individual differences, and examine whether associations between needs and self-esteem shift over time at different levels. To strengthen the interpretation of developmental patterns in self-esteem in our sample, we also compare new mothers' trajectories with a non-mother comparison sample.

Our first aim is to describe developmental changes. At the trait level, we estimate mean-level change and individual differences in trajectories of self-esteem (RQ1) and autonomy, competence, and relatedness satisfaction (RQ2) across the transition. The second aim is to examine associations between psychological need satisfaction and self-esteem and determine which needs are most strongly linked to self-esteem, both at the trait and state levels (RQ3). The third aim is to explore whether the needs–self-esteem association changes over time (RQ4) by testing whether the strength of these associations differs across different transition phases and across levels of analysis (state vs. trait), capturing potential developmental reorganization as mothers adapt to their new role. Together, these aims provide an integrated developmental framework: we first establish how self-esteem and psychological need satisfaction evolve across early motherhood, then identify which psychological need satisfaction is most strongly tied to self-esteem, and finally assess whether these links change over time, both across individuals and within daily life.

METHODS

Sample

The study was conducted between 2022 and 2024, following first-time mothers across three time points over a period of 10 months. Wave 1 occurred during mid-late pregnancy (range: 20–32 weeks, with 96% between 20–27 weeks gestation), Wave 2 around 2–3 months postpartum, and Wave 3 at 6 months postpartum. Participants were drawn from the Brabant Study, a large prospective longitudinal cohort of approximately 4,000 pregnant individuals in the Brabant region of the Netherlands (https://www.brabantstudie.nl/; Meems et al., 2020). Inclusion criteria required participants to be at least 18 years old, reside in Brabant, and receive prenatal care from a midwife or hospital. Women with multiple pregnancies or chronic health conditions were excluded. Only first-time mothers were eligible for the present study.

Before applying exclusion criteria, the sample included 161 participants at Wave 1, 143 at Wave 2, and 130 at Wave 3. After excluding participants with fewer than two measurements per wave, the sample sizes were N = 159, 140, and 130, respectively. At the observation level, no extreme values (scores exceeding ±3 standard deviations from a participant's mean) were found. Majority of participants (96.3%) identified as Dutch, with an average age at childbirth of 31.61 years (SD = 3.47, range = 22–42). Regarding relationship status, 95% had a partner, with 92.6% married or cohabiting, and 97% of partners were male. During pregnancy, participants had been in a relationship with their partner for an average of 7.43 years (range = 1–17 years), and all participants remained with the same partner throughout the study duration. By six months postpartum, 97.7% of participants were employed, with 90.1% currently working 21–40 hours per week. Educational attainment of the sample was high: 77.6% held university degrees, and 18.6% completed vocational training. Compliance rates for the daily surveys were strong across all waves: 85% at Wave 1, 89.9% at Wave 2, and 90.8% at Wave 3.

An effect-size sensitivity analysis was conducted using 1,000 simulations in *simr* (Green & MacLeod, 2016) to determine the minimal detectable effects (MDES) with at least 80% power (α = .05) for the focal parameters across research questions (Giner-Sorolla et al., 2024). Both unstandardized (b) and standardized (β) effect sizes are reported.

For developmental change in trait self-esteem (RQ1), detectable effects were small (b = |.06|–|.07|; $\beta \approx$ |.08|–|.11|). For trait need satisfaction (RQ2), MDES ranged from b = |.06| to |.10| ($\beta \approx$ |.11|–|.13|) across autonomy, competence, and relatedness. For trait-level associations between need satisfaction and self-esteem (RQ3a), MDES ranged from b = |.09|–|.13| ($\beta \approx$ |.09|–|.10|). At the state (within-person) level (RQ3b), smaller effects were detectable (b = |.05|–|.06|; $\beta \approx$ |.07|). For changes in associations across the transition (RQ4),

detectable interaction effects ranged from $b = |.09|–|.14|$ ($\beta \approx |.08|–|.10|$) at the trait level, and $b = |.06|–|.09|$ ($\beta \approx |.08|–|.09|$) at the state level.

Overall, the study was well powered to detect small effects, particularly at the within-person level. Substantively, the standardized MDES ($\beta \approx .07–.13$ across analyses) indicate sensitivity to effects in the small range, suggesting the design is capable of detecting modest but theoretically meaningful associations typical in longitudinal and within-person research.

Comparison Sample

To determine whether changes in self-esteem observed among new mothers in our sample over a 10-month period reflect the motherhood transition specifically or a more general age-graded normative trend, we drew a comparison sample from the Longitudinal Internet Studies for the Social Sciences (LISS) panel to serve as a normative developmental benchmark. The LISS panel is a true probability-based household panel in the Netherlands, comprising over 7,500 individuals (Scherpenzeel, 2011). The LISS panel collects repeated measures of self-esteem with the 10-item Rosenberg Self-esteem scale (Rosenberg, 1965), of which 4 items were adapted and used as the daily self-esteem measure in our primary sample. The LISS panel survey waves are spaced 12 months apart, making it well-suited for constructing a comparison group for our 10-month observation period.

Applying the same matching criteria used in Tran et al. (2025), we selected a comparison sample of Dutch women from the LISS panel who were matched to our primary sample on age, relationship status, and stability of partnership, but were *not mothers* at T1 (i.e., 2022). Specifically, for the first time point (T1, 2022), we included female participants aged 22–42, currently in a romantic relationship, and without children. For the second time point (T2, 2023), we retained only participants who had completed T1 and reported to have remained with the same romantic partner over the prior 12 months, ensuring relationship stability comparable to our primary sample. This process yielded a final comparison sample of 145 participants, each contributing two observations.

Procedure

The study procedure was consistent across all waves and comprised two main components at each wave: an online baseline questionnaire and a seven-day experience sampling (ESM) period. Participants first completed a 10–15 minutes baseline questionnaire via Qualtrics. Upon completion, they received a unique code to access the ESM platform Avicenna (previously Ethica), and ESM surveys began the following morning. During the seven-day ESM period, participants received three surveys per day on their smartphones. State self-esteem and basic psychological needs satisfaction were measured daily in the evening surveys.

To reduce participant burden, a fixed-schedule sampling approach was used, with surveys sent at 8:00 am (morning), 1:00 pm (afternoon), and 6:00 pm (evening). Participants had a four-hour window to complete each survey, with reminders sent 2 hours and 30 minutes before the survey expired. This design aims to balance ecological validity with feasibility during the demanding transition to motherhood. Participants received financial compensation for their ESM participation at the end of each wave (up to €72), calculated per completed daily survey and not contingent on overall compliance. They were also provided with personalized reports at the end of each wave if they completed more than 5 out of 7 evening surveys.

Measures

Self-Esteem

State self-esteem was measured daily in the evening. Participants were asked to report their feelings about themselves *that day* using four items adapted from the original 10-item Rosenberg Self-esteem scale (Rosenberg, 1965) to capture daily experiences of self-worth (Guðmundsdóttir et al., 2025; Nezlek & Plesko, 2001). An example item is "I felt that I have a number of good qualities." Participants indicated on a scale of 1 = "Strongly disagree" to 5 = "Strongly agree" to what extent they agree with the statements. A mean score was computed from the 4 items to get a daily self-esteem score for each day, with higher scores indicating higher self-esteem.

Trait self-esteem was operationalized as the means of all daily self-esteem scores within each wave (capturing relatively stable, between-person differences), consistent with the theoretical trait-as-density-distribution-of-states perspective, consistent with the trait-as-density-distribution-of-states framework (Fleeson, 2001).

Psychological Need Satisfaction

State psychological need satisfaction was measured daily in the evening with 12 items from the Basic Psychological Need Satisfaction and Frustration (BPNSF) – Diary measure scale (Mabbe et al., 2018; Van der Kaap-Deeder et al., 2020). Example items included "I felt a sense of choice and freedom in the things I did" and "I felt forced to do many things I wouldn't choose to do." Participants were asked to what extent the statements applied to them on a scale of 1 = Not at all true to 5 = Totally true".

While the original 12-item scale was designed to measure six factors (distinguishing satisfaction and frustration for each of the three basic psychological needs), multilevel confirmatory factor analyses comparing 6-, 3-, and 1-factor models revealed that despite the 6-factor model showing slightly better fit, it also showed extremely high correlations between satisfaction and frustration factors of the same need (within-person r = -0.86 to -0.92; between-person r = -0.62 to -0.92), exceeding the commonly cited threshold of 0.85 (Cheung et al., 2024), and indicating insufficient empirical distinction between these constructs. In

contrast, the 3-factor solution (only distinguishing between autonomy, competence, and relatedness) showed acceptable fit to the data and provided more stable and discriminable factors (for more details, see the Supplementary Online Material).

Thus, we opted to adopt the 3-factor solution for our main analysis. Frustration items were reverse-coded and combined with the corresponding satisfaction items of the same psychological need, resulting in each psychological need satisfaction being measured with 4 items. A mean score was computed from the 4 items to get a daily need satisfaction score for each day of each need, with a higher score indicating higher need satisfaction.

Trait psychological need satisfaction at each wave were operationalized as the means of all daily need satisfaction scores within each wave (capturing stable, between-person differences), similar to trait self-esteem.

Reliability estimates for self-esteem and basic psychological need satisfaction were generally acceptable for multilevel analyses across all three waves, with most coefficients exceeding .70 and no evidence of severe measurement instability across waves (Table 1). Between-person reliability ranged from .58 to .85, with most coefficients at or above .70. Within-person reliability ranged from .52 to .78, with the majority of estimates exceeding .60. Although a small number of coefficients fell slightly below conventional .70 benchmarks, these values are considered adequate for intensive longitudinal research, where within-person reliability is typically attenuated (Cranford et al., 2006).

Table 1

Between- and Within-Person Reliability

	Mid-late pregnancy		2-3 months postpartum		6 months postpartum	
	Between	**Within**	**Between**	**Within**	**Between**	**Within**
Self-esteem	0.85	0.64	0.82	0.71	0.78	0.74
Relatedness satisfaction	0.82	0.52	0.58	0.75	0.65	0.54
Autonomy satisfaction	0.73	0.62	0.77	0.63	0.73	0.71
Competence satisfaction	0.71	0.75	0.73	0.78	0.74	0.74

Note. Between = between-person reliability (i.e., the extent to which individuals differ reliably from one another), Within = within-person reliability (i.e., the extent to which fluctuations within individuals over time are reliably captured). Between- and within-person reliabilities were computed using multilevel reliability models, which partition item variance into between-person and within-person components based on days nested within individuals.

Transparency and Openness

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. The study's design, hypotheses, and analysis plan were preregistered on the Open Science Framework. The pre-registration, analysis code, along

with the anonymized data with final transformations of the variables used in the current study, are available on OSF at https://osf.io/y5a8f/overview?view_only=1d966c27cb5c431589e18a732b6409cf. Materials for the data collection, including other variables collected but not used in the current study, are available at https://osf.io/7kz8f/. The data has been used in one previous publication but did not employ the same variables or analyses.

Analysis Plan

All analyses were conducted using R version 4.4.3 (R Core Team, 2025) with the *lme4* (Bates et al., 2015). Standardized effect sizes were obtained using the package *parameters* (Lüdecke et al., 2020), and data visualization was made with the package *ggplot2* (Wickham, 2016).

To examine developmental changes in trait self-esteem (RQ1) across the transition, we used multilevel modeling with waves nested within participants. Time was modeled using contrast coding to represent the two phases: Phase 1 captured change from mid-late pregnancy (Wave 1) to 2–3 months postpartum (Wave 2), and Phase 2 captured change from 2–3 months to 6 months postpartum (Wave 3). Specifically, Phase 1 was coded as –1 (mid-late pregnancy), +1 (2–3 months), and 0 (6 months), such that its coefficient reflects the difference in trait self-esteem between Wave 1 and Wave 2; Phase 2 was coded as 0 (mid-late pregnancy), –1 (2–3 months), and +1 (6 months), such that its coefficient reflects the difference between Wave 2 and Wave 3. Together, these two contrasts estimate each developmental period independently, providing a flexible alternative to linear or polynomial growth curve modeling (which would be statistically untenable with only three time points) while preserving all measurement occasions. The model included a random intercept to account for stable between-person differences in trait self-esteem, and random slopes for Phase 1 and Phase 2 to capture individual differences in the rate of change across each developmental phase. When including a random slope resulted in a singular fit, indicating negligible between-person variability in that slope, the random slope was excluded from the final model. To examine developmental changes in trait psychological need satisfaction (RQ2), we applied the same modeling framework separately to trait autonomy, competence, and relatedness satisfaction, using identical phase contrast and random effect specifications as RQ1.

To examine the relationship between trait self-esteem and trait need satisfaction (RQ3a), we fitted a wave-level multilevel model with waves (Level 1) nested within individuals (Level 2). Trait self-esteem was predicted by trait autonomy, competence, and relatedness satisfaction measured within the same wave, controlling for developmental phases (Phase 1 and Phase 2). All need satisfaction predictors were grand-mean centered across the sample to preserve developmental trends while removing arbitrary scale anchors. Random effect structure was similar to the models specified above. This analysis captures stable, trait-level associations between need satisfaction and self-esteem, with coefficients reflecting whether individuals with higher need satisfaction in a wave also report higher self-esteem in the same wave.

To examine the relationship between state self-esteem and state need satisfaction (RQ3b), we fitted a daily-level multilevel model with days (Level 1) nested within waves (Level 2) nested within individuals (Level 3). State self-esteem was predicted by daily autonomy, competence, and relatedness satisfaction, which were decomposed into a *between-person component* (person mean across days within a wave) and a *within-person component* (deviation from that mean). Both components were included in the model, with the between-person component serving as a control for stable differences, and the within-person component capturing the fluctuations of interest. Developmental phases were also included as controls. Random effect structure was similar to the model specified above. This analysis captures fluctuating, state-level associations between need satisfaction and self-esteem, with coefficients reflecting whether individuals who experience higher need satisfaction than usual on a given day also report higher state self-esteem on that same day.

Finally, to examine RQ4, interactions between need satisfaction (trait-level and state-level) and phase contrasts were included to test whether these associations changed across the transition. In case of convergence issues with the interaction models, we fitted separate wave-specific models for each measurement occasion and compared the resulting slopes across waves using Wald tests to assess whether the associations differed significantly between phases.

RESULTS

Table 2 presents the means, standard deviations, and trait and state level correlations of the study variables. At the state level, self-esteem shows large correlations with competence satisfaction (.64–.65), and medium–large correlations with relatedness satisfaction (.34–.50) and autonomy satisfaction (.44–.50); psychological need satisfaction scores were also moderately to strongly intercorrelated (.35–.54). At the trait level, the same general patterns emerged. ICCs indicated that a substantial proportion of variance in all four variables was attributable to between-person differences (self-esteem = .65, relatedness = .56, autonomy = .46, competence = .48). 35%–54% of variance reflected within-person fluctuation, consistent with multilevel and intensive longitudinal research demonstrating meaningful state-level variability, and reliability estimates were adequate for within-person analyses (Bolger & Laurenceau, 2013; Cranford et al., 2006).

Table 2

Means, Standard Deviations, and Correlations at Trait and State Levels

	M	*SD*	1	2	3	4
Wave 1 (mid-late pregnancy)						
1. Self-esteem	4.01	0.57	-	0.34*** [.27; .40]	.44*** [.39; .50]	.65*** [.61; .69]
2. Relatedness satisfaction	4.36	0.45	.55*** [.43; .65]	-	.42*** [.36; .48]	.35*** [.29; .41]
3. Autonomy satisfaction	3.83	0.58	.63*** [.53; .72]	.58*** [.47; .68]	-	.54*** [.49; .59]
4. Competence satisfaction	4.01	0.53	.82*** [.76; .87]	.60*** [.49; .69]	.70*** [.61; .77]	-
Wave 2 (2-3 months postpartum)						
1. Self-esteem	4.15	0.59	-	.49*** [.43; .54]	.45*** [.39; .50]	.65*** [.61; .69]
2. Relatedness satisfaction	4.47	0.42	.61*** [.49; .70]	-	.47*** [.41; .52]	.53*** [.47; .58]
3. Autonomy satisfaction	3.86	0.64	.59*** [.48; .69]	.48*** [.34; .59]	-	.54*** [.48; .59]
4. Competence satisfaction	4.16	0.55	.85*** [.80; .89]	.67*** [.56; .75]	.65*** [.54; .74]	-
Wave 3 (6 months postpartum)						
1. Self-esteem	4.19	0.55	-	.50*** [.45; .56]	.50*** [.44; .56]	.64*** [.59; .68]
2. Relatedness satisfaction	4.49	0.40	.65*** [.54; .74]	-	.52*** [.47; .57]	.49*** [.43; .54]
3. Autonomy satisfaction	3.84	0.59	.61*** [.48; .70]	.60*** [.47; .70]	-	.53*** [.48; .58]
4. Competence satisfaction	4.16	0.53	.82*** [.76; .87]	.69*** [.59; .77]	.70*** [.60; .78]	-

Note. * $p < .05$, ** $p < .01$, ***$p < .001$. Values in square brackets indicate the 95% confidence interval for each correlation. The triangle below the diagonal (in blue) shows trait-level correlations, reflecting stable between-person differences based on each participant's mean score across the study. The triangle above the diagonal (in orange) shows state-level correlations, reflecting daily within-person fluctuations around each participant's mean. All variables were measured on a scale from 1 to 5.

Developmental Changes of Self-Esteem and Psychological Need Satisfaction

To examine developmental changes in self-esteem (RQ1) and psychological need satisfaction (RQ2) across the transition to motherhood, we fitted two separate multilevel models of wave-level self-esteem / need satisfaction with 2 phase contrasts (Phase 1: mid-late pregnancy to 2–3 months postpartum, Phase 2: 2–3 months to 6 months postpartum) to capture non-linearity. Attempts to estimate random slopes for Phase 2 consistently resulted in singular fits, suggesting minimal between-person variability in change during this period and/or insufficient power to reliably estimate this effect. Therefore, we report results from models including random intercepts and random slopes for Phase 1 only. Because this model adequately captured individual differences in change during Phase 1 while providing stable estimation given the available data, it was retained for all trajectory analyses.

New mothers showed significant increases in trait self-esteem across both phases. Specifically, trait self-esteem increased from mid-late pregnancy to 2–3 months postpartum (Phase 1: $\beta = .15$, 95% CI [.09, .22], $p < .001$) and continued to increase between 2–3 and 6 months postpartum (Phase 2: $\beta = .10$, 95% CI [.03, .16], $p = .001$). In contrast, in a comparison sample of 145 Dutch non-mothers, trait self-esteem showed a marginally significant decrease over a similar period ($\beta = -.04$, 95% CI [−.08, .00], $p = .049$).

For a formal comparison, we combined both samples and conducted a linear mixed-effects model to examine whether changes in trait self-esteem differed between samples. Time (0 = pre-childbirth/year 2022, 1 = post-childbirth/year 2023), group (0 = nonmothers, 1 = mothers), and their interaction were entered as fixed effects, with a random intercept for participants to account for repeated measurements. The Time × Group interaction was significant, $\beta = 0.17$, 95% CI [.10, .24], $p < .001$, indicating that the change in trait self-esteem differed between mothers and nonmothers. Specifically, the change in trait self-esteem was significantly more positive among mothers than among the nonmothers comparison group.

For trait satisfaction of psychological needs, different trajectories were observed (Figure 1). New mothers reported a significant increase in their competence satisfaction from mid-late pregnancy to 2–3 months postpartum (Phase 1: $\beta = 0.16$, 95% CI [0.08, 0.24], $p < .001$), and a smaller, marginal increase from 2–3 to 6 months postpartum (Phase 2: $\beta = 0.07$, 95% CI [0.00, 0.15], $p = .050$). Similarly, new mothers also reported a significant increase in their relatedness satisfaction from mid-late pregnancy to 2–3 months postpartum (Phase 1: $\beta = 0.15$, 95% CI [0.07, 0.23], $p < .001$), and from 2–3 to 6 months postpartum (Phase 2: $\beta = 0.09$, 95% CI [0.02, 0.16], $p = .009$). In contrast, no significant changes were observed for new mothers' autonomy satisfaction. Specifically, autonomy satisfaction did not change from mid-late pregnancy to 2–3 months postpartum (Phase 1: $\beta = 0.02$, 95% CI [−0.06, 0.11], $p = .628$), nor from 2–3 to 6 months postpartum (Phase 2: $\beta = -0.01$, 95% CI [−0.08, 0.07],

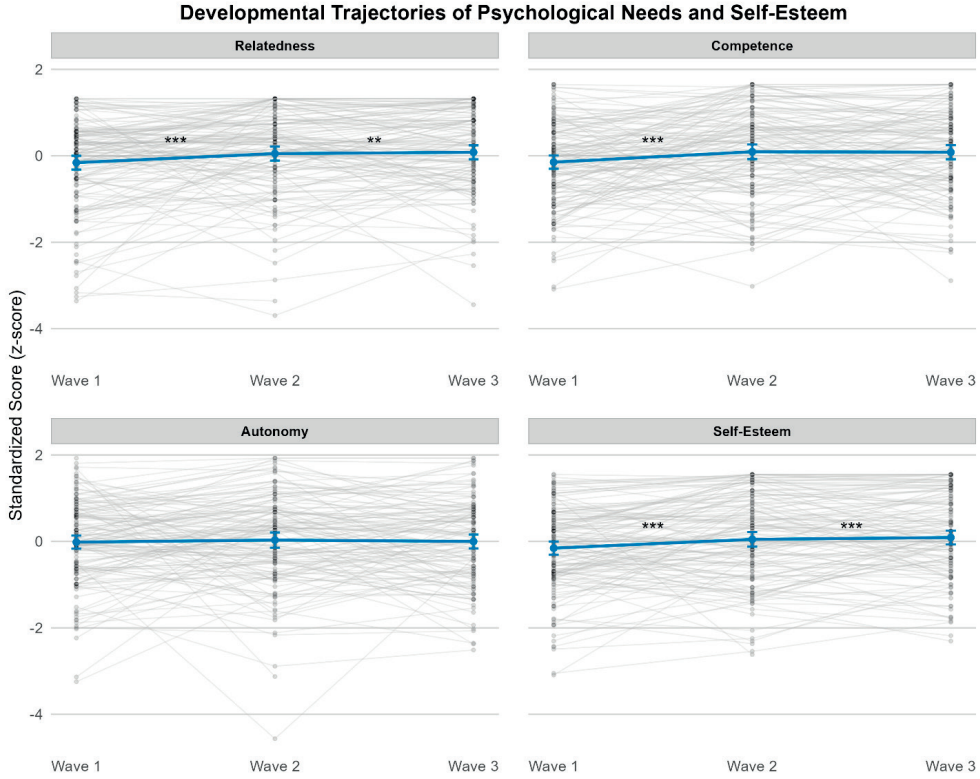
p = .883). In summary, competence and relatedness satisfaction increased across the transition, while autonomy satisfaction did not show significant changes.

Regarding individual differences in change from mid-late pregnancy to 2–3 months postpartum (Phase 1), patterns varied across constructs. For self-esteem, adding a random slope for Phase 1 significantly improved model fit ($\Delta\chi^2$ = 8.51, df = 2, p = .014), indicating meaningful individual differences in change trajectory over time. Similarly, autonomy satisfaction also showed significant heterogeneity in change, with the random-slope model having a better fit than the random-intercept-only model ($\Delta\chi^2$ = 8.34, df = 2, p = .015). Importantly, although the fixed effect for autonomy need satisfaction did not indicate an average change, the significant random slope demonstrates that new mothers differed substantially in how their autonomy need satisfaction evolved across Phase 1, suggesting that group-level stability masked meaningful individual variation.

In contrast, adding a random slope for Phase 1 did not improve model fit for competence satisfaction ($\Delta\chi^2$ = 2.79, df = 2, p = .25) or relatedness satisfaction ($\Delta\chi^2$ = 3.12, df = 2, p = .21), indicating no evidence for statistically reliable individual differences in change for these constructs. In short, results indicate that individuals differed significantly in how their trait self-esteem and autonomy satisfaction changed across Phase 1, whereas changes in competence and relatedness did not show significant between-individual variability in change across individuals.

Figure 1

Trajectories of Self-Esteem and Basic Psychological Need Satisfaction from Mid-Late Pregnancy to 6-months Postpartum



Note. * $p < .05$, ** $p < .01$, ***$p < .001$. Wave 1 = mid-late pregnancy, Wave 2 = 2-3 months postpartum, Wave 3 = 6 months postpartum. Grey dots represent individual observed scores at each wave, and grey lines represent individual trajectories across waves. The blue dots show the predicted standardized scores at each wave, and the blue line shows the average pattern of change over time. Error bars indicate 95% confidence intervals.

Association Between Self-Esteem and Psychological Need Satisfaction

Trait Level Association

To examine whether individuals with higher psychological need satisfaction also reported higher trait self-esteem, we conducted a trait level multilevel regression with waves (Level 1) nested within individuals (Level 2). The model included a random intercept to account for stable individual differences in baseline self-esteem and a random slope for Phase 1 to allow individual differences in self-esteem change from mid-late pregnancy to early postpartum. Random slopes for Phase 2 and for the need satisfaction predictors were tested but did not converge reliably, so only the Phase 1 random slope was retained in the final model.

Results showed that all trait psychological need satisfaction was positively associated with trait self-esteem at the wave level across the transition to parenthood (Figure 2). Specifically, new mothers who reported higher autonomy, competence, and relatedness satisfaction also reported higher trait self-esteem in the same wave. Competence satisfaction exhibited the strongest association ($\beta = 0.62$, 95% CI [0.56, 0.69], $p < .001$), followed by relatedness ($\beta = 0.12$, 95% CI [0.06, 0.18], $p < .001$) and autonomy ($\beta = 0.07$, 95% CI [0.01, 0.14], $p = .015$), consistent with formal comparisons (see below). These associations held after controlling for phase effects, which revealed no significant difference in trait self-esteem between mid-late pregnancy and early postpartum ($\beta = 0.03$, 95% CI [-0.01, 0.07], $p = .114$), but a small increase from early postpartum to 6 months postpartum ($\beta = 0.04$, 95% CI [0.00, 0.08], $p = .032$). Fixed effects explained 65.6% of variance (marginal R^2) in trait self-esteem, and the full model including random effects explained 88.1% (conditional R^2).

We formally compared the strengths of the three need–self-esteem trait level associations using Wald tests. Competence satisfaction was significantly more strongly associated with self-esteem than both relatedness ($\chi^2(1) = 64.20$, $p < .001$), and autonomy satisfaction ($\chi^2(1) = 107.15$, $p < .001$). In contrast, the strengths of the relatedness and autonomy associations did not differ significantly ($\chi^2(1) = 2.55$, $p = .110$). These results indicated that at the trait level, competence satisfaction is the most robust predictor of self-esteem, whereas autonomy and relatedness satisfaction show weaker but still significant positive associations.

State Level Association

To examine whether daily fluctuations in psychological need satisfaction were associated with corresponding fluctuations in state self-esteem, we conducted a daily-level multilevel regression with days (Level 1) nested within waves (Level 2) nested within individuals (Level 3). Daily need satisfaction scores were decomposed into a stable between-person component (the person-wave mean) and a within-person fluctuation component (the day-level deviation from that mean), allowing the model to simultaneously estimate trait-level and state-level associations with self-esteem. The model included a random intercept to account for stable individual differences in baseline state self-esteem and a random slope for Phase 1 to allow individual differences in state self-esteem change from mid-late pregnancy to early postpartum. Random slopes for Phase 2 and for the daily need satisfaction predictors were tested but did not converge reliably, so only the Phase 1 random slope was retained in the final model.

Results indicated significant positive associations between daily self-esteem and all three psychological needs at the state level (Figure 2). On days when individuals reported higher-than-usual competence satisfaction, they also reported higher state self-esteem ($\beta = 0.31$, 95% CI [0.28, 0.33], $p < .001$). Similarly, on days when individuals reported higher-than-usual relatedness or autonomy satisfaction, state self-esteem also increased (relatedness: $\beta = 0.09$, 95% CI [0.07, 0.12], $p < .001$; autonomy: $\beta = 0.07$, 95% CI [0.05, 0.09], $p < .001$). We

formally compared the strengths of these within-person associations using Wald tests. Daily competence fluctuations were significantly more strongly associated with state self-esteem than both relatedness ($\chi^2(1) = 78.19$, $p < .001$), and autonomy ($\chi^2(1) = 165.66$, $p < .001$). Relatedness fluctuations were also more strongly associated with state self-esteem than autonomy fluctuations, $\chi^2(1) = 8.05$, $p = .005$, though this difference was more modest ($\Delta\beta$ = 0.02 SDs).

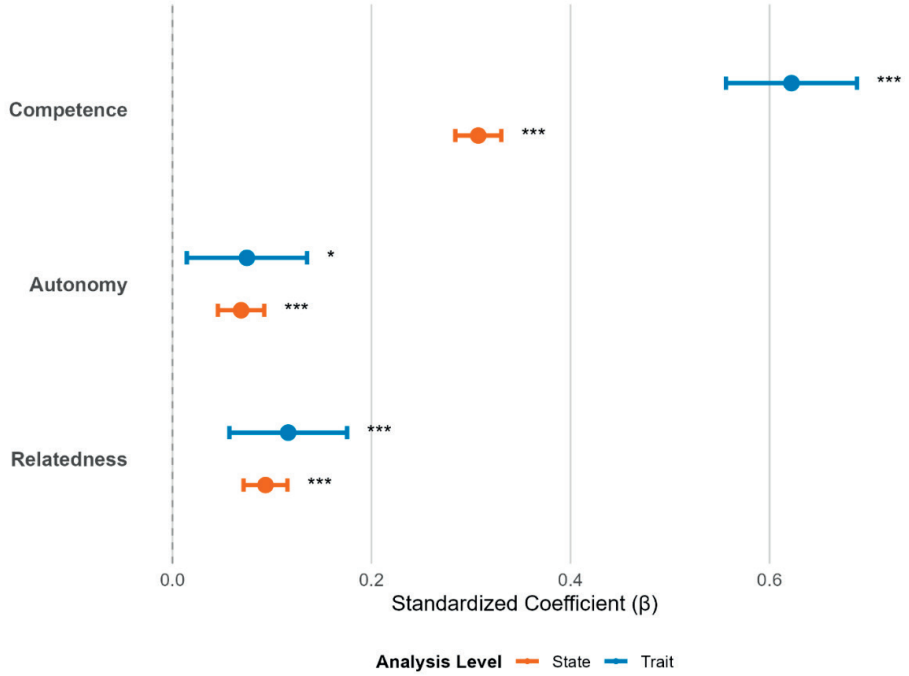
Consistent with the trait level findings reported previously, between-person differences in average need satisfaction were also positively associated with state self-esteem. Individuals with higher average competence satisfaction reported higher self-esteem ($\beta = 0.48$, 95% CI [0.44, 0.53], $p < .001$), followed by relatedness ($\beta = 0.10$, 95% CI [0.06, 0.14], $p < .001$) and autonomy ($\beta = 0.06$, 95% CI [0.01, 0.10], $p = .011$). Formal comparisons confirmed that competence was more strongly associated with self-esteem than both relatedness ($\chi^2(1) = 73.13$, $p < .001$), and autonomy ($\chi^2(1) = 137.39$, $p < .001$). Relatedness was also more strongly associated with self-esteem than autonomy ($\chi^2(1) = 5.37$, $p = .021$).

After accounting for need satisfaction and individual differences, both phase contrasts remained significant. State self-esteem increased modestly from mid-late pregnancy to early postpartum ($\beta = 0.03$, 95% CI [0.00, 0.06], $p = .043$) and from early postpartum to 6 months postpartum ($\beta = 0.04$, 95% CI [0.02, 0.06], $p < .001$). Fixed effects explained 57.2% of variance in state self-esteem (marginal R^2), and the full model including random effects explained 73.3% (conditional R^2).

Together, these results indicate that psychological need satisfaction predicts self-esteem at both the daily state level (within-person fluctuations) and trait level (stable between-person differences). Competence showed the strongest associations at both levels, followed by relatedness and autonomy. Notably, the within-person effect of competence ($\beta = 0.31$) was smaller than the between-person effect ($\beta = 0.48$), suggesting that stable individual differences in competence satisfaction are more strongly related to self-esteem than day-to-day fluctuations. Importantly, developmental phase effects remained significant after accounting for need satisfaction, indicating that self-esteem increases across the transition to motherhood were not fully explained by concurrent changes in psychological need fulfillment. This suggests that factors specific to each phase of the transition, beyond variations in autonomy, competence, and relatedness, contribute to self-esteem trajectories during this period.

Figure 2

Trait and State Level Associations Between Psychological Need Satisfaction and Self-Esteem



Note. * $p < .05$; ** $p < .01$; *** $p < .001$. Each data point represents the standardized regression coefficient (β) for the association between each basic psychological need and self-esteem, with error bars indicating 95% confidence intervals. Wider confidence intervals at the trait level reflect the smaller number of observations compared to the state level. Trait-level coefficients reflect between-person associations between trait need satisfaction and trait self-esteem across waves. State-level coefficients reflect within-person associations between daily need satisfaction fluctuations and daily self-esteem.

Developmental Dynamics in the Association Between Self-Esteem and Need Satisfaction

To investigate whether the associations between psychological need satisfaction and self-esteem *changed across the transition* to motherhood (RQ4), Need satisfaction × Phase interaction terms were added to both the wave-level and daily-level models fitted above. Both models retained a random intercept and a random slope for Phase 1, while random slopes for need satisfaction predictors were excluded due to convergence issues. Main effects remained consistent with the prior models and are not repeated here.

At both levels of analysis, only the Relatedness × Phase 1 interaction reached significance. At the wave level, the Relatedness × Phase 1 interaction was significant (β = 0.07, SE = 0.05, t(294) = 2.63, p = .009), indicating that the trait-level relatedness–self-esteem association differed significantly between mid-late pregnancy and 2–3 months postpartum. Estimated marginal trends showed that this association was small and non-significant during mid-late

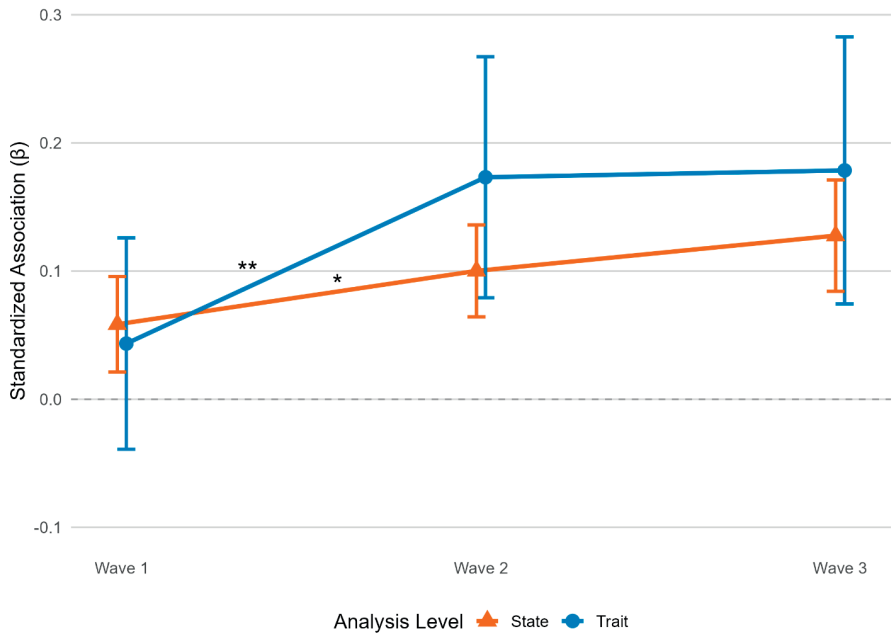
pregnancy (Wave 1; β = 0.04, SE = 0.04, 95% CI [−0.04, 0.13]), increased at 2–3 months postpartum (Wave 2; β = 0.17, SE = 0.05, 95% CI [0.08, 0.27]), and remained positive at six months postpartum (Wave 3; β = 0.18, SE = 0.05, 95% CI [0.07, 0.28]).

At the daily level, the Relatedness × Phase 1 interaction was likewise significant (β = 0.03, SE = 0.01, t(2357) = 2.33, p = .020). Estimated marginal trends showed a positive but smaller within-person association during mid-late pregnancy (Wave 1; β = 0.06, SE = 0.02, 95% CI [0.02, 0.10]), which strengthened at 2–3 months postpartum (Wave 2; β = 0.10, SE = 0.02, 95% CI [0.06, 0.14]), and remained elevated at six months postpartum (Wave 3; β = 0.13, SE = 0.02, 95% CI [0.08, 0.17]).

Taken together, the pattern across both levels suggests a developmental increase in the importance of relatedness satisfaction to self-esteem from mid-late pregnancy to early postpartum that remains equally important at six months (Figure 3).

Figure 3

Developmental Changes in Relatedness Satisfaction–Self-Esteem Association



Note. * $p < .05$; ** $p < .01$; *** $p < .001$. Wave 1 = mid-late pregnancy, Wave 2 = 2-3 months postpartum, Wave 3 = 6 months postpartum. Each data point represents the standardized regression coefficient (β) for the association between relatedness satisfaction and self-esteem at that wave, with error bars indicating 95% confidence intervals. Wider confidence intervals at the trait level reflect the smaller number of observations compared to the state level. Trait-level analysis reflects between-person, across waves associations. State-level analysis reflects within-person, across daily assessments associations.

DISCUSSION

The present study integrates self-determination theory (Deci & Ryan, 2012), self-esteem theories (Leary & Baumeister, 2000; Reitz, 2022; Wojciszke et al., 2011), and lifespan developmental perspective (Baltes et al., 1999)to advance understanding of self-esteem and psychological need satisfaction development across the transition to motherhood. Using a multilevel design following new mothers over 10 months from mid-late pregnancy through six months postpartum, we aimed to describe developmental trajectories, examine how psychological need satisfaction is associated with self-esteem at both trait and state levels, and explore whether these associations shift over time. Together, these aims allow us to characterize early motherhood not merely as a period of risk or decline, but as a dynamic process of reorganization and growth.

First, we aimed to describe patterns of developmental change in self-esteem and three basic psychological need satisfaction (RQ1-2; H1, H2a–b). Contrary to H1, self-esteem did not decline across the transition. Instead, new mothers showed a significant increase in trait self-esteem from mid-late pregnancy to 6 months postpartum, with meaningful individual differences in change. Competence satisfaction increased significantly from mid-late pregnancy to 2-3 months postpartum, with a smaller increase by 6 months, a pattern consistent with infants becoming more predictable and easier to care for over time, allowing mothers to develop a firmer sense of parenting mastery. Relatedness satisfaction, contrary to H2b, did not decline but increased over time. Lastly, contrary to H2a, autonomy satisfaction showed no significant mean-level change, though mothers differed significantly in how their autonomy satisfaction developed. Taken together, these findings suggest that early motherhood in this context is better characterized as a period of growth than one of normative decline, with gains observed in self-esteem, competence satisfaction, and relatedness satisfaction, and no decline in autonomy satisfaction.

Second, we examined the associations between psychological need satisfaction and self-esteem (RQ3; H3a–b). Consistent with H3a, satisfaction of all three psychological needs was positively associated with self-esteem at both the trait and state levels. Yet, contrary to the tentative expectation in H3b, competence satisfaction—rather than relatedness—emerged as most strongly associated with self-esteem, both across individuals and in daily contexts. This is perhaps surprising given that the transition to motherhood is, at first glance, a relational life event which alters close relationships, introduces new social roles, and the relational domain might be expected to dominate the judgment of one's self-worth. However, contemporary motherhood is also characterized by pervasive norms that define a "good mother" as a high-performing one (Schmidt et al., 2023). In this context, feelings of effectiveness and adequacy may remain a powerful concern for new mothers, keeping competence highly diagnostic for self-worth even within a deeply relational transition. Rather than supporting a sociometer account in which self-esteem primarily tracks felt belonging and social acceptance (Leary

& Baumeister, 2000), our results align with the double perspective model (Wojciszke et al., 2011) and extend support for the primacy of competence in self-esteem evaluation beyond work contexts to early motherhood, suggesting that mastering a demanding new role is what becomes most central to maternal self-esteem.

Third, we explored whether the associations between psychological need satisfaction and self-esteem changed across the early motherhood transition (RQ4). Consistent with a lifespan developmental perspective and theoretical accounts of self-esteem dynamics during life transitions (Baltes et al., 1999; Crocker & Wolfe, 2001; Reitz, 2022), we found evidence of selective recalibration: the association between relatedness satisfaction and self-esteem strengthened from mid-late pregnancy to 2–3 months postpartum, suggesting that life transitions may not introduce new determinants of self-worth, but rather recalibrate the relative weight of existing psychological resources. It is important to note, however, that even at its strongest, the association between relatedness and self-esteem remained considerably weaker than that of competence, which raises questions about the extent to which the observed shift constitutes meaningful reorganization or reflects a more modest recalibration. Furthermore, these findings capture change during the early transition only and should not be taken as evidence of longer-term reorganization. Still, this early shift suggests that social connection becomes increasingly relevant for self-esteem as new mothers begin navigating their new role, pointing to a dynamic rather than static relationship between psychological needs and self-worth.

Challenging Deficit Narratives: Growth in Self-Esteem and Psychological Need Satisfaction

Self-Esteem Increases Are Specific to the Motherhood Transition

Our finding of increasing self-esteem from mid-late pregnancy to 6 months postpartum converges with van Scheppingen et al. (2018), who employed the most comparable timeframe, suggesting this upward trajectory reflects developmental changes characteristic of early motherhood. Studies reporting declines (e.g., Bleidorn et al., 2016; Wenzel et al., 2021) assessed change at annual intervals across multiple years, a timescale that may obscure shorter-term increases by averaging across both the early postpartum rise and any subsequent adjustments. Notably, our results also align with Grundström et al. (2025), who documented increases from prebirth into toddlerhood, suggesting the observed increase reflects a broader developmental pattern rather than a transient effect.

A particularly striking finding is how quickly this change emerged: self-esteem increased already between mid-late pregnancy and 2–3 months postpartum, a remarkably short window given that self-esteem and personality traits are generally considered to change slowly (Trzesniewski et al., 2003). This rapid early shift is something no prior study has documented given the reliance on annual assessments. One possible explanation is that

expectant mothers' self-esteem was particularly low in late pregnancy, consistent with van Scheppingen et al. (2018) who also observed a trough in the final trimester, making the early postpartum period a time of relatively rapid recovery rather than gradual growth.

Beyond the fine-grained temporal resolution, the observed self-esteem increase appears specific to the motherhood transition rather than reflecting normative development. Comparing new mothers with non-mothers from the same Dutch national context, assessed over the same historical period and matched on age and relationship characteristics, the self-esteem increase was not replicated among non-mothers over a comparable one-year period, strengthening the inference that the upward trajectory is specifically tied to becoming a mother rather than reflecting broader developmental or period effects.

Basic Psychological Needs Show Different Developmental Trajectories Across the Transition

The developmental patterns observed for the three psychological need satisfaction revealed a more nuanced picture than could be expected from existing literature. Competence and relatedness need satisfaction both increased across the transition period, while autonomy satisfaction showed no average change, yet was marked by significant between-individual heterogeneity. These patterns contribute to the scarce empirical evidence on how fundamental psychological needs develop during this major life transition, a topic that has thus far received little direct attention.

The increase in competence satisfaction from mid-late pregnancy through 6 months postpartum, with a steeper gain by 2–3 months followed by a more modest increase thereafter, can be understood through Bandura's self-efficacy theory (1977). Early interactions with their infants provide new mothers opportunities to practice caregiving tasks, develop strategies, and receive feedback on their effectiveness, building perceived competence rapidly. As experience accumulates, gains become smaller, reflecting diminishing returns once basic mastery is established. This trajectory supports the view that early motherhood constitutes a rapid mastery phase, during which intensive hands-on caregiving may recalibrates broader competence beliefs. It should be noted, however, that this potential explanation centers on maternal competence, whereas the measure we used captures general competence satisfaction—a broader construct that also encompasses feelings of effectiveness in work and other life domains. Whether gains in maternal competence are the primary driver of the observed trajectory, or whether competence experiences in other domains contribute as well, remains an open question. Future research should therefore examine how general competence need satisfaction relates to domain-specific maternal competence across this transition, and at what point, if any, the two may diverge as mothers return to work or take on other roles beyond caregiving.

The increase in relatedness satisfaction is perhaps the most theoretically surprising finding, given the substantial evidence of challenges to social relationships postpartum, including declines in partner relationship satisfaction (Mitnick et al., 2009; Tran et al., 2025), social support satisfaction (McVeigh, 2000), and leisure time with friends (Zheng et al., 2023). We tentatively propose that this apparent paradox may be partly resolved by considering a relationship often overlooked in this literature: the emerging mother-child bond. Research suggests that maternal attachment develops and intensifies across pregnancy and the early postpartum period for the majority of mothers (de Waal et al., 2026; Rossen et al., 2017), and the mother-infant relationship may become the most psychologically central source of social connection during this time. Thus, the intensity of this growing bond may compensate for strains in other relationships, yielding an overall increase in general relatedness satisfaction. This remains an interpretation rather than a tested claim, however, and future research should directly examine how different relationship sources (e.g., partner, friends, family), especially the mother-child relationship, contribute to relatedness satisfaction across the transition.

Lastly, although (mean-level) changes in self-esteem and need satisfaction were modest in absolute terms (self-esteem: $\beta = .10–.15$; competence and relatedness: $\beta = .07–.16$), they are consistent in magnitude with mean-level personality changes associated with major life events reported in large-scale longitudinal research (Bleidorn et al., 2018; Roberts & Wood, 2006). Given the well-documented stability of self-esteem and personality across adulthood (Trzesniewski et al., 2003), even small but systematic shifts may reflect meaningful developmental recalibration in response to the demands and experiences of early motherhood.

Universality and Context-Dependence: Individual Differences Across Domains

The patterns of change across psychosocial constructs point to an important distinction between domains that follow relatively universal developmental trajectories and those that are more sensitive to individual circumstances. To quantify individual differences more intuitively, we computed person-specific slopes and report their standard deviation (reflecting how much mothers differed from each other in their rate of change) and 5th–95th percentile range (capturing the spread of trajectories for the middle 90% of mothers).

Autonomy satisfaction showed the widest spread in individual slopes (SD = 0.12), with the middle 90% of new mothers ranging from a decline (−0.19 in raw score) to an increase (+0.17 in raw score), reflecting that new motherhood was associated with meaningful autonomy loss for some and gains for others. For self-esteem (SD = 0.09), the middle 90% ranged from a slight decline (−0.04 in raw score) to a meaningful increase (+0.26 in raw score), indicating that while most mothers improved in their self-esteem, a minority did not. In contrast, competence satisfaction (SD = 0.06, -0.01 to +0.21) and relatedness satisfaction (SD = 0.05, +0.01 to +0.16) showed narrower distributions of individual change trajectories. Notably, the 5th percentile for autonomy satisfaction (−0.19) was considerably more negative

than for self-esteem (−0.04), competence satisfaction (−0.01), and relatedness satisfaction (+0.01), suggesting that new mothers who fared worst in terms of autonomy satisfaction experienced a substantially larger decline than the most adversely affected mothers in any other domain. In contrast, the 5th percentile for relatedness satisfaction remained positive (+0.01), suggesting that nearly all mothers experienced at least some increase in their sense of connection.

The heterogeneity in autonomy satisfaction trajectories is particularly noteworthy. Rather than reflecting a uniform experience of restricted freedom, these findings suggest that the degree to which new motherhood constrains autonomy varies substantially across individuals. This variation could be shaped by structural conditions of motherhood, such as access to childcare, financial resources, and informal family support which can determine how much freedom mothers can realistically maintain or reclaim. New mothers with fewer autonomy-supporting resources may experience a sustained reduction in their freedom, while those with greater support may adapt more readily or even gain a sense of agency in their new role. This interpretation also has direct implications for generalizability: the Netherlands offers relatively early and accessible subsidized childcare (available from approximately 6–12 weeks postpartum), which may buffer autonomy loss for many mothers in this sample. In countries with less institutional support for young mothers, the proportion experiencing sustained autonomy decline may be considerably higher, and the average trajectory may be more negative overall. Future research should examine whether the structural conditions of motherhood moderate not only the level but also the variability of autonomy trajectories across the transition to parenthood.

An alternative explanation could be that some new mothers may successfully reframe autonomy in ways compatible with caregiving, for instance, by emphasizing self-direction *within* parenting choices or drawing on motivated reappraisal processes (Gross, 1998; Heckhausen & Schulz, 1995), while others may experience these constraints more acutely, particularly if they lack adequate support, have to cope with rigid work demands, or difficult infant care. Future research should investigate which personal and contextual factors (e.g., partner involvement, workplace flexibility, infant temperament) explain individual differences in these trajectories as such insights could inform targeted support for mothers at risk of autonomy loss.

Taken together, the transition to motherhood is marked by both gains and meaningful variability. Competence and relatedness satisfaction follow relatively universal upward trajectories, while autonomy satisfaction and self-esteem show heterogeneity that could reflect the diverse circumstances in which mothers adapt to their new role. Recognizing this distinction is critical for understanding maternal well-being and designing interventions that address the full range of mothers' psychological experiences. Importantly, our three-wave design, while well-suited to capturing developmental trajectories, has limited resolution

between assessment points; more intensive longitudinal designs could reveal finer-grained fluctuations and turning points within these broader trends.

All Psychological Need Satisfaction Support Self-Esteem, But Competence Dominates

Consistent with self-determination theory (Deci & Ryan, 2012), satisfaction of all three basic psychological needs was positively associated with self-esteem at both the trait and state levels. Critically, this study is among the first to pit the three needs directly against one another within the same sample and design, enabling a comparative test of their relative contributions and a direct test of competing self-esteem theories. The core theoretical takeaway is twofold: all three needs matter, supporting SDT's claim that autonomy, competence, and relatedness each contribute to psychological functioning; but competence matters most, supporting the double-perspective model (Wojciszke et al., 2011) over sociometer theory (Leary & Baumeister, 2000)—and this holds at both the between-person trait level and the within-person state level.

Competence satisfaction showed markedly stronger associations with self-esteem than either relatedness or autonomy at both the trait level (competence: $\beta = .62$ vs. relatedness: $\beta = .12$, autonomy: $\beta = .07$) and the daily within-person level (competence: $\beta = .31$ vs. relatedness: $\beta = .09$, autonomy: $\beta = .07$), with formal comparisons confirming these differences were statistically significant. This is theoretically striking for two reasons. First, both sociometer theory (Leary & Baumeister, 2000) and self-worth contingency theory (Crocker & Wolfe, 2001) predict that relatedness should be the primary driver of self-esteem during this transition: the former because perceived social inclusion is the universal basis of self-esteem, the latter because the transition to motherhood is fundamentally a relational life event (Bleidorn et al., 2018), making relational domains the most salient contingency of self-worth. Yet even in this deeply relational-salient context, feeling capable proves to be a more potent driver of self-esteem than feeling connected or autonomous. Second, the double-perspective model holds that self-worth evaluations are anchored primarily in competence appraisals (Wojciszke et al., 2011), and our findings provide direct support for this claim in a novel developmental context.

The dominance of competence is further corroborated by studies reporting associations for all three needs separately in other domains. Karaday et al. (2018) and Avakyan et al. (2024) both reported the same competence-dominant ordering in classroom and physical education contexts, settings where achievement and performance evaluation are structurally salient, making competence dominance theoretically expected. The fact that competence satisfaction emerges as the strongest predictor of self-esteem in our sample, where new motherhood might reasonably have elevated the role of relatedness satisfaction, makes our finding more striking and suggests that competence satisfaction may be the need most consistently tied to self-esteem across populations and contexts.

The competence-dominant finding can also be understood in light of contemporary intensive mothering norms, which construct the "good mother" as one who is continuously attentive, knowledgeable, and effective across all domains of infant care (Schmidt et al., 2023). Under these cultural standards, new mothers' sense of competence is rendered highly diagnostic for self-esteem: a mother's value is implicitly staked on visible, moment-to-moment performance in feeding, soothing, and caregiving. Crocker and Wolfe's (2001) contingencies of self-worth framework offers a complementary lens here: self-esteem fluctuates most strongly in domains where self-worth is experienced as *conditional*. When new mothers' competence is culturally constructed as something that must be continuously demonstrated rather than assumed, competence satisfaction becomes precisely such a contingent domain and maintaining its strong tie to self-esteem even within a deeply relational transition. This is further illustrated by work documenting the shame experienced by mothers who feel they fall short of performance standards in specific caregiving practices, such as breastfeeding (Lakshman et al., 2009). These intensive mothering norms are further compounded by broader "do-it-all" expectations, where mothers are also implicitly evaluated on their ability to successfully integrate employment and motherhood (Meeussen & Van Laar, 2018). If this interpretation is correct, then competence dominance may be specific to relational life transitions that are simultaneously replete with performance expectations, rather than a generic feature of self-esteem regulation. Future research comparing need–self-esteem associations across different relational transitions (e.g., examining whether competence similarly dominates during marriage, a relational life event less culturally freighted with performance demands) could help disentangle whether competence primacy reflects a universal pattern or one amplified by the particular evaluative pressures of early motherhood.

Importantly, competence satisfaction was central not only at the trait level but also at the state level—providing evidence for a micro-level mechanism through which momentary experiences feed directly into self-esteem fluctuations. This suggests that mothers' sense of effectiveness operates as a dynamic feedback loop: successful mastery of daily caregiving challenges can immediately boost self-esteem, while temporary difficulties may lower it. The convergence of within- and between-person associations is itself a noteworthy contribution, as research has long cautioned that associations observed at one level of analysis need not replicate at another—a well-documented concern (Kievit et al., 2013). That need satisfaction and self-esteem are systematically linked at both the trait and state levels strengthens confidence in the robustness of these associations, and aligns with theories of adult personality development proposing that repeated within-person fluctuations can consolidate into stable between-person differences over time (Wrzus & Roberts, 2017).

Lastly, while competence emerged as the dominant predictor, the contributions of autonomy and relatedness should not be overlooked. Both showed statistically robust associations with self-esteem at trait and state levels, supporting SDT's proposition that all three needs are fundamental to psychological functioning (Deci & Ryan, 2012). The more precise question

our findings address is not whether autonomy and relatedness matter—they do—but whether the three needs matter equally. Our findings suggest they do not: during the motherhood transition, competence satisfaction is particularly consequential for self-esteem, while autonomy and relatedness contribute meaningfully but to a substantially lesser degree. The need–self-esteem associations ranged from modest to large in magnitude: the dominance of competence was striking in absolute terms, with trait-level associations nearly five times larger than those of relatedness ($\beta = .62$ vs. $\beta = .12$) and autonomy ($\beta = .07$), and a similar pattern emerging at the state level ($\beta = .31$ vs. $\beta = .09$ and $\beta = .07$). Although the associations for relatedness and autonomy were small in magnitude, they were statistically robust across levels of analysis, suggesting that while these needs are reliably linked to self-esteem, their influence is substantially more limited than that of competence—a distinction that aggregate or theory-driven summaries risk obscuring if the three needs are treated as interchangeable.

Selective Recalibration: The Growing Importance of Relational Connection

Our examination of temporal dynamics revealed that the relatedness–self-esteem association was not static but strengthened across the transition—a pattern consistent with the lifespan developmental perspective (Baltes, 1999) and developmental perspectives on self-esteem (Reitz, 2022), which propose that major life transitions can reorganize psychological systems by shifting which needs are most central to self-worth. Importantly, this finding does not contradict the earlier observation that competence dominates self-esteem overall; rather, it suggests that while competence remains the stronger anchor throughout, relatedness undergoes the most pronounced functional shift—becoming progressively more central to self-esteem as the transition unfolds.

We interpret this selective strengthening cautiously, as underlying mechanisms were not directly measured, and consider three possible processes. First, the mother-infant relationship likely becomes more concrete and emotionally reciprocal over time—as infants begin to show recognition and responsiveness (Salley et al., 2016; Yurkovic-Harding & Bradshaw, 2025), the relational dimensions of motherhood may grow more psychologically salient, increasing their relevance to self-evaluation. Second, mothers may reorganize their broader social networks, establishing new connections with other parents and adjusting expectations for social contact, such that relational quality stabilizes into a clearer and more self-relevant baseline. Third, as maternal identity becomes more fully integrated into the self-concept, the relational aspects of that identity—connection with one's child, embeddedness in family, membership in a parenting community—may become more foundational to self-worth (Crocker & Wolfe, 2001; Reitz, 2022). Together, these processes suggest that the strengthening relatedness–self-esteem association reflects both deepening bonds and broader shifts in social and identity domains.

By contrast, we found no significant temporal variation in the competence–self-esteem or autonomy–self-esteem associations. Despite theoretical reasons to expect that competence might show a strengthening association as mothers gained parenting mastery, and that autonomy might weaken as reduced independence becomes normalized, neither pattern emerged. This suggests that these needs function as relatively stable psychological resources for self-esteem during this period, though recalibration in these domains may occur over longer timescales or later developmental phases. The selectivity of this recalibration is also theoretically informative. Not all components of the psychological system shift simultaneously or to the same degree—relatedness emerges as the domain most susceptible to functional recalibration during this transition window, consistent with lifespan perspectives emphasizing adaptive, domain-specific change (Baltes, 1999). Whether the strengthening relatedness effect eventually rivals competence remains an open question for future research.

Overall, these findings support a nuanced picture of psychological adaptation: rather than a wholesale recalibration of all need–self-esteem associations, the motherhood transition involves selective recalibration. Competence remains the dominant and stable driver of self-esteem throughout, while relatedness undergoes a progressive functional shift, becoming increasingly central to self-worth as mothers adapt to their new roles and relationships. This demonstrates that major life transitions recalibrate not only mean levels of psychological experience, but also the pathways through which need satisfaction shapes self-esteem, in a domain-specific and time-sensitive manner.

Strengths, Limitations, and Future Research

This study advances theory by showing that the motherhood transition involves selective recalibration in how psychological needs relate to self-esteem. Tracking autonomy, competence, and relatedness simultaneously, we demonstrate that competence remains the dominant and stable predictor of self-esteem, while relatedness becomes increasingly central over time. This pattern refines existing perspectives—including self-determination theory, sociometer theory, and the double perspective model—by showing that life transitions do not uniformly shift all need–self-esteem links, but instead produce domain-specific changes in their relative importance. The intensive longitudinal design strengthens these conclusions by capturing both stable between-person differences and within-person dynamics, allowing us to identify which associations are enduring versus developmentally sensitive.

Several limitations should be noted. The sample consisted largely of highly educated mothers in stable relationships, reflecting a relatively favorable transition context. While this provides a clear view of psychosocial adaptation under supportive conditions, it remains important to examine whether similar patterns emerge in more diverse samples. At the same time, there is reason to expect some generalizability, as the transition to motherhood entails a set of core developmental challenges that are broadly shared across contexts. The prominence of competence in this sample may reflect that highly educated mothers place particular value

on effectiveness and mastery, which could strengthen its association with self-esteem. Future research should test whether this pattern holds across socioeconomic and cultural contexts.

A further limitation concerns causal inference. Although the design captures associations at both trait and state levels, directionality cannot be established. Need satisfaction may shape self-esteem, self-esteem may shape perceptions of need satisfaction, or both processes may operate simultaneously (e.g.; de Moor et al., 2021). Establishing causal pathways will require designs that manipulate need-relevant experiences or track temporal ordering more explicitly.

Finally, three items (one per need) showed weaker psychometric performance (see Supplementary Online Material). Although retained in the main analyses to preserve theoretical completeness, robustness checks excluding these items yielded substantively identical results, indicating that the findings are not dependent on these indicators. This highlights the need for future research to further develop and refine the basic psychological need satisfaction (and frustration) scale for intensive longitudinal use.

CONCLUSION

Rather than confirming a deficit narrative, the present study characterizes early motherhood as a period of consolidation and growth: self-esteem, competence, and relatedness satisfaction increased across the transition, while autonomy remained stable on average. Competence emerged as the dominant driver of self-esteem at both trait and state levels—even within this deeply relational life event—challenging strong sociometer-primacy accounts and extending support for the double perspective theory to early motherhood. At the same time, the transition selectively reorganized the psychological architecture linking needs to self-esteem, with relatedness satisfaction becoming progressively more central to self-worth over time. By showing that this transition involves both growth and selective recalibration in the predictors of self-esteem, our findings suggest that self-esteem regulation is dynamically organized and context-sensitive rather than structurally fixed across adulthood. Together, these findings offer a more dynamic and differentiated portrait of maternal psychological development, demonstrating that major life transitions reshape not only how people feel, but how their psychological needs function.

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5

CHAPTER 5

Today is going to be a good day: New mothers' daily affective forecast and well-being

This chapter is based on:
Tran, C. B., Ivanova, K., Reitz, A. K., & Stavrova, O. (2025). *Today is Going to be a Good Day: New Mothers' Daily Affective Forecast and Well-being.* Manuscript under revision.

Pre-registration, analysis code, and anonymized data are available at https://osf.io/duxnb/overview?view_only=0fa7272b145b4e779369a075f02151b3.

Materials are available at https://osf.io/7kz8f/.

Abstract

Do expectations about the day ahead matter for daily well-being? We examined this question across an important life transition – the parenthood transition – assessing forecast valence, the magnitude and direction of forecast error, and how these relate to same-day well-being. Across three seven-day experience-sampling waves between pregnancy and six months postpartum, 161 mothers reported morning well-being forecasts and evening well-being experiences. On average, mothers' forecasts were positive and accurate, yet daily deviations mattered: Days with more positive forecasts had higher same-day well-being. Larger underestimation errors (expecting a worse day than experienced) were linearly associated with greater well-being, and when non-linear patterns emerged, accuracy was not better than underestimation. Across analyses, forecast error emerged as a stronger predictor of daily well-being than forecast valence. These findings suggest that cautious expectations may buffer disappointment and aid adaptation, extending affective forecasting research into parenthood and informing future work on calibrating expectations.

Keywords: affective forecasting, experience sampling method, transition to parenthood, well-being, daily expectation

The transition to motherhood is a major life event characterized by uncertainty and rapid change. During this period, expectant first-time mothers (hereafter referred to as mothers) may form affective forecasts—cognitive representations of how they will feel (Szpunar et al., 2014; Wilson & Gilbert, 2005)—both long-term (e.g., their competence months after birth) and daily (e.g., how each day with their child unfolds). How do these forecasts affect mothers' well-being? Affective forecasting research has focused on forecast error while largely ignoring forecast valence. As a result, it remains unclear whether it is more beneficial for well-being to be as optimistic as possible or to strive for error-free predictions. Further, while research has examined long-term forecasts (e.g., prenatal expectations of competence at 1-year postpartum; Kalmuss et al., 1992), these forecasts offer limited learning opportunities: mothers discover how accurate their pre-birth expectations were only months later, and can only adjust expectations in subsequent pregnancies. In contrast, daily forecasts provide repeated opportunities to learn from forecast errors and adjust expectations, which may accumulate to shape longer-term well-being, consistent with recent theories of personality development (Wrzus & Roberts, 2017). To address this gap, the present study examines both forecast valence and error in daily affective forecasts of new mothers.

Forecast Valence and Well-being

People tend to have positive forecasts of the future (Weinstein, 1980; Wilson & Gilbert, 2005). Early studies have observed this in new parents as well, especially mothers, who tend to have predominantly positive expectations of parenthood (Biehle & Mickelson, 2012; Harwood et al., 2007; Lawrence et al., 2007). Yet, the cultural narrative around motherhood has shifted in recent years, potentially influencing maternal forecast valence. Today, motherhood is often depicted as exhausting, challenging, and isolating (e.g., Jones, 2024). This shift is reflected in research addressing previously neglected topics, such as postpartum mental health (Gross & Marcussen, 2017), and regretting motherhood (Donath, 2015). Thus, nowadays, new mothers' forecasts could be more negative than reported in earlier studies, and examining this potential shift is important for understanding the relationship between forecast valence and well-being.

Given the potential shift toward more negative maternal forecasts, it is crucial to understand how forecast valence influences well-being. The relationship between positive forecasts and higher well-being is theorized to operate through several mechanisms. Positive forecasts are linked to adaptive cognition and behaviors, including effective coping and goal-directed perseverance, such as grit (Eddington et al., 2016; Oriol et al., 2020). They also evoke positive anticipatory feelings (i.e., emotions experienced in anticipation of expected good outcomes), which can enhance current and later emotional experiences (Clayton McClure et al., 2024; Predatu et al., 2024).

Empirical studies also support the link between positive forecasts and well-being. Positive forecasts are associated with higher subjective, eudaimonic, and social well-being in student and community samples (Gallagher & Lopez, 2009; MacLeod & Conway, 2005). Regarding parenthood, pre-birth positive expectations of parenthood are linked with a higher likelihood of becoming parents, and higher family satisfaction and parenting pleasures (Tran et al., 2024). Yet, these studies traditionally focused on long-term forecasts, while research on *daily* positive forecasts and well-being in the context of parenthood is lacking. Therefore, we aim to examine the average valence of new mothers' daily affective forecasts and investigate how forecast valence relates to same-day well-being during the transition to motherhood. While direct evidence on daily affective forecasts is scarce, findings from long-term forecasts suggest that positive daily forecasts might be associated with higher same-day well-being.

Forecast Error and Well-being

Research consistently demonstrates that people are generally poor at affective forecasting, exhibiting various systematic biases across diverse domains and populations (Wilson & Gilbert, 2005). These errors could be exacerbated for new mothers whose expectations are formed with limited experiences and high uncertainty (Windschitl et al., 2022). Indeed, Adams et al. (2021) reported that for nearly half of new mothers, prenatal expectations of their infant, their partner, and themselves were not met. How are such forecast errors related to well-being?

Only three studies have *directly* investigated the relationship between (both long-term and daily) affective forecasting error and well-being in adults, and none focused on new parents. Bertoni and Corazzini (2018) found that underestimations of life satisfaction five years in the future were unrelated to subsequent well-being, while overestimations negatively correlated with follow-up well-being. In contrast, Colombo et al. (2020) reported that overestimating positive affect was associated with higher well-being. Yet, the only study on *daily affective forecasting and well-being*, which examined general adults rather than parents, found no evidence that daily forecast errors affect daily life satisfaction or coping (Moeck et al., 2022). Given these contradictory empirical findings and the scarcity of research on daily affective forecast errors— particularly the complete absence of such research with new parents—we turn to theoretical perspectives to guide our investigation. Below, we outline four competing accounts predicting how forecast errors may impact well-being (see Figure 1).

Accuracy Hypothesis

Forecast error is often operationalized as either *absolute* discrepancy (e.g., accurate versus inaccurate) or *directional* discrepancy (e.g., underestimate, error-free, overestimate). For example, a mother might forecast in the morning that her day will be moderately enjoyable (e.g., rating of 6 out of 10), but her actual experience might be either more positive (rating of 8; underestimation error) or more negative (rating of 4; overestimation error) than forecasted. Absolute error captures the magnitude of discrepancy regardless of direction (|2|

in both cases), while directional error distinguishes whether the forecast was too pessimistic or too optimistic.

Several theoretical accounts argue that minimizing absolute error would maximize well-being. The meaning maintenance model theorizes that all forecast errors, regardless of direction, threaten a person's sense of meaning and produce discomfort (Proulx & Inzlicht, 2012). The affective forecasting literature and broader forecasting literature also emphasize the absence of forecast error as optimal for well-being, as error-free predictions enable better decision-making that results in better outcomes, without specifying whether under- or over-estimation is more beneficial (Wilson & Gilbert, 2005). Supporting this view, de Meza and Dawson (2021) demonstrated that people who were accurate in their future financial forecasts reported the highest level of well-being compared to those who underestimated or overestimated their financial well-being, suggesting an inverted-U-shaped relationship in which well-being peaks at zero forecast error. We refer to this as the "*accuracy hypothesis*", expecting an inverted-U-shaped relationship between forecast error and well-being.

Over- and Underestimation Hypothesis

On the other hand, the direction (rather than the mere magnitude) of error could be decisive for well-being as over- and underestimation errors carry distinct psychological implications. Two competing theoretical perspectives offer different predictions about which *direction* of error is more beneficial for well-being. Research on positive illusion theory and the optimism bias suggests that overestimation can be adaptive, enhancing motivation and resilience (Sharot, 2011; Taylor & Brown, 1988; Weinstein, 1980). Supporting this view, Colombo and colleagues (2020) found that overestimating positive emotions, rather than accurate forecasts, was linked to greater resilience and psychological well-being, although this finding has not yet been examined in parents. We call this the "*overestimation hypothesis*", expecting a linear positive relationship between forecast error and well-being.

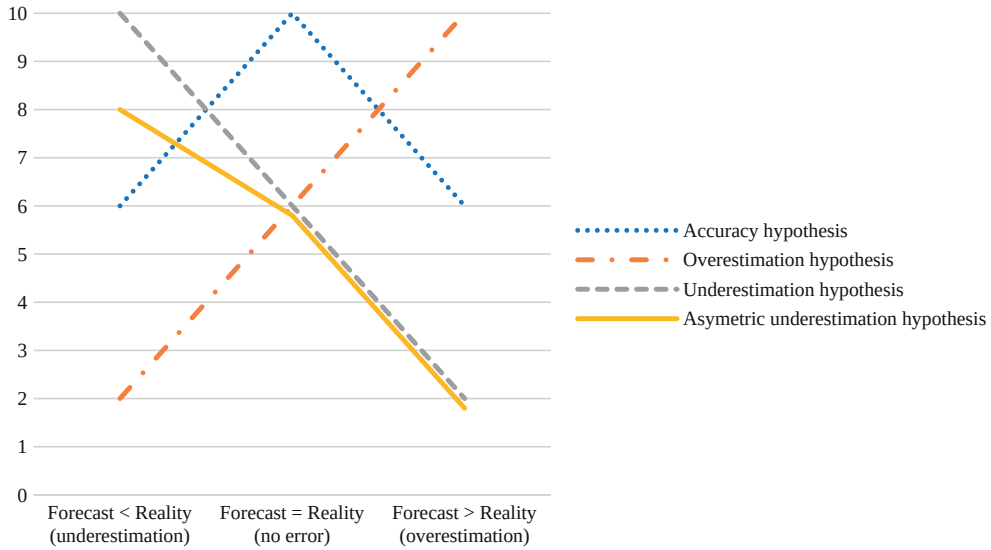
Conversely, the defensive pessimism and "bracing for loss" literature, along with expectancy violation theory, suggests that underestimation can be adaptive, as it helps individuals prepare for potential disappointments and leads to pleasant surprise when outcomes exceed expectations, thus promoting greater well-being (Burgoon, 1993; Norem & Cantor, 1986; Shepperd et al., 2000). We term this the "*underestimation hypothesis*", expecting a linear negative relationship between forecast error and well-being.

Prospect theory offers an additional perspective by emphasizing the asymmetry between gains and losses: because losses loom larger than equivalent gains, the psychological costs of overestimation (loss of expected positive feelings) should exceed the benefits of underestimation (Kahneman & Tversky, 2012). Consistent with this notion, two studies showed that overestimating future affective and financial well-being was linked to greater subsequent declines in well-being than underestimating was linked to improvements

(Bertoni & Corazzini, 2018; Barazzetta, 2015). We term this the "*asymmetric underestimation hypothesis*", expecting a non-linear relationship between forecast error and well-being, with greater declines in well-being following overestimation (compared to accurate forecasts) than increases in well-being following underestimation (compared to accurate forecasts), see Figure 1.

Figure 1

Competing Hypotheses for the Relationship Between Forecasting Error and Well-being



Our study addresses these competing theoretical perspectives by examining daily affective forecasting in new mothers. We focus on *daily* (rather than long-term) affective forecasts for several critical reasons. Daily forecasts are highly frequent and repeated, creating forecast-experience cycles that offer ongoing opportunities for learning and recalibration—mothers make new predictions each day and can adjust based on prior errors, unlike infrequent long-term forecasts (e.g., pregnancy-to-postpartum transitions) where learning opportunities are limited. Small daily errors may accumulate over time, producing cumulative effects on psychological functioning that single long-term forecasts cannot capture. Given the lack of empirical research on daily affective forecasting errors and well-being in new mothers, our study examines both the extent of these directional errors and their relationship to daily well-being. We comprehensively test four competing theoretical predictions, including the often-understudied asymmetric effects, and investigate potential thresholds at which the relationship between forecast error and well-being may shift (i.e., error-free or at small levels of over- or underestimation), thus contributing to the affective forecasting literature more broadly.

Domain Differences: Self- Versus Child Forecasts

Mothers' affective forecasts can apply to different targets or domains (Lawrence et al., 2007), with self-focused and child-focused affective forecasts being of particular interest, given that child well-being is intrinsically linked to maternal well-being and represents a central concern during the transition to motherhood (Tran et al., 2025). Forecasting a child's future emotions may be especially challenging as infants provide limited cues about their upcoming states, with observable behaviors such as crying indicating current distress rather than future affect. The Self-Other Knowledge Asymmetry (SOKA) model suggests that new mothers have privileged access to internal information about themselves (e.g., feelings, thoughts, previous experiences), but rely mainly on observable behaviors to infer and predict their child's internal states (Vazire, 2010). Therefore, mothers may be more accurate when forecasting their own well-being than their child's. In addition to comparing forecast accuracy, we will also explore whether mothers' forecasts are more positive when focused on the self vs. on their child. We do not make a directional hypothesis here, given the lack of prior evidence.

The Present Study

The present study addresses four research questions and tests several preregistered hypotheses about daily affective forecasts in expectant and new mothers. **RQ1:** What is the average valence of expectant and new mothers' daily affective forecasts? We hypothesize that new mothers will be positive in their daily expectations for both self- and child forecasts (H1). **RQ2:** What is the magnitude and direction of forecast error in these daily forecasts? Due to the mixed literature, we do not formulate a specific directional hypothesis for this research question. **RQ3:** Do forecast valence and error differ depending on the type of forecasts (self- versus child-focused)? Here, we hypothesize that new mothers' self-forecast accuracy will be higher than their child forecast accuracy (H2), while having no specific hypothesis for forecast valence. **RQ4:** Do forecast valence and error separately predict daily well-being? We hypothesize that positive daily expectation valence will be associated with higher daily well-being (H3). In contrast, the relationship between forecast error and daily well-being is theoretically and empirically ambiguous, with four competing theoretical perspectives: the *accuracy hypothesis*, *overestimation hypothesis*, *underestimation hypothesis*, and *asymmetric underestimation hypothesis*. Given these conflicting theoretical perspectives and mixed empirical evidence, we do not have a preference for either one of these hypotheses for our study. Instead, we comprehensively test all four competing predictions by examining whether the relationship is linear (supporting the over- or underestimation hypotheses) or nonlinear (supporting the accuracy or asymmetric underestimation hypotheses). We further explore the often-understudied asymmetric effects of directional error and investigate potential thresholds (including but not limited to perfect accuracy) at which the error–well-being relationship may shift.

We focus on three indicators of daily well-being particularly relevant to the transition to parenthood. Life satisfaction is a widely assessed component of subjective well-being

in parenthood research (Nelson et al., 2014; Nomaguchi & Milkie, 2020), allowing our findings to connect with the broader literature. Relationship satisfaction is crucial given that parenthood most often occurs within a couple context, and relationship quality is a key predictor of parental adjustment (Lawrence et al., 2007). Finally, meaning in life is often theorized to be central to the parenthood experience but has been largely neglected empirically (Taubman – Ben-Ari, 2014). Examining whether forecast valence and error relate similarly or differently to these three outcomes will provide insight into whether affective forecasting operates as a general mechanism influencing well-being or whether its effects are domain-specific.

We answer these research questions in a sample of 161 expectant and new mothers followed from pregnancy to 6 months postpartum. Participants completed intensive repeated measurements at three time points: late pregnancy (Wave 1), 2-3 months postpartum (Wave 2), and 6 months postpartum (Wave 3), with 3 daily surveys for 7 days at each wave. This design allows us to examine how forecasting patterns and their associations with well-being may shift across the critical transition period from pregnancy through early motherhood, capturing both the anticipatory period and the early adjustment to parenting.

METHOD

Sample

The study spanned 2022–2024, tracking first-time mothers across three time points over 10 months. Wave 1 occurred during pregnancy (weeks 20-33 of gestation), Wave 2 occurred 2–3 months after childbirth, and Wave 3 occurred at 6 months postpartum. Participants were recruited from the Brabant Study, an extensive prospective longitudinal cohort comprising roughly 4000 pregnant individuals in the Netherlands' Brabant region (https://www.brabantstudie.nl/; Meems et al., 2020). Eligibility required participants to be 18 years or older, living in Brabant with no intention of moving, and receiving prenatal care from a midwife or hospital. Women carrying multiple pregnancies (such as twins) or those with chronic health conditions were excluded. Only women who were expecting their first child were invited to our study. Participant recruitment concluded in early 2024, coinciding with the Brabant Study's ending enrollment in December 2023.

The final sample included 161 first-time mothers at Wave 1. Attrition rates were 11.2% between Wave 1–2, and 8.4% between Wave 2–3. Demographic characteristics of this sample were first reported in Tran et al. (2025) and summarized here. Most participants (96.3%) identified as Dutch with a mean childbirth age of 31.61 years (SD = 3.47, range = 22–42). Regarding relationship status, 95% had a partner, with 92.6% being married or cohabiting; 97% of these partners were male. During pregnancy, mothers had been with their partner an average of 7.43 years (range = 1–17 years), and all remained with the same partner

throughout. By 6 months postpartum, 97.7% were working, with 90.1% employed 21–40 hours weekly. Educational attainment was high in this sample, with 77.6% holding university degrees and 18.6% completed vocational training. Compliance rates were strong across all waves: 85% at Wave 1, 89.9% at Wave 2, and 90.8% at Wave 3.

We conducted an effect-size sensitivity analysis to assess the power to detect an association between forecast valence and forecast error with daily well-being in a multilevel regression with days nested within participants (Giner-Sorolla et al., 2024). We used Wave 3 data as it had the smallest number of observations. Based on 1,000 simulations using *simr* package (Green & MacLeod, 2016), the smallest detectable effects (with 80% power and alpha .05) were estimated at b = |.13|–|.20| for life satisfaction, b = |.12|–|.18| for relationship satisfaction, and b = |08|–|.11| for meaning in life.

Procedure

The study procedure, detailed in Tran et al. (2025), is summarized here. It was consistent across waves and included two parts: an online baseline questionnaire (10–15 minutes via Qualtrics) and seven days of ESM surveys. After completing the questionnaire, participants used a unique code to access the ESM platform and began receiving surveys the next morning. Over seven days, they completed three surveys per day. Morning surveys captured participants' daily expectations, while evening surveys measured their actual daily experiences and psychological functioning.

To reduce participants' burden, we implemented a fixed-schedule sampling approach, with surveys delivered at 8:00 am (morning), 1:00 pm (afternoon), and 6:00 pm (evening). Participants had a 4-hour window to complete each survey after release, with reminder alerts sent 2 hours and 30 minutes before closure. This approach maximizes ecological validity while minimizing participant burden during this demanding transition. Financial compensation for ESM participation was provided at each wave's conclusion (up to €72), and participants received individualized feedback reports summarizing their wave responses.

Measures

Daily Well-being

All three well-being indicators (life satisfaction, relationship satisfaction, and meaning in life) were measured once a day in the evening and analyzed separately. Life and relationship satisfaction were each assessed with a single item: "All things considered, how satisfied are you today with your life as a whole/your relationship with your partner?" and answered on a scale of *0 = Extremely dissatisfied* to *10 = Extremely satisfied*. Meaning in life was measured with one item: "Today, to what extent have you felt that your life has meaning?" and answered on a scale of *1 = Not at all* to *5 = Very much*.

Daily Forecasts and Experiences

Daily forecasts were made once a day in the morning. We measured two types of affective forecasts: (i) self-forecast (all 3 waves), and (ii) child forecast (Waves 2 & 3). *Self-forecast* was measured with the item "How much do you expect to enjoy your day today?" and answered on a scale of *1 = Not at all* to *5 = Very much*. *Child forecast* was measured with two items: "Today, I expect that my child will be easy to comfort and console" and "Today, I expect that my child will be irritable and cry often," and answered on a scale of *1 = Not at all* to *5 = Very much*. The negative item was reverse-coded, and a composite average score for child forecast was computed. A higher score indicates a more positive expectation for the day.

Daily experiences were measured once a day in the evening. Exactly the same items were used as for the forecasts, now referring to the experiences during the day (e.g., "How much did you enjoy your day today?"). We used the same response scale and the same coding schemes as for forecasts.

Forecast Error

Daily forecast errors were computed for self- and child forecasts by subtracting the experience scores from the forecast scores (i.e., error = forecast – experience). A positive forecast error indicates that expectations were higher than the actual experiences (i.e., overestimation), while a negative forecast error indicates that expectations were lower than the actual experiences (i.e., underestimation), and a score of zero indicates that actual experiences perfectly matched expectations (i.e., perfect accuracy).

Transparency and Openness

The study was preregistered on the Open Science Framework. The pre-registration, analysis code, along with the anonymized data with final transformations of variables used, are available at https://osf.io/duxnb/overview?view_only=0fa7272b145b4e779369a075f02151b3. Materials for the data collection, including other variables collected but not used in the current study, are available at https://osf.io/7kz8f/?view_only=0f1e85d73d0745cc86f5f237e911f50e. The data has been used in one prior publication, but with different variables and answering different research questions (Tran et al., 2025).

Analytic Strategy

All analyses were conducted using R version 4.2.2 (R Core Team, 2022) with the *lme4* (Bates et al., 2015). Standardized effect sizes were obtained using the package *parameters* (Lüdecke et al., 2020), and data visualization was made with the package *ggplot2* (Wickham, 2016). To enhance clarity and readability, we describe the specific analytical approach for each research question in the Results section, directly before presenting the corresponding findings. All models were tested separately for each wave. Given that sleep quality has been shown to influence daily mood and optimism (e.g., Triantafillou et al., 2019), consistent with the pre-registration, we tested models both with and without controlling for the prior night's sleep

quality. To account for multiple comparisons, we adopted a more conservative significance threshold of $p < .01$ for all reported models.

RESULTS

Table 1 presents means, standard deviations, and within-person correlations of all variables measured at Wave 2, the first wave including child-related measures. Average daily forecast valence was moderately positive for both self- and child (M = 3.86 and 3.89, respectively), as were actual experiences (M = 3.85 and 3.84). Average daily forecast errors for both domains were centered near zero (M = -0.01 and 0.04), indicating no systematic over- or underestimation, though moderate standard deviations (0.88 and 1.02) suggest considerable day-to-day variability. Self- and child-forecasts showed weak positive correlations with their corresponding experiences, indicating limited daily alignment between expectations and outcomes for both.

Regarding links with daily well-being, self-forecast valence correlated significantly with life satisfaction and meaning in life, but not relationship satisfaction, while child forecast valence only correlated significantly with life satisfaction. Both self- and child forecast errors correlated significantly with all three well-being indicators. These patterns are further tested in subsequent multilevel models.

Table 1

Means, Standard Deviations, and Within-Person Correlations at Wave 2

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Sleep quality	3.51	1.11	–								
2. Self-forecast valence	3.86	0.77	0.44*** [0.29, 0.56]	–							
3. Self-experience	3.85	0.82	0.13* [-0.04, 0.29]	0.23*** [0.07, 0.38]	–						
4. Self-forecast error	-0.01	0.88	0.22*** [0.06, 0.38]	0.61*** [0.50, 0.71]	-0.71*** [-0.79, -0.62]	–					
5. Life satisfaction	7.76	1.39	0.21*** [0.05, 0.37]	0.21*** [0.05, 0.36]	0.68*** [0.58, 0.76]	-0.43*** [-0.55, -0.28]	–				
6. Relationship satisfaction	8.24	1.41	0.05 [-0.12, 0.21]	0.08 [-0.09, 0.24]	0.50*** [0.37, 0.62]	-0.33*** [-0.47, -0.17]	0.57*** [0.44, 0.67]	–			
7. Meaning in life	4.16	0.76	0.09 [-0.08, 0.25]	0.11* [-0.05, 0.27]	0.60*** [0.48, 0.69]	-0.46*** [-0.58, -0.32]	0.53*** [0.40, 0.64]	0.37*** [0.22, 0.51]	–		
8. Child forecast valence	3.89	0.84	0.24*** [0.07, 0.39]	0.33*** [0.17, 0.47]	0.18** [0.01, 0.34]	0.14* [-0.02, 0.30]	0.12* [-0.04, 0.28]	0.04 [-0.12, 0.21]	0.03 [-0.14, 0.19]	–	
9. Child experience	3.84	1.00	0.10* [-0.06, 0.26]	0.05 [-0.12, 0.21]	0.44*** [0.30, 0.56]	-0.33*** [-0.47, -0.17]	0.48*** [0.34, 0.59]	0.26*** [0.09, 0.41]	0.28*** [0.12, 0.43]	0.13** [-0.03, 0.29]	–
10. Child forecast error	0.04	1.02	0.07 [-0.09, 0.24]	0.15** [-0.02, 0.31]	-0.26*** [-0.41, -0.10]	0.36*** [0.21, 0.50]	-0.33*** [-0.47, -0.18]	-0.18** [-0.34, -0.02]	-0.20*** [-0.36, -0.04]	0.51*** [0.37, 0.62]	-0.86*** [-0.90, -0.81]

Note. * $p < .05$, ** $p < .01$, ***$p < .001$. Values in square brackets indicate the 95% confidence interval for each correlation. Meaning in life was measured on a 1-5 scale. Correlations for Wave 1 and Wave 3 can be found in the Supplemental Online Material (SOM, Tables 1S and 2S).

Table 2 presents stability correlations across waves. Daily well-being (life satisfaction, relationship satisfaction, meaning in life) and forecast valence were highly stable (r = .44–.74 and .36–.52, respectively). In contrast, forecast error showed non-significant temporal correlations, indicating high instability, suggesting that forecast errors are likely driven by daily contextual or developmental fluctuations rather than stable individual traits.

Table 2

Stability Correlations Across Waves

Variable	W1 – W2	W1 – W3	W2 – W3
1. Sleep quality	**0.25**** [0.08; 0.4]	**0.39***** [0.24; 0.53	**0.47***** [0.32; 0.6
2. Self-forecast valence	**0.36***** [0.21; 0.5]	**0.36***** [0.2; 0.5]	**0.52***** [0.38; 0.6
3. Self-experience	**0.37***** [0.21; 0.5]	**0.35***** [0.19; 0.5]	**0.43***** [0.27; 0.5
4. Self-forecast error	**0.28**** [0.12; 0.43]	0.15 [-0.03; 0.32]	0.13 [-0.04; 0.3]
5. Life satisfaction	**0.44***** [0.3; 0.57]	**0.59***** [0.46; 0.69	**0.64***** [0.52; 0.7
6. Relationship satisfaction	**0.57***** [0.44; 0.67]	**0.6***** [0.46; 0.7]	**0.74***** [0.65; 0.8
7. Meaning in life	**0.55***** [0.42; 0.66]	**0.62***** [0.5; 0.72]	**0.73***** [0.64; 0.8
8. Child forecast valence	-	-	**0.51***** [0.36; 0.62]
9. Child experience	-	-	**0.38***** [0.22; 0.52]
10. Child forecast error	-	-	0.15 [-0.02; 0.32]

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Values in square brackets indicate the 95% confidence interval for each correlation. Repeated observations were aggregated for each wave.

What is the Average Valence and Error of Mothers' Daily Forecasts?

We fitted separate intercept-only multilevel models for self- and child forecast valence, with random intercepts at the individual level. The 1–5 response scale was linearly transformed to –2 to +2, where zero indicated neutral valence. A significant intercept would suggest that forecasts on average differ from neutrality. Across all three waves, mothers' expectations were significantly above the neutral scale mid-point for both their own and their child's well-being (intercepts = 0.69–1.19; Table 3).

Similarly, intercept-only models for self- and child forecast error tested whether forecasts differed from actual experiences (zero = perfect accuracy). Mothers' forecasts did not

significantly differ from actual experiences across waves, indicating minimal forecasting error (intercepts = –0.04–0.07; Table 3).

Table 3

Multilevel Models Predicting Forecast Valence and Forecast Error

	Pregnancy			*2-3 months postpartum*			*6 months postpartum*		
Predictors	**b**	**SE**	***p***	**b**	**SE**	***p***	**b**	**SE**	***p***
Forecast valence									
Self-forecast	0.69	0.04	**<.001**	0.86	0.04	**<.001**	0.84	0.05	**<.001**
Child forecast	-	-	-	0.89	0.05	**<.001**	1.19	0.05	**<.001**
Forecast error									
Self-forecast	-0.04	0.03	.255	-0.01	0.03	.770	-0.01	0.03	.822
Child forecast	-	-	-	0.04	0.04	.293	0.07	0.03	.030

Note. Fixed effects are unstandardized coefficients.

Do Self- and Child-Focused Forecasts Differ?

To compare self- and child-focused forecasts, we fitted multilevel models with forecast valence and error as dependent variables and forecast type as the predictor, including random intercepts for individuals. A significant forecast-type coefficient would indicate differences between self- and child forecasts.

At 2–3 months postpartum, self- and child forecasts did not differ in valence or error, suggesting mothers were equally optimistic and accurate about both. By 6 months, self- and child-forecast accuracy remained similar, but child forecasts valence became significantly higher (i.e., more optimistic) than self-forecasts valence (Table 4).

Table 4

Differences in Forecast Valence and Forecast Error by Forecast Type

	2-3 months postpartum			**6 months postpartum**		
Predictors	**b**	**SE**	***p***	**b**	**SE**	***p***
Forecast valence						
Type	0.03	0.03	.362	0.35	0.03	**<.001**
Sleep quality	0.20	0.02	**<.001**	0.24	0.02	**<.001**
Forecast error						
Type	0.05	0.05	.290	0.07	0.04	.079
Sleep quality	0.10	0.02	**<.001**	0.08	0.02	**<.001**

Note. Fixed effects are unstandardized coefficients. Type: 0 = self-forecast, 1 = child forecast.

Do Daily Forecast Valence and Error Predict Daily Well-being?

Forecast Valence and Well-being

We examined whether forecast valence predicted mothers' same-day well-being using separate multilevel models for each well-being indicator, with person–mean–centered daily forecast valence as the predictor and random intercepts for individuals.

Self-forecast valence did not predict well-being during pregnancy, with or without controlling for sleep quality. After birth, results were mixed: on days when mothers were more optimistic than usual, they reported higher life satisfaction and meaning in life, but not greater relationship satisfaction. Child-forecast valence did not significantly predict mothers' daily well-being, with or without controlling for sleep quality (Table 5).

Table 5

Self- and Child Forecast Valence and Well-being

	Pregnancy		2-3 months postpartum		6 months postpartum	
	Self-forecast	Child forecast	Self-forecast	Child forecast	Self-forecast	Child forecast
	b (*p*)	b (*p*)	b (*p*)	b (*p*)	b (*p*)	b (*p*)
Relationship satisfaction						
Forecast valence	-0.03 (.541)	-	0.15 (.033)	-0.06 (.443)	0.13 (.022)	-0.05 (.443)
Sleep quality	-0.01 (.798)	-	0.01 (.867)	0.05 (.251)	-0.02 (.578)	0.02 (.617)
Life satisfaction						
Forecast valence	0.01 (.827)	-	**0.18 (.006)**	0.06 (.389)	**0.45 (<.001)**	-0.06 (.383)
Sleep quality	-0.04 (.368)	-	**0.13 (.004)**	**0.16 (<.001)**	-0.05 (.275)	0.09 (.048)
Meaning in life						
Forecast valence	0.03 (.260)	-	0.07 (.049)	0.01 (.694)	**0.16 (<.001)**	-0.01 (.758)
Sleep quality	-0.01 (.532)	-	0.03 (.197)	0.04 (.044)	-0.04 (.122)	0.01 (.646)

Note. Fixed effects are unstandardized coefficients.

Forecast Error and Well-being

We examined whether forecast error predicted mothers' daily well-being using a two-step approach. First, for each well-being outcome at each wave, we fitted a linear and a quadratic multilevel model with random intercepts and person–mean–centered forecast error as predictor. We compared the models using chi-square likelihood ratio tests. For child forecast error, linear models fit best and indicated that mothers had greater well-being on days they underestimated their child's well-being more than usual. For self-forecast error, the majority of the outcomes were better fit by linear models, providing support to the *underestimation hypothesis*: on days mothers underestimated their own enjoyment more than usual, they reported higher well-being. There were three exceptions to this pattern where a better fit was achieved by quadratic models (life satisfaction Waves 2–3; relationship satisfaction Wave 3) (Tables 6–7).

Table 6

Linear Versus Quadratic Model Comparisons for Forecast Error

	Pregnancy	2-3 months postpartum	6 months postpartum
	Δ AIC (*p*)	**Δ AIC (*p*)**	**Δ AIC (*p*)**
Child forecast			
Life satisfaction	-	1.51 (.486)	1.51 (.483)
Relationship satisfaction	-	-1.39 (.065)	1.35 (.172)
Meaning in life	-	1.93 (.795)	1.98 (.889)
Self-forecast			
Life satisfaction	-0.33 (.127)	**-9.58 (<.001)**	**-14.62 (<.001)**
Relationship satisfaction	1.13 (.350)	1.49 (.474)	**-6.44 (.004)**
Meaning in life	1.98 (.889)	-3.29 (.022)	-0.36 (.124)

Note. Δ AIC: Quadratic – Linear.

Table 7

Linear Relationships between (Self- and Child) Forecast Error and Mothers' Well-being

	Pregnancy		2-3 months postpartum		6 months postpartum	
	Self-forecast	**Child forecast**	**Self-forecast**	**Child forecast**	**Self-forecast**	**Child forecast**
	b (*p*)	**b (*p*)**	**b (*p*)**	**b (*p*)**	**b (*p*)**	**b (*p*)**
Life satisfaction						
Forecast error	**-0.50 (<.001)**	-	**Quad**	**-0.33 (<.001)**	**Quad**	**-0.24 (<.001)**
Sleep quality	0.10 (.004)	-		**0.19 (<.001)**		0.09 (.041)
Relationship satisfaction						
Forecast error	**-0.19 (<.001)**	-	**-0.39 (<.001)**	**-0.19 (<.001)**	**Quad**	**-0.16 (<.001)**
Sleep quality	0.03 (.294)	-	**0.11 (.008)**	0.05 (.212)		0.02 (.629)
Meaning in life						
Forecast error	**-0.17 (<.001)**	-	**-0.23 (<.001)**	**-0.09 (<.001)**	**-0.20 (<.001)**	-0.06 (.025)
Sleep quality	0.04 (.020)	-	**0.08 (<.001)**	0.05 (.016)	0.05 (.028)	0.01 (.623)

Note. Fixed effects are unstandardized coefficients. Quad = Quadratic model was of better fit and will be further discussed later.

To further test whether, in case of these three exceptions, the quadratic pattern is consistent with the *asymmetric underestimation hypothesis*, we first examined the quadratic plots (Figure 2). We observed a noticeable asymmetry in the strength of the relationship between underestimation and well-being and overestimation and well-being—a pattern consistent with the *asymmetric underestimation hypothesis*, which we explored more further.

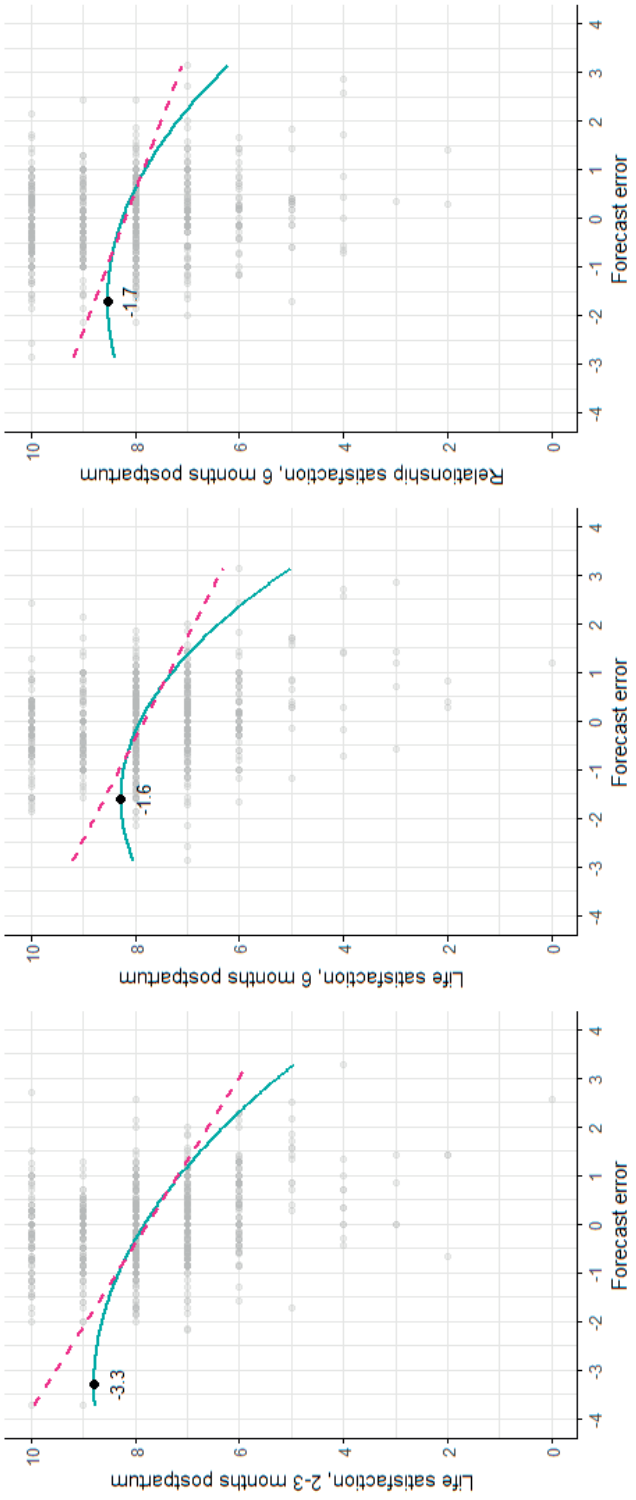


Figure 2

Quadratic Relationships Between Forecast Error and Mothers' Daily Well-being

Note. Grey dots = raw data, dashed line = linear model, solid line = quadratic model, black dot = computed apex of the quadratic model.

To quantify and determine the significance of underestimation and overestimation slopes, we fitted separate piecewise models for each well-being outcome with the breakpoint set at 0 (perfect accuracy). The breakpoint at 0 tested whether perfect accuracy represents a meaningful threshold where the relationship between forecast error and well-being changes. The forecast error variable was divided into two segments (represented by two separate variables): the underestimation segment captured values from -4 up to the breakpoint (with the values beyond the breakpoint coded as zero), and the overestimation segment captured values starting from the breakpoint and beyond (with the values up to the breakpoint coded as zero). We used both segments in a multilevel regression predicting daily well-being, such that the respective segment coefficients reflected the effects of under- and overestimation errors on well-being.

At 2–3 months postpartum, both under- and overestimation errors were significant predictors of life satisfaction. At 6 months, only overestimation errors negatively predicted life and relationship satisfaction, whereas underestimation errors were not significant predictors (Table 8). This pattern is consistent with the prospect theory predictions that losses (underestimation) hurt more than gains (overestimation) of equal magnitude.

To test whether the underestimation slope is indeed significantly different than the overestimation slope, we refitted separate piecewise models using an alternative slope specification. In these models, the underestimation slope was retained, and the overestimation slope was replaced with a *slope-change* variable (zero up to the breakpoint, forecast error minus breakpoint beyond it). For life satisfaction, a significant change in slopes (under- vs. overestimation) was identified at both 2-3 months and 6 months postpartum. In contrast, no significant slope change was found for relationship satisfaction at 6 months postpartum (Table 8).

Table 8

Effects of Underestimation and Overestimation Errors on Well-being

Well-being outcomes	b	*SE*	*p*
Life satisfaction, 2-3 months postpartum			
Underestimation slope	-0.37	0.08	**<.001**
Overestimation slope	-0.79	0.08	**<.001**
(Slope change)	-0.42	0.14	**.002**
Sleep quality	0.26	0.04	**<.001**
Life satisfaction, 6 months postpartum			
Underestimation slope	-0.24	0.09	.012
Overestimation slope	-0.71	0.09	**<.001**
(Slope change)	-0.47	0.16	**.003**
Sleep quality	0.16	0.04	**<.001**
Relationship satisfaction, 6 months postpartum			
Underestimation slope	-0.20	0.09	.026
Overestimation slope	-0.49	0.08	**<.001**
(Slope change)	-0.29	0.15	.048
Sleep quality	0.08	0.04	.043

Note. Fixed effects are unstandardized coefficients. (Slope change) was obtained in a separate model with different coding, but reported here for brevity.

Exploratory Analysis

Although not pre-registered, we conducted an exploratory analysis to understand whether forecast accuracy drives well-being outcomes by separating the effects of forecast error and forecast valence. To this end, we regressed forecast error on forecast valence and used the residuals as a measure of valence-free forecast error (García et al., 2020). Daily well-being was modeled as a function of valence-free forecast error and forecast valence, controlling for sleep quality, with all predictors standardized to enable direct comparison of effect sizes.

Forecast valence was a less consistent predictor of mothers' daily well-being. Specifically, forecast valence did not predict mothers' well-being during pregnancy or predict relationship satisfaction at any time point. In contrast, valence-free forecast error consistently negatively predicted mothers' well-being (Table 9), such that the higher the error, the lower was mothers' well-being.

Table 9

Valence-free Forecast Error, Forecast Valence, and Mothers' Well-being

	Pregnancy		2-3 months postpartum		6 months postpartum	
	Self-forecast	Child-forecast	Self-forecast	Child-forecast	Self-forecast	Child-forecast
	b (*p*)	b (*p*)	b (*p*)	b (*p*)	b (*p*)	b (*p*)
Life satisfaction						
Forecast valence	-0.00 (.913)	-	**0.12 (<.001)**	0.04 (.245)	**0.29 (<.001)**	-0.03 (.456)
Valence-free forecast error	**-0.58 (<.001)**	-	**-0.62 (<.001)**	**-0.37 (<.001)**	**-0.56 (<.001)**	**-0.18 (<.001)**
Sleep quality	0.01 (.864)	-	**0.10 (.004)**	**0.14 (<.001)**	-0.04 (.316)	0.07 (.107)
Relationship satisfaction						
Forecast valence	-0.02 (.474)	-	0.09 (.016)	-0.03 (.476)	0.08 (.012)	-0.02 (.501)
Valence-free forecast error	**-0.20 (<.001)**	-	**-0.42 (<.001)**	**-0.18 (<.001)**	**-0.34 (<.001)**	**-0.12 (<.001)**
Sleep quality	0.00 (.902)	-	-0.01 (.868)	0.04 (.357)	-0.01 (.853)	0.01 (.826)
Meaning in life						
Forecast valence	0.02 (.263)	-	**0.05 (.008)**	0.01 (.611)	**0.10 (<.001)**	-0.01 (.803)
Valence-free forecast error	**-0.21 (<.001)**	-	**-0.25 (<.001)**	**-0.10 (<.001)**	**-0.23 (<.001)**	-0.05 (.017)
Sleep quality	0.00 (.840)	-	0.02 (.360)	0.04 (.070)	-0.03 (.131)	0.01 (.789)

Note. Fixed effects are unstandardized coefficients.

DISCUSSION

The current study investigated two characteristics of affective forecast—valence and error—and their relationship with daily well-being in new mothers. Using experience sampling across three waves between pregnancy and 6 months postpartum, we addressed four research questions about the nature of mothers' daily affective forecasts and their associations with well-being.

New mothers' daily affective forecasts were generally positive and error-free. While forecasts were error-free *on average* across days, daily fluctuations in error magnitude and direction had meaningful consequences for daily well-being. Larger overestimation errors in both self- and child forecasts generally predicted lower well-being. Interestingly, some associations were nonlinear: for life satisfaction at 2–3 and 6 months postpartum, and relationship satisfaction at 6 months, declines in well-being steepened beyond a slight overestimation (self-forecast error > 0.5). In contrast, the association of forecast valence and well-being was small and inconsistent across the different forecast types and well-being outcomes.

Characteristics of Maternal Affective Forecasting

Our results suggest that mothers are well-calibrated in their daily predictions, neither systematically over- nor underestimating their future experiences, in contrast to previous research showing systematic affective forecast errors in other populations (e.g., Pilin, 2021), and in new parents (Biehle & Mickelson, 2012; Lawrence et al., 2007). The lack of errors may reflect the short-term nature of our daily forecasting paradigm, as forecast accuracy typically declines with temporal distance (Jain, 2002). Since our study examined predictions realized within 24 hours, high accuracy aligns with this temporal proximity effect. Notably, this occurs despite the unpredictability of new motherhood—fluctuating infant sleep and feeding patterns, childcare challenges, recovery, and shifting emotional states—indicating mothers can accurately forecast their emotional experiences even in a volatile context.

The lack of forecast error, combined with the average positive forecast valence, point at our sample's relatively high well-being. This alignment of error-free, positive forecasts with lived experiences suggests that adaptive psychological mechanisms for navigating this major life transition, maintaining realistic yet optimistic outlooks. These findings complement research showing new mothers experience more positive affect and a sense of meaning in life (Tran et al., 2025), and greater positivity during time with their children (Kerr et al., 2021; Nelson et al., 2013). Thus, the transition to motherhood, while stressful, remains a positive experience for new mothers.

We also explored whether forecast characteristics differ between self- and child-focused predictions. We observed an unexpected finding: There was no difference in new mothers' forecast error between self- and child forecasts across the postpartum period. This is

surprising as self-forecasts are typically more accurate than other-forecasts, potentially due to privileged access to one's internal states (Spain et al., 2000). However, several factors may explain why mothers' predictions about their infants are equally accurate. First, unlike forecasting for other adults, infant well-being is uniquely observable. Infants do not self-monitor or censor their emotional expressions: their behavior directly reflects their internal state through changes in activity level and fussiness that precede full distress. This could allow mothers to detect early warning signs and accurately anticipate how their infant's day will unfold. Second, the intensive caregiving relationship may enhance mothers' attunement to their infant's states. New mothers spend considerable time observing and responding to their baby throughout the day, potentially making them as attuned to their infant's emotional patterns as to their own fluctuating states during this demanding transition period. Together, these factors may enable mothers to overcome the typical self-other forecasting asymmetry when predicting their infant's well-being.

Additionally, we found that at 6 months postpartum, new mothers' forecasts of their child's well-being became significantly more positive compared to forecasts of their own well-being. Several factors may contribute to this divergence. First, by 6 months, infants have developed new skills and more predictable routines—they sleep more consistently, feed more efficiently, and can entertain themselves briefly. These developmental gains may make mothers more confident in predicting positive days for their infants. In contrast, mothers' own well-being at 6 months may be more difficult to predict as many return to work during this period, introducing new complexities and competing demands. Second, this pattern may reflect cultural norms around intensive parenting that prioritize child well-being (Gauthier et al., 2021). When societal expectations strongly emphasize the child's welfare, mothers may internalize these values and generate more optimistic forecasts about their child's experiences while paying less attention to their own needs and well-being. This selective optimism aligns with their identity as devoted caregivers meeting cultural standards of good motherhood.

Differential Effects of Forecast Valence and Forecast Error

New mothers' affective forecast showed different relationships with their daily well-being across time. During pregnancy, optimism or pessimism about their day has little to no bearing on their well-being of the day. Yet, this association between forecast and well-being changes during the postpartum period, where self-forecast valence becomes a positive predictor of both life satisfaction and meaning in life. This shift may reflect the increased stakes, daily caregiving demands, and uncertainty mothers face after the child arrives. Under these conditions, expecting positive experiences may enhance motivation and engagement, helping mothers approach the day with more effort or persistence, while expecting negative experiences may reduce perceived control or affect, thereby influencing actual well-being (Eddington et al., 2016; Oriol et al., 2020). In this way, the valence of forecasts becomes psychologically meaningful, directly shaping daily well-being (Hewitt et al., 2025).

In contrast to the changes in self-forecast valence, child forecast valence showed a remarkable stability in its relationship with mothers' well-being, specifically, a consistent *absence* of relationship across both postpartum time points. This consistency suggests that the psychological mechanisms underlying the relationship between child-focused optimism and mothers' well-being remain constant even as other aspects of mothers' psychology exhibit changes during the early postpartum months (e.g., self-esteem and relationship satisfaction; van Scheppingen et al., 2018). Further, this absence of a relationship between child forecasts valence and well-being indicates that mothers' emotional investment in their infant's well-being (characterized by optimism) might not translate into personal psychological benefit in the early postpartum period, inconsistent with existing studies reporting better psychological adjustments to parenthood in more hopeful parents (Cole & Molloy, 2023). This inconsistency could be due to the prevalence of studies focusing on optimism in parents of children with developmental disabilities or behavioral issues (e.g., Kurtz-Nelson & McIntyre, 2017; Slattery et al., 2017), leading to a gap in our current understanding of how optimism about one's child might influence parents' well-being in more general settings. Additionally, this finding could also suggest the presence of emotion regulation strategies that help new mothers not to over-identify with their child's well-being, as well as maintain adaptive functioning in the taxing early postpartum period (Rutherford et al., 2015). Thus, new mothers may engage in motivated optimism when forecasting child outcomes, maintaining positive expectations for their child while keeping these beliefs psychologically distinct from their own mood and well-being.

Across all analyses, forecast error emerged as a more consistent and robust predictor of maternal well-being than forecast valence. While the association between forecast valence and well-being was limited to a specific time (early postpartum period) and domain (self-forecast), forecast error effects were observed across both pregnancy and postpartum periods for both self- and child forecasts. The predominantly negative linear relationships suggest that on days when experiences are worse than expected (i.e., overestimation), mothers tend to experience reduced well-being across multiple domains. This finding reinforces the notion that lived experiences and their alignment with expectations, rather than the valence of predicted experiences alone, are more strongly linked to new mothers' daily well-being during the transition to parenthood.

The Adaptive Value of Underestimation During the Motherhood Transition

Contrary to the assumption that accurate predictions enable individuals to make daily decisions that optimize their well-being (Wilson & Gilbert, 2005), or the notion that some degree of positive illusions (i.e., overestimation) can boost well-being (Makridakis & Moleskis, 2015; Taylor & Brown, 1988), our finding paints a different picture. New mothers reported higher life satisfaction, relationship satisfaction, and meaning on days when they underestimated how they would feel, suggesting that some degree of underestimation

may have protective or uplifting effects. This is consistent with the expectancy violation literature, which posits that negatively violated expectations (i.e., overestimation) result in disappointment and reduced satisfaction and well-being, while positively violated expectations (i.e., underestimation) create pleasant surprises that enhance well-being (Burgoon, 1993). Our findings complement the literature on defensive pessimism, which has documented how individuals strategically set low expectations to manage anxiety and disappointment (Norem & Cantor, 1986; Showers & Ruben, 1990), by demonstrating that underestimation—whether strategic or incidental—is associated with enhanced well-being in the context of daily life during the transition to motherhood.

Why might underestimation be particularly adaptive during this life transition? In the context of new motherhood, setting expectations more cautiously might serve additional adaptive functions that override the potential benefits of positive illusions or perfect accuracy. For example, a recent experimental study of a resource allocation game reports that when individuals underestimated their future positive affect (which was realized within a few hours during the experiment), they tended to show more prosocial allocation behaviors by offering more resources to the other person (Liu et al., 2022). For new mothers, this could translate into more responsive parenting behaviors and allocating more effort, time, and energy to the caretaking of their child, making underestimations of future emotions at the daily level adaptive and developmentally appropriate for this transition. This mechanism may be especially relevant for child-focused forecasts: mothers who are more cautious in their predictions about their child's day may engage in more preventive caregiving behaviors, such as responding more quickly to early signs of distress, resulting in better infant care and ultimately, more positive outcomes than anticipated.

In contrast, overestimation appears particularly detrimental, contradicting existing research suggesting that positive illusions and optimistic forecasts can boost well-being and motivation (Makridakis & Moleskis, 2015; Taylor & Brown, 1988). Considering the forecast timeframe might reconcile our results with this prior research. The majority of affective forecasting studies demonstrating the benefits of optimism have focused on longer-term forecasts, with timeframes of weeks, months, or even years in the future (e.g.; Colombo et al., 2020). In contrast, our study examined daily forecasts realized within 24 hours. The further away a future event is, the more likely people are to make larger prediction errors (Jain, 2002; Shepperd et al., 1996). In line with this interpretation, research that used shorter timeframes found less consistent effects for positive forecasting (Enting et al., 2025) or forecasting error (Moeck et al., 2022). Crucially, this overestimation may serve adaptive functions for distant goals, such as maintaining motivation and commitment over extended periods. Yet, when forecasts are made and evaluated within the same day, daily overestimation offers no opportunity to sustain motivation over time but instead results in immediate disappointment when expectations are unmet by day's end. Conversely, daily underestimation creates frequent pleasant surprises and reinforces a sense of managing challenges better than

anticipated—experiences that may be particularly valuable during the demanding transition to motherhood.

Further, prior studies paid little attention to the possibility of asymmetric effects as proposed by prospect theory, where overestimation and underestimation might have different relationships with psychological well-being. Our study addresses this gap by systematically testing whether overestimation and underestimation are symmetrically or asymmetrically related to well-being by exploring both linear and non-linear relationships between forecast error and well-being. We discovered that while most relationships between forecast error and well-being were indeed linear, pointing at symmetric effects with underestimation between better than accuracy and accuracy being better than overestimation, three curvilinear relationships emerged during the postpartum period, revealing an important asymmetry: stronger underestimation was barely associated with higher well-being, while stronger overestimation was linked with substantially lower well-being. This asymmetry is consistent with prospect theory's principle that losses loom larger than gains (Kahneman & Tversky, 1979), suggesting that the disappointment from overestimation (a "loss" relative to expectations) has a stronger negative impact on well-being than the pleasure from equivalent underestimation (a "gain" relative to expectations). These findings point to a more nuanced role of forecast error in shaping well-being, where not all forecast errors are created equal in their psychological consequences. It is notable that these asymmetric, nonlinear patterns emerged only for life satisfaction and relationship satisfaction, but not for sense of meaning, and only during the postpartum period rather than pregnancy. This specificity may reflect important distinctions in both the nature of these well-being components and the developmental context. Life and relationship satisfaction are evaluative judgments particularly sensitive to substantial overestimation, where the gap between expected and actual experiences becomes psychologically disruptive. The absence of underestimation benefits may reflect hedonic adaptation—by 6 months postpartum, mothers may have already adapted to better-than-expected experiences, normalizing positive surprises rather than deriving lasting satisfaction boosts from them.

Strengths and Limitations

Our study employed experience sampling methods with three waves of data collection, providing rich, ecologically valid data that captured the dynamic nature of the maternal experiences across a critical life transition. This data also allowed for daily-level analysis, which enables the investigation of affective forecasting *within-persons*, an area that has received little attention. The longitudinal design allowed for the examination of changes in forecasting patterns, and the inclusion of both valence and accuracy provides a more comprehensive understanding of the role of affective forecasting in daily life. The inclusion of both self- and child forecasts enabled us to explore a previously unstudied topic and highlighted the similarities and differences in how expectant mothers distinguish between their own psychology and their child. The use of three different well-being indicators (life

satisfaction, relationship satisfaction, meaning in life) added robustness to our findings and provided a more comprehensive understanding of the relationship between affective forecasting and well-being.

Still, several limitations need to be acknowledged. Our sample was primarily well-educated, employed first-time Dutch mothers, which potentially limits the generalizability to more diverse populations. Due to the nature of the early postpartum period, infant behaviors/temperament were used as a proxy for infant well-being. While this method has been used (e.g.; Blum et al., 2002; Sidor et al., 2013), it does limit the scope of child affective forecasting to observable behaviors.

Another limitation is that, although we found that underestimation was associated with higher well-being, the mechanisms underlying this effect remain unclear. While this finding is consistent with expectation violation theory or the defensive pessimism literature, our study was not designed to test these explanations. Thus, future research should examine the specific cognitive or motivational processes that account for the positive effects of underestimation. Moreover, our correlational design limits causal inferences about the relationship between forecast error and well-being. While our daily assessments capture temporal associations, we cannot definitively establish whether forecast errors cause changes in well-being or whether other factors (such as mood or stress) influence both forecasting accuracy and well-being simultaneously. Future research could address this through experimental manipulations, for instance, by providing feedback that systematically biases mothers' forecasts toward overestimation or underestimation and examining subsequent effects on well-being outcomes.

CONCLUSION

In conclusion, the current study provides novel insights into the daily affective forecasting patterns of expectant new mothers, revealing a complex picture that both aligns with and challenges the existing theoretical framework and empirical findings. Our results indicate that how closely reality matches expectations matters more for the daily well-being of mothers than whether they maintain a generally positive or negative outlook. In addition, the discovery that a moderate level of underestimation instead of perfect accuracy or overestimation is optimal for well-being challenges both the *overestimation hypothesis* and the *accuracy hypothesis*. Instead, our results support the *underestimation hypothesis* as predicted by the expectancy violation literature. We further demonstrate that the effects of forecast error on well-being are asymmetric in some instances, partially supporting the *asymmetric underestimation hypothesis*. These findings not only advance our understanding of affective forecasting in the daily life context but also offer practical implications for supporting maternal well-being during the transition to motherhood.

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6

CHAPTER 6

General discussion

The transition to parenthood is one of the most consequential life events in adulthood, yet our understanding of its implications for new parents' psychological well-being remains limited. Existing research has relied on narrow conceptualizations of both well-being and change, and has rarely achieved the temporal resolution needed to capture the transition. The present dissertation examines how multiple well-being dimensions develop and are shaped by daily experiences and expectations. By integrating longitudinal and intensive experience sampling data across several empirical studies, this work moves beyond single-indicator approaches to well-being and static accounts of adaptation. In doing so, it offers a multidimensional and dynamic perspective on the transition to motherhood, highlighting both its challenges and its potential for growth.

Summary of Findings

Chapter 2 examined whether pre-transition expectations about the costs and rewards of having children—referred to as value of children (VOC) or child-value expectations—predict both the likelihood of becoming a parent and family-life satisfaction (operationalized as family satisfaction and parenting pleasure) following the transition, using data from a large nationally representative German panel study with up to 11 years of follow-up (N = 6,850). Individuals with more negative child-value expectations (higher cost/lower reward) were less likely to become parents, while those with more positive expectations were more likely to do so, supporting the notion that child-value expectations shape fertility decisions. Among those who did become parents, more negative pre-parenthood child-value expectations predicted lower parenting pleasure and family-life satisfaction in the birth year, while more positive expectations predicted the opposite. This association persisted thereafter, with parents holding more negative child-value expectations consistently reporting lower levels of both parenting pleasure and family-life satisfaction. Regardless of their pre-parenthood expectations, however, all parents followed a similar trajectory: an initial positive jump in family-life satisfaction post-birth, followed by a gradual decline in both family-life satisfaction and parenting pleasure. This suggests that while child-value expectations shape the overall level of family-life satisfaction, they do not alter the trajectory itself.

Chapter 3 examined changes in expectant and new mothers' psychological well-being across the transition to motherhood, using three waves of experience sampling data from 161 first-time Dutch mothers from 20 weeks of pregnancy to 6 months postpartum. The most significant well-being changes occurred between pregnancy and 2–3 months postpartum, with new mothers reporting increases in positive affect and meaning in life alongside declines in relationship satisfaction. Beyond this initial period, relationship satisfaction and life satisfaction continued to decline through 6 months postpartum. Negative affect showed no significant changes. Comparison with a matched sample of non-mothers confirmed that the observed changes reflected the motherhood transition rather than general developmental trends. New mothers differed significantly in their trajectories of positive affect, relationship satisfaction, and meaning in life, highlighting substantial individual

heterogeneity. Exploratory analyses of daily predictors revealed that sleep quality and diverse family contact consistently predicted higher daily well-being, while infant crying emerged in the postpartum phase as the strongest predictor of new mothers' daily well-being across all outcomes. Additionally, nonfamily contact shifted from a positive predictor of well-being at 2–3 months postpartum to a negative predictor at 6 months, possibly reflecting the challenges of returning to work.

Using the same sample, **Chapter 4** examined how self-esteem and basic psychological need satisfaction (autonomy, competence, and relatedness) developed across the transition to motherhood, and how need satisfaction was associated with self-esteem at both the stable trait and daily state levels. Contrary to expectations, new mothers' self-esteem increased significantly across both phases of the transition—from pregnancy to 2–3 months postpartum and from 2–3 to 6 months postpartum—with comparison to a matched non-mother sample confirming these increases were attributable to the motherhood transition rather than general developmental trends. Competence and relatedness satisfaction similarly increased, while autonomy satisfaction showed no significant average change, though mothers differed substantially in how their self-esteem and autonomy satisfaction evolved. At both the trait and daily state levels, all three needs were positively associated with self-esteem, but competence satisfaction emerged as the strongest predictor, followed by relatedness and autonomy. Finally, the association between relatedness satisfaction and self-esteem was not static but strengthened significantly from pregnancy to 2–3 months postpartum at both the trait and state levels, suggesting that the motherhood transition selectively recalibrated the psychological processes linking need satisfaction to self-esteem rather than producing uniform change across all needs.

Using the same sample, **Chapter 5** examined daily affective forecasting, investigating new mothers' daily affective forecasts valence and error, and their associations with daily well-being (relationship satisfaction, life satisfaction, meaning in life). New mothers' daily forecasts were consistently positive, suggesting that they maintained an optimistic outlook. On average, new mothers' forecasts were also accurate—they neither systematically over- nor underestimated their actual experiences—though considerable day-to-day variability in forecast error was observed. Mothers were equally accurate in forecasting their own and their child's well-being across the postpartum period; however, by 6 months postpartum, mothers' forecasts for their child's well-being became significantly more positive than their forecasts for their own well-being. When examining associations with daily well-being, self-forecast valence positively predicted mothers' life satisfaction and meaning in life postpartum, but showed no consistent association during pregnancy or with relationship satisfaction. Forecast error emerged as a stronger predictor of daily well-being than forecast valence: on days when mothers underestimated their day, they reported higher well-being, while overestimation was associated with lower well-being. For most well-being outcomes, this relationship was linear; however, for life satisfaction at both postpartum waves and relationship satisfaction

at 6 months, nonlinear patterns emerged consistent with prospect theory, where the negative impact of overestimation on mothers' well-being was substantially stronger than the positive impact of equivalent underestimation.

Table 1 summarizes the key findings across all chapters.

Table 1

Summary of Key Findings Across Chapters

Finding Type	Level	Key Findings
Mean-level change	Trait	*Positive affect* increased from pregnancy to 2–3 months postpartum; *negative affect* showed no significant change. *Relationship satisfaction* declined from mid-late pregnancy to 2–3 months and continued declining through 6 months; *life satisfaction* continued to decline through 6 months. *Family-life satisfaction* and *parenting pleasure* declined significantly from the year of childbirth through 11 years postpartum; notably, family-life satisfaction remained higher in the years after the transition than in the two years preceding it. *Meaning in life* increased from mid-late pregnancy to 2–3 months. *Self-esteem* increased throughout the transition. Competence and relatedness satisfaction increased across the transition; autonomy satisfaction showed no significant change.
Beyond mean-level change	Between-person	Significant heterogeneity in trajectories of *positive affect, relationship satisfaction, meaning in life, self-esteem,* and autonomy satisfaction from mid-late pregnancy to 2–3 months but not from 2–3 to 6 months.
	Within-person	Intraindividual variability in affective, cognitive, and eudaimonic well-being showed no significant changes across the transition; mothers did not differ from one another in variability trajectories.
Predictors of well-being	Trait	Need satisfaction (competence, relatedness, autonomy) positively predicted self-esteem; competence was the strongest predictor. The relatedness–self-esteem association strengthened from pregnancy to 2–3 months and remained elevated at 6 months.
	State	Need satisfaction positively predicted self-esteem; competence was the strongest predictor. Sleep quality and family contact consistently predicted higher well-being throughout the transition. Infant crying was the strongest predictor postpartum. Non-family contact shifted from a positive predictor (2–3 months) to a negative predictor (6 months).
Prospective expectations	Trait	People with more negative child-value expectations were less likely to become parents. Negative expectations predicted lower *family-life satisfaction* and *parenting pleasure*, both at the birth year and in subsequent years; all parents followed the same well-being trajectory regardless of expectations: initial increase at birth, followed by gradual decline.
	State	Forecast valence positively predicted life satisfaction and meaning in life postpartum but not during mid-late pregnancy. Forecast error was a stronger and more consistent predictor of daily well-being (cognitive, eudaimonic) than forecast valence; underestimation predicted higher well-being, overestimation predicted lower. For life satisfaction and relationship satisfaction, the negative impact of overestimation exceeded the positive impact of equivalent underestimation.

Note. Trait-level measures refer to global self-report scales designed to capture stable, between-person differences in well-being, or in some studies to the average of repeated daily measures as an approximation of trait-level scores. State-level measures refer to momentary assessments captured through experience sampling, reflecting how a person feels on a given day. Trait = assessed across longitudinal waves spanning mid-late pregnancy to 6 months postpartum; State = assessed at the daily level within experience-sampling waves. Affective well-being = positive and negative affect; cognitive well-being = life satisfaction, relationship satisfaction, family-life satisfaction, and parenting pleasure; eudaimonic well-being = meaning in life; self-evaluative well-being = self-esteem.

Implications of Findings

This section synthesizes the findings across all empirical chapters to identify broader patterns that extend beyond the individual studies. Rather than discussing each chapter in isolation, the results are integrated to highlight overarching insights into the transition to parenthood. From this synthesis, four main themes emerge.

Divergent Psychological Well-being Trajectories Across the Transition to Motherhood

The transition to motherhood was associated with a complex mix of changes across psychological well-being dimensions. Declines were observed across cognitive well-being indicators, while improvements emerged across affective and eudaimonic domains: positive affect, meaning in life, self-esteem, competence, and relatedness satisfaction all increased, and negative affect and autonomy satisfaction showed no significant changes. Overall, improvements were observed across more well-being domains than declines, although this balance reflects the specific outcomes examined here and may differ if other dimensions were included.

A key pattern concerns **cognitive well-being**, which we operationalized across four indicators: life satisfaction, relationship satisfaction, family-life satisfaction, and parenting pleasure. All four showed declining trajectories, but their patterns of change differed. Life satisfaction and relationship satisfaction were each assessed across two successive waves, precluding conclusions about the shape of their trajectories; both showed decline between mid-late pregnancy and six months postpartum. Family-life satisfaction and parenting pleasure, assessed over a longer timeframe of up to 11 years, followed a nonlinear pattern of decline, with family-life satisfaction showing an initial increase around childbirth before declining. Notably, despite this longer-term decline, family-life satisfaction remained on average higher after the transition than in the two years preceding it. Together, these findings suggest that even among cognitive well-being domain, the transition is not uniform—declines are consistent across all four dimensions, but their timing, shape, and magnitude vary in ways that are worth considering separately.

Life satisfaction relies on evaluative and comparison-based judgments of one's life as a whole, rather than direct experience (Schwarz & Strack, 1999), making it sensitive to social comparisons, cultural expectations, and perceived alternatives. In the context of motherhood, such evaluations may become more negative due to heightened exposure to intensive parenting norms and opportunities for upward social comparison, such as comparing oneself to other mothers who appear to manage parenthood more effortlessly on social media (Nomaguchi & Milkie, 2020; Schoppe-Sullivan et al., 2017). Moreover, because life satisfaction integrates across multiple life domains, it could be sensitive to the trade-offs introduced by parenthood, namely reduced satisfaction in other domains (e.g., leisure, work, relationships). Thus, a decline in global life satisfaction thus implies that the negative

changes across all different life domains outweigh the positive ones—suggesting that, for this evaluative measure, the perceived costs of the transition exceed the gains.

Notably, prior research has documented an initial boost in life satisfaction around childbirth before this longer-term decline sets in (Luhmann et al., 2012), suggesting that the immediate experience of becoming a parent carries genuine satisfaction that fades over time. In our NiMo data, however, this boost was not observed: life satisfaction had already declined by our first postpartum assessment at 2–3 months and continued declining through 6 months. This raises the possibility that any initial boost in life satisfaction is extremely short-lived, potentially occurring in the immediate weeks after birth before dissipating, a window that fell between our pregnancy and first postpartum assessments and was therefore not captured in our data. If so, this would have important practical implications. In many countries, formal support for new parents is concentrated in the immediate postpartum period and tapers off rapidly thereafter. For example, in the Netherlands, families receive intensive in-home support following childbirth in which a maternity nurse provides medical monitoring, infant care assistance, parental guidance, and light household help, but typically only for the first 8–10 days; similarly, partners are entitled to only one week of fully paid leave following birth (with up to 5 additional weeks of partially paid leave), after which both formal and informal support may decline rapidly. While this period provides substantial practical and emotional support, it is relatively short-lived. If well-being peaks during this same early window and declines thereafter, the withdrawal of structured support may coincide with the onset of increasing vulnerability. This suggests that new parents may be relatively well supported during the very period in which well-being is highest, but less so during the subsequent months when declines emerge. As such, extending support beyond the immediate postpartum period—or better aligning its timing with parents' evolving needs—may be critical.

Relationship satisfaction—reflecting one's evaluation of the romantic partnership—showed a consistent decline across the transition, replicating prior research documenting this as one of the most robust negative effects of the transition to parenthood (Bogdan et al., 2022; Mitnick et al., 2009). This decline is likely driven by proximal changes in relationship dynamics: the arrival of a child reorganizes how partners spend time together, reduces opportunities for intimacy and connection, and introduces new demands around the negotiation of childcare and household task division. Importantly, relationship satisfaction may also be one of the contributing factors to the broader decline in global life satisfaction: as the romantic relationship is a central life domain for most people, deterioration in this domain likely weighs heavily in overall life evaluations, compounding declines driven by other trade-offs such as reduced leisure or career setbacks. At the same time, it is important not to overinterpret the decline in relationship satisfaction as indicative of a broader relational declines. Our findings on relatedness satisfaction—one of the three basic psychological needs reflecting a sense of connection across all meaningful social relationships—showed an increase across the transition. This suggests that while the romantic partnership may become

strained, other sources of relational connection are simultaneously strengthened or added (e.g., the developing bond with the infant). The transition to motherhood thus appears to involve a reorganization rather than a depletion of relational life, with declines in partner-specific satisfaction offset by gains in broader felt connectedness.

Family-life satisfaction and *parenting pleasure* occupy a conceptually distinct position among the cognitive well-being indicators examined here: unlike life satisfaction, which integrates across all life domains, and relationship satisfaction, which focuses on the romantic partnership, these two measures center specifically on the family unit and the parenting role. Family-life satisfaction showed a nonlinear trajectory, with an initial increase around childbirth before gradually declining over the longer term. This boost-then-decline pattern is consistent with prior research on life satisfaction, and may reflect the genuine positive value of entering a new and socially meaningful role, followed by hedonic adaptation as the novelty of parenthood fades and the cumulative demands of caregiving accumulate (Frederick & Loewenstein, 1999). Parenting pleasure declined over time may reflect habituation to what was initially a novel and emotionally intense experience, as well as the increasing behavioral demands of children as they develop beyond infancy (Meier et al., 2018). The decline in family-life satisfaction, meanwhile, likely shares some of the same drivers as the decline in relationship satisfaction: since one's partner is an integral part of the family unit, deterioration in the romantic relationship may spill over into broader evaluations of family life. Notably, despite the longer-term decline, family-life satisfaction remained on average higher after the transition than in the two years preceding it, suggesting a lasting upward shift in how mothers evaluate their family life overall.

A another key pattern concerns **affective well-being**, operationalized here as positive and negative affect. These two dimensions showed divergent trajectories: *positive affect* increased across the transition, while *negative affect* remained unchanged. The observed increases in **positive affect** across the transition may reflect the rewarding and emotionally salient nature of daily interactions with the child. Limited experience sampling studies have shown that time spent with children is often associated with higher momentary happiness (e.g., Kerr et al., 2021; Nelson et al., 2013), suggesting that caregiving contexts can be affectively enriching despite their demands. Still, this overall increase in positive affect may not be uniform across specific positive emotions: emotions closely tied to caregiving and the parent-child bond (e.g., love, gratitude, pride) may drive the increase, while other positive emotional less specific to parenthood (e.g., calm) may remain unchanged or even decrease yet still produce an increasing overall average. Similarly, the stability of negative affect on average should not be taken to imply an absence of negative emotional experiences: the composite across multiple negative emotions could masks divergent patterns—some negative emotions (e.g., shame) may increase, while others (e.g., sadness) may decrease, resulting in a stable overall average. Together, these findings imply that early motherhood may generally enhance

positive emotional experiences without uniformly reducing negative ones, and highlight the importance of distinguishing between different affective components and distinct emotions.

We also found robust increases in **meaning in life**, contributing to a relatively small but growing body of longitudinal research on eudaimonic well-being across the transition to parenthood (e.g., Bassi et al., 2017; Brandel et al., 2018; Taubman-Ben-Ari et al., 2024). Meaning in life has been proposed as a key component in understanding the "parenting paradox," whereby individuals choose parenthood despite its potential costs to happiness (Morse & Steger, 2019); however, much of the existing literature has relied on cross-sectional comparisons between parents and non-parents (e.g., Nelson et al., 2014) or has examined broader eudaimonic constructs such as personal growth or flourishing rather than meaning in life specifically (e.g., Brajša-Žganec et al., 2023), limiting insight into within-person change during the transition. Our findings therefore provide stronger evidence that meaning in life increases as individuals transition into motherhood. This pattern is consistent with theoretical accounts suggesting that major life events can reorganize individuals' goals, values, and sense of purpose (Morse & Steger, 2019; Wehner et al., 2022). Parenthood may enhance meaning by providing a socially valued role, clarifying long-term goals, and fostering a sense of contributing to something beyond the self. In doing so, it may strengthen core components of meaning—such as purpose, coherence, and significance—by anchoring daily activities within a broader life narrative. Importantly, these findings suggest that while motherhood may introduce constraints at the level of satisfaction, it simultaneously enhances existential and motivational aspects of well-being, pointing to qualitatively distinct forms of psychological gain.

The increase in **self-esteem** across the transition can be understood through the lens of role acquisition and identity consolidation: becoming a mother represents the adoption of a socially valued role, and successfully navigating its demands may strengthen self-worth (Reitz, 2022). Consistent with this, our findings on psychological need satisfaction offer a more proximate account based on self-determination theory (Deci & Ryan, 2012): the observed increases in both competence and relatedness satisfaction across the transition may help explain the rise in self-esteem, as mothers develop a new sense of mastery in caregiving and form a deepening bond with their infant. This aligns with the contingent self-worth and related extension of this framework (Crocker & Wolfe, 2001; Reitz, 2022), which suggests that self-esteem rises when individuals experience success in domains that are central to their current life context. An alternative explanation for the positive trajectory observed here, however, concerns the characteristics of our sample. Prior research has produced mixed findings on self-esteem during the transition, with some studies reporting declines rather than increases. The composition of our sample—largely highly educated women in stable relationships—may partly account for this discrepancy, as these characteristics are associated with greater access to material, relational, and social resources that may buffer threats to self-

esteem and facilitate a more positive adjustment. The question of whether the increase in self-esteem generalizes to more diverse populations is taken up further in the limitations

Taken together, these findings suggest that the effects of motherhood cannot be meaningfully summarized using a single indicator of well-being. Different components—cognitive, affective, eudaimonic, and self-evaluative—are potentially governed by distinct psychological processes and therefore respond differently to the same life transition. This has important implications for both theory and research. Theoretically, it calls for models of well-being that explicitly distinguish between these components and specify their underlying mechanisms. Methodologically, it underscores the importance of assessing multiple dimensions within the same design. Substantively, it suggests that deficit-oriented accounts of motherhood may be overstated when based solely on cognitive evaluations, overlooking meaningful gains in affective experience, sense of meaning, self-esteem, and need satisfaction.

Substantial Variations and Selective Recalibration

We found that although the transition to motherhood is characterized by generally positive average patterns of change (except for cognitive well-being), these patterns mask considerable heterogeneity and selective recalibration of psychological processes. Rather than reflecting a uniform experience, the transition produces diverse developmental pathways and shifting relationships between key psychological and contextual factors.

A first key finding is the substantial **heterogeneity in well-being trajectories**. New mothers differed markedly in their changes in positive affect, relationship satisfaction, meaning in life, self-esteem, and autonomy satisfaction, indicating that the transition is far from uniform. One explanation is that the transition to motherhood constitutes a developmentally sensitive period in which individuals respond differently depending on their resources, contexts, and stable characteristics. This interpretation is consistent with life-event research showing that major transitions produce multiple adjustment trajectories rather than a single normative pattern (Galatzer-Levy et al., 2011; Luhmann et al., 2014; Reitz, 2022). Differences in factors such as social interaction, infant characteristics, sleep quality, basic need satisfaction, and daily expectations may accumulate over time, leading to diverging developmental paths. Our findings on daily predictors point to a potential mechanism underlying this process: repeated differences in everyday experiences—such as caregiving demands or sleep quality—may gradually translate into distinct longer-term trajectories.

At the same time, we found little evidence for changes in **intraindividual variability** (i.e., the extent to which individuals fluctuate around their own mean) and limited individual differences in how intraindividual variability changed across the transition. Although both intraindividual variability and individual trajectories of intraindividual variability can be understood as different forms of change, they reflect fundamentally different processes: trajectories capture between-person differences in developmental direction, whereas

intraindividual variability captures within-person fluctuation over time. The dissociation between these patterns suggests that individuals may differ substantially in where they end up, while remaining similar in how much they fluctuate along the way. One possible explanation is that intraindividual variability could reflect relatively stable individual differences in emotional regulation or vulnerability, rather than a state that is easily altered by life transitions. This interpretation aligns with the Vulnerability–Stress–Adaptation framework, which posits that individuals bring relatively stable regulatory capacities into new life contexts, shaping how they respond to stressors without necessarily altering their baseline level of fluctuation (Karney & Bradbury, 1995). Consistent with this view, prior research suggests that affective variability shows substantial stability over time and is partly trait-like (Eid & Diener, 1999; Kuppens et al., 2010; Houben et al., 2015). Alternatively, changes in intraindividual variability may have occurred earlier in the transition (e.g., early pregnancy) and were therefore not captured in the present design. Intraindividual variability may also shift primarily within specific subgroups (e.g., more vulnerable mothers), such that average-level analyses obscure meaningful differences. Taken together, these findings suggest that heterogeneity in mean-level change does not necessarily imply heterogeneity in intraindividual variability (e.g., instability), highlighting that these two forms of change are governed by distinct psychological processes.

Beyond differences in trajectories, our findings also point to **selective recalibration** of psychological processes during the transition. In particular, the strengthening association between relatedness satisfaction and self-esteem suggests that the basis on which self-esteem is constructed shifts over time in new mothers. This pattern is consistent with theoretical perspectives on contingent self-worth, which propose that self-esteem becomes more strongly tied to domains that are particularly salient to the individual (Crocker & Wolfe, 2001). However, this framework primarily accounts for stable individual differences in self-esteem contingencies, rather than developmental change. To account for the dynamic, transition-driven shift observed here, we draw on Reitz's (2022) extension of this framework, which proposes that self-esteem contingencies are not fixed but recalibrate in response to the developmental tasks associated with major life transitions. Support for this view comes from findings on the transition to work, where competence satisfaction became more strongly associated with self-esteem among those who entered the workforce compared to those who did not (Reitz et al., 2020), suggesting that the demands and goals central to a given transition shape which domains become relevant. The present findings extend this pattern to the transition to motherhood: as relatedness satisfaction became more strongly linked to self-esteem, this suggests that forming and maintaining close bonds represents a core developmental task of early motherhood, and that self-esteem becomes increasingly contingent on success in this domain. Taken together, these findings suggest that developmental tasks associated with life transitions shape self-esteem contingencies, with the transition to work elevating the role of competence and the transition to motherhood elevating the role of relatedness.

At the same time, our findings show that predictors of daily well-being change across the transition, pointing to a broader form of recalibration in how experiences are psychologically interpreted. The clearest evidence for this comes from the shifting role of nonfamily contact (e.g., colleagues, acquaintances), which changed from a positive predictor of daily well-being at 2–3 months postpartum to a negative one at 6 months. This reversal suggests that the same social experiences take on different psychological meanings as circumstances evolve, likely reflecting work–family conflict associated with the return to work around this time. While sleep quality and family contact consistently predicted higher daily well-being throughout the transition, their relative importance shifted once infant crying entered the picture. Notably, when infant crying was included, family contact no longer predicted relationship satisfaction or life satisfaction, and infant crying frequently emerged as a stronger predictor of well-being than sleep quality across dimensions. This shift could reflect genuine recalibration whereby the psychological salience of sleep and social contact is reorganized in the context of new caregiving demands, or more simply the introduction of a wholly new and overwhelmingly salient stressor that displaces other predictors by sheer magnitude. Either way, the pattern illustrates how the well-being landscape is recalibrated across the transition, with caregiving demands becoming the central organizer of daily psychological experience.

Importantly, these changes were **selective** rather than global. While some associations strengthened or even reversed (e.g., relatedness–self-esteem, nonfamily contact–well-being), others remained relatively stable (e.g., competence–self-esteem). This indicates that psychological adaptation during the transition to motherhood does not involve a wholesale restructuring of the self, but rather targeted adjustments in domains most relevant to the developmental demands of the transition.

Taken together, these findings suggest that the transition to motherhood is characterized not only by changes in average levels of well-being, but also by diversity in developmental trajectories and selective shifts in the processes underlying well-being. Theoretically, this supports a view of development as both heterogeneous and systemically adaptive, in which life transitions are accompanied not only by shifts in well-being levels but also by changes in the psychological processes and associations underlying them. Methodologically, it highlights the importance of designs that capture individual trajectories and within-person dynamics. Substantively, it suggests that support for new mothers should account for diverse adjustment pathways rather than relying on normative average experience, and that the factors most relevant for well-being may shift over time as mothers adapt to new roles and contexts.

Prospective Expectations Shape the Transition, Daily, and Long-term Well-being

We found that prospective expectations about the costs and rewards of having children are linked to both the likelihood of entering parenthood and subsequent family-life satisfaction and parenting pleasure, shaping overall levels but not trajectories of change. At the same time, new mothers' short-term affective forecasts were generally optimistic and well-calibrated,

yet mismatches between expected and actual experiences, especially overestimation, were systematically related to daily well-being. Together, these findings suggest that expectations operate through two distinct components that become relevant at different timescales, most notably expectation valence and expectation error.

A first set of explanations centers on **expectation valence**, or how positive or negative individuals anticipate the transition to be. Consistent with the value-of-children (VOC) framework (Hoffman & Hoffman, 1973), individuals may rely on anticipated costs and rewards of having children as a basis for deliberation, such that more positive expectations increase the perceived desirability of having children and, in turn, the likelihood of entering parenthood. Beyond selection, expectation valence is also linked to long-term levels of family-life satisfaction and parenting pleasure. This association may arise through several complementary processes. First, interpretive processes such as confirmation bias may lead individuals to attend to and recall experiences that align with their prior expectations, reinforcing more positive or negative evaluations over time (Vedejová & Čavojová, 2022). Second, expectations may shape behavior in ways that contribute to their own confirmation: individuals with more positive expectations may approach parenting with greater engagement and persistence, whereas those with more negative expectations may experience more stress or disengagement, resulting in lower satisfaction (Snyder, 1984). Third, expectation valence may also reflect underlying differences in life circumstances, such that individuals with more positive expectations also have more resources (socially, relationally, or economically), enabling more positive experiences after childbirth.

This third pathway may be particularly relevant. Rather than purely biased constructions, expectations appear to be at least partly grounded in reality. We found that expectations predicted overall levels of family-life satisfaction and parenting pleasure, but not how these trajectories unfolded over time. Taken together, this pattern suggests that expectation valence is likely to reflect stable underlying differences in life circumstances that shape both what individuals anticipate before the transition and what they actually experience afterward, rather than actively driving how satisfaction changes once parenthood begins. This interpretation is further supported by our finding that new mothers' daily forecasts were, on average, well-calibrated across three different measurement waves throughout the transition. From this perspective, more negative expectations may not only color the interpretation of experiences, as described above, but also accurately anticipate genuinely more challenging conditions. This means that lower well-being among those with negative expectations is, at least in part, a realistic reflection of their circumstances rather than a product of biased perception alone.

However, expectation valence was not a robust predictor of new mothers' day-to-day well-being. While more positive expectations were associated with higher long-term satisfaction, their associations with daily well-being were relatively weak and inconsistent. This shifts

our attention to a second key component: **expectation error**, defined as the discrepancy between anticipated and actual experiences. Across the transition, we found that expectation error was a more consistent and robust predictor of daily well-being than valence. The negative impact of overestimation can be understood through expectancy violation theory (Burgoon, 1993), which posits that unmet expectations generate disappointment and reduced satisfaction. When daily experiences fall short of what was anticipated, this negative violation lowers well-being, whereas experiences that exceed expectations can enhance well-being through pleasant surprise. The stronger impact of overestimation error relative to underestimation error further aligns with prospect theory (Kahneman & Tversky, 1979), suggesting that negative deviations from expectations carry greater psychological costs than positive ones do gains. Additionally, the apparent benefits of underestimation may reflect defensive pessimism (Norem & Cantor, 1986), whereby individuals set cautious expectations to manage uncertainty and reduce the risk of disappointment—an approach that may be particularly adaptive in the unpredictable context of early motherhood.

Notably, our finding that daily forecasts were on average well-calibrated stands in contrast to the broader affective forecasting literature, which consistently documents systematic overestimation of the intensity and duration of future emotional experiences (Wilson & Gilbert, 2003). Several features of this context may explain the relative accuracy observed. Unlike one-off predictions about distant events, daily forecasting allows mothers to draw on rapidly accumulating experience with their new circumstances. In addition, the functional demands of early motherhood may motivate more grounded anticipations, as accurate forecasting serves practical planning and coping purposes. Finally, because the transition so thoroughly dominates daily life, there may be fewer competing domains to distort predictions—reducing the focalism that typically drives forecasting errors (Gilbert & Wilson, 2007). Together, these factors suggest that affective forecasting error could be context-dependent, and improving when predictions are iterative, proximal, and embedded in a highly salient life context.

Taken together, these findings suggest that different components of expectations operate through distinct mechanisms at different timescales. Expectation valence appears most relevant prior to the transition and for shaping overall levels of satisfaction, through potential processes related to decision-making, interpretation, behavior, and underlying life circumstances. In contrast, day-to-day well-being is driven less by how positive expectations are and more by how closely they align with actual experiences, with consequences emerging from expectation violations. The finding that expectations shape levels but not trajectories further suggests that these mechanisms operate in a relatively stable manner across time, rather than dynamically altering patterns of adaptation. Cutting across both components, the well-calibrated nature of daily forecasts points to an additional nuance: the context of early motherhood may itself support forecasting accuracy, through iterative learning, motivational grounding, and reduced focalism. This suggests that the psychological consequences of

expectations during the transition are shaped not only by their content and accuracy, but also by the timescale and context in which they operate.

These findings have several implications. Theoretically, they suggest that expectation valence and expectation error represent distinct components that operate through different processes and at different timescales, and that studying both is important for a fuller understanding of how expectations shape the transition. This perspective helps reconcile mixed findings in the literature on optimism by showing that positive expectations may support entry into parenthood and long-term evaluations of family life, but may be less beneficial for daily well-being when they are repeatedly unmet. It is worth noting, however, that this distinction across timescales may partly reflect differences in study design: the longer-term findings relied on valence alone, whereas the daily well-being findings could assess both valence and error simultaneously—leaving open the possibility that error could also account for variance in longer-term outcomes if measured accordingly. More broadly, integrating expectation valence and expectation error into models of the transition to parenthood may help bridge sociological and psychological perspectives on parenthood. Sociological accounts have long emphasized how anticipated future states (i.e., expectations) shape fertility intentions and family formation decisions (Hoffman & Manis, 1979). Psychological research, by contrast, has more often focused on how expectations influence subjective experience and well-being once a transition is underway. The present findings speak to both levels, showing that imagined futures shape not only the decision to become a parent but also the texture of lived experience once parenthood begins.

Daily Well-being Fluctuates Systematically with Daily Experiences

We found that mothers' daily well-being is systematically linked to both their daily experiences and their cognitive appraisals. Across the transition, better sleep quality and more diverse family contact were consistently associated with higher daily well-being, while infant crying emerged in the postpartum period as the strongest predictor across well-being domains. In addition, the role of social interactions shifted over time: nonfamily contact was positively associated with well-being early postpartum but became negatively associated by 6 months. At the same time, internal psychological processes were closely tied to daily functioning: satisfaction of basic psychological needs—especially competence—was strongly associated with daily self-esteem, and expectation error was a robust predictor of daily well-being. Together, these findings indicate that daily well-being is systematically shaped by different processes that operate in everyday life.

The first set of daily well-being predictors concerns **physiological regulation** within the caregiving context. Sleep quality and infant crying—although distinct at the surface—both engage core biological systems that shape mothers' daily functioning. The consistent role of sleep aligns with extensive evidence linking sleep to emotional regulation and overall well-being (Brand et al., 2014), highlighting its role as a foundational physiological resource.

At the same time, infant crying emerged as the strongest predictor of daily well-being in the postpartum period, which can be understood through its direct impact on mothers' physiological and neural systems. Infant distress signals elicit robust autonomic and hormonal responses, including increased activation of stress-related systems (Erhart et al., 2025), and engage brain networks involved in emotional processing and caregiving behavior (Kim et al., 2020). These responses are functionally adaptive, as they prioritize attention to the infant and mobilize caregiving actions, but they also increase physiological arousal and emotional load. Importantly, infant crying may simultaneously disrupt sleep, further compounding its effects on regulation. Taken together, these findings suggest that mothers' daily well-being is strongly shaped by physiological processes embedded within caregiving, where both restorative resources (sleep) and biologically salient demands (infant distress) jointly influence daily functioning.

A second set of well-being predictors concern the context-dependent nature of **social experiences**. While diverse family contact was consistently associated with higher well-being, the role of nonfamily contact shifted over time—from a positive predictor early postpartum to a negative one at 6 months. This pattern suggests that the nature or psychological function of social interactions could change across the transition. Early postpartum, nonfamily contact may primarily reflect supportive interactions that buffer the challenges of adjustment, consistent with research on relational diversity and social support (Collins et al., 2022). By contrast, later in the transition, nonfamily contact may increasingly reflect work-related interactions, which can introduce stress and role conflict as mothers return to work (Byron, 2005). These findings suggest that the same measured variable can potentially capture qualitatively different experiences across developmental phases, emphasizing the importance of interpreting predictors within their broader contextual meaning.

Beyond these external inputs, our findings indicate that daily well-being is also shaped by **internal evaluative processes**. In line with self-determination theory (Deci & Ryan, 2012), satisfaction of basic psychological needs was positively associated with self-esteem at both trait and daily levels, suggesting that daily experiences contribute to well-being to the extent that they support feelings of competence, relatedness, and autonomy. Notably, competence satisfaction emerged as the strongest predictor of self-esteem, challenging sociometer theory (Leary & Baumeister, 2000), which emphasizes relatedness as the primary basis of self-worth. Instead, this pattern aligns more closely with the double-perspective model (Wojciszke et al., 2011), indicating that perceptions of effectiveness and mastery are particularly central for self-evaluation, even within a highly relational life transition. One explanation for this pattern is that contemporary motherhood is often framed in terms of performance, where being a "good mother" is implicitly defined by effectiveness in managing caregiving demands (Schmidt et al., 2023). In such a context, competence becomes a highly salient and evaluative domain, making momentary feelings of effectiveness especially consequential for daily self-worth. In addition, as previously mentioned, daily well-being is shaped by how experiences

compare to prior expectations, such that mismatches between expected and actual experiences—particularly overestimation—are associated with lower well-being, consistent with expectancy violation accounts (Burgoon, 1993). Together, these findings suggest that daily experiences influence well-being not only through their content, but through how they are evaluated in relation to both psychological needs and anticipated outcomes.

Taken together, these results point to a complex process model of daily well-being during the transition to motherhood. Daily functioning reflects the joint influence of **external inputs**, such as physiological states, caregiving demands, and social interactions, and **internal evaluative processes**, through which these experiences are assessed in relation to psychological needs and prior expectations. From this perspective, well-being emerges dynamically from the interplay between daily experiences and how those experiences are interpreted.

These findings have several implications. Theoretically, they support a process-oriented view of well-being that integrates contextual inputs with evaluative mechanisms, rather than treating well-being as a purely stable or trait-like construct that is impervious to change. Methodologically, they underscore the importance of intensive longitudinal approaches, such as experience sampling, for capturing these dynamic processes as they unfold in daily life. Practically, the results point to intervention targets at the level of everyday experience, such as improving sleep, supporting caregiving demands, and fostering well-calibrated expectations, which may be more effective than approaches focused solely on global evaluations of well-being.

Limitations and Future Directions

The present research is limited in its ability to draw causal conclusions. Due to the nature of the parenthood transition as a naturally occurring life event, experimental or quasi-experimental designs are difficult to implement, making it challenging to establish causal directionality. Although many of the analyses treated psychological well-being as an outcome variable, the observed associations may also reflect reverse or bidirectional relationships. For example, while psychological need satisfaction is theoretically expected to promote well-being (Deci & Ryan, 2012), it is equally plausible that higher well-being facilitates greater perceived need satisfaction. To address this, the present dissertation adopted a cautious approach, focusing primarily on associations rather than causal claims, and interpreting directional patterns in light of well-established theoretical frameworks. More specifically, the aim was to map developmental trajectories and establish non-directional associations between key variables as foundational steps for future research. Such groundwork is essential before moving on to more targeted investigations of directional relationships and causal mechanisms. Future research should build on this foundation by employing designs that allow stronger causal inference. For instance, intervention-based (experimental) studies could manipulate key psychological processes identified—such as psychological need satisfaction or expectations

(e.g., through mindfulness-based or psychoeducational interventions)—to examine their causal effects on psychological well-being. In addition, intensive longitudinal designs with cross-lagged or dynamic modeling approaches could help disentangle temporal ordering and bidirectional influences between variables in daily life.

Several limitations relate to the structure and scope of the intensive longitudinal data collected. A first limitation concerns **the number of longitudinal waves**. With three waves of data, we were able to capture change across the transition, but this design constrained the types of models that could be estimated. In particular, more complex nonlinear trajectories (e.g., growth curve models capturing curvature) typically require at least four measurement occasions. To address this, we estimated changes between waves using time dummy variables, allowing us to model discrete shifts across the transition. However, this approach is not a perfect substitute for more fine-grained longitudinal modeling and limits our ability to capture continuous change or curvature in developmental trajectories. As such, the present findings may not fully reflect more nuanced patterns of change over time. Future research should aim to employ more extensive longitudinal designs with at least four or more waves of data, which would allow for the estimation of nonlinear trajectories and more precise modeling of change over time. Ideally, such designs would include multiple assessments both before and after childbirth—for example, at least two prenatal and two postnatal waves—to better capture anticipatory changes, immediate post-birth adjustments, and subsequent stabilization processes. This would enable researchers to examine whether changes follow linear, curvilinear, or discontinuous patterns, and to identify potential inflection points in well-being trajectories.

A second limitation concerns the **temporal resolution** of the data. Although the overall design represents an improvement over much of the existing literature tracking new parents' well-being that relies on annual panel data, the intervals between waves remain relatively large (i.e., between 4 and 6 months) given the intensity and developmental sensitivity of the period surrounding childbirth. Our findings that many psychological changes occurred between mid-to-late pregnancy and 2–3 months postpartum (compared to between 2–3 and 6 months postpartum) further suggests that important shifts may unfold over relatively short timescales that are not fully captured with the current design. Future research would benefit from denser longitudinal designs, such as monthly assessments around childbirth, to more precisely identify when specific psychological changes occur and to better inform the timing of interventions and support.

A third limitation of our data is the **focus on first-time mothers** without including fathers or dyadic data. While this allowed for a detailed examination of the maternal experiences via rich experience sampling data, it limits our ability to understand the transition to parenthood as a shared or relational process. This limitation is partly a consequence of our recruitment strategy, which was conducted in collaboration with the Brabant Study, a project that

recruited mothers rather than couples. Given the substantial participant burden associated with experience sampling methods (ESM), we chose to prioritize intensive within-person data collection over dyadic sampling, as combining both would likely have compromised sample size and data quality. Future research could build on this work in two ways.

First, studies could examine **new fathers** using similar intensive longitudinal designs to capture the complementary side of the transition to parenthood. This is particularly warranted given that existing research suggests the transition to parenthood affects mothers and fathers differently. Compared to fathers, mothers tend to experience higher levels of stress and time pressure and lower subjective well-being in childcare contexts, patterns that are closely linked to their greater responsibility for routine and time-intensive caregiving (Musick et al., 2016; Nomaguchi & Milkie, 2020). At the same time, fathers are not unaffected: first-time fathers report increased stress, identity changes, and role strain as they adjust to new responsibilities. In addition, the transition to parenthood is frequently associated with declines in relationship satisfaction, including reduced intimacy, fewer shared activities, and shifts in couple dynamics that fathers may experience as relational strain (Baldwin et al., 2018; Mack et al., 2023). Capturing fathers' experiences through intensive longitudinal designs would allow researchers to examine whether the within-person dynamics observed in new mothers—such as fluctuations in affect, sleep, and identity—are mirrored, attenuated, or qualitatively different in fathers, and whether the timing and trajectory of adjustment differs by gender.

Second, where resources and feasibility allow, future studies could aim to collect **dyadic experience sampling data** from both parents simultaneously. Such a design would be particularly valuable for understanding the well-documented decline in relationship satisfaction that many couples experience following the birth of a first child (Mitnick et al., 2009). While this decline is robust on average, its causes remain insufficiently understood at the within-couple level. Dyadic ESM data would enable researchers to model the day-to-day interdependencies between partners—for instance, whether one partner's fatigue, negative affect, or perceived lack of support on a given day predicts the other partner's relationship satisfaction or emotional withdrawal that same evening. Actor–partner interdependence models provide a framework for disentangling within-person from between-couple effects in dyadic data (Kenny & Ledermann, 2010). Applied to intensive longitudinal designs, such approaches can capture partner influence processes over time (Luginbuehl & Schoebi, 2020; Sels et al., 2016), thereby providing a more fine-grained understanding of how daily interactions between partners contribute to the decline in relationship satisfaction that many couples experience following the birth of a first child.

A fourth limitation concerns **generalizability**. Our sample consisted primarily of highly educated Dutch women in stable, heterosexual relationships. While this population is important to study—particularly in advanced Western contexts where higher education

women are increasingly delaying or opting out of parenthood (Blossfeld & Huinink, 1991; Esping-Andersen & Billari, 2015; Hoem & Kreyenfeld, 2006)—these characteristics limit the extent to which the findings can be generalized to more diverse populations. At the same time, the results suggest that even among women who are often thought to face substantial opportunity costs, the transition to motherhood is not uniformly negative and may involve meaningful psychological gains. Future research should therefore examine whether similar patterns emerge in more diverse samples, including individuals from different socioeconomic backgrounds, cultural contexts, and family structures. In particular, it would be valuable to focus on more vulnerable groups of new mothers, such as those with lower socioeconomic status or those navigating single parenthood, who may face different constraints and support systems that could shape their well-being trajectories in distinct ways.

CONCLUDING REMARKS

Taken together, this dissertation provides a nuanced and integrative account of the transition to motherhood by demonstrating that psychological well-being and their developmental changes during this period are multidimensional, heterogeneous, and dynamically shaped by both internal processes and daily experiences. Rather than supporting a uniformly negative or positive narrative, the findings reveal a complex pattern of simultaneous gains and losses across different domains, alongside substantial individual variation and shifting psychological processes over time. By showing that conclusions about the impact of parenthood depend critically on how well-being is conceptualized and how change is measured, this work underscores the importance of moving beyond narrow, single-indicator approaches toward a more comprehensive framework. In doing so, it not only advances theoretical understanding of life transitions and well-being, but also highlights new directions for research and intervention aimed at supporting parents during this pivotal period of change.

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ACADEMIC SUMMARY

ENGLISH SUMMARY

The transition to parenthood is one of the most common yet profound life events in adulthood, bringing substantial changes in identity, social relationships, daily routines, and psychological functioning. Although previous research has extensively examined how becoming a parent affects well-being, findings remain mixed. Existing studies have primarily examined a limited range of psychological well-being indicators while relying predominantly on panel studies with widely spaced assessments that are unable to capture the dynamic nature of the transition, leading to a focus on average developmental trajectories while overlooking individual differences and day-to-day fluctuations. This dissertation addresses these limitations by adopting a multidimensional perspective on psychological well-being, examining hedonic well-being, eudaimonic well-being and self-esteem, and by combining traditional longitudinal methods with intensive daily assessments. Across two complementary research streams, the dissertation investigates how expectations shape the transition to parenthood and how new mothers' psychological well-being unfolds across pregnancy and early motherhood, with the aim of providing a more comprehensive understanding of adaptation during this important life transition.

Chapter 2 investigates whether expectations about the value of children influence both the likelihood of becoming a parent and subsequent family-life satisfaction. Using nationally representative longitudinal panel data from Germany following respondents for up to eleven years, the study examines how perceived costs and rewards of having children are associated with the transition to parenthood and adaptation thereafter. The results show that individuals with more positive prenatal expectations are more likely to become parents, and among those who do, more negative expectations are associated with lower postnatal parenting pleasure and family satisfaction. Yet, prenatal expectations do not predict the trajectory of family-life satisfaction following childbirth. These findings highlight the importance of pre-parenthood expectations for both selection into parenthood and subsequent family-life experiences.

Chapter 3 examines changes in psychological well-being across the transition to motherhood using Project NiMo, an intensive longitudinal study that followed first-time mothers from pregnancy until six months postpartum through three waves of questionnaires and daily experience sampling. Moving beyond previous research that has primarily focused on life satisfaction, this study simultaneously investigates affective, cognitive, and eudaimonic well-being while examining mean-level change, between-person differences, and within-person day-to-day fluctuations. The findings demonstrate that different dimensions of well-being follow distinct developmental trajectories and that considerable heterogeneity exists in new mothers' adaptation to parenthood. Furthermore, daily well-being fluctuates substantially throughout the transition and is associated with everyday contextual factors such as sleep, infant characteristics, and social experiences, underscoring the dynamic nature of psychological adaptation during early motherhood.

Chapter 4 focuses on the development of self-esteem and the satisfaction of the basic psychological needs for autonomy, competence, and relatedness during the transition to motherhood. Drawing on the same intensive longitudinal design, the study investigates both developmental trajectories and daily fluctuations while testing competing theoretical perspectives on the psychological foundations of self-esteem. The findings indicate that self-esteem is closely linked to basic psychological need satisfaction at both the between-person and within-person levels. In particular, perceived competence emerges as the strongest and most consistent predictor of self-esteem, suggesting that feeling capable in the parenting role is central to maintaining a positive sense of self during early motherhood.

Chapter 5 investigates how daily affective forecasts shape well-being during the transition to motherhood. The study simultaneously examines the effects of forecast valence (i.e., expecting a good or bad day) and forecast error (i.e., the discrepancy between expected and experienced affect) on daily well-being. The findings show that both more positive daily forecasts and smaller forecast errors are associated with higher daily well-being for new mothers. Exploratory analyses further indicate that forecast error is a more robust predictor of daily well-being than forecast valence, suggesting that whether experiences match or violate expectations may matter more for mothers' daily psychological functioning than simply expecting the day to be positive or negative. Moreover, the effect of forecast error is asymmetric: well-being is more strongly diminished when mothers experience a worse day than expected than it is enhanced when the day turns out better than expected. These findings demonstrate that expectations influence well-being not only in the long-term but also through the accuracy of everyday affective forecasts during early motherhood.

Taken together, the studies in this dissertation provide a comprehensive perspective on psychological well-being across the transition to parenthood by integrating long-term developmental processes with day-to-day psychological dynamics. The findings demonstrate that adaptation to parenthood cannot be understood through a single indicator of well-being or a single average developmental trajectory. Instead, different dimensions of psychological well-being develop differently across the transition, substantial individual differences exist in these trajectories, and everyday experiences contribute importantly to the process of adaptation.

By examining both existing large-scale longitudinal panel data and an intensive longitudinal study specifically designed to capture psychological experiences during pregnancy and early motherhood, this dissertation advances current understanding of how major life transitions shape new parents psychological well-being. Moreover, it shows that expectations operate across multiple timescales, from expectations formed years before becoming a parent to affective forecasts made each morning, and that these expectations play an important role in shaping both family-life satisfaction and daily psychological functioning. Together, these findings contribute to a more nuanced understanding of the transition to parenthood and provide directions for future research and interventions aimed at promoting parents' psychological well-being.

DUTCH SUMMARY

De overgang naar het ouderschap is een van de meest voorkomende en tegelijkertijd ingrijpende levensgebeurtenissen in de volwassenheid, die aanzienlijke veranderingen met zich meebrengt op het gebied van identiteit, sociale relaties, dagelijkse routines en psychologisch functioneren. Hoewel in eerder onderzoek uitgebreid is gekeken naar de invloed van het ouderschap op het welzijn, blijven de bevindingen gemengd. Bestaande studies hebben voornamelijk een beperkt aantal indicatoren voor psychologisch welzijn onderzocht en steunden daarbij grotendeels op panelstudies met metingen die ver uit elkaar liggen, waardoor de dynamische aard van de overgang niet goed kan worden vastgelegd.

Hierdoor ligt de nadruk vooral op gemiddelde ontwikkelingstrajecten, terwijl individuele verschillen en dagelijkse schommelingen over het hoofd worden gezien. Dit proefschrift pakt deze beperkingen aan door een multidimensionaal perspectief op psychologisch welzijn te hanteren, waarbij hedonisch welzijn, eudaimonisch welzijn en zelfrespect worden onderzocht, en door traditionele longitudinale methoden te combineren met intensieve dagelijkse metingen. Aan de hand van twee complementaire onderzoeksstromen onderzoekt het proefschrift hoe verwachtingen de overgang naar het ouderschap vormgeven en hoe het psychologisch welzijn van nieuwe moeders zich ontwikkelt tijdens de zwangerschap en het vroege moederschap, met als doel een uitgebreider inzicht te bieden in de aanpassing tijdens deze belangrijke levensovergang.

In hoofdstuk 2 wordt onderzocht of verwachtingen over de waarde van kinderen van invloed zijn op zowel de kans om ouder te worden als de tevredenheid over het gezinsleven daarna. Aan de hand van landelijk representatieve longitudinale panelgegevens uit Duitsland, waarbij respondenten tot elf jaar lang werden gevolgd, wordt nagegaan hoe de waargenomen nadelen en voordelen van het krijgen van kinderen samenhangen met de overgang naar het ouderschap en de aanpassing daarna. De resultaten tonen aan dat personen met positievere verwachtingen vóór de geboorte meer kans hebben om ouders te worden, en dat bij degenen die dat doen, negatievere verwachtingen gepaard gaan met minder plezier in het ouderschap en minder tevredenheid met het gezinsleven na de geboorte. Toch zijn de verwachtingen vóór de geboorte geen voorspeller van het verloop van de tevredenheid met het gezinsleven na de bevalling. Deze bevindingen benadrukken het belang van verwachtingen vóór het ouderschap, zowel voor de keuze om ouders te worden als voor de daaropvolgende ervaringen in het gezinsleven.

Hoofdstuk 3 onderzoekt veranderingen in psychologisch welzijn tijdens de overgang naar het moederschap aan de hand van Project NiMo, een intensief longitudinaal onderzoek waarin moeders die voor het eerst moeder werden, vanaf de zwangerschap tot zes maanden na de bevalling werden gevolgd via drie vragenrondes en dagelijkse ervaringsregistraties. In tegenstelling tot eerder onderzoek dat zich voornamelijk richtte op levensvoldoening, onderzoekt deze studie tegelijkertijd affectief, cognitief en eudaimonisch welzijn, waarbij zowel veranderingen

in het gemiddelde niveau, verschillen tussen personen als dagelijkse schommelingen binnen een persoon worden bekeken. De bevindingen tonen aan dat verschillende dimensies van welzijn afzonderlijke ontwikkelingstrajecten volgen en dat er aanzienlijke heterogeniteit bestaat in de aanpassing van nieuwe moeders aan het ouderschap. Bovendien fluctueert het dagelijkse welzijn aanzienlijk gedurende de overgang en hangt het samen met alledaagse contextuele factoren zoals slaap, kenmerken van de baby en sociale ervaringen, wat de dynamische aard van psychologische aanpassing tijdens het vroege moederschap benadrukt.

Hoofdstuk 4 richt zich op de ontwikkeling van het zelfbeeld en de bevrediging van de fundamentele psychologische behoeften aan autonomie, competentie en verbondenheid tijdens de overgang naar het moederschap. Op basis van hetzelfde intensieve longitudinale onderzoeksopzet onderzoekt de studie zowel ontwikkelingstrajecten als dagelijkse schommelingen, terwijl concurrerende theoretische perspectieven op de psychologische grondslagen van het zelfbeeld worden getoetst. De bevindingen wijzen erop dat zelfwaardering nauw verband houdt met de bevrediging van fundamentele psychologische behoeften, zowel op interpersoonlijk als op intrapersoonlijk niveau. Met name de waargenomen competentie blijkt de sterkste en meest consistente voorspeller van zelfwaardering te zijn, wat suggereert dat het gevoel bekwaam te zijn in de opvoedingsrol van cruciaal belang is voor het behoud van een positief zelfbeeld tijdens de vroege fase van het moederschap.

Hoofdstuk 5 onderzoekt hoe dagelijkse affectieve voorspellingen het welzijn beïnvloeden tijdens de overgang naar het moederschap. Het onderzoek bestudeert tegelijkertijd de effecten van de valentie van de voorspelling (d.w.z. de verwachting van een goede of slechte dag) en de voorspellingsfout (d.w.z. het verschil tussen het verwachte en het ervaren affect) op het dagelijkse welzijn. Uit de bevindingen blijkt dat zowel positievere dagelijkse voorspellingen als kleinere voorspellingsfouten gepaard gaan met een hoger dagelijks welzijn bij kersverse moeders. Verkennende analyses wijzen er bovendien op dat de voorspellingsfout een robuustere voorspeller is van het dagelijkse welzijn dan de emotionele valentie van de voorspelling, wat suggereert dat het voor het dagelijkse psychologische functioneren van moeders wellicht belangrijker is of ervaringen overeenkomen met of afwijken van verwachtingen, dan louter de verwachting dat de dag positief of negatief zal zijn. Bovendien is het effect van de voorspellingsfout asymmetrisch: het welzijn neemt sterker af wanneer moeders een slechtere dag beleven dan verwacht, dan dat het toeneemt wanneer de dag beter uitpakt dan verwacht. Deze bevindingen tonen aan dat verwachtingen het welzijn niet alleen op de lange termijn beïnvloeden, maar ook via de nauwkeurigheid van dagelijkse affectieve voorspellingen tijdens het vroege moederschap.

Samen bieden de onderzoeken in dit proefschrift een uitgebreid perspectief op het psychologisch welzijn tijdens de overgang naar het ouderschap, door langetermijnontwikkelingsprocessen te integreren met dagelijkse psychologische dynamieken. De bevindingen tonen aan dat de aanpassing aan het ouderschap niet kan worden begrepen aan de hand van één enkele indicator van welzijn of één enkel gemiddeld ontwikkelingstraject. In plaats daarvan ontwikkelen

verschillende dimensies van psychologisch welzijn zich op verschillende manieren tijdens de overgang, bestaan er aanzienlijke individuele verschillen in deze trajecten en leveren dagelijkse ervaringen een belangrijke bijdrage aan het aanpassingsproces.

Door zowel bestaande grootschalige longitudinale panelgegevens als een intensief longitudinaal onderzoek te bestuderen dat specifiek is ontworpen om psychologische ervaringen tijdens de zwangerschap en het vroege moederschap in kaart te brengen, draagt dit proefschrift bij aan het huidige inzicht in hoe ingrijpende levensovergangen het psychologisch welzijn van nieuwe ouders beïnvloeden. Bovendien laat het zien dat verwachtingen op meerdere tijdschalen een rol spelen, van verwachtingen die jaren voordat men ouder wordt al zijn gevormd tot affectieve voorspellingen die elke ochtend worden gemaakt, en dat deze verwachtingen een belangrijke rol spelen bij het vormgeven van zowel de tevredenheid over het gezinsleven als het dagelijkse psychologische functioneren. Samen dragen deze bevindingen bij aan een genuanceerder begrip van de overgang naar het ouderschap en bieden ze richtingen voor toekomstig onderzoek en interventies gericht op het bevorderen van het psychologisch welzijn van ouders.

