A LATENT PROFILE ANALYSIS OF MATERNAL SELF-REGULATION AND ASSOCIATIONS WITH PARENT-CHILD BEHAVIORAL AND PHYSIOLOGICAL SYNCHRONY IN LATINX AND BLACK MOTHER-CHILD DYADS

by

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(Under the Direction of Cynthia M. Suveg)

ABSTRACT

Maternal self-regulation involves mothers' abilities to process emotional experiences. It is unclear how maternal self-regulation relates to behavioral synchrony and respiratory sinus arrhythmia (RSA) synchrony among parent-child dyads. This study identified self-regulation profiles and differences in synchrony with 100 Latinx and Black mothers (M_{age} = 34.48, *SD* = 6.39) and their children (M_{age} = 6.83, *SD* = 1.50). Dyads participated in a stress task where RSA was collected and maternal positive affect, negative affect, supportive presence, and behavioral synchrony were coded. Mothers self-reported on their self-regulation. Latent profile analyses revealed a three-profile solution: *average* (mean self-regulation), *unaware and behaviorally dysregulated* (high self-reported self-regulation and negative affect, low supportive presence, average positive affect), and *aware and behaviorally regulated* (low self-reported self-regulation, high positive affect and supportive presence, average negative affect). The *aware and behaviorally regulated* profile demonstrated the highest positive behavioral synchrony, highlighting the importance of maternal self-regulation in parent-child relationships.

INDEX WORDS: Black; Latinx; parenting; mothers; self-regulation; behavioral synchrony; physiological synchrony

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BA, West Virginia University, 2019

A Thesis Defense Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2023

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December 2023

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CHAPTER 1

INTRODUCTION

Rigorous, longitudinal research has shown that self-regulation, the ability to control one's own behavioral and emotional processes, underlies healthy development across the lifespan (McClelland et al., 2018, Robson et al., 2020). Maternal self-regulation is especially critical to the parenting context and facilitates important parenting behaviors (e.g., emotional expressiveness, sensitivity) that shape positive parent-child relationships (Baker et al., 2019; Barros et al., 2015; Lobo et al., 2020). However, scarce research has examined whether maternal self-regulatory capabilities specifically in the parenting context, referred to henceforth as *maternal self-regulation*, are associated with the dynamic concordance of behavioral and biological cues between caregivers and their children (Bell, 2020; Feldman, 2012). This is a critical gap in developmental science given both behavioral (i.e., positive behavioral synchrony) and physiological synchrony (i.e., RSA synchrony) are dyadic processes associated with significant child outcomes (i.e., youth self-regulation development; Davis, et al., 2017; DePasquale, 2020).

Maternal self-regulation is a multi-level construct comprised of biological, cognitive, and behavioral processes, yet the majority of this work examines only one domain of self-regulation at a time (Cole et al., 2019; Murray et al., 2015). Further, this work has predominantly included White families (Bridgett et al., 2013; Holmberg et al., 2020). Less is known about self-regulation processes among Latinx and Black families, yet Latinx and Black mothers may face additional psychosocial stressors (e.g., acculturative stress, discrimination) that impact their self-regulation

(Santos et al., 2021; Murray et al., 2018). A comprehensive assessment of maternal self-regulation across different self-regulation domains in Latinx and Black mothers is needed to help identify strategies that strengthen or undermine synchrony processes among families underrepresented within developmental research. The present study identified maternal self-regulatory profiles using a multi-methodological approach and examined potential differences in positive behavioral synchrony and physiological synchrony across profiles.

Maternal SR

The Self-Regulation Intergenerational Transmission Model suggests that the combination of biobehavioral mechanisms and transactional processes explain the link between maternal self-regulation and child self-regulation (Bridgett et al., 2015). The theory states that adaptive maternal self-regulation can facilitate positive parent-child interactions that encourage child self-regulation during critical stages of development. Maternal self-regulation reflects a caregiver's ability to process their own emotions and behaviors while also interpreting and scaffolding their children's emotion regulation. During parent-child interactions, parents employ multiple self-regulatory processes (e.g., self-management, self-efficacy), model affective displays, and implement parenting strategies (e.g., validation, teaching) to support child self-regulation. These processes can be assessed at various units of analysis, including self-reports of maternal self-regulation, coded maternal self-regulation behaviors, and maternal physiological responses during parent-child interactions. Adaptive maternal self-regulation strategies have been associated with positive parenting practices such as maternal warmth, responsiveness, and involvement whereas maladaptive maternal self-regulation strategies have been linked to poorer parenting outcomes including maternal psychological distress and internalizing symptoms (Albanese et al., 2019; Aranda, 2013; Fuchs et al., 2021; Jones & Prinz, 2005).

Limited research has examined the relation between maternal self-regulation and parenting processes in Latinx and Black mother-child dyads. Even less is known about maternal self-regulation and dyadic processes among Latinx and Black children in the school-age period - a developmental stage marked by increased time spent away from family and the home setting (Chung et al., 2017). Preliminary evidence among Latina mothers and their toddlers found that adaptive maternal self-regulation behaviors were associated with the implementation of household routines at mealtimes and bedtime (Aldoney Ramirez, 2015). Among Black mothers and their two-to seven-year-old children, maternal self-regulation strategies have also been linked with positive parent-reported perceptions of the parent-child relationship (Taylor, 2006). In a sample of four to five-year old children and their mothers (30% African America, 6.5% Hispanic), maternal self-regulation was also associated with greater maternal emotional support during a mother-child problem solving task (Zeytinoglu et al., 2017).

Two studies to date have explored multi-methodological indexes of maternal self-regulation and their associations with parenting behaviors and dyadic processes. In a sample of diverse mothers and their preschool-age children (47% Black/African American, 43% White, 10% Hispanic/Latinx, Asian or other), Shaffer and colleagues (2018) identified profiles of maternal emotion regulation using self-reported emotion regulation, coded negative affect, and RSA baseline and suppression during a stressful interaction task. *Well-regulated* mothers engaged in higher structure/limit setting, encouragement of child self-regulation, and dyadic collaboration, whereas *dysregulated* mothers endorsed higher levels of negative affect, emotion regulation difficulties, and exhibited poorer parenting behaviors (e.g., less encouragement of child self-regulation). In the second study, Sosa-Hernandez and colleagues (2020) established profiles of parental emotion socialization practices in a sample of mothers and fathers and their eight to twelve-year old children (59% White, 18% Black, No Hispanic/Latinx parents). Four profiles were identified: a *balanced* profile characterized by moderate levels of both supportive and unsupportive emotion socialization, a *hyperengaged* profile reflecting high scores across almost all emotion socialization indicators, a *teach and problem-focused* profile characterized by high problem-focused and high teach/control reactions to children's emotions, and a *supportive* profile reflecting high levels of supportive reactions and low levels of unsupportive emotion socialization. Results indicated that parental emotion dysregulation was associated with greater odds of being placed in the *balanced* and *hyper-engaged* profile relative to the *supportive* profile. Similarly, parental psychopathology symptoms were associated with the greatest odds of being placed in the *balanced, hyper-engaged,* and *teach and problem-focused* profiles relative to the *supportive* profile. These findings suggest that parents within the *supportive* profile may use adaptive coping strategies, which help to facilitate positive parenting behaviors and scaffold child emotion regulation.

Maternal Self-Regulation and Dyadic Processes

Synchrony is one type of dyadic process that involves the temporal coordination of behavioral and biological processes between mothers and their children (Leclère et al., 2014). Parent-child synchrony is expressed at the behavioral, physiological, neural, and hormonal level, with each unit playing a key role in the development of social competence, prosocial behaviors, and self-regulation in children (Birk, 2022). According to the Biobehavioral Model of Synchrony, parent-child synchrony is shaped early in infancy (e.g., mutual gaze, touch) and becomes increasingly bidirectional in toddlerhood and middle childhood, whereby both verbal and non-verbal cues can be equally exchanged between parents and their children (Atzaba-Poria et al., 2017; Feldman, 2007).

Positive behavioral synchrony, the availability and mutuality of emotion shared between caregivers and children, is a hallmark of parent-child relationships and is associated with adaptive youth self-regulation (Davis et al., 2017). Positive behavioral synchrony emphasizes the free-flow of emotions and communication assessed through verbal and non-verbal cues including eye contact, facial expressions, and physical proximity seeking during parent-child interactions (Suveg et al., 2016). While the literature has directly linked positive behavioral synchrony with adaptive youth self-regulation development and positive child outcomes (e.g., communication, listening skills), no study has examined the association between maternal self-regulation and positive behavioral synchrony (Davis et al., 2017; Leclère et al., 2014; Kochanska et al., 2008). Theoretically, poor maternal self-regulation may lead to maladaptive parenting behaviors that inhibit or undermine parent-child synchrony processes such as positive behavioral synchrony (Holmberg et al., 2020; Shaffer et al., 2018). Conversely, adaptive maternal regulatory strategies may allow for the parent to be more attuned to their children's socioemotional needs and to modify their parenting behaviors flexibly in a way that strengthens synchrony processes (Davis et al., 2018; Feldman, 2012).

Physiological synchrony, the co-regulation of physiological activity between the caregiver and child, is also associated with the development of regulatory skills in children (Davis et al., 2018; Lobo et al., 2020; DePasquale, 2020). Synchrony assessed via respiratory sinus arrhythmia (RSA) refers to shifts in cardiac rhythm that coincide with respiration, which serves as an index of parasympathetic regulation of the heart and an individuals' ability to respond to different environmental and social demands (Davis et al., 2018; Beauchaine, 2001). The vagus nerve reflects the regulation of the vagal brake, such that stimulation of the brake calms the body while vagal withdrawal results in sympathetic activation to prepare the body for action (Porges, 2007). Parasympathetic synchrony in parent-child dyads has been associated with adaptive parenting behaviors such as parental teaching and engagement in samples of primarily White mothers and their preschool children (Lunkenheimer et al., 2018; Skoranski et al., 2017). Parent-child physiological synchrony has also been associated with fewer negative emotional parenting behaviors, including psychological unavailability and psychological control in a sample of Chinese parents and their school-age children (Han et al., 2019). In a sample of mothers and their four-to nine-year-old children, however, Creavy and colleages (2020) found that positive synchrony was associated with maladaptive outcomes (e.g., lower levels of parent-child empathy) when parents reported feelings of shame, guilt, and anger in response to their children's negative emotions. Thus, it may be that physiological synchrony is not always adaptive for children if mothers are exhibiting maladaptive self-regulatory or parenting skills that discourage child self-regulation or dampen children's emotions. Despite the influx of studies on positive behavioral synchrony and physiological synchrony in parent-child dyads, it is not yet clear how maternal self-regulation is related to synchrony processes. Thus, additional research is needed to examine maternal self-regulation and parent-child synchrony, given their centrality to parent-child relationships and child self-regulation development (Feldman, 2015).

The Current Study

Guided by the Self-Regulation Intergenerational Transmission Model and the Biobehavioral Model of Synchrony, this study identified profiles of maternal self-regulation using a multi-methodological approach in a sample of Latinx and Black mother-child dyads. Once maternal self-regulation profiles were identified, the second aim of the study examined differences in positive behavioral synchrony and physiological synchrony between the profiles. Given that preliminary evidence links broader parenting behaviors to positive behavioral synchrony and physiological synchrony, research is needed to identify specific maternal self-regulation processes that influence dyadic synchrony (Bell, 2020; DePasquale, 2020). Furthermore, additional studies examining parent-child synchrony from underrepresented racial or ethnic groups are needed, as Latinx and Black mothers may be experiencing contextual stressors or use specific parenting skills that provide novel information about caregivers' abilities to attune to their own and their children's emotional needs (Murry et al., 2018; West et al., 2022). Given the exploratory nature of latent profile analysis (LPA), no specific predictions regarding the number of profiles were put forth. However, it was expected that a profile for "*average*" levels of maternal self-regulation would emerge and represent a majority of the sample, which is consistent with prior emotion regulation profiles (e.g., Price et al., 2022; Shaffer et al., 2018). It was further hypothesized that smaller subsets of mothers may show patterns of maladaptive self-regulatory profiles (e.g., poor self-reported maternal self-regulation and coded maternal self-regulation). Regarding links to synchrony processes, it was hypothesized that mothers with poorer maternal self-regulation would exhibit lower levels of positive behavioral synchrony and negative and weak physiological synchrony. It was also hypothesized that mothers with average or adaptive maternal self-regulation would exhibit higher levels of positive behavioral synchrony and positive and strong physiological synchrony.

CHAPTER 2

METHOD

Participants

Participants included 100 mothers (M_{age} = 34.48 years, *SD* = 6.39 years) and their children (M_{age} = 6.83 years, *SD* = 1.50 years). 74.0% of mother-child dyads identified as Latinx while 26.0% identified as Black. As part of inclusion criteria, children were required to be between the ages of 5 and 9 and were free of a developmental disability that could impact the completion of study procedures (e.g., non-verbal autism). A majority of mothers (66.9%) were born outside of the United States in countries including Mexico, El Salvador, Guatemala, Columbia, Venezuela, Costa Rica, Argentina, and Honduras. With respect to education status, a majority of mothers reported obtaining a high school diploma or GED (58.0%), while the remaining mothers reported not completing a degree (13.0%) or earning a Master's degree (4.0%). Mothers were primarily employed full-time (54.0%) and reported a yearly income ranging from less than $5,000 to greater than $100,000. Approximately 56% of mothers earned below $30,000 annually.

Procedures

A majority of participants were recruited via participant referral (67.0%; i.e., word of mouth), while additional dyads were recruited via flyers posted within the local community and social media platforms (e.g., Facebook). Participants completed an eligibility screener with research staff members over the phone and, if eligible, were scheduled for a 2-hour assessment conducted within the laboratory. Upon arrival, participants reviewed and signed a parent consent form and child assent form detailing all study procedures. Research assistants placed electrodes on participants to measure their heart rate via Mindware BioLab software (Version 3.0.6). During the COVID-19 pandemic, research assistants instructed dyads to put on electrodes themselves given close-contact was prohibited by the IRB and the Centers for Disease Control and Prevention. Participants watched a 5-minute baseline video of a waterfall to capture resting heart rate and then engaged in a mildly stressful dyadic parent-child interaction task. During the task, children were informed they had approximately 10 minutes to build a developmentally advanced LEGO figure. Mothers were instructed that they could verbally, but not physically, assist with the task. RSA and behavioral data were collected continuously throughout the tasks. Research assistants administered a series of questionnaires to mothers about their parenting behaviors and about their child's socioemotional functioning in Spanish or English, depending upon the mothers' primary language (39 English, 61 Spanish). Families were given $100 gift cards for participating in the study and an additional $40 in gift cards for each additional family they referred that completed the study. Study procedures were approved and completed in adherence with the University of Georgia's Institutional Review Board (IRB).

Measures

Me as a Parent Questionnaire (self-report measure)

Mothers reported on their own self-regulatory strategies on a Likert response scale from 1 (totally disagree) to 5 (totally agree) using the 16-item *Me as a Paren*t (MaaP) Questionnaire (Hamilton et al., 2015). Total scores were computed from the following four subscale items of maternal self-regulation: *Self-efficacy* (4-items; e.g., "I have confidence in myself as a parent"), *Personal agency* (4-items reverse scored; e.g., "I often feel helpless about my child's behavior"), *Self-sufficiency* (4-items; e.g., "I know how to solve most problems that arise with parenting"), and *Self-management* (4-items; e.g., "I meet my expectations for providing emotional support for my child"). The total score for maternal self-regulation demonstrated adequate internal consistency (α = .71; Cronbach's alpha). The Spanish version of this questionnaire was produced using a forward and back translation method with Spanish-speaking research assistants. This scale has been used successfully to measure self-regulation within Spanish-speaking mothers (Callejas et al., 2021).

Negative and Positive Affect (behavioral observation)

Video recordings that were captured during the LEGO parent-child interaction task were later coded for maternal negative affect. Negative affect included the individual's expressed negative emotion (e.g., anger, sadness, fear, guilt) demonstrated via verbal or facial expressions, body posture, and/or tone of voice. While the duration of the LEGO task was originally 10 minutes, video recordings and physiological data indicated that parent-child dyads habituated to the task after approximately five minutes (e.g., children requesting bathroom breaks, mothers frequently checking phones, RSA values returning to baseline levels). Thus, all behavioral observations included only the first five minutes of the interaction task to ensure dyad engagement and effective physiological reactivity. All recordings were coded by a trained research assistant fluent in both Spanish and English and 25% of the videos were randomly selected and coded via an additional bilingual trained research assistant for reliability. The negative affect scale ranged from "1 = *No negative affect*" to "5 = *Very high negative affect"* marked by no enjoyment through the task, crying, frowning throughout the entire 5-minute interaction task. Scores for negative affect demonstrated adequate interrater reliability (*ICC* = .69, $p < .001$).

Maternal positive affect was marked by the individual's expressed pleasure and enjoyment as evidenced by animation, smiling, laughter, body posture, and/or tone of voice. The positive affect scale also ranged from "1 = *No positive affect*" to "5 = *Very high positive affect*" displayed via high frequency and quality of positive affect and characterized by enjoyment, laughter, and/or smiling throughout the entire interaction task. Scores for positive affect demonstrated high interrater reliability (*ICC* = .93, *p* < .001).

Maternal Supportive Presence

Video recordings captured during the first 5-minutes of the parent-child interaction task were also coded for maternal supportive presence. Maternal supportive presence was expressed via positive regard and emotional support to the child during the stress task as observed by parental encouragement, reassuring the child, and providing a "secure base" for the child. Maternal supportive presence scores ranged from "1 = *Very Low"* marked by the parent being unavailable or hostile to the child in times where support is needed to "7 = *Very High"* marked by parental confidence and reinforcement of the child's success and attempts to complete the LEGO figure. Scores for maternal supportive presence demonstrated high interrater reliability (*ICC* = .98, *p* < .001).

Positive Behavioral Synchrony (behavioral observation)

Positive behavioral synchrony involved the availability and mutuality of emotion shared between mothers and their children during the first 5-minutes of the interaction task. Positive behavioral synchrony was captured via verbal and non-verbal communication with an emphasis on maternal warmth, personal involvement, engagement, and shared intimacy within the dyad (see Davis et al., 2017). Positive behavioral synchrony scales ranged from "1 = *Very Low Positive Behavioral Synchrony*" to 7 = "*Very High Positive Behavioral Synchrony*" with lower positive behavioral synchrony marked by disengagement, underlying conflict or ambivalence, or emotional disconnectedness during the interaction and higher positive behavioral synchrony involving shared smiling, eye contact, physical proximity seeking, and emotion validation. Using the same process for calculating interrater reliability as above, the positive behavioral synchrony code indicated strong interrater reliability ($ICC = .96$, $p < .001$).

RSA During the Dyadic Task (physiological data)

Mother and child physiological data was collected using Mindware Biolab Software (Version 3.0.6) during the baseline and parent-child LEGO interaction task. Prior to data collection, seven disposable electrocardiogram (ECG) electrodes were placed in the following regions for each mother-child dyad: the right collarbone (i.e., right clavicle area), the cleft of the throat (i.e., below the laryngeal prominence - also referred to as the “Adam’s apple” colloquially), the bottom rib region on the left and right side of the body, the lower end of the sternum (i.e., near the xiphoid process), midway down the spine, and just below the base of the skull on the back. The EKG signal was digitized to 1,000 Hz and MindWare used a peak-identification algorithm to create an interbeat interval (IBI; the time between heartbeats) series, also known as an R-R interval.

Physiological data was later cleaned by trained research assistants using Mindware Heart Rate Variability (HRV) Software (Version 3.0.25). Research assistants detected abnormal R-R intervals within the data due to movement artifacts and/or heart arrythmia and manually corrected the intervals by inserting midbeats and deleting additional beats. Epochs requiring more than 10% of the data to be edited were marked unusable and removed from analyses. RSA values from the first 10 epochs (e.g., 5-minutes) were then computed in Mindware using the natural logarithm of the variance heart rate period within the frequency bandpass related to respiration (0.24 –1.04 Hz for children and 0.12– 0.40 Hz for adults; Fracasso, Porges, Lamb, & Rosenberg, 1994). A 30-second time window for epochs has been commonly used when collecting RSA levels to determine synchrony values among mother-child dyads (e.g., Creaven et al., 2014; Suveg et al., 2019; Woody et al., 2016). The mean RSA values for each epoch (10 epochs each for baseline and LEGO) were then used in the analyses.

Analytic Plan

Bivariate correlations were computed between study and demographic variables (e.g., child gender, socioeconomic status). Missing data was estimated in *Mplus* using full-information maximum-likelihood (FIML).

Prior to LPA estimation, two power analyses were calculated. There is no specific formula for determining optimal sample size for LPA (McNeil & Zeman, 2021; Spurk et al., 2020; Tein et al., 2013). Although some research recommended examining interclass distances between profile indicators (Price et al., 2022), Tein and colleagues (2013) stated that the use of interclass distances as a metric to detect power may be challenging if heterogeneity of means and variances among indicators is present. Recent literature recommended the use of Monte Carlo simulation to determine adequacy of power and estimate model performance (Sinha et al., 2021; Olivera-Aguilar & Rikoon, 2018). Given this, prior to LPA analyses, a Monte Carlo simulation with 10000 repetitions was conducted to compare three commonly used fit indices (e.g., AIC, BIC, SABIC) based upon distinct sample sizes (n = 50, 75, 100, 125, 150, 200, 250, 300). Secondly, Alfaki and colleagues (2023) recommended using traditional power methods (e.g., Cohen's d) to determine whether there is sufficient statistical power to detect differences between profiles for each indicator. Thus, a second power analysis, a two-tailed, independent-samples *t*-test for 12 comparisons (3 profiles with 4 indicators) with Sidak correction, was carried out.

Regarding Monte Carlo estimates, a series of Monte Carlo simulations with 10000 repetitions were conducted using eight different sample sizes (n = 50, 75, 100, 125, 150, 200, 250, 300) within *Mplus* 8.3 (Muthén & Muthén, 2017). For each hypothetical sample size, a 2-, 3-, 4-, and 5-profile solution was estimated. Model comparisons suggested a 3-profile solution outperformed other profile solutions regardless of sample size (see Table 2 for fit indices). For the second power analysis, Tein et al. (2013)'s simulation study found that 62.5% of published LPA papers had a Cohen's *d* between 0.8 and 1.25 for all pairs of indicators across adjacent profiles. Guided by this finding, a two-tailed, independent-samples *t*-test for 12 comparisons (3 profiles with 4 indicators) with Sidak correction, was conducted. With an alpha of 0.05, power of 0.8, and Cohen's *d* of 0.80 or 1.20, and considering that the indicators are nested within each of the three profiles, a total sample size of 135 or 66 dyads, respectively would be needed to detect the hypothesized effect. In sum, results from the two power analyses suggested the present study's sample size of 100 mother-child dyads was sufficient to run the LPA.

For Aim 1, an LPA was conducted in *Mplus* (Version 6.11) to examine profiles of maternal self-regulation using measures of maternal self-regulatory behaviors (i.e., *Me as a Parent* questionnaire, positive affect, negative affect, maternal supportive presence). The LPA allowed for estimation of quantitatively different groups and operated under the assumption that these groups cannot be observed a priori, allowing researchers to detect unseen maternal self-regulation patterns within the data using both self-report questionnaires and behavioral observations. The optimal number profile solution was based on multiple fit indices. The number of mothers in each profile was determined by participants' latent profile membership. The following model fit indices were included: Akaike's Information Criterion (AIC; Akaike, 1987; Tein et al., 2013), Bayesian Information Criterion (BIC; Schwarz, 1978; Nylund et al., 2007), Sample-adjusted Bayesian Information Criterion (SABIC; Kim, 2014), the Lo-Mendell-Rubin Likelihood Ratio Test (LMR LRT; Lo, Mendell, & Rubin, 2001), and the Bootstrapped Likelihood Ratio (BLRT; Peel & McLachlan , 2000). For the AIC, BIC, and SABIC, lower values indicated better model fit. The Lo–Mendell–Rubin Likelihood Ratio Test (LMR LRT; Lo, Mendell, & Rubin, 2001) and the Bootstrapped Likelihood Ratio Test (BLRT; Peel & McLachlan, 2000) were also calculated where latent profile solutions with lower p values ($p < .05$) were preferred. Entropy values were also evaluated with higher entropy values representing greater classification uncertainty and a higher likelihood of assigning true latent profiles (Masyn, 2013; Tein et al., 2013). Finally, the percentage of the smallest latent profile was examined. Profiles containing less than 5% of the sample were considered spurious and were disregarded (Ferguson et al., 2020).

To assess for physiological synchrony via RSA, multilevel models were run using Hierarchical Linear Modeling 8.0 software (HLM; Raudenbush et al., 2019). Multilevel modeling simultaneously estimates both between-dyad (BD) and within-dyad (WD) effects. The BD effect assesses whether mother's average RSA during the stress task is related to child's average RSA during the stress task, whereas the WD effect assesses whether mother and child RSA temporally coordinate over the course of the stress task (Creaven et al., 2014; Hale et al., 2023). When estimating the WD effect, the magnitude of change in RSA during each epoch is compared to the individual's average RSA. Both the BD and WD effects are used to reflect the prediction of children's RSA by maternal RSA. Once calculated, synchrony is represented by a coefficient on a continuum indicating both the strength (i.e., positive/negative) and direction (i.e., strong/weak) of synchrony. Positive synchrony reflects values on the continuum that are greater than 0 whereas negative synchrony reflects values less than 0. Dyads who exhibit more similar magnitudes of change in RSA over the course of the stress task will have higher values demonstrating stronger physiological synchrony (e.g., mother and child RSA magnitude increasing and decreasing together) than dyads with dissimilar magnitudes of change (e.g., mother increasing drastically whereas child demonstrates small increase in RSA).

Based upon previous research, child RSA was the dependent variable in the multilevel model (Merwin et al., 2017; Pratt et al., 2019; Suveg et al., 2019). The WD effect was depicted at Level 1 of the model, whereby child RSA in dyad *j* in epoch *i* was a function of the intercept, $ß_{0j}$, which represented the rate of change in child RSA that was associated with concurrent variation in mother's person-mean centered RSA during the stress task, $ß_{1j}$, and the residual within-dyad error term, r_{ij}. Mother's RSA was person-mean centered to reflect within-dyad variation (e.g., Merwin et al., 2017; Pratt et al., 2019; Suveg et al., 2019). Within Level 2 of the model, the BD effect reflected variability in the Level 1 intercept and slope. BD analyses used intercept- and slope-as-outcome equations, where both the intercept and slope were modeled as random across dyads. The intercept was modeled as a function of the average intercept, γ_{00}, mothers' grand-mean centered RSA, γ_{01}, and the residual error term, μ_{0j}. The slope was modeled as the grand slope, γ_{10}, and the residual error term, μ_{1j}. Maternal average RSA, child gender, and income were included as covariates at Level 2, γ_{02}. A significant BD effect indicates maternal RSA and child RSA correlate on average, whereas a WD effect indicates maternal and child RSA correlate over the course of the stress task. The WD effect was used as a measure of physiological synchrony. The equation below demonstrates the tested model:

Level 1:

$$\text{Child RSA}_{ij} = ß_{0j} + ß_{1j}\,(\text{Mom \_ RSA}_{ij}) + r_{ij}.$$

Level 2:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\,(\text{Mom\_Avg\_RSA}_j) + \gamma_{02}\,(\text{Child\_Gender}_j\,) + \gamma_{03}\,(\text{Income}_j) + \mu_{0j}$$

$$\beta_{1j} = \gamma_{10} + \mu_{1j}.$$

To test Aim 2, analyses of covariance (ANCOVAs) were conducted to assess mean differences of positive behavioral synchrony and physiological synchrony between the unique maternal self-regulatory profiles determined through the LPA. ANCOVAs were conducted in SPSS (IBM Software Version 27.0). Partial eta squared (η^2) values were calculated to determine effect sizes for variables within the ANCOVA. The following interpretations were used for effect sizes: .01 = *small effect size*, .06 = *medium effect size*, .14 or higher = *large effect size* (Richardson et al., 2011). Post-hoc tests (e.g., Tukey, Bonferroni) were calculated to determine statistically significant differences between maternal self-regulatory groups. For any post hoc comparisons, *Cohen's d* or *Hedges' g* was computed with the following interpretation: .2 = *small*, .5 = *medium*, .8 and above = *large* (Fritz et al., 2012).

CHAPTER 3

RESULTS

Descriptive Statistics and Bivariate Correlations

Table 1 presents means, standard deviations, and correlations for demographic factors, maternal self-regulatory behaviors (i.e., *Me as a Parent* questionnaire, positive affect, negative affect, maternal supportive presence), positive behavioral synchrony, and physiological synchrony during the stress task.

Missing Data

Five dyads had missing scores for the *Me as a Parent* questionnaire due to not completing the measure. Two Latinx families did not have behavioral observation codes (e.g., positive affect, negative affect, maternal supportive presence, positive behavioral synchrony) as a result of technological difficulties during data collection. Nine dyads of the 100 participating families had missing physiological data due to trouble collecting physiological data (n = 5) or cleaning procedures that required more than 10% of the data to be altered (n = 4). An ANOVA showed no significant differences between dyads with and without physiological data on any study variables. Additional ANOVA analyses revealed no significant differences between Latinx and Black families with respect to positive behavioral synchrony, mother and child average RSA, and mother positive affect, negative affect, maternal supportive presence, and the *Me as a Parent* questionnaire. Given no significant differences between dyads with and without physiological data as well as no differences between Latinx and Black families on study variables, data were considered missing at random and full information maximum likelihood was used (Larsen, 2011).

LPA Analyses

Model Comparison and a Three-Profile Solution

An LPA was conducted to detect maternal self-regulation profiles based on their patterns of scores on the following facets of SR: *Me as a Parent* questionnaire*,* positive affect, negative affect, and maternal supportive presence. Fit statistics for the profile solutions are displayed in Table 3. The one, two, and four-profile solutions were not endorsed due to comparable or worse fit statistics compared to the three-profile model. The three-profile solution showed a lower AIC, BIC, and SABIC values than both a one- and two-profile solution and had significant LMR and BLRT *p*-values compared to the two-profile solution. A four-profile solution yielded a spurious profile (Sample percentage = 4.40%). Thus, the three-profile solution was determined to be the best representation of the data.

Three-Profile Solution Characterization

For the three-profile solution (see Table 4), Profile 1 was characterized by mean levels of maternal self-regulation across the sample and represented the largest subgroup (71.73% of sample), thus referred to as the *average maternal self-regulation* profile. Profile 2, thus referred to as the *unaware and behaviorally dysregulated* profile, (14.48% of sample) reported higher levels of parenting self-regulation yet exhibited lower levels of maternal supportive presence, average levels of positive affect, and higher levels of negative affect during the mildly stressful parent-child interaction task. Profile 3 (13.79% of sample) endorsed lower levels of parenting self-regulation but demonstrated higher levels of maternal supportive presence and positive affect as well as comparable levels of negative affect to Profile 1 and is henceforth referred to as the *aware and behaviorally regulated* profile.

RSA Synchrony

The BD effect, which assessed whether average maternal RSA was related to average child RSA, was not significant ($\gamma_{01} = 0.02$, $p = .898$). The effects of child gender ($\gamma_{02} = 0.10$, $p = .657$) and income ($\gamma_{03} = -0.04$, $p = .244$) were not significant. The WD effect, assessing whether mother and child RSA were dynamically coordinated across the stress task, was also not significant ($\gamma_{10} = -0.02$, $p = .597$). Given that physiological synchrony was not detected during the stress task, it was not possible to determine whether there were profile differences based on this variable.

Profile Associations with Demographic Variables

Given significant correlations between yearly income level and child age with profile indicators as well as positive behavioral synchrony (see Table 1 for more details), a one-way multivariate analysis of variance (MANOVA) was conducted to examine whether there were differences between the three maternal self-regulation profiles for income and child age. Results indicated there were significant differences across maternal self-regulation profiles for income and child age ($F(4, 180) = 3.74$, $p = .006$, Wilks' $\lambda = .85$, $\eta^2 = .08$). Post hoc Tukey comparisons indicated mothers in the *aware and behaviorally regulated* reported significantly higher income (Mdiff = 3.38, $p = .03$, 95% C.I., [.26, 6.50], $d = 1.03$) and had children who were significantly older (Mdiff = 1.74, $p = .01$, 95% C.I., [.38, 3.10], $d = 1.54$) than the *unaware and behaviorally dysregulated* profile. No significant differences were detected between the *aware and behaviorally regulated* profile and the *average maternal self-regulation* profile with respect to income or child age.

Profile Association with Positive Behavioral Synchrony

A one-way ANCOVA (Figure 1) was conducted to determine whether the three profiles varied on levels of positive behavioral synchrony while controlling for income and child age.

The three profiles showed significantly different levels of positive behavioral synchrony ($F(2, 92) = 7.80$, $p < .001$, $\eta^2 = .15$) when controlling for income ($p = .25$) and child age ($p = .24$). Post hoc comparisons indicated that mothers in the *aware and behaviorally regulated* profile demonstrated significantly higher levels of positive behavioral synchrony than the *average maternal self-regulation* (*M*diff = 1.36, $p = .02$, 95% C.I., [.21, 2.51], Hedges' $g = .91$) and *unaware and behaviorally dysregulated* profiles (*M*diff = 2.51, $p < .001$, 95% C.I., [.96, 4.07], $d = 2.12$). Results also indicated mothers in the *average maternal self-regulation* profile demonstrated significantly higher levels of positive behavioral synchrony than the *unaware and behaviorally regulated* profile (*M*diff = 1.15, $p = .046$, 95% C.I., [.02, 2.29], Hedges' $g = .72$).

CHAPTER 4
DISCUSSION

There is a gap in the extant literature on how mothers' self-regulation strategies in the parenting context relate to synchrony between parent-child dyads. While previous literature has linked broader parenting behaviors to positive behavioral synchrony and physiological synchrony, less is known about specific maternal self-regulation processes that relate to dyadic synchrony, particularly among families from underrepresented racial or ethnic groups (Bell, 2020; DePasquale, 2020). Poor maternal self-regulation may undermine parent-child synchrony processes while adaptive maternal self-regulation may allow parents to more easily attune to their children's socioemotional needs. Thus, research is needed to identify the specific maternal self-regulation processes that influence behavioral and physiological synchrony. Guided by the Self-Regulation Intergenerational Transmission Model, the current study is among the first to examine maternal self-regulation as a multidimensional construct (i.e., self-report, behavioral observation) and its association with positive behavioral synchrony and physiological synchrony with Latinx and Black mother-child dyads (Bridgett et al., 2015; Feldman, 2007). Furthermore, the use of LPA moves beyond previous work testing variable-specific models by conducting person-centered analyses.

The first aim of the study was to identify profiles of maternal self-regulation using LPA. No specific predictions were made regarding the number of profiles that would emerge from the data, but it was hypothesized that a profile of *average* levels of maternal self-regulation representing a majority of the sample as well as a smaller subset of mothers demonstrating patterns of *maladaptive* maternal self-regulation would emerge. Three profiles of maternal self-regulation emerged from the analyses: the *average maternal self-regulation* profile, the *unaware and behaviorally dysregulated* profile, and the *aware and behaviorally regulated* profile. Profile patterns are consistent with other LPA's that found three and four profile solutions when examining parenting styles and parental emotion regulation processes (McKee et al., 2022; Qiu et al., 2022; Sosa-Hernandez et al., 2020).

The first hypothesis that a profile for "*average*" levels of maternal self-regulation would emerge and represent a majority of the sample was supported, given that 71.73% of mothers in the study fell into this profile. This profile represented mothers with indicator values close to sample mean levels of maternal self-regulation assessed via self-report and behavioral observations. The *average* profile is similar to that of Sosa-Hernandez et al.'s (2020) and Miller-Slough et al.'s (2017) *"balanced"* profiles of parental emotion socialization, which consisted of moderate levels of supportive and unsupportive socialization strategies primarily among White mothers and fathers and their 8- to 12-year-olds. Self-reports of parenting self-regulation within the study were also within one standard deviation of mean parenting self-regulation levels collected during the original development and validation of the *Me as a Parent* questionnaire within a sample of middle-to high socioeconomic status Australian parents (Hamilton et al., 2015). Thus, extant literature is consistent with an overall pattern of average maternal self-regulation among Latinx and Black mothers found within this profile (Hamilton et al., 2015).

The hypothesis that a small subset of mothers would demonstrate maladaptive maternal self-regulation was partially supported. Two profiles consisting of smaller subsets of mothers were identified and represented more and less adaptive maternal self-regulation. For both of these profiles, self-reported self-regulation strategies were discordant with observed characteristics of maternal-self-regulation (i.e., positive affect, negative affect, maternal supportive presence). Mothers with higher levels of self-reported parenting self-regulation exhibited the lowest levels of maternal self-regulation strategies during the parent-child interaction task. Conversely, mothers with lower levels of self-reported parenting self-regulation demonstrated positive levels of maternal self-regulation strategies during the stress task. Thus, the second profile, the *unaware and behaviorally dysregulated* profile (14.48%) represented mothers who perceived themselves as competent within their parenting role (e.g., ability to problem solve, adapt to parenting challenges) but demonstrated higher levels of negative affect, average levels of positive affect, and lower levels of maternal supportive presence throughout the mildly stressful dyadic task. Mothers within this profile reported their parenting self-regulation greater than one standard deviation (i.e., approximately 7 points) above the mean score reported during the development and validation of the *Me as a Parent* questionnaire (Hamilton et al., 2015). Shaffer and colleagues (2018) "*responsive-expressive"* cluster is similar to the above profile, as the cluster demonstrated elevated levels of observed negative affect and RSA, yet low levels of self-reported emotion regulation difficulties.

It may be that mothers within the *unaware and behaviorally dysregulated* profile are less mindful regarding their abilities to regulate their emotions in the context of parenting, which has implications for the parent-child relationship. Mothers within this profile may also be experiencing additional contextual stressors (e.g., financial hardship, intensive caregiving responsibilities) that impact their ability to attend to their own and their children's socioemotional needs resulting in lower levels of supportive presence and higher levels of negative affect observed during the parent-child interaction task. Research demonstrates that perceptions of life stress can weaken the positive link between maternal mindfulness and positive parenting behaviors among Chinese mothers of school-age children (Ren et. al., 2021). This is further substantiated by our findings indicating mothers within the *aware and behaviorally regulated* profile reported higher levels of income than the *unaware and behaviorally dysregulated* profile. Similarly, Shaffer and colleagues (2018) found that mothers within the *well-regulated* cluster reported indicators of socioeconomic privilege (e.g., higher education level, two-parent household) compared to other clusters. Mothers in the *aware and behaviorally regulated* profile also reported having older children than mothers in the *unaware and behaviorally dysregulated* group. Thus, it may be that mothers within the *unaware and behaviorally dysregulated* profile have less practice reflecting on their parenting self-regulation or are less knowledgeable surrounding the importance of self-reflection in the parenting context given their children are reportedly younger. Nevertheless, reflection on and awareness of one's self-regulation in the parenting role seem critical for healthy parenting behaviors and the promotion of healthy family dynamics (Shaffer et al., 2018; Spinrad et al., 2020; Zhang et al., 2019).

The third profile, the *aware and behaviorally regulated* profile (13.79%) was comprised of mothers who endorsed lower levels of parenting self-regulation but demonstrated higher levels of positive affect, average levels of negative affect, and higher levels of maternal supportive presence relative to the sample. Though mothers in this group demonstrated the lowest self-reported levels of parenting self-regulation in the current sample, levels of self-reported parenting self-regulation were comparable to mean scores reported in the validation study (Hamilton et al., 2015). This profile coincides with elements of Sosa Hernandez et al.'s and Wang et al.'s profiles characterized by high supportive parental responses (i.e., encouragement, emotion-focused) and low unsupportive parental responses (i.e., punitive, minimizing). Thus, results across studies indicate a subset of mothers who engage in behaviorally regulated parenting behaviors during parent-child interactions.

Interestingly, no LPA to date has noted differences between mothers' reports of their own self-regulation and behavioral observations of their self-regulation behaviors. Yet, a growing body of literature examining the role of parental mindfulness and emotional awareness in promoting positive parenting practices and child self-regulation development could explain this discrepancy (Lengua et al., 2021; McKee et al., 2022; Rodriguez & Shaffer, 2021). Mothers who are mindful of their own parenting may exhibit positive parenting behaviors (i.e., emotional awareness, flexible responses to child behavior, reflection) that improve their overall parenting self-regulation and help to effectively model regulation for their child (Duncan et al., 2009; McKee et al., 2022). In turn, continued parental reflection and positive parenting behaviors can allow for greater emotional attunement during parent-child interactions, which encourages positive behavioral synchrony (Birk et al., 2022; Davis et al., 2018).

The second aim of the study was to examine differences in positive behavioral synchrony and physiological synchrony across the different maternal self-regulation profiles. Our hypothesis that mothers with average or adaptive maternal self-regulation would exhibit higher levels of positive behavioral synchrony and positive and strong physiological synchrony was partially supported. With regard to links to positive behavioral synchrony, findings indicated that mothers within the *aware and behaviorally regulated* profile demonstrated significantly higher levels of positive behavioral synchrony than mothers within the *average maternal self-regulation* and the *unaware and behaviorally dysregulated* profiles while controlling for income and child age. Results also indicated mothers in the *average maternal self-regulation* profile demonstrated significantly higher levels of positive behavioral synchrony than the *unaware and behaviorally regulated profile*. While no studies to date have examined the link between maternal self-regulation and positive behavioral synchrony in middle childhood, findings are consistent with theory stating that adaptive maternal self-regulatory strategies allow parents to flexibly respond to children's socioemotional behaviors in a way that strengthens parent-child synchrony processes (Davis et al., 2018). Our findings are also consistent with that of Shaffer and colleagues (2018) who detected differences between "*well-regulated*" and "*dysregulated*" clusters such that dyads in the dysregulated cluster demonstrated lower dyadic collaboration and encouragement of child self-regulation. Shaffer et al. (2018) attributed these robust effects to the role of effective maternal self-regulation in promoting dyadic collaboration, an indicator of positive mother-child behavioral synchrony. Thus, it is possible mothers within the *aware and behaviorally regulated* profile exhibited positive parenting practices (e.g., self-reflection, warmth, encouragement) that promoted positive behavioral synchrony above and beyond mothers demonstrating average parenting self-regulation and mothers with lower observed parenting self-regulation.

Our hypothesis that maternal self-regulation profiles would be associated with mother-child physiological synchrony was not supported by the findings. Findings indicated both the BD and WD effects for the relationship between average mother and child RSA and mother and child RSA concordance were not significant. It is possible that the ability to detect distinct patterns of RSA concordance across the three self-regulation profiles may have been limited by the exclusion of variables that could explicate the relationship between mother and child RSA. Previous literature has identified moderators (e.g., psychopathology symptoms, mother and child NA) of RSA synchrony (Hale et al., 2023; Suveg et al., 2019). Thus, it could be that synchrony exists for just some groups within the larger sample. However, much larger sample sizes are needed to adequately examine moderators of RSA synchrony while considering profiles of maternal self-regulation.

Limitations and Future Directions

Findings should be considered within the context of the study limitations. The current study only examined parenting self-regulation in the context of mother-child relationships. During the initial stages of the study, a small number of fathers were recruited; however, continued recruitment of fathers was challenging mostly due to time constraints (e.g., working late hours, working outside of the home). As a result, fathers were removed from analyses due to the small sample size and to specifically contextualize maternal self-regulation behaviors. Future work should identify strategies for engaging fathers in research to examine the unique role of father self-regulation in shaping behavioral and physiological synchrony (Lunkenheimer et al., 2021; Kerr et al., 2021). While our study is among the first to examine self-regulation among mothers from underrepresented racial and ethnic groups, differences in parenting self-regulation between Latinx and Black mothers were not examined due to our small sample size. Future research should work to highlight the role of unique cultural contexts experienced by racial and ethnic minority families (Arikan & Kumru, 2023; Kiel & Kalomiris, 2015). Future work should also consider profiles of maternal self-regulation across different developmental stages (i.e., adolescence), as parents' involvement in shaping child self-regulation shifts as children spend more time with peers and in social settings (Cui et al., 2020).

Furthermore, there were large differences with respect to sample sizes within the three profiles. Differences across sample size when conducting ANCOVA's may reduce power to detect mean differences between profiles and violate the assumption of homogeneity of variance across groups. Physiological synchrony was assessed via RSA, which typically serves as an indicator of stress and arousal within the parasympathetic nervous system. Given RSA is only one way to measure physiological synchrony, future research should consider using other indexes of physiological arousal such as respiration and heart rate variability in examining physiological synchrony between mother-child dyads. Continued research on multidimensional parenting self-regulation as it relates to physiological synchrony should be considered using larger sample sizes given the potential for novel intervention development (Lunkenheimer et al., 2023). Given the discrepancy between maternal self-regulation behaviors reported via self-report questionnaires versus observed behaviorally, future work should also examine potential explanations for differences across methodologies as discrepancies may provide additional information about the role of insight in shaping maternal self-regulation. Finally, researchers should work to explore additional indices of maternal self-regulation that may be important for positive behavioral synchrony in mother-child dyads (e.g., cognitive reappraisal, emotional lability).

Guided by the Self-Regulation Intergenerational Transmission Model, the present study examined profiles of maternal self-regulatory behaviors across multiple methodologies (e.g., self-report, behavioral observation) as well as potential differences in both positive behavioral synchrony and physiological synchrony. This study is among the first to examine maternal self-regulation via person-centered analyses among Latinx and Black parents and their school-age children, who are often underrepresented within developmental science. Results extend previous literature highlighting patterns of average, well-regulated, and dysregulated mothers by noting important discrepancies in what parents are reporting regarding their own self-regulation versus their observed self-regulation behaviors during parent-child interactions. Preliminary evidence suggests that parents who are emotionally aware of their own parenting self-regulation may exhibit positive parenting behaviors resulting in higher observed self-regulation and positive behavioral synchrony. The current work highlights the importance of examining maternal self-regulation in shaping positive behavioral synchrony, which has critical implications for scaffolding child emotion regulation and improving the overall parent-child relationship.

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Tables and Figures

Table 1

Descriptive Statistics and Correlations for Demographics and Study Variables

Variable	*M* (*SD*)	1	2	3	4	5	6	7	8	9
1. Income	6.28 (3.36)	-								
2. Child Age	6.89 (1.51)	.11	-							
3. Child Gender	1.51 (.50)	-.02	-.11	-						
4. Positive Behavioral Synchrony	4.69 (1.60)	.21*	-.02	-.04	-					
5. WD Physiological Synchrony	-.04 (.05)	.11	.19	-.007	-.13	-				
6. *Me as a Parent* questionnaire	69.27 (7.78)	.02	-.25*	.02	-.004	.04	-			
7. Positive Affect	1.69 (.88)	.26*	.008	-.16	.27**	-.14	-.02	-		
8. Negative Affect	1.18 (.46)	-.28**	-.27**	.03	-.32**	-.10	.11	-.08	-	
9. Maternal Supportive Presence	4.67 (1.59)	.17	-.10	-.09	.84**	-.10	-.10	.30**	-.35**	-

Note. $^{*}p < .05$, $^{**}p < .01$. Child Gender (1 = boy; 2 = girl); Income: 1 = $0 - $5,000, 2 = $5,001 - $10,000, 3 = $10,001 - $15,000, 4 = $15,001 - $20,000, 5 = $20,001 - $25,000, 6 = $25,001 - $30,000, 7 = $30,001 - $35,000, 8 = $35,001 - $40,000, 9 = $40,001 - $50,000, 10 = $50,001 - $60,000, 11 = $60,001 - $70,000, 12 = $70,001 - $80,000, 13 = $80,001 - $90,000, 14 = $90,001 - $100,000, 15 = $100,001 or more.

Table 2

Mean Scores of AIC, BIC, and SABIC for Estimated Models

	2-Profiles			3-Profiles			4-Profiles			5-Profiles		
n	AIC	BIC	SABIC	AIC	BIC	SABIC	AIC	BIC	SABIC	AIC	BIC	SABIC
50	724.830	749.686	708.881	685.942	720.358	663.859	688.467	732.444	660.251	692.037	745.573	657.686
75	1082.328	1112.455	1071.483	1021.037	1062.751	1006.020	1023.915	1077.217	1004.727	1026.357	1091.246	1002.998
100	1439.583	1473.451	1432.393	1356.269	1403.162	1346.313	1359.138	1419.057	1346.417	1361.390	1434.335	1345.904
125	1791.076	1833.844	1792.736	1691.414	1742.324	1685.405	1693.646	1758.697	1685.967	1696.569	1775.762	1687.221
150	2154.583	2193.721	2152.579	2026.314	2080.505	2023.539	2028.344	2097.589	2024.798	2031.656	2115.954	2027.339
200	2869.059	2911.937	2870.751	2695.710	2755.080	2698.054	2697.871	2773.732	2700.866	2700.467	2792.820	2704.113
250	3583.725	3629.504	3588.293	3365.326	3428.712	3371.651	3367.669	3448.662	3375.750	3370.275	3468.876	3380.113
300	4298.410	4346.559	4305.330	4033.925	4100.593	4043.508	4036.966	4122.153	4049.211	4039.644	4143.350	4054.550

Note. AIC = Akaike's Information Criterion, BIC = Bayesian Information Criterion, SABIC = Sample-adjusted Bayesian Information Criterion.

Table 3

Fit Statistics for One- to Four-Profile Solutions

Number of Profiles	Log Likelihood	AIC	BIC	SABIC	Entropy	Smallest %	LMR adj. LRT *p* value	BLRT *p* value
1	-678.891	1373.781	1394.542	1369.278	N/A	N/A	N/A	N/A
2	-615.596	1257.191	1290.928	1249.873	0.946	14.48%	0.42	<.01
3	-599.362	1234.724	1281.436	1224.591	0.899	13.79%	0.02	<.001
4	-566.103	1178.205	1237.893	1165.258	0.93	4.40%	0.76	<.001

Note. AIC = Akaike information criterion, BIC = Bayesian information criterion, VLMR LRT = Vuong-Lo-Mendell-Rubin likelihood ratio, LMR adj. LRT = Lo-Mendell Rubin adjusted likelihood ratio test, BLRT = parametric bootstrap likelihood ratio test. LMR adjusted and BLRT statistics compare K to $K – 1$, where K is the number of classes in that solution.

Table 4

Means and Standard Deviations of Maternal Self-Regulation Measures for Three-Profile Solution

Measure	**Profile 1 Average Maternal Self-Regulation**	**Profile 2 Unaware and behaviorally dysregulated**	**Profile 3 Aware and behaviorally regulated**
Percentage of sample (N)	71.73% (73)	14.48% (13)	13.79% (13)
Maternal Self-Regulation Measures			
Maternal Supportive Presence	4.62 (.18)	3.54 (.42)	6.08 (.41)
Positive Affect	1.39 (.08)	1.54 (.18)	3.38 (.23)
Negative Affect	1.00 (0)	2.23 (.12)	1.00 (0)
Me as a Parent questionnaire	69.17 (.97)	71.97 (1.99)	66.95 (2.06)

Note. Group means for measures within the three-profile solution are presented in the columns.

Table 5

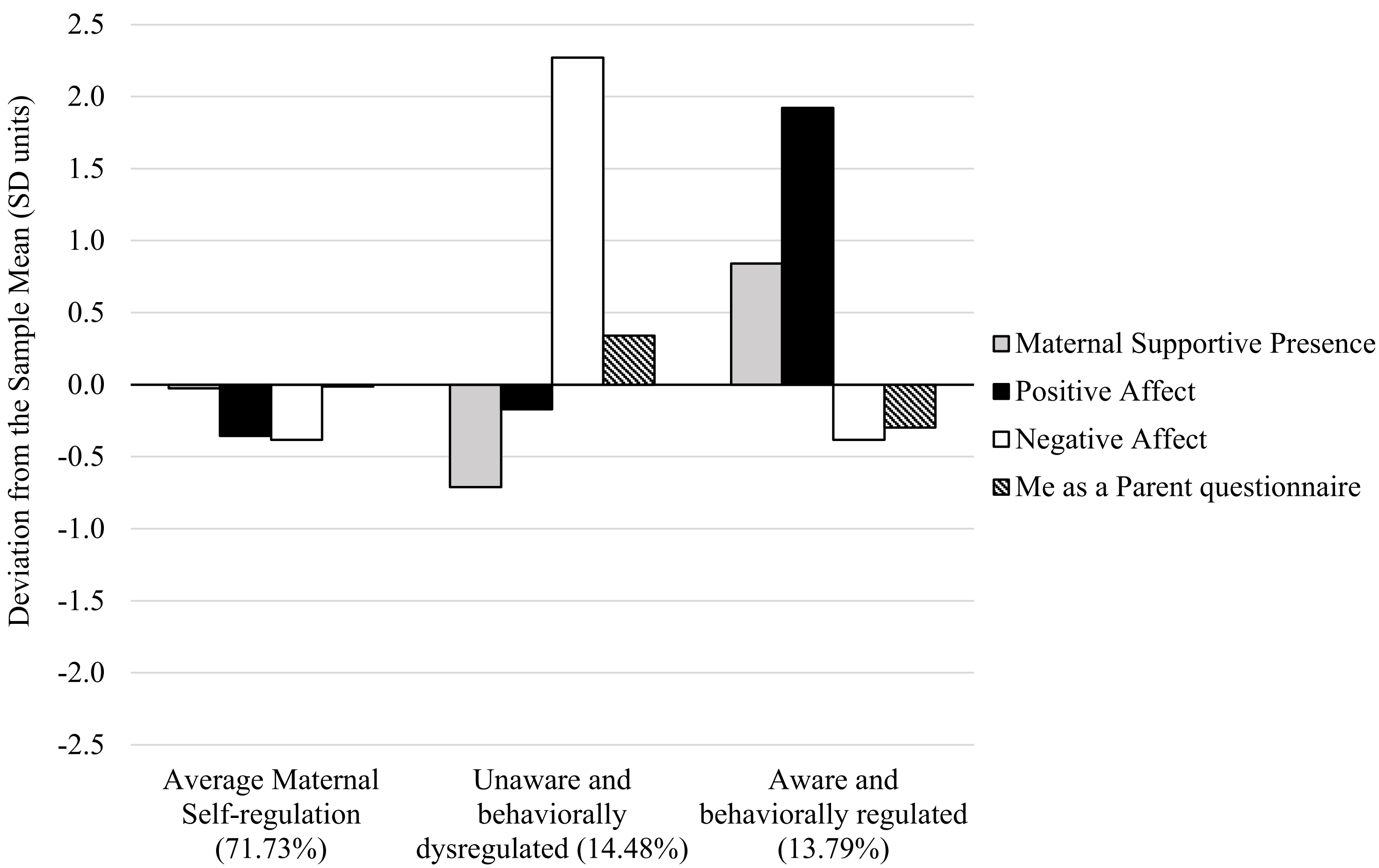
Mean Difference between Mother Self-Regulation Profiles by Positive Behavioral Synchrony and Demographic Variables

	F (*df*)	*p*	*Average Maternal Self-Regulation M (SE)*	*Unaware and behaviorally dysregulated M (SE)*	*Aware and behaviorally regulated M (SE)*
Positive Behavioral Synchrony	7.80** (2, 93)	< .001	4.74 (.18) [b]	3.59 (.43) [c]	6.10 (.44) [a]
Income	3.34* (2, 93)	.04	6.32 (.39) [ab]	4.54 (.91) [b]	7.92 (.95) [a]
Child Age	4.77* (2, 93)	.01	6.91 (.17) [ab]	5.92 (.40) [b]	7.67 (.41) [a]

Note. $^{*}p < .05$, $^{**}p < .01$. Different superscripts indicate a significant difference between groups within each sample. Income: 1 = $0 - $5,000, 2 = $5,001 - $10,000, 3 = $10,001 - $15,000, 4 = $15,001 - $20,000, 5 = $20,001 - $25,000, 6 = $25,001 - $30,000, 7 = $30,001 - $35,000, 8 = $35,001 - $40,000, 9 = $40,001 - $50,000, 10 = $50,001 - $60,000, 11 = $60,001 - $70,000, 12 = $70,001 - $80,000, 13 = $80,001 - $90,000, 14 = $90,001 - $100,000, 15 = $100,001 or more.

Figure 1

Deviation from Sample Mean for Three-Profile Solution with Maternal Self-Regulation Measures



Note. Maternal Supportive Presence = behaviorally coded from interaction task; Positive Affect = behaviorally coded from interaction task; Negative Affect = behaviorally coded from interaction task; *Me as a Parent* questionnaire = total score; Percentages reflect % of sample within each profile.