

Perspectives of Parent-Adolescent Conflict and Mexican-origin Adolescents' Adjustment

by

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ABSTRACT

Understanding the extent to which adolescents and parents have shared and unique perceptions of parent-adolescent conflict is an important area for developmental research, considering that shared views have been described to operate as a source of risk or protection in links with adjustment. Research on shared and unique perspectives of conflict has rarely been examined in Latinx families but may be particularly salient given cultural values that emphasize family cohesion and interdependence. Participants were mothers, fathers, and two adolescent siblings in 246 Mexican-origin families. All four family members reported on parent-youth conflict during in-home interviews and adolescents reported on their depressive symptoms, grade point average, and educational expectations. Grounded within a family systems perspective, the goals of this study were to examine a measurement model of shared and unique perspectives of parent-adolescent conflict, and investigate the links from shared and unique perspectives of parent-adolescent conflict to adolescent depressive symptoms, grade point average, and educational expectations. Findings revealed support for the measurement model that included shared (i.e., general family, triad, and dyad) and unique (i.e., mother, father, older sibling, younger sibling) perspectives of parent-adolescent conflict. Further, the family shared and unique perspectives were positively associated with adolescent depressive symptoms and the family shared perspective was negatively associated with grade point average. Findings provided insights on sources of variation in parent-adolescent conflict within the family system that may serve as a potential risk for youth adjustment.

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CHAPTER 1

INTRODUCTION

Parent-adolescent conflict, defined as differences of opinion or disagreements about issues or topics (Smetana, 1988), is more common in adolescence than earlier developmental periods (Laursen & Collins, 1994; Pasch et al., 2006). These conflicts primarily focus on topics central in day-to-day family life, such as getting along with siblings, doing homework, and completing chores (Smetana, 1988; Galambos & Almeida, 1992; Updegraff et al., 2009). In studying the nature of parent-adolescent conflict, researchers have measured parent-adolescent conflict in different ways, including the occurrence or frequency of conflicts, the content or topics that are sources of conflict, and the emotional intensity of these conflicts (Marshall et al., 2022); typically reports of conflict are assessed either by adolescents' or their parents' (primarily mothers') reports, and less often by considering the perspectives of parents and adolescents *simultaneously* (Branje, 2018; Galambos & Almeida, 1992; Laursen & Collins, 1994; Smetana, 1988). Although ratings provided by parents and adolescents suggest that conflict regarding daily issues is common (Laursen & Collins, 1994), research shows that the frequency and intensity of conflict is associated with youth adjustment among youth from a range of sociocultural backgrounds (Weymouth et al., 2016; Céspedes & Huey, 2008; Dotterer et al., 2008). Further, conflict in parent-youth relationships may be particularly salient for Latinx youth adjustment given cultural values that prioritize family cohesion and harmony (Cahill et al., 2021). In the present

study, parent-adolescent conflict was operationally defined as the frequency of conflict regarding various topics (e.g., finances, chores) between parents and youth and a shared perspective of parent-adolescent conflict is defined as the co-occurrence of dyadic parent-adolescent conflict among mother-older sibling, mother-younger sibling, father-older sibling, and father-younger sibling dyads.

Parent-Adolescent Conflict

There is consensus that adolescence is a period when conflicts between parents and youth increase in both frequency and significance (De Geode et al., 2009; Laursen et al., 1998; Smetana & Rote, 2019). From a developmental perspective, biological, cognitive, and social developmental maturation of youth has implications for the parent-youth relationship. That is, these maturation processes shape how youth view, interpret, and respond to conflicts (Branje, 2018; Smetana, 1988; Steinberg, 2001). Further, from a social relational perspective, these changes have implications for the organization and structure of the parent-adolescent relationship, including the balance of power and authority and opportunities for autonomy and decision-making (Branje, 2018; Adams & Laursen, 2001). Collectively, these processes have implications for the frequency, intensity, and content of parent-youth conflict (Branje, 2018; Laursen & Collins, 1994).

Looking at how conflict unfolds across adolescence, early research suggested that parent-adolescent conflict increases in early adolescence, remains stable in middle adolescence, and decreases in late adolescence (Montemayor, 1983). Subsequent research on developmental trajectories of parent-adolescent conflict shows that patterns of change may depend on how conflict is measured (Laursen & Collins, 1994). In a meta-analysis,

the intensity of parent-adolescent conflict (affect) increased from early to middle adolescence, whereas the frequency of parent-adolescent conflict (total and rate) decreased from early adolescence to middle adolescence and middle to late adolescence (Laursen et al., 1998). Notably, in this early body of research (Montemayor, 1983; Laursen & Collins, 1994; Laursen et al., 1998), the race and ethnic compositions of the samples were not reported, limiting our understanding of the generalizability of these findings to diverse groups of youth. In empirical research, there have been changes documented across adolescence in the frequency of conflict with mothers and fathers among European American families (Shanahan et al., 2007) and intensity of conflict with mothers and fathers among predominately Dutch families (De Geode et al., 2009; Hadiwijaya et al., 2017), with some evidence of peak levels of conflict occurring during early to middle adolescence.

Developmental changes also may depend on the content or topic of parent-adolescent conflict during adolescence (Smetana, 1988). One early study found that patterns of change in parent-adolescent conflict depended on the topic of conflict (e.g., chores, finances; Galambos & Almeida, 1992). Specifically, the frequency of parent-adolescent conflict over finances was found to increase from 6th grade into middle school, but for other domains of conflict (e.g., chores, appearance, and politeness) there was a decrease during this same period (Galambos & Almeida, 1992). However, there has been limited work on the developmental trajectories of specific topics of conflict, and most recent studies examine frequency of conflict averaged across different domains (Marshall et al., 2022).

Apart from different informants of parent-adolescent conflict, parent-adolescent conflict is not consistently measured the same across studies in current research on adolescent development and family dynamics (Marshall et al., 2022). A recent systematic review of the current literature on parent-adolescent conflict found that the most frequently used measures (both observational and self-report) assessed the frequency of disagreements between adolescents and parents (Marshall et al., 2022). These measures of parent-adolescent conflict typically ask parents or youth to report on the number of disagreements that occurred during the past month for several topic domains (Marshall et al., 2022).

Altogether, this body of research underscores adolescence as a period of change in conflict with different patterns potentially depending on how conflict is operationalized. In the present study, conflict is measured as the frequency of conflict across 12 domains that represent common sources of conflict between youth and parents in adolescence (Smetana, 1988), adapted to include topics that may be particularly salient in Mexican origin families such as respect and family obligations (Updegraff et al., 2009). Additionally, conflict was assessed in two developmental periods using a within-family design, including early adolescence (younger siblings) and middle adolescence (older siblings), by drawing on a sample of Mexican-origin families raising adolescent sibling pairs.

Parent-Adolescent Conflict and Adjustment

In developmental and family science there is considerable interest in understanding the implications of parent-adolescent conflict for youth adjustment

(Weymouth et al., 2016; Laursen & Collins, 1994). In a meta-analysis of predominantly White samples, findings show that there was a positive association between parent-adolescent conflict and adjustment problems (e.g., internalizing and externalizing symptoms; Weymouth et al., 2016). Although conflict between parents and adolescents is considered a normative part of adolescence, greater frequency and intensity of conflict is conceptualized as a potential risk factor for youth adjustment (Smetana & Rote, 2019), with multiple potential mechanisms underlying these links. From a family systems perspective, when conflict is more frequent and intense it is theorized to be a source of stress for parents that can have negative implications for parent mental health, and in turn for youth adjustment (Cox & Paley, 2003). Conflict also may have a negative effect on the overall quality of parent-youth relationships by diminishing other aspects (Smetana & Rote, 2019), such as open communication and disclosure, processes that are promotive and protective for youth (Son et al., 2022). Frequent and intense conflict also may have negative implications for youth's socioemotional skills (e.g., emotion regulation, problem solving), all of which may be associated with their psychological and educational adjustment (Jensen et al., 2014).

Although not the focus of this study of predominantly immigrant families, it is important to acknowledge that a common focus of research on parent-youth conflict in immigrant families has centered around the acculturation gap hypothesis (Szapocznik & Kurtines, 1993), or the premise that intergenerational differences in acculturation are a key source of conflict in immigrant families that contributes to youth adjustment difficulties (Telzer, 2010). Research testing the acculturation-gap hypothesis has yielded

mixed findings, however. There is some evidence that acculturation gaps between fathers and youth were linked prospectively to father-youth conflict and internalizing and externalizing symptoms, but similar links did not emerge for mothers (Schofield et al., 2008). Acculturation gaps, as measured by family members' perceptions of acculturative family distancing (e.g., perceived incongruence in cultural values), also have been linked to greater frequency of parent-adolescent conflict and lower family cohesion as reported by Latinx adolescents (Nair et al., 2018). Other research fails to find support for these associations, however (Jensen et al., 2014; Pasch et al., 2006). The mixed findings may be, in part, because acculturation gaps are measured differently across studies.

In this dissertation, I will examine the links between mother- and father-youth conflict with two adolescent aged youth (one in early adolescence and an older sibling in middle adolescence) and youth depressive symptoms and educational adjustment (i.e., grade point average, educational expectations) concurrently among Mexican-origin youth. An important strength of this study is consideration of how conflict is linked to adjustment among multiple family subsystems (i.e., mother-younger sibling, father-younger sibling, mother-older sibling, father older-sibling). My focus will be on the outcomes of youth depressive symptoms and educational adjustment, given well established ethnic-racial disparities showing disproportionate risks in mental health (Calzada et al., 2020; Menselson et al., 2008) and education (Azmitia, 2021; Krogstad, 2016) in Latinx populations.

Parent-Adolescent Conflict and Youth Psychosocial Adjustment. Recognizing the potential links between parent-adolescent conflict and youth adjustment, several

studies have investigated the concurrent associations between conflict and youth psychosocial adjustment (Pasch et al., 2006; Lopez & Shen, 2021). With a focus on conflict frequency and youth anxiety and depressive symptoms, one study of Mexican American families found that mothers', fathers', and adolescents' ratings of the frequency of conflict were concurrently associated with youth anxiety, but only adolescents' report of conflict with their mothers and fathers' report of conflict with adolescents were associated with adolescents' depression (Pasch et al., 2006). A recent study using cross-sectional data from the Children of Immigrants Longitudinal Study (CILS) also found that adolescents' report of conflict with parents (e.g., measure items use the term 'parents' not referring specifically to mother figures or father figures) was linked to lower self-esteem in a U.S. sample of Mexican immigrant adolescents (Lopez & Shen, 2021).

Longitudinal links have also been found for the association between parent-adolescent conflict and youth psychosocial adjustment (Gonzales et al., 2018; Derlan et al., 2015; Dotterer et al., 2008). Among Mexican American families, for example, high levels of parent-adolescent conflict at 10th grade were associated with adolescents' internalizing and externalizing symptoms two years later, controlling for prior levels of adjustment (Gonzales et al., 2018). Among a sample of Mexican-origin teen mothers, mother-daughter conflict as reported by teen mothers predicted their depressive symptoms and risky behaviors longitudinally (Derlan et al., 2015). A longitudinal study of Latino families in North Carolina and Arizona found that adolescents who reported more parent-adolescent conflict (behaviors) had greater aggression at baseline and over

time (Smokowski et al., 2009) and lower self-esteem and greater internalizing symptoms compared to youth who reported less parent-adolescent conflict (Smokowski et al., 2010). Using the same sample and a shorter time frame (i.e., six months), parent-adolescent conflict was linked to declines in adolescents' internalizing symptoms (Smokowski et al., 2014). Strongest evidence of the links between conflict and adjustment are findings of a randomized clinical trial showing that a parent-youth relationship-focused prevention program when youth were in 7th grade predicted declines in internalizing symptoms and disorders and externalizing symptoms five years later *via reductions in parent-youth conflict* (Jensen et al., 2014).

Parent-Adolescent Conflict and Educational Adjustment. Parent-adolescent conflict can be considered a potential risk factor in youth's educational adjustment. The spillover hypothesis, defined as "the direct transfer of mood, affect, or behavior from one setting to another (Repetti, 1987)" (Erel & Burman 1995, p. 109), suggests that conflict with parents can spill over across family subsystems may have negative implications for educational adjustment. Supporting notions of spillover, a meta-analysis of predominantly White samples found that high parent-adolescent conflict was linked to lower GPAs and test scores (Weymouth et al., 2016). Studies also have shown potential spillover effects of parent-adolescent conflict to youths' educational adjustment for ethnic-racial minoritized groups (Flook & Fuligni, 2008; Roche et al., 2019). One study including youth from multiple ethnic/racial backgrounds (e.g., Mexican, Chinese, and European) found that daily family conflict as reported by youth was associated with greater school problems (e.g., attendance, and learning problems; Flook & Fuligni, 2008).

A study of Latinx adolescents' school performance found that the co-occurrence of moderate parental monitoring and moderate parent-adolescent conflict (compared to high monitoring/low conflict) was linked to declines in adolescents' grade point averages (Roche et al., 2019).

Research examining longitudinal associations have also demonstrated that parent-adolescent conflict has potential risk for youths' educational adjustment over time (Dotterer et al., 2013; Dotterer et al., 2008; Roche et al., 2021). In a study of African American families, links were found between increases in frequency of parent-adolescent conflict with both mothers and fathers and declining trajectories of school bonding, school self-esteem, and grade point average (Dotterer et al., 2013). A longitudinal study on a predominantly White sample found that parent-adolescent conflict as reported by mothers and fathers separately was negatively associated with adolescent academic achievement (e.g., grades in English and math) two years later; additionally, the average of both parents' reports of parent-adolescent conflict predicted lower adolescent academic achievement two years later (Dotterer et al., 2008). A recent study of Latinx adolescents found that frequency of parent-adolescent conflict (parent not specified) as reported by adolescents was a significant predictor of GPA 6 months later and mediator of the link between acculturative family distancing and GPA 12 months later (Roche et al., 2021). Taken together, parent-adolescent conflict is often related to lower educational outcomes across multiple studies with different measures of educational adjustment and among youth from different sociocultural backgrounds, suggesting that parent-adolescent conflict may be a potential risk factor for youth educational adjustment. In this

dissertation, I build on this body of research by examining mothers' and fathers' conflict with adolescents (two in each family) to capture whether 'shared' parent-adolescent conflict at the dyad, triad, and family levels are linked to youth depressive symptoms and educational adjustment (i.e., educational expectations, grade point average).

Shared Perspectives of Parent-Adolescent Conflict

Apart from the frequency, intensity, and type of conflict, understanding parent-adolescent conflict as it is experienced within an interrelated set of family subsystems has the potential to broaden our understanding of this important family dynamic in adolescence. One way to recognize parent-adolescent conflict as an interdependent relational dynamic is to consider conflict as reported by both dyad members and from multiple parent-youth dyads within families. A family systems perspective posits that family members shape each other's experiences and family relationship dynamics (Cox & Paley, 2003), and that the interrelated views of multiple family members can be captured by considering shared perspectives within family systems and subsystems (Minuchin, 1988). Conceptually, shared perspectives imply similarity or agreement in the participants' views, potentially a shared reality of their relationship subsystem (Bartle-Haring et al., 1999). The idea is that all family members may have common shared experiences (Cox & Paley, 2003), in addition to differences in parent-adolescent conflict among family subsystems, and unique experiences of each family member. Additionally, the whole family system is considered (e.g., holism) to be meaningful over and above the parts (e.g., family subsystems) of the family level and individual views (Cox & Paley, 1997).

Shared perspectives are defined in the present study as a common perception or view among multiple informants' report of a family relationship construct, in this study parent-youth conflict. In family science research, *shared perspectives* have often been conceptualized by a shared family system view of a construct as reported by multiple family members (Cook & Goldstein, 1993; Horwitz et al., 2010; Padilla et al., 2020). Analytically, a shared perspective of a construct is defined as a latent factor that represents shared variance or variability (i.e., co-occurrence of the spread of scores). Informed by family systems theory, shared perspectives of parent-adolescent conflict are conceptualized in the present study as representing an interrelated or interdependent family view of multiple family members' reports of parent-adolescent conflict. In this study, the shared perspectives were intended to explain common experiences among family members in dyadic parent-child conflict. Specifically, the shared family perspectives are those that are common across family members, such as aspects of the family environment that may be experienced similarly. The notion of the shared family environment is broadly congruent with ideas from family systems theory, that is, we expect that families are interrelated systems with similarities among family members. The family systems perspective suggests that there is sharedness among family members but also possible differences in subsystems of the family. In the current study, guided by the family systems perspective, I examine whether there are certain shared perspective views within family subsystems and whether these shared views are related to adjustment, accounting for unique perspectives of individual family members.

In the empirical literature, studies that use multiple reports from different family members have examined relations between shared and unique perspectives of families (Cook & Goldstein, 1993; Horwitz et al., 2010; Padilla et al., 2020) or focused primarily on discrepancies between ratings of the construct (De Los Reyes et al., 2008; De Los Reyes & Ohannessian, 2016). Research from this latter perspective aims to capture divergent views between parent and youth reports with the goal of investigating family members' unique perspectives or idiosyncratic views of the family system as reported by each individual family member. Although unique perspectives of individual family members are important, investigating the family system and its parts (e.g., subsystems) is crucial for understanding family relationship dynamics and subsystems in adolescence (Gavazzi, 2013). Examination of shared perspectives of parent-adolescent conflict is warranted based on existing research that supports the occurrence of convergence in views among parent and youth during adolescence, specifically that there is some degree of similarity in youth's and parents' views (Mastrotheodoros et al., 2018). As illustrated in the review of the literature, parent-adolescent conflict is often studied via the perspective of a single member of the dyad (Lopez & Shen, 2021; Vargas et al., 2013) or by considering each reporter separately (De Geode et al., 2009; Schofield et al., 2008; Pasch et al., 2006), and less often by examining conflict with multiple parents/caregivers and youth within the same family. To advance this area of research on parent-child relationships, the overarching goal of the present study is to advance our understanding of ways that shared perspectives in parent-adolescent conflict (i.e., the co-occurrence of

parent-child conflict among multiple parent-child subsystems within the family) matter for youth adjustment, accounting for family members' unique perspectives.

Sources of Variability in the Family System

In examining family subsystems as sources of variation in the family system, a shared perspective is operationalized as the co-occurrence of multiple family members' views of conflict within parent-child dyads. Sources of variation are considered in examining the family system given that it is expected that the processes occurring among multiple family subsystems are as important as the subsystem and individual family members' views in links to adjustment. The co-occurrence would suggest that there is a shared perspective of parent-adolescent conflict, with higher scores indicating greater shared perspective of parent-adolescent conflict across the parent-child subsystems measured within each family. The co-occurrence of parent-adolescent conflict is important to examine because reports from multiple informants are interrelated (Dotterer et al., 2008; Shanahan et al., 2007). The family shared perspective of parent-adolescent conflict includes all family members' reports of dyadic parent-adolescent conflict to understand the views of parent-adolescent conflict that co-occur among mothers, fathers, older siblings, and younger siblings in the family. That is, the family shared perspective provides an understanding of the co-occurrence of multiple family members' perception of the frequency of dyadic parent-adolescent conflict. Scholars have described that examining converging views of multiple family members are important given that converging views can be examined as a risk or protective for youth maladjustment (De Los Reyes et al., 2019). The lack of evidence of a shared family perspective would

suggest that the views (i.e., co-occurrence) across multiple family members of dyadic parent-child conflict are not related to one another. A conceptual assumption of this investigation is that the shared family perspective of conflict exists independently of (i.e., unrelated to) the dyadic and unique perspectives of conflict. Specifically, the shared view of conflict frequency that mothers, fathers, older and younger siblings have of parent-adolescent conflict is separate from other family subsystem shared perspectives (e.g., dyad).

In the present study I examine the frequency of parent-adolescent conflict among parent-adolescent dyads, triads, and the overall combination of four dyads (referred to as the family perspective). Shared and unique perspectives will be examined using a confirmatory factor analysis model with a tri-factor model structure (or bi-factor model; Bauer et al., 2013). A major contribution of the proposed study is that I include multiple informants (i.e., mother, father, older sibling, and younger sibling) on parent-adolescent conflict in a shared family perspective of parent-adolescent conflict (i.e., general latent factor), as well as dyadic (i.e., each parent and adolescent) and triadic (i.e., both parents and adolescent) family subsystem perspectives (Figure 1) to examine parent-adolescent conflict in relation to youth depressive symptoms and educational outcomes.

Differences in conflict are expected for various family relationship subsystems (Laursen & Collins, 1994), however, less work has examined shared perspectives. Examining shared perspectives of parent-adolescent conflict rather than only individual reports of parent-adolescent conflict (i.e., adolescent reported mother-adolescent conflict) is warranted given that parent-adolescent conflict may have spillover effects across

family systems and frequency of conflict may be similar across dyads (Shanahan et al., 2007). Further, such questions regarding shared family perspectives have rarely been examined in Latinx families (except, see Padilla et al., 2020), where there is a strong cultural emphasis on family cohesion and interdependence (Cahill et al., 2021; Knight et al., 2011). One study that used the same data as the present study examined both shared and unique perspectives of familism values in associations with parent-youth warmth and conflict and found that multiple family members' ratings (e.g., mother, father, older, and younger sibling) converged on a shared family perspective of family support, but not for overall familism values (Padilla et al., 2020). A different study of European American Families (mother, father, and adolescent reports) examined shared family perspectives of family dysfunction and predicted adolescent-mother and -father conflict (Jager et al., 2014). To my knowledge Padilla et al. (2020) is the only study that examines shared perspectives of four family members among Latinx populations, and there are no existing studies that examine shared perspectives of parent-adolescent conflict among multiple family members (e.g., mother, father, adolescent). In the present study the primary conceptual focus was on shared perspectives of parent-adolescent conflict. Specifically, this study aimed to partition different sources of shared family variance, including dyad perspectives of mother- and father-youth relationships with adolescents and their older siblings.

The Current Study

The focus of this dissertation is on parent-adolescent conflict as it occurs within multiple parent-adolescent dyads in an existing study of two-parent Mexican-origin

families with adolescent siblings. Limited by available measures of conflict, this study examines ‘shared’ perspectives of parent-adolescent conflict, operationalized as the co-occurrence of multiple family members’ perceptions of dyadic parent-adolescent conflict. Framed primarily within family systems perspective (Cox & Paley, 2003), the first goal was to examine whether there are shared perspectives in conflict (e.g., factor structure) among youth and parents, and the second study goal is to test whether shared perspectives are linked to adolescents’ depressive symptoms and educational outcomes by applying a Bayesian structural equation model to family data (i.e., mothers, fathers, younger siblings, older siblings). Concurrent links between shared perspectives of parent-adolescent conflict and Mexican-origin adolescents’ adjustment (e.g., depressive symptoms) and educational outcomes (i.e., grade point average, educational expectations) will be examined.

The first study goal focuses on examining the measurement model of shared perspectives of conflict among the family subsystems (Hypothesis 1.0). Given the sibling design, the goals of this study encompass early and middle adolescence. For the second study goal, it was hypothesized that higher levels of shared family, dyad, and triad parent-adolescent conflict would be cross-sectionally associated with higher risk of depressive symptoms (Hypothesis 2.1) and lower academic adjustment (i.e., GPA, educational expectations; Hypothesis 2.2). Building on family systems perspectives and potential spillover effects of conflict to multiple family members, I hypothesize family shared perspective of parent-adolescent conflict is larger in magnitude and different than the dyad shared perspectives of parent-adolescent conflict (Hypothesis 2.3).

CHAPTER 2

METHOD

Participants

Participants were from 246 Mexican-origin families (i.e., mothers, fathers, younger siblings, older siblings) from a longitudinal study of family, culture, and gender socialization (Updegraff et al., 2005). Families were recruited from public school districts and parochial schools in and around a southwestern metropolitan area. Recruitment strategies included sending letters and brochures to families describing the study, and bilingual staff conducted follow up phone calls to assess participant eligibility. All materials provided to participants were in both English and Spanish. Public and parochial schools were selected to represent a range of school ethnic-racial and socioeconomic compositions. Across all schools, the percentage of Latino students ranged from 6% to 63%, and the percentage of students eligible for free/reduced lunch ranged from 8% to 82%. Eligibility to participate required that target adolescents and at least one older sibling be living with their biological mothers and biological or long-term adoptive (> 10 years) fathers, and all four family members had to agree to participate. At T1 most of the parents completed the survey in Spanish (66.26% of mothers, and 67.76% of fathers), whereas most of the youth participants completed the survey in English (84.15% of younger siblings, and 82.52% of older siblings). Only mothers were required to be of Mexican origin, but 93% of fathers were as well. Finally, all fathers were required to work at least 20 hours/week.

Most of the mothers (70.73%) and fathers were born in Mexico (69.39%). On average mothers reported living in the U.S. for 12.38 years, and fathers reported 15.18 years. On average, at T1 mothers reported that their highest level of education completed was 10.34 years of education, and fathers reported 9.88 years of education. Younger siblings averaged 12.5 years of age ($SD = .57$) at Time 1 (T1) and were in 7th grade at the onset of the study. Among the younger siblings, 51% female, 62% U.S.-born, and the remaining 38% were Mexico-born. Older siblings averaged 15.49 years of age at T1. Among the older siblings, 50% female, 53% U.S.-born, and the remaining 46% were Mexico-born. The median household income of the sample at T1 (\$40,000) was slightly higher than the census data for the county (\$32,000). The average household size of participating families was 5.93 family members at T1.

Procedures

Data from the present study were collected in Arizona through semi-structured interviews during home visits (T1 2002 – 2003). At T1, bilingual project staff visited each family and obtained parental consent from parents (and parents for youth under 18 years of age) and assent from youth was obtained prior to the interview. Interviewers administered survey measures separately to the four target family members (mothers, fathers, target adolescents referred to as younger siblings, and their older siblings) in their preferred language using a laptop-assisted interview program. Participating families received honorariums of \$100 for the family at T1. All procedures were approved by the university's IRB (Protocol No. 002001021).

Measures

Parent-Adolescent Conflict. At T1, the frequency of parent-adolescent conflict was measured using a 12-item scale based on the work of Smetana (1988) and adapted for use with Mexican Americans (Ruiz et al., 1998; Updegraff et al., 2009). Mothers and fathers rated their conflict with older and younger siblings at separate points in the interview, and similarly older and younger siblings rated their conflict with mothers and fathers at separate points. All items were rated on a 6-point scale (1 = *not at all*, 6 = *several times a day*) regarding differences of opinions and disagreements on topics such as behaviors, chores, appearance, cultural traditions, homework/schoolwork, bedtime/curfew, health, activities, money, religion, and relationships with friends, extended family members and siblings. The items were averaged to create scale scores for each reporter for each relationship, with higher scores indicating greater parent-adolescent conflict. At T1, coefficient alphas for were .87 for mothers' and fathers' report of conflict with younger and older siblings, and from .80 to .86 for older and younger siblings' report of conflict with mothers and fathers.

Depressive Symptoms. At T1, the Center for Epidemiological Studies Depression Scale (CES- D) was used to assess adolescents' cognitive, affective, and behavioral depressive symptoms (Radloff, 1977). Each of twenty items included one statement (e.g., "*During the past month, I felt depressed*") that adolescents rated on a four-point scale (ranging from 0 to 3). The items were summed to create a total score, where higher scores indicate higher depressive symptoms. Prior work has established the reliability and validity of this measure with Latino youth (Moscicki et al., 1989). At T1,

coefficient alphas for were .72 for older siblings' report and .71 for younger siblings' report.

Grade Point Average. At T1, younger siblings and older siblings reported on their current grades in the four core academic areas (English, Social Studies, Science, Math). An average of these four grades was created to represent their self-reported GPA for younger siblings and older siblings at T1.

Educational Expectations. At T1, both younger siblings and older siblings reported their educational expectations, which were assessed by their response to the following question: "*How far do you think you will go in school?*". Responses were coded into the appropriate category: 1 through 11 representing grade in school, 11.5 for GED, 12 = high school graduate; 13 = some post-secondary training; 14 = associate's degree; 15 = some college; 16 = bachelor's degree; 18 = master's degree; 19 = some work towards doctorate or advanced degree; and 21 = Ph.D., M.D.

Adolescent Gender and Immigrant Status. Both younger sibling and older sibling gender were coded as a dichotomous variable adolescent gender (1 = *Female*, 2 = *Male*), and youth immigrant status (1 = *U.S.-Born*, 2 = *Born in Mexico*).

Family socioeconomic status. Family socioeconomic status (SES) was calculated as the mean of mothers' and fathers' highest education level and family income and standardized (after log transformation of income to correct for skewness).

Analytic Approach

Preliminary analyses were conducted to examine the bivariate correlations among study variables and means and standard deviations for the sample. Missing data will also

be described. To address the study aims I will use Bayesian factor analysis and structural equation modeling. All models examined will include eleven latent variables (e.g., factors) and eight measured variables of average scores from each family member's report of parent-adolescent conflict.

Convergence Assessment

Both visual and numerical checks of the posterior were used to assess evidence of nonconvergence. One of the commonly reported numerical checks for convergence assessment is potential scale reduction factor (Vehtari et al., 2021; Zitzmann & Hecht, 2019), specifically whether the potential scale reduction factor (\hat{R}) is below 1.05 or 1.10 (Brooks & Gelman, 1998; Gelman & Rubin, 1992). Other multiple indicators of nonconvergence were visually examined because \hat{R} can have issues for diagnosing inadequate mixing of the Markov chain Monte Carlo (MCMC) chains (Vehtari et al., 2020). The term mixing is used to refer to how well the MCMC chains are exploring different regions of the parameter space (Levy & Mislevy, 2016). Convergence and mixing will be assessed for all models using graphical checks of the posterior densities, trace plots, plots of the running mean, and autocorrelation. Although some researchers have raised concerns of the feasibility and accuracy of reviewing visual checks of diagnostic plots of models with hundreds of parameters (Depaoli, 2021; Gelman et al., 2014), I conducted the visual checks of nonconvergence for all parameters in each model (i.e., 34 unknown parameters in the measurement model; 44 unknown parameters in each SEM model). Additionally, many of the SEM models examined have the exact same structure but have differences in prior specifications for some of the model parameters,

which implies that the models are substantively distinct from one another (Graves & Merkle, 2021; Levy & McNeish, 2023). Therefore, convergence diagnostics were evaluated for all models.

Graphs of the posterior density of each chain were examined to visually inspect whether the posterior density of each parameter appeared reasonable. The plots of the posterior density can be helpful to visualize the shape of the posterior distribution for each parameter (e.g., regions of the density that are more precise, skewness; Depaoli, 2021). The plot of the running mean provides information about whether the posterior mean remains similar or is stable for each chain throughout the increased iterations (Gill, 2002). Trace plots can be used as a visual check of nonconvergence to inspect the regions of the parameter space that each draw of the MCMC chains explores. Additionally, mixing of each individual chain can be assessed by examining density and trace plots of each chain to detect whether there are overlapping curves of the density or chains which would suggest that the chains are exploring the same space at the same rate.

The autocorrelation and effective sample size are measures that can support evidence of whether the draws from the MCMC chains are samples that accurately represent the posterior distribution (Kruschke, 2015). The autocorrelation provides information as to whether the iterations are approximately independent of one another, with an autocorrelation of zero suggesting independent iterations and an autocorrelation of one suggesting that the parameters are perfectly correlated (Levy & Mislevy, 2016). The effective MCMC sample size is a measure that provides information about how much independent pieces of information we have for the posterior distribution of each

parameter. There is not a specific value that is required for the effective sample size, but some researchers suggest an effective sample size of at least 10,000 if 95% highest posterior density intervals are reported (Kruschke, 2015; Depaoli, 2021).

Evaluating convergence diagnostics can be a sequential process where additional models may be specified with increased iterations for instance to obtain evidence of convergence (Levy & Mislevy, 2016). In Bayesian analyses the MCMC chains will always converge but there is no certainty as to when it will converge (Levy & Mislevy, 2016). All inferences will be based on the draws that approximate the posterior which are obtained after evidence of convergence to a stationary distribution.

Model Fit

The posterior predictive p -value based on the likelihood ratio statistic was used for model assessment as a global fit metric (Gelman et al., 1996; Merkle & Rosseel, 2018). As an additional measure of model fit for the SEM models, the proportion of variance explained by the predictors was examined using the R^2 . The R^2 values reported in this study are based on the posterior mean estimates using the classical R^2 formula (Gelman et al., 2018).

Posterior predictive model checking (PPMC) was conducted to assess model-data fit, specifically I examined local sources of misfit of the measurement model, and global sources of misfit of the measurement model and all final SEM models. Global and local fit were examined using a diagnostic approach that evaluates the strengths and weaknesses of the model (Garnier-Villarreal & Jorgensen, 2020; Levy, 2011). Global fit of the measurement model was assessed using the χ^2 statistic, CFI (comparative fit index;

Bentler, 1990), SRMR (Standardized Root Mean Square Residual; Hu & Bentler, 1999) , and RMSEA (root mean square error of approximation; Steiger & Lind, 1980), with benchmarks for acceptable fit indicated by CFI values close to 1, SRMR values below .08, and RMSEA values below .05. The PPMC of the global fit indices provide information about whether the realized (observed) values are comparable to the posterior predicted (simulated) values of the data (Levy, 2011). Local fit was assessed by examining the magnitude of the standardized residual correlations from the posterior predictive distribution (Levy, 2011).

Interpretability of Results

For the final analysis models, the parameter results will only be reported if there is evidence that the parameters are interpretable. A series of models were examined in the present study in the approach of building up to the final model. The model posterior results were not interpreted if the model did not demonstrate sufficient evidence of convergence or the results were not plausible (e.g., extreme multimodality, wide credibility intervals with implausible values). Evidence of interpretability of the parameters will be supported from the overall collective pattern of results (e.g. convergence diagnostics, data-model fit assessment, posterior summary statistics of the mean and HPD intervals).

As an additional measure of quantifying the uncertainty of an effect, the Bayesian evidence ratio, is reported for selected individual regression coefficients, and for comparisons between effects regarding the strength of association. Evidence ratios were computed using the via the R package ‘*brms*’ in RStudio (Bürkner, 2017; Posit Team,

2023). The evidence ratio was computed to quantify the probability of the hypothesis of an effect exceeding a certain value (e.g., 0), and comparing two regression coefficient parameters. The evidence ratio for a one-sided hypothesis test (e.g., one-sided Bayes factor $BF_{\theta > 0 \text{ vs. } \theta = 0}$; Bürkner, 2018) describes the posterior probability of one model relative to a competing model (e.g., the ratio of the posterior probability of H_1 and the posterior probability of H_0), with values above 1 providing evidence in support that H_1 is larger than H_0 (Bürkner, n.d.).

For the individual regression coefficients, the evidence ratio of the probability of direction was examined as the posterior probability that the regression coefficient parameter is below zero for a negative effect, and above zero for a positive effect. The ratio provides information about what proportion of the posterior distribution is above (or below) zero, which helps with understanding whether there is a high probability of a positive (or negative) effect. For example, in testing the hypothesis that the regression coefficient is lower than zero, $\beta < 0$, the evidence ratio examines the ratio of the posterior probability of $P(\beta < 0 | Y)$ and of $P(\beta > 0 | Y)$, where the expression in the ratio denotes the model given the data. The probability of direction index is computed using results from the posterior distribution and is related to the frequentist p -value, but the main difference is that it allows us to understand the probability of the existence of an effect given the data (Makowski, 2019). For the comparisons of the regression coefficients, I examined equalities of the regression parameters to describe whether the effect was stronger for one regression coefficient compared to the other coefficient (Garnier-Villarreal, n.d.). The comparison of the two regression coefficient tests

equalities between the parameters to understand what proportion of the posterior distribution for a regression coefficient is higher (or lower) than another regression coefficient. For example, in examining the hypothesis that the regression coefficient of β_1 is higher than β_2 , the evidence ratio examines the ratio of the posterior probability of $P(\beta_1 - \beta_2 > 0 | Y)$ and of $P(\beta_1 - \beta_2 < 0 | Y)$.

Measurement Model

To address the first study goal, I will examine a measurement model that includes a similar structure to a bifactor model (e.g., or tri-factor model; Figure 1). In the bifactor model (Holzinger and Swineford, 1937) the specific factors capture additional associations among items from the general factor (Levy, 2020). The bifactor model is an appropriate approach for partitioning general and group variance (Reise et al., 2023; Simms et al., 2008), so that we may understand shared parent-adolescent conflict at the family level and in family subsystems. In the tri-factor model (e.g., extension of the bifactor model; Bauer et al., 2013), the shared perspective at the family level represents shared variance among all informants' report of parent-adolescent conflict, and the family subsystems represent variance shared among informants within each subsystem accounting for variance over and above the family-level, and the unique level represents the individual views of each family member.

The measurement model (Figure 1) includes latent factors that represent the shared perspectives of the general family, triad, dyad, and unique perspective of reporters ($M = 11$). The general family shared perspective (θ_{FAM}) of parent-adolescent conflict includes eight measured variables, which are each individual family members report of

conflict with OS indicating older sibling, YS indicating younger sibling, M indicating mother and D indicating father (i.e., OS-M, OS-D, YS-M, YS-D, M-OS, M-YS, D-OS, D-YS). There are three latent factors in the measurement model that are represented by a bifactor structure, where the general family shared perspective (θ_{FAM}) includes all reports of parent-adolescent conflict, and the specific factors are represented by the triad shared perspectives (θ_{YS} ; θ_{OS}) that include subsets of these reports as represented by latent dyad factors (θ_{M-OS} , θ_{D-OS} ; θ_{M-YS} , θ_{D-YS}).

The triad shared perspectives were specified as two distinct latent factors of older sibling-parent (θ_{OS}) and younger-sibling parent (θ_{YS}) reports of conflict. The older sibling-parent triad shared perspective (θ_{OS}) underlies two latent factors representing mother-older sibling dyad shared perspective (θ_{M-OS}) and father-older sibling dyad shared perspective (θ_{D-OS}). The younger sibling-parent triad shared perspective (θ_{YS}) underlies two latent factors representing mother- younger sibling dyad shared perspective (θ_{M-YS}) and father-younger sibling dyad shared perspective (θ_{D-YS}). The mother-older sibling dyad shared perspective (θ_{M-OS}) underlies two measured variables (i.e., OS-M, M-OS), and the father-older sibling dyad shared perspective (θ_{D-OS}) underlies two measured variables (i.e., OS-D, D-OS). The mother-younger sibling dyad shared perspective (θ_{M-YS}) underlies two measured variables (i.e., YS-M, M-YS), and the father-younger sibling dyad shared perspective (θ_{D-YS}) underlies two measured variables (i.e., YS-D, D-YS).

The unique perspective of each family member was modeled as four latent factors (θ_{R_YS} , θ_{R_OS} , θ_{R_M} , θ_{R_D}) representing each unique reporter (e.g., younger sibling, older sibling, mother, and father) view of parent-adolescent conflict. The younger siblings'

report of their unique perspective (θ_{R_YS}) underlies two measured variables (i.e., YS-M, YS-D), and the older siblings' report of their unique perspective (θ_{R_OS}) underlies two measured variables (i.e., OS-M, OS-D). Similarly, mothers' (θ_{R_M}) and fathers' unique perspectives (θ_{R_D}) underlie two measured variables (i.e., M-YS, M-OS and D-OS, D-YS, respectively).

To address the first study goal, I examined whether there is evidence to support the measurement model of shared perspectives of conflict among the family system and subsystems (Hypothesis 1.0). I fit a confirmatory factor analysis model of parent-youth conflict that includes the general family, triad, and dyad shared perspectives, in addition to unique perspectives of each reporter. The decision of which items load onto each shared perspective (e.g., latent variable) was informed by family systems theory.

Structural Equation Model

To examine the second study goal, structural equation models that includes the measurement model (Figures 2 and 3) were fit to examine cross-sectional associations of shared and unique perspectives of parent-adolescent conflict in links with youth depressive symptoms (Hypothesis 2.1), grade point average, and educational expectations (Hypothesis 2.2), accounting for covariates of youth gender, youth immigrant status, and family socio-economic status. I also examined comparisons of the strength of association between shared family perspectives and unique perspectives of parent-adolescent conflict (Hypothesis 2.3). All results reported in the main text are from the standardized results.

Model Settings

Measurement Model Settings

The Bayesian confirmatory factor analysis (CFA) model with eleven latent variables was fit in Stan via the R package ‘*blavaan*’ in RStudio (Merkle et al., 2021; Posit Team, 2023). Four chains were run for the Markov chain Monte Carlo (MCMC) algorithm, the first 500 iterations were specified as warm-up for each chain, and then 5,000 iterations from each chain after warm-up were obtained and saved. Thinning by 1 was included in the model to keep every iteration. For model specification, the general family latent factor (family shared perspective) variance was fixed to 1 for identification, and the factor loadings were freely estimated. The higher order factor loadings (e.g., triad) for the lower order latent variables (e.g., dyad) included fixed values of 1 to resolve indeterminacies, and the latent factor variances were freely estimated. The latent factors dyad shared perspectives and unique reporter perspectives factor loading for each latent variable were fixed to 1 to resolve indeterminacies, and the latent factor variances were freely estimated.

SEM Model Settings

All SEM models included the same measurement model structure from Model 0 (Figure 1). Each SEM model was examined separately for younger (Figure 2) and older siblings (Figure 3) included the measured outcome variable (endogenous variable) regressed on the family shared perspective, dyad shared perspective, triad shared perspective, unique reporter perspective, family socioeconomic status, adolescent gender (1 = *Female*, 2 = *Male*), and youth immigrant status (1 = *U.S.-Born*, 2 = *Born in Mexico*). The series of models that were examined differed by outcome variable, Table 2 includes a description of the model numbers that correspond to each outcome variable.

The initial series of models that were examined (Models: 1a, 2a, 3a, 4a, 5a, 6a) included four chains for the MCMC with 500 warm-up iterations and with 5,000 iterations after warm-up specified. To examine stability of the posterior results, another series of models (Models: 1b, 2, 3b, 4b, 5, 6b) were examined with four chains and double the number of iterations (i.e., 1,000 warm-up iterations, 10,000 iterations after warm-up). Based on the results from the initial models, additional models with informative prior specifications for the residual variance parameter were examined (except for Models 2 and 5). All models (Models: 1, 3, 4, 6) with informative residual variance prior specifications had 500 iterations specified as warm-up, and 5,000 iterations were then run to empirically approximate the posterior distribution.

Prior Specifications

Measurement Model Prior specifications

Model prior specifications of the measurement model were as follows: the measured variable intercepts were specified with the following mean and variance hyperparameters $Normal(0, 1024)$, and the measured variable loadings were specified as $Normal(1, .25)$, with the normal distribution parameterized as the standard deviation. This common prior specification for the loadings reflects that the values should be closer to 1, which was included to avoid issues with negative factor loadings and potential sign indeterminacies. All scale parameter priors were placed on the standard deviation. The measured variable error standard deviation was specified as $Gamma(1, .5)$, and the latent variable standard deviation was specified as $Gamma(1, .5)$. The covariance parameters for the latent variables were all fixed to zero.

SEM Model Prior specifications

For the prior specifications of all SEM models, the prior distribution of the measured variable factor loading parameters specified as *Normal*(1, .25) included a mean of 1 and a standard deviation of .5. The intercept parameters associated with the observed variables were specified as a normal distribution with a mean of 0 and a standard deviation of 32 (variance of 1024), and the measured and latent variable intercept parameter prior specification was *Normal*(0, 900). For the prior distribution of the slope (regression coefficient) parameters, I specified a normal distribution with mean of 0 and standard deviation of 30 (variance of 900). The prior specifications for the variance parameters were not the same across all models. In the initial models and the models with increased iterations (Models: 1a, 2a, 3a, 4a, 5a, 6a, 1b, 2, 3b, 4b, 5, 6b), both the observed variable and latent variable variance parameters were specified as *Gamma* (1, .5) placed on the standard deviations of the variance parameters. The respecified SEM models (Models: 1, 3, 4, 6) all had inverse-gamma distributed informative priors included for the residual variance parameter of the primary outcome variable (e.g., depressive symptoms, GPA, educational expectations). Specifically, the residual variance parameter of the primary outcome variable represents the unexplained variance in the outcome apart from what is explained by the predictors included in the model. Including prior specifications that are informed by substantive knowledge have been shown to improve the quality of regression analysis results to obtain plausible parameter estimates (Levy & Crawford, 2009). An advantage of analyses using Bayesian inference is the ability to specify informative priors, which have been described as useful for reducing the

“implausibility of an estimate” (Vanpaemel, 2011, p. 109). An informative prior specification was included to regularize the outcome residual variance parameter to obtain reasonable values for the parameter results.

In the respecified models (1, 3, and 4) the variances of all other latent and observed variables were assigned inverse-gamma priors of $\alpha = 1$ and $\beta = .5$, which reflect weakly informative prior beliefs about the variance parameters. In model 6, the variance parameters were specified as $\alpha = 1$ and $\beta = .5$, with the latent variable variances (except for the outcome) in the form of the inverse-gamma distribution, and the observed variable variances in the form of the gamma distribution on the standard deviation.

The informative prior for the residual variance associated with each outcome in Models 1, 3, 4, and 6 all included the first hyperparameter specified in the form of inverse-gamma distribution with a value of 5 for the shape hyperparameter ($\alpha = v_0/2$). This specification can be thought of as a pseudo-sample size (v_0) of the variance estimate being based on data from 10 participants. The value of the scale hyperparameter ($\beta = \sigma_0^2 v_0/2$) was set using the sample variance (Table 1) as the best guess for the variance (σ_0^2) of the measured outcome variable. For the second hyperparameter β , the value encodes information for the residual variance that reflects my expectation that there is approximately 15% of the proportion of variance explained (R^2) for the outcome variable by the predictors included in the model.

In model 1, the scale hyperparameter for the residual variance associated with the younger sibling report of depressive symptoms outcome variable was specified as $\beta =$

425, the younger sibling report of GPA outcome variable for model 3 was specified as $\beta = 3.6$, in model 4 younger sibling report of grade point average outcome variable was specified as $\beta = 3.4$, and in model 6 the older sibling report of educational expectations outcome variable was specified as $\beta = 25$.

CHAPTER 3

RESULTS

Preliminary Analyses

Descriptive analyses

The bivariate correlations among study variables, means, and standard deviations for the sample are presented in Table 1. The pattern of associations is consistent with the expectation that youths' self-reported parent-adolescent conflict was consistently associated with their self-reported outcomes (e.g., grades, depressive symptoms, and educational expectations). Additionally, there was also a consistent pattern of correlations between each family member's self-report of parent-adolescent conflict with one family member (e.g., YS-M) with their self-report of parent-adolescent conflict with a different family member (e.g., YS-D). Descriptively, adolescents expected to complete some college education (e.g., less than 4 years) and their GPAs were in the B- to C+ range. In terms of depressive symptoms, the older and younger sibling participants both reported average depressive symptoms that slightly exceed established clinical cutoff values (> 16) based on community-based samples of youth (Roberts, et al., 1990).

Missing Data

The CFA and SEM analyses included all available data. The observed variables with the largest percentage of missing data were grade point average reported by older siblings (18.7% of sample, $N = 46$) and younger siblings (4.88% of sample, $N = 12$). One of the reasons for the substantial percentage of this missingness is due to some older

siblings being out of high school at T1. The only other variables that had missing data were younger siblings' educational expectations (.41%, $N = 1$), mother report of conflict with older (.81%, $N = 2$) and younger siblings (.81%, $N = 2$), and father report of conflict with older (.81%, $N = 2$) and younger siblings (.81%, $N = 2$). Missing data were handled using Bayesian estimation that implements a full information likelihood to handle missing data (Merkle et al., 2021).

Measurement Model

Summary of Convergence Evaluation and Model fit

The measurement model had evidence of convergence for all model parameters based on the numerical and graphical checks of convergence (i.e., trace plots, plots of the running mean, and autocorrelation). The posterior predictive p -value of the measurement model (Model 0) was 0.385, which suggests adequate data-model fit.

Posterior Predictive Model Checking

Beginning with the measurement model, the model slightly overpredicted the CFI, χ^2 , and RMSEA, and underpredicted the SRMR (Table 3; Figure 4). Specifically, the realized values are smaller than the posterior predicted values for the CFI, χ^2 , and RMSEA, and the posterior predicted values are smaller than the realized values for the SRMR. Overall, there was adequate fit of the discrepancy measures for the data included in the measurement model. Based on the local fit assessment, there was no evidence of any systematic patterns of misfit in the residual correlations, specifically there were no residual covariances that were greater than $|.10|$ (Table 4). Taken together, the results from the posterior predictive model evaluation support adequate fit of the measurement

model.

Summary of Posterior Results

Model 0: Measurement Model. The results of the Bayesian CFA support the factor structure of the parent-youth conflict items. Most of the indicators of the general family shared perspective factor (θ_{FAM}) have a posterior mean factor loading greater than 0.30, only two items out of eight have a posterior mean near .20, and 3 items have a posterior mean of at least .50 (Table 5). For the dyad shared perspectives (θ_{M-OS} , θ_{D-OS} , θ_{M-YS} , θ_{D-YS}), all posterior mean factor loadings were above .30, both of the triad shared perspectives (θ_{OS} , θ_{YS}) had posterior mean factor loadings with a value of at least .80, and all unique reporter perspectives (θ_{R_YS} , θ_{R_OS} , θ_{R_M} , θ_{R_D}) had posterior mean factor loadings above .40 (Table 5). The unstandardized results from the analysis are reported in Table 6.

The posterior distribution of the factor loading parameters of all eight measured variables (i.e., OS-M, OS-D, YS-M, YS-D, M-OS, M-YS, D-OS, D-YS) have most of the posterior density above zero (Figure 11), and none of the highest probability density intervals included zero except for one item (older siblings report of conflict with their father; Table 5). The older siblings report of conflict with their father (OS-D) was the item with the lowest factor loading, where the posterior mean is 0.18 and there is a 95% probability that the parameter is between -0.01 and 0.37 (Table 5). The measured variable variance was largest in magnitude for older (OS-D $_{\zeta 3}$) and younger siblings (YS-D $_{\zeta 7}$) report of conflict with their father (Figure 12; Table 6). The latent factor variances were largest for the reporter perspectives of older (OS Unique $_{\psi 8}$) and younger siblings (YS

Unique ψ_9 ; Figure 13; Table 6). Taken together, the posterior results suggest that the factor structure underlies all eight items parent-youth conflict.

Structural Equation Models

Summary of Convergence Evaluation

The SEM models for every outcome demonstrated evidence of convergence except for Model 2a and 4b. A detailed interpretation of numerical and graphical checks of convergence of the parameters from all models (Table 2) is reported in Appendix C, with figures of convergence diagnostics included in Appendix D. There was not sufficient evidence of reasonable parameter values to represent the posterior distribution for several of the parameters in the initial models (Models: 1a, 2a, 3a, 4a, 5a, 6a). Additionally, this same issue of interpretability of parameters for inferences remained in the models that included an increased number of iterations (Models: 1b, 3b, 4b, 6b). The Model 2 and Model 5 had acceptable parameter results for inferences from the posterior distribution of the parameters. Finally, the series of models that were respecified to regularize the residual variance parameter (Models: 1, 3, 4, 6) had acceptable results from the convergence assessment and posterior density summaries of the model parameters.

Model Fit

None of the models had a posterior predictive p -value (ppp) for the χ^2 statistic near .5 (Table 2). The models including the endogenous variables of younger sibling depressive symptoms, older sibling educational expectations, and both younger and older sibling GPA, had a similar magnitude of the posterior predictive p -values and R^2 values in the initial models with weakly informative priors and with the model with increased

iterations, and the ppp and R^2 value were smaller in the final model with informative residual variance prior specification (Table 2). For the older sibling depressive symptoms and younger sibling educational expectations models the posterior predictive p -values and R^2 were similar for the initial model and the final model with increased iterations (Table 2).

Taken together, the results from this model suggest potential model misfit based on the posterior predictive p -values, and acceptable R^2 values for all models. However, some of the R^2 values (e.g., .8) are near 1, which is unexpected and warrants caution in interpretation for the R^2 values. It is not reasonable for the fitted model to explain close to 100% of the variance. In several of the final models that included the informative prior specification (Models 1, 3, 4, and 6) for the residual variance the R^2 values were more reasonable in magnitude. The reduction in the R^2 value for most of the final models was most likely due to the prior specification of my expectation that the R^2 would be 15%.

SEM Posterior Predictive Model Checking

In the SEM model results only Model 2 (older sibling depressive symptoms) and Model 5 (younger sibling educational expectations) had adequate results from the posterior predictive model evaluation (Table 3). In both Model 2 and 5, the posterior predicted values were comparable to the realized values for all fit indices (i.e., CFI, χ^2 , SRMR, and RMSEA; Figures 6 and 9). In models 1, 3, 4, and 6, there was sufficient evidence that the posterior predicted values were similar to the realized values, however there was some evidence of potential data-model misfit (Table 3). Specifically, the models overpredicted the CFI and underpredicted the χ^2 , RMSEA, and SRMR (Figures 5,

7, 8, 10).

Summary of Model Comparison and Evaluation

The final SEM models (Models: 1, 3, 4, 6) all have R^2 values that were reasonable and acceptable results from the PPMC evaluation with some evidence of potential misfit. Conversely, the final models with increased number of iterations (Models 2 and 5) had adequate results from the PPMC evaluation but unreasonably large R^2 values.

Based on all of the results collectively from the convergence assessment and model fit evaluation, Models 1, 2, 3, 4, 5, and 6 were retained as the final models for interpretation of the posterior results. Not all the final models demonstrated evidence of reasonable R^2 values and there were some evidence of potential data-model misfit based on the PPMC results. The goal of the model comparison and evaluation is to identify features of the model that have poorer performance to build up to a model that adequately represents the data (Gelman & Shalizi, 2013). This goal departs from common focus on statistical power and Type-1 error rates in conventional (frequentist) approaches in examining model fit for the reason that the objective is not to reject or retain a model but to understand potential model misfit (Berkhof & van Mechelen, 2000; Gelman et al., 2014). With this in consideration, it is not a major issue that there are features of the final models that are not adequate because the model checking provides information about what the weaknesses of the model are. The final models all have sufficient evidence to support interpretation of the results.

Summary of Posterior Results

Model 1: Younger Sibling Depressive Symptoms

Summary of Posterior Results. Findings from this model suggest that both the general family perspective ($\beta_{\theta_{FAM}}$) and younger sibling unique reporter perspective ($\beta_{\theta_{R_YS}}$) are associated with younger sibling depressive symptoms (Table 7). The posterior mean of the slope for the general family shared perspective ($\beta_{\theta_{FAM}}$) is positive, which suggests that as shared perspectives of parent-adolescent conflict in the family increase, younger siblings' depressive symptoms also increase (Table 7). The positive 95% HPD interval values of the family shared perspective ($\beta_{\theta_{FAM}}$) regression coefficient was mostly small and near zero at the lower limit of the interval (Figure 14; Table 7). The younger sibling unique reporter perspective ($\beta_{\theta_{R_YS}}$) is related in positive direction with younger sibling depressive symptoms, suggesting that increases in younger siblings' unique view of conflict are related to increases in their self-reported depressive symptoms. The posterior distribution of the parameter $\beta_{\theta_{R_YS}}$ has most of its density at positive values near .26, and there is a 95% probability that the parameter is between .13 and .40 (Figure 14).

Both the covariates of family socioeconomic status (β_{SES}) and younger sibling gender (β_{Gender}) were associated with younger sibling depressive symptoms. For every one standard deviation increase in family socioeconomic status there was a .23 standard deviation decrease in younger siblings' depressive symptoms. For younger sibling gender (β_{Gender}), boys reported fewer depressive symptoms than girls (-.15). None of the other shared perspectives (triad, unique, dyad) or child immigrant status were associated with younger siblings' depressive symptoms.

All the factor loadings were moderate to large in magnitude except for OS- $M_{\lambda,1,1}$

and OS- $D_{\lambda_{3,1}}$ that had factor loadings that were small in magnitude, although these were also the only loading that included zero in the posterior interval (Table 9). For the variance parameters, the dyad shared perspective latent variance was the variance parameters that was largest in magnitude with greater uncertainty in the parameter estimate compared to the observed variable variance (Table 10). The HPD intervals for all the variance and intercept parameters included positive values (except for $SES_{\gamma_{10}}$) and did not include zero in the interval.

Model 2: Older Sibling Depressive Symptoms

Summary of Posterior Results. Findings from this model suggest that both the general family perspective ($\beta_{\theta_{FAM}}$) and older sibling unique reporter perspective ($\beta_{\theta_{R_OS}}$) are associated with older sibling depressive symptoms (Table 8). Specifically, as the shared family perspective and older sibling unique perspective of parent-adolescent conflict increases there is an increase in older sibling depressive symptoms. Most of the density for the posterior mean of the shared family perspective slope ($\beta_{\theta_{FAM}}$) is near .44, with a 95% probability of being between the values of .22 and .64 (Figure 15). Older siblings' unique perspective of parent-adolescent conflict slope ($\beta_{\theta_{R_OS}}$) has a posterior mean of .32, with a 95% probability of values between .17 and .47. The only covariate in this model that was related to older sibling depressive symptoms is child gender. The posterior mean of the slope for older sibling gender (β_{Gender}) is -.18, which suggests that boys report fewer depressive symptoms compared to girls.

All the factor loadings were above .20, and none of the factor loadings included zero in the posterior 95% HPD interval. Compared to YS, the OS dyad loadings and the

triad loadings (paths) had greater uncertainty and were smaller in magnitude (Table 11). Additionally, the variance parameters with the largest amount of uncertainty were the shared perspectives of M-OS Dyad $_{\psi_6}$ and D-OS Dyad $_{\psi_7}$ and the outcome residual variance (Table 12). None of the variance and intercept parameters included zero in the HPD interval.

Model 3: Younger Sibling Grade Point Average

Summary of Posterior Results. As shown in Table 7, increases in parent-adolescent conflict from the general family shared perspective ($\beta_{\theta_{FAM}}$) was associated with lower grade point average for younger siblings (Figure 16). There is a 95% probability that the slope of $\beta_{\theta_{FAM}}$ is between .47 to .12. Covariates that were associated with younger sibling GPA include family socioeconomic status (β_{SES}) and younger sibling gender (β_{Gender}). Increases in family socioeconomic status (β_{SES}) were related to higher GPA for younger siblings. The posterior mean of the slope for younger sibling gender (β_{Gender}) of -.16 suggests that boys report lower grade point average than girls. The younger siblings' unique perspective of parent-adolescent conflict slope ($\beta_{\theta_{R_YS}}$) was associated in negative direction with GPA and had a narrow HPD interval that included zero, there was not sufficient to interpret this effect.

The factor loading, intercepts, and variance parameter results are reported in Tables 13 and 14. The factor loadings with the smallest magnitude were OS-M $_{\lambda_{1,1}}$ and OS-D $_{\lambda_{3,1}}$, all other loadings were above .20 and did not include zero in the posterior interval (Table 13). The dyad shared perspective variance parameters and the outcome residual variance were large in magnitude and had a greater amount of uncertainty

compared to observed parent-adolescent conflict variable variance parameters (Table 14). With exception of $SES_{\gamma_{10}}$, the HPD intervals of the variance and intercept parameters were all positive. The posterior intervals of the variance and intercept parameters were all nonzero.

Model 4: Older Sibling Grade Point Average

Summary of Posterior Results. Results from this model suggest that none of the dyad, triad, or unique perspectives were associated with older siblings' grade point average (Table 8). Only the general family shared perspective ($\beta_{\theta_{FAM}}$) and the covariate of family socioeconomic status (β_{SES}) predicted older siblings grade point average (Figure 17). The general family shared perspective ($\beta_{\theta_{FAM}}$) was negatively associated with older siblings' depressive symptoms. Most of the posterior density for the $\beta_{\theta_{FAM}}$ parameter were concentrated at -.28, with a 95% probability of being between the values of -.52 to -.05. Turning to the covariate results, as family socioeconomic status (β_{SES}) increases, the predicted older sibling grade point average increases (.25), with a 95% probability of being between the values of .13 and .39. The older siblings' unique perspective of parent-adolescent conflict slope ($\beta_{\theta_{R_OS}}$) was associated in negative direction with GPA, with a narrow HPD interval however the zero was included in the HPD interval suggesting that there was not sufficient evidence to interpret this effect.

The factor loading, intercepts, and variance parameter results are reported in Tables 15 and 16. The factor loadings of the family shared perspective had the greatest amount of uncertainty compared to the loadings (paths) of the dyad and triad shared perspectives (Table 15). The variance parameters of the dyad factors were larger in

magnitude compared to the parent-adolescent conflict observed variable parameters (Table 16). The intercepts and HPD intervals of the parent-adolescent conflict observed variables were positive and did not include zero in the HPD interval (Table 16).

Model 5: Younger Sibling Educational Expectations

Summary of Posterior Regression Coefficient Results. The results from this model suggest that none of the dyad and triad shared and unique perspectives of parent-adolescent conflict were associated with younger siblings' reports of educational expectations (Table 7; Figure 18). The general family shared perspective ($\beta_{\theta_{FAM}}$) was related in negative direction to younger siblings' educational expectations, however there was a large amount of uncertainty in this small effect, and the posterior interval includes zero with a 95% probability that the parameter is between -.34 and .08. There was not sufficient evidence to interpret the general family shared perspective ($\beta_{\theta_{FAM}}$) as a predictor of educational expectations. All of the covariates (β_{SES} , β_{Gender} , $\beta_{immigrant}$) included in this model were related to younger siblings' educational expectations. The posterior mean of the slope for family socioeconomic status (β_{SES}) is 0.29, such that increases in socioeconomic status are related to increases in educational expectations. For younger sibling gender (β_{Gender}), results suggest that boys report lower (-.13) educational expectations relative to girls. The posterior mean (.17) of the slope parameter of younger siblings' immigrant status ($\beta_{immigrant}$) suggests that youth born in Mexico have greater expectations for their educational attainment compared to youth born in the U.S.

The factor loading, intercepts, and variance parameter results are reported in Tables 17 and 18. All of the factor loadings were above .20 and the HPD intervals all

included positive values (except for OS- $M_{\lambda 1,1}$ and OS- $D_{\lambda 3,1}$; Table 17). The outcome residual variance and the dyad latent variable variance parameters all included zero in the HPD interval, with the YS dyad variance parameters (M-YS Dyad $_{\psi 4}$ and D-YS Dyad $_{\psi 5}$) having the largest amount of uncertainty (Table 18). The intercept parameters were all in the expected direction, and none included zero in the HPD interval (Table 18).

Model 6: Older Sibling Educational Expectations

Summary of Posterior Results. Findings from this model suggest that none of the shared and unique perspectives were associated with older siblings' educational expectations (Table 8; Figure 19). Although the HPD interval of the general family shared perspective ($\beta_{\theta_{FAM}}$) included zero, the posterior interval was narrow with a similar standard deviation value to other effects in the same model that did not include zero in the HPD interval, the $\beta_{\theta_{FAM}}$ was related in positive direction to older siblings' educational expectations, however there is not sufficient evidence to interpret the general family shared perspective ($\beta_{\theta_{FAM}}$) as a predictor of educational expectations.

In this model, the only covariates that were linked to older siblings' educational expectations were family socioeconomic status (β_{SES}) and older sibling gender (β_{Gender}). The relation between family socioeconomic status (β_{SES}) and older siblings' educational expectations is positive in direction (.30), which suggests older siblings' educational expectations increase with greater family socioeconomic status. The posterior mean of the slope for older sibling gender (β_{Gender}) is -0.15, such that boys report lower educational expectations than girls.

The factor loading, intercepts, and variance parameter results are reported in

Tables 19 and 20. The factor loadings of the general family shared perspective had the greatest amount of uncertainty compared to the dyad, triad, and unique perspective loadings (e.g., paths; Table 19). The older sibling report of conflict with their father (OS- $D_{\lambda 3,1}$) is the only factor loading that includes zero in the HPD interval (Table 19). None of the intercept or variance parameters included zero in the HPD interval except for a few of the observed variable variances which were also the variance parameters that were smallest in magnitude (i.e., OS- $M_{\zeta 1}$, YS- $M_{\zeta 2}$, M-YS $_{\zeta 6}$, D-OS $_{\zeta 7}$, D-YS $_{\zeta 8}$).

Summary of SEM Model Results

Using a model building approach, a series of models were fit to the data to examine shared and unique perspectives of parent-adolescent conflict as predictors of youth depressive symptoms and educational outcomes. The general family shared perspective was associated positively with both older and younger sibling depressive symptoms, and negatively with both older and younger sibling grade point average (Tables 7 and 8). Both older and younger siblings' unique perspectives of parent-adolescent conflict were linked in positive direction with their report of depressive symptoms. Family socioeconomic status was associated with higher educational expectations and grade point average for both older and younger siblings. Youth gender was associated with depressive symptoms, grade point average, and educational expectations for both older and younger siblings. Finally, younger siblings' immigrant status was associated with their educational expectations.

Strength of the Associations between Perspectives of Parent-Adolescent Conflict and Adjustment

The magnitude of the association between the perspectives that were linked to youths' outcomes were examined descriptively. In the younger sibling depressive symptoms model, the magnitude of the association was similar for both the regression coefficients of the family shared perspective and younger sibling unique perspective. The older sibling depressive symptoms model had slightly different results, such that, the older sibling unique perspective was slightly smaller in magnitude than the general family shared perspective. In both the older and younger sibling grade point average models, the effect of the general family perspective was small in magnitude.

In examining whether the effect of the general family perspective was stronger than the unique reporter perspective for younger sibling depressive symptoms, according to the model there is a 79% probability that the regression coefficient for the unique perspective is greater than the coefficient for the general family shared perspective (Mean difference = 1.19, SD = 1.49, 95% C.I. [-1.31, 3.60], Evidence Ratio = 3.75). In the model predicting older sibling depressive symptoms, there is a 57% probability that the regression coefficient for the unique perspective is greater than the coefficient for the general family shared perspective (Mean difference = .26, SD = 1.53, 95% C.I. [-2.26, 2.76], Evidence Ratio = 1.33). However, because this result suggests weak evidence (Kass & Raftery, 1995) there is not sufficient support from the results to interpret the findings from this test of the strength of association.

For the grade point average models and the younger sibling educational expectations model, the probability of the direction of the effect being negative was examined because the family shared perspective was the only predictor associated with

youths' educational outcomes. The general family shared perspective slope parameter has 100% of the posterior distribution for the younger sibling GPA model (Mean = $-.28$, SD = $.09$, 95% C.I. [-0.43 , -0.14], Evidence Ratio = 1249), and 99% of the posterior distribution for the older sibling GPA model (Mean = $-.26$, SD = $.12$, 95% C.I. [-0.46 , -0.08], Evidence Ratio = 87.89) that is lower than 0, suggesting greater certainty that effect is in negative direction.

CHAPTER 4

DISCUSSION

Overview

Parent-adolescent conflict regarding minor daily issues is common in families (Laursen & Collins, 1994; Weymouth et al., 2016) and is an important aspect of parent-child relationships that has been studied extensively over the past five decades (Marshall et al., 2022). Adolescence is a developmental period when conflicts increase in frequency relative to earlier periods (Laursen & Collins, 2004; Pasch et al., 2006). Multiple studies have consistently found that higher levels of parent-adolescent conflict, typically measured as adolescents' perceptions of the frequency or degree of conflict, are associated cross-sectionally (Pasch et al., 2006; Lopez & Shen, 2021), in meta-analytic research (Weymouth et al., 2016), and longitudinally (Derlan et al., 2015; Dotterer et al., 2013; Smokowski et al., 2014) with lower levels of psychosocial adjustment and educational outcomes.

Building on this existing research on parent-adolescent conflict and grounded in a family systems framework (Cox & Paley, 1997; Minuchin, 1988), this study examined multiple perspectives of parent-adolescent conflict simultaneously across different parent-adolescent dyads in the family system. More specifically, this study tested a model of shared and unique perspectives of parent-adolescent conflict in Mexican-origin families that captured shared perspectives from the family, triad, dyad, and unique perspectives of parent-adolescent conflict. Generalizations of the family shared perspective to the family level should be interpreted cautiously as the family shared

perspective is measured in this study as the co-occurrence of two parents and two siblings view of dyadic parent-adolescent conflict. This study also examined how these perspectives were associated with Mexican-origin adolescents' depressive symptoms and educational outcomes. An important strength of this study was the focus on Mexican-origin families, a group that has received limited attention in the field of family science (Perez-Brena et al., 2022) and one that warrants attention to parent-adolescent conflict given strong cultural norms that prioritize harmony and cohesion over conflict (Cahill et al., 2021).

There were several key contributions of this study. The first was examining the measurement model that considers parent-adolescent conflict as measured with dimensions representing the shared family, triad, dyad, and unique perspectives of parent-adolescent conflict. This model extends research that has primarily examined parent-youth conflict as reported by one member of the dyad (Lopez & Shen, 2021; Derlan et al., 2015; Vargas et al., 2013) or focused on divergence in two family members' reports (De Los Reyes et al., 2008; De Los Reyes & Ohannessian, 2016). Second, this study also highlighted the importance of shared perspectives of parent-adolescent conflict among all four family members in youth's concurrent adjustment, providing new insights on how parent-adolescent conflict can serve as a risk factor when shared across family members (Smetana & Rote, 2019).

Goal 1

Perceptions of Parent-adolescent conflict in the family system

In interpreting the findings related to the first goal of examining the factor structure of the measurement model of shared and unique perspectives of parent-adolescent conflict, it is important to provide descriptive information about parent-adolescent conflict in this sample of two-parent Mexican-origin families with two adolescent-age siblings. In general, family members rated conflict in the low to moderate range, averaging below the midpoint of the scale, suggesting that conflict occurred a couple times a month. Descriptively, siblings reported conflict ratings that were closer to the midpoint of the scale (2.59 to 2.77) and parents reported ratings of conflict that were slightly lower (2.19 to 2.31), although not significantly different. Findings from this study should be interpreted with an understanding that families in this study, who were recruited primarily through public junior high schools, generally described low to moderate conflict in their day-to-day lives.

The first goal focused on examining the measurement model of perspectives of parent-adolescent conflict. It was hypothesized that there would be a shared view of parent-adolescent conflict among the four dyads studied here, in addition to family subsystem views among parents and target youth including triadic (mother-father-older sibling and mother-father-younger sibling) and dyadic views of parent-adolescent conflict, accounting for unique views of the four family members. As expected, the results supported that the measurement model adequately represented the hypothesized model of the family subsystems. There are several limitations of the field that were addressed in this study by testing a measurement model that drew on conflict ratings provided by mothers, fathers, and two adolescents in each family. First, prior work has

largely focused on parent-adolescent conflict by using reports of conflict separately from parents and youth (De Geode et al., 2009; Pasch et al., 2006; Schofield et al., 2008), limiting the potential understanding of how these perspectives may be shared. In fact, when multiple perspectives of parent-youth conflict are examined the focus is typically on divergence or discrepancies in these perspectives (Ehrlich et al., 2016; Mastrotheodoros et al., 2020; Nelemans et al., 2016). This study, grounded in family systems theory (Cox & Paley, 1997), prioritized consideration of *shared* family perspectives as particularly important to understanding the nature and implications of parent-youth conflict.

Second, research on family relationships more broadly as well as on parent-youth conflict specifically has more often focused on youth's conflict with mothers or generic parents (i.e., not specifying mother or father) with less attention to how *fathers* and youth experience conflict (Branje, 2018; Galambos & Almeida, 1992; Laursen & Collins, 1994; Smetana, 1988). As more than half of Latinx children grow up in a household with two parents (56%; Chen & Guzman, 2022), ignoring fathers means that an important part of children's daily family interactions in this sociocultural context is often overlooked. Indeed, a recent review of the top six family journals highlights that, relative to mothers, fathers are less often studied including in ethno-racially minoritized families (Perez-Brena et al., 2022). This study captured parent-youth conflict with mothers and fathers simultaneously and considered the degree to which conflict was shared across family subsystems.

Third, this study utilized a sibling design to study parent-youth conflict with two adolescent-age youth within each family. As most previous research investigates parent-youth conflict with a *single target child* in each family and assume that findings are generalizable to other youth in the same family (McHale et al., 2012). Such an assumption is inconsistent with a large body of literature on parental differential treatment (Jensen & Thomsen, 2024). Research with White families highlight the importance of looking at conflict with multiple children in each family as conflicts between older siblings and their parents as they transition to adolescence predicted increases in conflict with younger siblings at the same time (Shanahan et al., 2007), highlighting the potential interconnections among conflicts of adolescents growing up in the same families.

Guided by family systems theory (Cox & Paley, 1997; Minuchin, 1988), evidence of the measurement model supports the notion that the whole is greater than the sum of its parts. In other words, the measurement model considers the different levels of the family system where the combination of parents' and adolescents' ratings provides a model for understanding parent-adolescent conflict in the family system. In this study, each perspective can be viewed as part of the whole system and subsystem of the family context. The co-occurrence of multiple family members' reports of parent-adolescent conflict underlying the factor would suggest that there is a shared perspective of parent-adolescent conflict across the various parent-youth subsystems within the families studied here. For instance, the general family factor (i.e., the factor that includes parent-child conflict in all four family dyads family members' reports) is important to examine

because we know from research that parent-adolescent conflict reported by multiple family members are often related (Mastrotheodoros, 2018). Further, as noted above, research on White families with adolescent siblings showed interrelations among older and younger siblings' conflict with mothers and fathers (Shanahan et al., 2007).

This study has advanced current knowledge of unique and shared views of parents' and youths' perspectives by showing that mothers', fathers', and adolescent siblings' perceptions of parent-adolescent conflict can be considered together. By simultaneously understanding different aspects of shared views of parent-adolescent conflict, this provides a greater understanding of a model that reflects adolescents' and parents' perceptions of the frequency of parent-adolescent conflict. The evidence of the family shared perspective of parent-adolescent conflict has implications for considering multiple family subsystems in future research on the frequency of parent-adolescent conflict in families.

Goal 2

Perspectives as sources of variability in links to adjustment

The second study goal was to understand which perspectives of the family system are related to adolescents' depressive symptoms and educational outcomes. Several hypotheses were advanced based on theory and previous research regarding links between shared perspectives and youth adjustment. It was expected that all shared and unique perspectives (e.g., family, triad, dyad, unique) would be negatively associated with depressive symptoms (Hypothesis 2.1.), and positively with grade point average (2.2.a.) and educational expectations (2.2.b.). Further, the family shared perspective was

expected to have a stronger association than adolescents' unique perspective in links with all three outcomes (2.3.).

Findings regarding the association between the family shared perspective and adolescents' depressive symptoms and grade point average implies that greater similarity in views of parent-adolescent conflict across multiple family members is a correlate of youth adjustment for these two indicators. As theorized, these findings are consistent with family systems theory which posits that the whole family system is considered (e.g., holism) to be meaningful over and above the parts (e.g., family subsystems) of the family level and individual views (Cox & Paley, 1997). That is, simultaneously considering each of the four family members' report of parent-adolescent conflict is meaningful in association with depressive symptoms and grade point average while also including dyad, triad, and unique views of conflict as predictors in the structural equation model.

In the present study the interrelated views of family members represented by the family shared perspective of parent-adolescent conflict was salient for adolescents' depressive symptoms and grade point average. The co-occurrence of multiple family members' perceptions of parent-adolescent conflict captures parent-adolescent conflict that is co-occurring in these different dyads, labeled in this study as the family level. The views of parent-adolescent conflict that occur at the shared family level (from both siblings with both parents) may have significant spill over implications for adolescents' psychosocial and educational adjustment outcomes.

Depressive Symptoms

Shared perspectives of the frequency of parent-adolescent conflict were hypothesized to increase risk for adolescents' depressive symptoms. As expected, higher family shared perspective of parent-adolescent conflict was associated with higher adolescent depressive symptoms at the same timepoint. This finding is consistent with previous research that suggests greater intensity and frequency of parent-adolescent conflict can be a risk factor for adolescent adjustment (Smetana & Rote, 2019). It may be that these links emerge between the family shared perspective of parent-adolescent conflict and adolescents' depressive symptoms because parent-adolescent conflict is a source of stress, where greater parent-adolescent conflict experienced by multiple parent-youth dyads in the family can be disruptive and stressful for youth (Cox & Paley, 2003), and the shared views can operate as a source of risk (De Los Reyes et al., 2019). The finding of the family shared perspective is consistent with another study showing that congruence, specifically in low levels of parent-adolescent conflict, were linked to lower adolescent depressive symptoms (Nelemans et al., 2016). Taken together, this work suggests that similar views in parent-adolescent conflict across multiple parent-child dyads within the family are a risk factor in the association with adolescent depressive symptoms. That is, when family members have similar views in their experience of parent-adolescent conflict, it may be more salient in predicting adolescents' adjustment, probably because the perspective (i.e., latent construct) is representing parent-adolescent conflict that has occurred as perceived similarly by each family member.

In addition, and as predicted, adolescents' unique views of parent-adolescent conflict also were predictive of adolescents' depressive symptoms while including family

shared, triad, and dyadic views in the models. This finding is consistent with research on parent-adolescent discrepancies that often focuses on unique perspectives of family members (De Los Reyes et al., 2008; De Los Reyes & Ohannessian, 2016). In considering potential explanations for the finding regarding adolescents' unique perspective as predictive of depressive symptoms, one potential reason could be that adolescents' own interpretation or view of the conflict with parents is important for their adjustment when also including in the model shared perspectives of parent-adolescent conflict (Laursen & Collins, 2004). For instance, how a family member interprets a conflict or disagreement may mean that the conflict is more impactful for one person and less for another because parents and adolescents may hold different views of the situation (Morris et al., 2021; Steinberg, 2001). The discrepancy in parents' and youths' view of the issue can contribute to the strength of conflict that occurs when there is a larger mismatch in views (Morris et al., 2021). In addition, differences in perspectives of conflict can be attributed to different experiences of each family member, as well as developmental changes in parent-adolescent relationships (Branje, 2018). An alternative reason for the unique perspective finding could be that depressive symptoms as an internalizing problem of an individual's own intrinsic feelings may also align with their intrinsic views of conflict that occurs between themselves and their parents. For example, individuals that experience depressive symptoms often experience negative perceptions or thoughts (Kircanski et al., 2012).

The finding for the depressive symptom model suggests that both the shared family perspective and adolescents' unique perspectives matter, not necessarily that one

is more important than the other for understanding adolescents' depressive symptoms but that both are correlates of depressive symptoms in this study. Unexpectedly, there were no associations between dyad and triad shared conflict perspectives with depressive symptoms when included with unique and family shared factors. One reason for the lack of evidence of dyad and triad shared perspectives in association with adolescent depressive symptoms could be that perceptions of parent-adolescent conflict among dyad and triad family members is less salient when parent-adolescent conflict is also measured at the family level, specifically because what is most important is the co-occurrence of views (e.g., shared variance) from parents, adolescents, and their siblings. Considering family systems theory (Cox & Paley, 1997), having a family with multiple family members that have similar experiences of parent-adolescent conflict may be more meaningful for adolescents' depressive symptoms than dyad and triad conflict because it is an issue that is occurring at the family level rather than the dyad or triad levels.

Finally, for the aim of understanding which perspective had a stronger association with adolescents' depressive symptoms, there was evidence that the younger sibling unique perspective had a stronger association with younger siblings' depressive symptoms than the family shared perspective. One explanation for this finding may be that younger siblings' unique view has greater salience for their depressive symptoms during early adolescence because in general they may view different relationships and aspects of their lives more negatively, where youth experiencing greater depressive symptoms may also have a more negative view of their relationships with their parents (Céspedes & Huey, 2008) and perceive higher levels of conflict as a result. Additionally,

another explanation for this finding could be that their own perception of how they interpret the relationships around them matters most for their intrinsic affect and emotions. From a developmental perspective, it could be that the unique views may matter more for younger siblings who are in early adolescence compared to the shared views because adolescence is a developmental period of increased autonomy relative to earlier developmental periods such as childhood.

In contrast to findings for younger siblings, for older siblings there was weak evidence in support of the finding that the older sibling unique perspective had a stronger association with the older sibling depressive symptoms than the family shared perspective. The weak evidence may be because the parent-youth relationship becomes more symmetrical in adolescence (Branje, 2018) which provides opportunities for more similar views with other family members.

Educational Outcomes

For adolescents' educational outcomes, it was expected that the experiences of parent-adolescent conflict, which could be a source of stress within the family (Smetana & Rote, 2019), would negatively impact youth, potentially spilling over to their school functioning (Repetti, 1987) and resulting in a negative association between conflict and educational outcomes. Consistent with findings of a meta-analysis generally showing an inverse relation between parent-youth conflict and grade point average (Weymouth et al., 2016), and spillover effects of parent-adolescent conflict to youths' educational adjustment (Flook & Fuligni, 2008; Roche et al., 2019), the family shared perspective was negatively associated with older and younger siblings' grade point average. The

current study extends this work by showing that the *family shared* perspective of parent-adolescent conflict (i.e., the co-occurrence of conflict among multiple parent-youth dyads in the family) is associated in negative direction with adolescent grade point average, moving beyond the consideration of single reports of parent-adolescent conflict (Lopez & Shen, 2021; Vargas et al., 2013) and a focus on discrepancies (De Los Reyes et al., 2019; De Los Reyes & Ohannessian, 2016). The finding of the family shared perspective aligns with the idea that the occurrence of multiple sources of stress from conflict within the family context may be harmful for youth functioning in other domains, including the school context (Repetti, 1987). It also may be that if all family members have similar views of parent-adolescent conflict, it may be that the similarity in experiences of conflict among family members has the potential to spill over as a source of stress for their own educational outcomes, which is consistent with ideas that congruence in measures such as conflict in parent-youth relationships can be a source of risk (De Los Reyes et al., 2019). However, the dyad and triad factors were not associated with grade point average. This may be due to the dyad and triad levels not having as much spillover as would the family shared perspective because it could be a greater source of stress when everyone in the family context is experiencing conflict versus the smaller family subsystem levels of dyad and triad.

Consistent with previous research which underscores the co-occurrence (e.g., convergence) in shared views among multiple family members (e.g., parent and youth; De Los Reyes et al., 2019; Mastrotheodoros et al., 2018), the findings of the shared family perspective of parent-adolescent conflict from this study advance our

understanding of the family as a set of interrelated subsystems which can provide insights as to ways that this operationalization of shared family conflict is particularly meaningful for adolescent grade point average. Contrary to prior research linking adolescents' own perspectives of parent-youth conflict to educational outcomes (Weymouth et al., 2016), the unique perspective was not associated with adolescents' grade point average or educational expectations. It may be that educational achievement is explained by other factors (e.g., family cohesion; Nair et al., 2018) beyond shared and unique perspectives of parent-adolescent conflict. The lack of evidence for the unique perspective in links to educational adjustment is inconsistent with previous research that has shown parent-adolescent conflict as negatively related to educational achievement (Weymouth, et al., 2016). In this study, the model simultaneously included multiple family members' reports for the shared perspectives of parent-adolescent conflict and the unique perspectives of all four family members. Thus, unique perspectives of adolescents as measured here may be different than when adolescents' own reports of conflict are the only indicator being examined (Flook & Fuligni, 2008; Vargas et al., 2013).

There was not sufficient evidence that any of the parent-youth conflict factors were associated with educational expectations. It is possible that their expectations for their educational achievement are more strongly influenced by other factors beyond unique and family subsystem perspectives of parent-adolescent conflict. Given that this is a primarily immigrant sample, youth may not have had many resources from their family in helping to support them in navigating their education (Han, 2008). It may be that factors related to documentation status and economic and educational resources to pursue

higher education are salient predictors (Suárez-Orozco et al., 2011). Indeed, in this study, family socioeconomic status was associated with greater educational expectations for both older and younger siblings and youth born in Mexico had greater educational expectations compared to youth born in the U.S. Future studies should examine these links longitudinally as previous research using the same sample has shown that for immigrant youth compared to U.S.-born youth they have greater declines in their educational expectations over early adolescence and improve in late adolescence (Perez-Brena et al., 2017).

Strengths and Limitations

This study had several strengths and limitations that can inform future research. First, a major limitation of this study was how shared family conflict was conceptualized because the available measures of conflict focused on dyadic parent-adolescent conflict and no measures were collected to capture family or triad level conflict specifically. The available measure assessed frequency of dyadic parent-adolescent conflict as reported individually by each member of the parent-youth dyad. With this limitation in mind, this study drew from family systems theory in using existing measures to examine shared and unique perspectives of parent-adolescent conflict across a total of four parent-youth dyads within each family. In the future, one way to better address conflict in multiple family subsystems will be to assess family members' perspectives of parent-adolescent conflict experienced by the other dyads in the family (e.g., younger siblings view of parent-adolescent conflict among mothers and older siblings). Future research on the shared family perspective can be expanded to also consider those additional views. It is

possible that this would be useful because, although the prompt for this measure states that adolescents should only consider the parent they are reporting on, it could be that adolescents consider their conflict with parents relative to their siblings (e.g., if asked how often they fight about chores, they may think they fight about chores much less often than their older siblings and report the frequency with this comparison in mind). Another potential direction would be to directly ask family members about the conflict that occurs at different levels in the family or to observe these different family subsystems (dyad, triad, family as a whole) to evaluate their conflict and its overlap across these different subsystems.

Another limitation of this study was that we only included one type of family structure, two-parent families with a mother, father, and two adolescent siblings. Research has found that two-parent households among Latinxs in the U.S. are common (Chen & Guzman, 2022), however additional research will be needed to capture the variety of parents or caregivers and the diversity of family structures (e.g., two-parent households with two mothers or two fathers; mother or father figures such as grandparents, aunts, uncles, siblings, cousins; divorced, remarried, or separated families) that may serve in parenting roles and thus engage in conflicts with over daily topics. The inclusion of fathers in this study was a strength given limited attention to fathers, particularly those from minoritized backgrounds (Perez-Brena et al., 2022).

This sample resided in an established region (Stamps & Bohon, 2006) for Latinos in the U.S. and these associations may differ in emerging Latinx destinations (e.g., North Carolina, Georgia) and established regions of U.S.-Mexico border communities. There

could be a difference in findings in new immigrant destinations (Spees et al., 2017) considering that families in established Latinx cultural contexts may have stronger infrastructure (Potochnick, 2014), more extended resources of adults who provide a caregiving role to youth (e.g., community leaders, neighbors), and the additional sources of support to the family from the community may mitigate some of the negative experiences of potentially harmful levels of parent-adolescent conflict. It is important to interpret these findings as they are situated in the larger context where families resided. Although these data were collected in the early 2000s, it is important to note that Arizona is a state that has had consistent anti-immigrant sentiments in the media for over a decade (Alvord & Menjívar, 2022), in addition to anti-immigrant policy efforts and laws that have been enacted in Arizona (i.e., Senate Bill 1070) with negative implications for Latinx individuals socio-emotional well-being, risk behaviors, health care utilization, and academic adjustment (Toomey et al., 2014; Santos & Menjívar, 2013; Santos et al., 2018). Future research should examine whether there are differences in the links between shared perspective of parent-adolescent conflict with adjustment for Mexican-origin youth living in Arizona that are exposed to other sources of risk or stressors (e.g., awareness of anti-immigrant policies or sentiments).

The findings from this study should also be interpreted by understanding the sociohistorical context in which these data were collected. In the past twenty years, there have been advances in technology and social media platforms that shape social changes in how youth interact with family members as well as others (Navarro & Tudge, 2023). For instance, mixed-methods research has found that conflict was a prevalent theme in

text messages adolescent send to family members, such as engaging in conflict via text messaging (Sun et al., 2023). Additionally, qualitative research has revealed that parent-child conflict around screen time use is an issue for families and that they have different perspectives about whether screen time use is beneficial or detrimental for their relationships (Francis, 2021). In addition, historical events have occurred in the last two decades such as the COVID-19 pandemic that has had implications for Latinx children's family functioning and mental health (Causadias & Neblett, 2024). The COVID-19 pandemic, for example, exacerbated vulnerabilities of families, with one nationwide study finding that low income families experienced greater parent-child conflict compared to high income families during the pandemic (Wang et al., 2024). Parent-adolescent conflict findings from the current study may operate similar or differently (e.g., less or greater risk) in the current time with consideration of these social and historical changes that have occurred in recent years.

In future studies, observational data would be beneficial for assessing conflict within each parent-adolescent dyad and also in higher level family subsystems such as triads and the whole family, providing the opportunity to view conflict as it occurs in real time rather than relying on self-report for understanding parents' and youths' perspectives of conflict in one specific family subsystem (i.e., parent-youth dyad). Such an approach is likely to provide novel insights on shared features of conflict in families. The current study design was limited to cross-sectional data, and thus future work should focus on examining these links longitudinally to assess changes in shared conflict parent-adolescent conflict over time and the associations with adjustment. For repeated

measures, a daily diary design has strengths for examining the spillover hypothesis of adolescents' family experiences to the school setting (Flook & Fuligni, 2008), with the possibility that there may be different patterns of findings for the shared and unique perspectives of parent-adolescent conflict if it is assessed on multiple occasions.

This study has several notable strengths that contribute to current research. Considering both mothers and fathers was a strength as much of the research of parent-adolescent conflict has focused on mother-child conflict reports, but less work has examined father-adolescent conflict (Pasch et al., 2006; De Geode et al., 2009; Shanahan et al., 2007) which is distinct from but also may be correlated with mother reports because of the interdependent relationships among family members (Cox & Paley, 1997). There are often challenges in recruiting fathers in family (Costigan & Cox, 2001), psychological (Roggman et al., 2012), and developmental science (Mitchell et al., 2007). A strength of this dissertation is it provides additional insights of parent-adolescent conflict by also including father-report data.

There were methodological strengths as well. This study applied a Bayesian structural equation model to family data (i.e., mother, father, and child reports). Structural equation modeling has been described as a methodological approach that has advantages in its flexibility for modeling multi-informant family reports (e.g., reports from husbands and wives; Ledermann & Kenny, 2017). A strength of the latent variable modeling approach is that it accounts for measurement error and estimation bias used to measure shared and unique perspectives of parent-adolescent conflict.

Conclusion

This study advanced knowledge of different perspectives of parent-adolescent conflict, a common aspect of parent-adolescent relationships in families (Laursen & Collins, 1994) that has implications for a wide range of indicators of youth adjustment (Weymouth et al., 2016). The focus on an underrepresented ethnic-racial minoritized group in family science (Perez-Brena et al., 2022) also contributes to literature of parent-adolescent conflict that has disproportionately focused on White families. This research focus is particularly salient considering that youth in Latinx families often have siblings (Knop, 2020) and the inclusion of two sibling adolescents in this study provided valuable insights about conflicts with parents that can help inform family-based prevention programs targeting parent-adolescent conflict. This research highlighted that the co-occurrence of parent-youth conflict across multiple dyads in families (i.e., mothers and fathers with two adolescent siblings) was related to youths' depressive symptoms and grade point average, in addition to adolescents' unique perspectives being associated with adolescents' depressive symptoms. Future research on parent-adolescent conflict that examines these links longitudinally, in addition to other indicators of internalizing symptoms, educational outcomes, and externalizing problems will contribute to more detailed knowledge of perspectives of parent-adolescent conflict with implications for prevention and intervention.

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APPENDIX A
TABLES AND FIGURES

Table 1. Means, Standard Deviations, and Bivariate Correlations Among Study Variables

	1	2	3	4	5	6	7	8
1. OS-M	1.00	--	--	--	--	--	--	--
2. YS-M	0.05	1.00	--	--	--	--	--	--
3. OS-D	0.73***	-0.02	1.00	--	--	--	--	--
4. YS-D	0.08	0.75***	0.09	1.00	--	--	--	--
5. M-OS	0.27***	0.16*	0.24***	0.17**	1.00	--	--	--
6. M-YS	0.11	0.30***	0.09	0.29***	0.55***	1.00	--	--
7. D-OS	0.22***	0.15*	0.17**	0.20**	0.45***	0.30***	1.00	--
8. D-YS	0.02	0.27***	0.04	0.29***	0.28***	0.41***	0.70***	1.00
9. YS Dep.	-0.00	0.40***	-0.09	0.41***	0.16*	0.28***	0.12	0.19**
10. OS Dep.	0.28***	0.08	0.31***	0.09	0.16*	0.21**	0.20**	0.12
11. YS Edu.	0.02	-0.24***	0.09	-0.15*	-0.02	-0.15*	-0.10	-0.17**
12. OS Edu.	-0.16*	-0.01	-0.09	0.03	-0.19**	-0.01	-0.12	0.02
13. YS GPA	-0.02	-0.23***	0.03	-0.19**	-0.13*	-0.32***	-0.19**	-0.26***
14. OS GPA	-0.19**	-0.09	-0.22**	-0.05	-0.32***	-0.17*	-0.22**	-0.12
15. YS I. Status	-0.00	0.11	0.04	0.15*	0.00	0.01	-0.05	-0.11
16. OS I. Status	-0.03	0.03	0.00	0.07	0.05	0.02	-0.08	-0.13*
17. YS Gender	-0.07	0.08	-0.06	0.16*	-0.06	0.04	0.01	0.07
18. OS Gender	0.09	0.01	0.02	0.07	0.09	0.06	0.14*	0.06
19. SES	-0.02	-0.15*	0.01	-0.22***	0.00	0.07	-0.00	0.10
Mean	2.61	2.71	2.57	2.69	2.22	2.31	2.19	2.25
(SD)	(0.85)	(0.88)	(0.94)	(0.99)	(0.85)	(0.78)	(0.89)	(0.83)

Note. Sample size ranges from 199 to 246; Pairwise deletion was used for missing observations.; Variables 1 – 8= parent-adolescent conflict; YS = younger sibling report; OS = older sibling report; Dep. = depressive symptoms; Edu. = Educational expectations; GPA = Grade point average; Gender coded as 1 = Female, 2 = Male; I. Status = Immigrant status (0 = U.S.-Born, 1 = Born in Mexico); SD = Standard Deviation; $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 1 (Continued). Means, Standard Deviations, and Bivariate Correlations Among Study Variables

	9	10	11	12	13	14
1. OS-M	--	--	--	--	--	--
2. YS-M	--	--	--	--	--	--
3. OS-D	--	--	--	--	--	--
4. YS-D	--	--	--	--	--	--
5. M-OS	--	--	--	--	--	--
6. M-YS	--	--	--	--	--	--
7. D-OS	--	--	--	--	--	--
8. D-YS	--	--	--	--	--	--
9. YS Dep.	1.00	--	--	--	--	--
10. OS Dep.	0.07	1.00	--	--	--	--
11. YS Edu.	-0.22***	-0.16*	1.00	--	--	--
12. OS Edu.	-0.07	-0.04	0.11	1.00	--	--
13. YS GPA	-0.29***	-0.17**	0.34***	0.16*	1.00	--
14. OS GPA	-0.12	-0.21**	0.18*	0.41***	0.29***	1.00
15. YS I. Status	0.04	0.07	0.05	-0.12	-0.10	-0.09
16. OS I. Status	-0.02	0.03	-0.02	-0.12	-0.03	-0.12
17. YS Gender	-0.09	0.04	-0.17**	0.02	-0.21**	-0.08
18. OS Gender	0.04	-0.15*	-0.04	-0.18**	-0.10	-0.16*
19. SES	-0.24***	-0.03	0.24***	0.32***	0.22***	0.28***
Mean	16.43	17.19	15.71	15.55	2.74	2.64
(SD)	(9.90)	(9.83)	(2.20)	(2.50)	(0.92)	(0.89)
Variance	98.04	96.69	4.82	6.25	0.85	0.78

Note. Sample size ranges from 199 to 246; Pairwise deletion was used for missing observations.; Variables 1 – 8= parent-adolescent conflict; YS = younger sibling report; OS = older sibling report; Dep. = depressive symptoms; Edu. = Educational expectations; GPA = Grade point average; I. Status = Immigrant status; Variance = sample variance; SD = Standard Deviation; $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 1 (Continued). Means, Standard Deviations, and Bivariate Correlations Among Study Variables

	15	16	17	18	19
1. OS-M	--	--	--	--	--
2. YS-M	--	--	--	--	--
3. OS-D	--	--	--	--	--
4. YS-D	--	--	--	--	--
5. M-OS	--	--	--	--	--
6. M-YS	--	--	--	--	--
7. D-OS	--	--	--	--	--
8. D-YS	--	--	--	--	--
9. YS Dep.	--	--	--	--	--
10. OS Dep.	--	--	--	--	--
11. YS Edu.	--	--	--	--	--
12. OS Edu.	--	--	--	--	--
13. YS GPA	--	--	--	--	--
14. OS GPA	--	--	--	--	--
15. YS I. Status	1.00	--	--	--	--
16. OS I. Status	0.75***	1.00	--	--	--
17. YS Gender	0.04	0.08	1.00	--	--
18. OS Gender	-0.06	-0.08	0.09	1.00	--
19. SES	-0.39***	-0.44***	-0.09	-0.02	1.00
Mean	1.38	1.46	1.49	1.50	-0.01
(SD)	(0.49)	(0.50)	(0.50)	(0.50)	(0.83)

Note. Sample size ranges from 199 to 246; Pairwise deletion was used for missing observations.; Variables 1 – 8= parent-adolescent conflict; YS = younger sibling report; OS = older sibling report; Dep. = depressive symptoms; Edu. = Educational expectations; GPA = Grade point average; I. Status = Immigrant status; SD = Standard Deviation; $p < .05^*$, $p < .01^{**}$, $p < .001^{***}$

Table 2.*Bayesian Structural Equation Model Fit Summary*

		Outcome						
		<i>YS Depressive Sym.</i>			<i>OS Depressive Sym.</i>		<i>YS GPA</i>	
Model	1a	1b	1	2a	2	3a	3b	3
<i>ppp</i>	.057	.060	.001	.114	.117	.122	.117	.002
<i>R</i> ²	.456	.442	.333	.812	.825	.806	.814	.391

		<i>OS GPA</i>			<i>YS Edu. Exp.</i>		<i>OS Edu. Exp.</i>	
Model	4a	4b	4	5a	5	6a	6b	6
<i>ppp</i>	.045	.049	0	.100	.101	.080	.082	.001
<i>R</i> ²	.525	.485	.284	.789	.790	.778	.788	.303

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Note. Models in bold were retained as the final models; Models ending with ‘a’ = weakly informative prior specifications included, Models ending with ‘b’ = increased iterations included; All models that begin with the same number include the same endogenous variable (e.g., all models that begin with ‘3’ include younger sibling GPA as an endogenous variable); *ppp* = posterior predictive p-value; *YS* = younger sibling report; *OS* = older sibling report; *Depressive Sym.* = depressive symptoms; *Edu. Exp.* = Educational expectations; *GPA* = Grade point average.

Table 3. Posterior Predictive Model Assessment Model Fit Summary of the Bayesian CFA and SEM Models

Model	χ^2	<i>ppp</i>	CFI	<i>ppp</i>	SRMR	<i>ppp</i>	RMSEA	<i>ppp</i>
0. CFA	48.240 (8.429), [32.506, 64.832]	.387	0.997 (0.001), [0.996, 0.998]	.617	0.081 (0.022), [0.045, 0.125]	.381	0.124 (0.014), [0.098, 0.151]	.387
1. YS Dep.	141.260 (11.627), [119.462, 164.770]	.001	0.999 (0.000), [0.999, 0.999]	.999	0.083 (0.013), [0.064, 0.111]	.108	0.107 (0.006), [0.096, 0.119]	.001
2. OS Dep.	101.737 (9.402), [84.461 120.766]	.117	0.999 (0.000), [0.999, 1.00]	.885	0.078 (0.014), [0.057, 0.106]	.208	0.084 (0.006) [0.073, 0.096]	.117
3. YS GPA	133.694 (11.554), [111.487, 156.323]	.002	0.993 (0.001), [0.992, 0.995]	.998	0.082 (0.013), [0.062, 0.108]	.117	0.103 (0.006), [0.091, 0.115]	.002
4. OS GPA	144.295 (11.728), [122.095, 167.481]	.000	0.992 (0.001), [0.991, 0.994]	1.00	0.081 (0.013) [0.060, 0.107]	.156	0.108 (0.006), [0.097, 0.120]	.000
5. YS Edu.	103.155 (9.397), [85.499, 121.879]	.101	0.999 (0.000), [0.999, 0.999]	.900	0.080 (0.013), [0.061, 0.105]	.149	0.085 (0.006), [0.074, 0.097]	.101
6. OS Edu.	139.780 (11.612), [118.312, 163.101]	.000	0.999 (0.000), [0.998, 0.999]	1.00	0.080 (0.012), [0.061, 0.105]	.130	0.106 (0.006), [0.095, 0.118]	.000

Note. χ^2 = Chi-square value, CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation; [95% Highest posterior density interval]; *ppp* = posterior predictive p-values to test the hypothesis that the simulated data are greater than the realized values.

Table 4.*Parent-Adolescent Conflict Data Residual Covariances from the Measurement Model 0*

	1.	2.	3.	4.	5.	6.	7.	8.
1. OS-M	--							
2. YS-M	-0.02	--						
3. OS-D	-0.01	-0.07	--					
4. YS-D	0.00	0.00	0.02	--				
5. M-OS	-0.01	-0.01	0.00	-0.03	--			
6. M-YS	-0.01	-0.02	-0.01	-0.02	0.00	--		
7. D-OS	-0.04	-0.02	-0.07	0.00	0.00	0.00	--	
8. D-YS	-0.08	0.00	-0.05	0.00	0.00	0.00	-0.01	--

Table 5. *Posterior (MCMC) Summary of Standardized Results from Bayesian Factor Analysis*

Factor	Effect	Loading (SD) 95%HPD	Effect	Mean (SD) 95%HPD	
Family	OS-M $\lambda_{1,1}$	0.21 (0.11), [0.01, 0.43]	Variance	OS-M ζ_1	0.15 (0.05), [0.06, 0.25]
	YS-M $\lambda_{2,1}$	0.31 (0.10), [0.12, 0.50]		YS-M ζ_2	0.15 (0.05), [0.05, 0.24]
	OS-D $\lambda_{3,1}$	0.18 (0.10), [-0.01, 0.38]		OS-D ζ_3	0.34 (0.04), [0.26, 0.41]
	YS-D $\lambda_{4,1}$	0.34 (0.09), [0.16, 0.52]		YS-D ζ_4	0.30 (0.04), [0.22, 0.38]
	M-OS $\lambda_{5,1}$	0.57 (0.12), [0.34, 0.79]		M-OS ζ_5	0.30 (0.07), [0.17, 0.43]
	M-YS $\lambda_{6,1}$	0.57 (0.11), [0.35, 0.79]		M-YS ζ_6	0.26 (0.07), [0.13, 0.40]
	D-OS $\lambda_{7,1}$	0.55 (0.11), [0.34, 0.76]		D-OS ζ_7	0.16 (0.06), [0.04, 0.26]
	D-YS $\lambda_{8,1}$	0.50 (0.11), [0.29, 0.73]		D-YS ζ_8	0.13 (0.05), [0, 0.22]
Triad	M-OS Dyad $\xi_{6,2}$	0.93 (0.12), [0.75, 1.00]	M-YS Dyad ψ_4	0.16 (0.21), [0, 0.63]	
	D-OS Dyad $\xi_{7,2}$	0.95 (0.11), [0.83, 1.00]	D-YS Dyad ψ_5	0.18 (0.20), [0, 0.61]	
	M-YS Dyad $\xi_{4,3}$	0.90 (0.15), [0.61, 1.00]	M-OS Dyad ψ_6	0.11 (0.17), [0, 0.44]	
	D-YS Dyad $\xi_{5,3}$	0.89 (0.15), [0.62, 1.00]	D-OS Dyad ψ_7	0.08 (0.15), [0, 0.31]	
Dyad	YS-M $\lambda_{2,4}$	0.34 (0.09), [0.15, 0.49]	Intercept	OS-M γ_1	3.03 (0.15), [2.73, 3.33]
	M-YS $\lambda_{6,4}$	0.38 (0.10), [0.17, 0.56]		YS-M γ_5	3.03 (0.15), [2.73, 3.33]
	YS-D $\lambda_{4,5}$	0.30 (0.08), [0.13, 0.44]		OS-D γ_3	2.66 (0.14), [2.40, 2.94]
	D-YS $\lambda_{8,5}$	0.36 (0.10), [0.15, 0.54]		YS-D γ_7	2.65 (0.14), [2.37, 2.91]
	OS-M $\lambda_{1,6}$	0.39 (0.10), [0.16, 0.55]		M-OS γ_2	2.54 (0.13), [2.28, 2.80]
	M-OS $\lambda_{5,6}$	0.38 (0.10), [0.16, 0.55]		M-YS γ_6	2.91 (0.15), [2.61, 3.2]
	OS-D $\lambda_{3,7}$	0.34 (0.09), [0.13, 0.48]		D-OS γ_4	2.37 (0.13), [2.12, 2.61]
	D-OS $\lambda_{7,7}$	0.36 (0.10), [0.13, 0.51]		D-YS γ_8	2.65 (0.14), [2.39, 2.94]
Unique	OS-M $\lambda_{1,8}$	0.79 (0.04), [0.72, 0.87]			
	OS-D $\lambda_{3,8}$	0.70 (0.04), [0.64, 0.77]			
	YS-M $\lambda_{2,9}$	0.79 (0.04), [0.70, 0.87]			
	YS-D $\lambda_{4,9}$	0.69 (0.04), [0.62, 0.76]			
	M-OS $\lambda_{5,10}$	0.44 (0.12), [0.17, 0.63]			
	M-YS $\lambda_{6,10}$	0.48 (0.13), [0.18, 0.69]			
	D-OS $\lambda_{7,11}$	0.63 (0.07), [0.49, 0.75]			
	D-YS $\lambda_{8,11}$	0.68 (0.08), [0.53, 0.82]			

Note. $\lambda_{j,k}$ = parent-adolescent conflict factor loading, subscript denotes item number and latent variable; $\xi_{k1, k2}$ = paths between latent variables, subscript denotes effect of exogenous latent variable on endogenous latent variable.

Table 6. Posterior (MCMC) Summary of Unstandardized Results from Bayesian Factor Analysis

Factor	Effect	Loading (SD) 95%HPD		Effect	Mean (SD) 95%HPD
Family	OS-M $\lambda_{1,1}$	0.19 (0.10), [0.01, 0.38]	Variance	OS-M ζ_1	0.11 (0.04), [0.04, 0.19]
	YS-M $\lambda_{2,1}$	0.28 (0.09), [0.10, 0.46]		YS-M ζ_2	0.12 (0.04), [0.04, 0.20]
	OS-D $\lambda_{3,1}$	0.18 (0.10), [-0.01, 0.37]		OS-D ζ_3	0.32 (0.05), [0.23, 0.41]
	YS-D $\lambda_{4,1}$	0.35 (0.10), [0.16, 0.55]		YS-D ζ_4	0.31 (0.05), [0.21, 0.40]
	M-OS $\lambda_{5,1}$	0.50 (0.11), [0.29, 0.72]		M-OS ζ_5	0.23 (0.05), [0.13, 0.33]
	M-YS $\lambda_{6,1}$	0.45 (0.10), [0.26, 0.64]		M-YS ζ_6	0.16 (0.04), [0.08, 0.25]
	D-OS $\lambda_{7,1}$	0.51 (0.11), [0.30, 0.72]		D-OS ζ_7	0.13 (0.05), [0.03, 0.23]
	D-YS $\lambda_{8,1}$	0.43 (0.10), [0.23, 0.64]		D-YS ζ_8	0.09 (0.04), [0, 0.16]
				M-YS Dyad ψ_4	0.01 (0.01), [0, 0.04]
				D-YS Dyad ψ_5	0.02 (0.02), [0, 0.05]
				M-OS Dyad ψ_6	0.01 (0.01), [0, 0.03]
				D-OS Dyad ψ_7	0.01 (0.01), [0, 0.02]
				OS Triad ψ_2	0.11 (0.05), [0, 0.19]
				YS Triad ψ_3	0.09 (0.04), [0, 0.15]
				OS Unique ψ_8	0.47 (0.06), [0.36, 0.59]
				YS Unique ψ_9	0.50 (0.07), [0.37, 0.64]
				M Unique ψ_{10}	0.16 (0.07), [0, 0.26]
				D Unique ψ_{11}	0.34 (0.07), [0.19, 0.47]
			Intercept	OS-M γ_1	2.61 (0.06), [2.5, 2.71]
				YS-M γ_2	2.71 (0.06), [2.6, 2.82]
				OS-D γ_3	2.57 (0.06), [2.45, 2.7]
				YS-D γ_4	2.69 (0.06), [2.56, 2.81]
				M-OS γ_5	2.22 (0.06), [2.11, 2.33]
				M-YS γ_6	2.31 (0.05), [2.21, 2.4]
				D-OS γ_7	2.18 (0.06), [2.07, 2.30]
				D-YS γ_8	2.25 (0.05), [2.14, 2.36]

Table 7. Summary of Standardized Posterior Regression Model Results from the Younger Sibling SEM Models

Predictor	Younger Sibling Models					
	1. Depressive Symptoms		3. Grade Point Average		5. Educational Expectations	
	Mean (SD)	95%HPD	Mean (SD)	95%HPD	Mean (SD)	95%HPD
Intercept α_0	2.27 (0.24)	[1.79, 2.72]	3.38 (0.28)	[2.86, 3.95]	6.87 (0.42)	[6.04, 7.68]
Family β_1	0.27 (0.09)	[0.08, 0.45]	-0.29 (0.09)	[-0.47, -0.12]	-0.13 (0.11)	[-0.34, 0.08]
Dyad M-YS β_2	0.21 (0.28)	[-0.34, 0.72]	-0.44 (0.30)	[-1.00, 0.13]	-1.02 (1.46)	[-4.59, 1.73]
Dyad D-YS β_3	0.10 (0.28)	[-0.41, 0.66]	0.07 (0.30)	[-0.50, 0.64]	0.65 (1.49)	[-2.08, 4.12]
Triad YS β_4	0.03 (0.51)	[-0.94, 0.94]	0 (0.55)	[-1.02, 0.98]	-0.07 (1.94)	[-4.29, 4.13]
Unique YS β_5	0.26 (0.07)	[0.13, 0.40]	0.08 (0.08)	[-0.06, 0.23]	-0.03 (0.08)	[-0.18, 0.12]
SES β_6	-0.23 (0.06)	[-0.34, -0.11]	0.22 (0.06)	[0.11, 0.34]	0.29 (0.06)	[0.17, 0.41]
YS Gender β_7	-0.15 (0.05)	[-0.25, -0.04]	-0.16 (0.06)	[-0.27, -0.05]	-0.13 (0.06)	[-0.24, -0.01]
YS I. Status β_8	-0.08 (0.06)	[-0.20, 0.03]	-0.02 (0.06)	[-0.14, 0.10]	0.17 (0.06)	[0.05, 0.29]

Note. β = regression coefficient, α = regression model intercept, YS = younger sibling report; OS = older sibling report; I. Status = Immigrant status; SD = Standard Deviation; 95%HPD = 95% Highest posterior density interval. Parameters in bold do not include zero in the HPD interval.

Table 8. Summary of Standardized Posterior Regression Model Results from the Older Sibling SEM Models

Predictor	Older Sibling Models					
	2. Depressive Symptoms		4. Grade Point Average		6. Educational Expectations	
	Mean (SD)	95%HPD	Mean (SD)	95%HPD	Mean (SD)	95%HPD
Intercept α_0	2.17 (0.27)	[1.63, 2.70]	3.22 (0.32)	[2.60, 3.85]	6.48 (0.38)	[5.73, 7.23]
Family β_1	0.44 (0.11)	[0.22, 0.64]	-0.28 (0.12)	[-0.52, -0.05]	0.04 (0.11)	[-0.16, 0.26]
Dyad M-OS β_2	-0.68 (0.52)	[-1.89, 0.33]	-0.08 (0.36)	[-0.75, 0.60]	-0.37 (0.36)	[-1.01, 0.35]
Dyad D-OS β_3	0.26 (0.65)	[-0.76, 1.74]	-0.19 (0.39)	[-0.92, 0.55]	0.01 (0.4)	[-0.73, 0.77]
Triad OS β_4	-0.04 (0.62)	[-1.30, 1.38]	-0.01 (0.68)	[-1.24, 1.21]	-0.01 (0.71)	[-1.26, 1.26]
Unique OS β_5	0.32 (0.08)	[0.17, 0.47]	-0.06 (0.08)	[-0.22, 0.10]	0.02 (0.07)	[-0.12, 0.17]
SES β_6	-0.02(0.06)	[-0.15, 0.10]	0.25 (0.07)	[0.13, 0.39]	0.30 (0.06)	[0.18, 0.42]
OS Gender β_7	-0.18 (0.06)	[-0.29, -0.07]	-0.12 (0.06)	[-0.24, 0]	-0.15 (0.06)	[-0.26, -0.03]
OS I. Status β_8	0.02 (0.06)	[-0.11, 0.14]	-0.01 (0.07)	[-0.15, 0.12]	0.01 (0.06)	[-0.12, 0.13]

Note. β = regression coefficient, α = regression model intercept, YS = younger sibling report; OS = older sibling report; I. Status = Immigrant status; SD = Standard Deviation; 95%HPD = 95% Highest posterior density interval. Parameters in bold do not include zero in the HPD interval.

Table 9. Model 1 Summary of Standardized Posterior Factor Loading Results

Family	Loading (SD)	Dyad	Loading (SD)	Unique	Loading (SD)
OS-M $\lambda_{1,1}$	.17 (.09), [-.01, .35]	YS-M $\lambda_{2,4}$	.42 (.04), [.35, .49]	OS-M $\lambda_{1,8}$	.76 (.03), [.70, .82]
YS-M $\lambda_{2,1}$	.29 (.09), [.12, .46]	M-YS $\lambda_{6,4}$	.48 (.04), [.40, .56]	OS-D $\lambda_{3,8}$	.70 (.03), [.64, .76]
OS-D $\lambda_{3,1}$	.14 (.10), [-.05, .33]	YS-D $\lambda_{4,5}$	.39 (.03), [.32, .46]	YS-M $\lambda_{2,9}$	.75 (.04), [.67, .82]
YS-D $\lambda_{4,1}$	.36 (.09), [.19, .53]	D-YS $\lambda_{8,5}$	.45 (.04), [.37, .52]	YS-D $\lambda_{4,9}$	.68 (.04), [.61, .76]
M-OS $\lambda_{5,1}$	.52 (.08), [.36, .68]	OS-M $\lambda_{1,6}$	.47 (.04), [.39, .55]	M-OS $\lambda_{5,10}$	.47 (.06), [.35, .59]
86 M-YS $\lambda_{6,1}$	.52 (.08), [.36, .68]	M-OS $\lambda_{5,6}$	.47 (.04), [.39, .55]	M-YS $\lambda_{6,10}$	.52 (.07), [.38, .64]
D-OS $\lambda_{7,1}$	.54 (.08), [.38, .70]	OS-D $\lambda_{3,7}$	.43 (.04), [.35, .50]	D-OS $\lambda_{7,11}$	.60 (.06), [.48, .71]
D-YS $\lambda_{8,1}$	.48 (.09), [.31, .64]	D-OS $\lambda_{7,7}$	.44 (.04), [.36, .52]	D-YS $\lambda_{8,11}$	.64 (.06), [.52, .75]
Triad	Loading (SD)				
M-OS $\xi_{6,2}$	.79 (.05), [.69, .89]				
D-OS $\xi_{7,2}$	.81 (.05), [.71, .90]				
M-YS $\xi_{4,3}$	.76 (.05), [.66, .87]				
D-YS $\xi_{5,3}$	.76 (.05), [.66, .86]				

Note. $\lambda_{j,k}$ = conflict factor loading, subscript denotes item number and factor; Factors 1 = θ_{FAM} , 2 = θ_{OS} , 3 = θ_{YS} , 4 = $\theta_{\text{M-YS}}$, 5 = $\theta_{\text{D-YS}}$, 6 = $\theta_{\text{M-OS}}$, 7 = $\theta_{\text{D-OS}}$, 8 = $\theta_{\text{R_OS}}$, 9 = $\theta_{\text{R_YS}}$, 10 = $\theta_{\text{R_M}}$, 11 = $\theta_{\text{R_D}}$; loading = factor loading posterior mean; Family, Dyad, and Unique = latent variables; SD = posterior standard deviation, [95%HPD] = 95% Highest posterior density interval.

Table 10. Model 1 Summary of Standardized Posterior Variance and Intercept Results

Obs. Var.	Mean (SD) 95%HPD	Latent Var.	Mean (SD) 95%HPD	Intercept	Mean (SD) 95%HPD
OS-M ζ_1	0.16 (0.04), [0.09, 0.23]	Outcome. ψ_9	.60 (0.09), [0.42, 0.76]	OS-M γ_1	2.95 (0.14), [2.67, 3.24]
YS-M ζ_2	0.16 (0.04), [0.1, 0.24]	M-YS Dyad ψ_4	.41 (0.08), [0.26, 0.58]	YS-M γ_2	2.95 (0.15), [2.66, 3.24]
OS-D ζ_3	0.29 (0.04), [0.22, 0.37]	D-YS Dyad ψ_5	.42 (0.08), [0.26, 0.57]	OS-D γ_3	2.69 (0.13), [2.45, 2.95]
YS-D ζ_4	0.24 (0.04), [0.16, 0.32]	M-OS Dyad ψ_6	.37 (0.08), [0.22, 0.52]	YS-D γ_4	2.67 (0.13), [2.41, 2.92]
M-OS ζ_5	0.27 (0.05), [0.17, 0.37]	D-OS Dyad ψ_7	.34 (0.08), [0.21, 0.50]	M-OS γ_5	2.51 (0.13), [2.26, 2.77]
66 M-YS ζ_6	0.22 (0.05), [0.12, 0.32]			M-YS γ_6	2.84 (0.14), [2.56, 3.12]
D-OS ζ_7	0.14 (0.04), [0.07, 0.22]			D-OS γ_7	2.34 (0.12), [2.10, 2.58]
D-YS ζ_8	0.14 (0.03), [0.08, 0.21]			D-YS γ_8	2.58 (0.13), [2.33, 2.85]
				SES γ_{10}	-0.01 (0), [-0.01, -0.01]
				Gender γ_{11}	2.98 (0), [2.98, 2.98]
				I. Status γ_{12}	2.84 (0), [2.84, 2.84]

Note. YS = younger sibling; OS = older sibling; M = mother, D = father; Gender = younger sibling gender; I. Status = younger sibling immigrant status.; SD = posterior standard deviation, 95%HPD = 95% Highest posterior density interval; Parameter subscript denotes item number.; ζ = observed variable variance, ψ = latent variable variance, γ = measured variable intercept. Obs. Var. = Observed variable variance; Latent Var. = latent variable variance.

Table 11. Model 2 Summary of Standardized Posterior Factor Loading Results

Family	Loading (SD)	Dyad	Loading (SD)	Reporter	Loading (SD)
OS-M $\lambda_{1,1}$	.33 (.10), [.11, .51]	YS-M $\lambda_{2,4}$	.41 (.06), [.30, .52]	OS-M $\lambda_{1,8}$	.81 (.04), [.73, .89]
YS-M $\lambda_{2,1}$	.26 (.08), [.11, .42]	M-YS $\lambda_{6,4}$	.47 (.07), [.34, .59]	OS-D $\lambda_{3,8}$	.73 (.04), [.66, .79]
OS-D $\lambda_{3,1}$	.27 (.10), [.08, .45]	YS-D $\lambda_{4,5}$	.37 (.05), [.27, .47]	YS-M $\lambda_{2,9}$	.77 (.04), [.69, .85]
YS-D $\lambda_{4,1}$	.30 (.08), [.14, .46]	D-YS $\lambda_{8,5}$	.45 (.06), [.32, .57]	YS-D $\lambda_{4,9}$	.68 (.03), [.62, .75]
M-OS $\lambda_{5,1}$	.63 (.09), [.45, .80]	OS-M $\lambda_{1,6}$	.26 (.10), [.11, .47]	M-OS $\lambda_{5,10}$	.46 (.08), [.30, .60]
M-YS $\lambda_{6,1}$	.49 (.09), [.31, .68]	M-OS $\lambda_{5,6}$	.25 (.10), [.10, .46]	M-YS $\lambda_{6,10}$	.51 (.09), [.33, .67]
D-OS $\lambda_{7,1}$	.63 (.09), [.45, .80]	OS-D $\lambda_{3,7}$	.20 (.10), [.05, .41]	D-OS $\lambda_{7,11}$	.64 (.05), [.53, .73]
D-YS $\lambda_{8,1}$	.41 (.09), [.23, .58]	D-OS $\lambda_{7,7}$	.21 (.11), [.05, .43]	D-YS $\lambda_{8,11}$	.69 (.06), [.58, .80]
Triad	Loading (SD)				
M-OS $\xi_{6,2}$	.75 (.23), [.28, 1.00]				
D-OS $\xi_{7,2}$	.87 (.18), [.49, 1.00]				
M-YS $\xi_{4,3}$	.96 (.06), [.87, 1.00]				
D-YS $\xi_{5,3}$	.94 (.07), [.83, 1.00]				

Note. $\lambda_{j,k}$ = conflict factor loading, subscript denotes item number and factor; Factors 1 = θ_{FAM} , 2 = θ_{OS} , 3 = θ_{YS} , 4 = $\theta_{\text{M-YS}}$, 5 = $\theta_{\text{D-YS}}$, 6 = $\theta_{\text{M-OS}}$, 7 = $\theta_{\text{D-OS}}$, 8 = $\theta_{\text{R-OS}}$, 9 = $\theta_{\text{R-YS}}$, 10 = $\theta_{\text{R-M}}$, 11 = $\theta_{\text{R-D}}$; loading = factor loading posterior mean; Family, Dyad, and Unique = latent variables; SD = posterior standard deviation, [95%HPD] = 95% Highest posterior density interval.

Table 12. Model 2 Summary of Standardized Posterior Variance and Intercept Results

Obs.	Mean (SD) 95%HPD	Latent. Var.	Mean (SD)	Intercept	Mean (SD) 95%HPD
OS-M ζ_1	0.15 (0.05), [0.05, 0.25]	Outcome. ψ_9	0.19 (0.23), [0, 0.67]	OS-M γ_1	3.03 (0.15), [2.72, 3.33]
YS-M ζ_2	0.15 (0.05), [0.06, 0.24]	M-YS Dyad ψ_4	0.08 (0.10), [0, 0.25]	YS-M γ_2	3.01 (0.15), [2.72, 3.30]
OS-D ζ_3	0.34 (0.04), [0.27, 0.42]	D-YS Dyad ψ_5	0.12 (0.11), [0, 0.31]	OS-D γ_3	2.68 (0.14), [2.41, 2.96]
YS-D ζ_4	0.30 (0.04), [0.22, 0.38]	M-OS Dyad ψ_6	0.38 (0.29), [0, 0.92]	YS-D γ_4	2.64 (0.14), [2.37, 2.90]
M-OS ζ_5	0.31 (0.07), [0.18, 0.44]	D-OS Dyad ψ_7	0.21 (0.24), [0, 0.76]	M-OS γ_5	2.53 (0.13), [2.27, 2.8]
M-YS ζ_6	0.25 (0.06), [0.13, 0.37]			M-YS γ_6	2.92 (0.15), [2.63, 3.21]
D-OS ζ_7	0.13 (0.06), [0, 0.22]			D-OS γ_7	2.37 (0.13), [2.12, 2.62]
D-YS ζ_8	0.14 (0.05), [0.03, 0.24]			D-YS γ_8	2.66 (0.14), [2.39, 2.92]
				SES γ_{10}	-0.01 (0), [-0.01, -0.01]
				Gender γ_{11}	3.00 (0), [3.00, 3.00]
				I. Status γ_{12}	2.93 (0), [2.93, 2.93]

Note. YS = younger sibling; OS = older sibling; M = mother, D = father; Gender = older sibling gender, I. Status = immigrant status; SD = posterior standard deviation, 95%HPD = 95% Highest posterior density interval; Parameter subscript denotes item number.; ζ = observed variable variance, ψ = latent variable variance, γ = measured variable intercept. Obs. Var. = Observed variable variance; Latent Var. = latent variable variance.

Table 13. Model 3 Summary of Standardized Posterior Factor Loading Results

Family	Loading (SD)	Dyad	Loading (SD)	Reporter	Loading (SD)
OS-M $\lambda_{1,1}$	.17 (.09), [0, .36]	YS-M $\lambda_{2,4}$	.43 (.04), [.36, .50]	OS-M $\lambda_{1,8}$	.76 (.03), [.70, .82]
YS-M $\lambda_{2,1}$	.29 (.09), [.13, .46]	M-YS $\lambda_{6,4}$	.48 (.04), [.4, .56]	OS-D $\lambda_{3,8}$	.70 (.03), [.64, .76]
OS-D $\lambda_{3,1}$	.13 (.10), [-.06, .32]	YS-D $\lambda_{4,5}$	.39 (.03), [.32, .46]	YS-M $\lambda_{2,9}$	.75 (.04), [.68, .83]
YS-D $\lambda_{4,1}$	.35 (.09), [.18, .52]	D-YS $\lambda_{8,5}$	.45 (.04), [.37, .53]	YS-D $\lambda_{4,9}$	.68 (.04), [.61, .75]
M-OS $\lambda_{5,1}$	.50 (.08), [.34, .66]	OS-M $\lambda_{1,6}$	.47 (.04), [.39, .55]	M-OS $\lambda_{5,10}$	.50 (.06), [.39, .60]
M-YS $\lambda_{6,1}$	.49 (.08), [.34, .65]	M-OS $\lambda_{5,6}$	.47 (.04), [.39, .56]	M-YS $\lambda_{6,10}$	.54 (.06), [.42, .65]
D-OS $\lambda_{7,1}$	.57 (.08), [.42, .72]	OS-D $\lambda_{3,7}$	.43 (.04), [.35, .50]	D-OS $\lambda_{7,11}$	.57 (.06), [.45, .70]
D-YS $\lambda_{8,1}$	.52 (.08), [.35, .67]	D-OS $\lambda_{7,7}$	.44 (.04), [.36, .52]	D-YS $\lambda_{8,11}$	.61 (.07), [.48, .74]
Triad	Loading (SD)				
M-OS $\xi_{6,2}$	.79 (.05), [.69, .89]				
D-OS $\xi_{7,2}$	.81 (.05), [.71, .90]				
M-YS $\xi_{4,3}$	.77 (.05), [.66, .87]				
D-YS $\xi_{5,3}$	.76 (.05), [.66, .87]				

Note. $\lambda_{j,k}$ = conflict factor loading, subscript denotes item number and factor; Factors 1 = θ_{FAM} , 2 = θ_{OS} , 3 = θ_{YS} , 4 = $\theta_{\text{M-YS}}$, 5 = $\theta_{\text{D-YS}}$, 6 = $\theta_{\text{M-OS}}$, 7 = $\theta_{\text{D-OS}}$, 8 = $\theta_{\text{R-OS}}$, 9 = $\theta_{\text{R-YS}}$, 10 = $\theta_{\text{R-M}}$, 11 = $\theta_{\text{R-D}}$; loading = factor loading posterior mean; Family, Dyad, and Unique = latent variables; SD = posterior standard deviation, [95%HPD] = 95% Highest posterior density interval.

Table 14. Model 3 Summary of Standardized Posterior Variance and Intercept Results

Obs. Var.	Mean (SD) 95%HPD	Latent. Var.	Mean (SD) 95%HPD	Intercept	Mean (SD) 95%HPD
OS-M ζ_1	0.16 (0.04), [0.09, 0.23]	Outcome. ψ_9	0.54 (0.10), [0.34, 0.72]	OS-M γ_1	2.95 (0.14), [2.68, 3.24]
YS-M ζ_2	0.15 (0.04), [0.09, 0.23]	M-YS Dyad ψ_4	0.41 (0.08), [0.26, 0.58]	YS-M γ_2	2.96 (0.15), [2.68, 3.25]
OS-D ζ_3	0.29 (0.04), [0.21, 0.37]	D-YS Dyad ψ_5	0.41 (0.08), [0.26, 0.57]	OS-D γ_3	2.69 (0.13), [2.44, 2.94]
YS-D ζ_4	0.25 (0.04), [0.17, 0.33]	M-OS Dyad ψ_6	0.37 (0.08), [0.22, 0.53]	YS-D γ_4	2.66 (0.13), [2.40, 2.91]
M-OS ζ_5	0.26 (0.05), [0.16, 0.36]	D-OS Dyad ψ_7	0.34 (0.08), [0.20, 0.50]	M-OS γ_5	2.51 (0.13), [2.25, 2.76]
M-YS ζ_6	0.22 (0.05), [0.13, 0.32]			M-YS γ_6	2.83 (0.14), [2.56, 3.12]
D-OS ζ_7	0.14 (0.04), [0.07, 0.21]			D-OS γ_7	2.33 (0.12), [2.09, 2.58]
D-YS ζ_8	0.14 (0.03), [0.08, 0.21]			D-YS γ_8	2.59 (0.13), [2.32, 2.84]
				SES γ_{10}	-0.01 (0), [-0.01, -0.01]
				Gender γ_{11}	2.98 (0), [2.98, 2.98]
				I. Status γ_{12}	2.84 (0), [2.84, 2.84]

Note. YS = younger sibling; OS = older sibling; M = mother, D = father; Gender = younger sibling gender, I. Status = younger sibling immigrant status; SD = posterior standard deviation, 95%HPD = 95% Highest posterior density interval; Parameter subscript denotes item number.; ζ = observed variable variance, ψ = latent variable variance, γ = measured variable intercept. Obs. Var. = Observed variable variance; Latent Var. = latent variable variance.; I. Status = immigrant status.

Table 15. Model 4 Summary of Standardized Posterior Factor Loading Results

Family	Loading (SD)	Dyad	Loading (SD)	Reporter	Loading (SD)
OS-M $\lambda_{1,1}$	.18 (.09), [0, .35]	YS-M $\lambda_{2,4}$	.43 (.04), [.36, .51]	OS-M $\lambda_{1,8}$	.76 (.03), [.70, .82]
YS-M $\lambda_{2,1}$	.27 (.08), [.11, .44]	M-YS $\lambda_{6,4}$	.49 (.04), [.41, .57]	OS-D $\lambda_{3,8}$	.70 (.03), [.64, .77]
OS-D $\lambda_{3,1}$	.17 (.09), [-.01, .36]	YS-D $\lambda_{4,5}$	.39 (.03), [.33, .46]	YS-M $\lambda_{2,9}$	.76 (.04), [.69, .82]
YS-D $\lambda_{4,1}$	.32 (.09), [.15, .49]	D-YS $\lambda_{8,5}$	.46 (.04), [.38, .53]	YS-D $\lambda_{4,9}$	.69 (.04), [.62, .76]
M-OS $\lambda_{5,1}$	.57 (.08), [.40, .72]	OS-M $\lambda_{1,6}$	.46 (.04), [.38, .54]	M-OS $\lambda_{5,10}$	.46 (.06), [.33, .58]
M-YS $\lambda_{6,1}$	.51 (.08), [.35, .66]	M-OS $\lambda_{5,6}$	.46 (.04), [.37, .54]	M-YS $\lambda_{6,10}$	.50 (.07), [.37, .63]
D-OS $\lambda_{7,1}$	.54 (.08), [.39, .70]	OS-D $\lambda_{3,7}$	.42 (.04), [.34, .49]	D-OS $\lambda_{7,11}$	.60 (.06), [.48, .71]
D-YS $\lambda_{8,1}$	.48 (.08), [.32, .65]	D-OS $\lambda_{7,7}$	.42 (.04), [.34, .50]	D-YS $\lambda_{8,11}$	.64 (.06), [.52, .75]
Triad	Loading (SD)				
M-OS $\xi_{6,2}$	.78 (.05), [.68, .89]				
D-OS $\xi_{7,2}$	.80 (.05), [.70, .89]				
M-YS $\xi_{4,3}$	.77 (.05), [.67, .87]				
D-YS $\xi_{5,3}$	.77 (.05), [.67, .87]				

Note. $\lambda_{j,k}$ = conflict factor loading, subscript denotes item number and factor; Factors 1 = θ_{FAM} , 2 = θ_{OS} , 3 = θ_{YS} , 4 = θ_{M-YS} , 5 = θ_{D-YS} , 6 = θ_{M-OS} , 7 = θ_{D-OS} , 8 = θ_{R_OS} , 9 = θ_{R_YS} , 10 = θ_{R_M} , 11 = θ_{R_D} ; loading = factor loading posterior mean; Family, Dyad, and Unique = latent variables; SD = posterior standard deviation, [95%HPD] = 95% Highest posterior density interval.

Table 16. Model 4 Summary of Standardized Posterior Variance and Intercept Results

Obs. Var.	Mean (SD) 95%HPD	Latent. Var.	Mean (SD) 95%HPD	Intercept	Mean (SD) 95%HPD
OS-M ζ_1	0.17 (0.04), [0.09, 0.24]	Outcome. ψ_9	0.60 (0.11), [0.37, 0.79]	OS-M γ_1	2.96 (0.15), [2.67, 3.24]
YS-M ζ_2	0.15 (0.04), [0.08, 0.22]	M-YS Dyad ψ_4	0.40 (0.08), [0.25, 0.56]	YS-M γ_2	2.96 (0.15), [2.68, 3.25]
OS-D ζ_3	0.29 (0.04), [0.21, 0.37]	D-YS Dyad ψ_5	0.41 (0.08), [0.25, 0.56]	OS-D γ_3	2.7 (0.13), [2.45, 2.96]
YS-D ζ_4	0.26 (0.04), [0.18, 0.34]	M-OS Dyad ψ_6	0.38 (0.08), [0.23, 0.55]	YS-D γ_4	2.66 (0.13), [2.41, 2.92]
M-OS ζ_5	0.24 (0.05), [0.14, 0.35]	D-OS Dyad ψ_7	0.35 (0.08), [0.21, 0.51]	M-OS γ_5	2.51 (0.13), [2.25, 2.77]
M-YS ζ_6	0.24 (0.05), [0.14, 0.34]			M-YS γ_6	2.83 (0.14), [2.55, 3.11]
D-OS ζ_7	0.16 (0.04), [0.09, 0.24]			D-OS γ_7	2.33 (0.12), [2.09, 2.57]
D-YS ζ_8	0.14 (0.03), [0.07, 0.21]			D-YS γ_8	2.58 (0.13), [2.33, 2.85]
				SES γ_{10}	-0.01 (0), [-0.01, -0.01]
				Gender γ_{11}	3.00 (0), [3.00, 3.00]
				I. Status γ_{12}	2.93 (0), [2.93, 2.93]

Note. YS = younger sibling; OS = older sibling; M = mother, D = father; Gender = older sibling gender, I. Status = older sibling immigrant status; SD = posterior standard deviation, 95%HPD = 95% Highest posterior density interval; Parameter subscript d enotes item number.; ζ = observed variable variance, ψ = latent variable variance, γ = measured variable intercept. Obs. Var. = Observed variable variance; Latent Var. = latent variable variance.; I. Status = immigrant status.

Table 17. Model 5 Summary of Standardized Factor Loading Results

Family	Loading (SD)	Dyad	Loading (SD)	Reporter	Loading (SD)
OS-M $\lambda_{1,1}$	.16 (.09), [-.01, .36]	YS-M $\lambda_{2,4}$	.23 (.11), [.05, .43]	OS-M $\lambda_{1,8}$	.78 (.04), [.71, .86]
YS-M $\lambda_{2,1}$	.38 (.10), [.19, .57]	M-YS $\lambda_{6,4}$	.26 (.12), [.06, .47]	OS-D $\lambda_{3,8}$	.69 (.03), [.63, .75]
OS-D $\lambda_{3,1}$	.15 (.09), [-.01, .33]	YS-D $\lambda_{4,5}$	.19 (.11), [.02, .37]	YS-M $\lambda_{2,9}$	.79 (.05), [.69, .88]
YS-D $\lambda_{4,1}$	.41 (.09), [.22, .58]	D-YS $\lambda_{8,5}$	.23 (.13), [.02, .45]	YS-D $\lambda_{4,9}$	.69 (.04), [.61, .77]
M-OS $\lambda_{5,1}$	.50 (.11), [.30, .72]	OS-M $\lambda_{1,6}$	.45 (.07), [.31, .56]	M-OS $\lambda_{5,10}$	.47 (.10), [.28, .64]
M-YS $\lambda_{6,1}$	.60 (.10), [.39, .80]	M-OS $\lambda_{5,6}$	.45 (.07), [.31, .57]	M-YS $\lambda_{6,10}$	.52 (.10), [.31, .69]
D-OS $\lambda_{7,1}$	.50 (.10), [.31, .70]	OS-D $\lambda_{3,7}$	.39 (.06), [.27, .49]	D-OS $\lambda_{7,11}$	.61 (.07), [.48, .74]
D-YS $\lambda_{8,1}$	.59 (.11), [.37, .80]	D-OS $\lambda_{7,7}$	.42 (.07), [.29, .54]	D-YS $\lambda_{8,11}$	.66 (.08), [.51, .80]
Triad	Loading (SD)				
M-OS $\xi_{6,2}$	.97 (.05), [.88, 1.00]				
D-OS $\xi_{7,2}$	.98 (.04), [.93, 1.00]				
M-YS $\xi_{4,3}$	.74 (.30), [.11, 1.00]				
D-YS $\xi_{5,3}$	.80 (.25), [.19, 1.00]				

Note. $\lambda_{j,k}$ = conflict factor loading, subscript denotes item number and factor; Factors 1 = θ_{FAM} , 2 = θ_{OS} , 3 = θ_{YS} , 4 = θ_{M-YS} , 5 = θ_{D-YS} , 6 = θ_{M-OS} , 7 = θ_{D-OS} , 8 = θ_{R_OS} , 9 = θ_{R_YS} , 10 = θ_{R_M} , 11 = θ_{R_D} ; loading = factor loading posterior mean; Family, Dyad, and Unique = latent variables; SD = posterior standard deviation, [95%HPD] = 95% Highest posterior density interval.

Table 18. Model 5 Summary of Standardized Posterior Variance and Intercept Results

Obs.	Mean (SD) 95%HPD	Latent. Var.	Mean (SD)	Intercept	Mean (SD) 95%HPD
OS-M ζ_1	0.15 (0.05), [0.05, 0.25]	Outcome. ψ_9	0.25 (0.23), [0, 0.68]	OS-M $_{\gamma 1}$	3.00 (0.15), [2.71, 3.30]
YS-M ζ_2	0.16 (0.05), [0.06, 0.25]	M-YS Dyad $_{\psi 4}$	0.36 (0.36), [0, 0.99]	YS-M $_{\gamma 2}$	3.05 (0.15), [2.74, 3.35]
OS-D ζ_3	0.33 (0.04), [0.26, 0.41]	D-YS Dyad $_{\psi 5}$	0.29 (0.31), [0, 0.96]	OS-D $_{\gamma 3}$	2.63 (0.14), [2.35, 2.9]
YS-D ζ_4	0.30 (0.04), [0.22, 0.38]	M-OS Dyad $_{\psi 6}$	0.06 (0.08), [0, 0.22]	YS-D $_{\gamma 4}$	2.65 (0.14), [2.37, 2.92]
M-OS ζ_5	0.30 (0.06), [0.19, 0.41]	D-OS Dyad $_{\psi 7}$	0.04 (0.06), [0, 0.14]	M-OS $_{\gamma 5}$	2.56 (0.13), [2.31, 2.83]
M-YS ζ_6	0.27 (0.07), [0.14, 0.41]			M-YS $_{\gamma 6}$	2.89 (0.15), [2.6, 3.18]
D-OS ζ_7	0.18 (0.05), [0.08, 0.28]			D-OS $_{\gamma 7}$	2.37 (0.13), [2.12, 2.61]
D-YS ζ_8	0.13 (0.06), [0, 0.22]			D-YS $_{\gamma 8}$	2.65 (0.14), [2.37, 2.92]
				SES $_{\gamma 10}$	-0.01 (0), [-0.01, -0.01]
				Gender $_{\gamma 11}$	2.98 (0), [2.98, 2.98]
				I. Status $_{\gamma 12}$	2.84 (0), [2.84, 2.84]

Note. YS = younger sibling; OS = older sibling; M = mother, D = father; Gender = younger sibling gender, I. Status = younger sibling immigrant status; SD = posterior standard deviation, 95%HPD = 95% Highest posterior density interval; Parameter subscript denotes item number.; ζ = observed variable variance, ψ = latent variable variance, γ = measured variable intercept. Obs. Var. = Observed variable variance; Latent Var. = latent variable variance.; I. Status = immigrant status.

Table 19. Model 6 Summary of Standardized Factor Loading Results

Family	Loading (SD)	Dyad	Loading (SD)	Reporter	Loading (SD)
OS-M $\lambda_{1,1}$	.21 (.10), [.02, .39]	YS-M $\lambda_{2,4}$	.46 (.04), [.39, .54]	OS-M $\lambda_{1,8}$	.79 (.04), [.72, .86]
YS-M $\lambda_{2,1}$	.26 (.09), [.08, .43]	M-YS $\lambda_{6,4}$	.53 (.05), [.44, .62]	OS-D $\lambda_{3,8}$	.70 (.03), [.64, .76]
OS-D $\lambda_{3,1}$	.13 (.19), [-.06, .32]	YS-D $\lambda_{4,5}$	.41 (.04), [.34, .48]	YS-M $\lambda_{2,9}$	.77 (.04), [.69, .85]
YS-D $\lambda_{4,1}$	.35 (.09), [.18, .52]	D-YS $\lambda_{8,5}$	.5 (.05), [.41, .59]	YS-D $\lambda_{4,9}$	.68 (.04), [.61, .75]
M-OS $\lambda_{5,1}$	.46 (.10), [.26, .65]	OS-M $\lambda_{1,6}$	.48 (.04), [.39, .56]	M-OS $\lambda_{5,10}$	.51 (.06), [.38, .62]
M-YS $\lambda_{6,1}$	.47 (.09), [.28, .65]	M-OS $\lambda_{5,6}$	.47 (.04), [.38, .55]	M-YS $\lambda_{6,10}$	.56 (.07), [.43, .69]
D-OS $\lambda_{7,1}$	.58 (.09), [.39, .75]	OS-D $\lambda_{3,7}$	.41 (.04), [.34, .49]	D-OS $\lambda_{7,11}$	.63 (.07), [.49, .76]
D-YS $\lambda_{8,1}$	.42 (.12), [.18, .64]	D-OS $\lambda_{7,7}$	.44 (.04), [.35, .52]	D-YS $\lambda_{8,11}$	.68 (.07), [.53, .81]
Triad	Loading (SD)				
M-OS $\xi_{6,2}$	.79 (.05), [.68, .88]				
D-OS $\xi_{7,2}$	.80 (.05), [.70, .90]				
M-YS $\xi_{4,3}$	.79 (.05), [.69, .88]				
D-YS $\xi_{5,3}$	.78 (.05), [.68, .87]				

Note. $\lambda_{j,k}$ = conflict factor loading, subscript denotes item number and factor; Factors 1 = θ_{FAM} , 2 = θ_{OS} , 3 = θ_{YS} , 4 = θ_{M-YS} , 5 = θ_{D-YS} , 6 = θ_{M-OS} , 7 = θ_{D-OS} , 8 = θ_{R_OS} , 9 = θ_{R_YS} , 10 = θ_{R_M} , 11 = θ_{R_D} ; loading = factor loading posterior mean; Family, Dyad, and Unique = latent variables; SD = posterior standard deviation, [95%HPD] = 95% Highest posterior density interval.

Table 20. *Model 6 Summary of Standardized Variance Results*

Obs. Var.	Mean (SD) 95%HPD	Latent. Var.	Mean (SD) 95%HPD	Intercept	Mean (SD) 95%HPD
OS-M ζ_1	0.10 (0.05), [0, 0.18]	Outcome. ψ_9	0.59 (0.12), [0.36, 0.81]	OS-M γ_1	2.99 (0.15), [2.70, 3.28]
YS-M ζ_2	0.11 (0.05), [0, 0.19]	M-YS Dyad ψ_4	0.38 (0.08), [0.23, 0.53]	YS-M γ_2	2.96 (0.15), [2.68, 3.25]
OS-D ζ_3	0.31 (0.04), [0.24, 0.39]	D-YS Dyad ψ_5	0.39 (0.08), [0.24, 0.54]	OS-D γ_3	2.63 (0.14), [2.36, 2.89]
YS-D ζ_4	0.24 (0.05), [0.14, 0.33]	M-OS Dyad ψ_6	0.38 (0.08), [0.22, 0.54]	YS-D γ_4	2.59 (0.13), [2.33, 2.85]
M-OS ζ_5	0.30 (0.06), [0.18, 0.41]	D-OS Dyad ψ_7	0.35 (0.08), [0.20, 0.51]	M-OS γ_5	2.5 (0.13), [2.25, 2.77]
M-YS ζ_6	0.17 (0.07), [0, 0.28]			M-YS γ_6	2.87 (0.15), [2.58, 3.16]
D-OS ζ_7	0.07 (0.06), [0, 0.18]			D-OS γ_7	2.35 (0.13), [2.10, 2.6]
D-YS ζ_8	0.10 (0.05), [0, 0.18]			D-YS γ_8	2.62 (0.14), [2.36, 2.89]
				SES γ_{10}	-0.01 (0), [-0.01, -0.01]
				Gender γ_{11}	3.00 (0), [3.00, 3.00]
				I. Status γ_{12}	2.93 (0), [2.93, 2.93]

Note. YS = younger sibling; OS = older sibling; M = mother, D = father; Gender = older sibling gender, I. Status = older sibling immigrant status; SD = posterior standard deviation, 95%HPD = 95% Highest posterior density interval; Parameter subscript denotes item number.; ζ = observed variable variance, ψ = latent variable variance, γ = measured variable intercept. Obs. Var. = Observed variable variance; Latent Var. = latent variable variance.

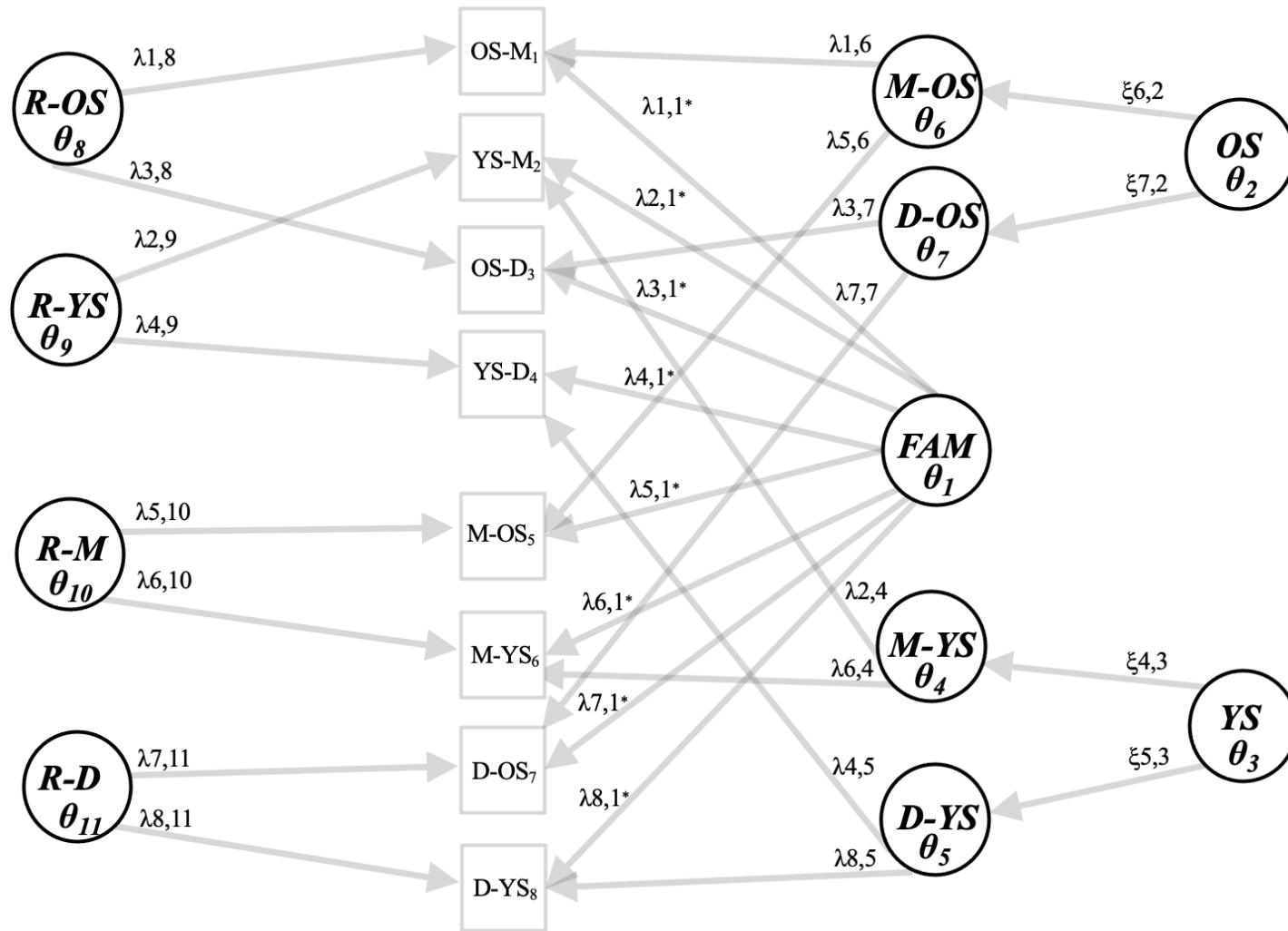


Figure 1. Path diagram of the Measurement Model of Shared and Unique Perspectives of Parent-Adolescent Conflict

Note. Intercepts and variances are not displayed.; * denote freely estimated parameters, all other paths fixed to 1.

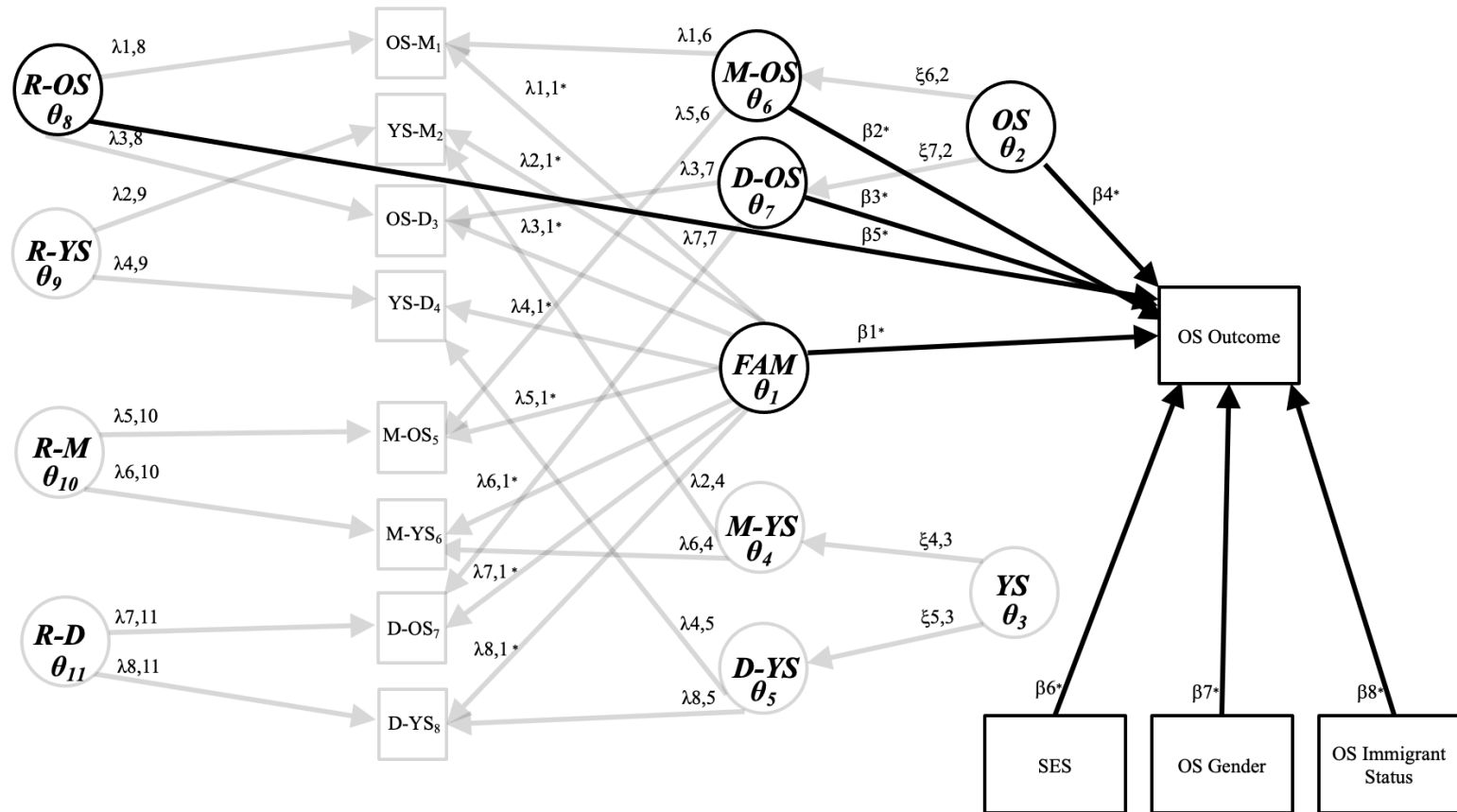


Figure 2. Path diagram of the Structural Equation Model for Older Sibling Outcomes

Note. Intercepts and variances are not displayed.; * denote freely estimated parameters, all other paths fixed to 1.

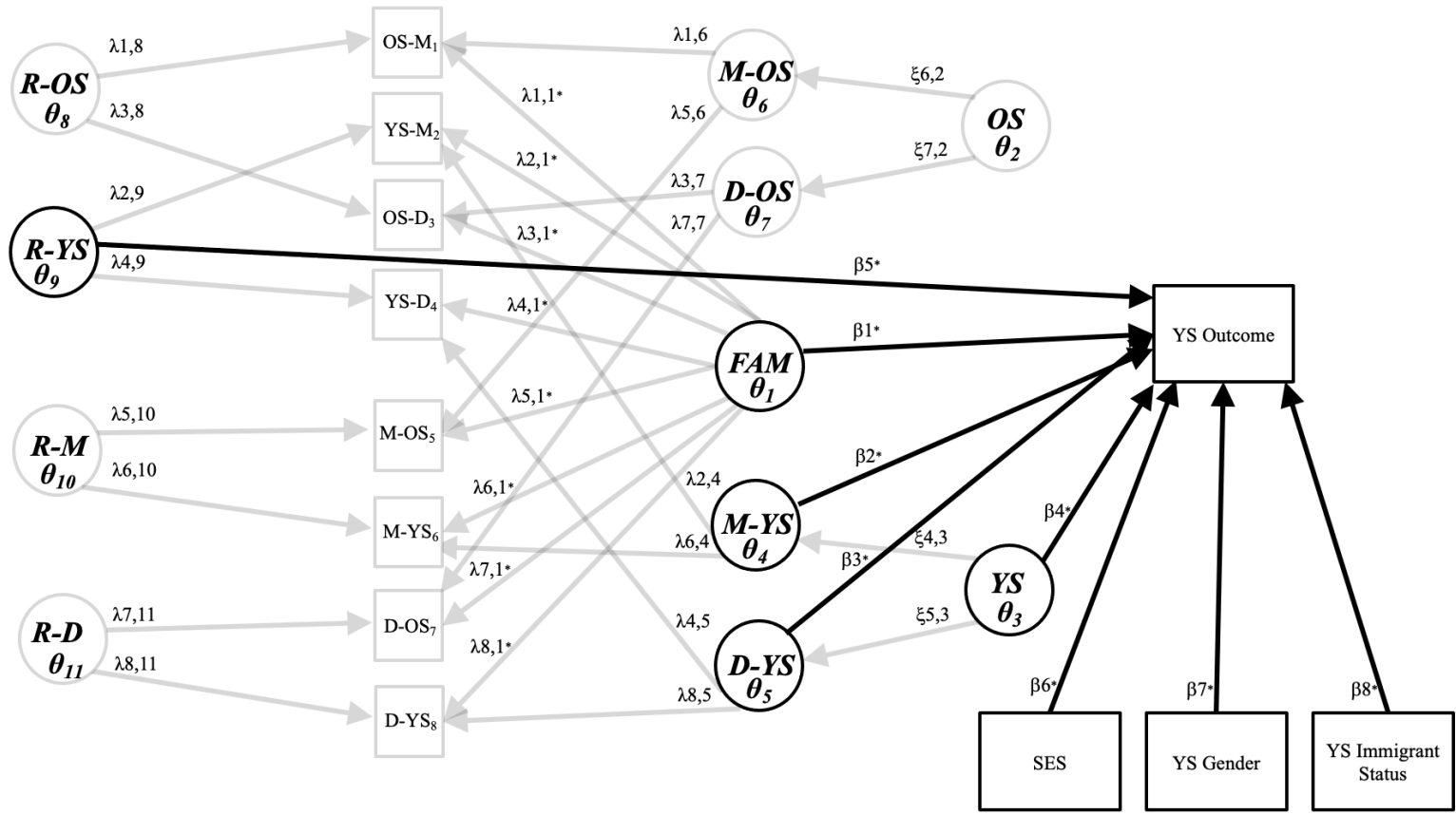


Figure 3. Path diagram of the Structural Equation Model Specifications for Younger Sibling Outcomes

Note. Intercepts and variances are not displayed.; * denote freely estimated parameters, all other paths fixed to 1.

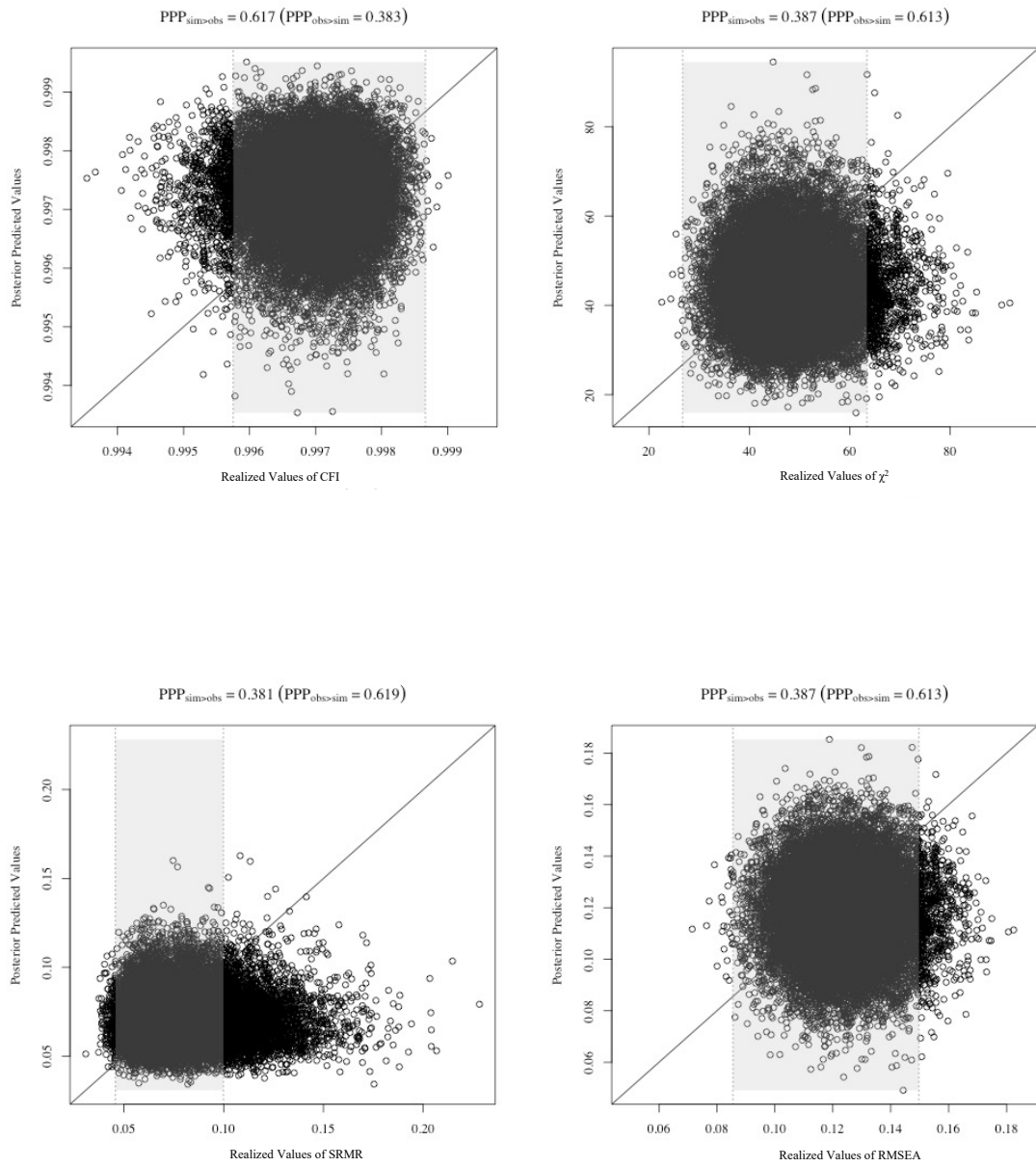


Figure 4. *Model 0 PPMC*

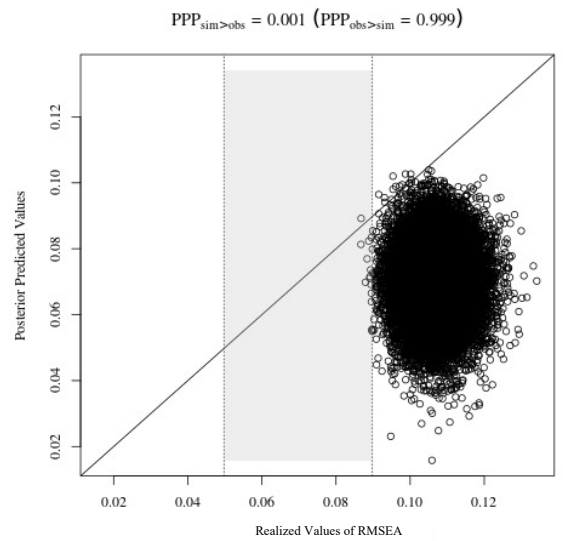
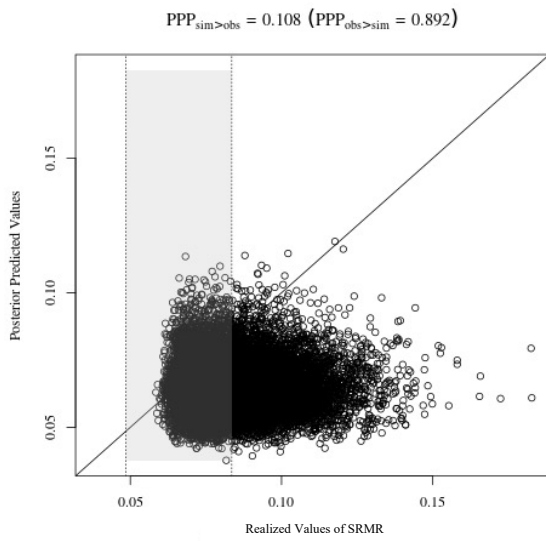
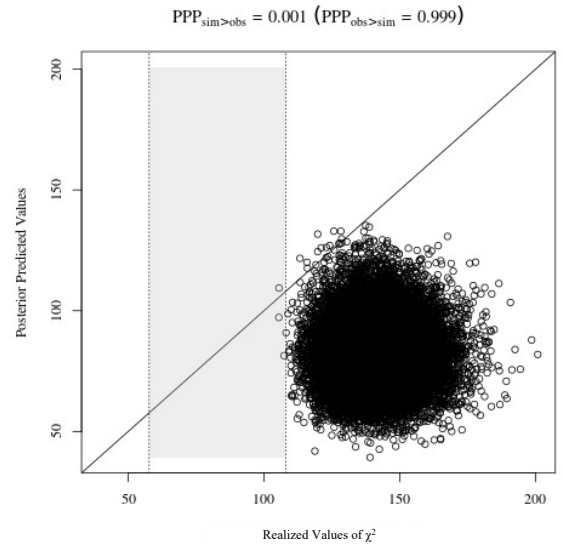
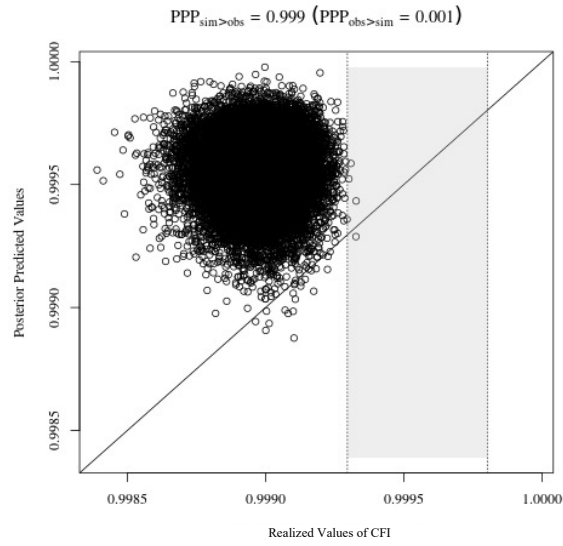


Figure 5. Model 1 PPMC

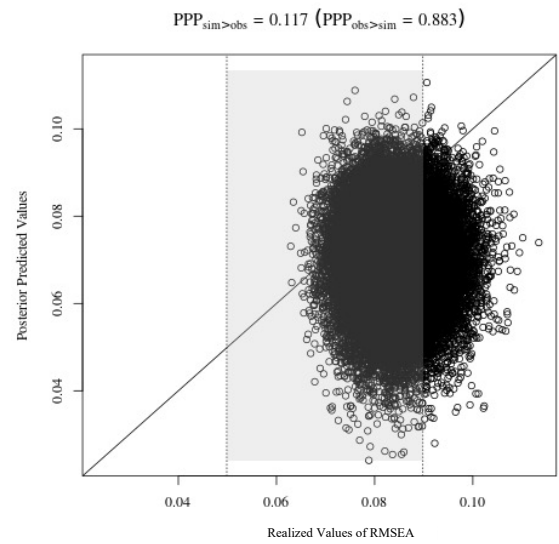
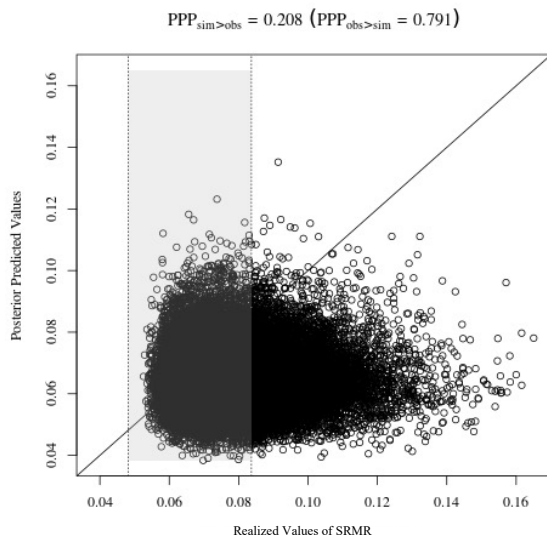
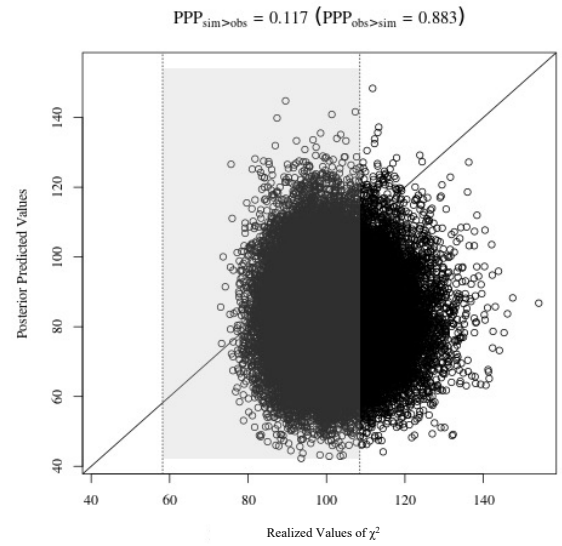
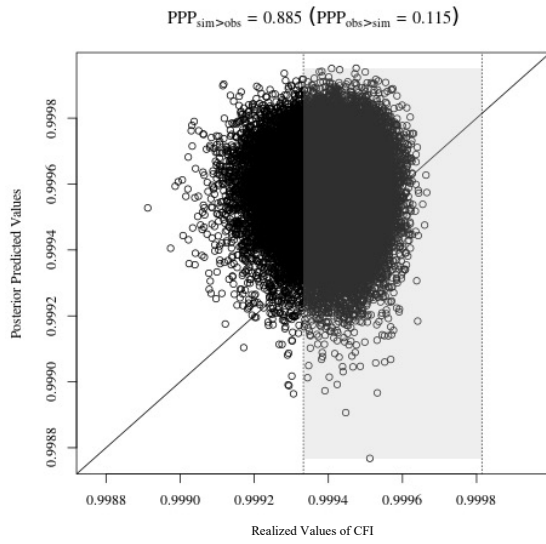


Figure 6. Model 2 PPMC

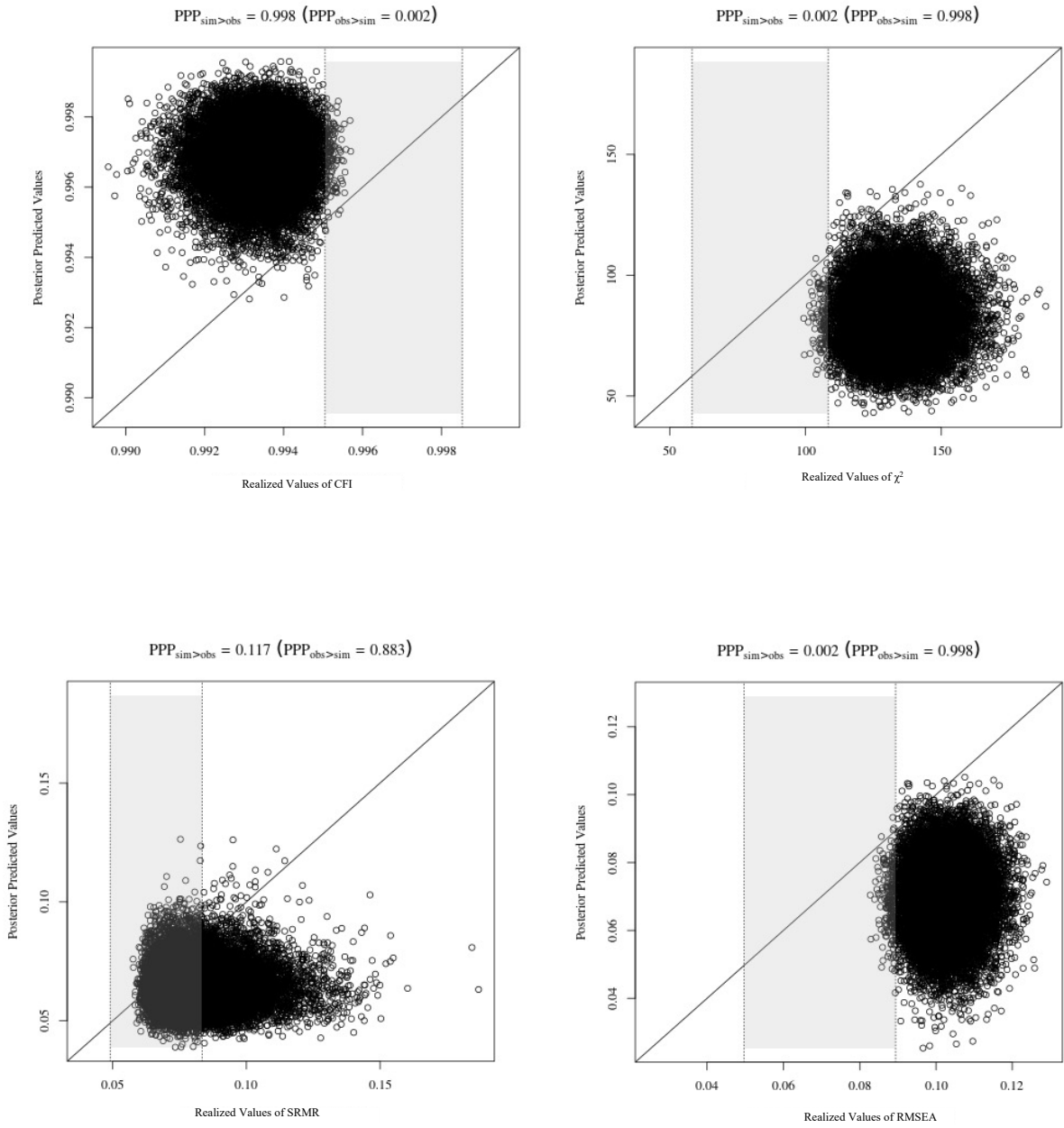


Figure 7. Model 3 PPMC

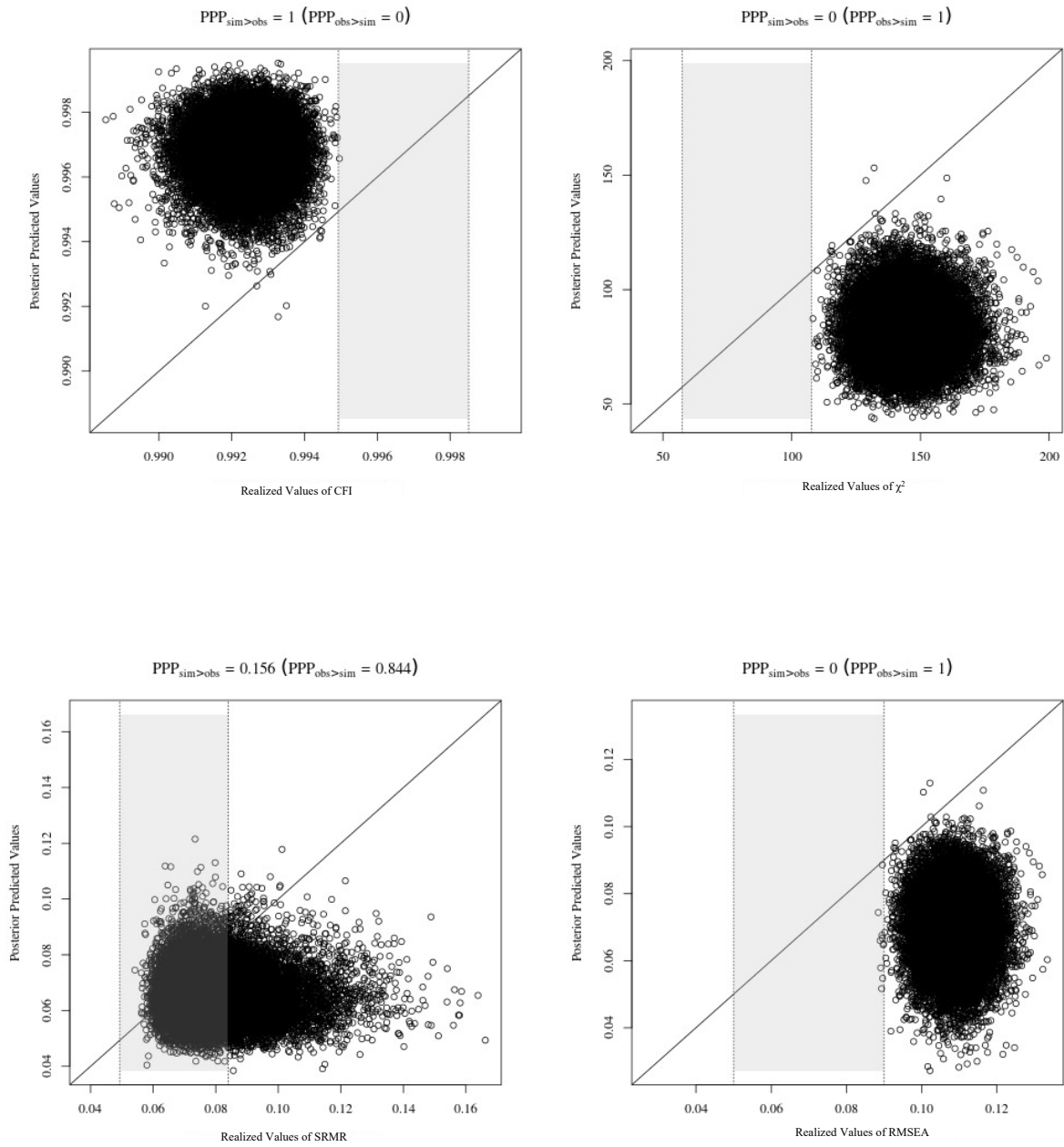


Figure 8. Model 4 PPMC

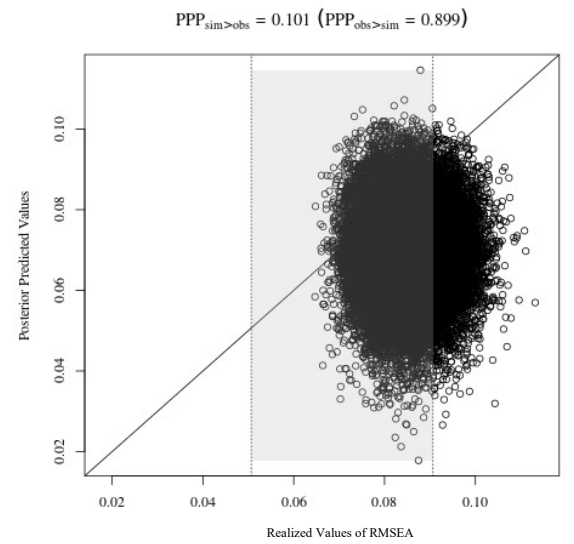
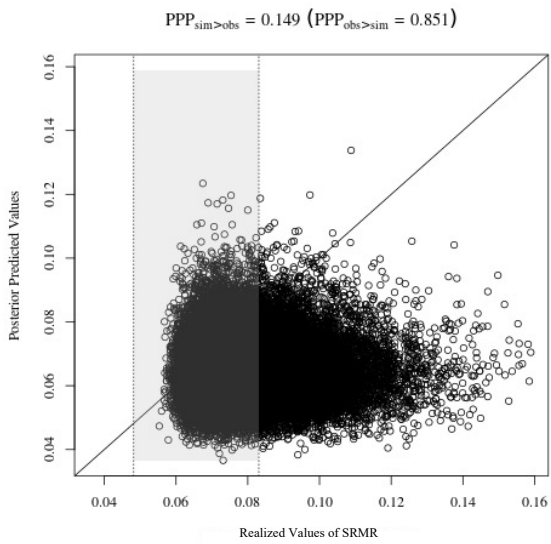
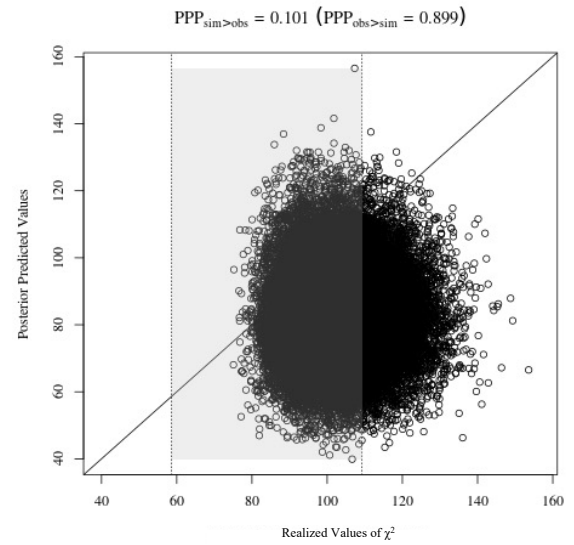
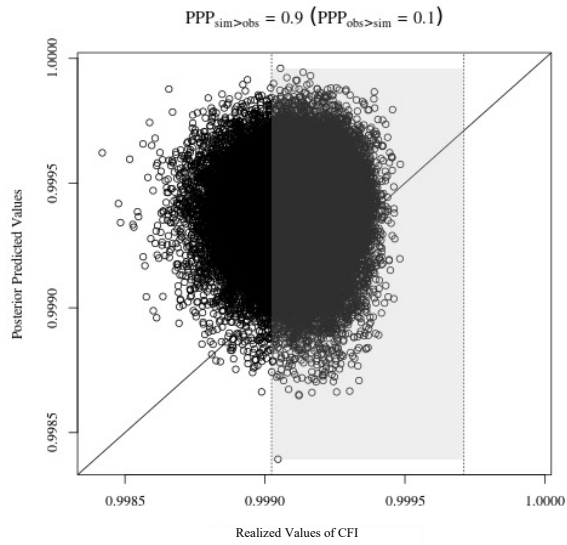


Figure 9. Model 5 PPMC

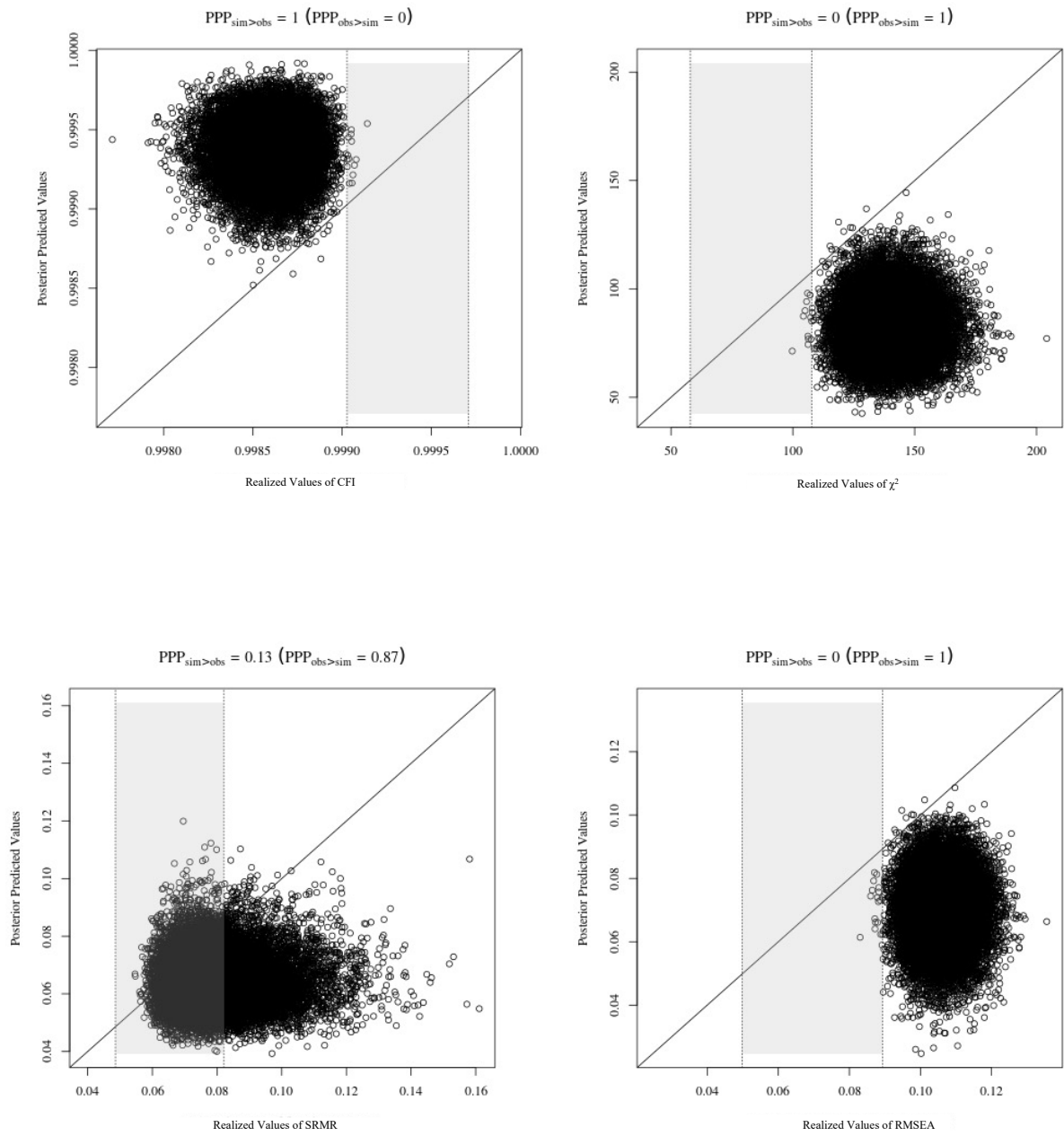


Figure 10. Model 6 PPMC

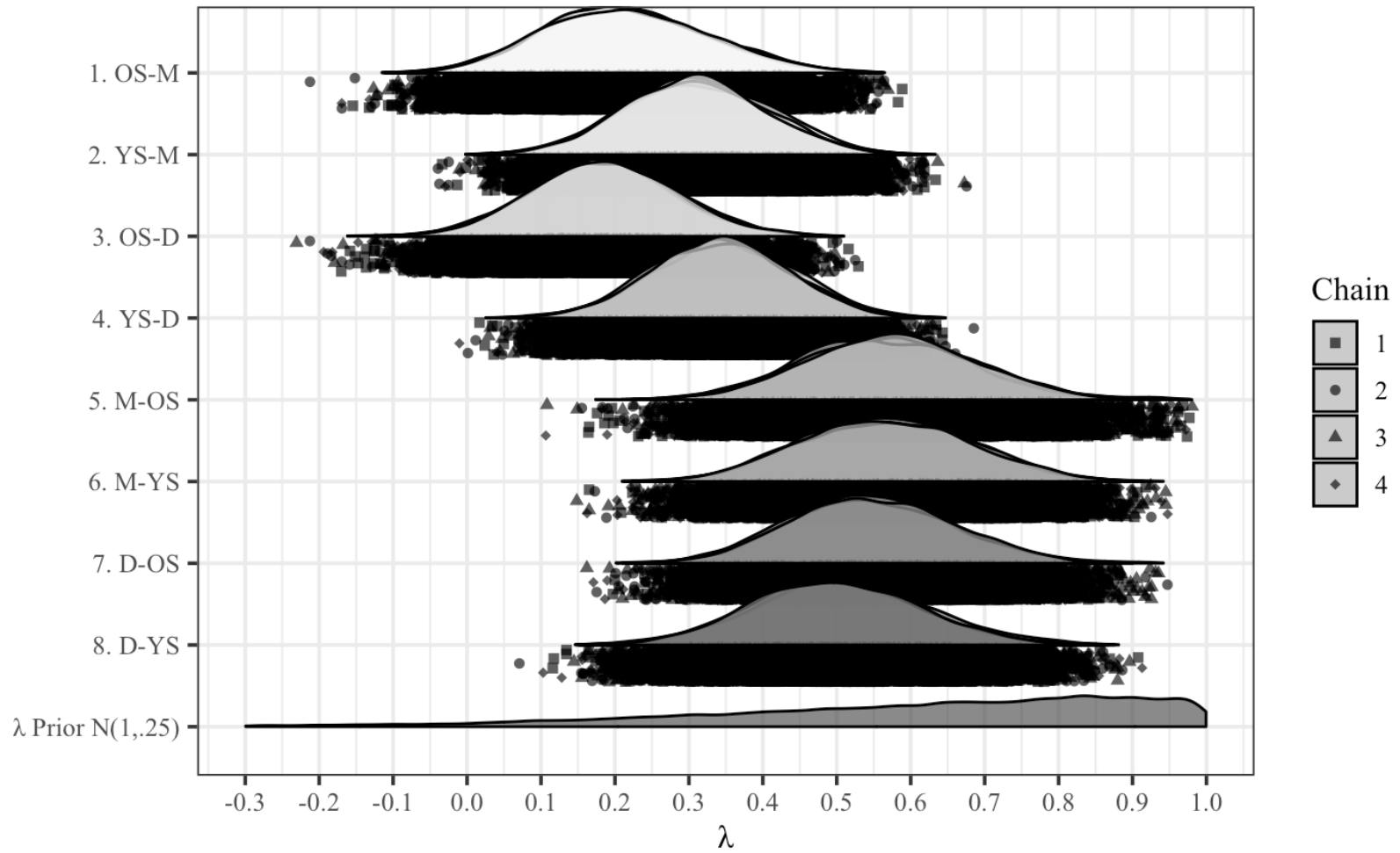


Figure 11. Model 0 Standardized Posterior Distributions and Prior Specifications of the Factor Loading Parameters

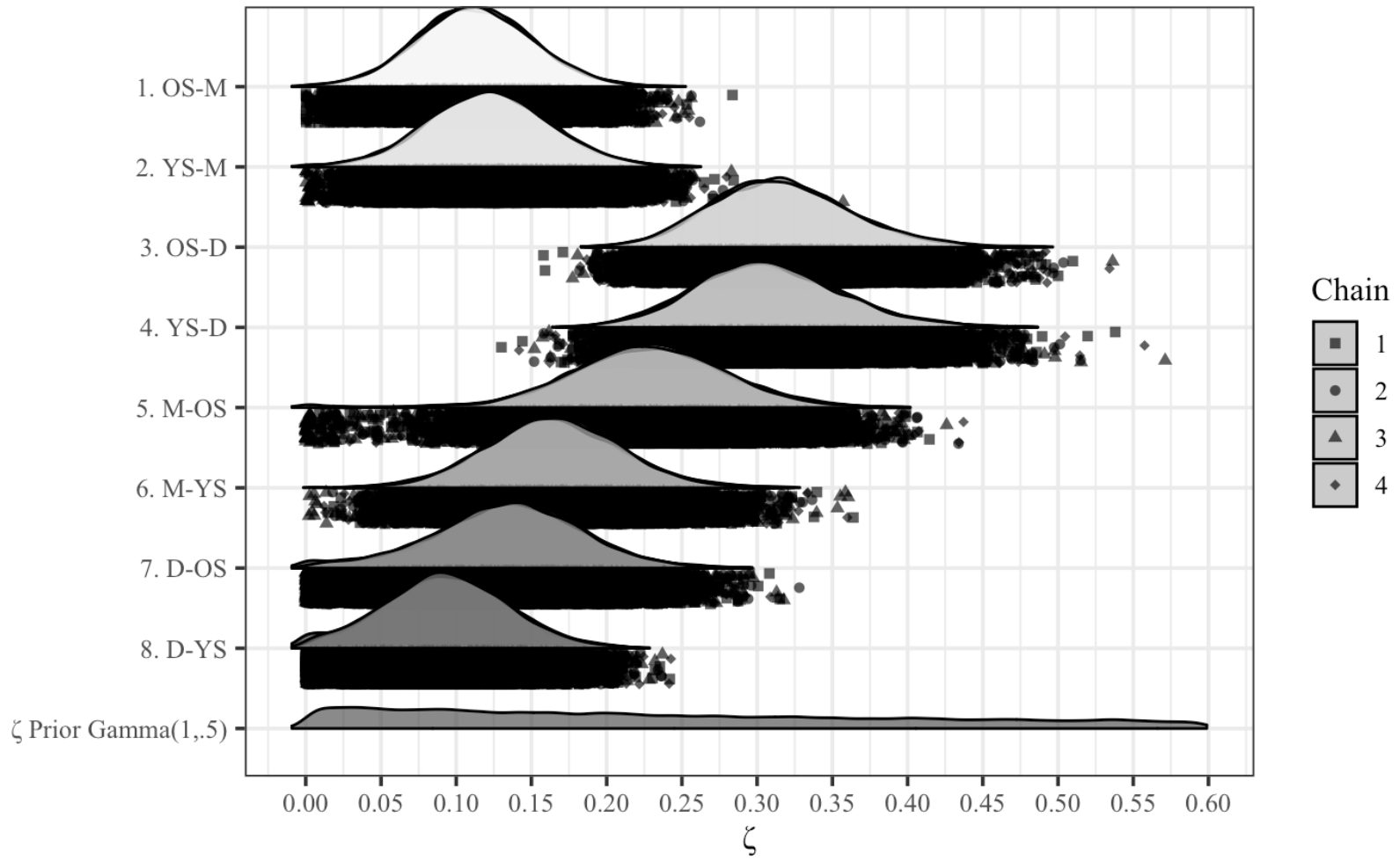


Figure 12. Model 0 Unstandardized Posterior Distributions and Prior Specifications of the Measured Variable Variances

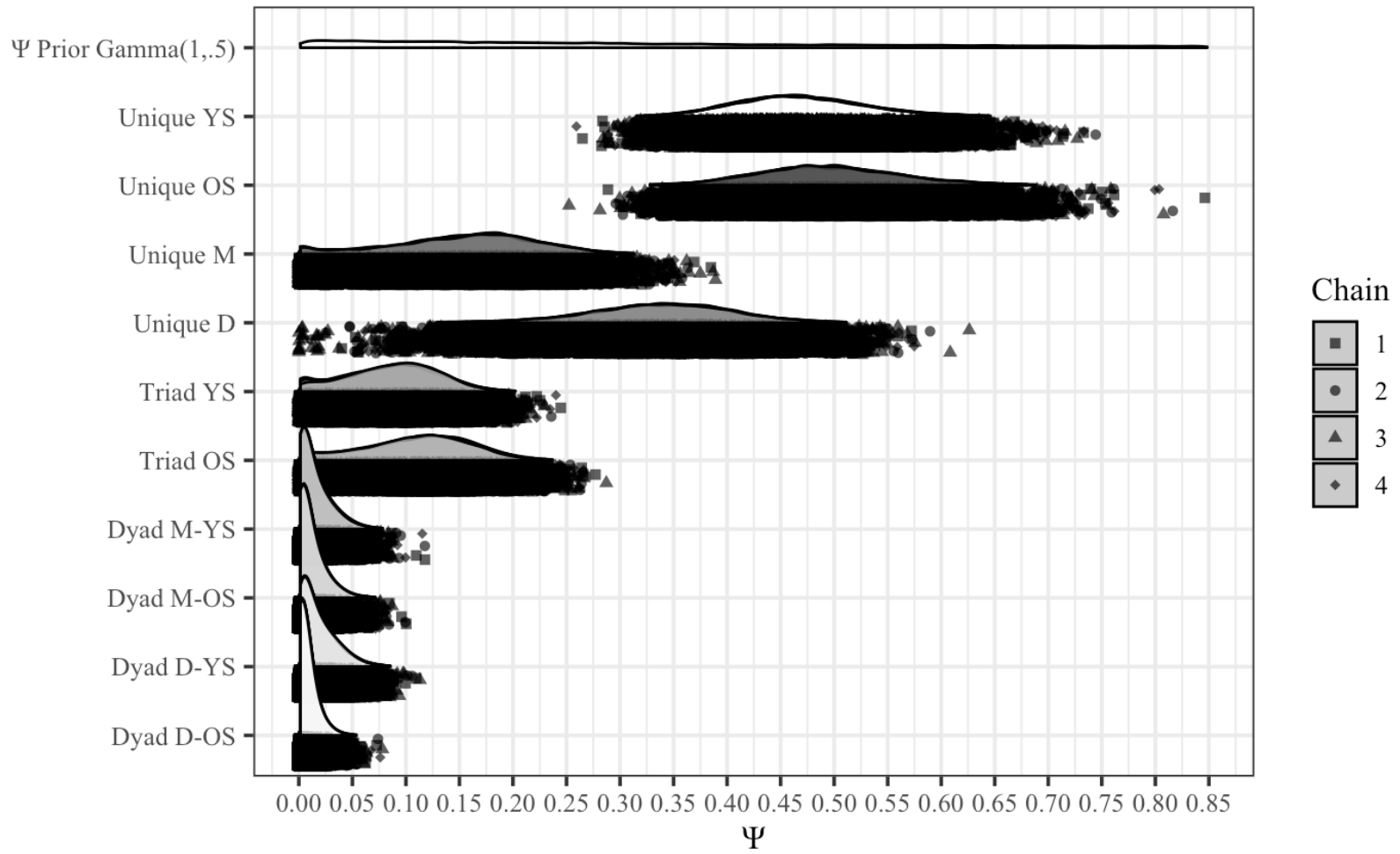


Figure 13. Model 0 Unstandardized Posterior Distributions and Prior Specifications of the Latent Variable Variances

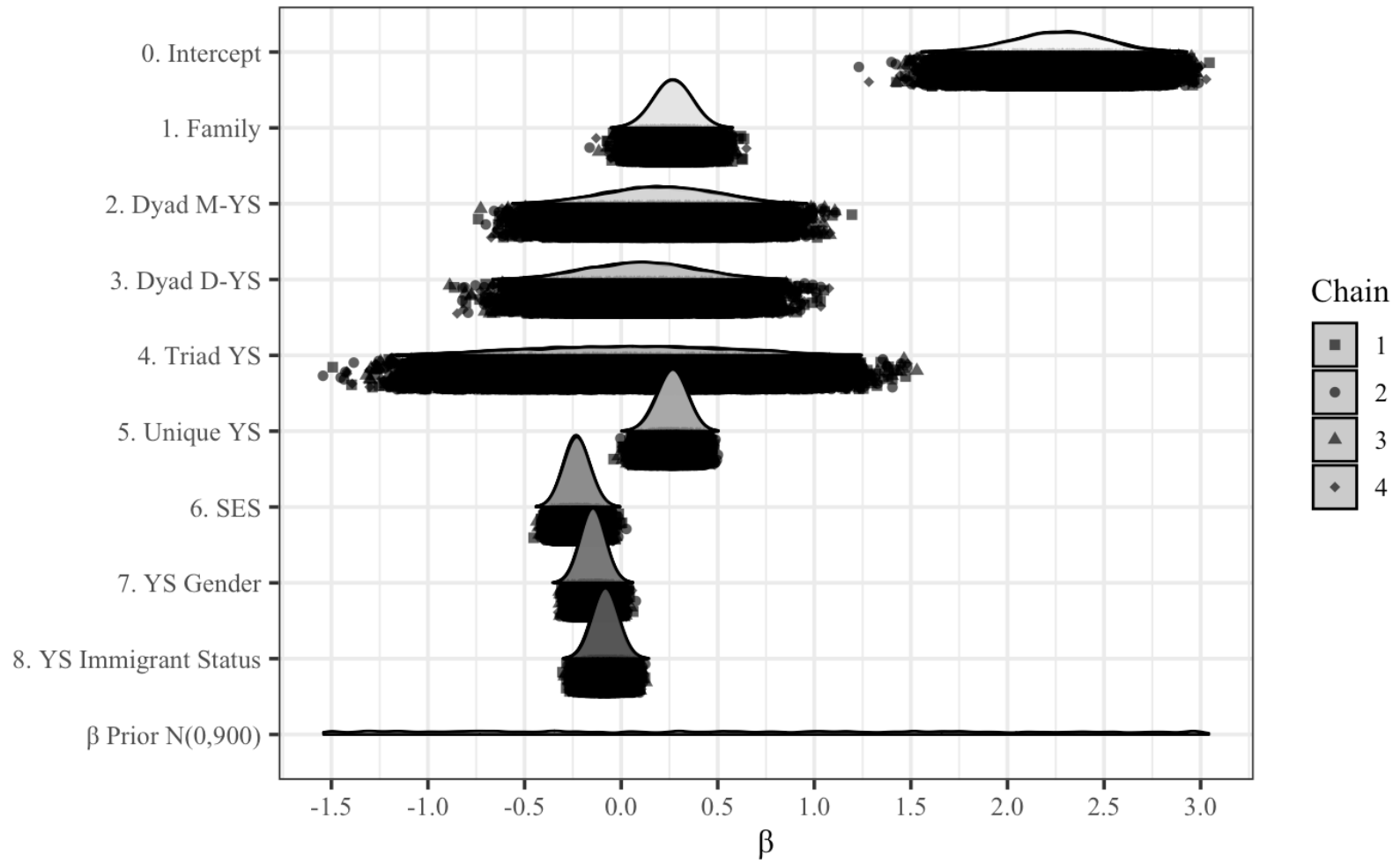


Figure 14. *Model 1 Standardized Posterior Distributions and Prior Specifications of the Regression Coefficient Parameters*

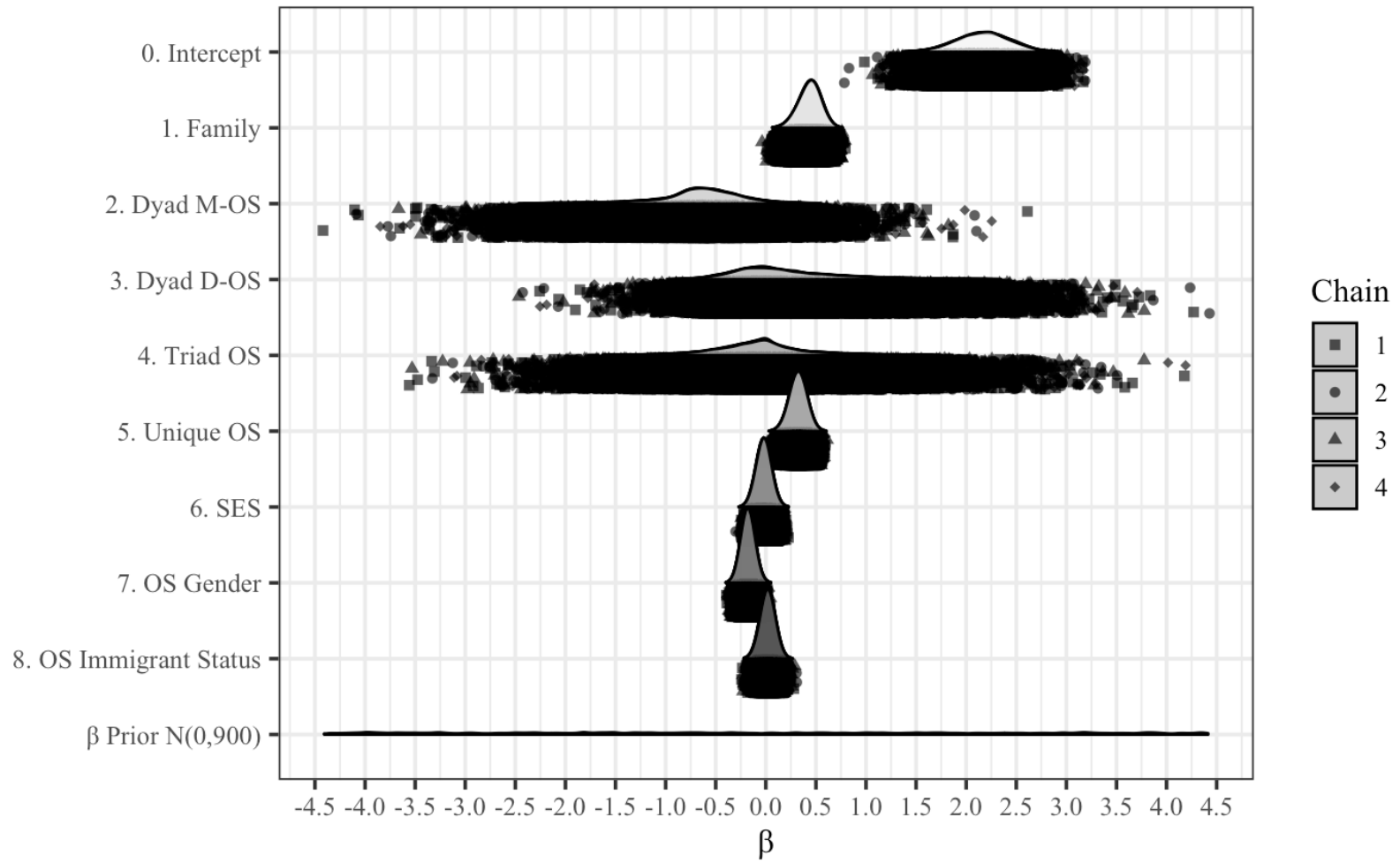


Figure 15. Model 2 Standardized Posterior Distribution and Prior Specifications of the Regression Coefficient Parameters

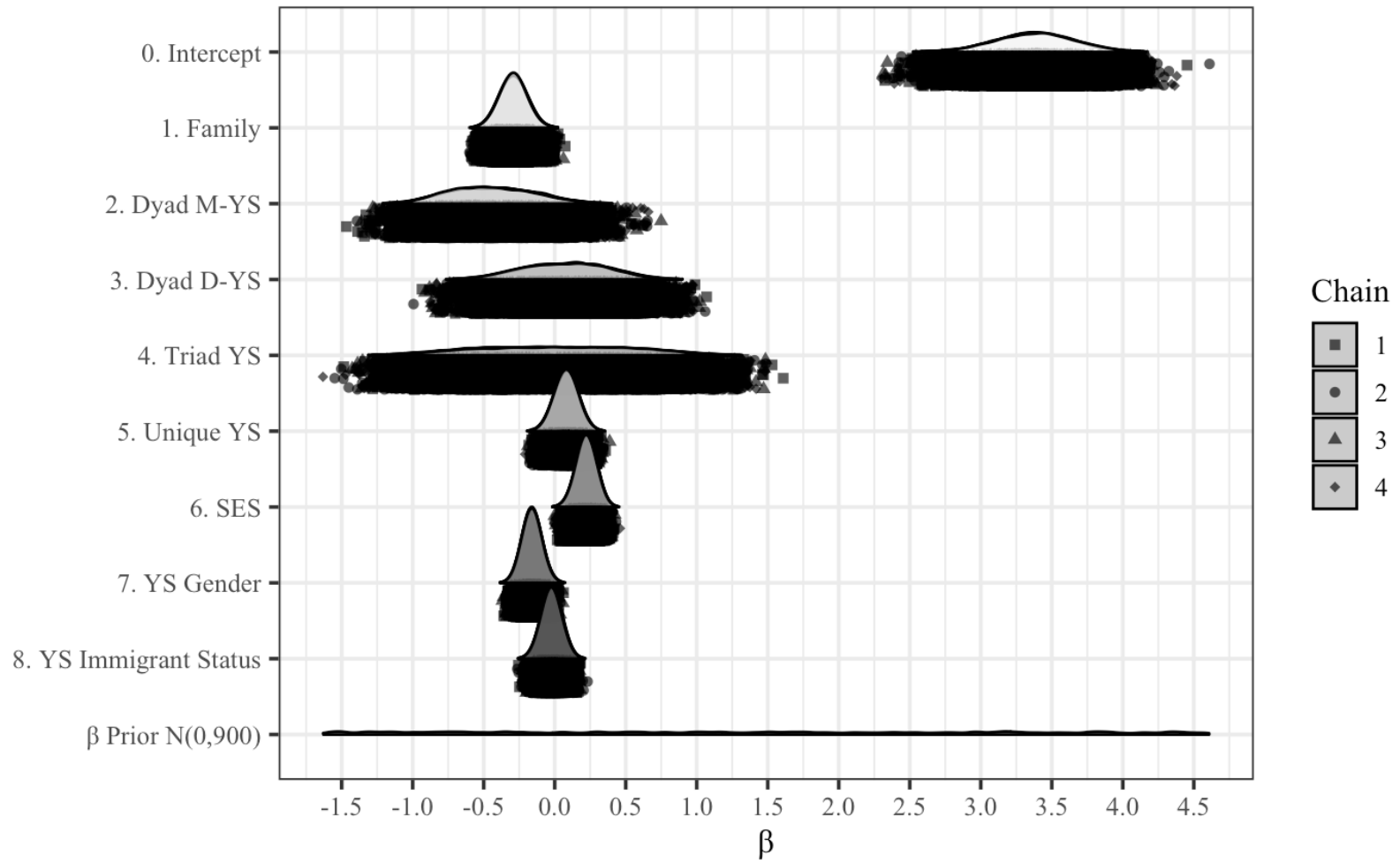


Figure 16. Model 3 Standardized Posterior Distribution and Prior Specifications of the Regression Coefficient Parameters

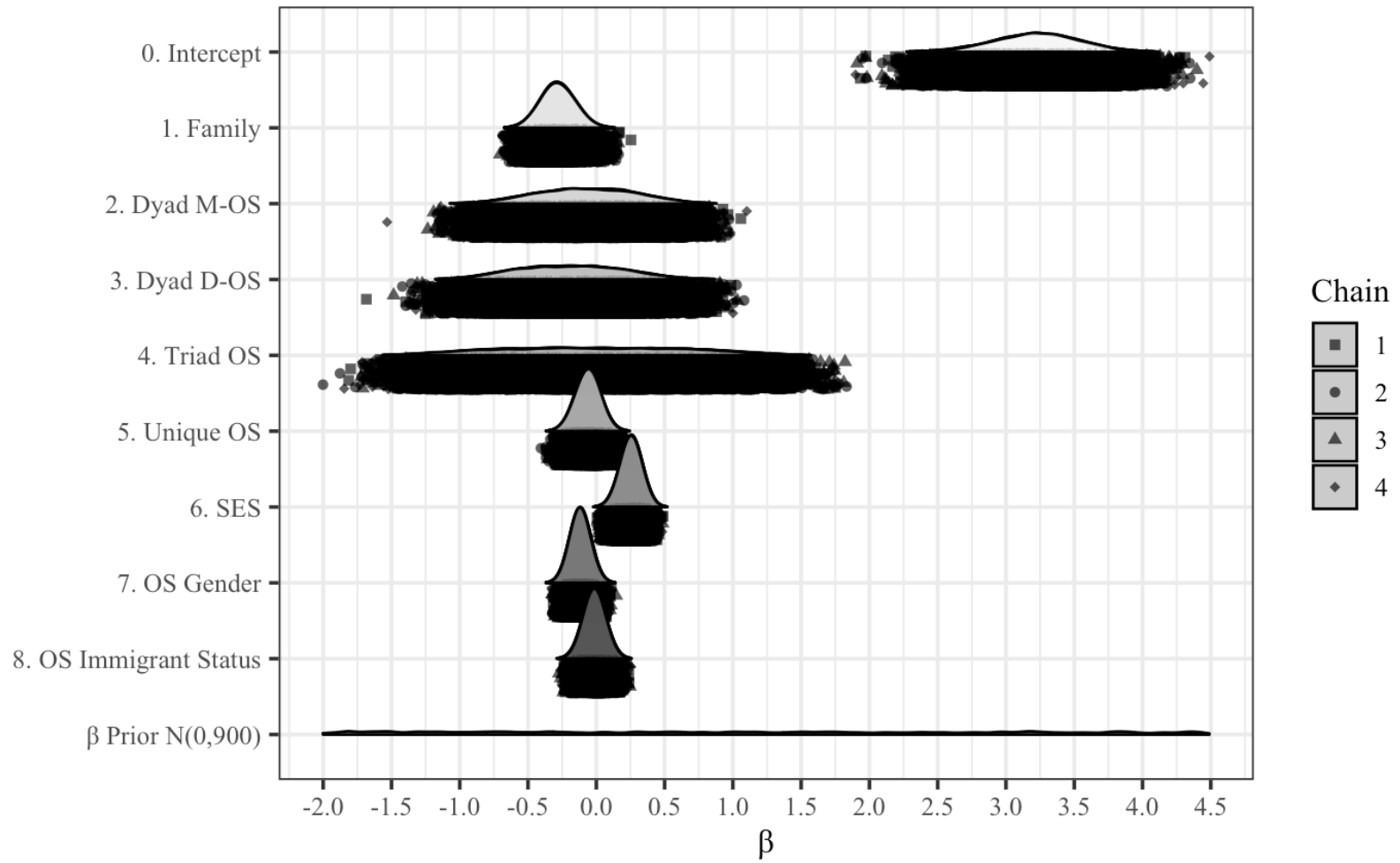


Figure 17. Model 4 Standardized Posterior Distribution and Prior Specifications of the Regression Coefficient Parameters

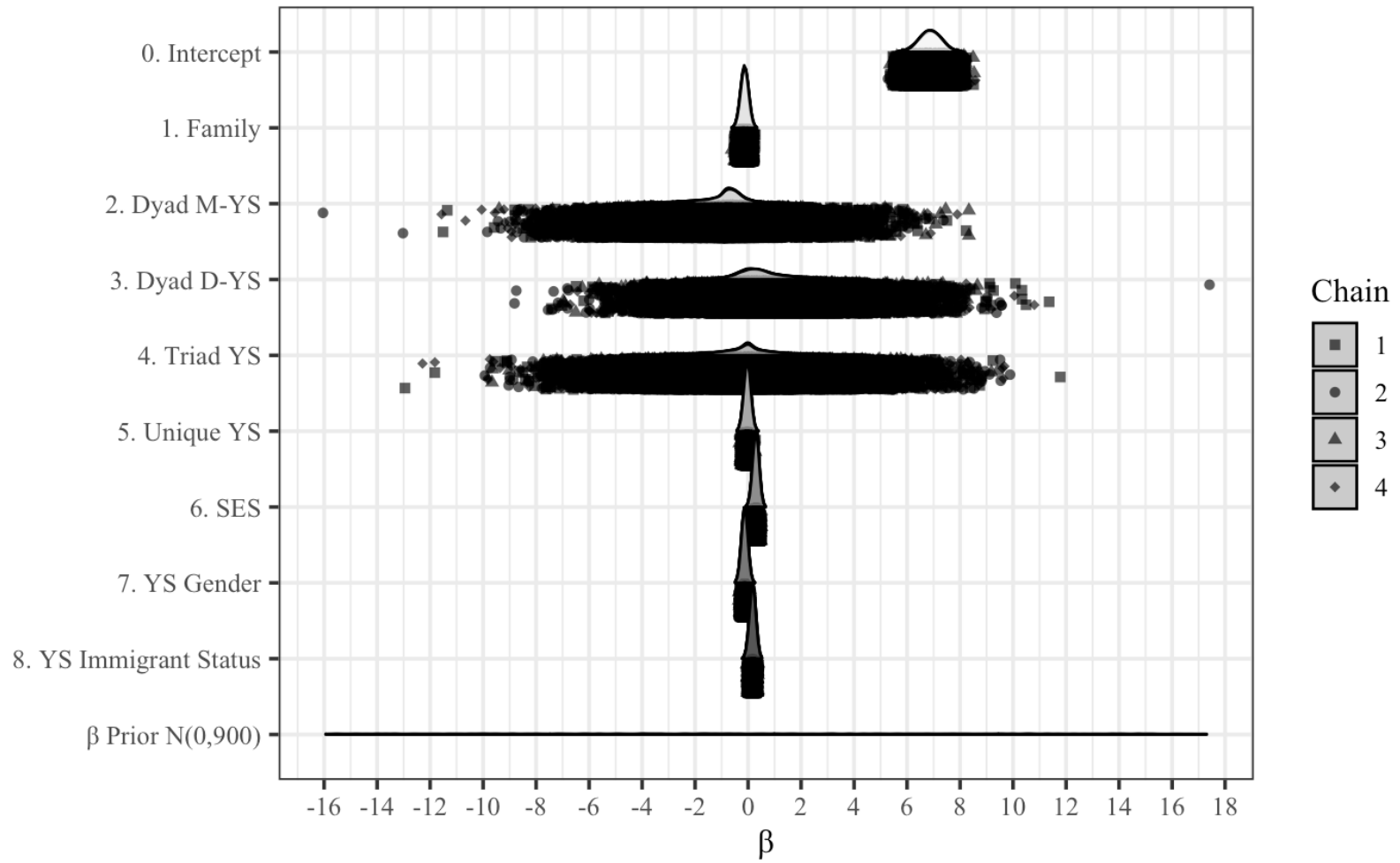


Figure 18. Model 5 Standardized Posterior Distribution and Prior Specifications of the Regression Coefficient Parameter

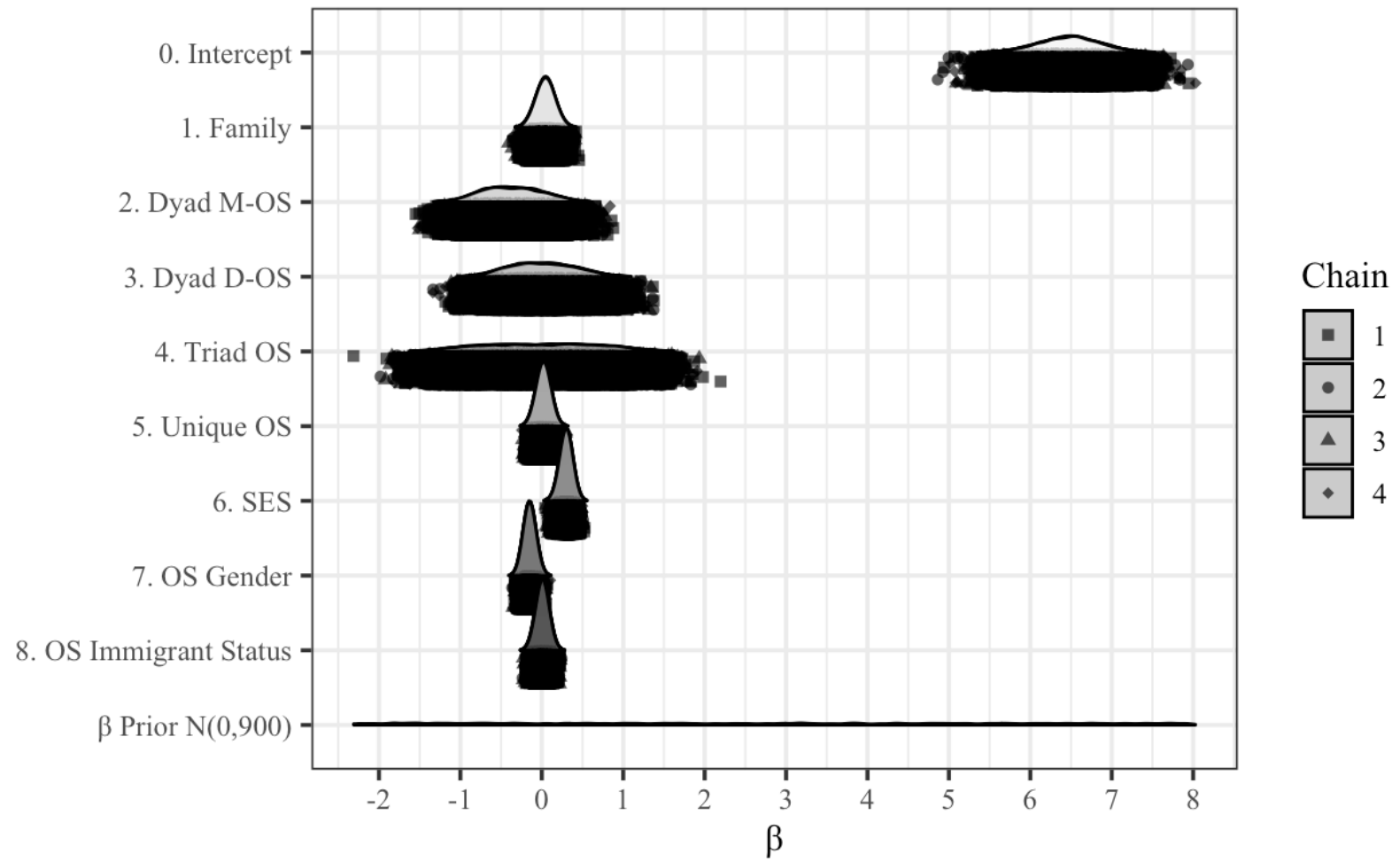


Figure 19. Model 6 Standardized Posterior Distribution and Prior Specifications of the Regression Coefficient Parameter

TABLE OF SYMBOLS / NOMENCLATURE

Table S1. *List of Parameter symbols and Item abbreviations*

Symbol	Description	Item Number	Measured Variable	
θ	Latent variable	1	OS-M	OS report of conflict with Mother
λ	Factor loading	2	YS-M	YS report of conflict with Mother
ξ	Factor loading/path of higher order factor measured by lower order factor	3	OS-D	OS report of conflict with father
ζ	Measured variable variance	4	YS-D	YS report of conflict with father
ψ	Latent variable variance	5	M-OS	Mother report of conflict with OS
γ	Measured variable intercept	6	M-YS	Mother report of conflict with YS
α	Regression intercept	7	D-OS	Father report of conflict with OS
β	Regression coefficient	8	D-YS	Father report of conflict with YS

Table S2. *List of Effect abbreviation and symbols*

Factor	Number	Effect	Description		Effect		
Family	1. θ_{FAM}	OS-M $_{\lambda 1,1}$	Item 1 on factor 1	Variance	OS-M $_{\zeta 1}$	Item 1 variance	
		YS-M $_{\lambda 2,1}$	Item 2 on factor 1		YS-M $_{\zeta 2}$	Item 2 variance	
		OS-D $_{\lambda 3,1}$	Item 3 on factor 1		OS-D $_{\zeta 3}$	Item 3 variance	
		YS-D $_{\lambda 4,1}$	Item 4 on factor 1		YS-D $_{\zeta 4}$	Item 4 variance	
		M-OS $_{\lambda 5,1}$	Item 5 on factor 1		M-OS $_{\zeta 5}$	Item 5 variance	
		M-YS $_{\lambda 6,1}$	Item 6 on factor 1		M-YS $_{\zeta 6}$	Item 6 variance	
		D-OS $_{\lambda 7,1}$	Item 7 on factor 1		D-OS $_{\zeta 7}$	Item 7 variance	
		D-YS $_{\lambda 8,1}$	Item 8 on factor 1		D-YS $_{\zeta 8}$	Item 8 variance	
Triad	2. θ_{OS}	M-OS Dyad $_{\xi 6,2}$	Factor 6 on factor 2		M-YS Dyad $_{\psi 4}$	Factor 4 variance	
		D-OS Dyad $_{\xi 7,2}$	Factor 7 on factor 2		D-YS Dyad $_{\psi 5}$	Factor 5 variance	
		3. θ_{YS}	M-YS Dyad $_{\xi 4,3}$		Factor 4 on factor 3	M-OS Dyad $_{\psi 6}$	Factor 6 variance
D-YS Dyad $_{\xi 5,3}$	Factor 5 on factor 3		D-OS Dyad $_{\psi 7}$	Factor 7 variance			
Dyad	4. θ_{M-YS}	YS-M $_{\lambda 2,4}$	Item 2 on factor 4	Intercept	OS-M $_{\gamma 1}$	Item 1 intercept	
		M-YS $_{\lambda 6,4}$	Item 6 on factor 4		YS-M $_{\gamma 5}$	Item 2 intercept	
		5. θ_{D-YS}	YS-D $_{\lambda 4,5}$		Item 4 on factor 5	OS-D $_{\gamma 3}$	Item 3 intercept
		6. θ_{M-OS}	D-YS $_{\lambda 8,5}$		Item 8 on factor 5	YS-D $_{\gamma 7}$	Item 4 intercept
		7. θ_{D-OS}	M-OS $_{\lambda 5,6}$		Item 5 on factor 6	M-OS $_{\gamma 2}$	Item 5 intercept
			OS-D $_{\lambda 3,7}$		Item 3 on factor 7	M-YS $_{\gamma 6}$	Item 6 intercept
			D-OS $_{\lambda 7,7}$		Item 7 on factor 7	D-OS $_{\gamma 4}$	Item 7 intercept
D-YS $_{\lambda 8,8}$	Item 8 on factor 8		D-YS $_{\gamma 8}$	Item 8 intercept			
Unique	8. θ_{R_OS}	OS-D $_{\lambda 3,8}$	Item 3 on factor 8				
	9. θ_{R_YS}	YS-M $_{\lambda 2,9}$	Item 2 on factor 9				
	10. θ_{R_M}	YS-D $_{\lambda 4,9}$	Item 5 on factor 9				
	11. θ_{R_D}	M-OS $_{\lambda 5,10}$	Item 5 on factor 10				
		M-YS $_{\lambda 6,10}$	Item 6 on factor 10				
		D-OS $_{\lambda 7,11}$	Item 7 on factor 11				
		D-YS $_{\lambda 8,11}$	Item 8 on factor 11				

APPENDIX B

PARENT-ADOLESCENT CONFLICT MEASURE

Appendix Table 1. *Adolescent Report of Frequency of Parent-Adolescent Conflict Measure Participant Instructions and Prompt*

English Version:

Response options:

- 1= Not at all
- 2= A couple of times
- 3= A few times each month
- 4= Several times each week
- 5= About once a day
- 6= Several times a day

Thinking about the past year, please indicate how often you disagree or have a difference of opinion with your mom/dad about each topic. In answering these questions, please think about minor disagreements or differences of opinion, such as when your mom/dad asks you to do the dishes and you do not want to, or bigger disagreements or problems. How often do you have disagreements or differences of opinion with your (mom or dad) about...

Spanish Version:

Response options:

- 1= Para nada
- 2= Un par de veces
- 3= Pocas veces cada mes
- 4= Varias veces cada semana
- 5= Como una vez al día
- 6= Varias veces al día

Piensa sobre el último año y dime qué tan seguido has estado en desacuerdo o has tenido una diferencia de opinión con tu mamá/papá en cada tema. Al contestar estas preguntas, por favor piensa en desacuerdos menores o diferencias de opinión, como cuando tu mamá/papá te pidió que lavaras los platos y tú no querías, así como desacuerdos o problemas mayores.

¿Qué tan seguido tienes desacuerdos o diferencias de opinión con tu mamá/papá sobre...

Appendix Table 2. *Adolescent Report of Frequency of Parent-Adolescent Conflict Measure Items*

	Topic	Item
1.	Chores	Keeping your room or the house clean or doing the chores you are asked to do? <i>el mantener tu cuarto o la casa limpia o hacer los quehaceres domésticos que se te pide que hagas?</i>
2.	Appearance	How you look, including clothing, hair style, and (for girls only) make up? <i>Como te ves, incluyendo ropa, peinado, accesorios y (sólo para niñas) maquillaje?</i>
3.	Homework and Schoolwork	Homework or getting good grades? <i>tareas o el sacar buenas calificaciones?</i>
4.	Bedtime and Curfew	How late you stay up or stay out? <i>qué tan tarde te quedas despierto(a) o fuera?</i>
5.	Friends	Choosing friends, going out with friends, spending time with friends, or spending the night at a friend's house? <i>el escoger amigos, salir con amigos, pasar tiempo con amigos, o pasar la noche en casa de un amigo(a)?</i>
6.	Romantic Relationships	Whether or not you can have a girlfriend/boyfriend or go out on dates, where you can go out on dates and the kinds of activities (e.g., going to the movies or parties) you can do on dates? <i>el si puedes tener novio(a) o salir con él/ella, a dónde pueden salir juntos y el tipo de actividades (como ir al cine o fiestas) que pueden hacer cuando salen?</i>

Topic	Item
7. Behavior and Rules	<p data-bbox="653 318 1932 391">Bad behavior or habits like being stubborn, disobeying rules, refusing to do as asked, lying, or going places without permission?</p> <p data-bbox="653 428 1932 500"><i>mal comportamiento o hábitos como ser terco, desobedecer reglas, negarte a hacer lo que se te pide, mentir, o ir a lugares sin permiso?</i></p>
8. Respect for Parents	<p data-bbox="653 537 1932 570">Talking back or being disrespectful?</p> <p data-bbox="653 607 1932 651"><i>Contestar y no ser respetuoso(a)?</i></p>
9. Relationships with Brothers and Sisters	<p data-bbox="653 688 1932 753">Getting along with your brothers and sisters such as fighting with them, hitting, yelling, teasing, or hurting them?</p> <p data-bbox="653 790 1932 867"><i>el llevarte bien con tus hermanos y hermanas como pelear con ellos, pegarles, gritarles, o lastimarlos?</i></p>
10. Family	<p data-bbox="653 904 1932 977">The importance of putting family first, such as spending time with family rather than with friends?</p> <p data-bbox="653 1015 1932 1083"><i>La importancia de poner a la familia primero, como pasar tiempo con la familia en lugar de con amigos?</i></p>
11. Religion	<p data-bbox="653 1120 1932 1153">Attending church or being involved in religious activities?</p> <p data-bbox="653 1190 1932 1234"><i>Ir a la iglesia o participar en actividades religiosas?</i></p>
12. Money	<p data-bbox="653 1271 1932 1304">The way your money is spent, earned or saved?</p> <p data-bbox="653 1341 1932 1375"><i>¿Cómo te gastas tu dinero, te lo ganas o te lo ahorras?</i></p>

Appendix Table 3. Parent Report of Frequency of Parent-Adolescent Conflict Measure Participant Instructions and Prompt

English Version:

Response options: 1= Not at all, 2= A couple of times, 3= A few times each month, 4= Several times each week, 5= About once a day, 6= Several times a day

Now I would like to ask you some questions about how often you and (child's name) disagree or have a difference of opinion about different topics. In answering these questions, think about minor disagreements or differences of opinion, such as when you ask (child's name) to do the dishes and he/she does not want to, as well as bigger disagreements or problems. Please think about the past year when answering these questions.

How often in the past year have you had disagreements or differences of opinion with (Younger Sibling Name/Older Sibling Name) about (repeat for the first 3 items then every third item)...

Spanish Version:

Response Options: 1= Para nada, 2= Un par de veces, 3= Pocas veces cada mes, 4= Varias veces cada semana, 5= Como una vez al día, 6= Varias veces al día

Ahora me gustaría hacerle algunas preguntas sobre qué tan seguido usted y (nombre de hijo(a)) están en desacuerdo o tienen una diferencia de opinión sobre diferentes temas. Al contestar estas preguntas, piense sobre desacuerdos menores o diferencias de opinión, como cuando usted le pide a (nombre de hijo(a)) que lave los platos y él/ella no quiere, así como desacuerdos o problemas más grandes. Por favor piense en el último año al contestar estas preguntas.

¿Qué tan seguido tiene desacuerdos o diferencias de opinión con (nombre de hijo(a)) sobre (repeat for the first 3 items then every third item)...

Appendix Table 4. *Parent Report of Frequency of Parent-Adolescent Conflict Measure Items*

	Topic	Item
1.	Chores	Keeping his/her room or the house clean or doing the chores he/she is asked to do. <i>Mantener su cuarto o la casa limpia o hacer los quehaceres domésticos que se le pide que haga?</i>
2.	Appearance	How he/she looks, including clothing, hair style, and (for girls only) make up. <i>Como él/ella se ve, incluyendo ropa, peinado, y (sólo para niñas) maquillaje?</i>
3.	Homework and Schoolwork	Homework or getting good grades. <i>Tareas escolares o el sacar buenas calificaciones?</i>
4.	Bedtime and Curfew	How late he/she stays up or stays out. <i>Qué tan tarde (nombre de hijo(a)) se queda despierto(a) o fuera?</i>
5.	Friends	Choosing friends, going out with friends, spending time with friends, or spending the night at a friend's house. <i>Escoger amigos, salir con amigos, pasar tiempo con amigos, o pasar la noche en casa de un amigo(a)?</i>
6.	Romantic Relationships	Whether or not he/she can have a girlfriend/boyfriend or go out on dates, where he/she can go on dates and the kinds activities (e.g., going to the movies or parties) he/she does on dates. <i>El si él/ella puede tener novio(a) o salir con él/ella, a dónde ellos pueden salir juntos y el tipo de actividades (como ir al cine o fiestas) que ellos pueden hacer cuando salen?</i>
7.	Behavior and Rules	Bad behavior or habits like being stubborn, disobeying rules, refusing to do as asked, lying, or going places without permission. <i>Mal comportamiento o hábitos como ser terco, desobedecer reglas, negarse a hacer lo que se le pide, mentir o ir a lugares sin permiso?</i>

	Topic	Item
8.	Respect for Parents	Talking back or being disrespectful. <i>Contestar y no ser respetuoso(a)?</i>
9.	Relationships with Brothers and Sisters	Getting along with his/her brothers and sisters such as fighting with them, hitting, yelling, teasing, or hurting them. <i>Llevarse bien con los hermanos y las hermanas de (nombre de hijo(a)) como pelear con ellos, pegarles, gritarles, o lastimarlos?</i>
10.	Family	About the importance of putting family first, such as spending time with family rather than with friends. <i>La importancia de poner a la familia primero, como el pasar tiempo con la familia en lugar de con los amigos?</i>
11.	Religion	Attending church or being involved in religious activities. <i>Ir a la iglesia o participar en actividades religiosas?</i>
12.	Money	About the way money is spent, earned or saved. <i>Cómo se gasta, se gana, o se ahorra el dinero de (nombre de hijo(a))?</i>

APPENDIX C
CONVERGENCE ASSESSMENT

Measurement Model MCMC Convergence Evaluation

Model 0 CFA Convergence

The MCMC diagnostic results provided evidence of convergence to a stationary distribution by iteration 500 for all unknown model parameters: latent variable loadings, measured variable intercepts, measured variable residual variances, latent variable variances, and latent variable residual variances. The \hat{R} value ranged from .99 to 1.00, and the lowest effective sample size was 3753.76 and the largest effective sample size was 25714.93. Overall, results from the assessment of model convergence suggest stability of the chains.

Visual inspection of the posterior density plots for all model parameters shows that all four chains had four overlapping curves, indicating that all four chains explored the same parameter space at the same rate (Figures 20 – 28). The trace plots for all model parameters suggest relatively good mixing, overall, the four chains appear to sample throughout the support of the distribution quickly. The autocorrelation plots show that the autocorrelation goes down to zero very quickly after the first few lags. Overall, the plot of running mean also suggests that the mean remains similar for each chain across increased iterations.

From the graphical inspection of the MCMC convergence diagnostic plots there were a few variance parameters that had poorer performance although still provided sufficient evidence of convergence. For the latent variable variances of factors YS

Triad ψ_3 M-Unique ψ_{10} the distribution is slightly multimodal where the chains have a small peak of density near zero. However, this is not an issue given that all of the chains are exploring the same space at roughly the same rate and the autocorrelation goes down to zero after about lag 10.

Structural Equation Model MCMC Convergence Evaluation

Younger Sibling Depressive Symptoms SEM MCMC Convergence

Model 1a Convergence. The maximum \hat{R} was 1.01, and the effective sample size ranged from 364.86 to 21643.64. The MCMC diagnostic results provided evidence of convergence. However, there were multiple latent variable variance parameters that appeared to not have adequate interpretability based on issues such as multimodality. Specifically, there are no issues of nonconvergence; however, the dyad factor parameters of M-YS ψ_4 , D-YS ψ_5 , M-OS ψ_6 , D-OS ψ_7 have most of the posterior density concentrated at zero (Figure 35). For the parameters OS Triad ψ_2 and YS Triad ψ_3 the autocorrelation is acceptable although it does not go down to zero quickly (Figure 36). The parameter YS Triad ψ_3 has slow mixing of the chains and most of the density is near zero. The most problematic parameter is the residual variance of YS depressive symptoms ψ_9 which is multimodal with one peak near zero and other peak near the larger positive values (Figure 37). The autocorrelation of YS depressive symptoms ψ_9 does not go down to near zero after multiple lags, and there is slow mixing but all chains appear to be exploring the same parameter space.

Model 1b Convergence. The maximum \hat{R} was 1.00, and the effective sample size ranged from 2789.08 to 50128.99. The evaluation of the MCMC convergence diagnostic plots revealed that the issues found in for the same latent variable variance parameters from Model 1a remained after increasing the number of iterations in Model 1b. However, the latent variable variance parameters diagnostic plots (Figure 47, 48, 49) look better compared to Model 1a. For instance, the autocorrelation goes down to zero for the parameters of OS Triad $_{\psi 2}$ and YS Triad $_{\psi 3}$ (Figure 48). The mother-reporter factor M-Unique $_{\psi 10}$ is slightly less unimodal compared to Model 1a, with a small peak showing up near zero for all of the chains (Figure 49). For the parameter YS depressive symptoms $_{\psi 9}$ the density remains multimodal except the four chains do appear to explore the different regions of the distribution more quickly, and overlap consistently in the model with greater iterations, suggesting fewer potential issues with mixing compared to Model 1a. The results from this model warrant caution in interpretation of the posterior results of the variance parameters.

Model 1 Convergence. The Model 1 (the model with the informative residual variance prior for the younger sibling depressive symptoms outcome variable) maximum \hat{R} value was 1.00, and the effective sample size ranged from 7022.92 to 29684.86. The results from the evaluation of the MCMC convergence diagnostic plots supported evidence of convergence for all unknown model parameters: latent variable loadings, measured variable intercepts, measured variable residual variances, latent variable residual variances, and regression slopes. Overall, results from the assessment of model

convergence suggest stability of the chains.

The trace plots for all of the parameters suggest adequate mixing, the four chains appear to sample throughout the support of the distribution quickly (Figures 53 – 64). Each posterior density plot of parameters have four overlapping curves of the density which suggests that the chains are exploring the same space at the same rate. The plot of running mean of each chain for the parameters suggests the mean remains similar for each chain throughout the increased iterations. There was a rapid decline in the autocorrelation for all parameters when thinned by 1. The autocorrelation near zero suggests that the iterations are approximately independent of one another. For all the parameters, at lag 0 the auto correlation is one (suggesting that the parameters are perfectly correlated with itself). By lag 1, the autocorrelation remains at approximately zero (suggesting it is independent).

Older Sibling Depressive Symptoms SEM MCMC Convergence

Model 2a Convergence. The maximum \hat{R} was 1.24, and the effective sample size ranged from 15.59 to 19318.15. The evaluation of convergence diagnostics (Figures 65 – 76) suggests some issues with the factor loadings and latent variable variance parameters. Based on the trace plots, the factor loadings parameters ($\lambda_1, \dots, \lambda_8$) all have one chain that is not exploring the same parameter space as the other three chains until approximately iteration 1,500 (Figures 65 and 66). The single problematic chain is staying in the negative region of the distribution before iteration 1,500. Additionally, the chain that is problematic does not overlap with the other chains in the running mean plot. The

autocorrelation for the factor loading parameters do go down to zero. For the latent variable variance parameters, the dyad factor parameters of M-YS $_{\psi 4}$, D-YS $_{\psi 5}$, M-OS $_{\psi 6}$, D-OS $_{\psi 7}$ had slow mixing at regions of the density further away from zero, and most of the density is near zero (Figure 71). The latent variable variance parameter M-OS $_{\psi 6}$ also has most of the density near zero and has slight multimodality with a second peak of density near 0.01. The parameter OS Triad $_{\psi 2}$ shows evidence of slow mixing of the four chains, with most density near zero (Figure 72). The autocorrelation goes down to zero after lag 10, and the running mean plot shows one chain not coming together with the other three chains. The parameter YS Triad $_{\psi 3}$ has one chain that has a small peak in density near zero, but overall the density is unimodal (Figure 72). The parameter OS Unique $_{\psi 8}$ has one of the chains with part of the density begin near the lower values of the parameter space (0.1), whereas all the other chains start at slightly larger values (0.25; Figure 72).

Model 2 Convergence. The visual inspection of the Model 2 (the model with the increased iterations) trace plot of the model, posterior density plots, running mean, and autocorrelation suggest evidence of convergence (Figures 77 – 88). The maximum \hat{R} was 1.00, and the effective sample size ranged from 4773.67 to 37900.53. The results from the convergence assessment suggest stability of the chains and support evidence of convergence.

Younger Sibling GPA SEM Model MCMC Convergence

Model 3a Convergence. The maximum \hat{R} was 1.02, and the effective sample size ranged from 214.09 to 7939.22. The model convergence diagnostic results (Figures 89 - 100) suggest evidence of convergence however some of the factor loadings, regression slopes, measured and latent variable variances appear to have minor issues.

The factor loading parameters ($\lambda_1, \lambda_2, \& \lambda_4, \dots, \lambda_8$) mixing of each of the four chains does not look acceptable, but overall the four chains are exploring the same parameter space. The autocorrelation does not go down to zero until after 35 lags, and in the running mean plot the four chains are near each other but not overlapping. The factor loading parameters λ_3 appears to have the most acceptable performance out of all the factor loadings, however the autocorrelation does not go down to exactly zero but is close to zero. The regression slope parameters ($\beta_1, \dots, \beta_4, \& \beta_6, \dots, \beta_8$) show evidence of slow mixing of chains, but overall appears acceptable. The observed variable variance parameters (ζ_1, \dots, ζ_8) have evidence of slow mixing, and some of the chains have peaks in density at different values of the distribution but overall all chains are exploring the same parameter space. The latent variable variance parameters OS Triad $_{\psi_2}$ and YS Triad $_{\psi_3}$ have evidence of slow mixing and high autocorrelation. For OS Triad $_{\psi_2}$ the chains seem to get stuck in different regions of the parameter space but overall exploring the same area.

Model 3b Convergence. The maximum \hat{R} was 1.02, and the effective sample size ranged from 188.84 to 6587.87. The same issues in the model convergence diagnostic

results (Figures 101 - 111) that appeared in Model 3a also remained when the number of iterations were doubled in Model 3b. Specifically, there was some evidence of minor issues for the factor loadings, regression slopes, measured and latent variable variances, and measured variable intercepts.

The same issues that were described in Model 3a remained for the factor loading parameters λ_1 & λ_6 , however, the running mean and autocorrelation appear to have improved when including more iterations. For the factor loading parameters of λ_2 , λ_4 & λ_5 there are similar issues as in Model 3a however the diagnostic plots look worse for the Model 3b with more iterations. For λ_3 the four chains are not overlapping consistently but overall the distribution is unimodal, and the autocorrelation does not go down to zero but is close. For λ_7 the density plot looks worse with the four chains overlapping less consistently, however the running mean and autocorrelation plots appear to have improved compared to Model 3a.

For the regression parameters (β_1, \dots, β_8) there is slow mixing of the four chains (Figures 103 and 104), and the convergence diagnostic plots appear to show evidence of poorer performance compared to Model 3a. The same issues with the observed variable variance parameters (ζ_1, \dots, ζ_8) remain in this model where some there are peaks in density at different values for the four chains (Figure 105 and 106), but overall all the chains are exploring the same parameter space. The latent variable residual variances of OS Triad $_{\psi_2}$ and YS Triad $_{\psi_3}$ have the same issues of slow mixing and high autocorrelation (Figure 107). In this model the M-Unique $_{\psi_{10}}$ parameter appears worse compared to

Model 3a. Specifically, there is a high autocorrelation and very slow mixing with one chain appearing to not be exploring the same region as the other three chains. The measured variable intercept parameters ($\gamma_1, \dots, \gamma_8$ & α_1) show that the four chains not consistently overlapping, and some of the chains have peaks in density at different values of the distribution (Figures 110, 111, 112). The autocorrelation of $\gamma_1, \gamma_2, \gamma_3$, and γ_8 do not go down to zero after multiple lags. The intercept parameters appear worse in Model 3b compared to Model 3a.

Model 3 Convergence. The Model 3 (the model with the informative residual variance prior for the younger sibling GPA outcome variable) MCMC diagnostic plots (e.g., trace plots, density plots, running mean, and autocorrelation) support evidence of convergence (Figures 113 – 124). The maximum \hat{R} value was 1.00, and the effective sample size ranged from 6795.56 to 29367.88.

Older Sibling GPA SEM Model MCMC Convergence

Model 4a Convergence. The maximum \hat{R} was 1.02, and the effective sample size ranged from 281.48 to 7175.87. The model convergence diagnostic results (Figures 125 – 136) suggest evidence of convergence; however, there are issues with all model parameters except for the intercepts. All of the factor loading parameters ($\lambda_1, \dots, \lambda_8$) show evidence of slow mixing for one of the MCMC chains, but overall the parameters are acceptable (Figures 125 and 126). All of the regression slope parameters (β_1, \dots, β_8) and observed variable variance parameters (ζ_1, \dots, ζ_8) have slow mixing, particularly for the same chain that also had issues for the factor loading parameters; notable, the

autocorrelation goes down near zero quickly and the parameters are acceptable (Figures 127, 128, 129, 130). All of the latent variable variance parameters (OS Triad $_{\psi 2}$, YS Triad $_{\psi 3}$, OS-Unique $_{\psi 8}$, YS-Unique $_{\psi 9}$, M-Unique $_{\psi 10}$, D-Unique $_{\psi 11}$) have slow mixing of the chains, with both OS Triad $_{\psi 2}$ and YS Triad $_{\psi 3}$ appearing to be most problematic (Figures 132 and 133). For OS Triad $_{\psi 2}$ the autocorrelation does not go down to zero, and one of the chains does not overlap well with the other chains in the running mean plot (Figure 132). For YS Triad $_{\psi 3}$ there is a large autocorrelation and slow mixing of the four chains, with three of the chains that have density in the region near zero and one chain starts at a larger value compared to the other chains (0.05). The residual variance OS depressive symptoms $_{\psi 9}$ has slow mixing of the four chains with most of the posterior density concentrated at zero (Figure 133).

Model 4b Convergence. The maximum \hat{R} was 1.04, and the effective sample size ranged from 86.07 to 4855.59. The same issues in the model convergence diagnostic results (Figures 137 – 148) that appeared in Model 4a were more problematic in Model 4b when the iterations were doubled. All of the factor loading parameters ($\lambda_1, \dots, \lambda_8$) have a high autocorrelation and slow mixing of chains (Figure 137 and 138). The regression coefficient parameters' (β_1, \dots, β_8) chains are not mixing well and the autocorrelation does not go down to zero (Figure 139 and 140). The observed variable variance parameter OS-M $_{\zeta 1}$ is one of the few parameters (Figure 141) that has an autocorrelation that does go down to zero. All of the other observed variable variance

parameters (ζ_2, \dots, ζ_8) all have an autocorrelation that does not go down to zero (Figure 141 and 142), and the four chains do not mix well. Similar to Model 4a, all of the latent variable variance parameters (ψ_2, \dots, ψ_{11}) have slow mixing of the chains (Figure 144 and 145), additionally both OS Triad $_{\psi_2}$ and YS Triad $_{\psi_3}$ remain to be the most problematic latent variance parameters (Figure 144). The parameter OS Triad $_{\psi_2}$ has a large autocorrelation near 0.8 does not go down to zero until after 40 lags. This parameter also has very slow mixing of chains, with most of the density at zero. For the parameter YS Triad $_{\psi_3}$ the four chains are not mixing well, and based on the trace plot it appears that some of the chains appear to get stuck in regions of the parameter space. This parameter also has a large autocorrelation near 0.7 and does not go down to zero. The latent variable variance parameters (ψ_1 , and ψ_7, \dots, ψ_{11}) also have an autocorrelation that does not go down to zero.

Model 4 Convergence. The Model 4 (the model with the informative residual variance prior for the older sibling GPA outcome variable) MCMC diagnostic plots (e.g., trace plots, density plots, running mean, and autocorrelation) support evidence of convergence (Figures 149 – 160). The maximum \hat{R} was 1.00, and the effective sample size ranged from 5740.17 to 29187.89.

Younger Sibling Educational Expectations SEM Model MCMC Convergence

Model 5a Convergence. The maximum \hat{R} was 1.00, and the effective sample size ranged from 1038.98 to 10000.82. The model convergence diagnostic results (Figures

161 - 172) suggest evidence of convergence, a few of the variance parameters appeared to have poorer performance but none were problematic. The measured variable variance of OS-M ζ_1 has one chain that is slightly multimodal with a peak at 0.05 and at 0.11, but overall, the posterior distribution appears unimodal (Figure 165). The latent variable variance parameter of OS Triad ψ_2 has one chain that include values near zero and other three chains densities minimum values start near 0.05 (Figure 168). Additionally, both M-Unique ψ_{10} and D-Unique ψ_{11} has one chain with a small peak in density at a value that does not overlap with the other three chains (M-Unique ψ_{10} near zero, and D-Unique ψ_{11} near 0.2) but overall, the chains are exploring the same parameter space (Figure 169). Similarly, one of the measured variable intercept parameters OS-D γ_3 has one chain that is slightly multimodal towards lower and higher values, but overall, it is acceptable. The residual variance YS Educational Expectations ψ_9 has slow mixing of the chains and most of the density near zero (Figure 169).

Model 5 Convergence. Convergence assessment of the Model 5 (the model with increased iterations) MCMC diagnostic plots of all parameters support evidence of convergence (Figures 173 – 184). The maximum \hat{R} was 1.00, and the effective sample size ranged from 2980.52 to 34440.98.

Older Sibling Educational Expectations SEM Model MCMC Convergence

Model 6a convergence. The minimum \hat{R} value obtained was .99, and the maximum \hat{R} was 1.00, and the effective sample size ranged from 2339.30 to 20518.99.

Overall, the MCMC diagnostic evaluation of the model supported evidence of convergence (Figures 185 – 196) and there were a few minor issues for a few of the variance parameters. For the measured variable variance parameter D-OS ζ_7 there is a small peak in density near zero, but overall, there were no issues with this parameter. The latent variable variance parameters of OS Triad ψ_2 and OS Educational Expectations ψ_9 also have most of the density near zero and there was slow mixing of the chains. None of the parameters described from this model were problematic, however an additional model was analyzed in attempt to arrive at a model with more acceptable parameters.

Model 6b convergence. In this model the convergence diagnostic results (Figures 197 – 208) showed that there were some minor issues with the measured variable intercepts, and the observed and latent variance parameters. The maximum \hat{R} was 1.00, and the effective sample size ranged from 1231.66 to 9940.26. The parameter M-OS ζ_5 has one chain has a small peak in density at zero; overall, the posterior density is unimodal (Figure 202). The parameter M-YS ζ_6 has two different chains with small peaks in density at lower and higher values of the posterior distribution, but overall the chains overlap (Figure 202). This issue does not occur in the model with less iterations (i.e., Model 6a). The parameter D-OS ζ_7 has multimodal peaks in density of one chain that are a bit larger compared to Model 6a, but overall, the parameter appears adequate. The latent variable variance parameter OS Triad ψ_2 has slow mixing of the chains, and most of the posterior density is near zero. The parameter YS Triad ψ_3 has two chains that are not overlapping consistently with the other two near the lower values of the posterior

distribution, this does not occur in Model 6a. The parameter D-Unique $_{\psi_{11}}$ has a small peak in density for one chain at a lower value (0.25), and slow mixing of chains but overall, the density is unimodal. Like Model 6a, the residual variance parameter OS Educational Expectations $_{\psi_9}$ has most of the density near zero. The intercept OS-M $_{\gamma_1}$ has one chain that has a small peak in density near a lower value of the distribution (2.5), other chains have most density near 2.65, and there is slow mixing of chains but overall acceptable. The intercept OS-D $_{\gamma_3}$ has one chain that has small peak near lower value of distribution (2.45) and there is slow mixing of chains but appears acceptable. The intercept M-YS $_{\gamma_6}$ one chain has slightly multimodal peak but overall overlaps with other chains and is unimodal.

Model 6 Convergence. Evidence of convergence was supported by the results from the Model 6 (the model with the informative residual variance prior for the older sibling educational expectations outcome variable) MCMC diagnostic plots (e.g., trace plots, density plots, running mean, and autocorrelation; Figures 209 – 220). The maximum \hat{R} was 1.00, and the effective sample size ranged from 6424.49 to 25859.02.

APPENDIX D
CONVERGENCE DIAGNOSTIC FIGURES

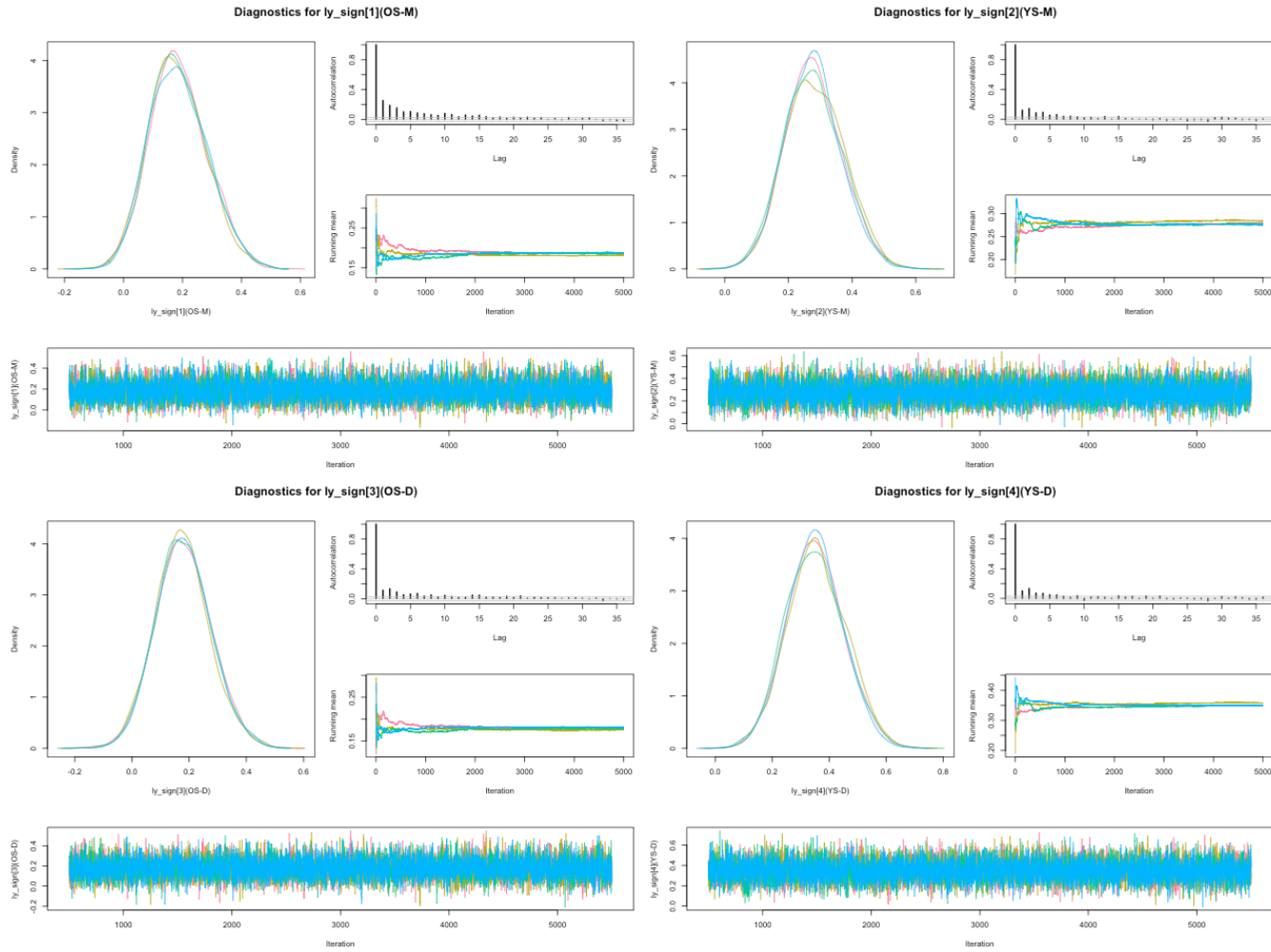


Figure 20. Model 0 MCMC Diagnostic Plots of Factor Loading Parameters

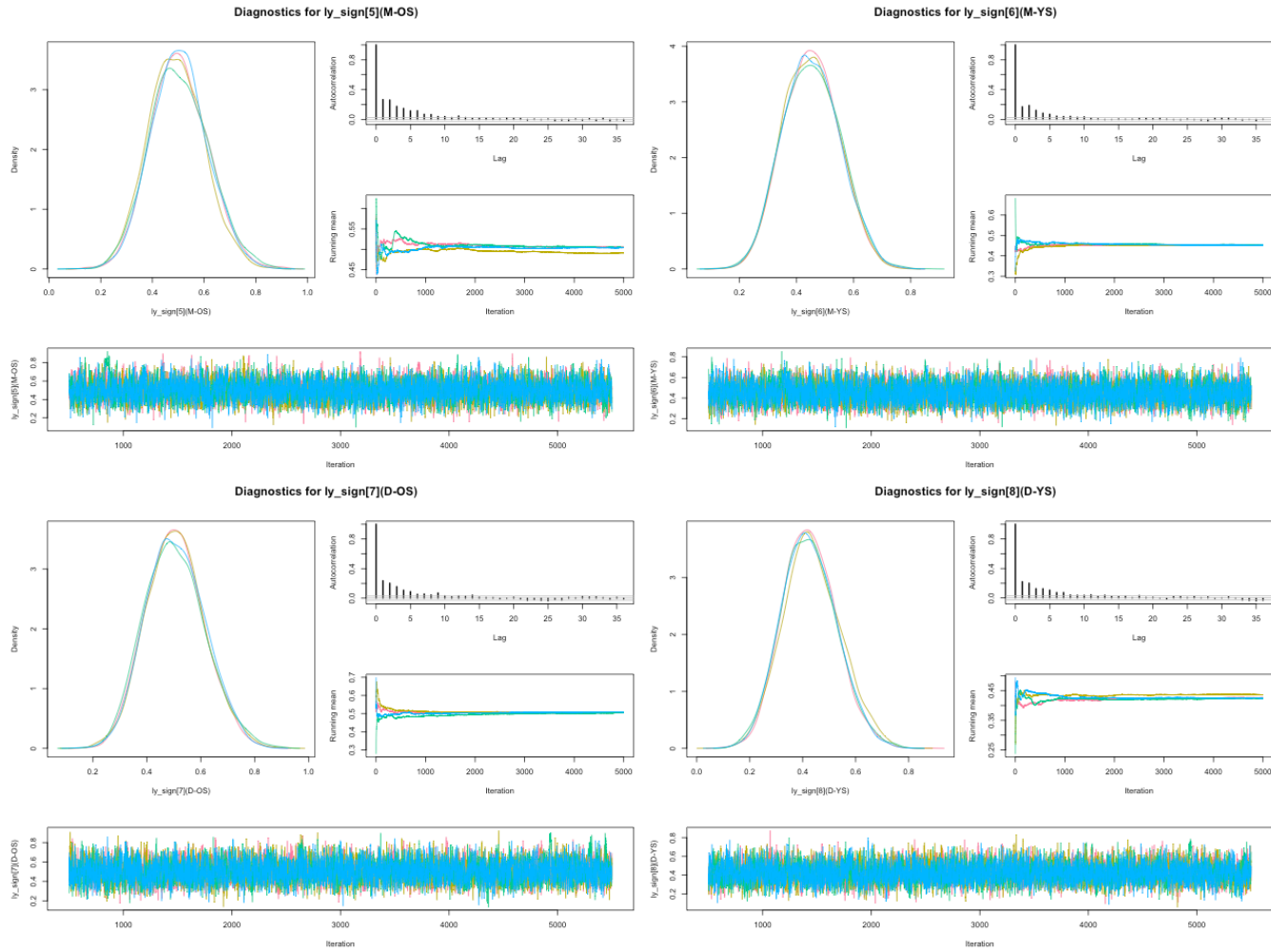


Figure 21. Model 0 MCMC Diagnostic Plots of Factor Loading Parameters

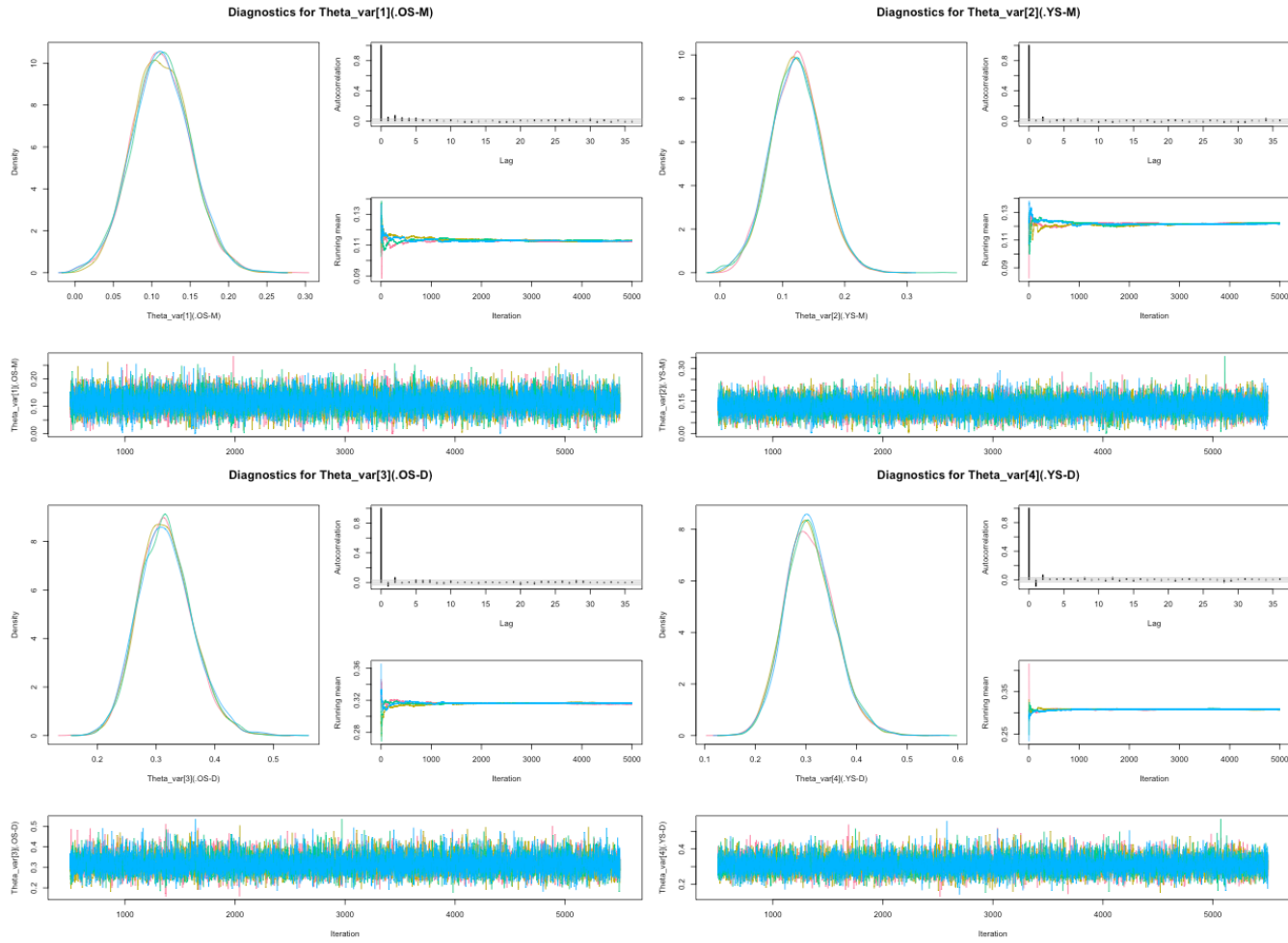


Figure 22. Model 0 MCMC Diagnostic Plots of Measured Variable Variance Parameters

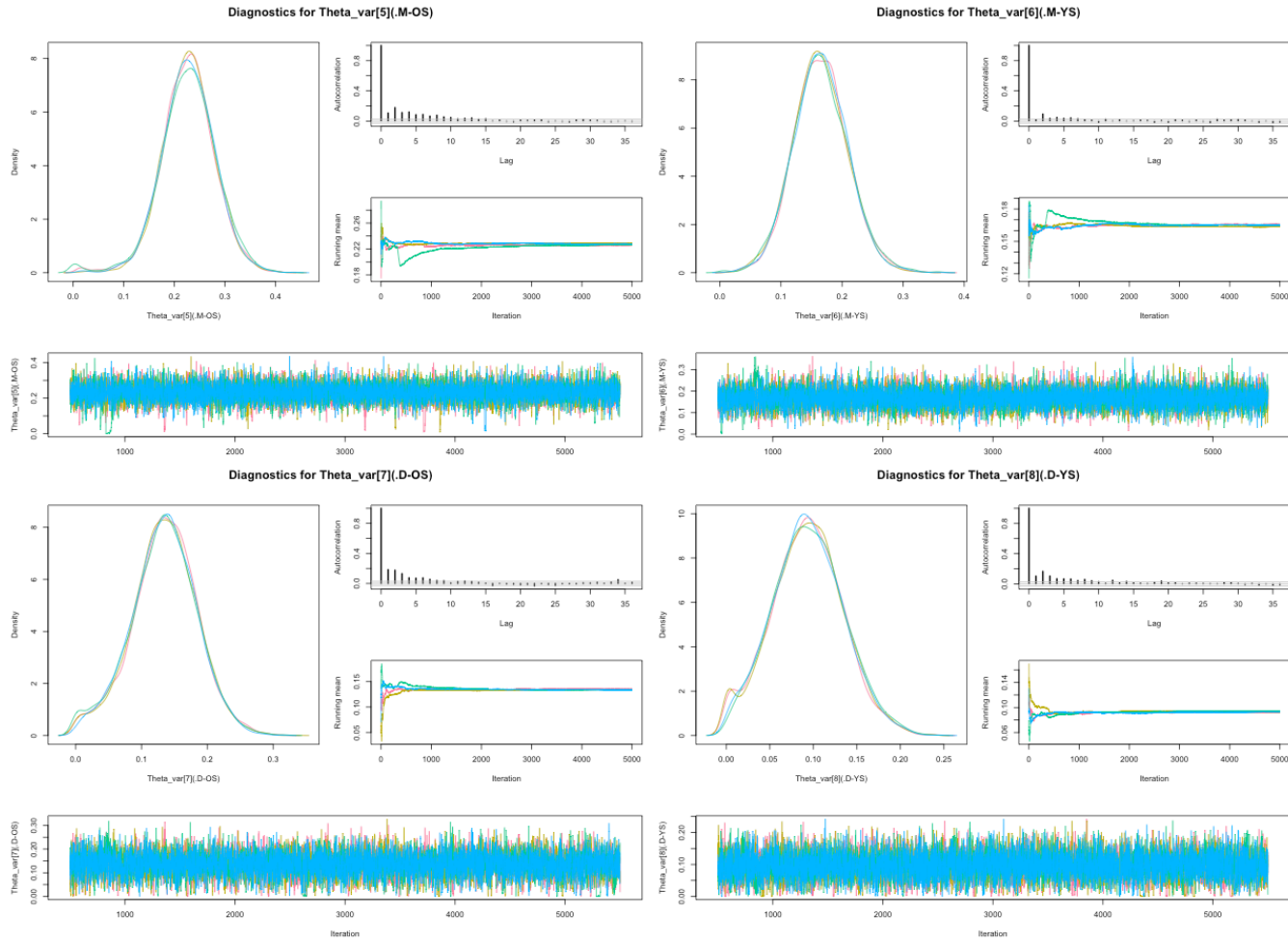


Figure 23. Model 0 MCMC Diagnostic Plots of Measured Variable Variance Parameters

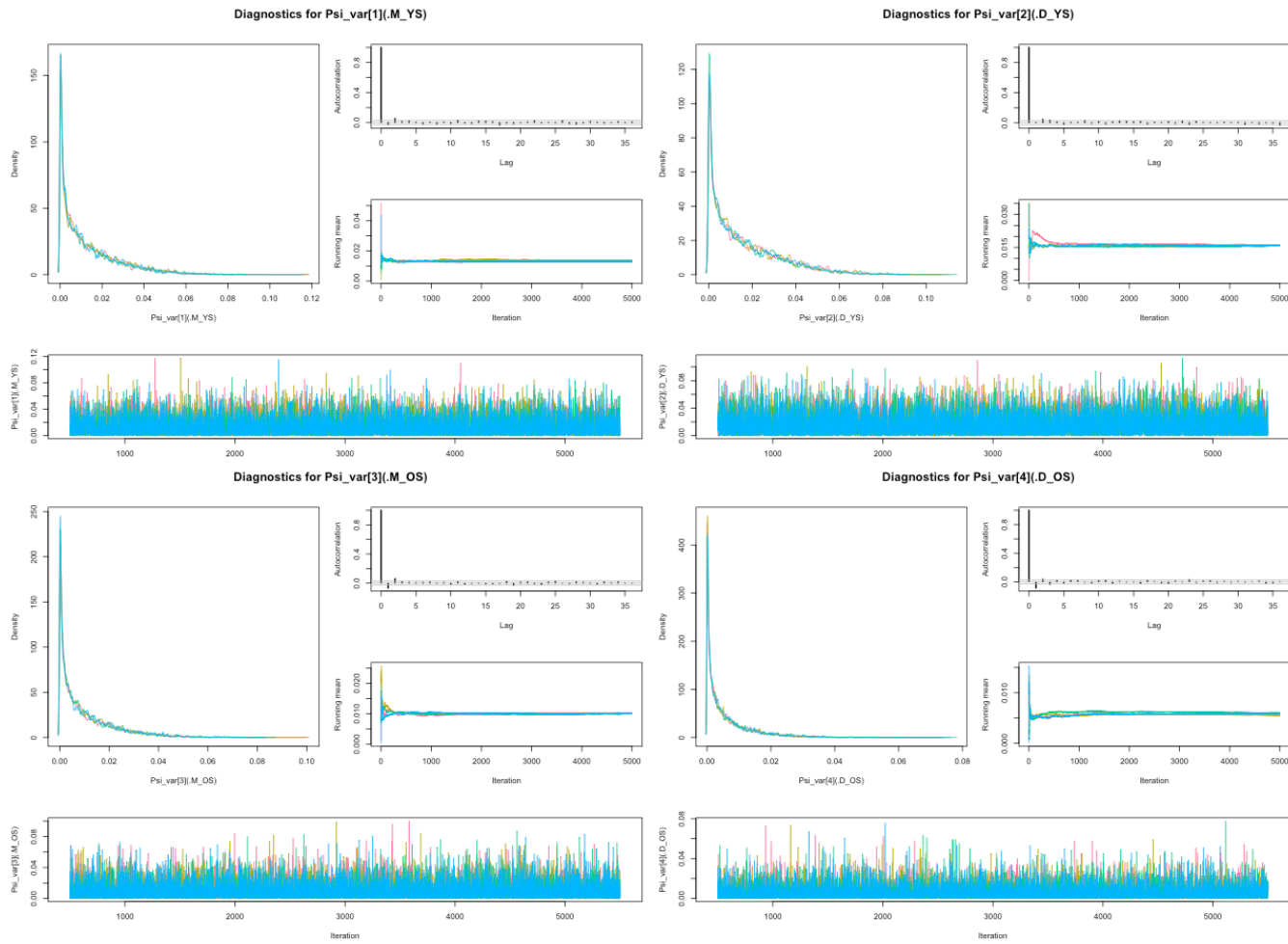


Figure 24. Model 0 MCMC Diagnostic Plots of Latent Variable Variance Parameters

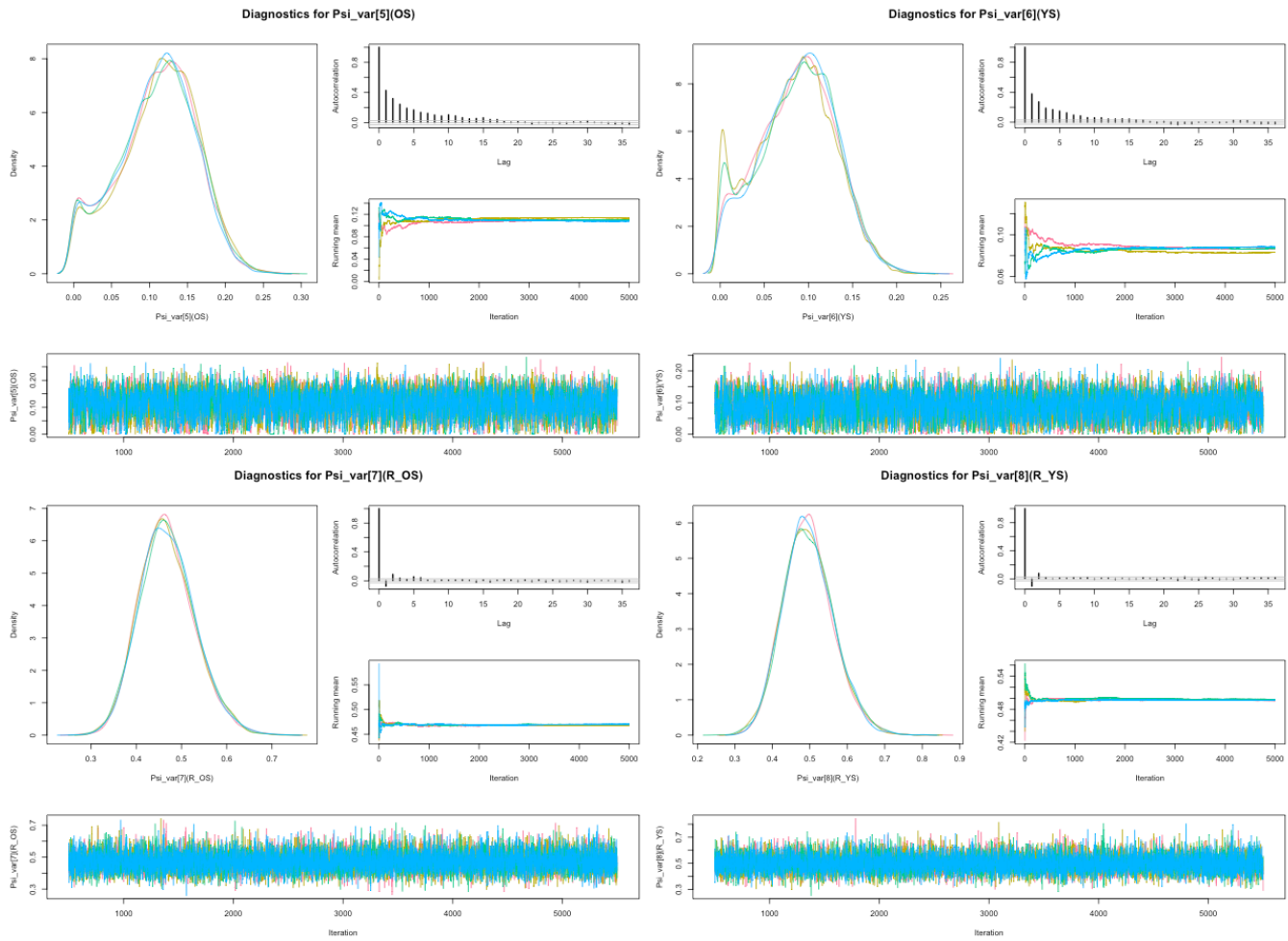


Figure 25. Model 0 MCMC Diagnostic Plots of Latent Variable Variance Parameters

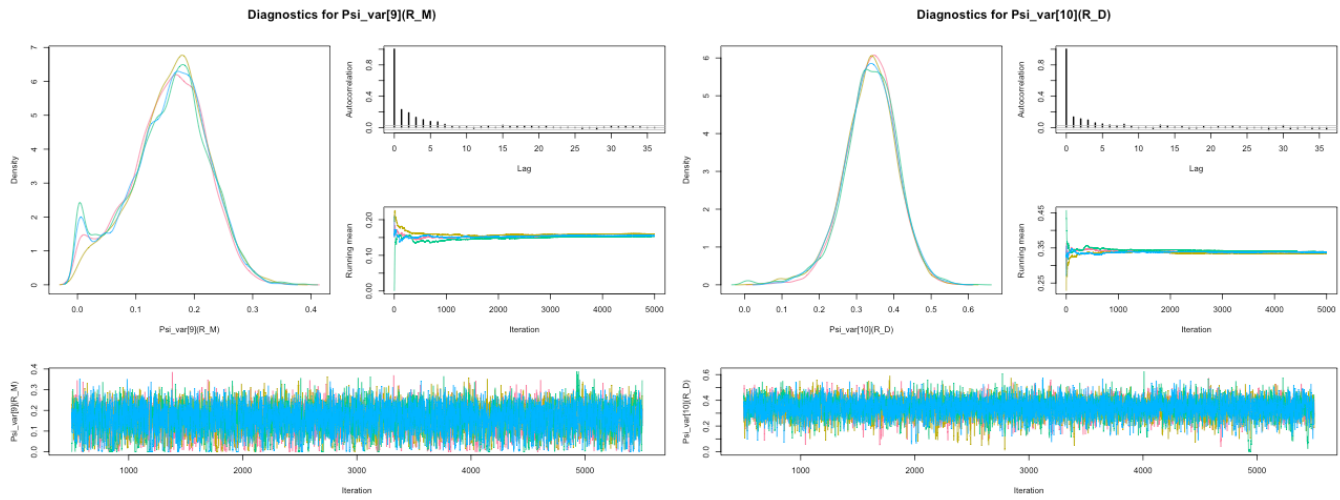


Figure 26. Model 0 MCMC Diagnostic Plots of Latent Variable Variance Parameters

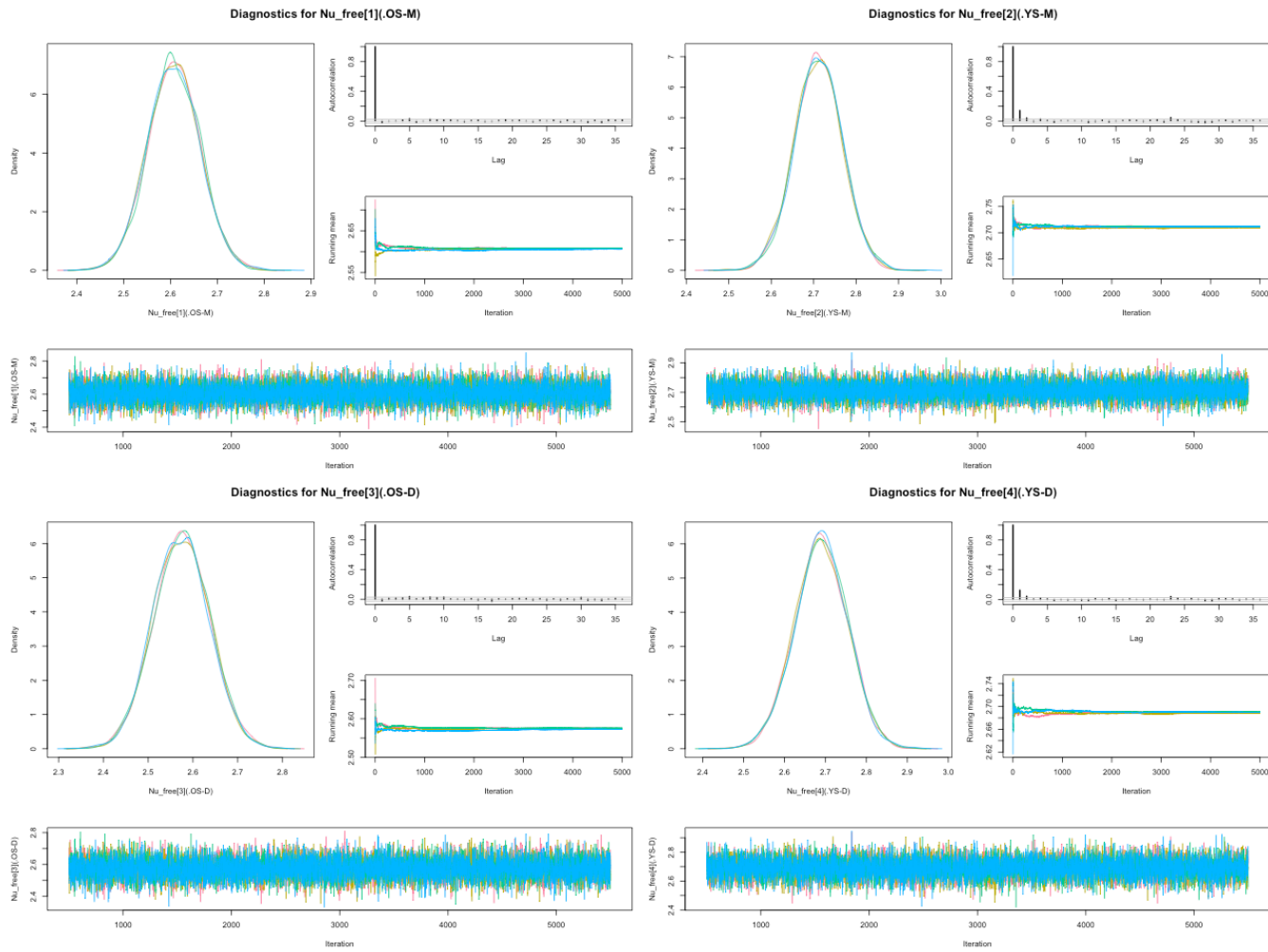


Figure 27. Model 0 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

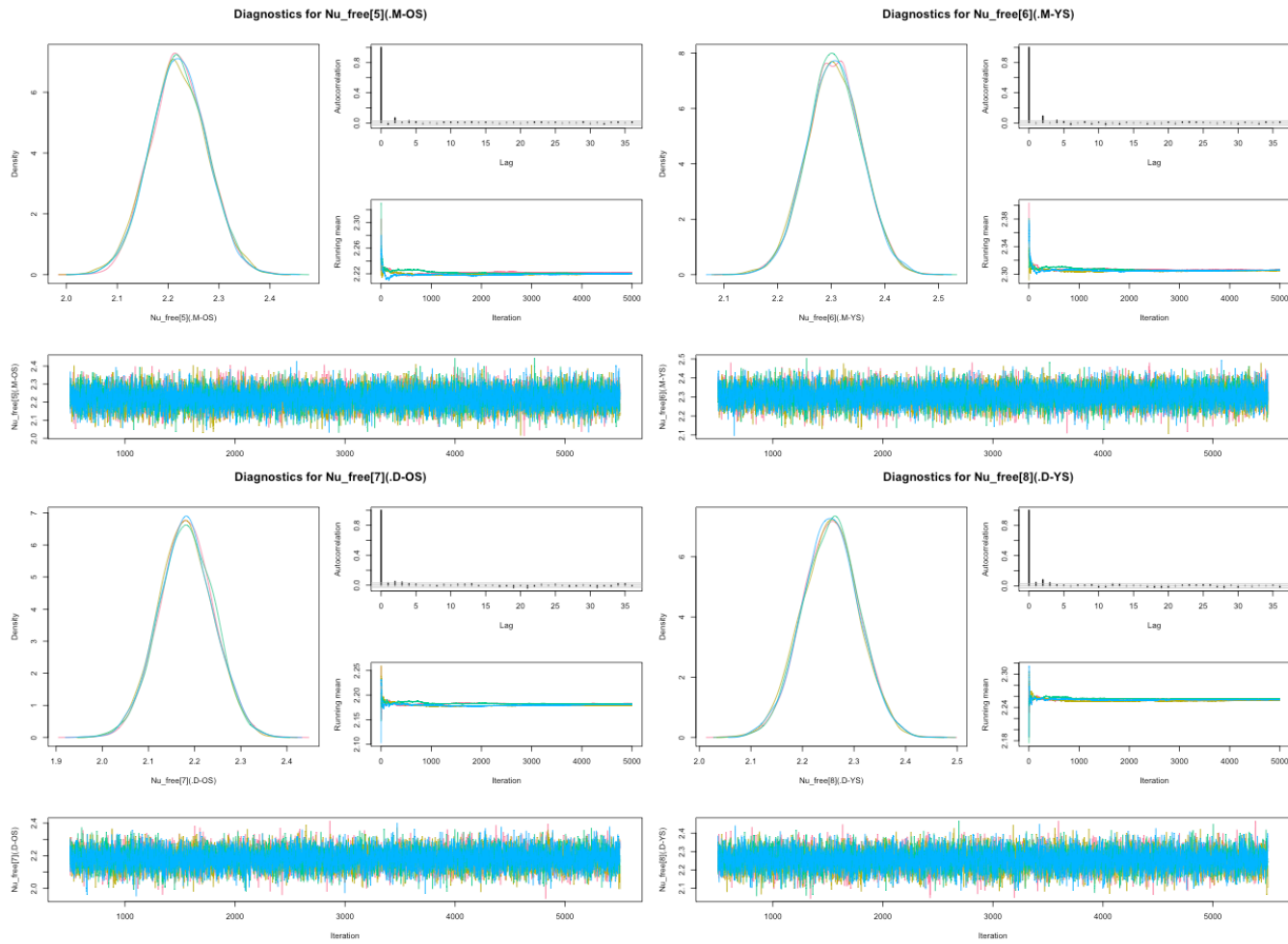


Figure 28. Model 0 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

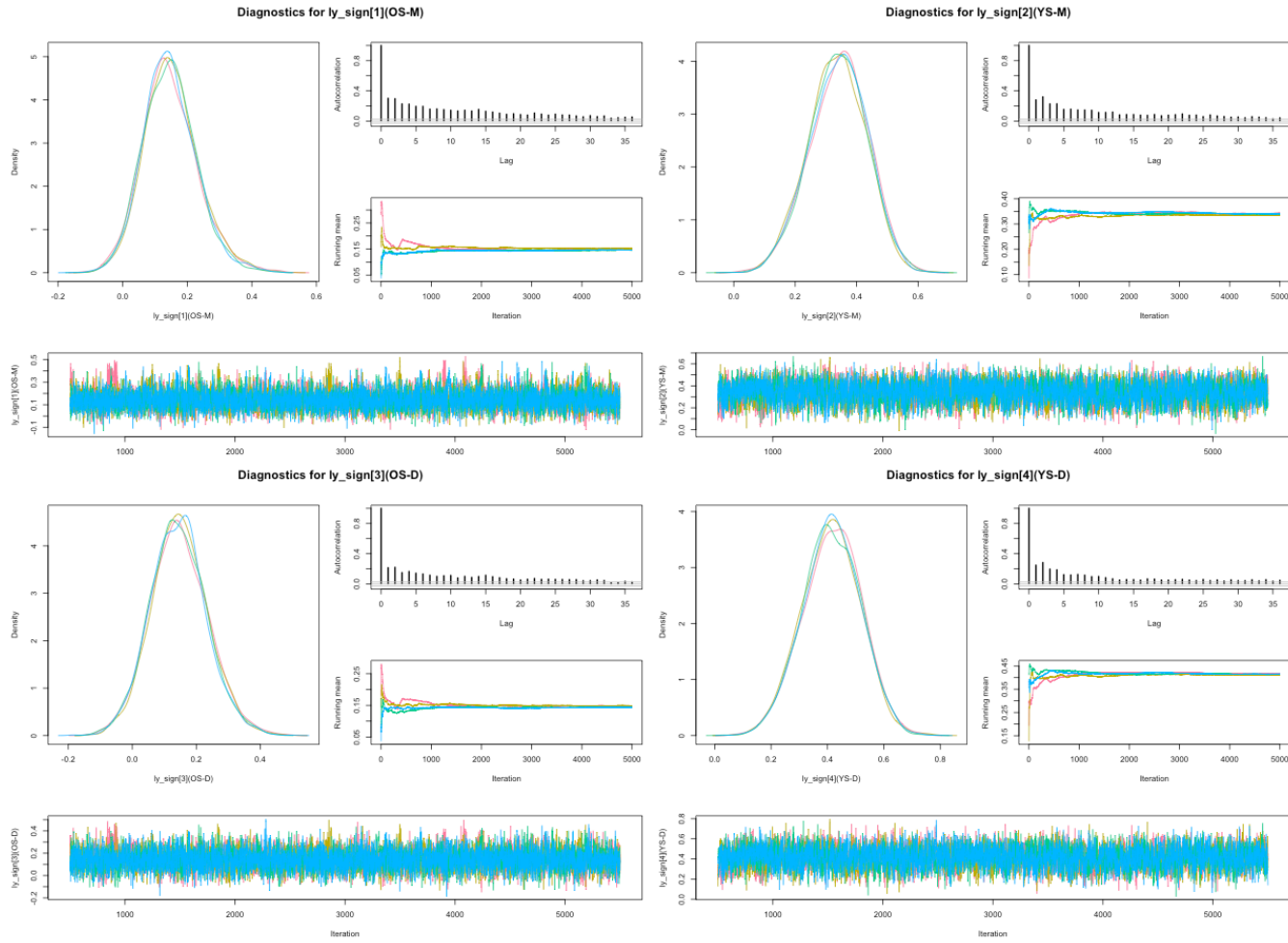


Figure 29. Model 1a MCMC Diagnostic Plots of Factor Loading Parameters

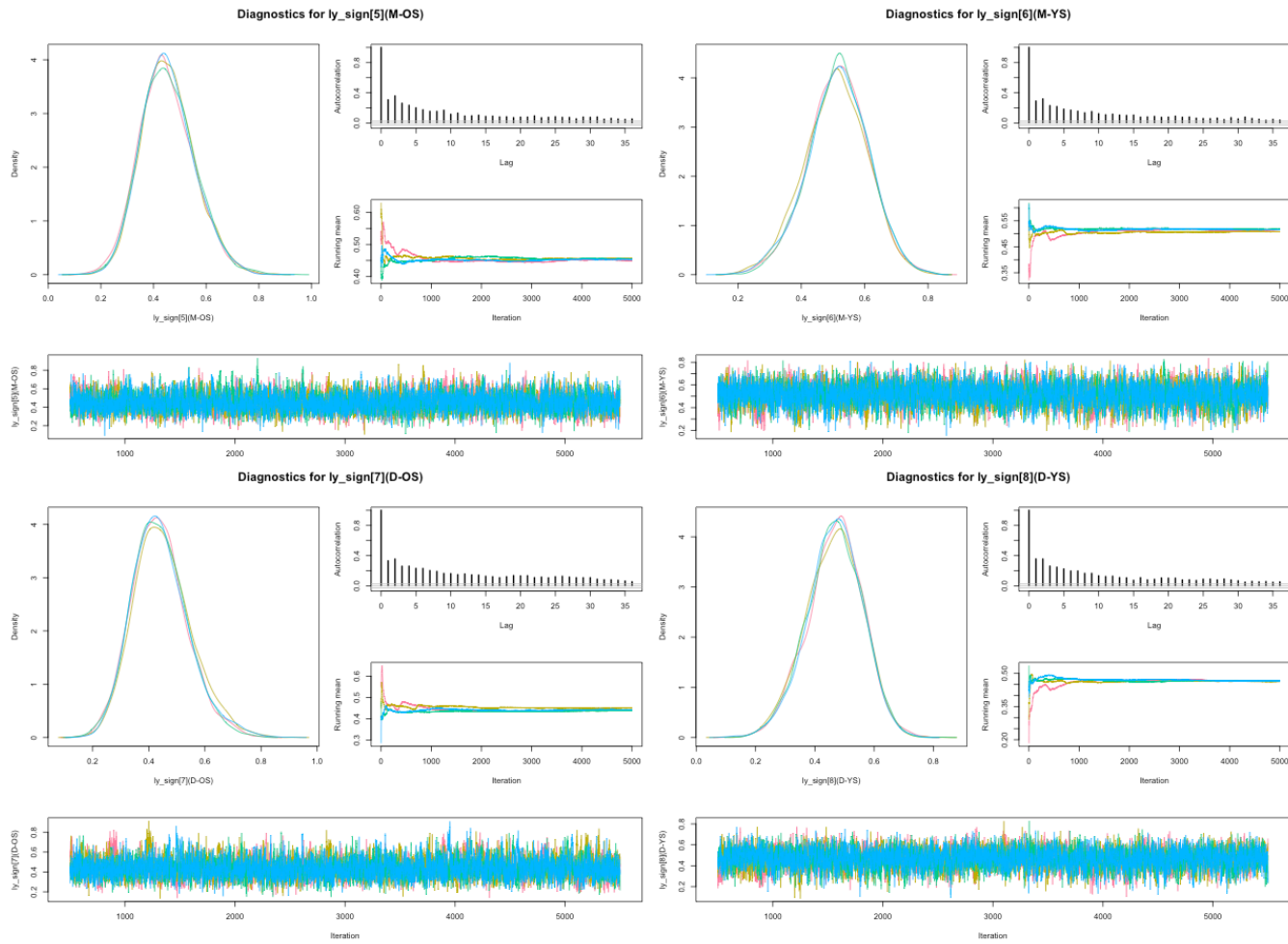


Figure 30. Model 1a MCMC Diagnostic Plots of Factor Loading Parameters

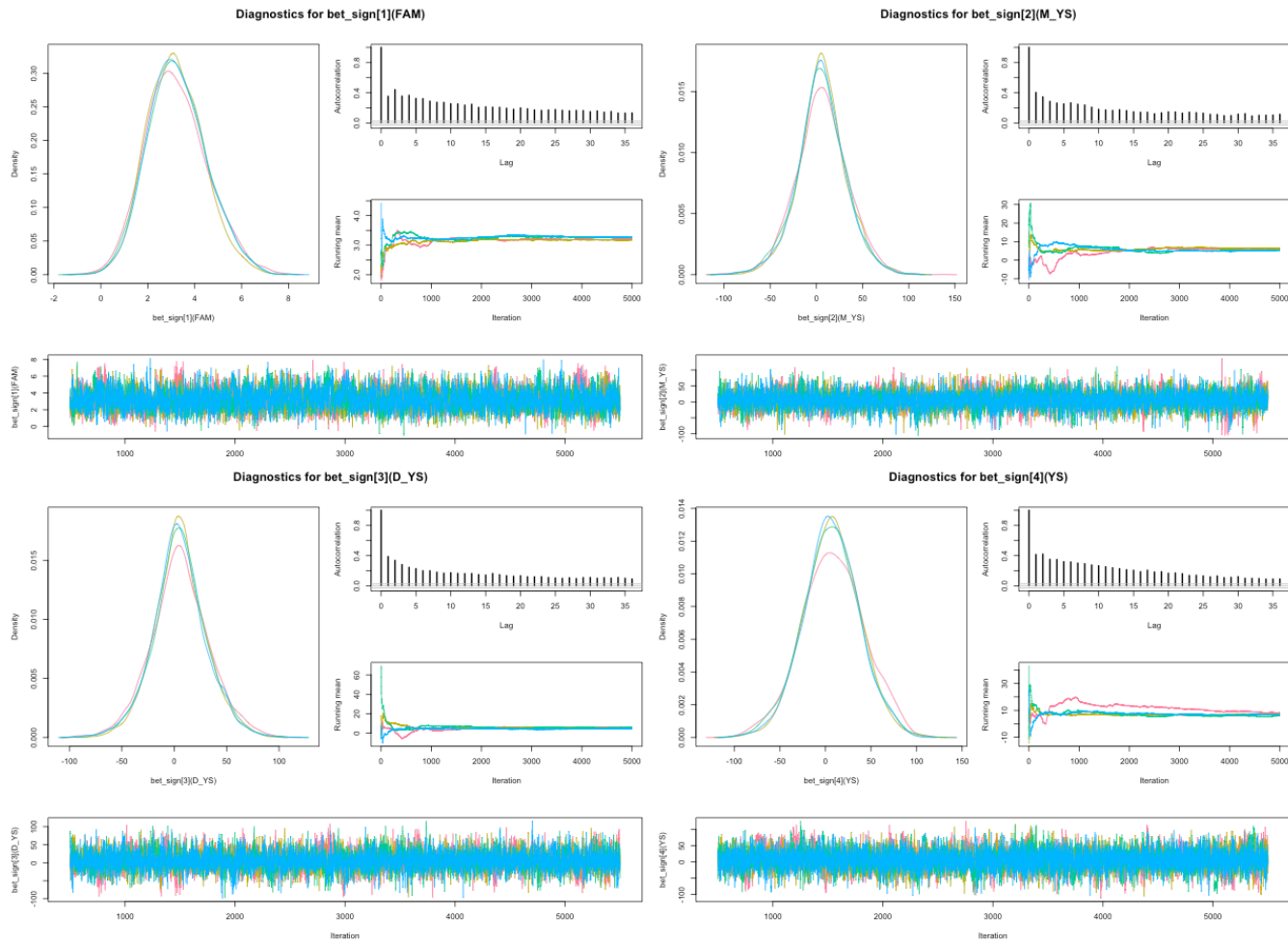


Figure 31. Model 1a MCMC Diagnostic Plots of Regression Coefficient Parameters

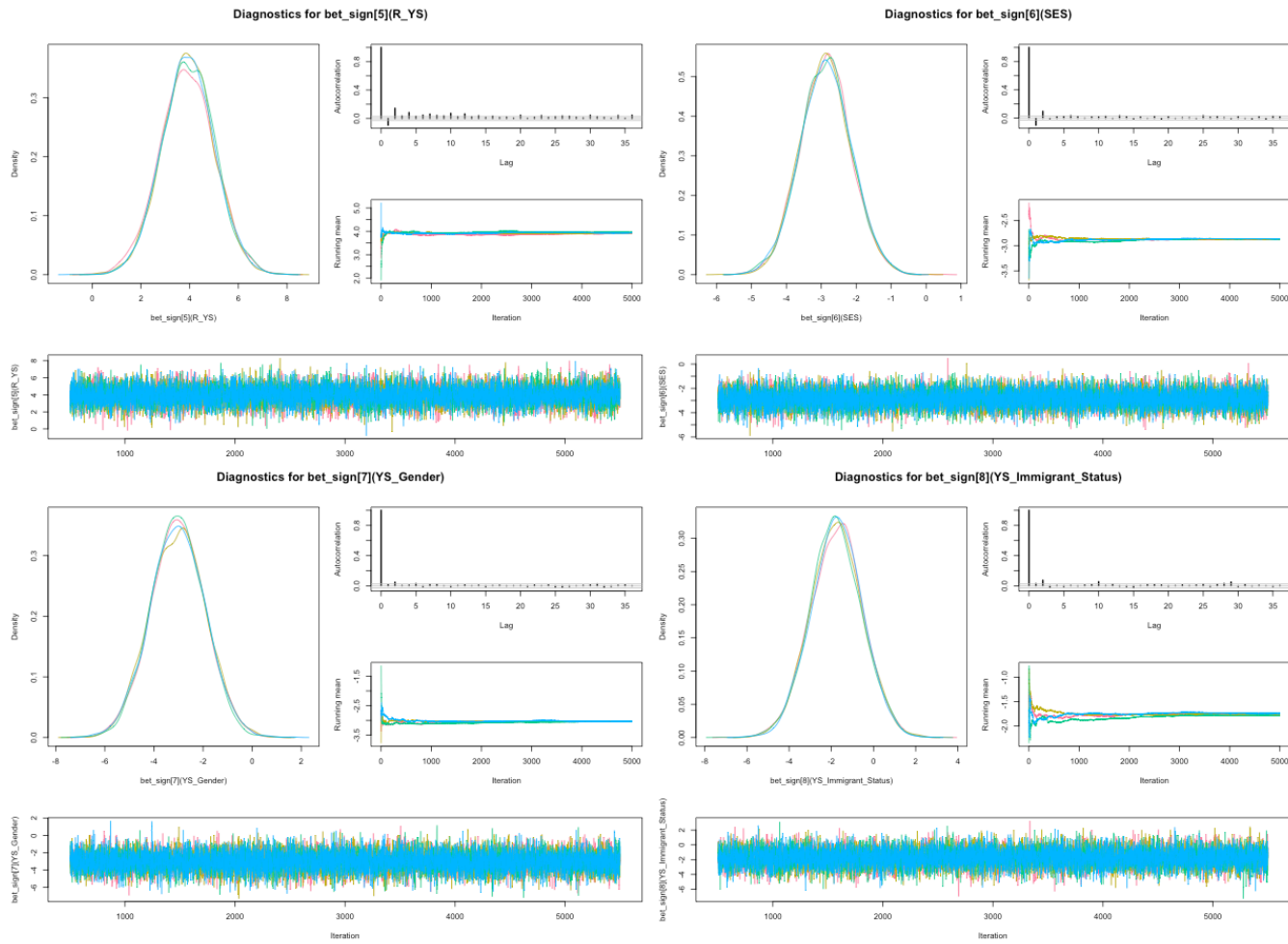


Figure 32. Model 1a MCMC Diagnostic Plots of Regression Coefficient Parameters

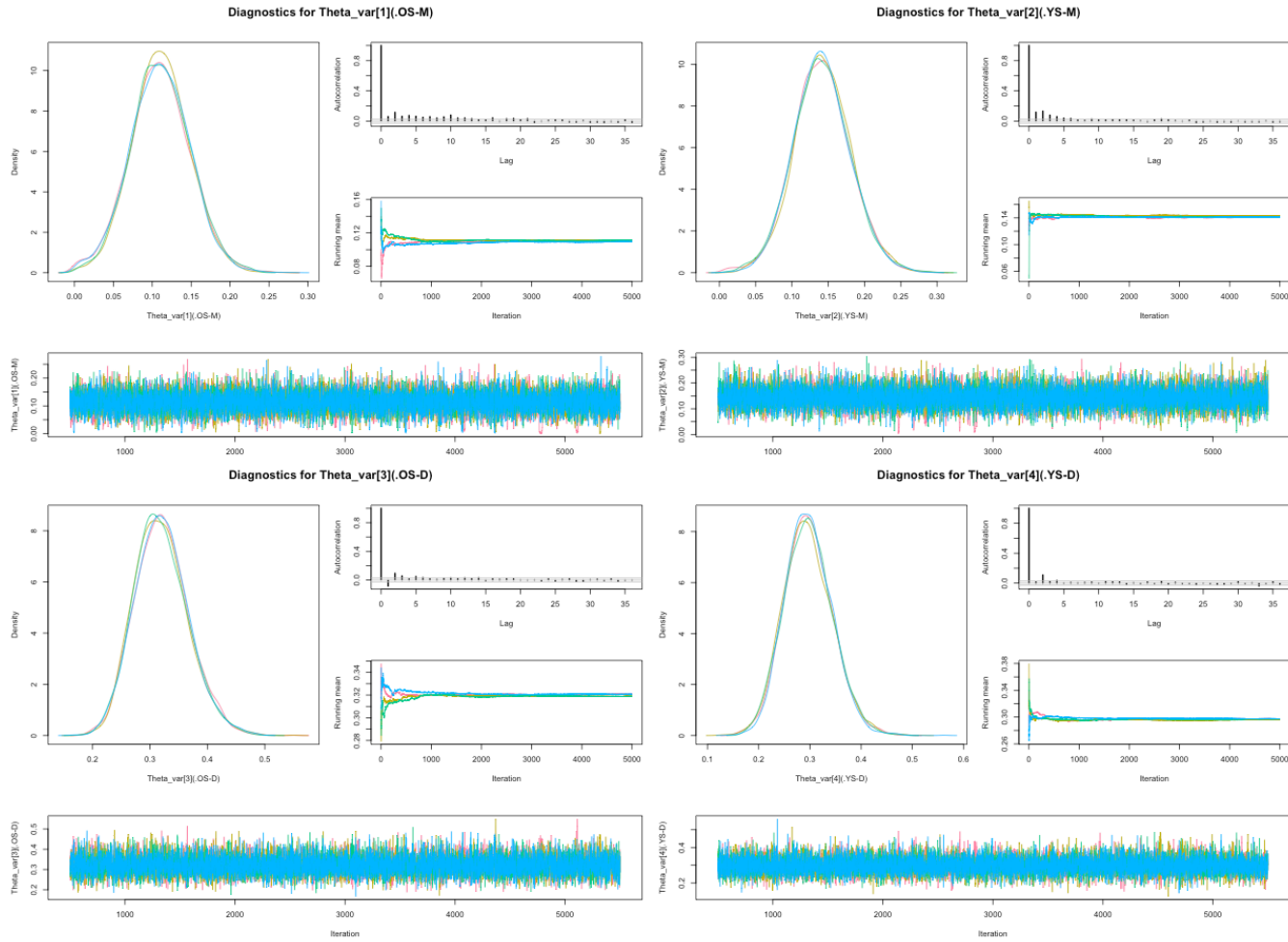


Figure 33. Model 1a MCMC Diagnostic Plots of Measured Variable Variance Parameters

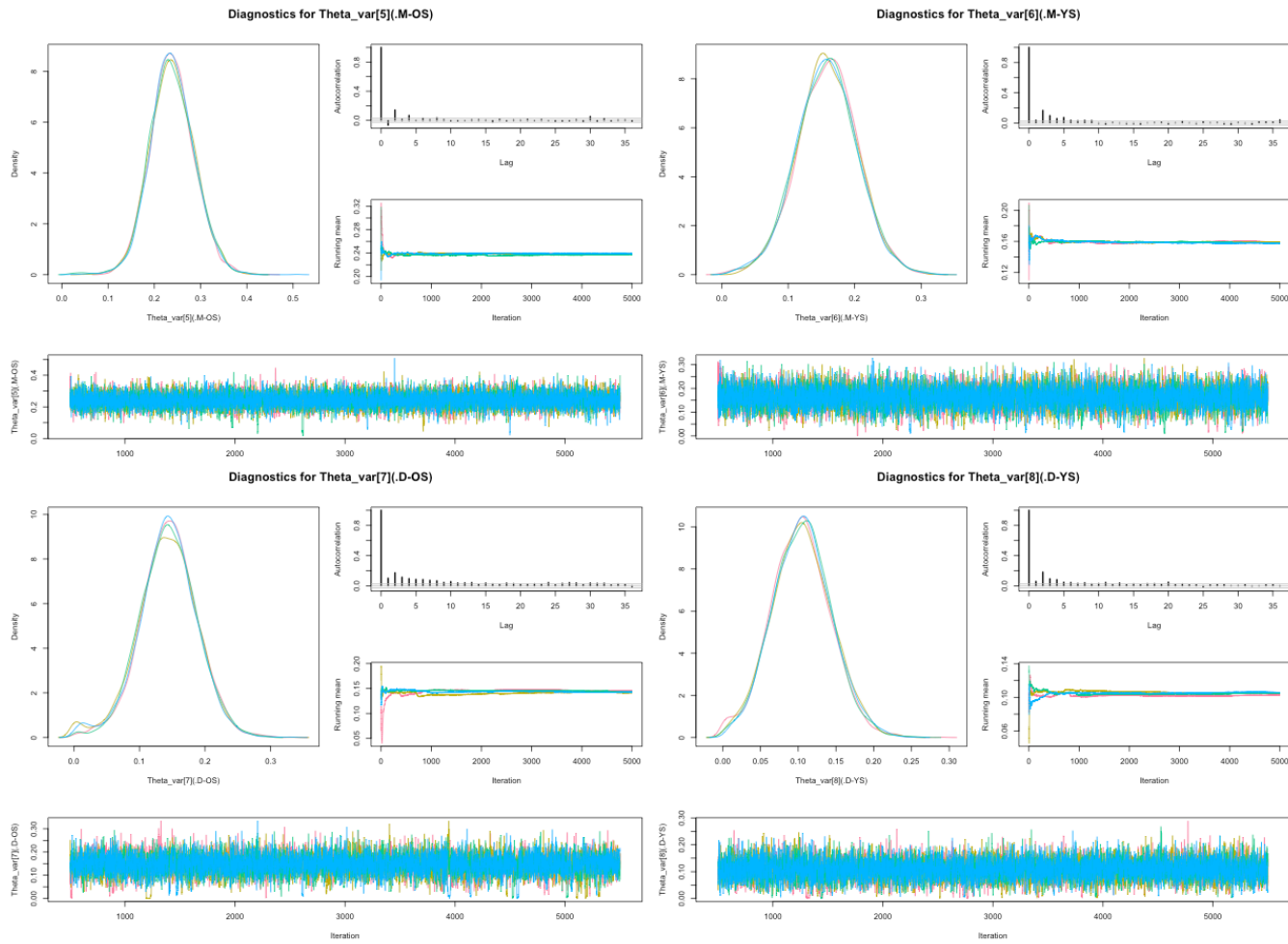


Figure 34. Model 1a MCMC Diagnostic Plots of Measured Variable Variance Parameters

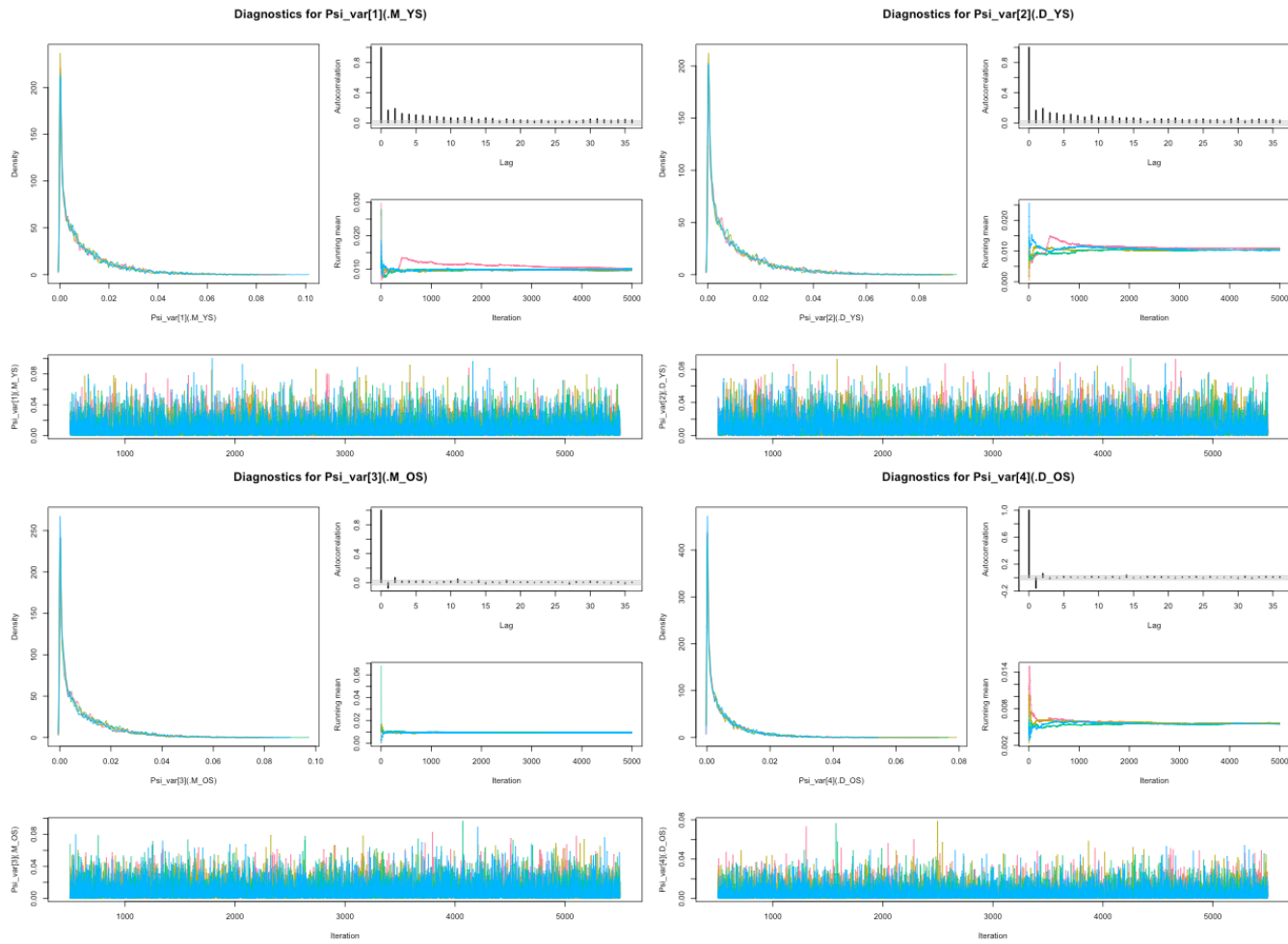


Figure 35. Model 1a MCMC Diagnostic Plots of Latent Variable Variance Parameters

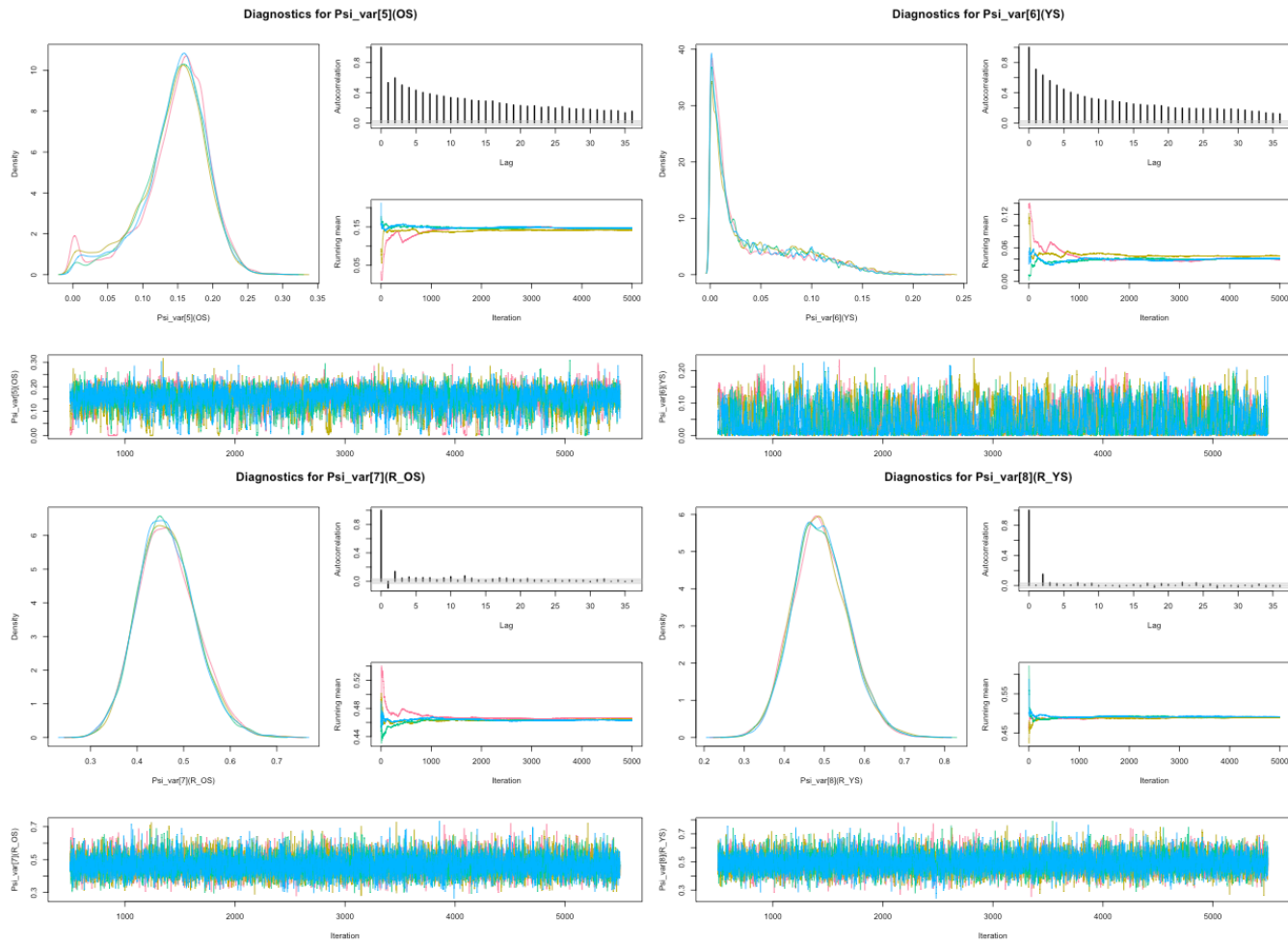


Figure 36. Model 1a MCMC Diagnostic Plots of Latent Variable Variance Parameters

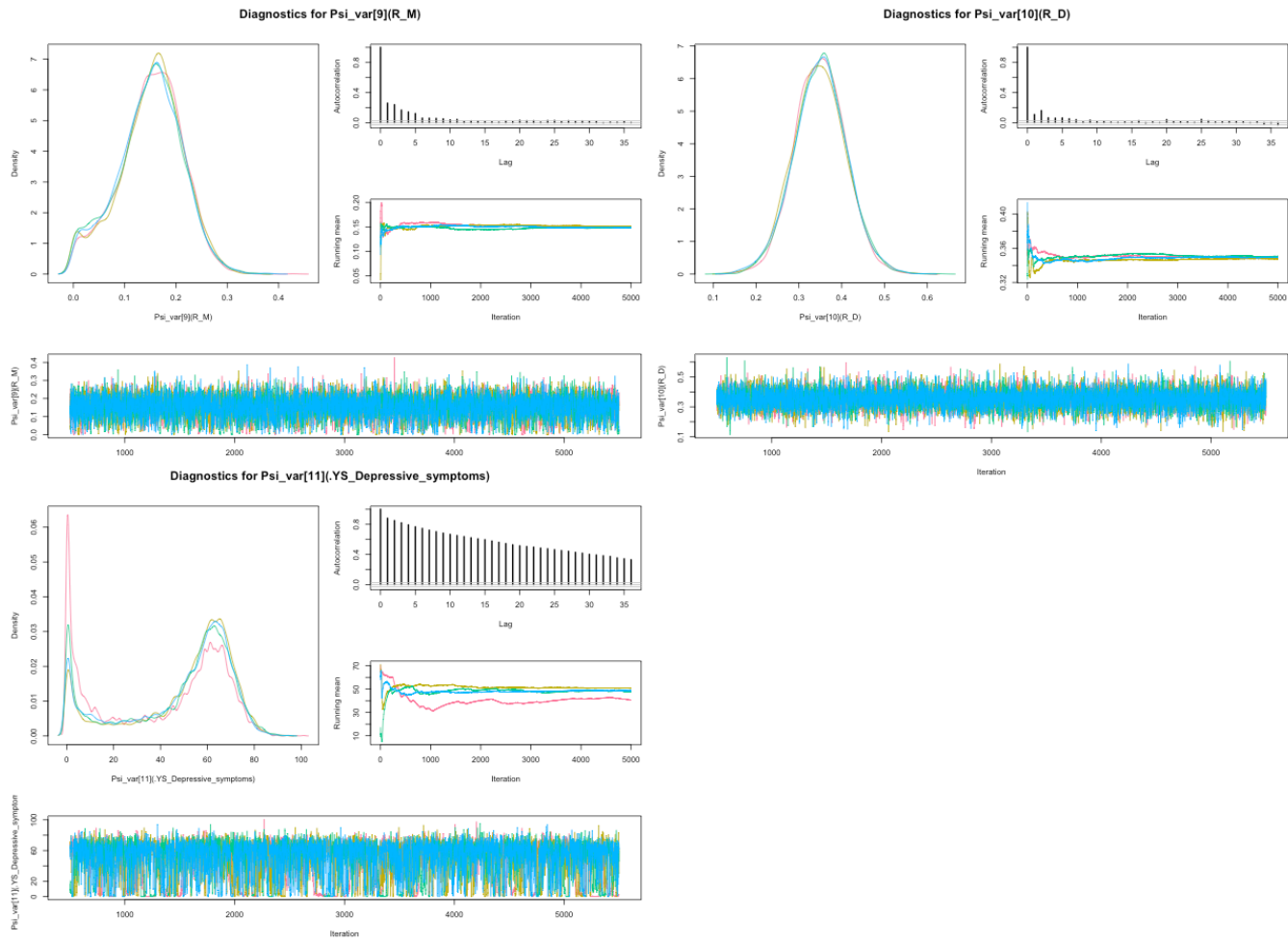


Figure 37. Model 1a MCMC Diagnostic Plots of Latent Variable Variance Parameters

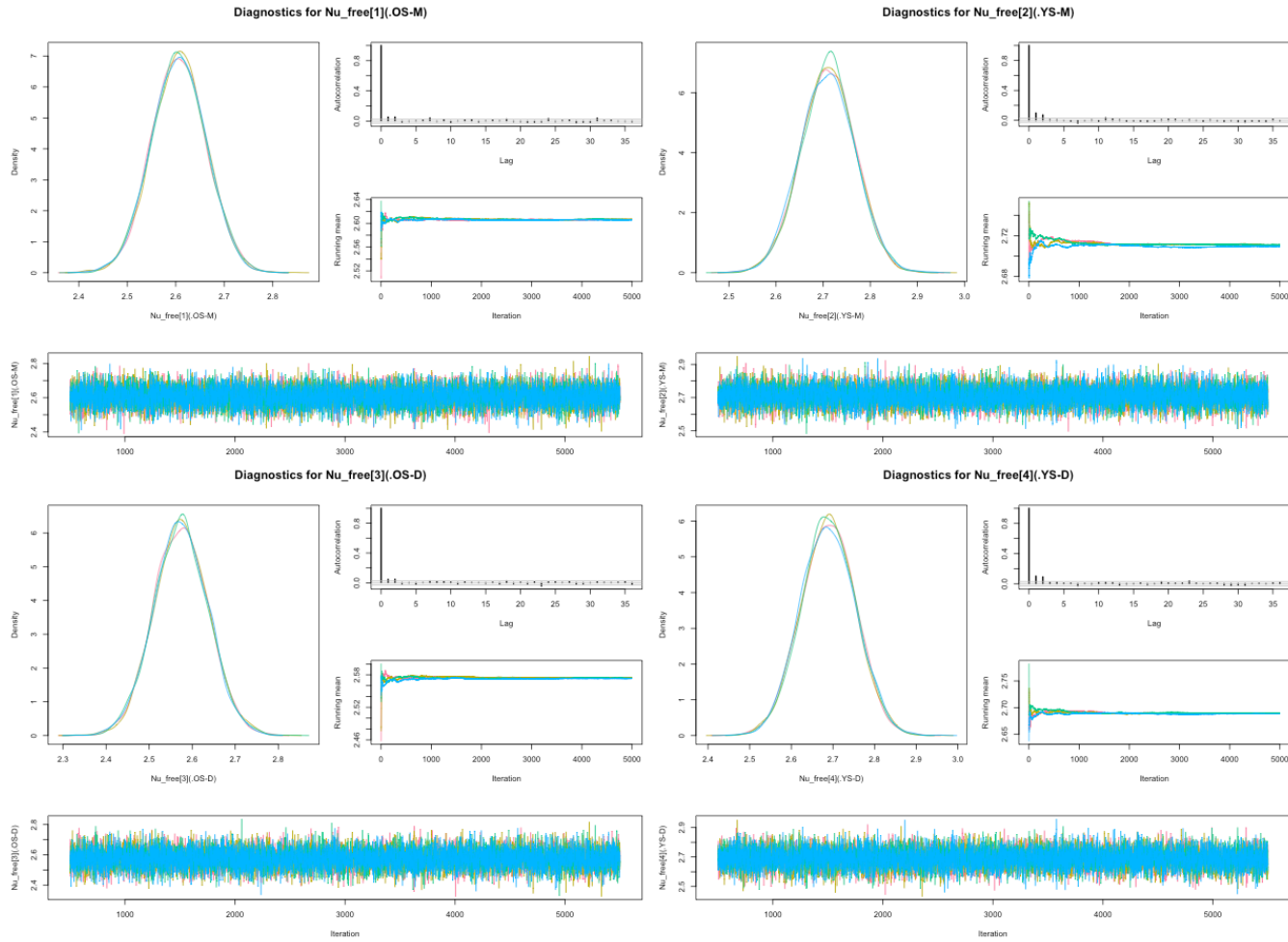


Figure 38. Model 1a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

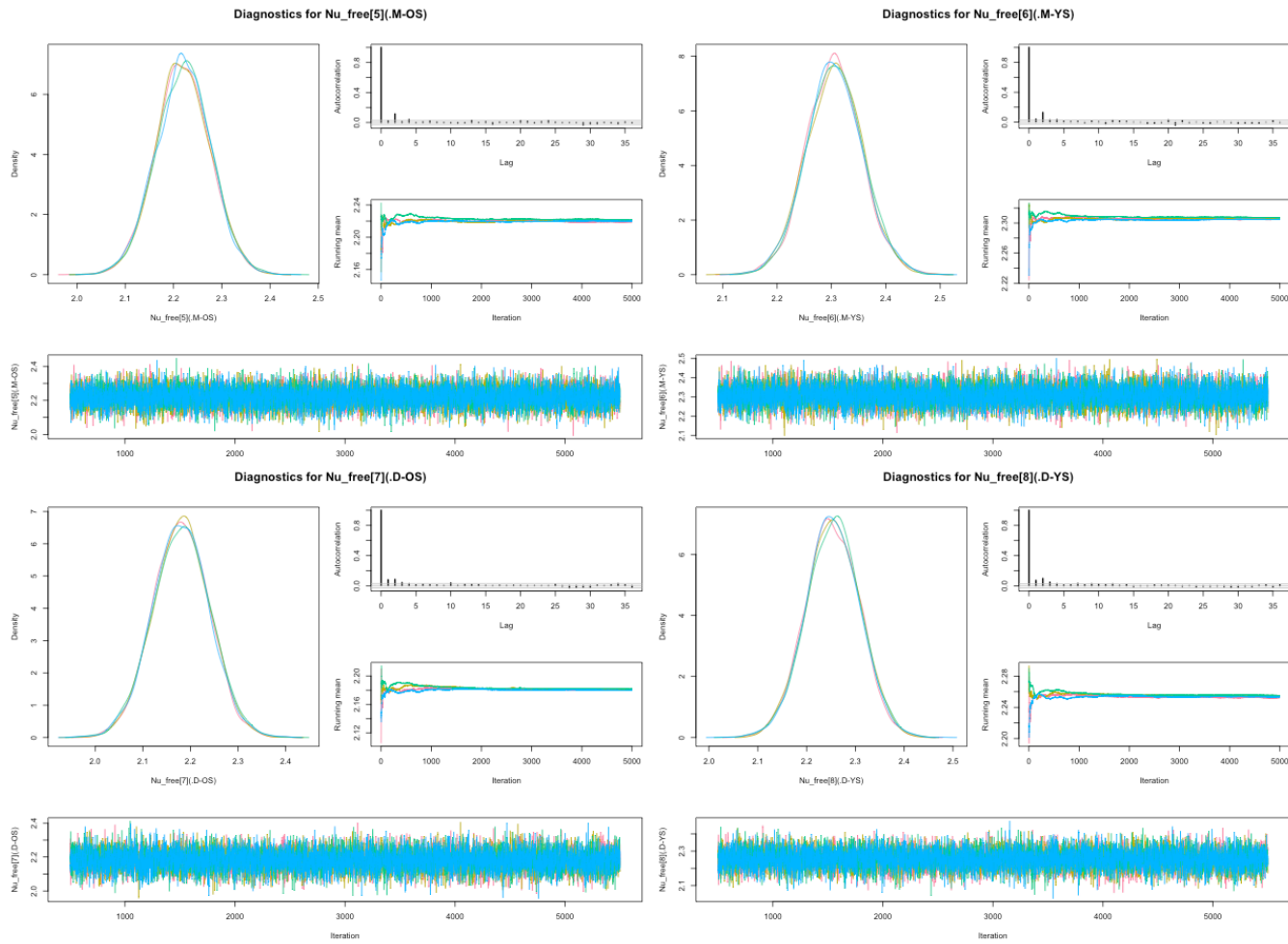


Figure 39. Model 1a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

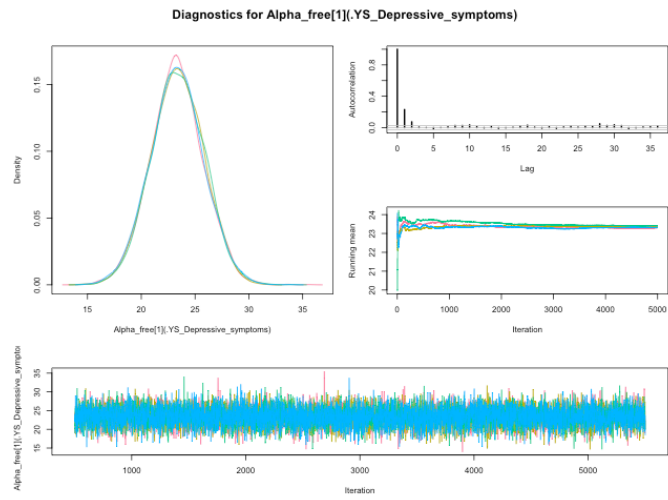


Figure 40. *Model 1a MCMC Diagnostic Plot of Regression Intercept Parameter*

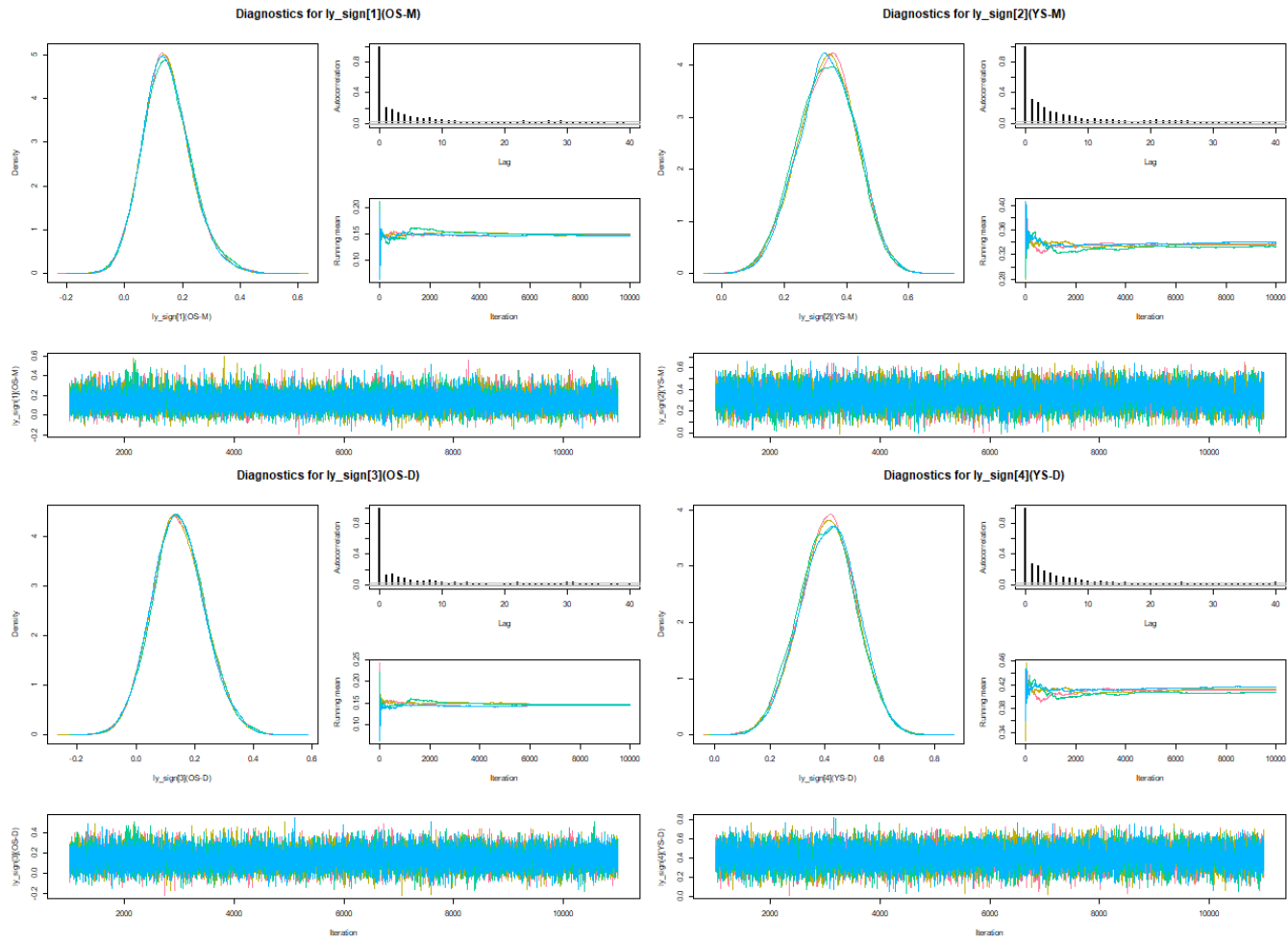


Figure 41. Model 1b MCMC Diagnostic Plots of Factor Loading Parameters

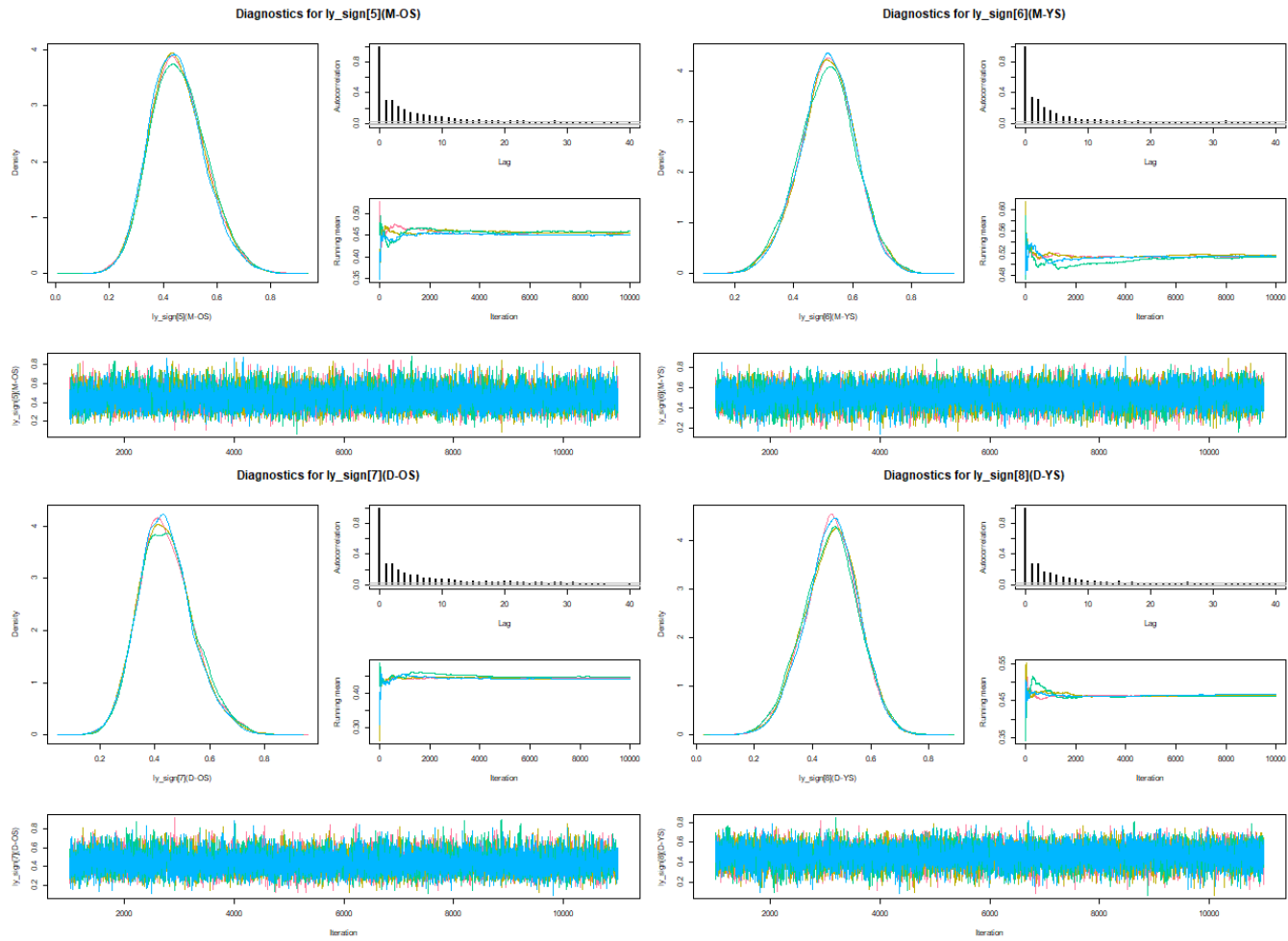


Figure 42. Model 1b MCMC Diagnostic Plots of Factor Loading Parameters

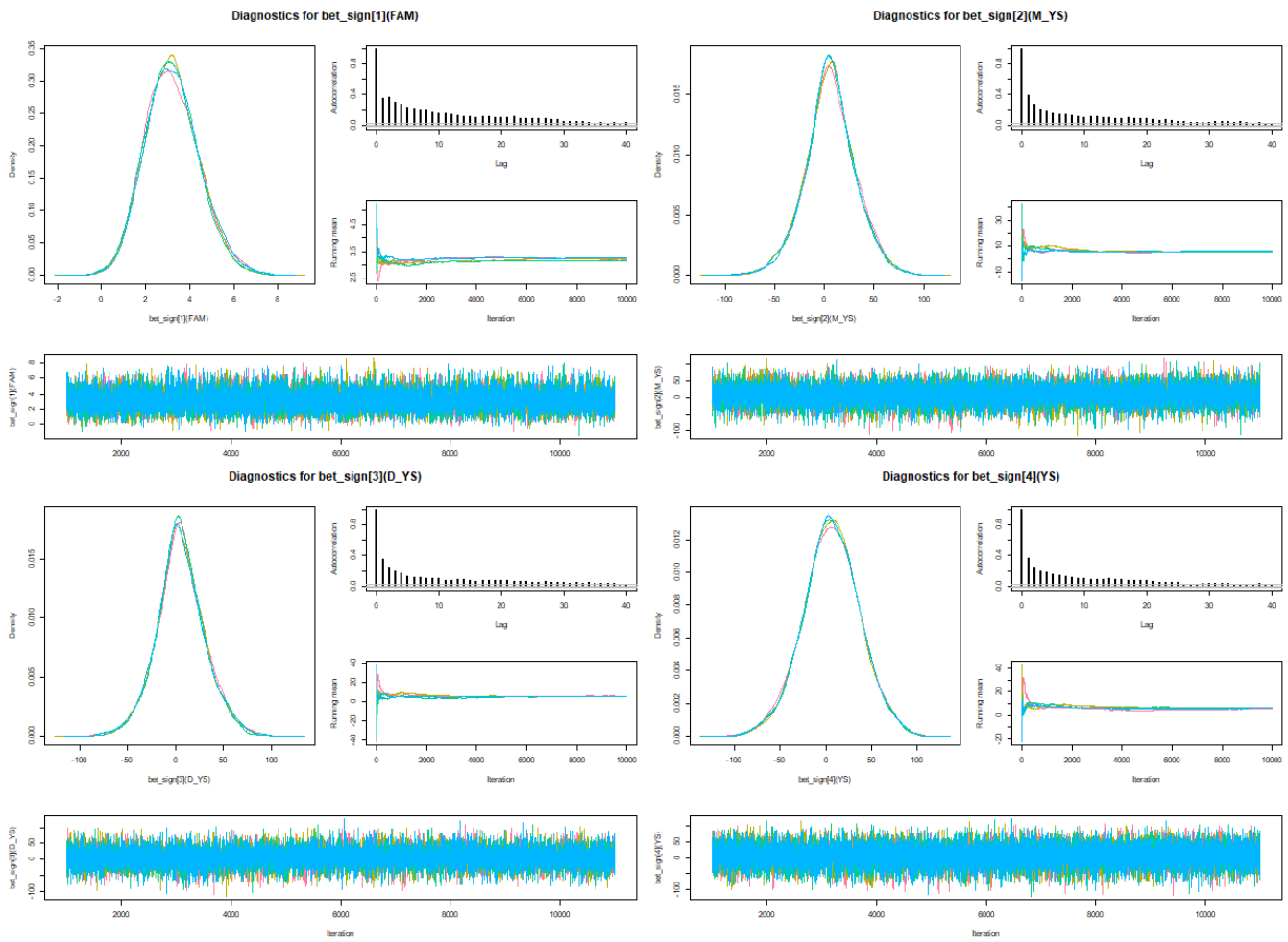


Figure 43. Model 1b MCMC Diagnostic Plots of Regression Coefficient Parameters

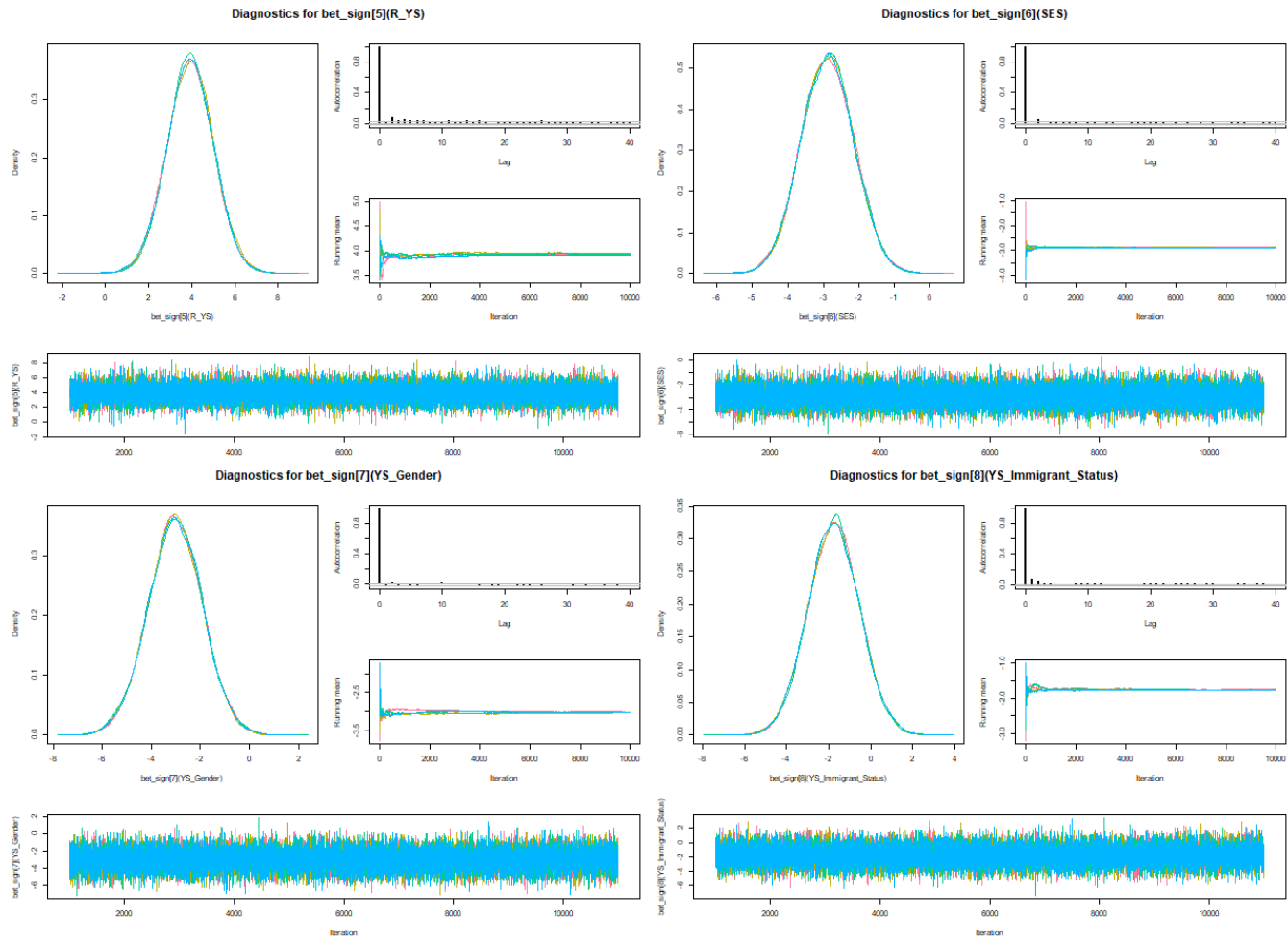


Figure 44. Model 1b MCMC Diagnostic Plots of Regression Coefficient Parameters

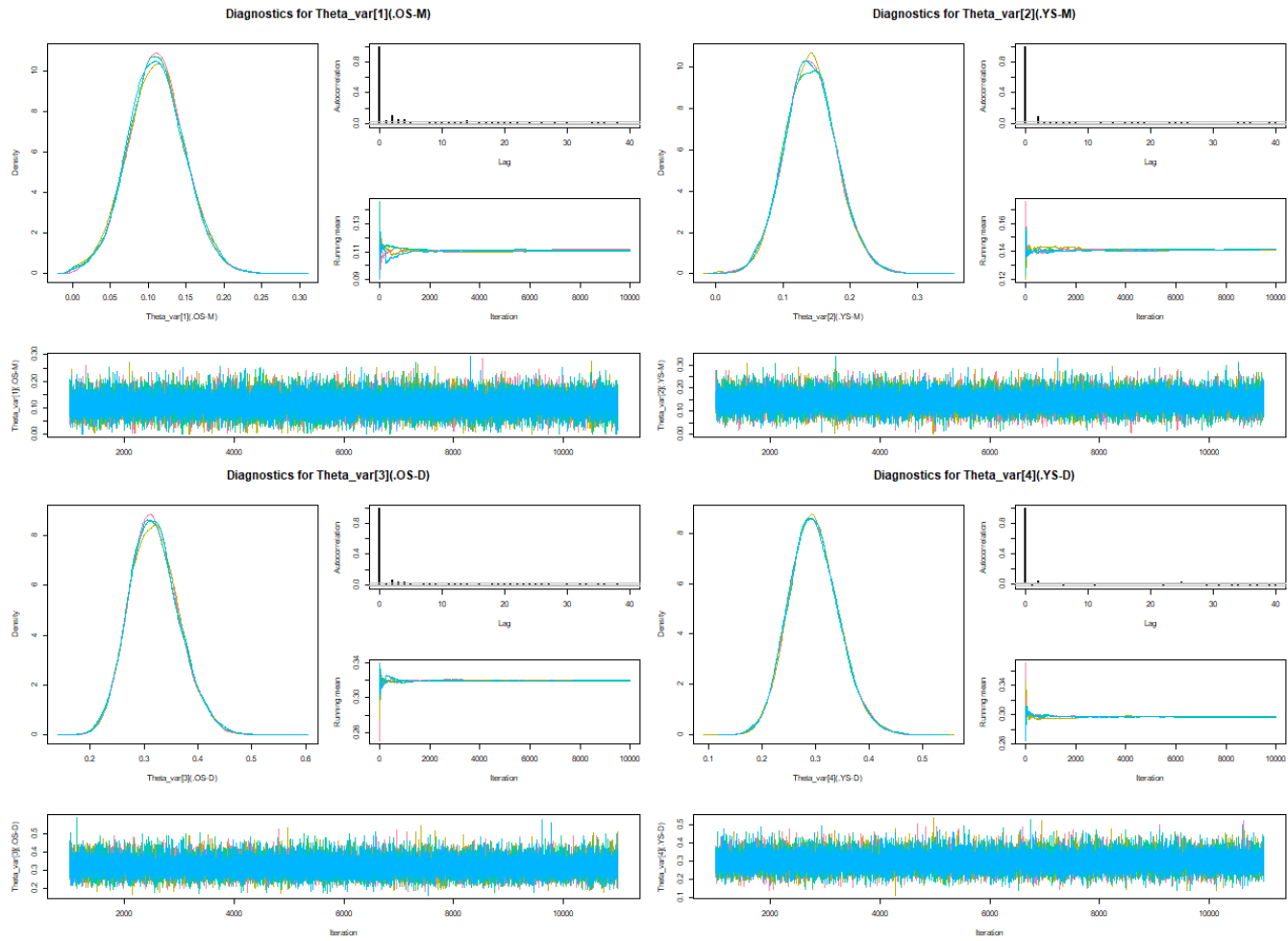


Figure 45. Model 1b MCMC Diagnostic Plots of Measured Variable Variance Parameters

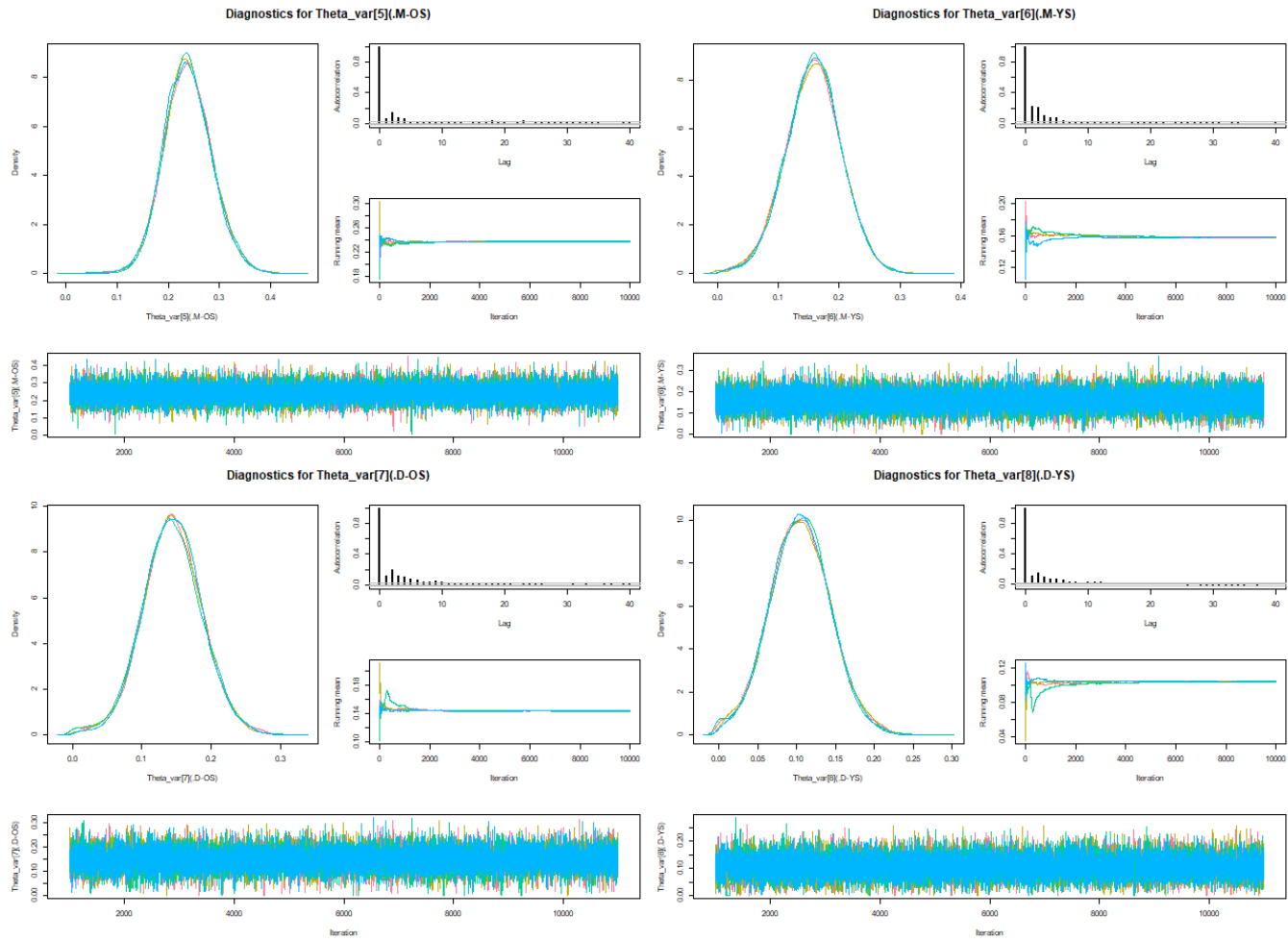


Figure 46. Model 1b MCMC Diagnostic Plots of Measured Variable Variance Parameters

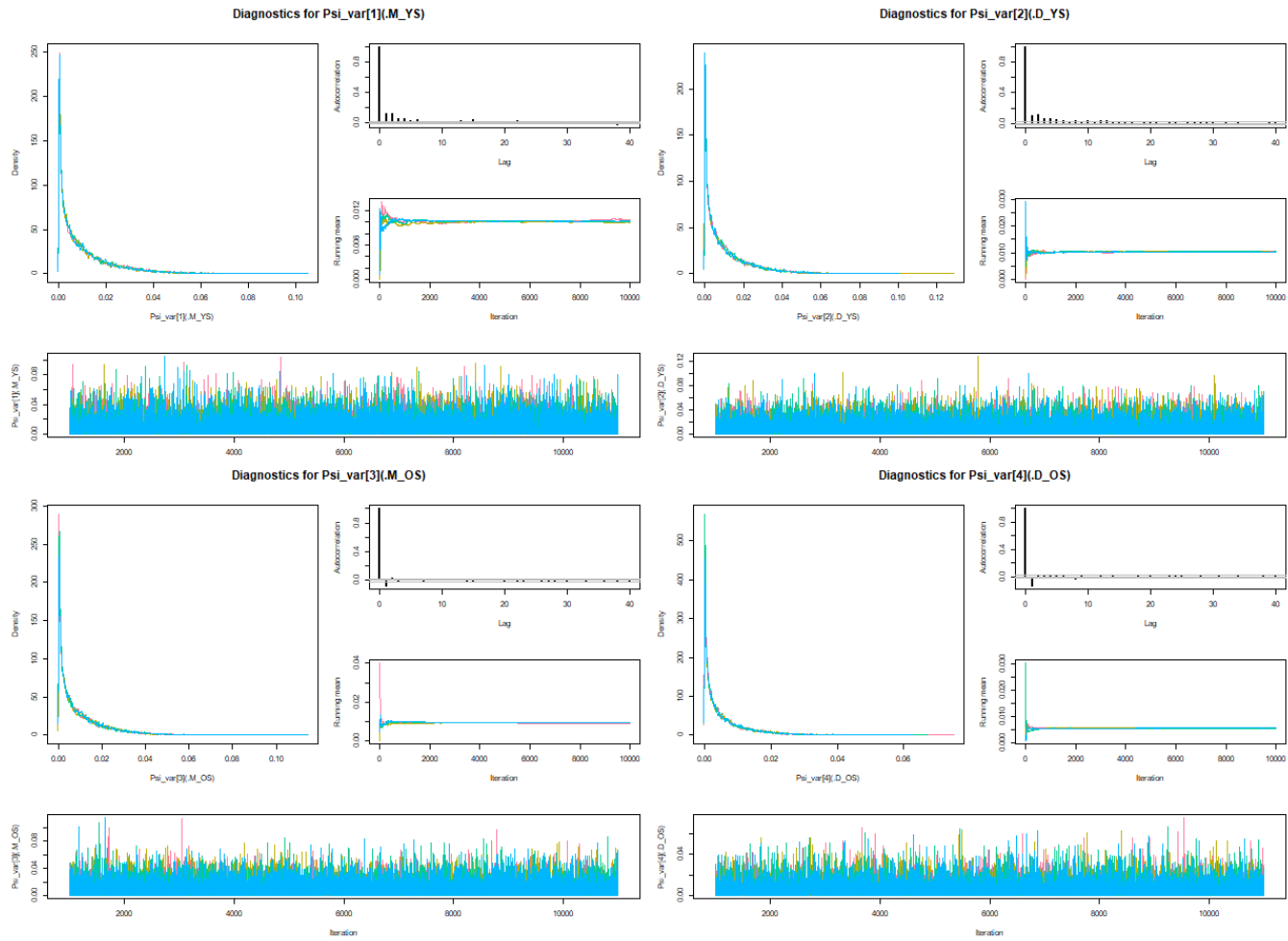


Figure 47. Model 1b MCMC Diagnostic Plots of Latent Variable Variance Parameters

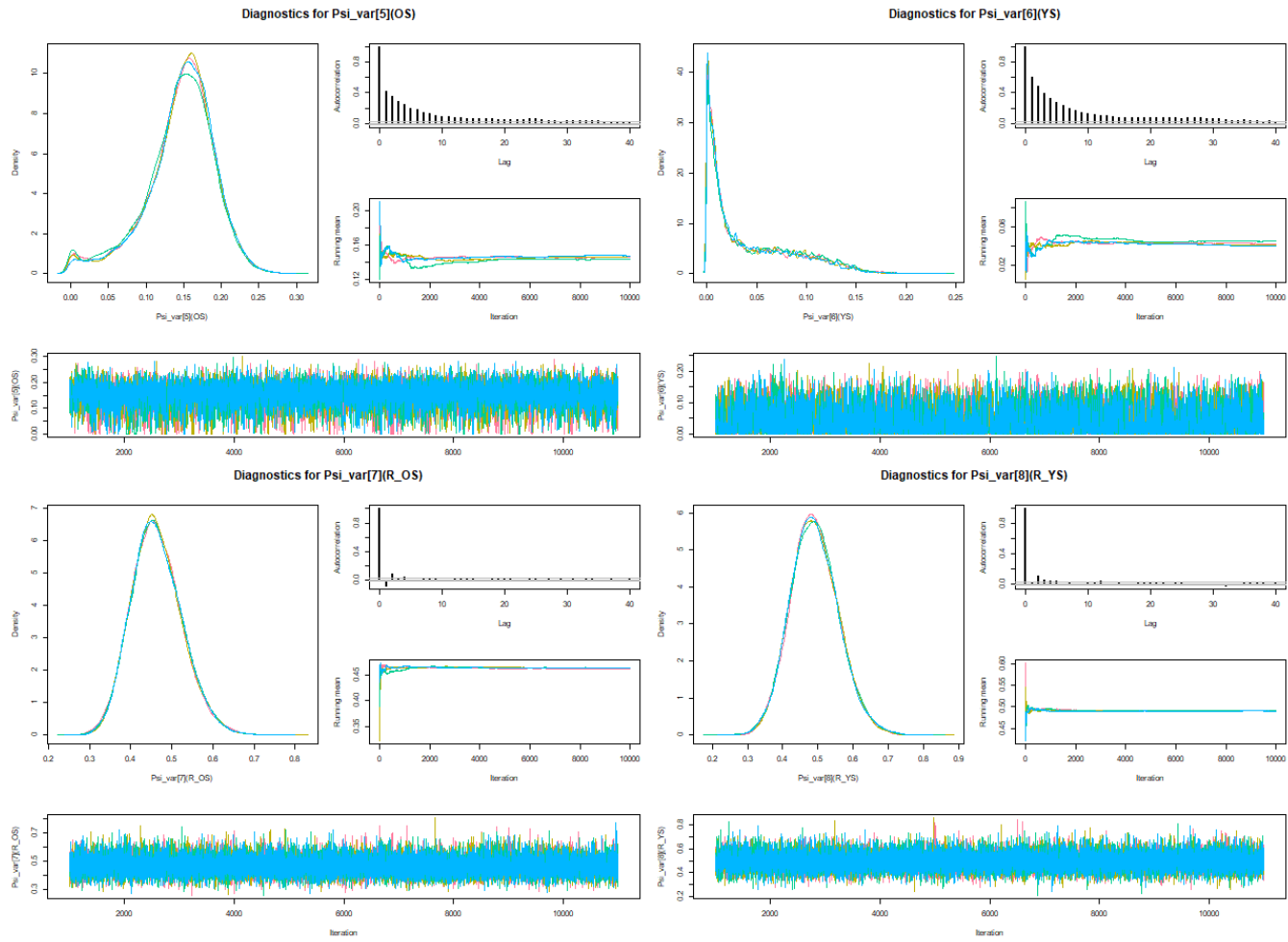


Figure 48. Model 1b MCMC Diagnostic Plots of Latent Variable Variance Parameters

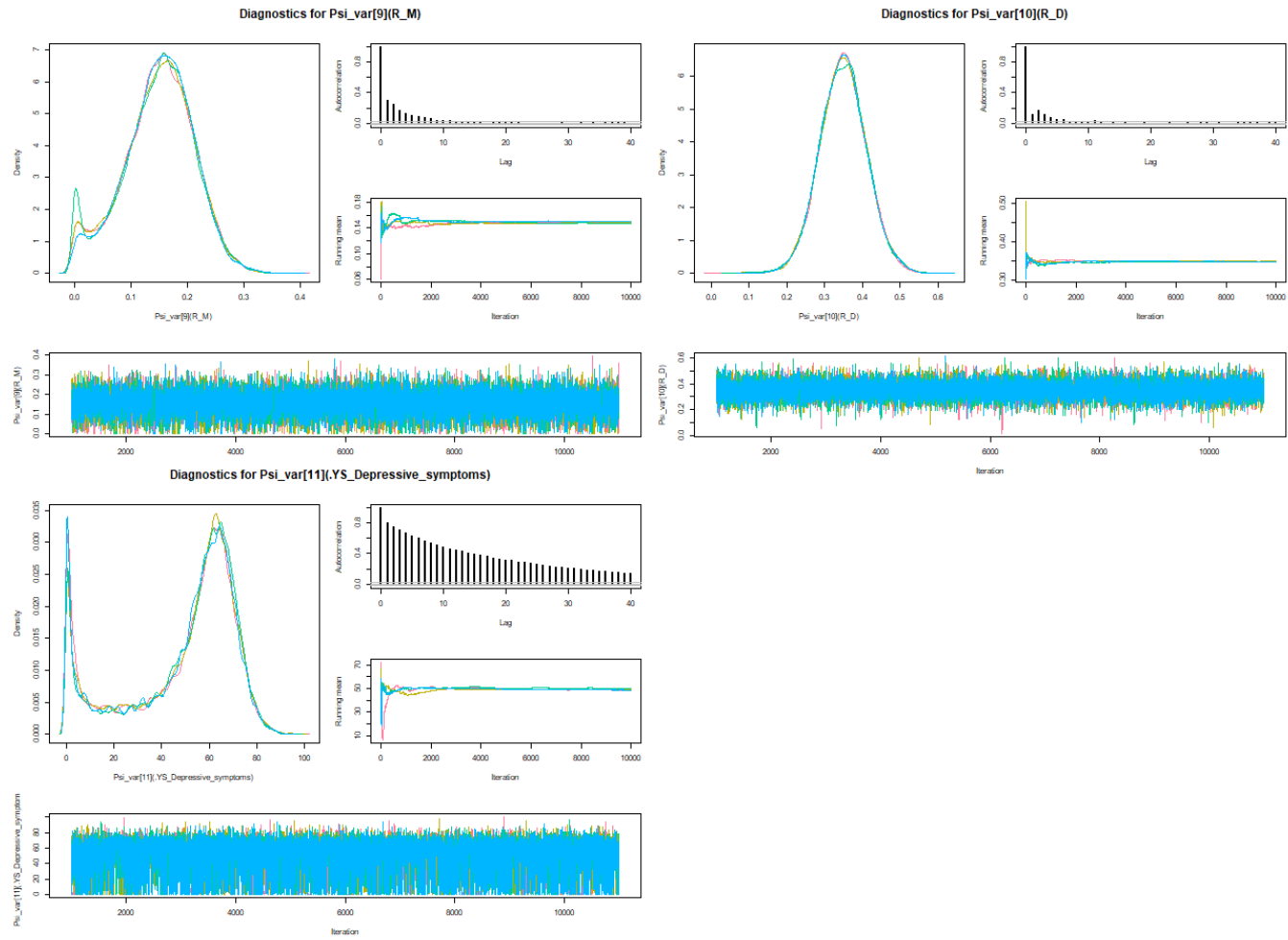


Figure 49. Model 1b MCMC Diagnostic Plots of Latent Variable Variance Parameters

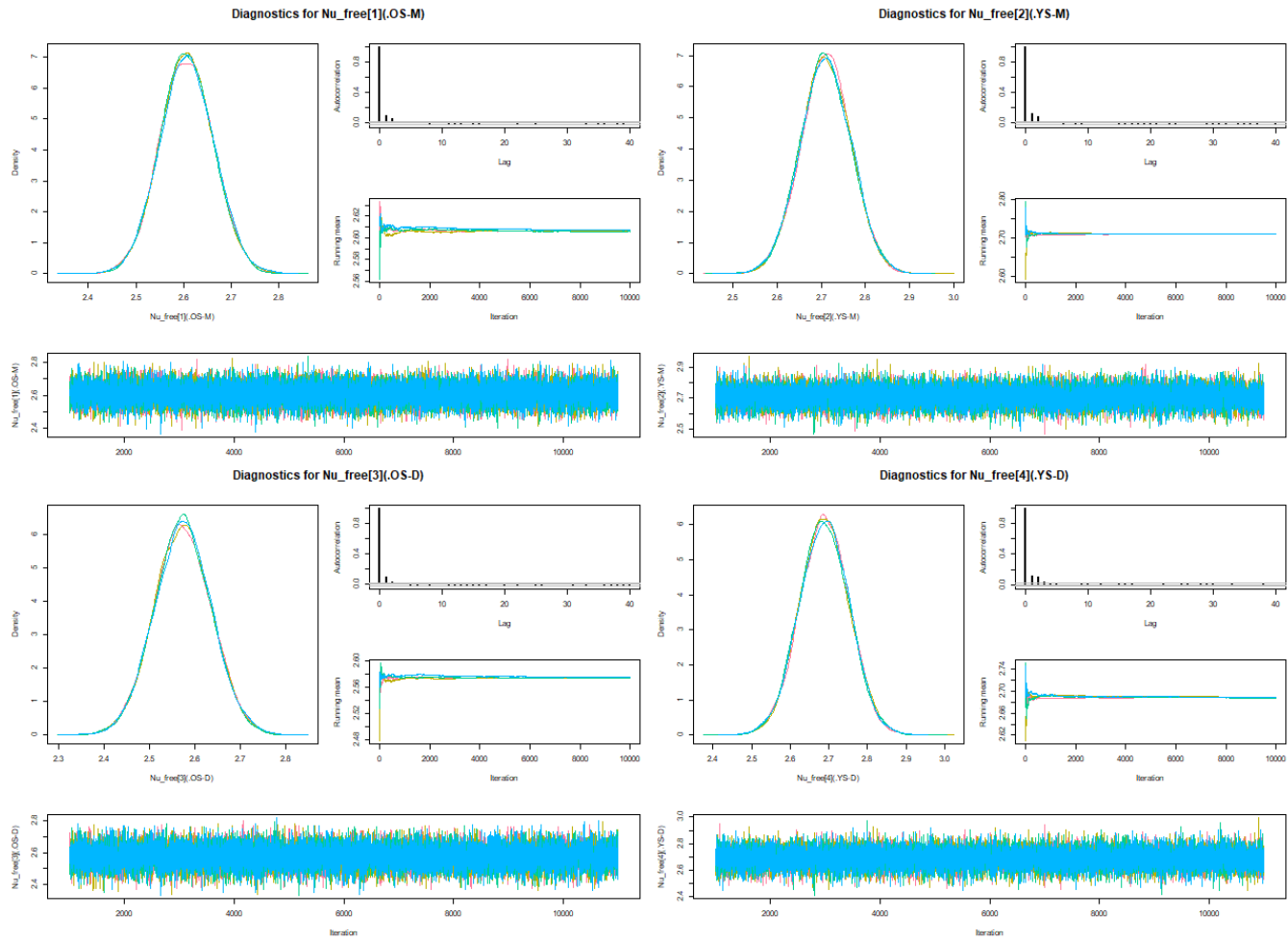


Figure 50. Model 1b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

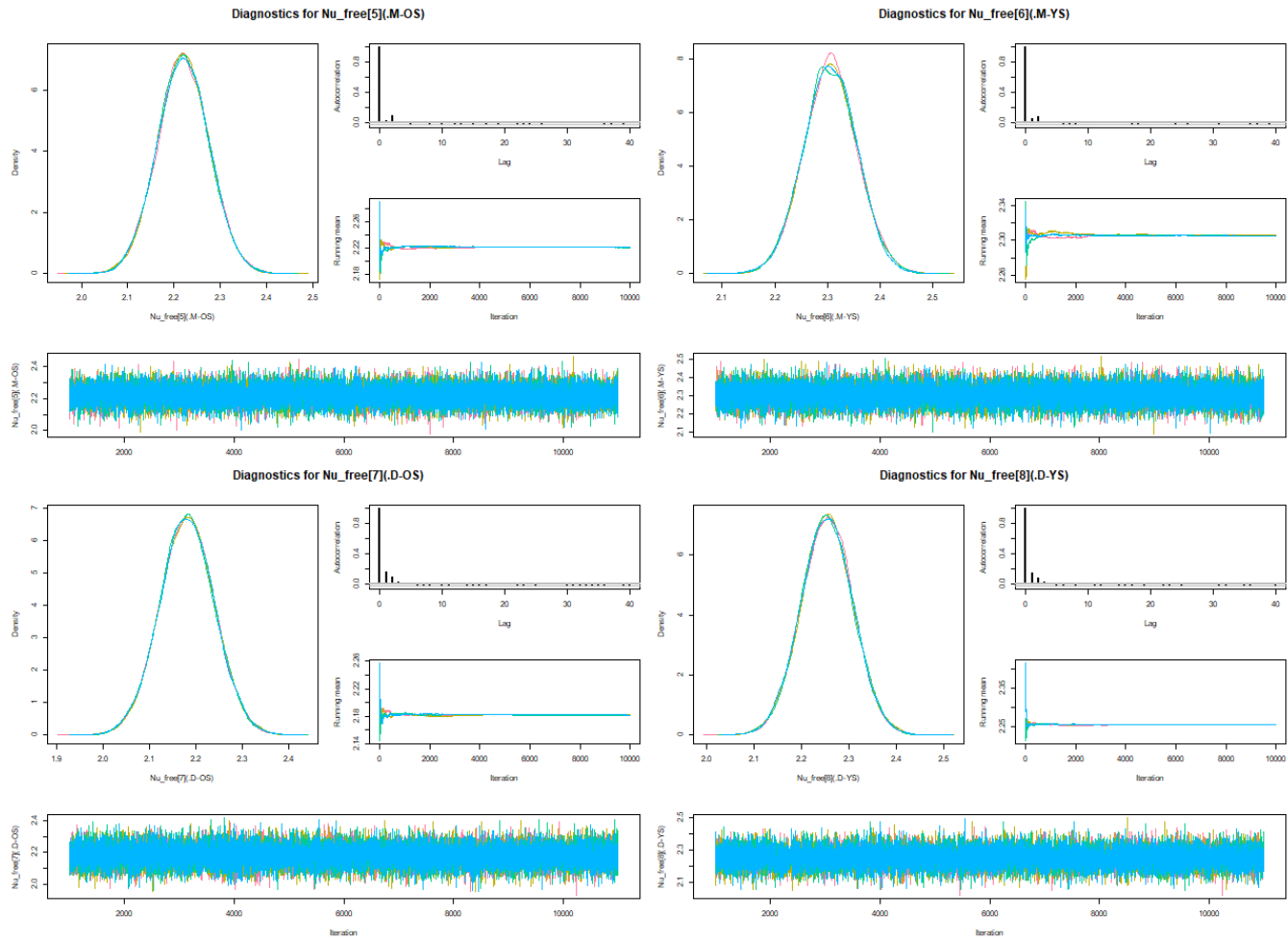


Figure 51. Model 1b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

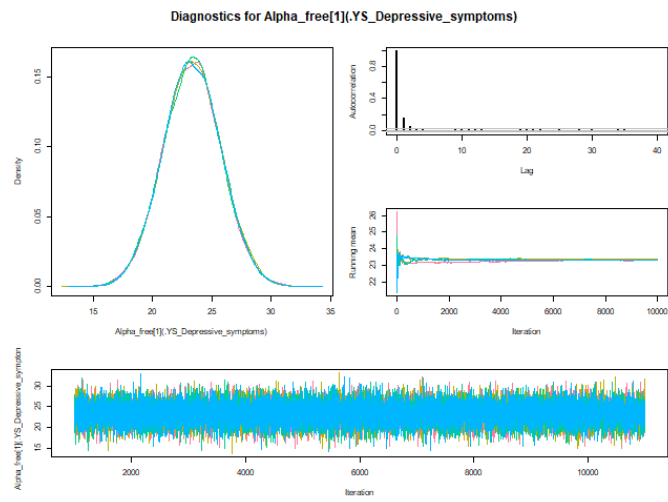


Figure 52. *Model 1b MCMC Diagnostic Plots of Regression Intercept Parameter*

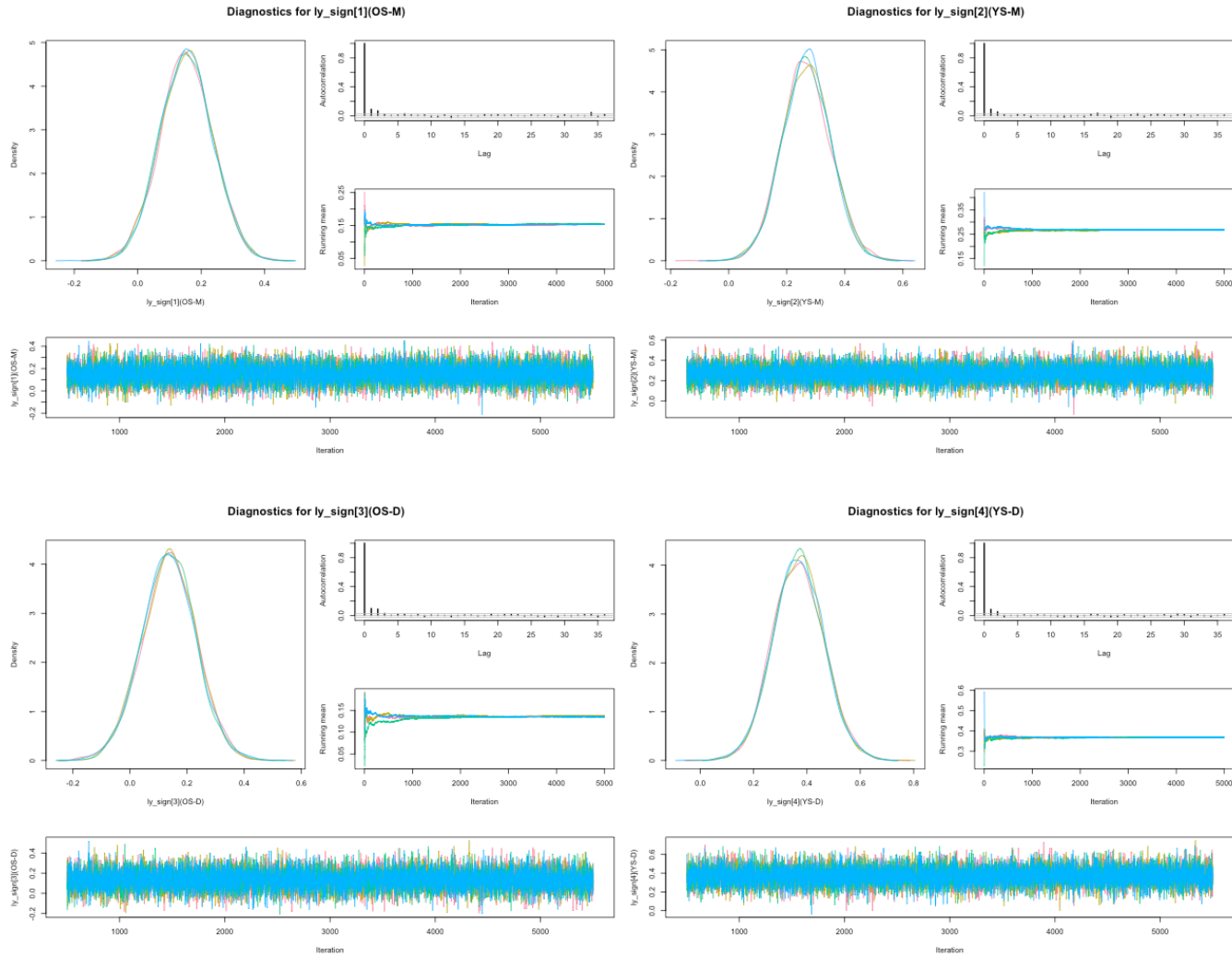


Figure 53. Model 1 MCMC Diagnostic Plots of Factor Loading Parameters

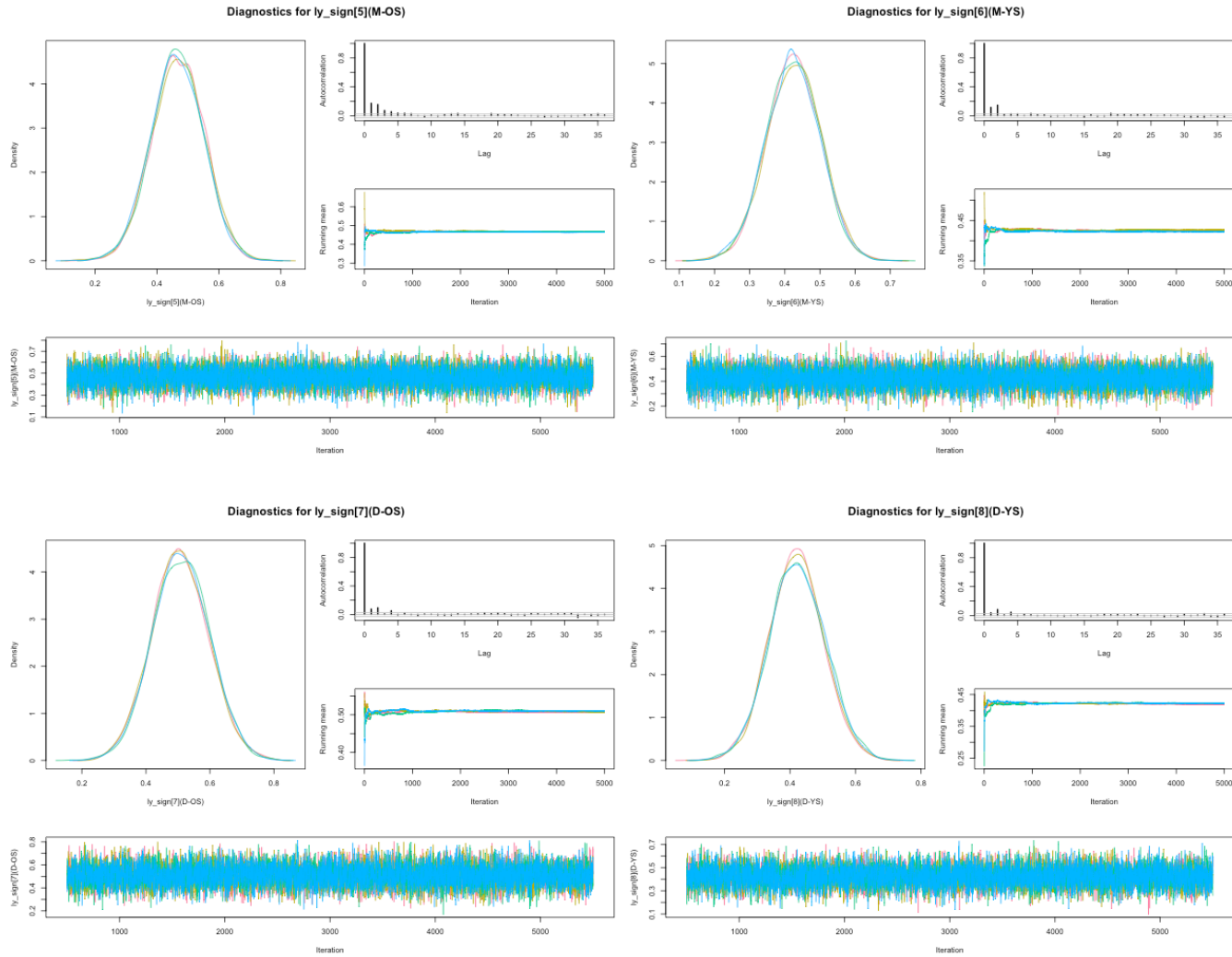


Figure 54. Model 1 MCMC Diagnostic Plots of Factor Loading Parameters

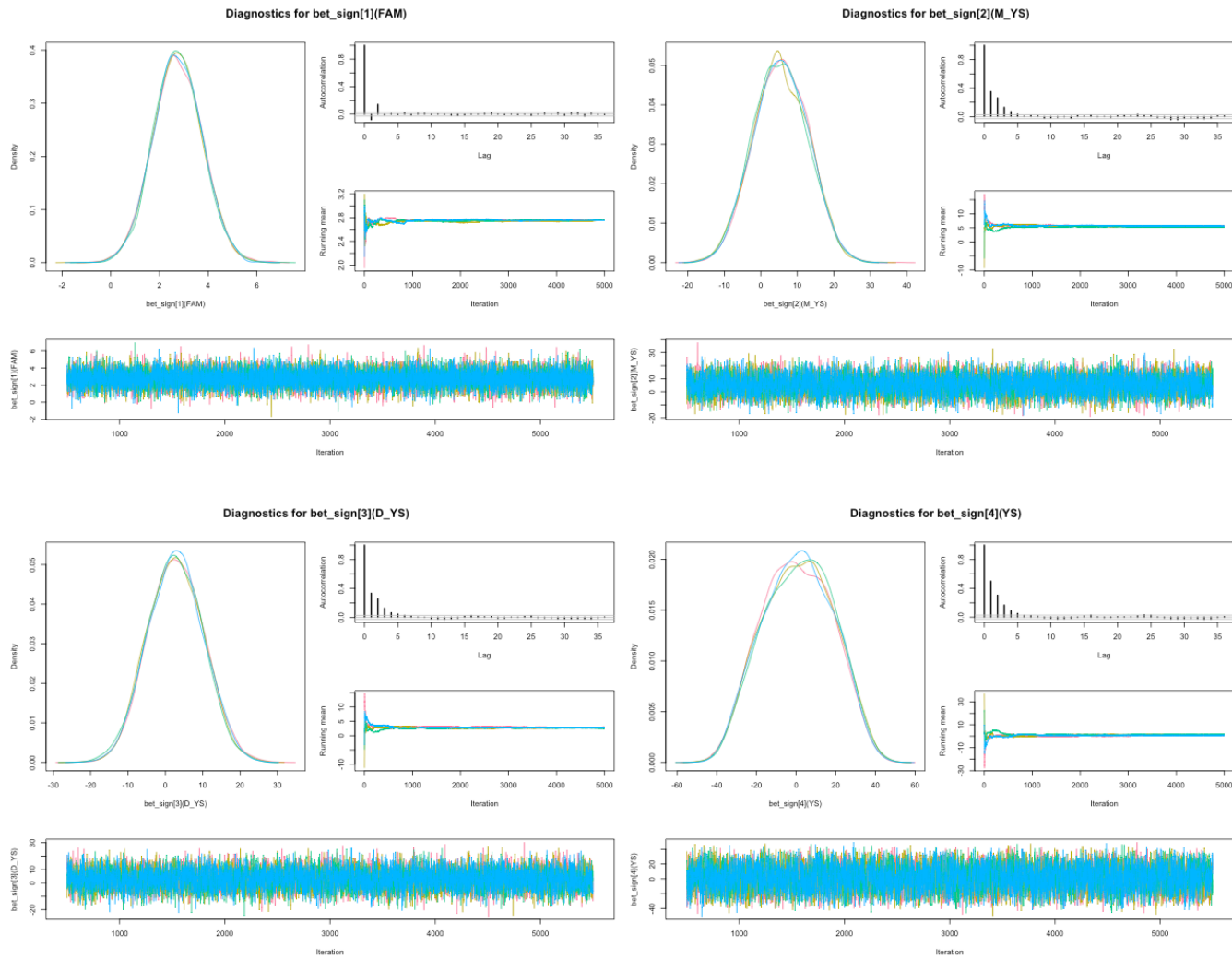


Figure 55. Model 1 MCMC Diagnostic Plots of Regression Coefficient Parameters

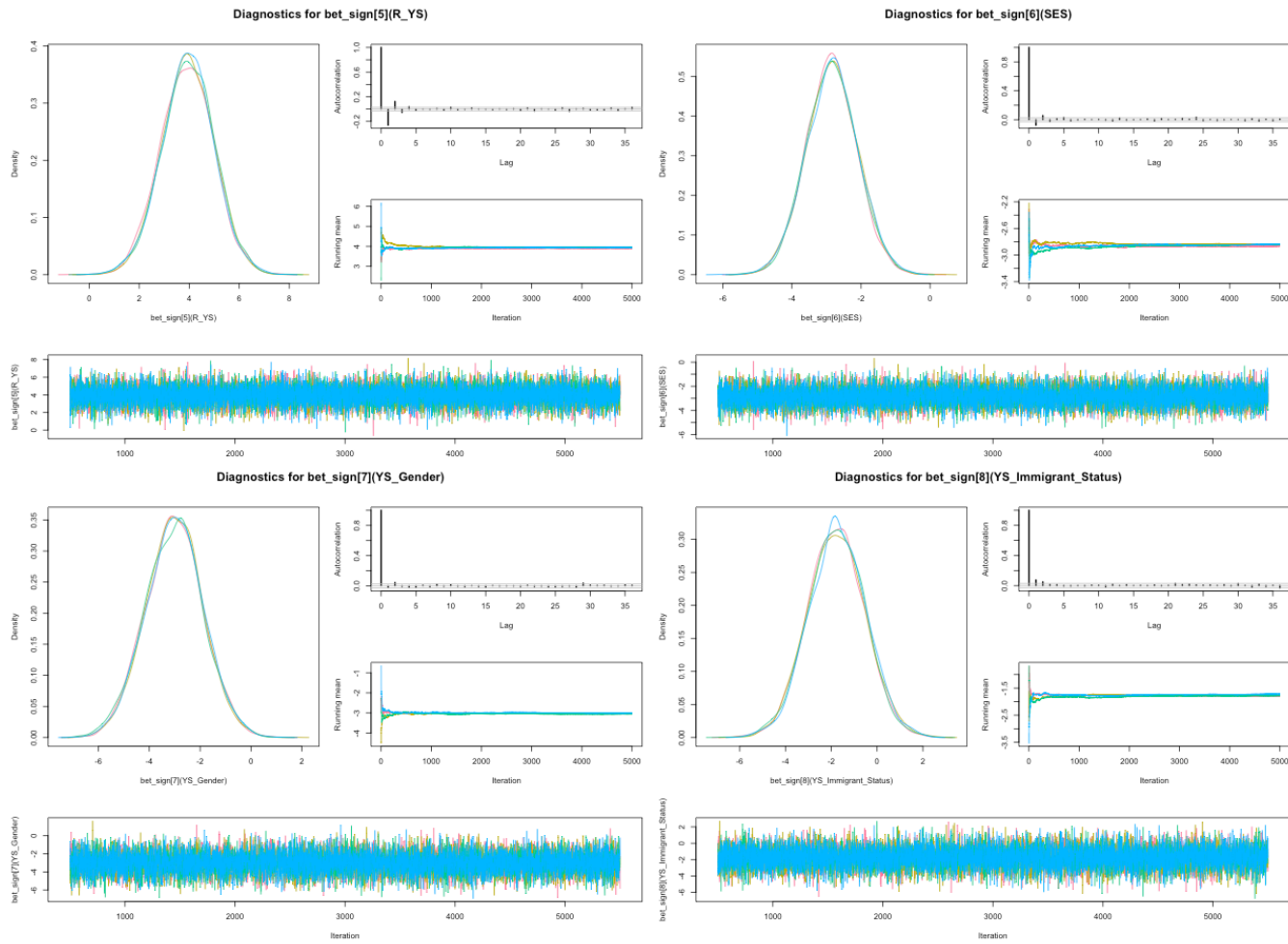


Figure 56. Model 1 MCMC Diagnostic Plots of Regression Coefficient Parameters

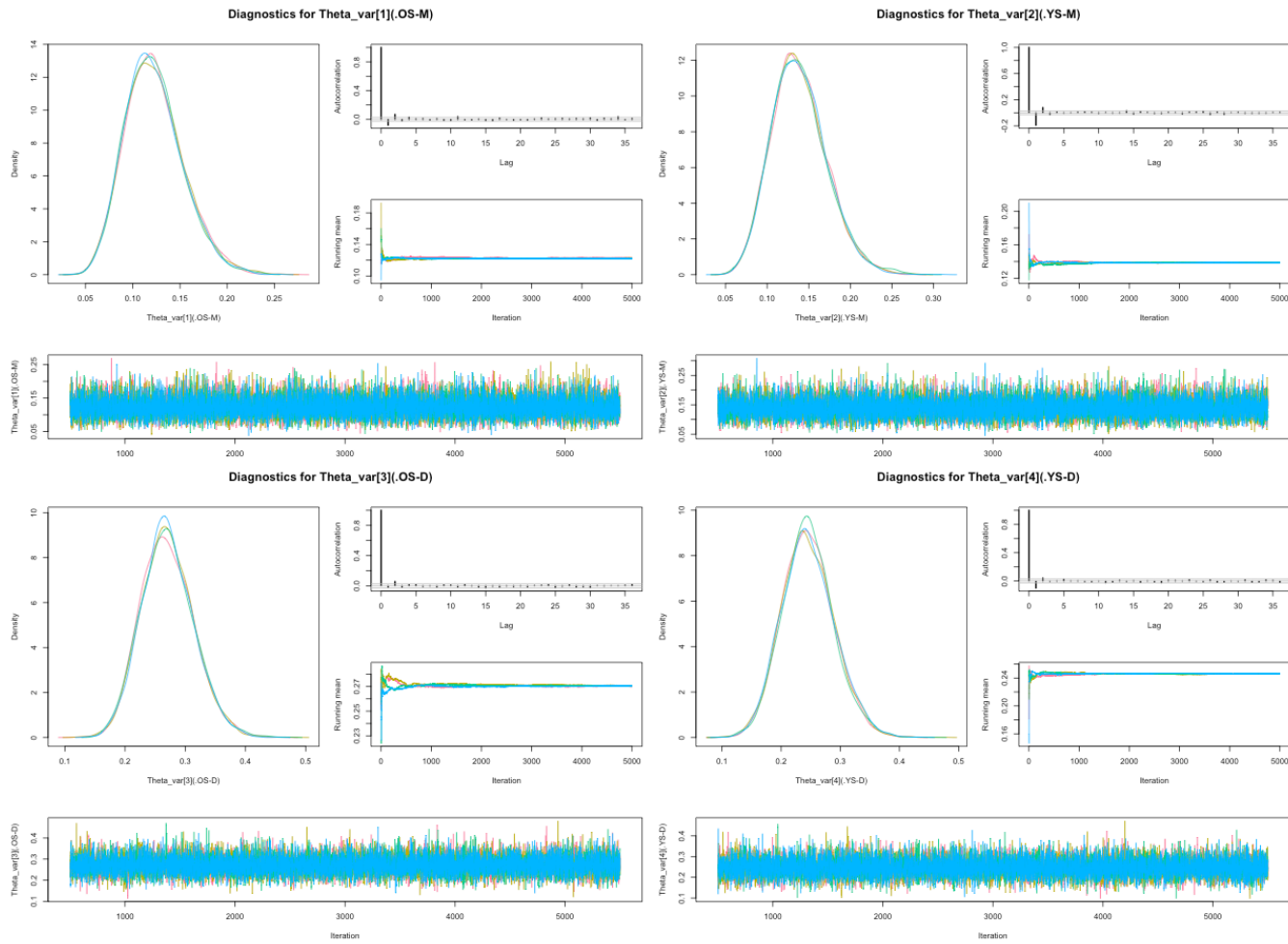


Figure 57. Model 1 MCMC Diagnostic Plots of Measured Variable Variance Parameters

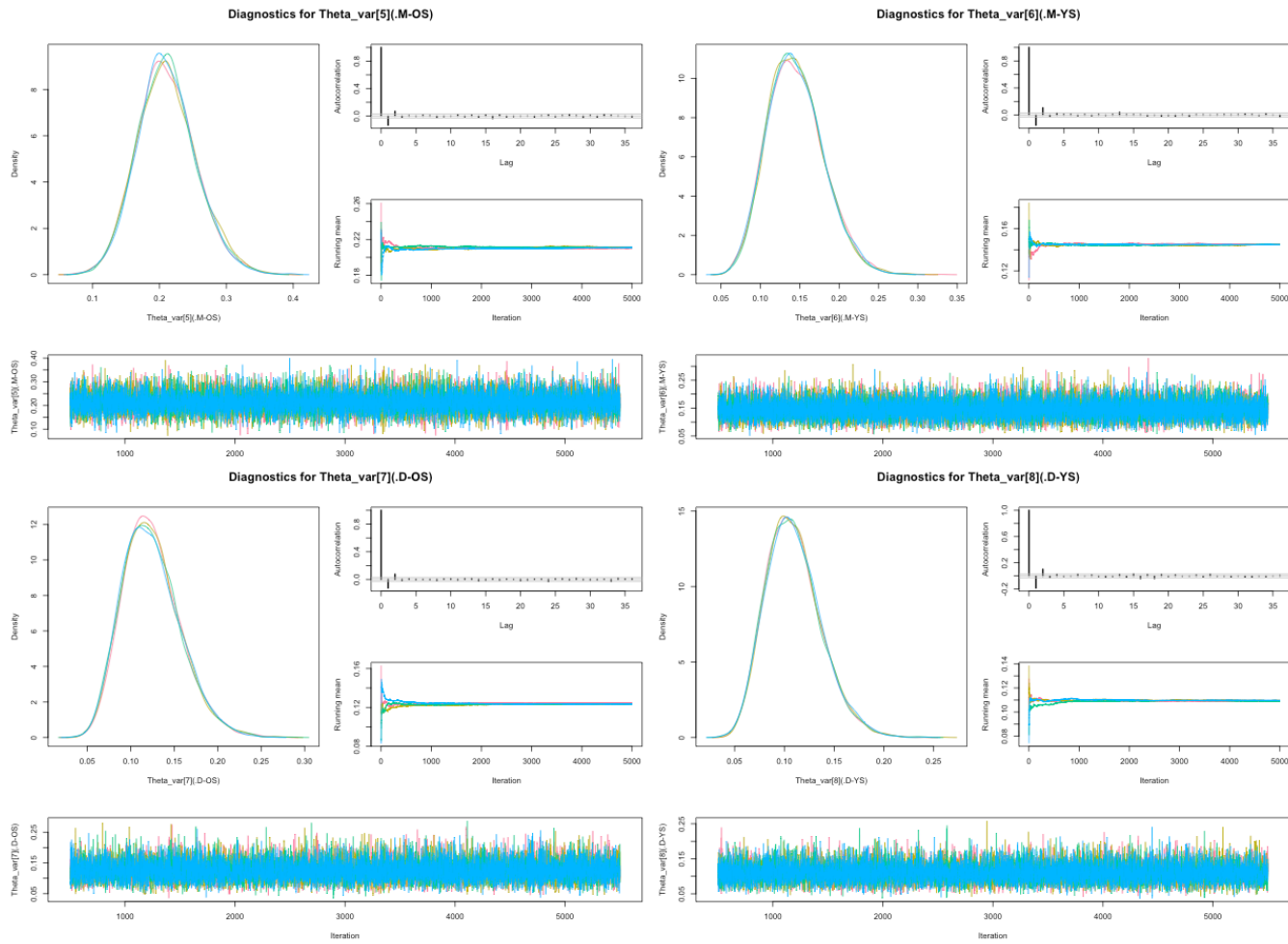


Figure 58. Model 1 MCMC Diagnostic Plots of Measured Variable Variance Parameters

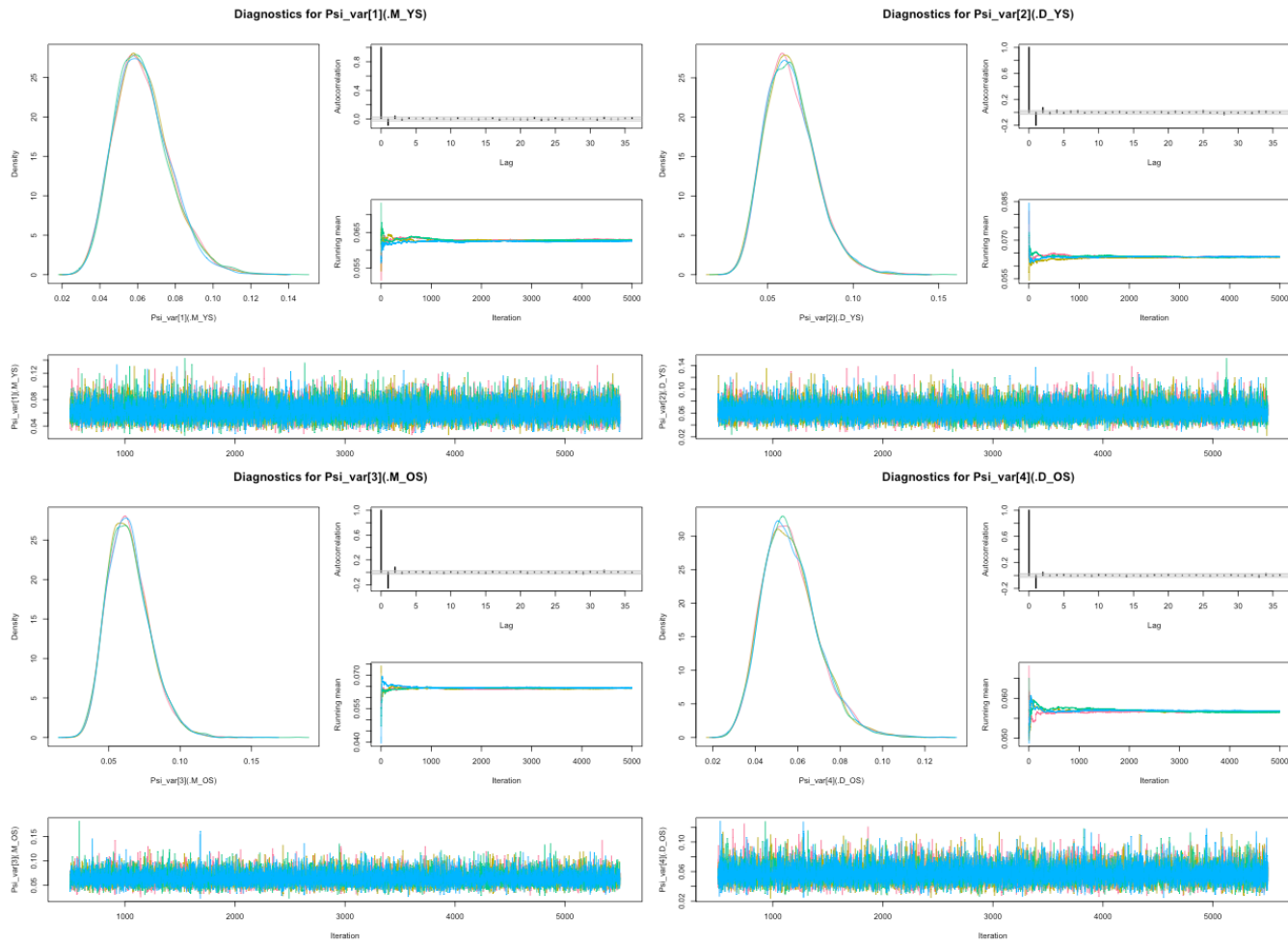


Figure 59. Model 1 MCMC Diagnostic Plots of Latent Variable Variance Parameters

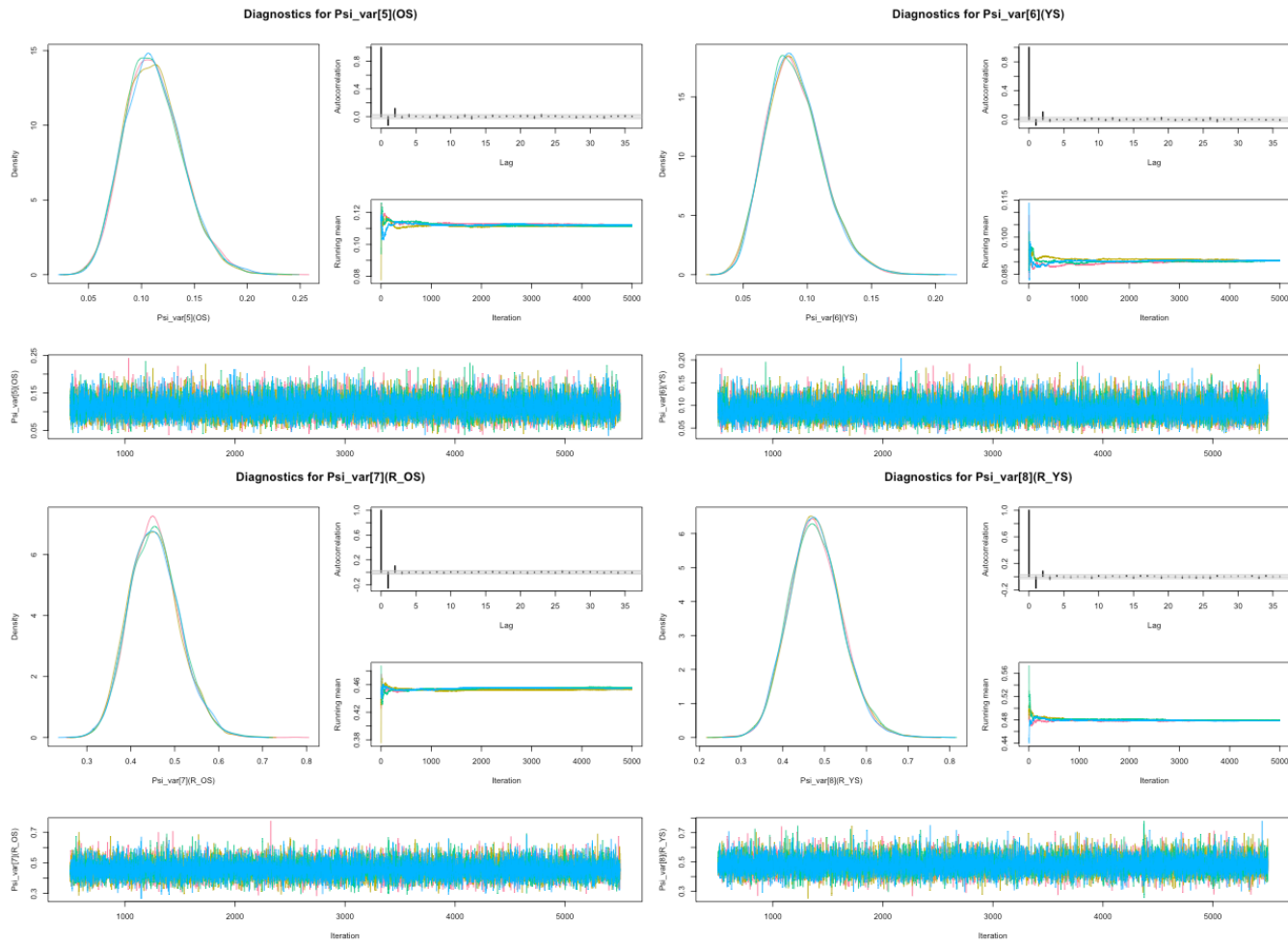


Figure 60. Model 1 MCMC Diagnostic Plots of Latent Variable Variance Parameters

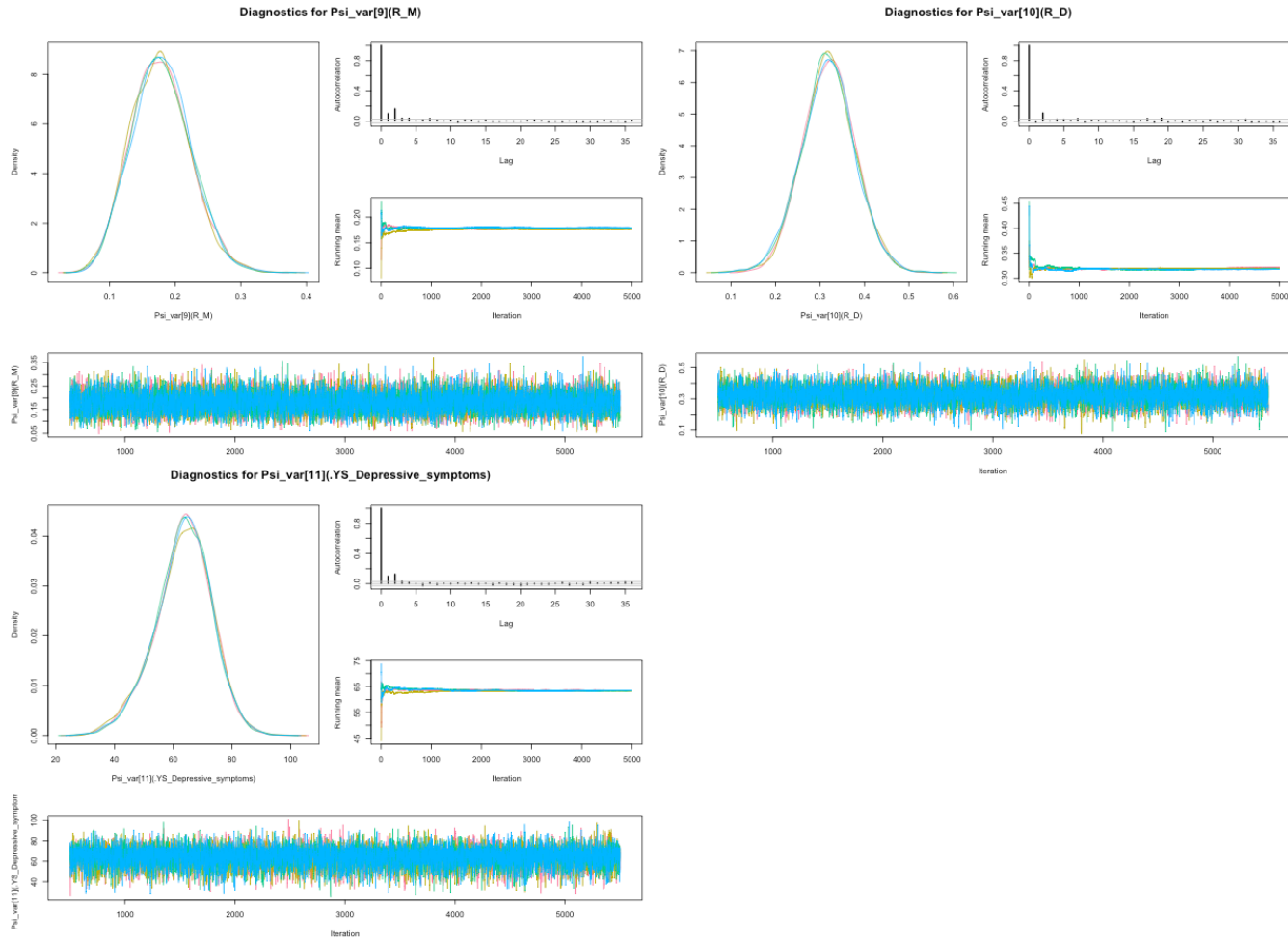


Figure 61. Model 1 MCMC Diagnostic Plots of Latent Variable Variance Parameters

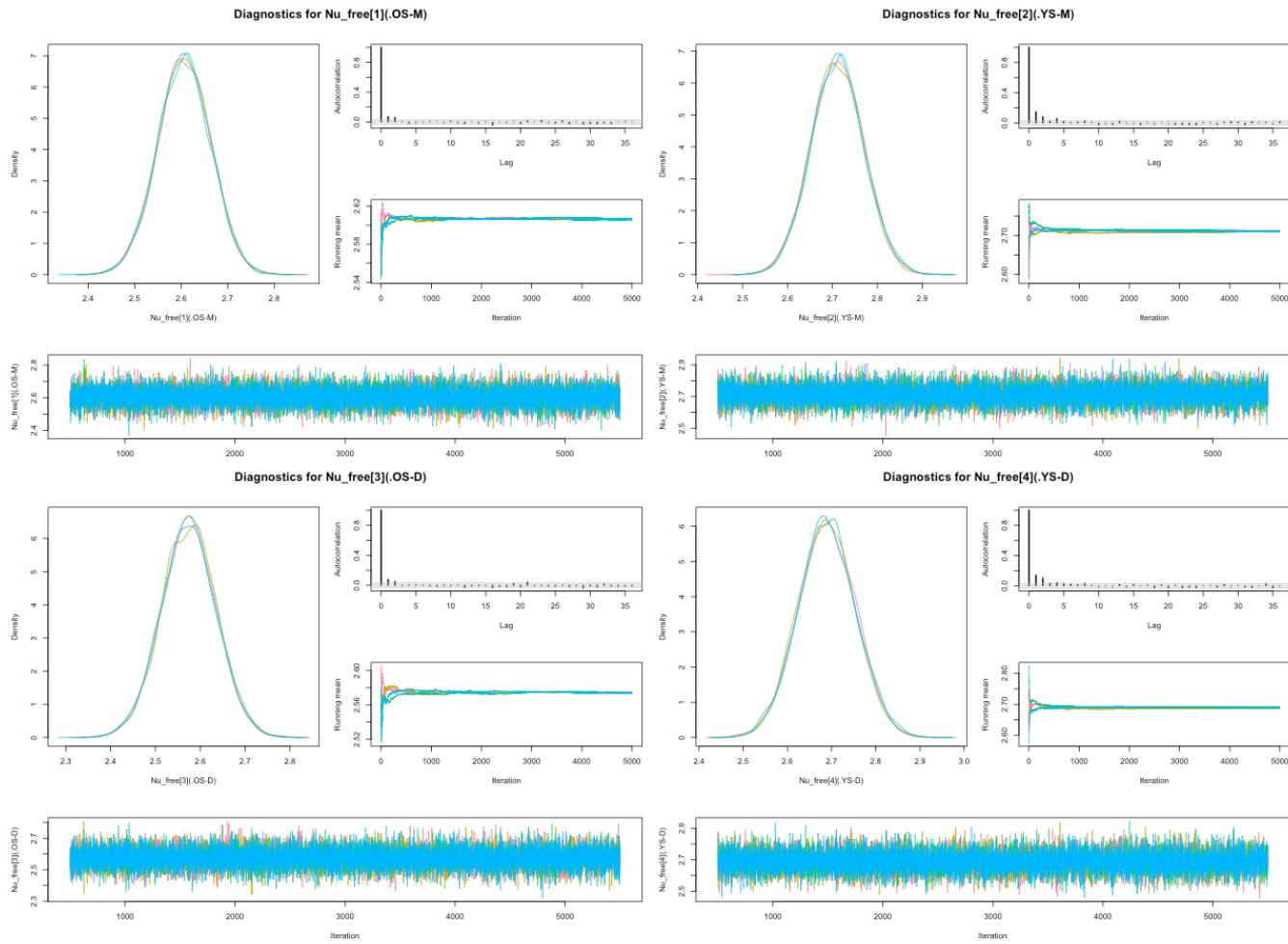


Figure 62. Model 1 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

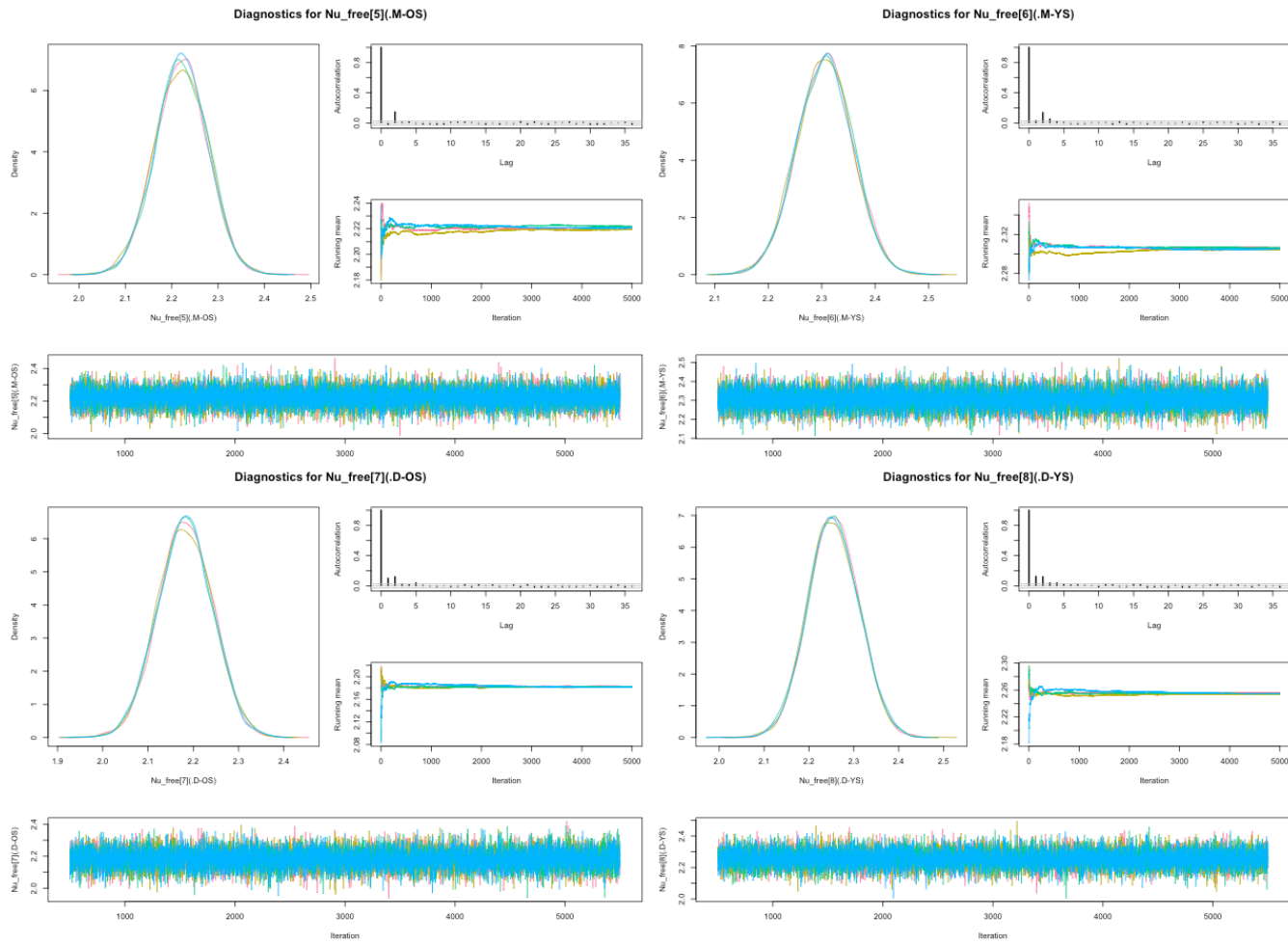


Figure 63. Model 1 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

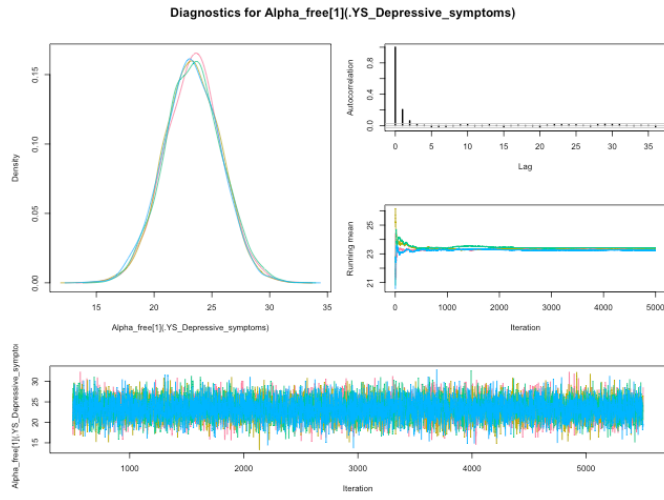


Figure 64. Model 1 MCMC Diagnostic Plots of Regression Intercept Parameter

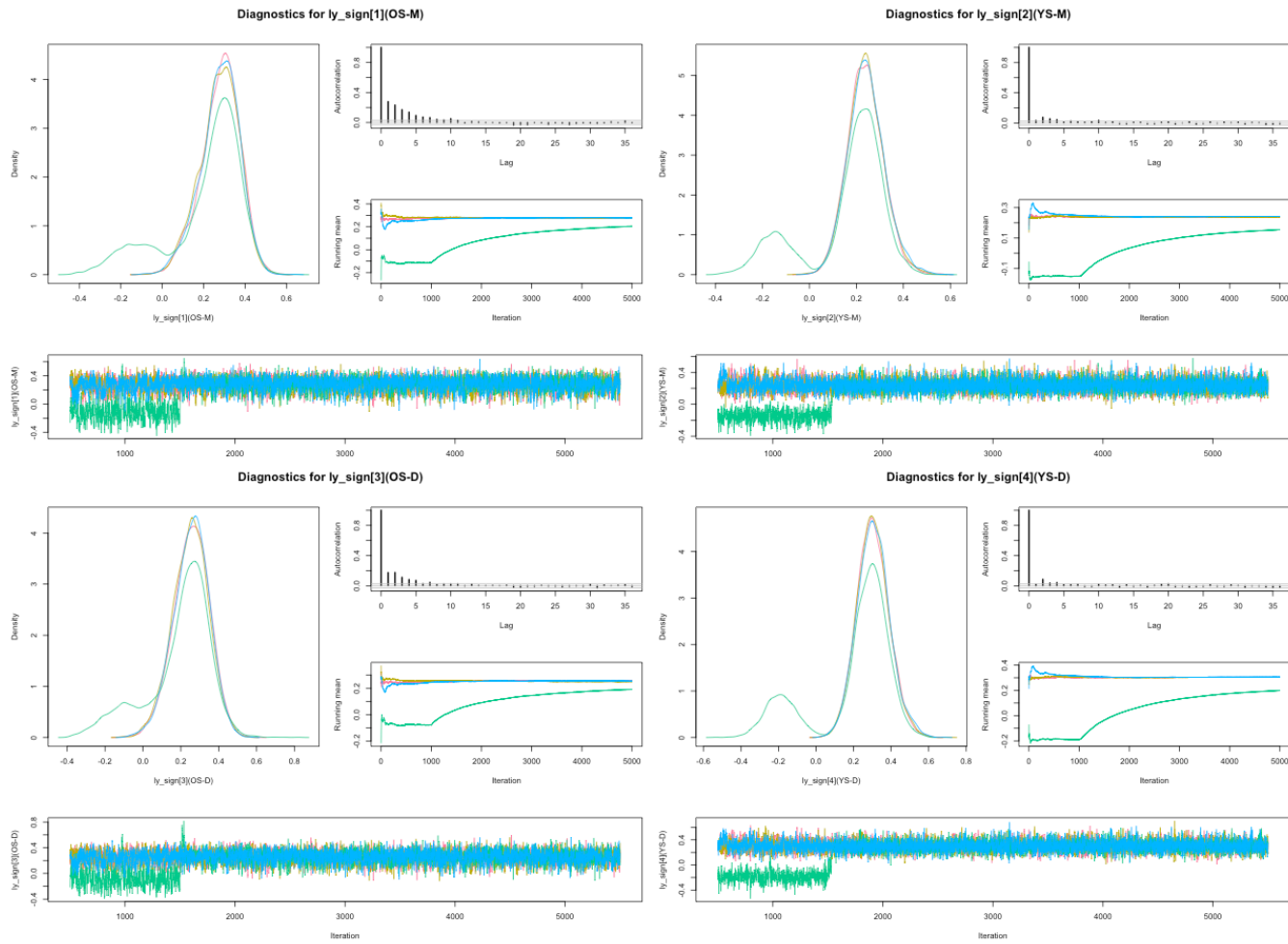


Figure 65. Model 2a MCMC Diagnostic Plots of Factor Loading Parameters

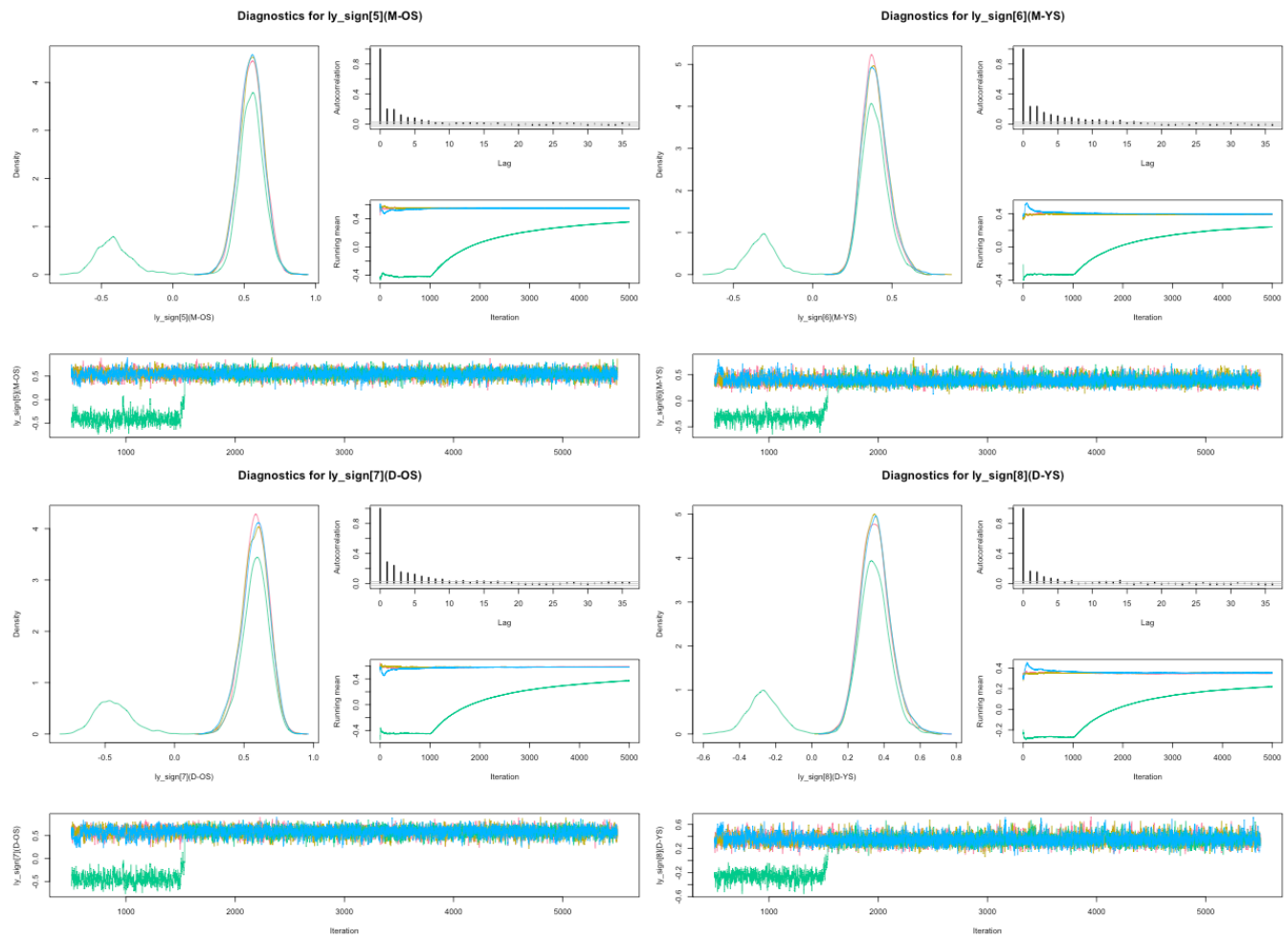


Figure 66. Model 2a MCMC Diagnostic Plots of Factor Loading Parameters

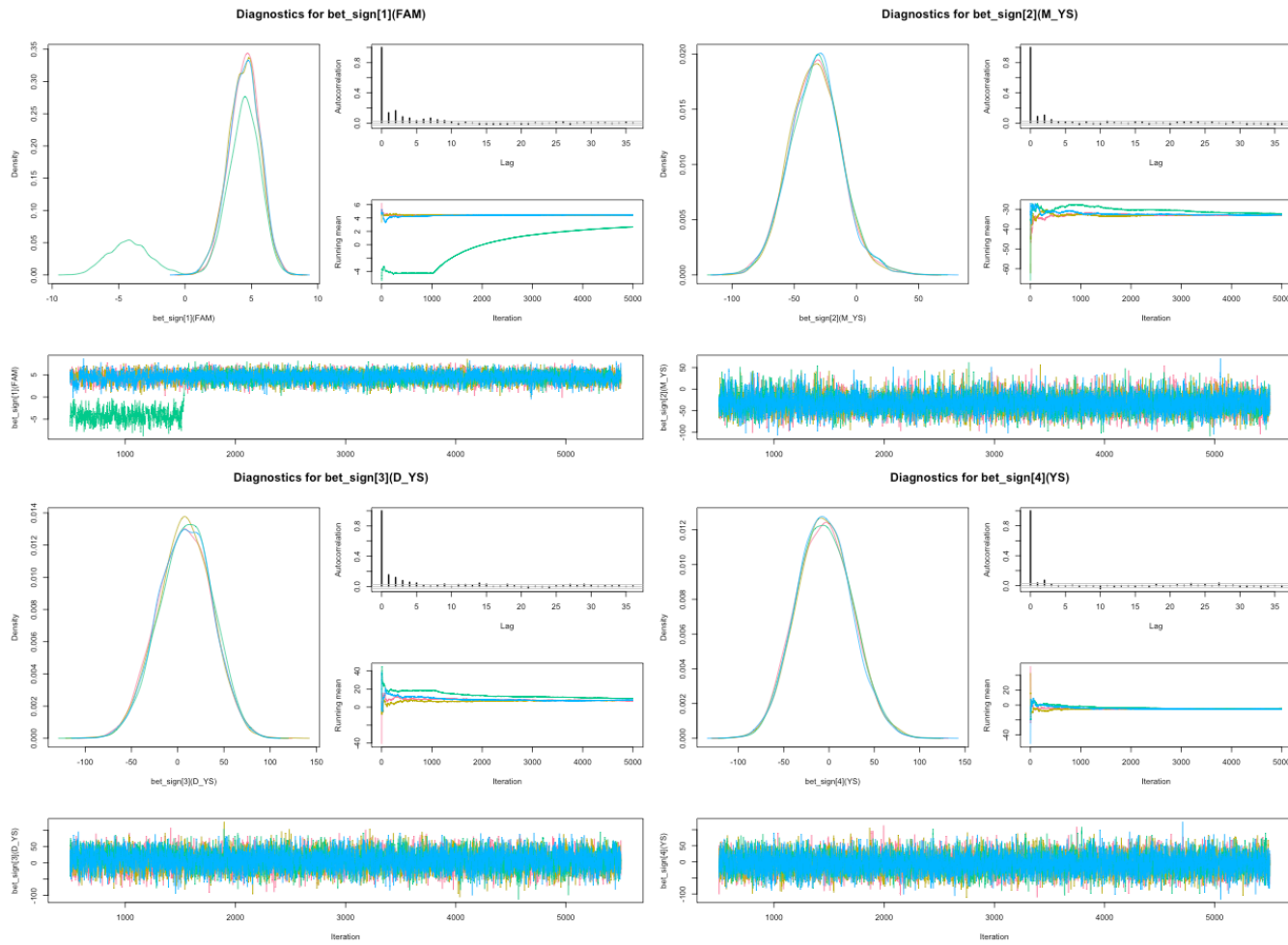


Figure 67. Model 2a MCMC Diagnostic Plots of Regression Coefficient Parameters

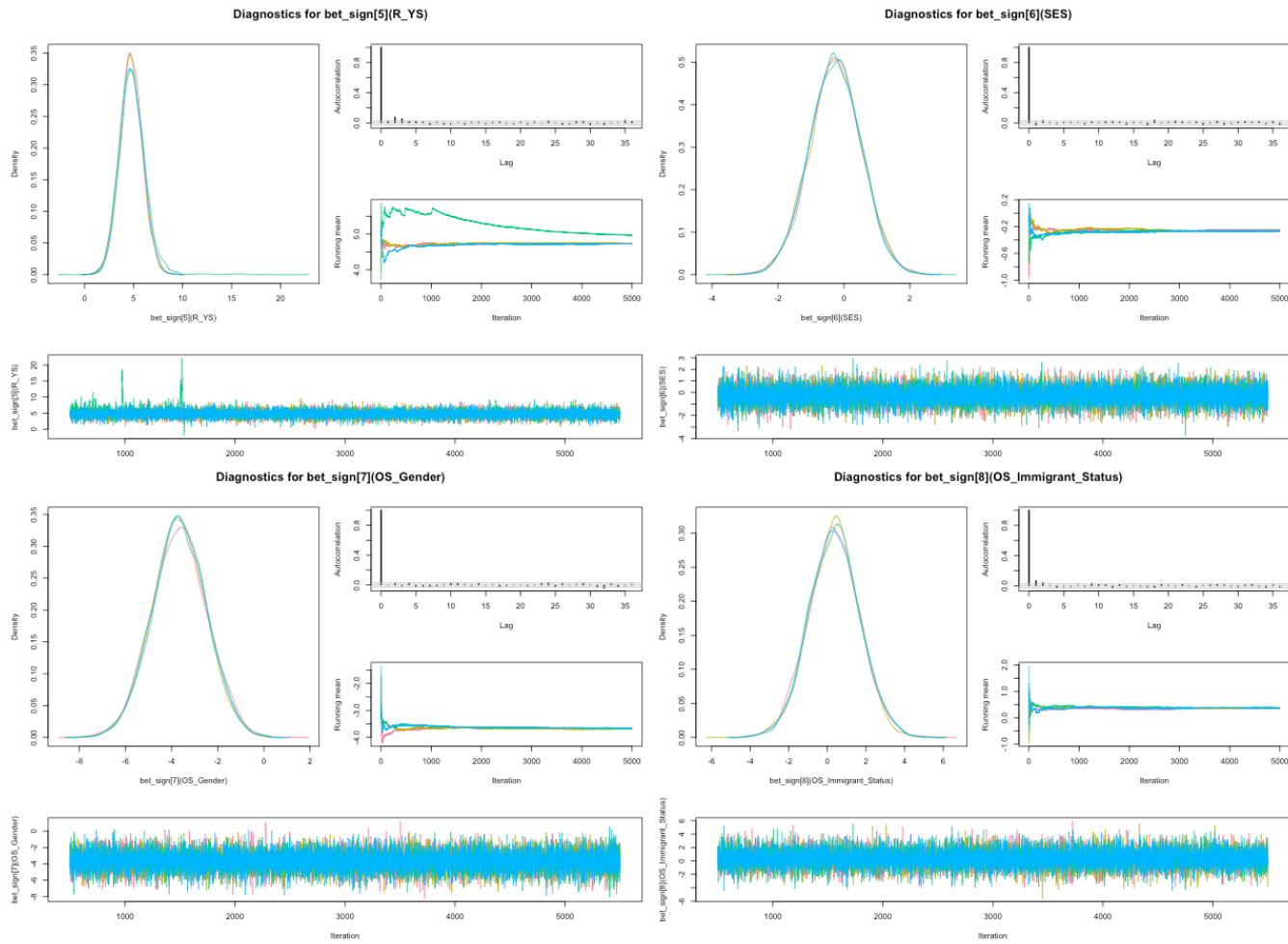


Figure 68. Model 2a MCMC Diagnostic Plots of Regression Coefficient Parameters

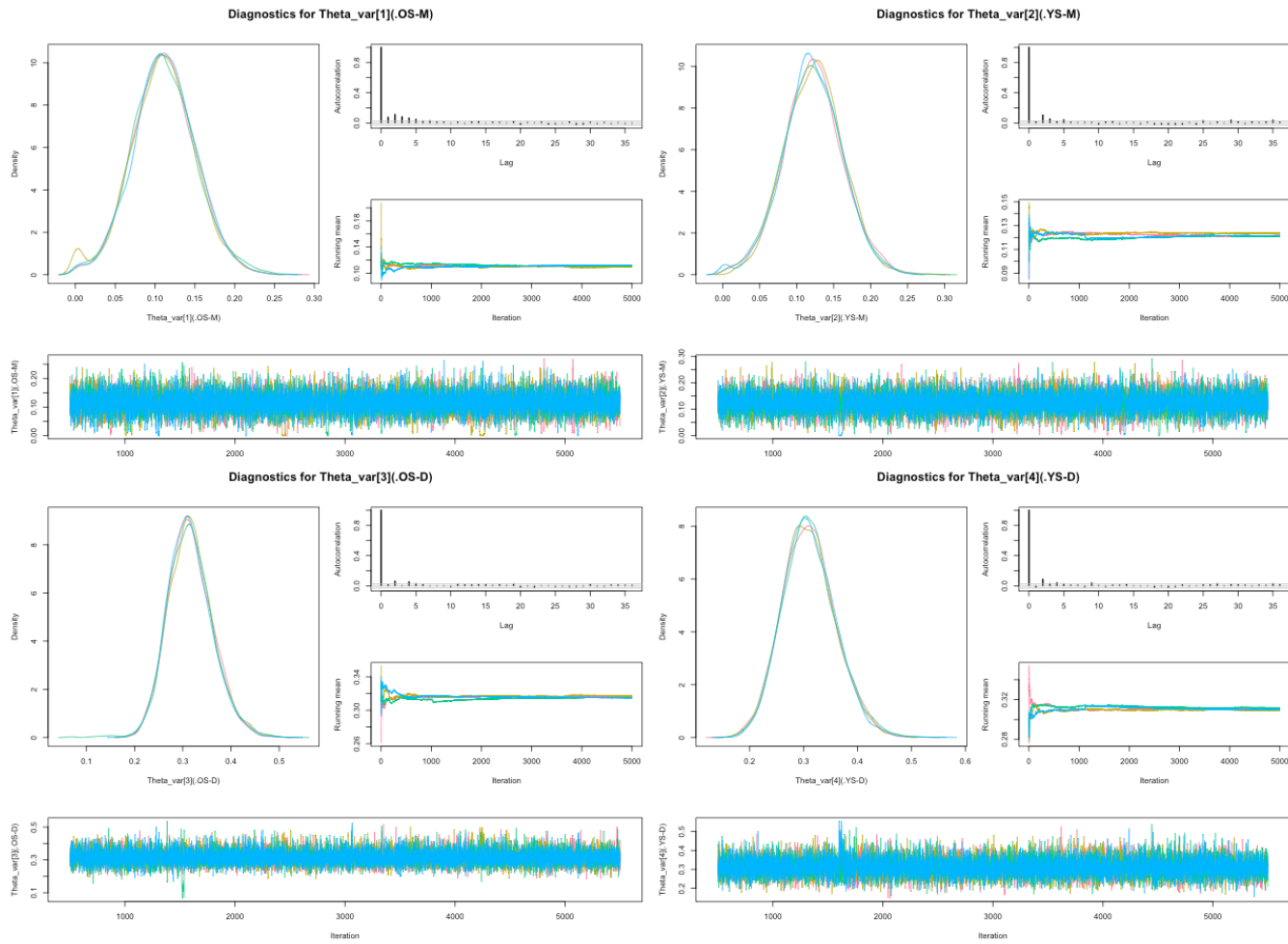


Figure 69. Model 2a MCMC Diagnostic Plots of Measured Variable Variance Parameters

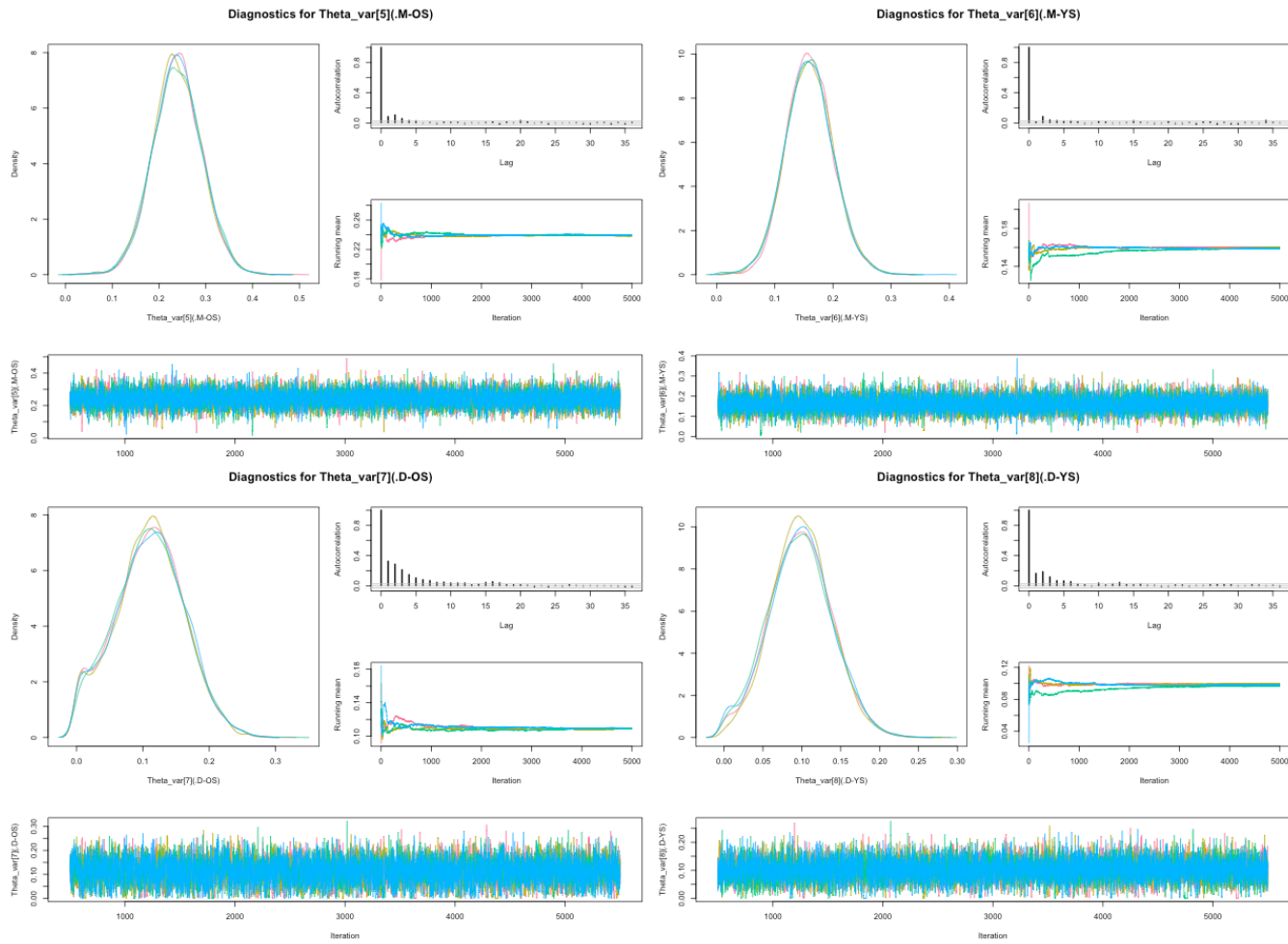


Figure 70. Model 2a MCMC Diagnostic Plots of Measured Variable Variance Parameters

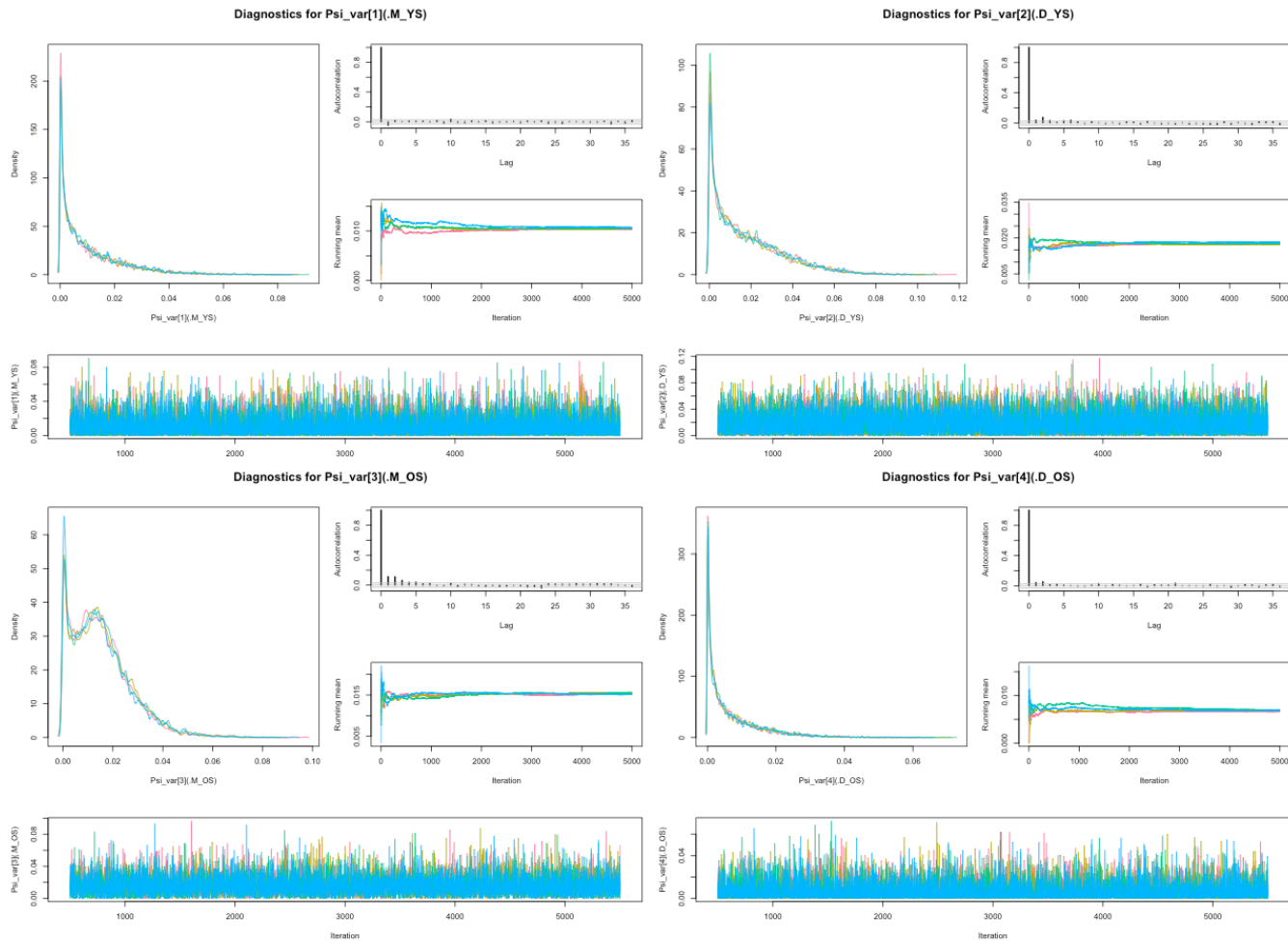


Figure 71. Model 2a MCMC Diagnostic Plots of Latent Variable Variance Parameters

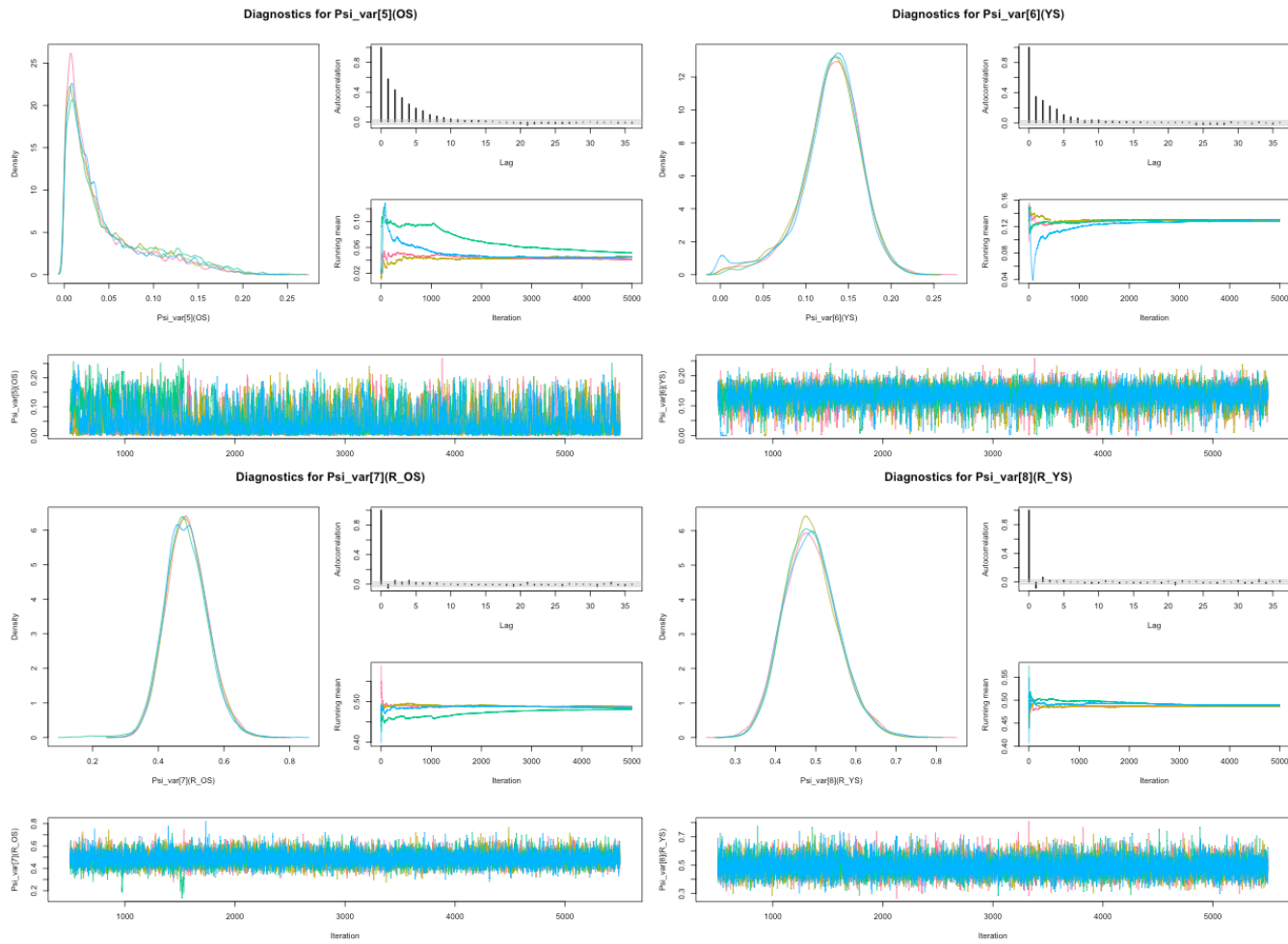


Figure 72. Model 2a MCMC Diagnostic Plots of Latent Variable Variance Parameters

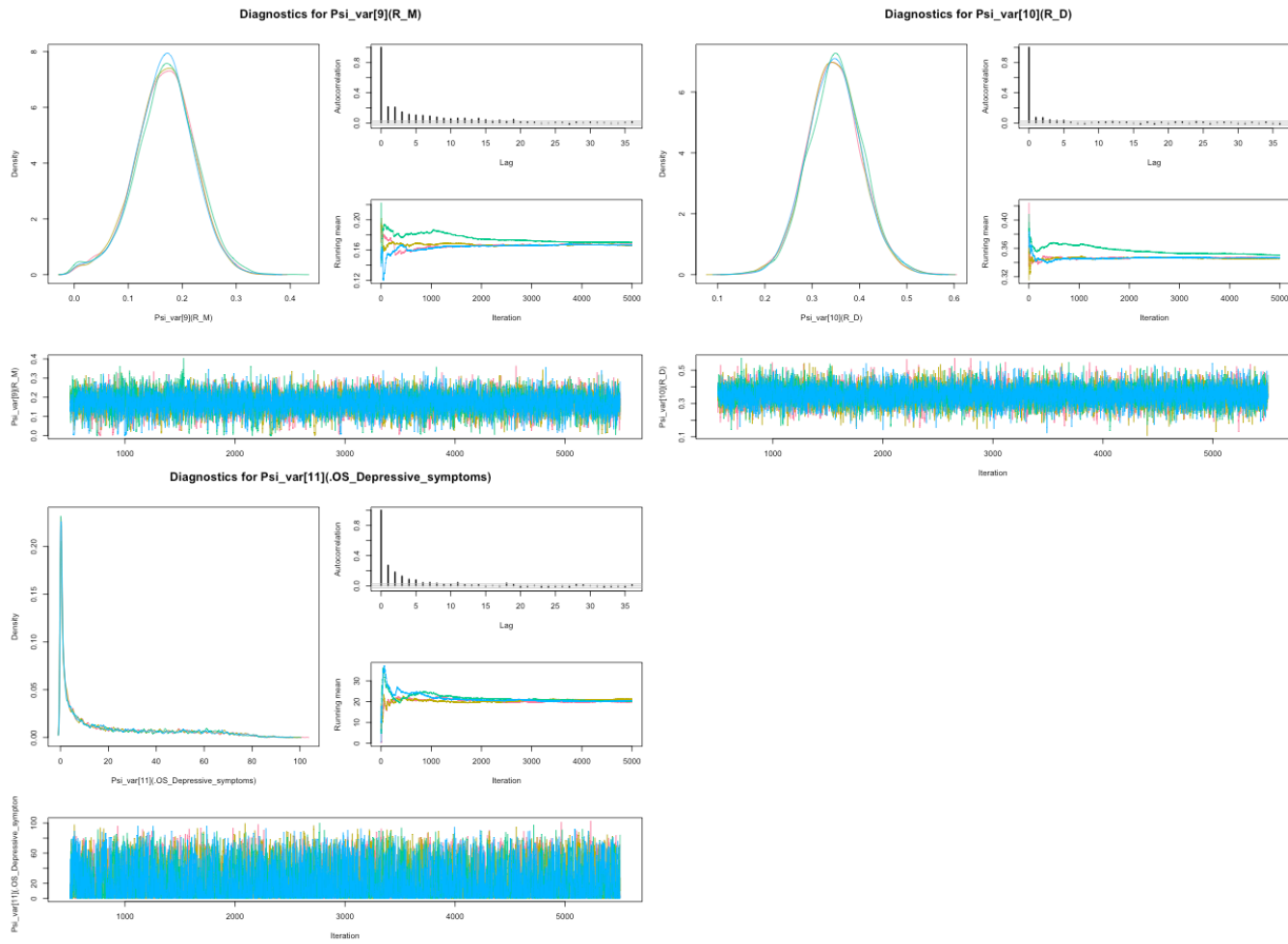


Figure 73. Model 2a MCMC Diagnostic Plots of Latent Variable Variance Parameters

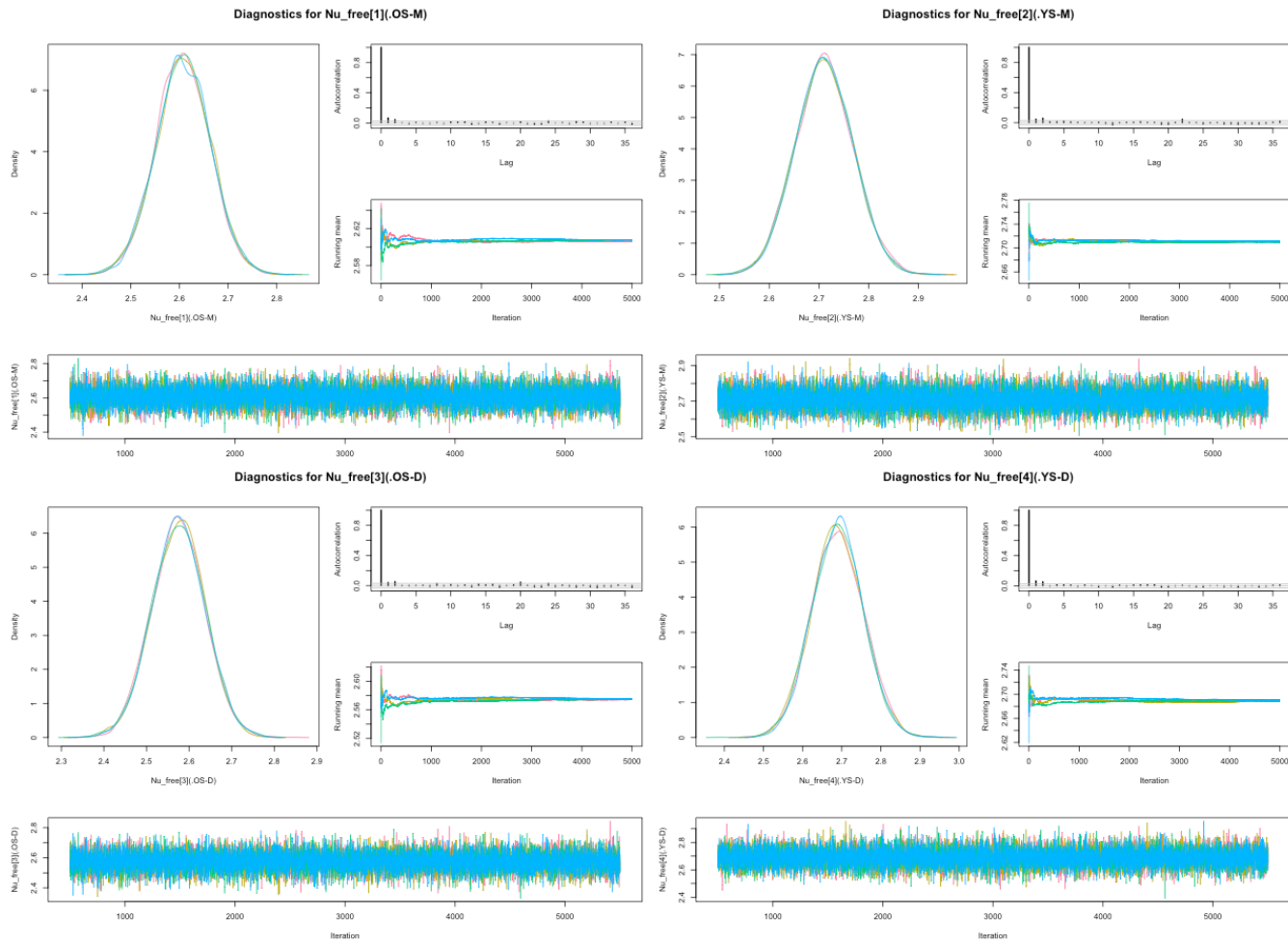


Figure 74. Model 2a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

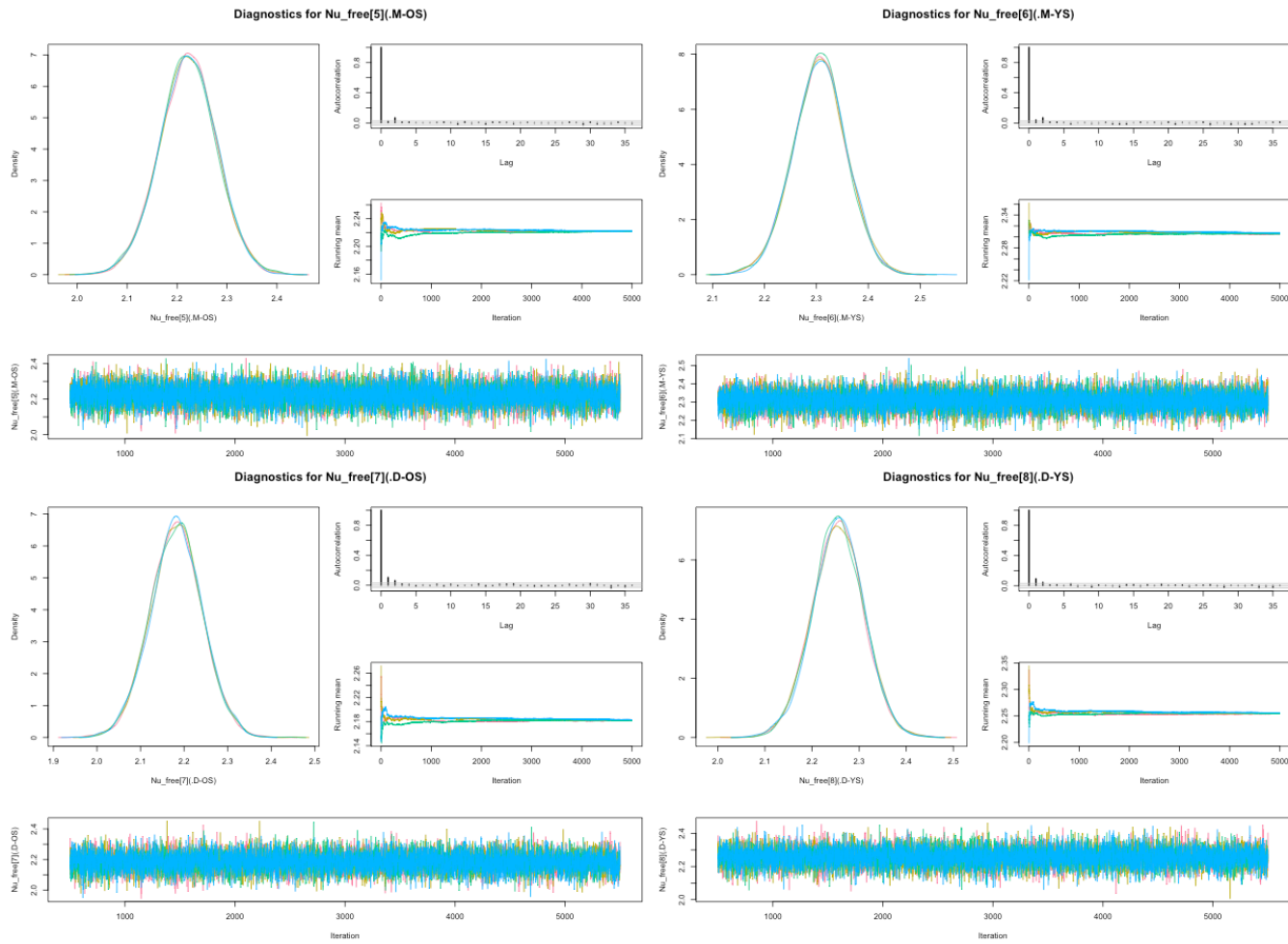


Figure 75. Model 2a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

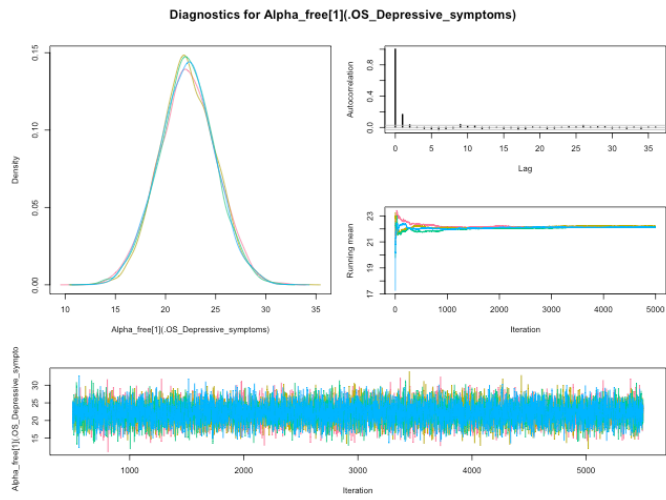


Figure 76. Model 2a MCMC Diagnostic Plots of Regression Intercept Parameter

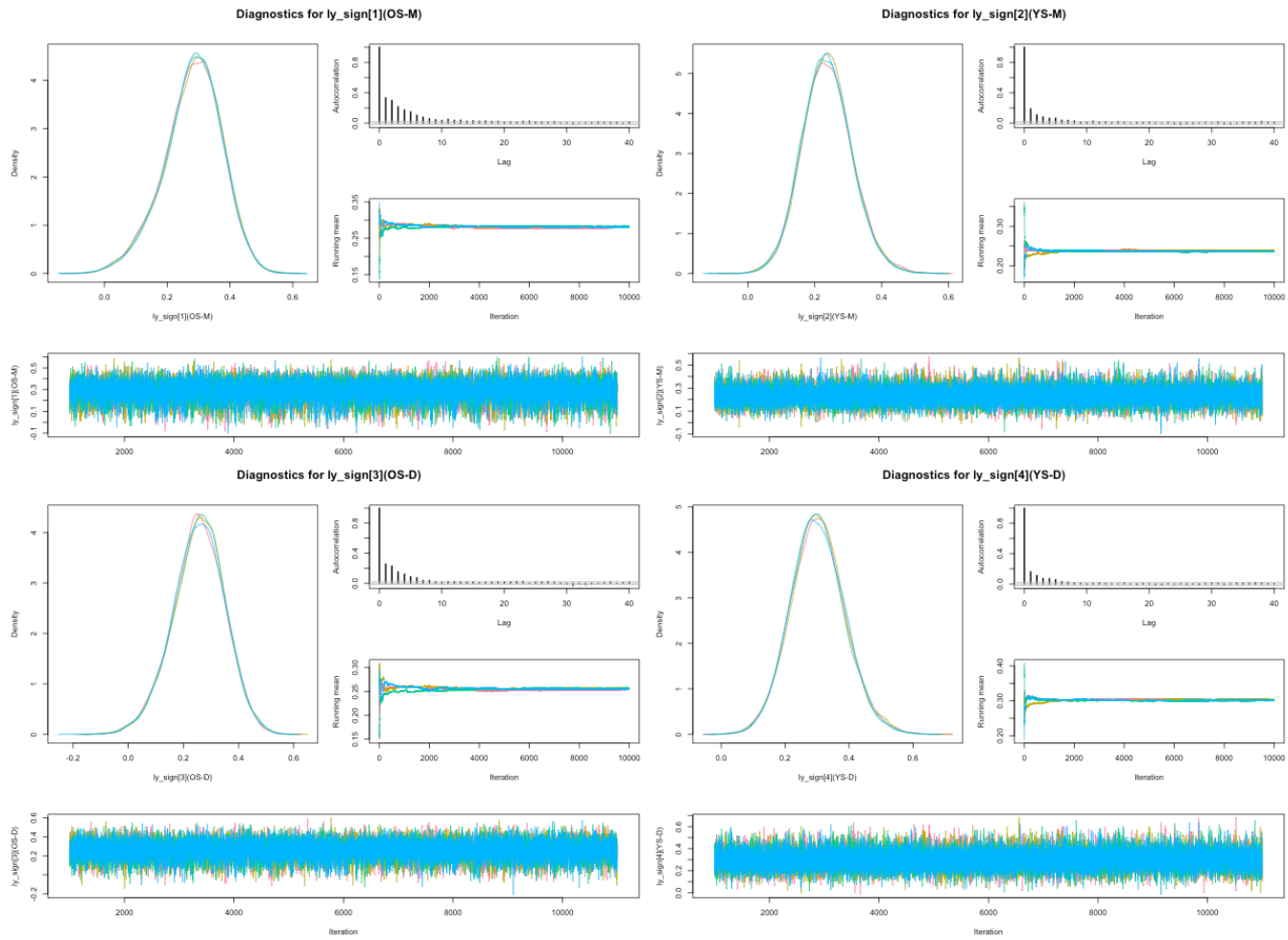


Figure 77. Model 2 MCMC Diagnostic Plots of Factor Loading Parameters

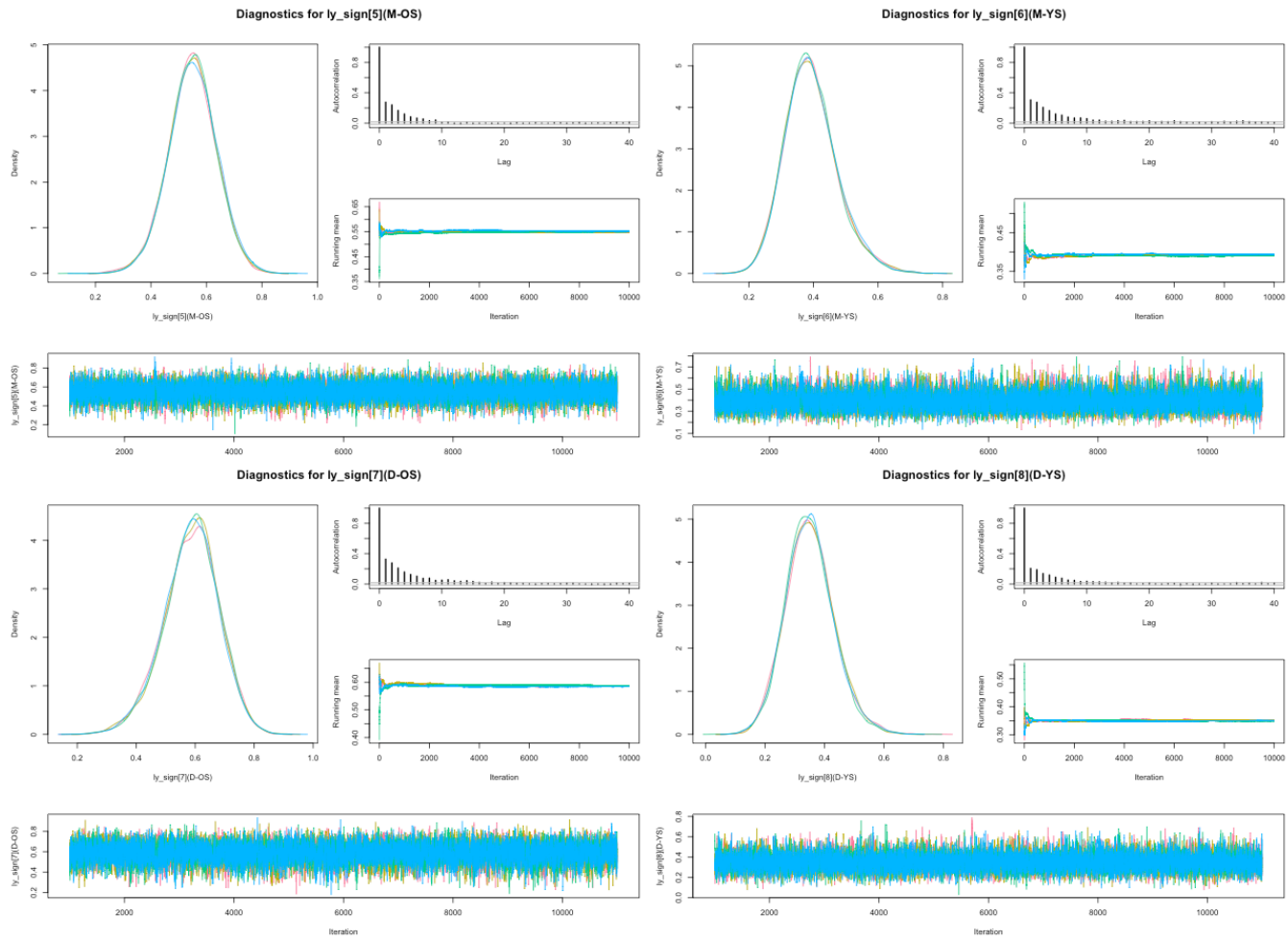


Figure 78. Model 2 MCMC Diagnostic Plots of Factor Loading Parameters

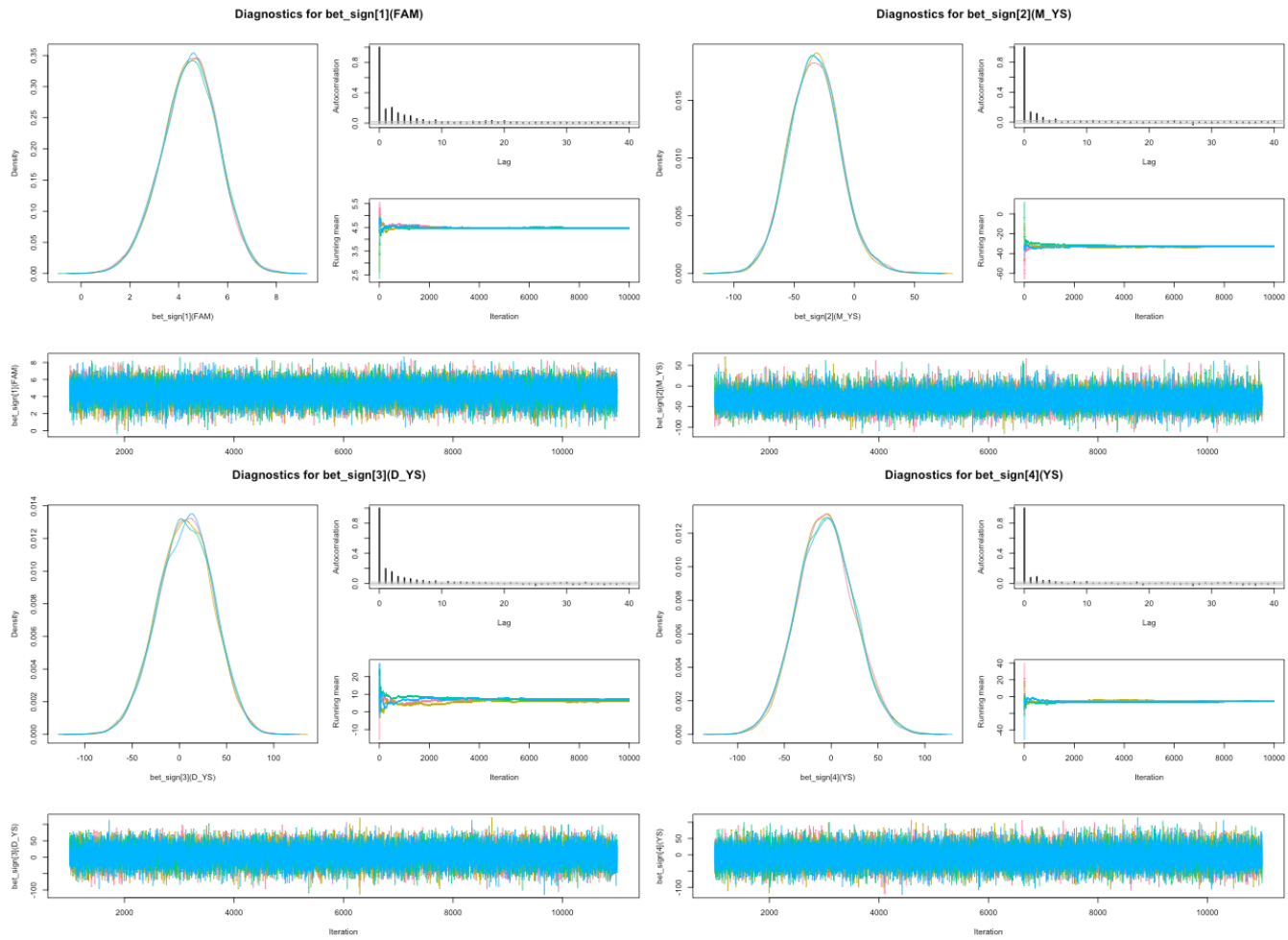


Figure 79. Model 2 MCMC Diagnostic Plots of Regression Coefficient Parameters

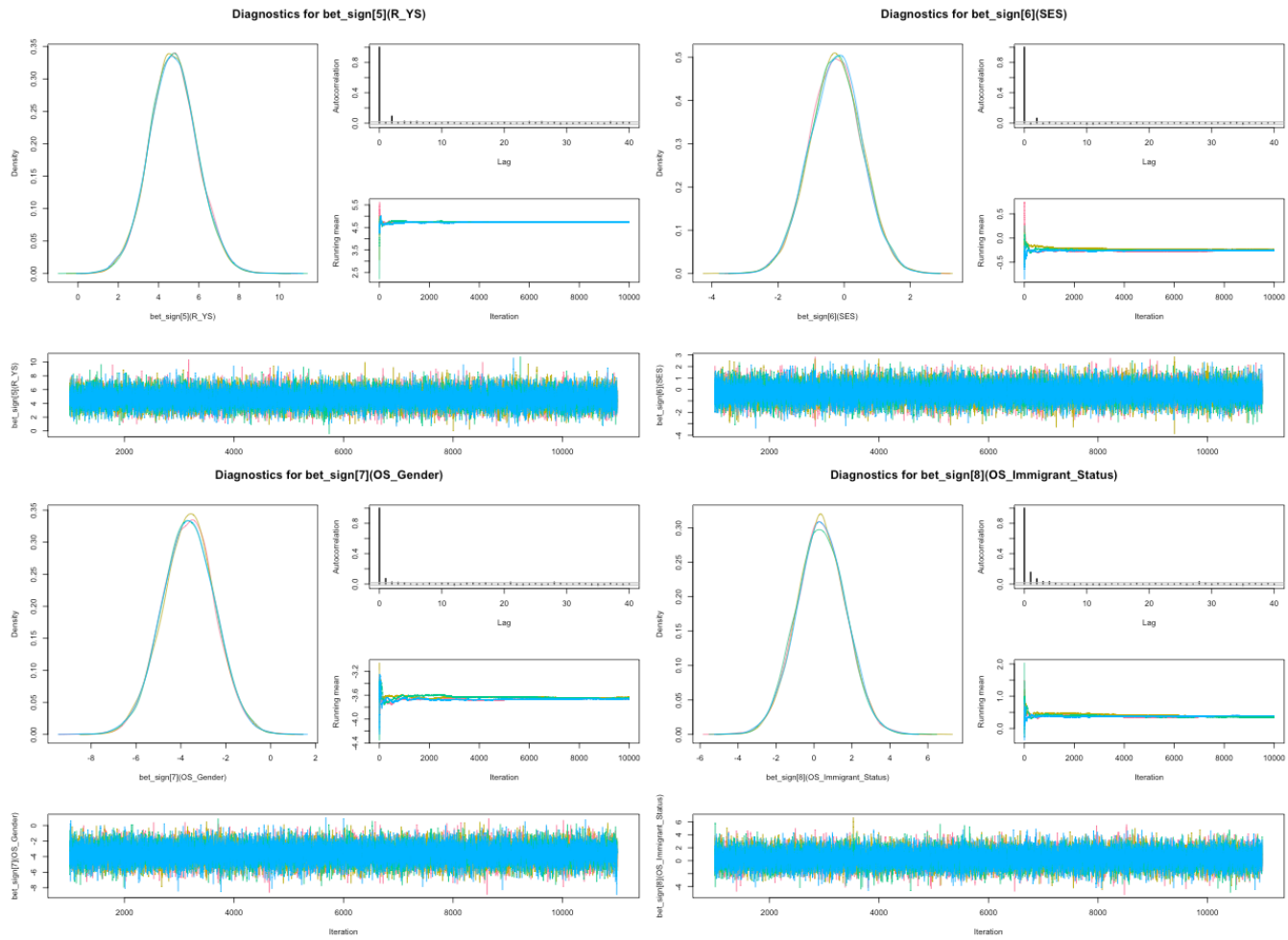


Figure 80. Model 2 MCMC Diagnostic Plots of Regression Coefficient Parameters

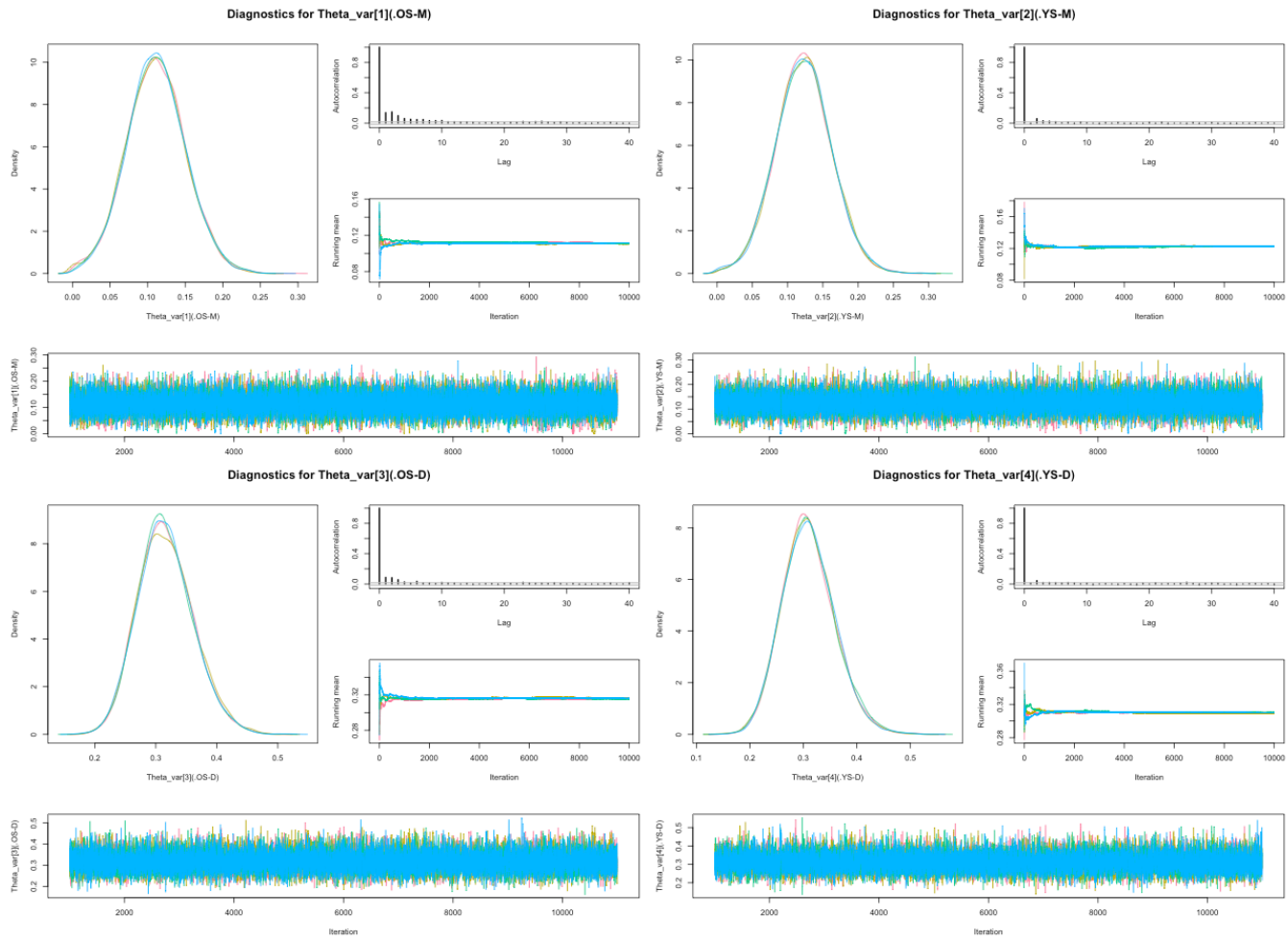


Figure 81. Model 2 MCMC Diagnostic Plots of Measured Variable Variance Parameters

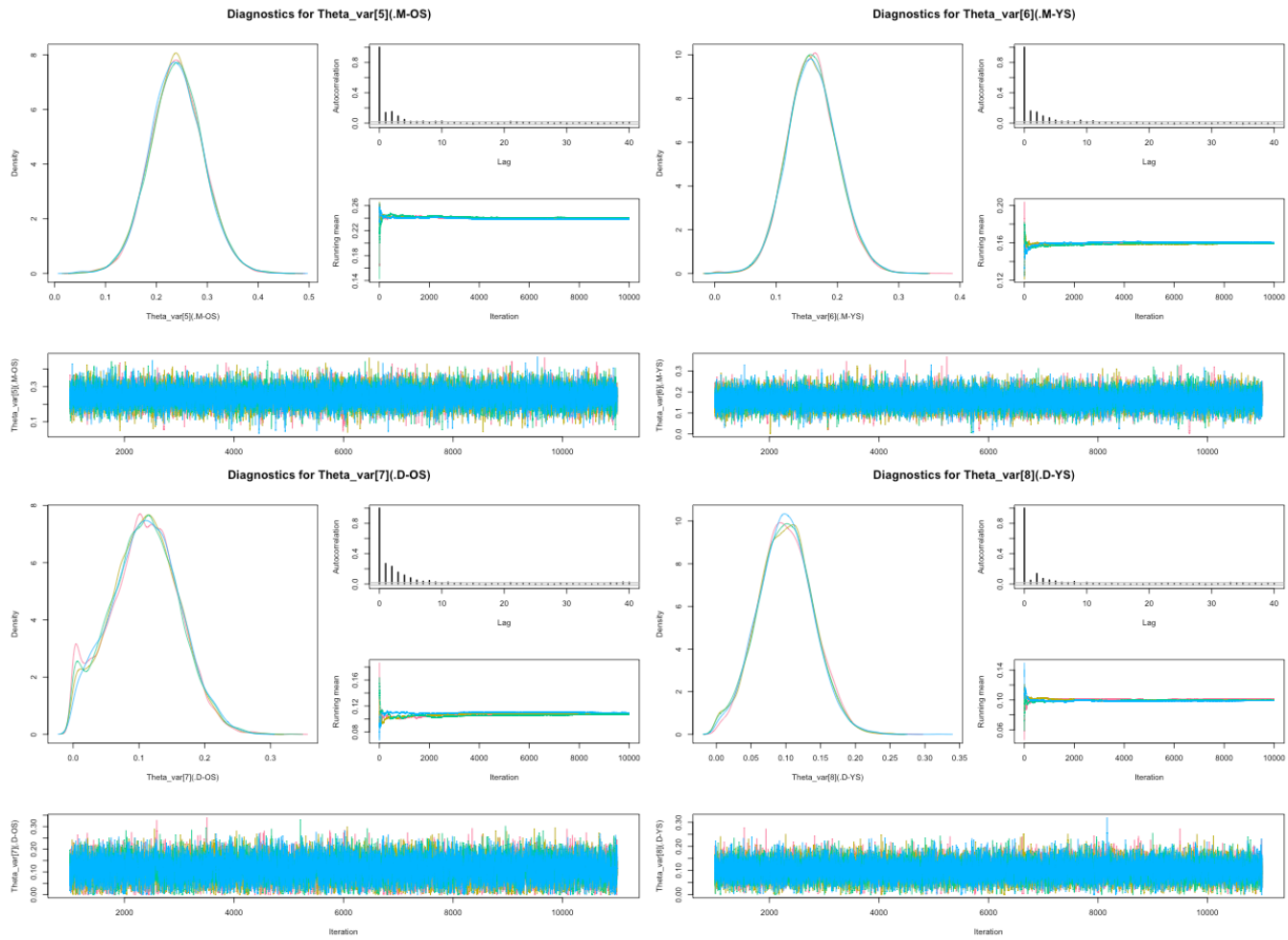


Figure 82. Model 2 MCMC Diagnostic Plots of Measured Variable Variance Parameters

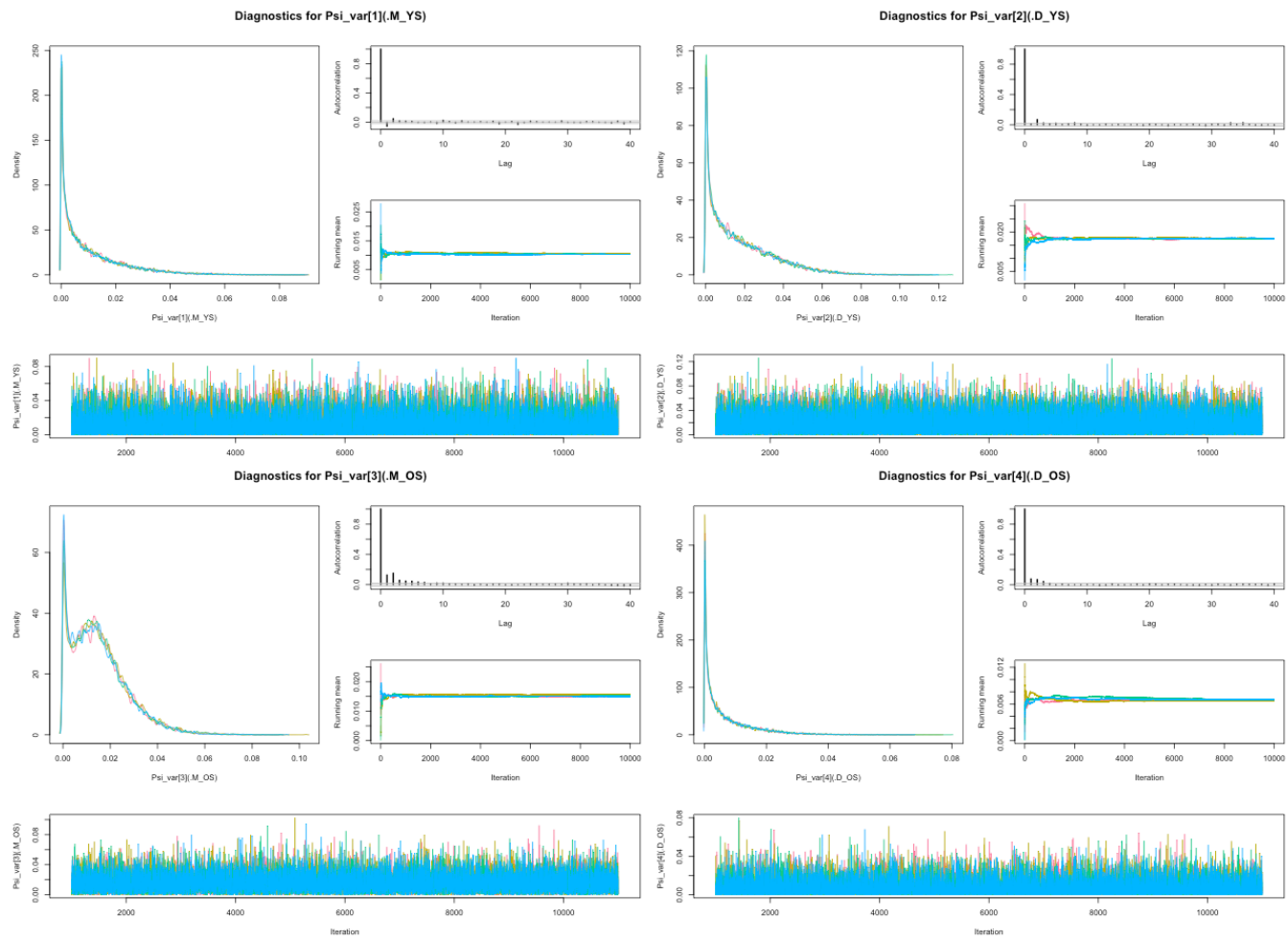


Figure 83. Model 2 MCMC Diagnostic Plots of Latent Variable Variance Parameters

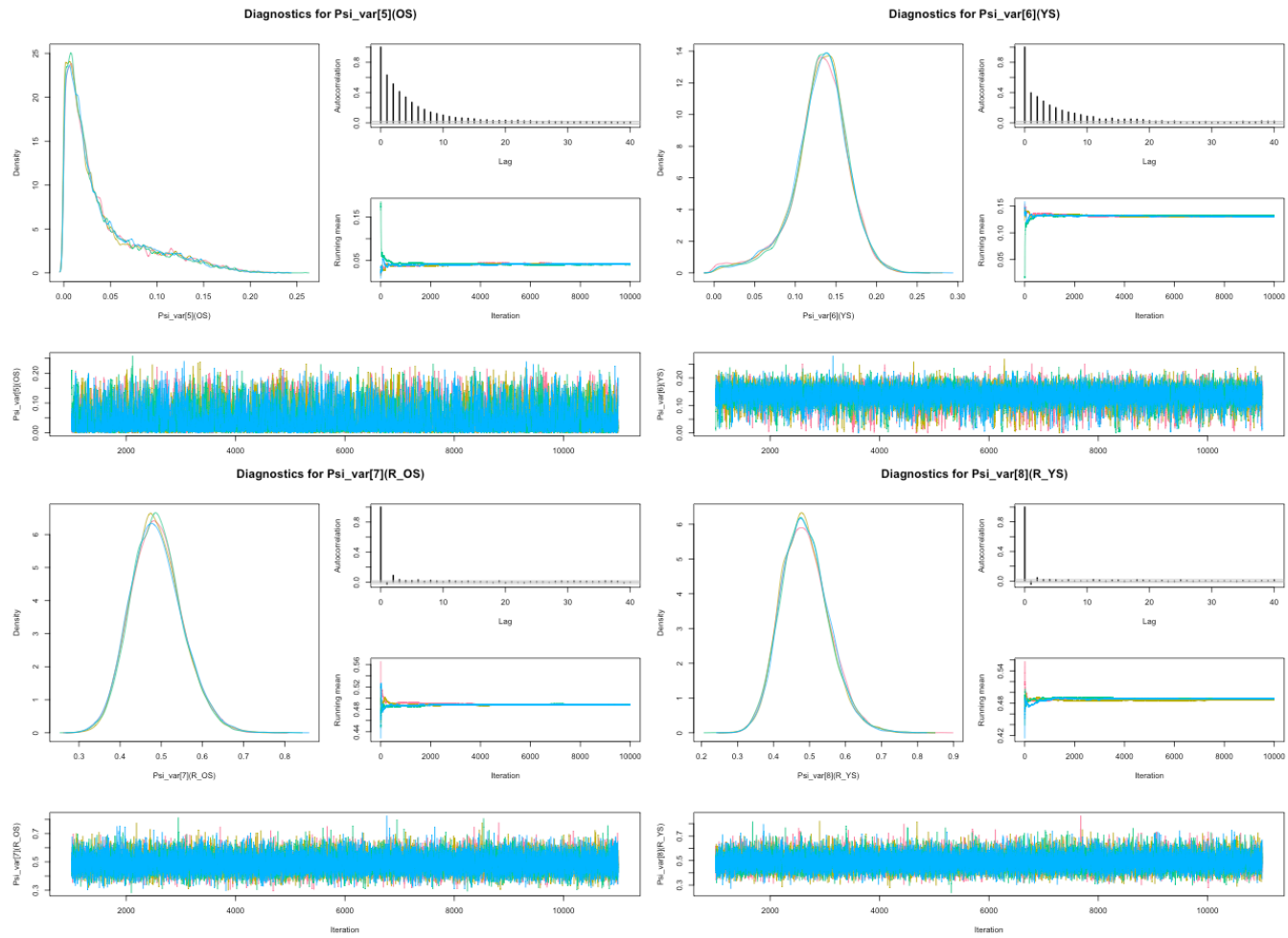


Figure 84. Model 2 MCMC Diagnostic Plots of Latent Variable Variance Parameters

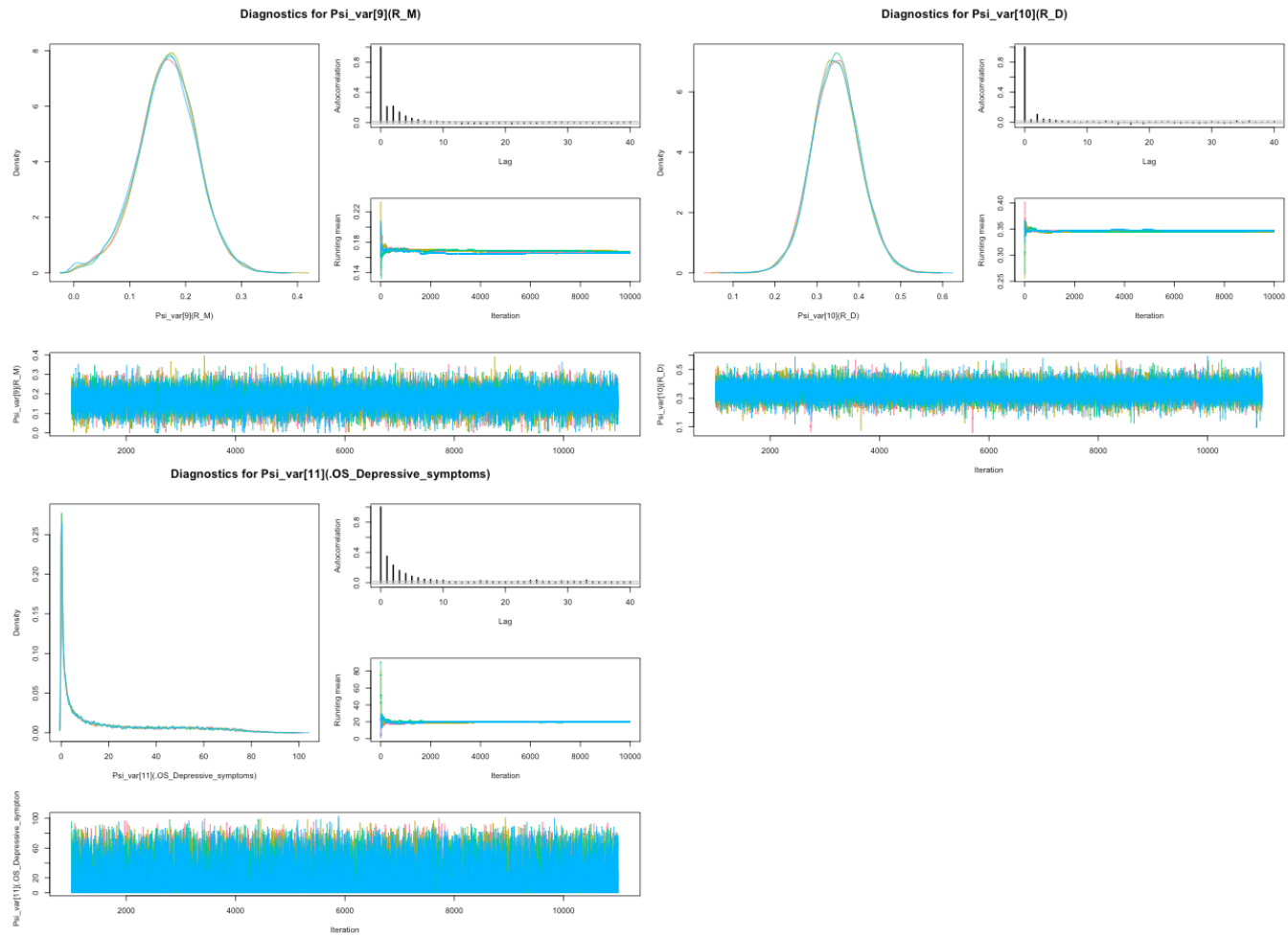


Figure 85. Model 2 MCMC Diagnostic Plots of Latent Variable Variance Parameters

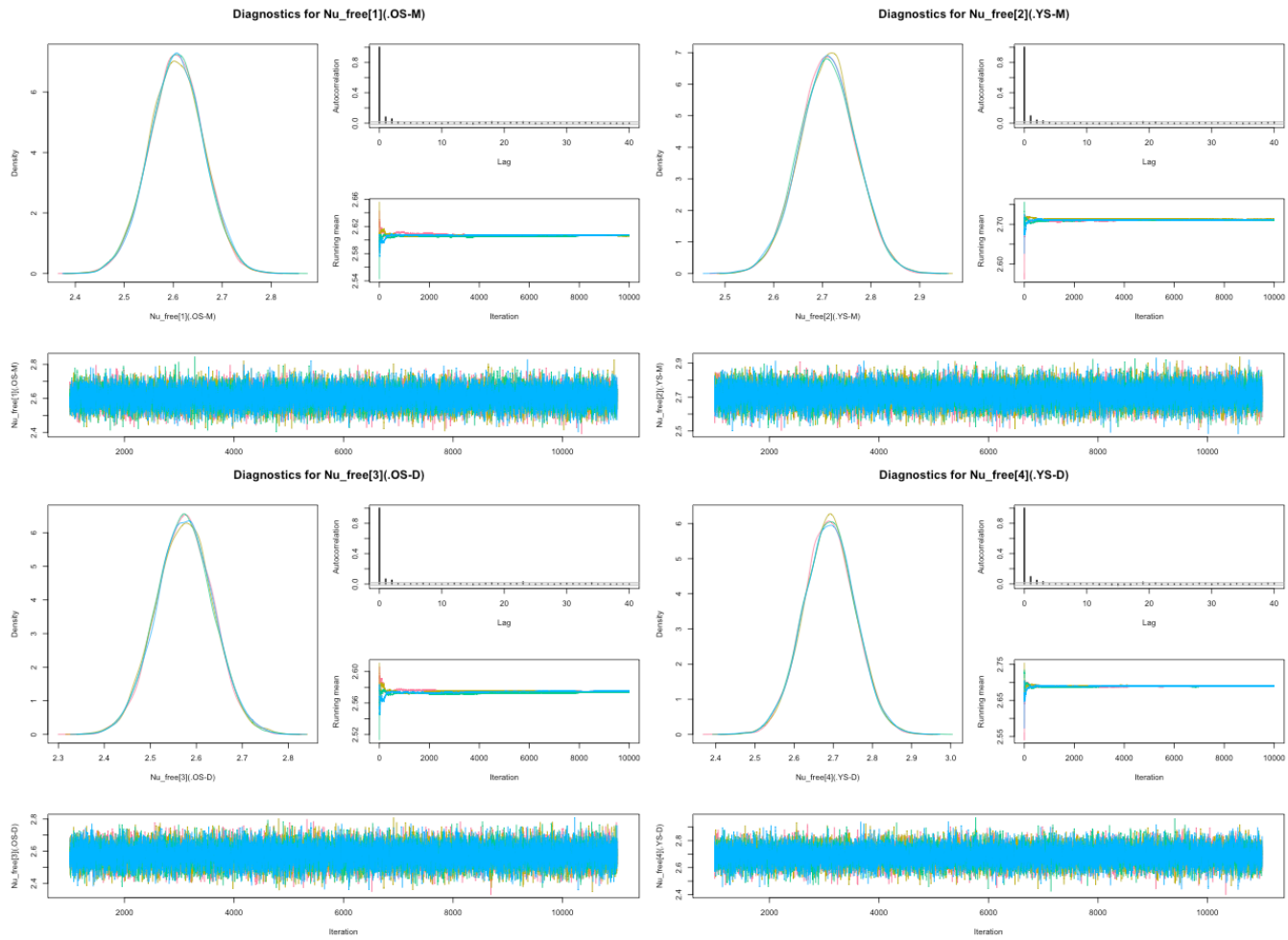


Figure 86. Model 2 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

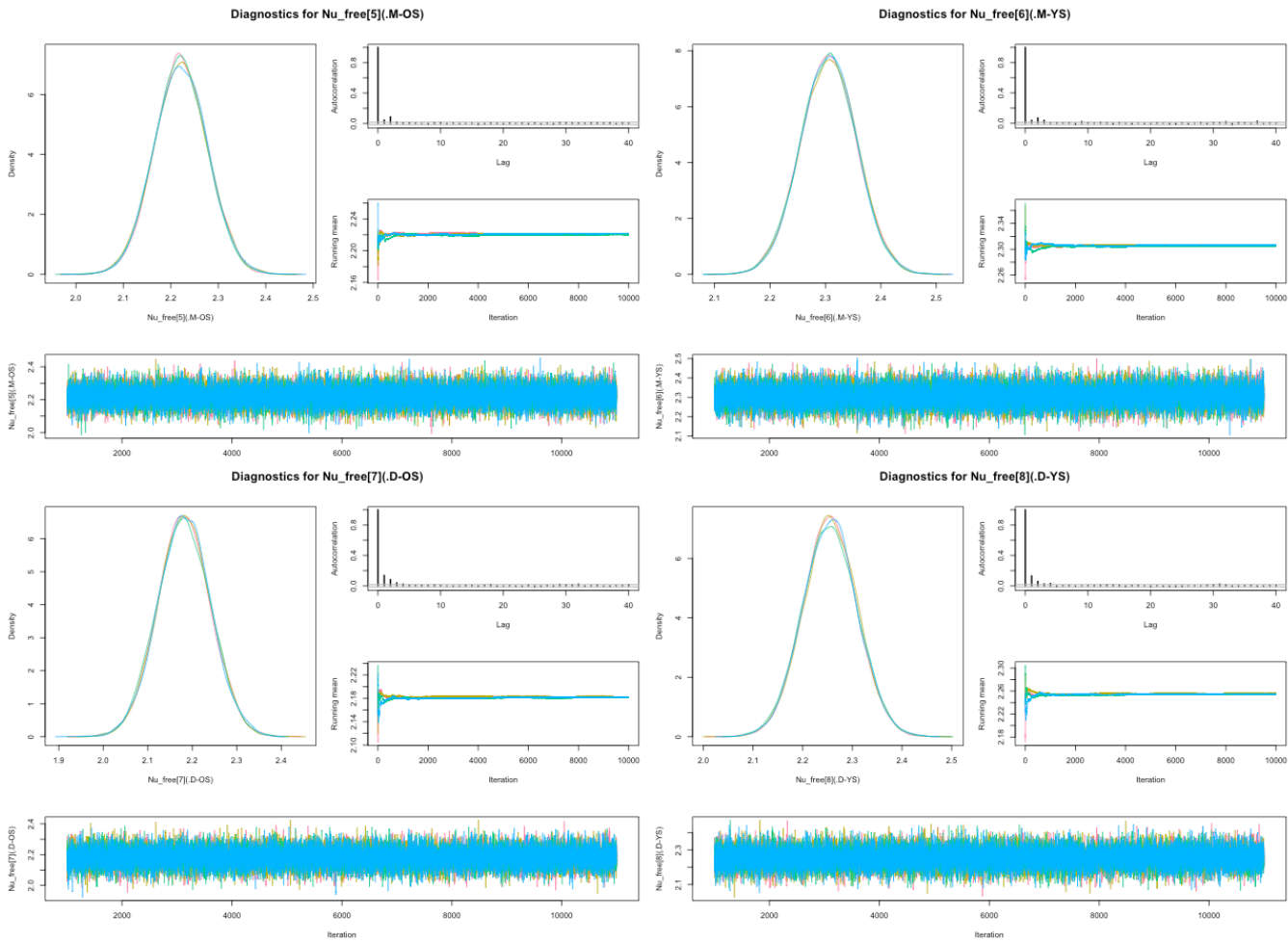


Figure 87. Model 2 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

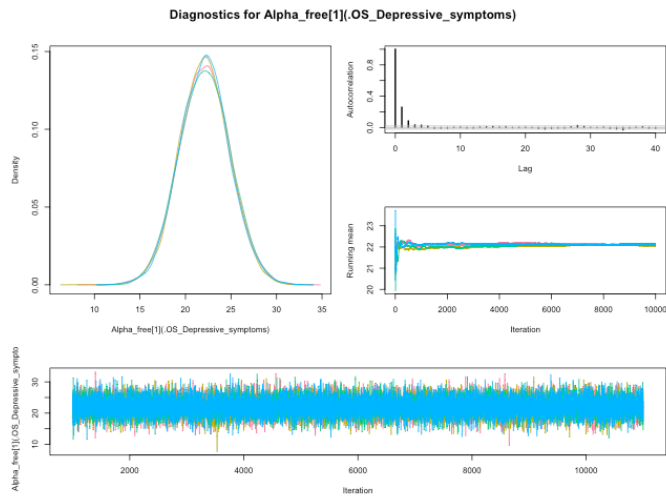


Figure 88. Model 2 MCMC Diagnostic Plots of Regression Intercept Parameter

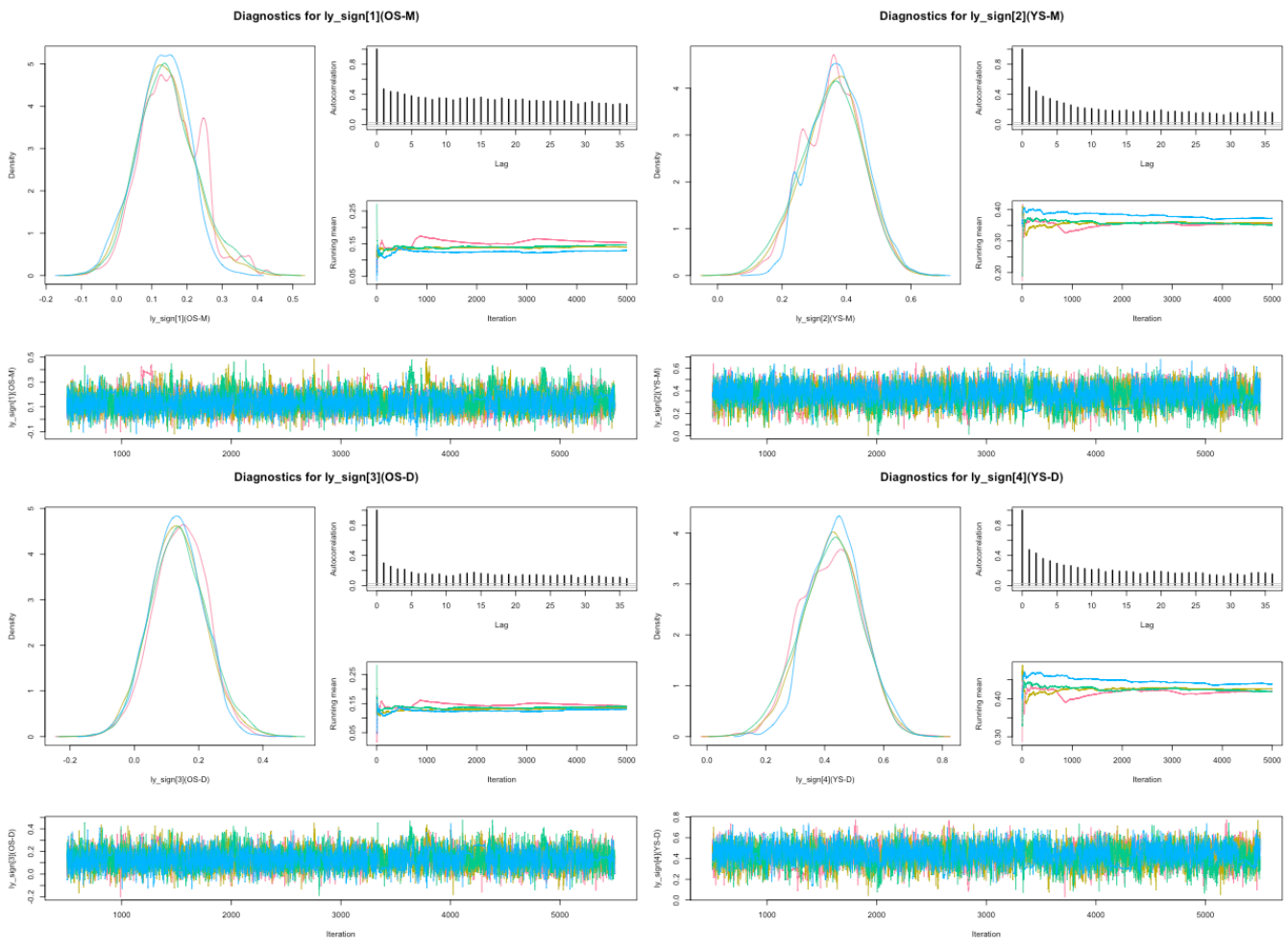


Figure 89. Model 3a MCMC Diagnostic Plots of Factor Loading Parameters

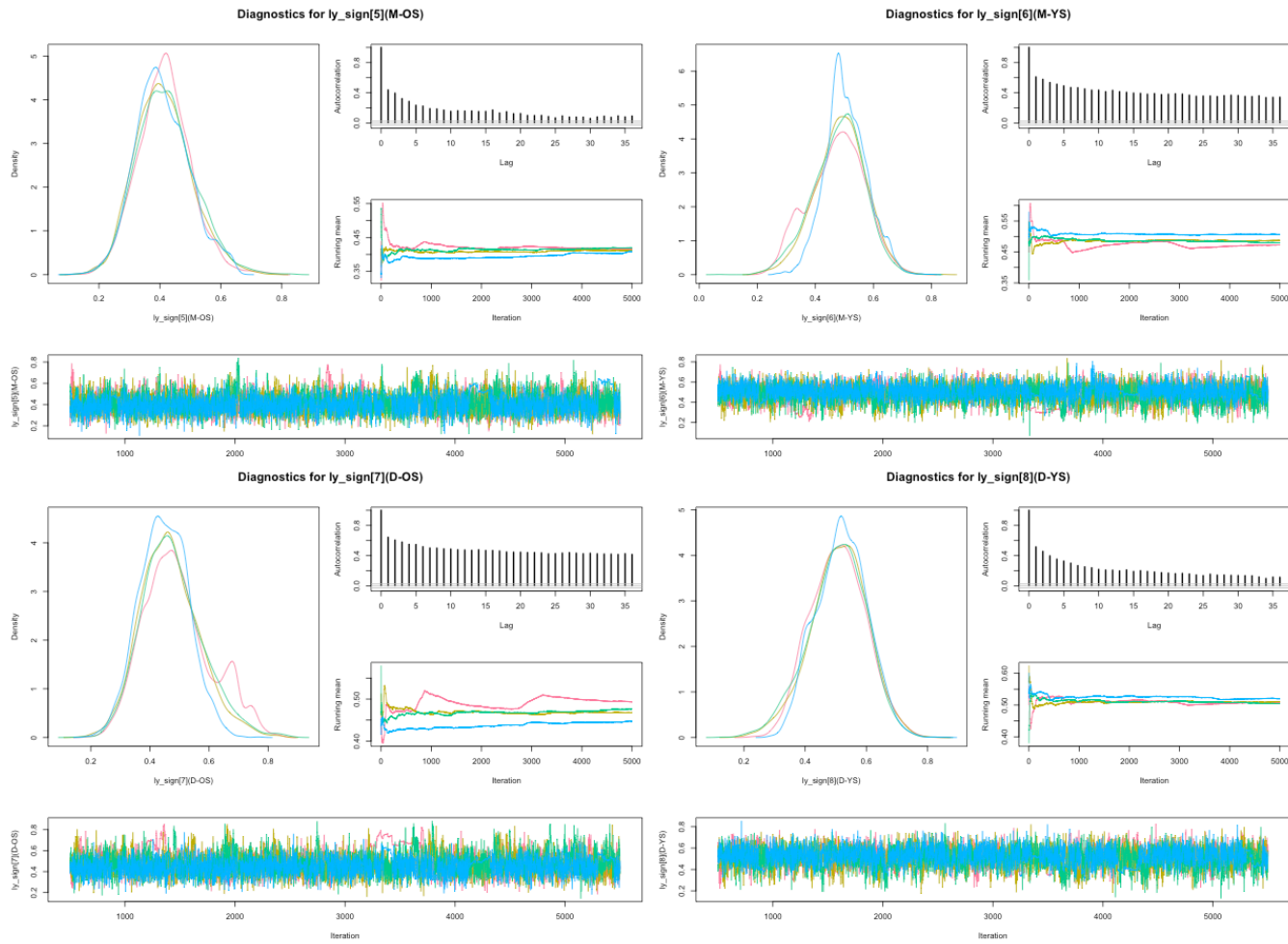


Figure 90. Model 3a MCMC Diagnostic Plots of Factor Loading Parameters

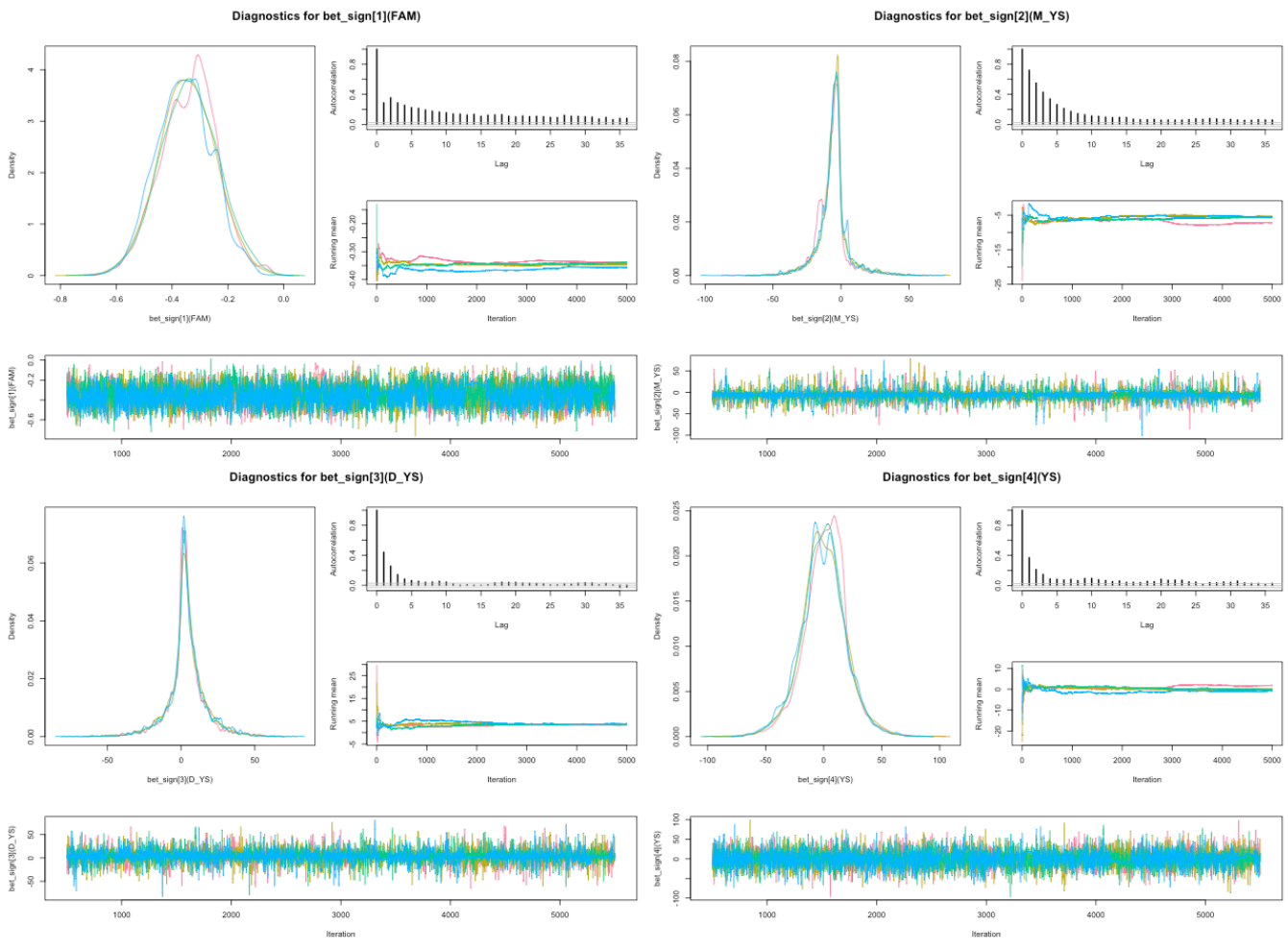


Figure 91. Model 3a MCMC Diagnostic Plots of Regression Coefficient Parameters

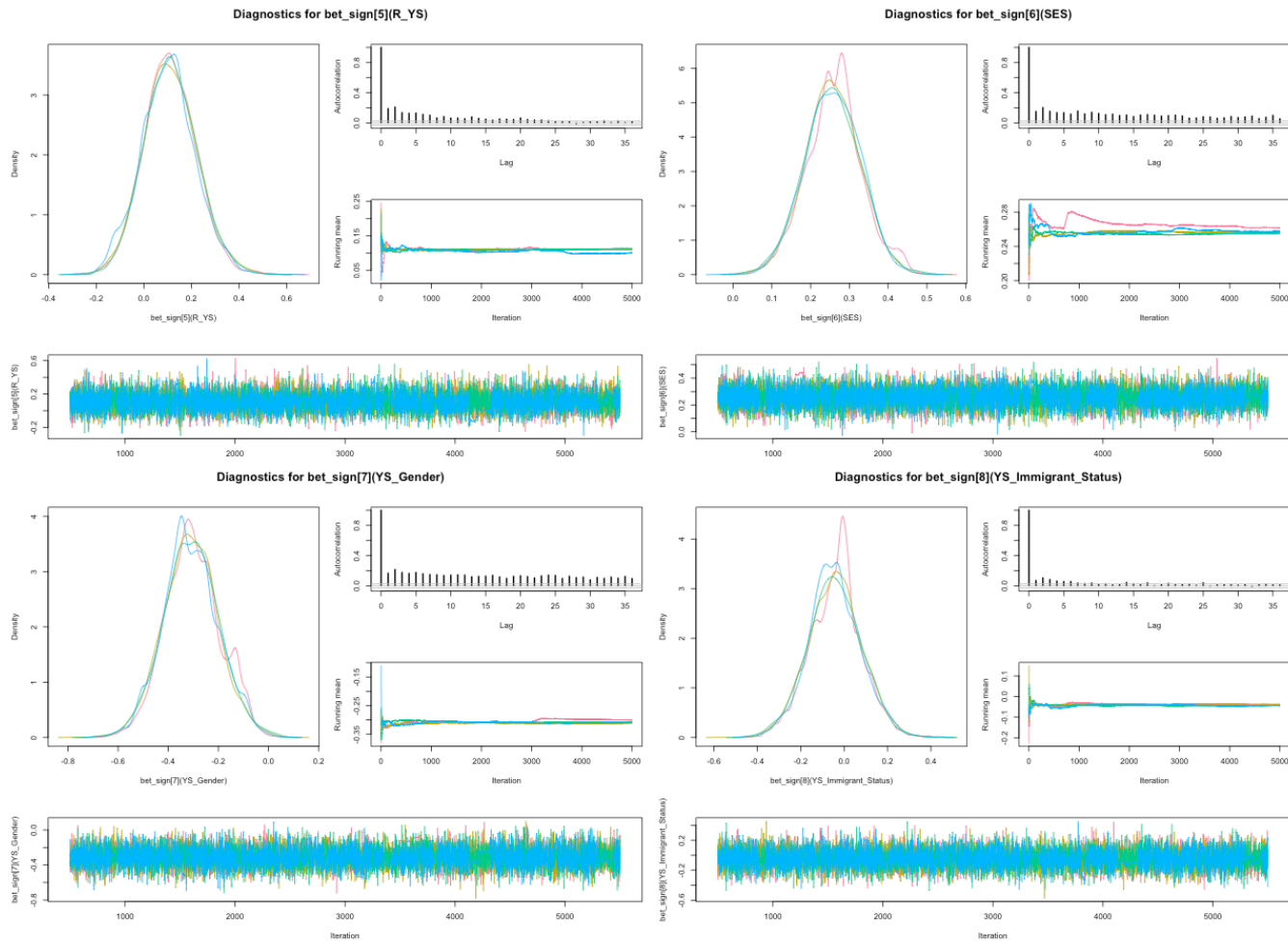


Figure 92. Model 3a MCMC Diagnostic Plots of Regression Coefficient Parameters

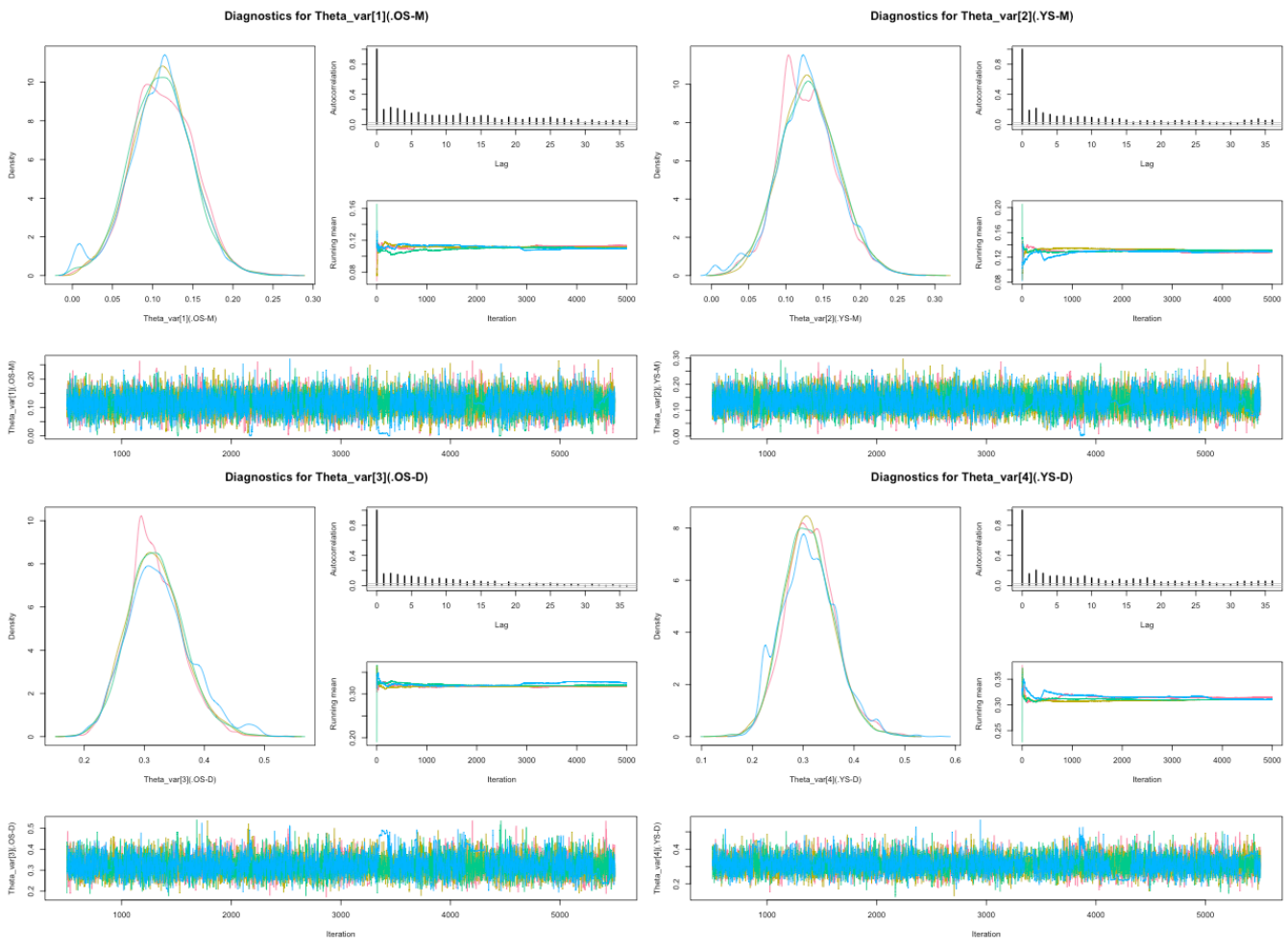


Figure 93. Model 3a MCMC Diagnostic Plots of Measured Variable Variance Parameters

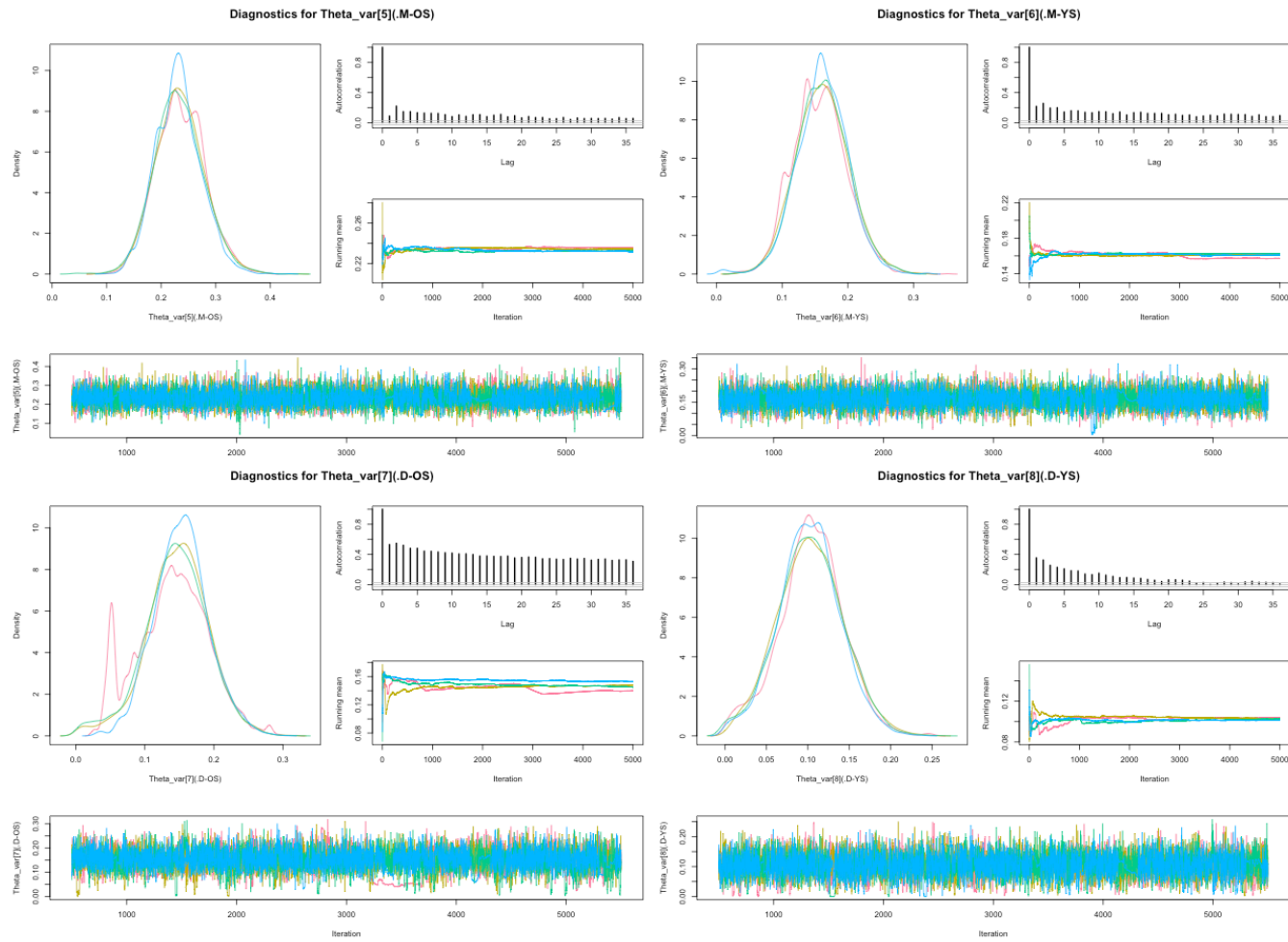


Figure 94. Model 3a MCMC Diagnostic Plots of Measured Variable Variance Parameters

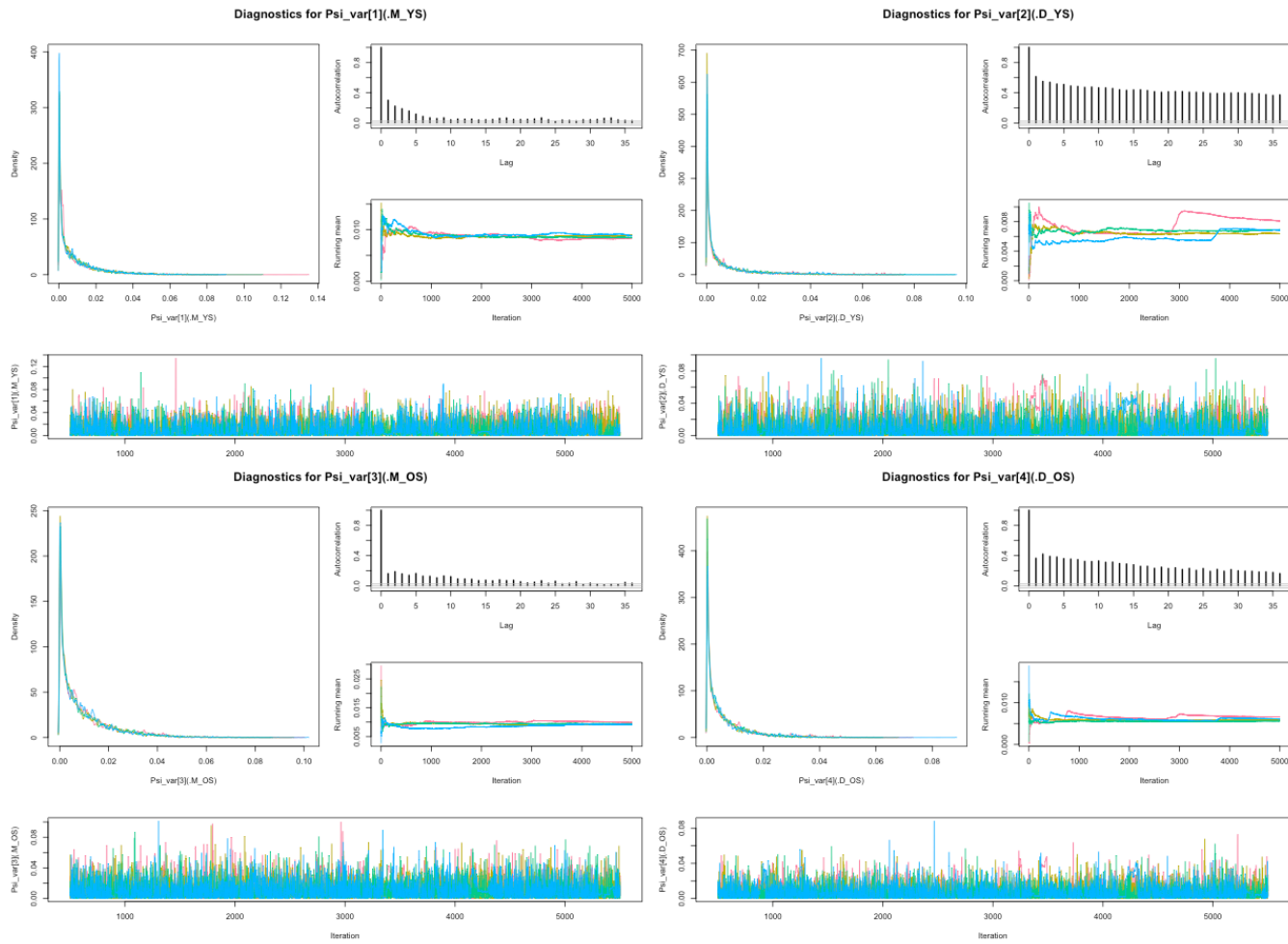


Figure 95. Model 3a MCMC Diagnostic Plots of Latent Variable Variance Parameters

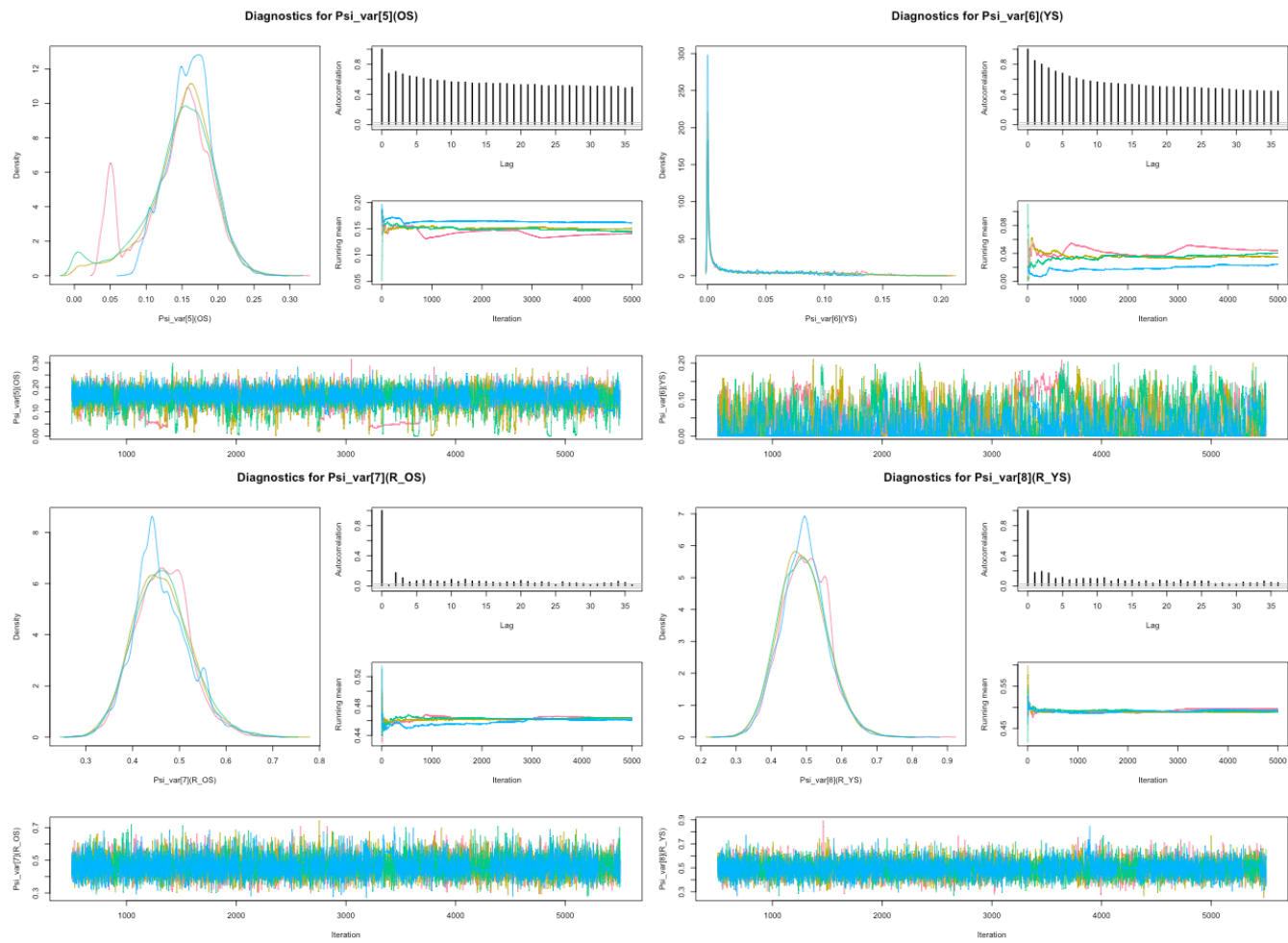


Figure 96. Model 3a MCMC Diagnostic Plots of Latent Variable Variance Parameters

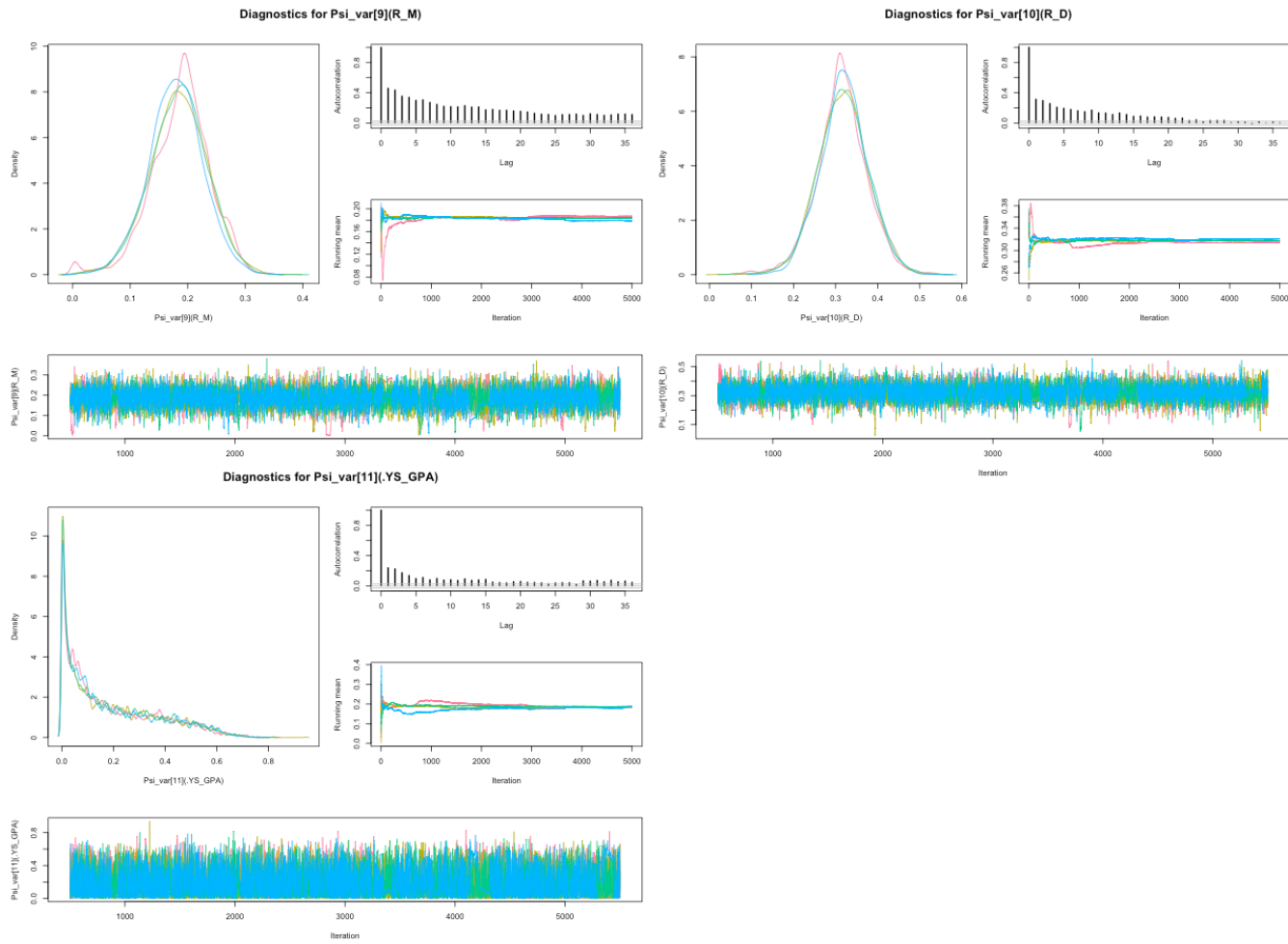


Figure 97. Model 3a MCMC Diagnostic Plots of Latent Variable Variance Parameters

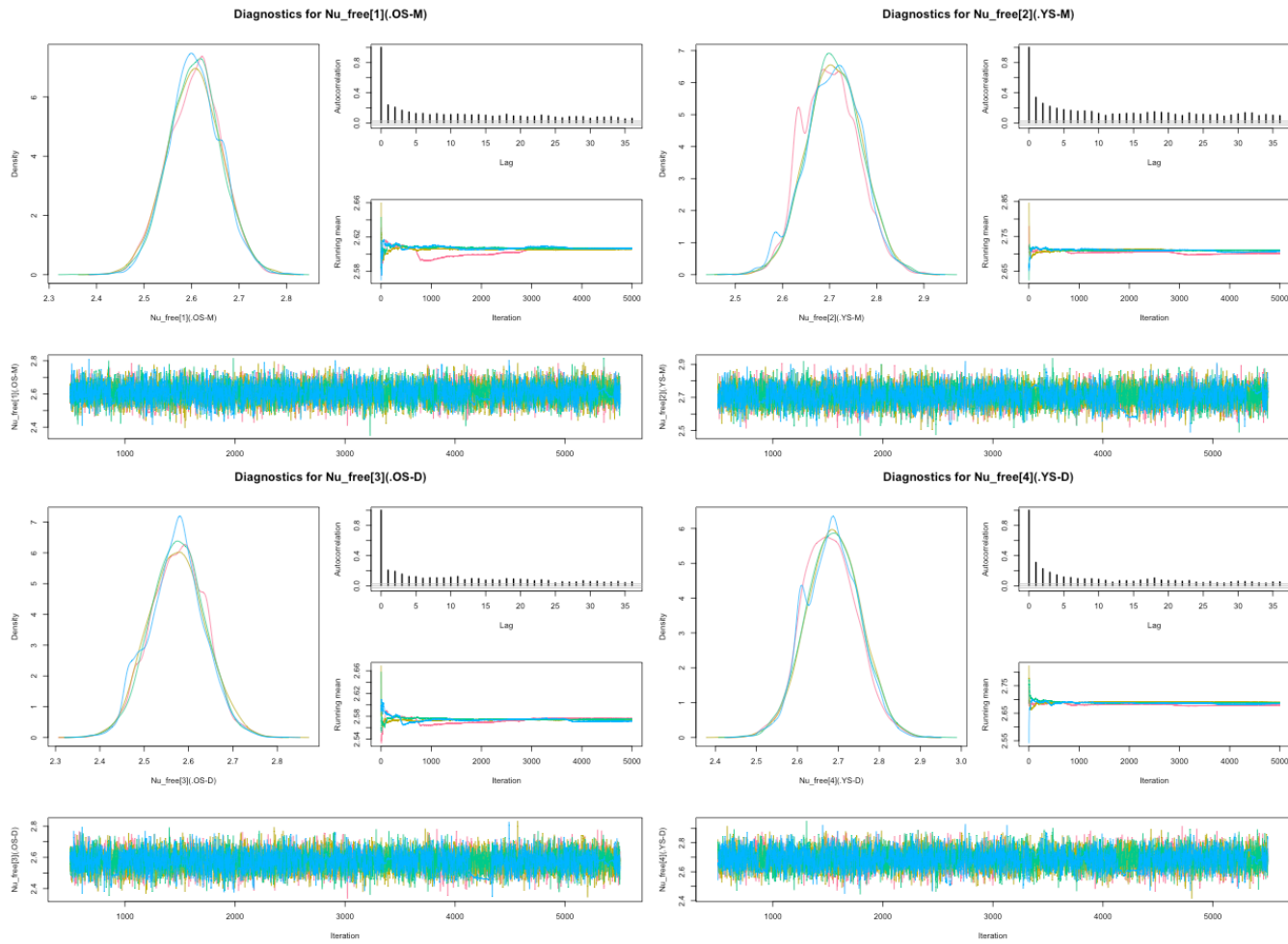


Figure 98. Model 3a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

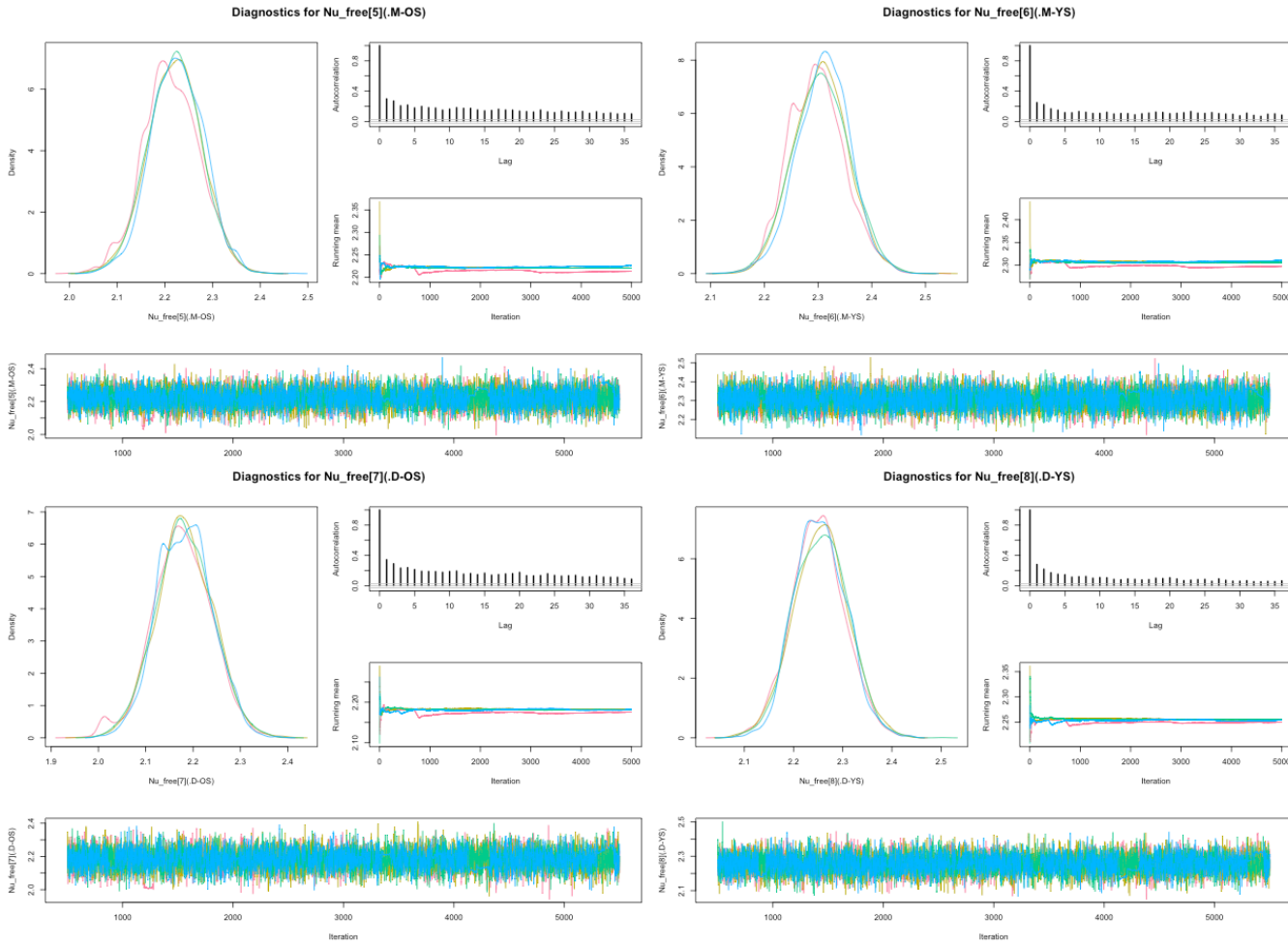


Figure 99. Model 3a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

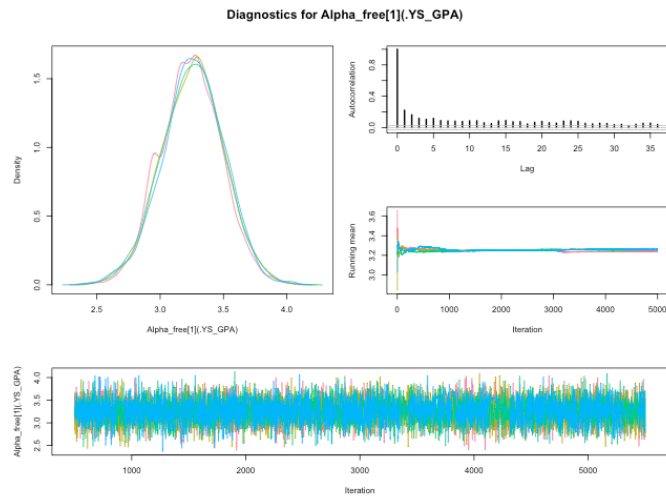


Figure 100. Model 3a MCMC Diagnostic Plots of Regression Intercept Parameter

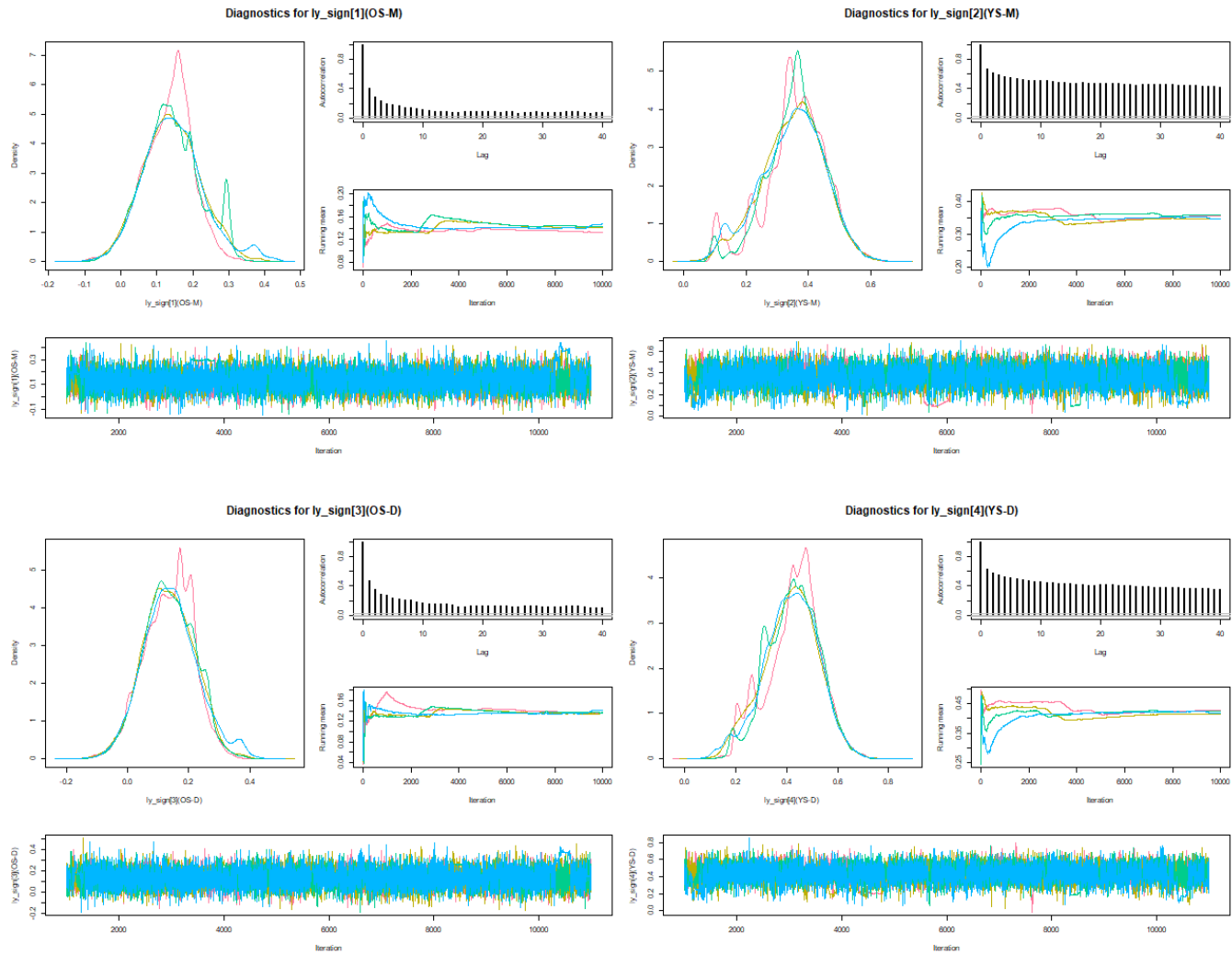


Figure 101. Model 3b MCMC Diagnostic Plots of Factor Loading Parameters

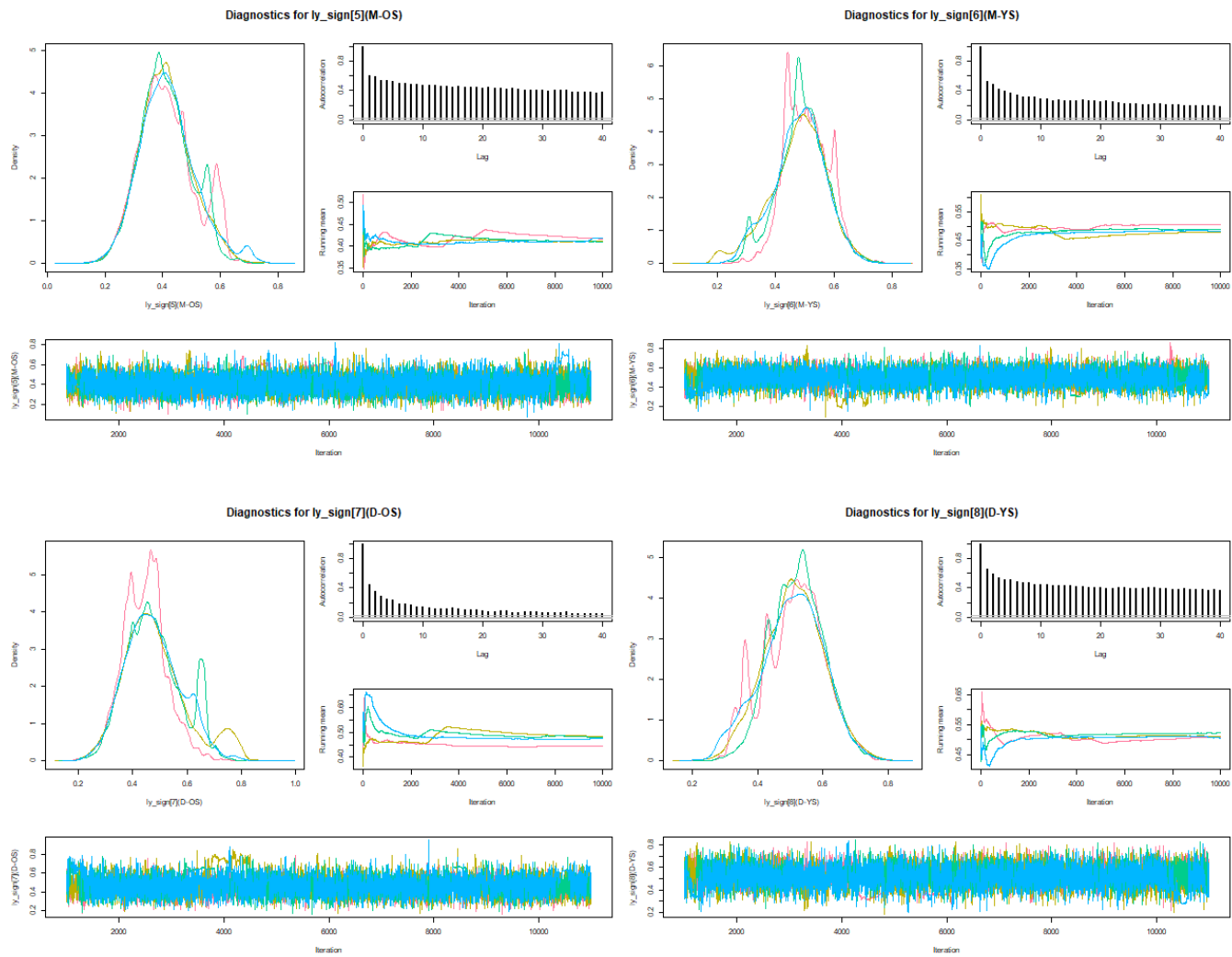


Figure 102. Model 3b MCMC Diagnostic Plots of Factor Loading Parameters

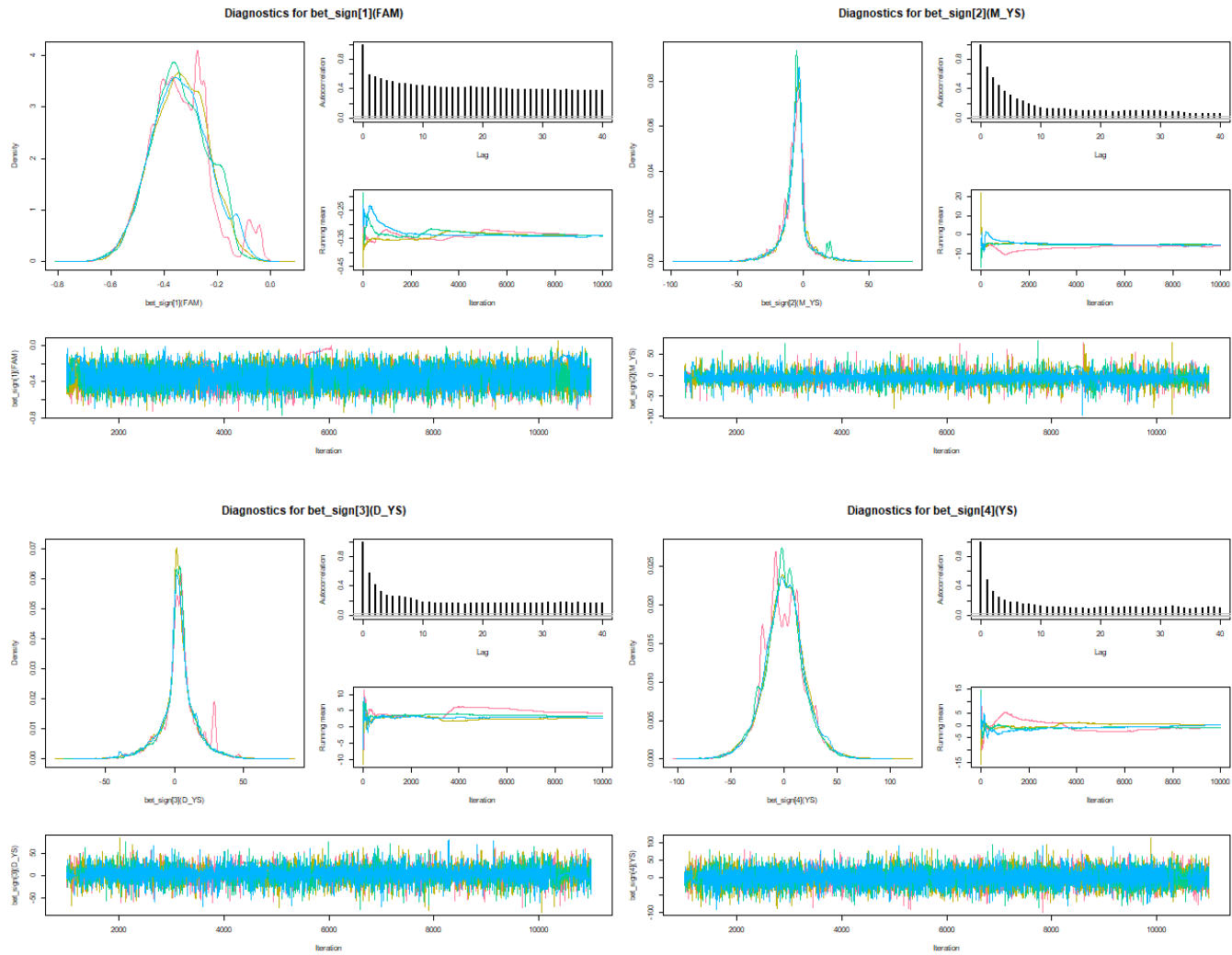


Figure 103. Model 3b MCMC Diagnostic Plots of Regression Coefficient Parameters

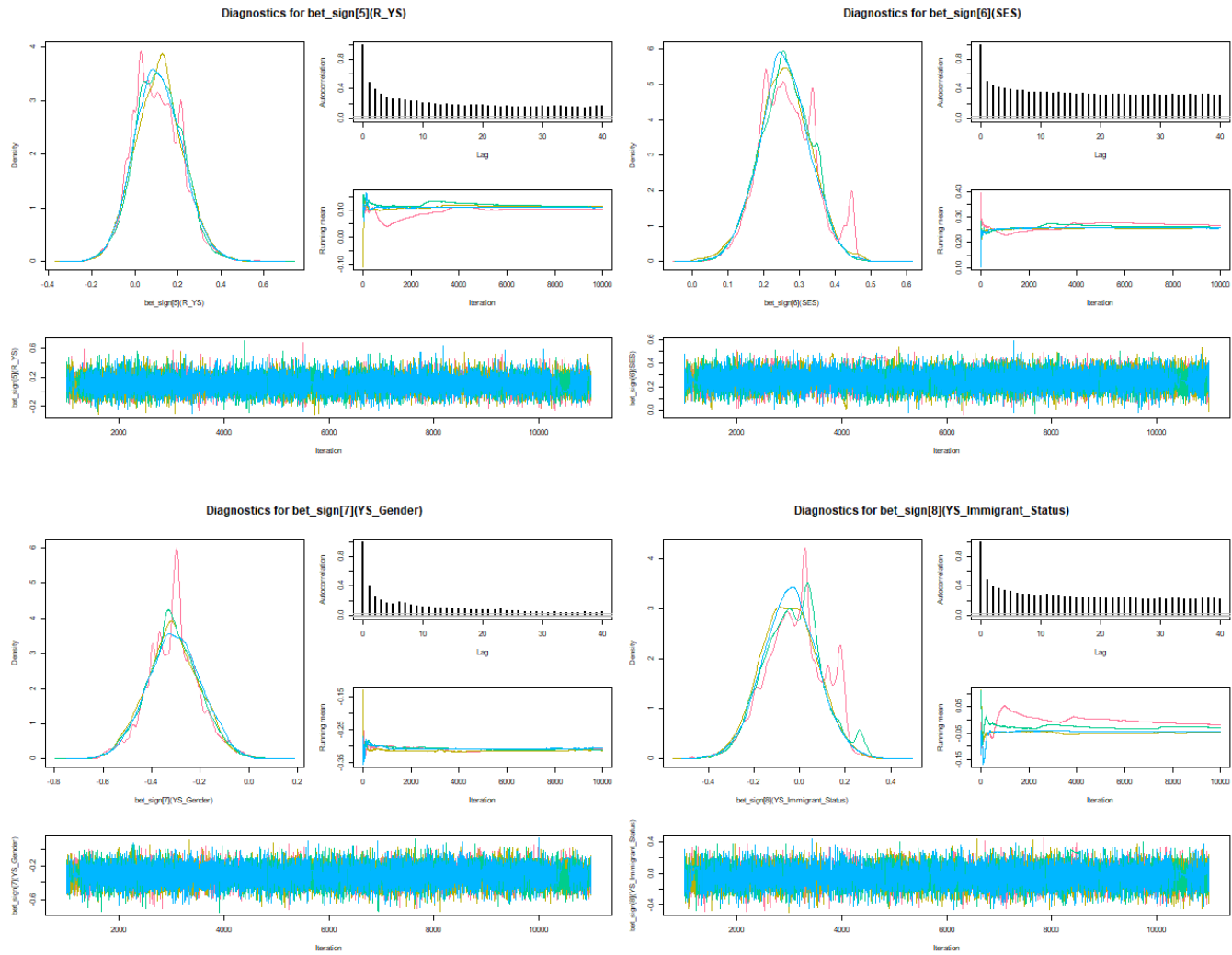


Figure 104. Model 3b MCMC Diagnostic Plots of Regression Coefficient Parameters

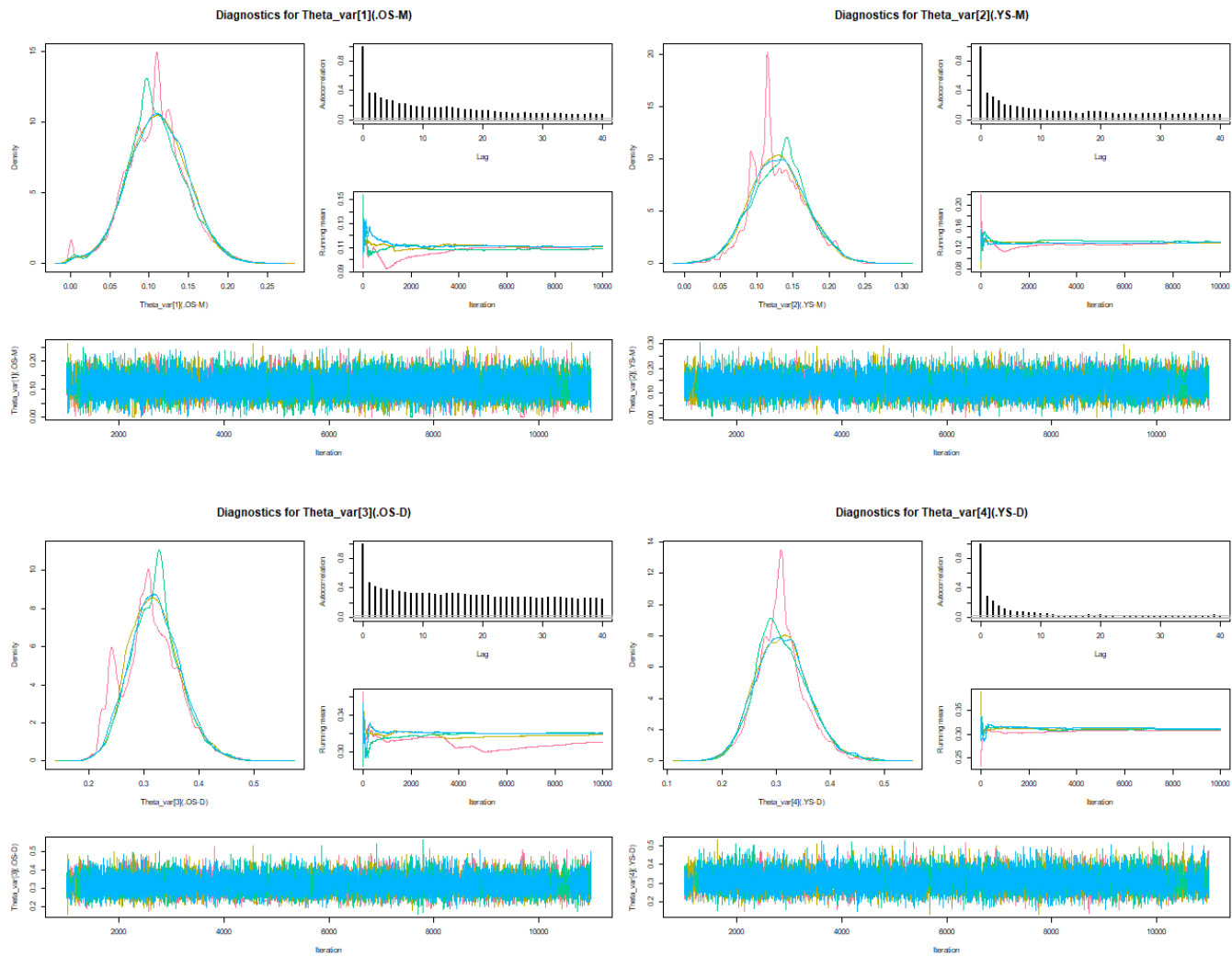


Figure 105. Model 3b MCMC Diagnostic Plots of Measured Variable Variance Parameters

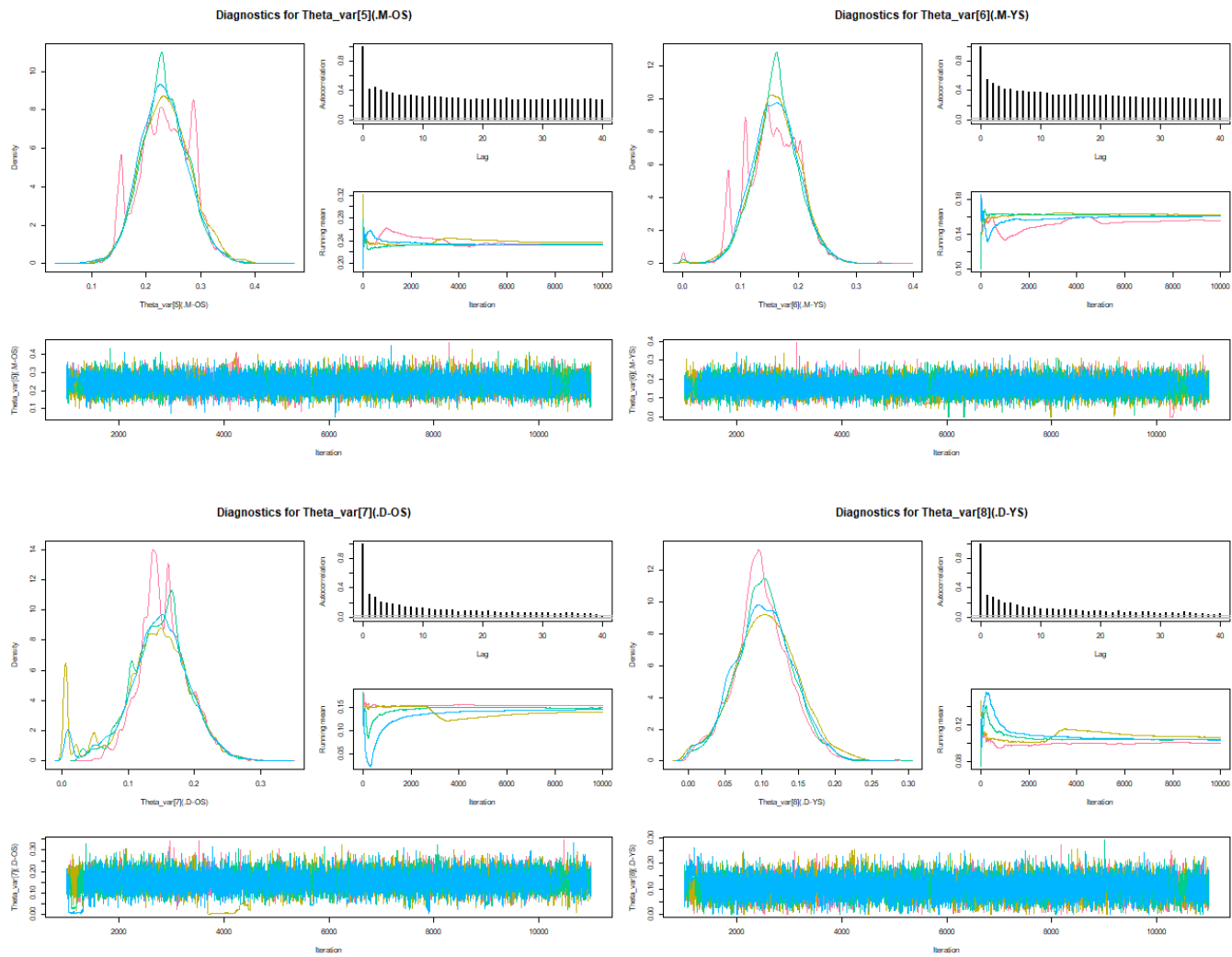


Figure 106. Model 3b MCMC Diagnostic Plots of Measured Variable Variance Parameters

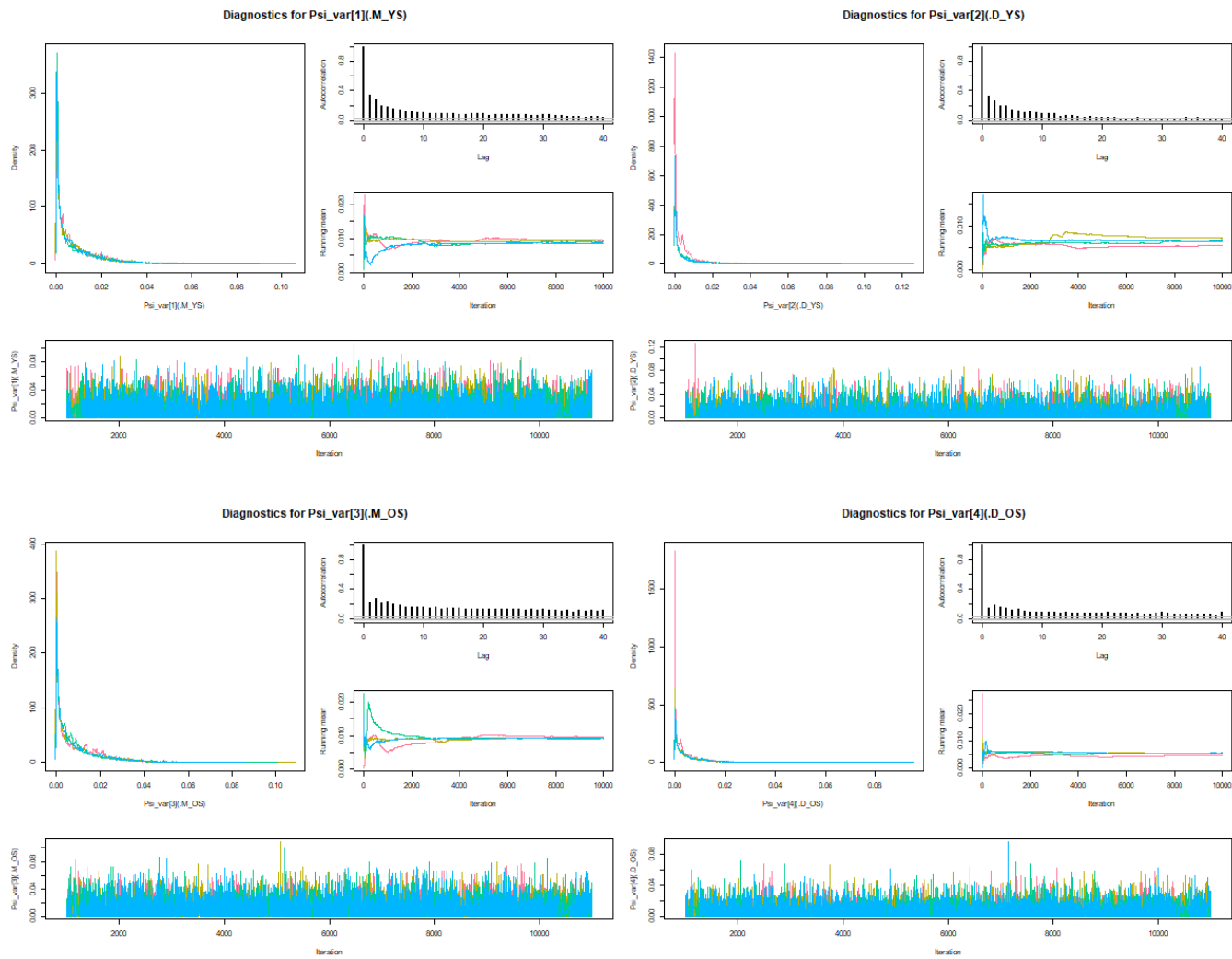


Figure 107. Model 3b MCMC Diagnostic Plots of Latent Variable Variance Parameters

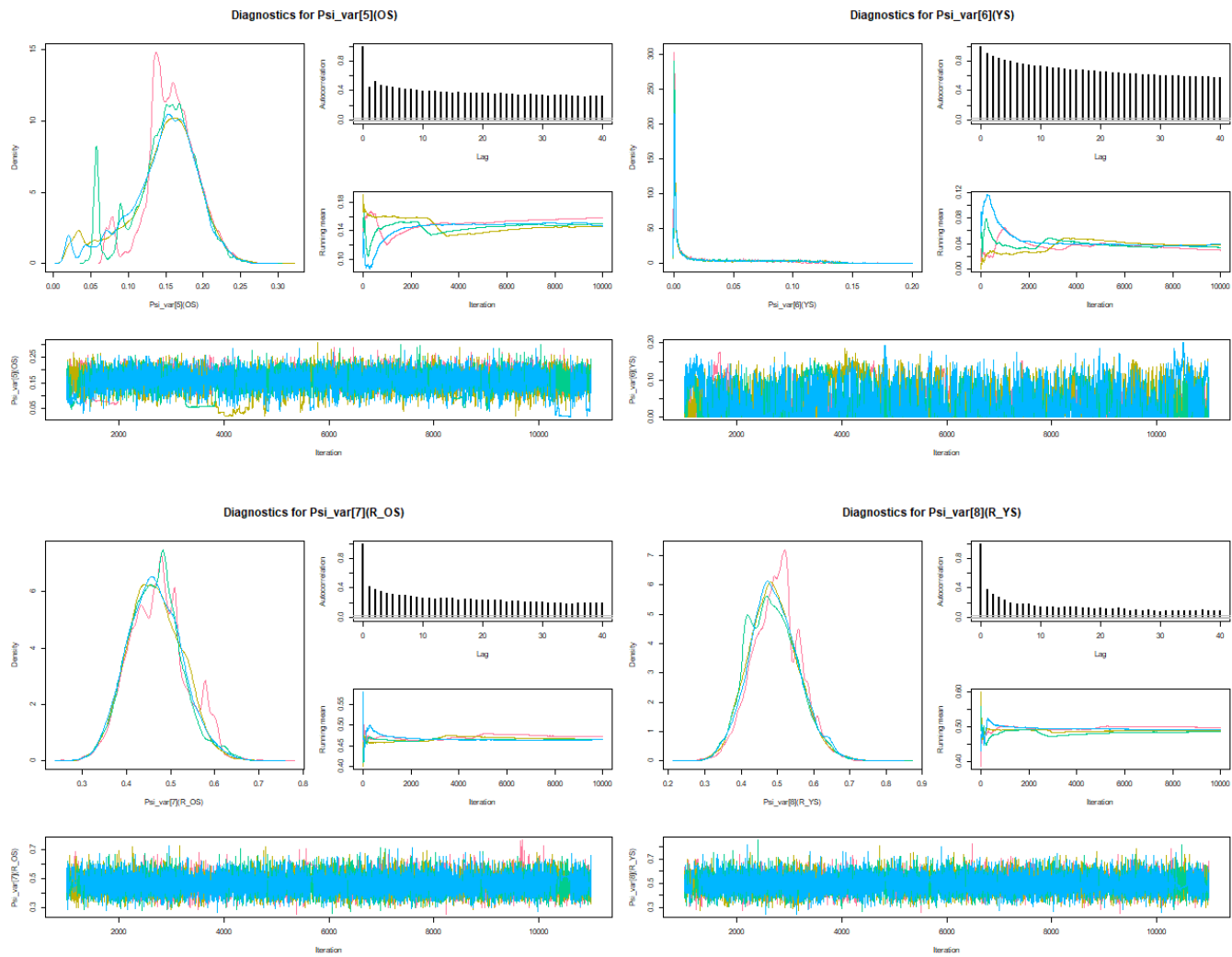


Figure 108. Model 3b MCMC Diagnostic Plots of Latent Variable Variance Parameters

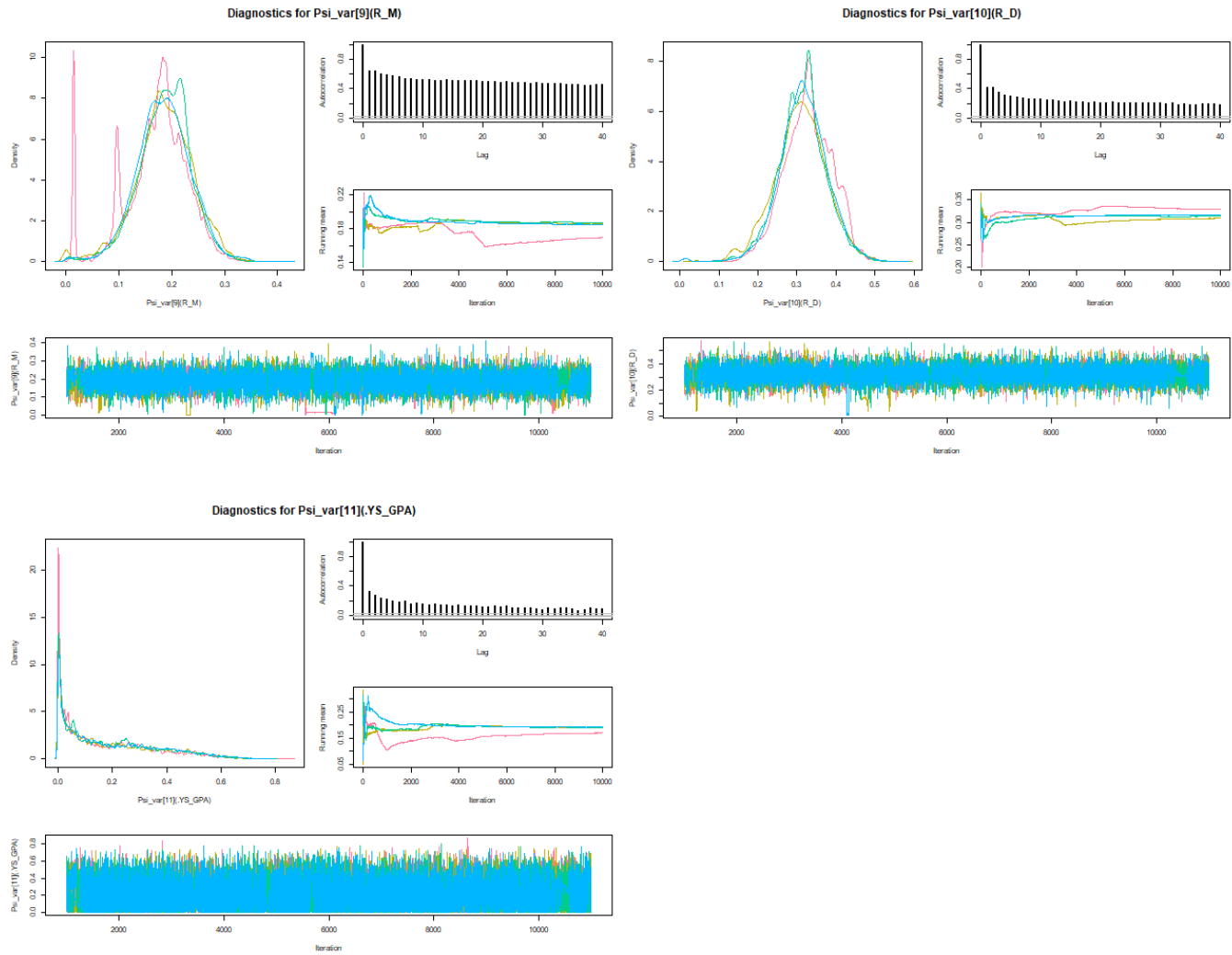


Figure 109. Model 3b MCMC Diagnostic Plots of Latent Variable Variance Parameters

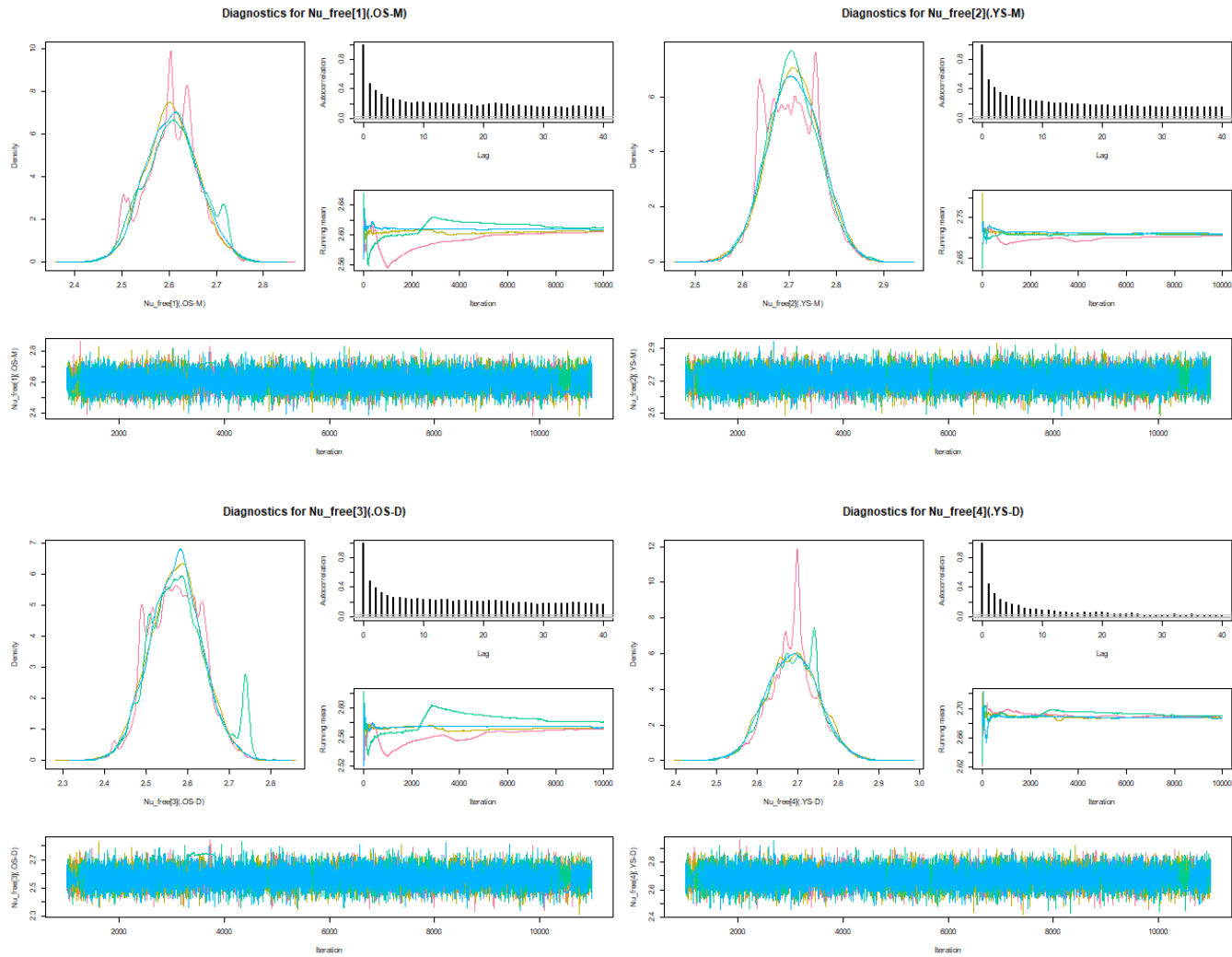


Figure 110. Model 3b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

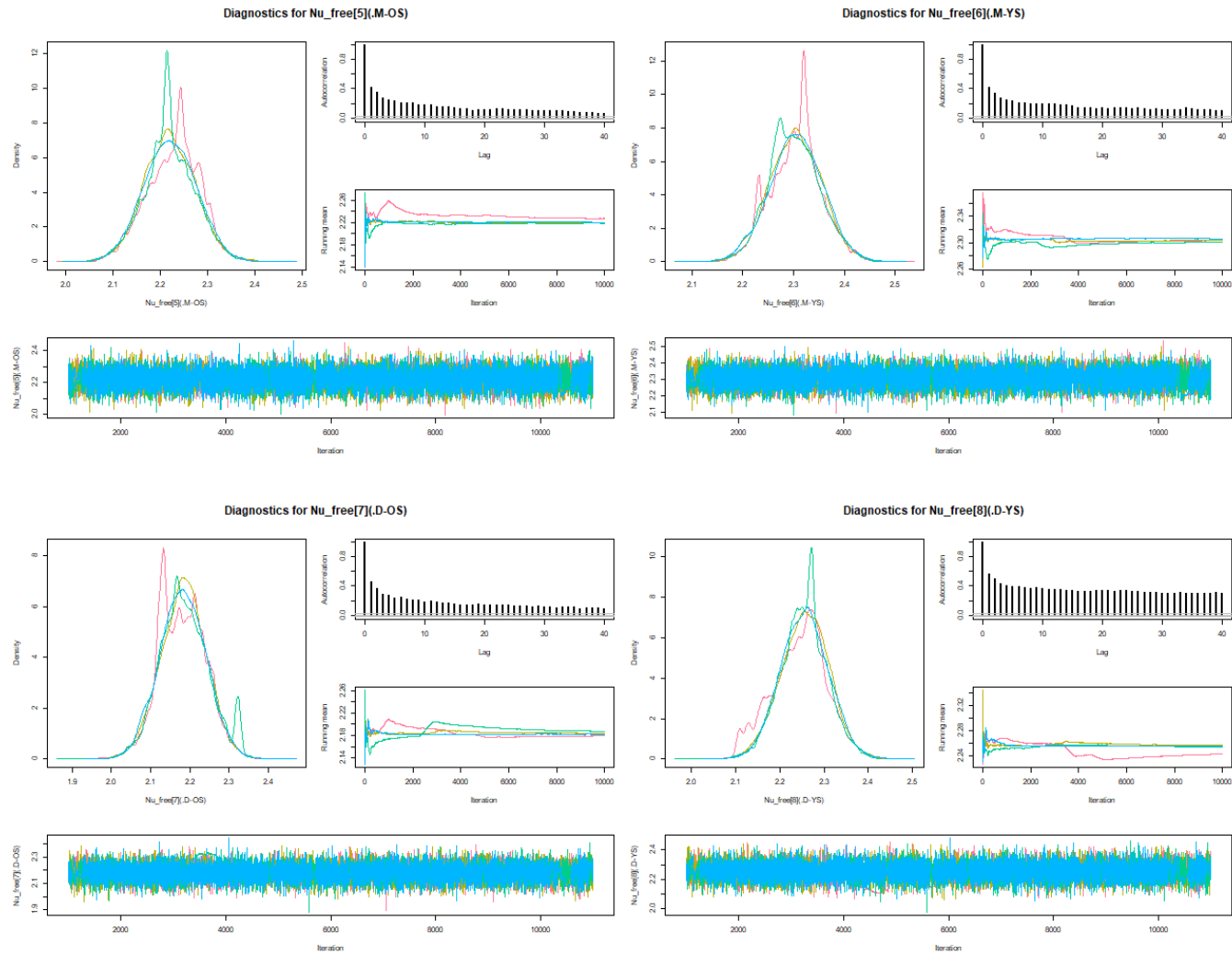


Figure 111. Model 3b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

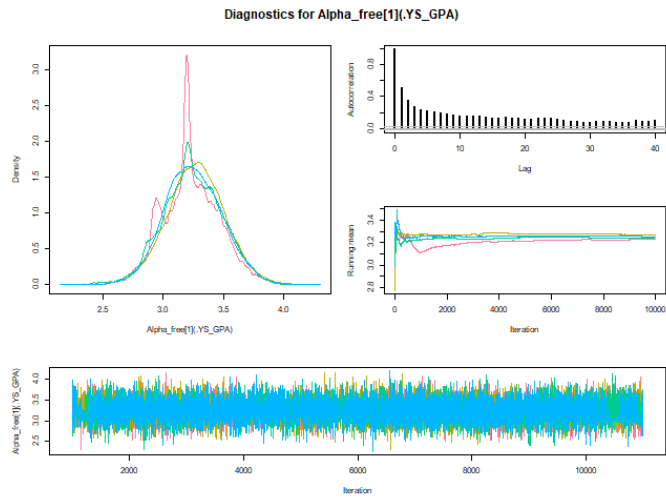


Figure 112. Model 3b MCMC Diagnostic Plots of Regression Intercept Parameter

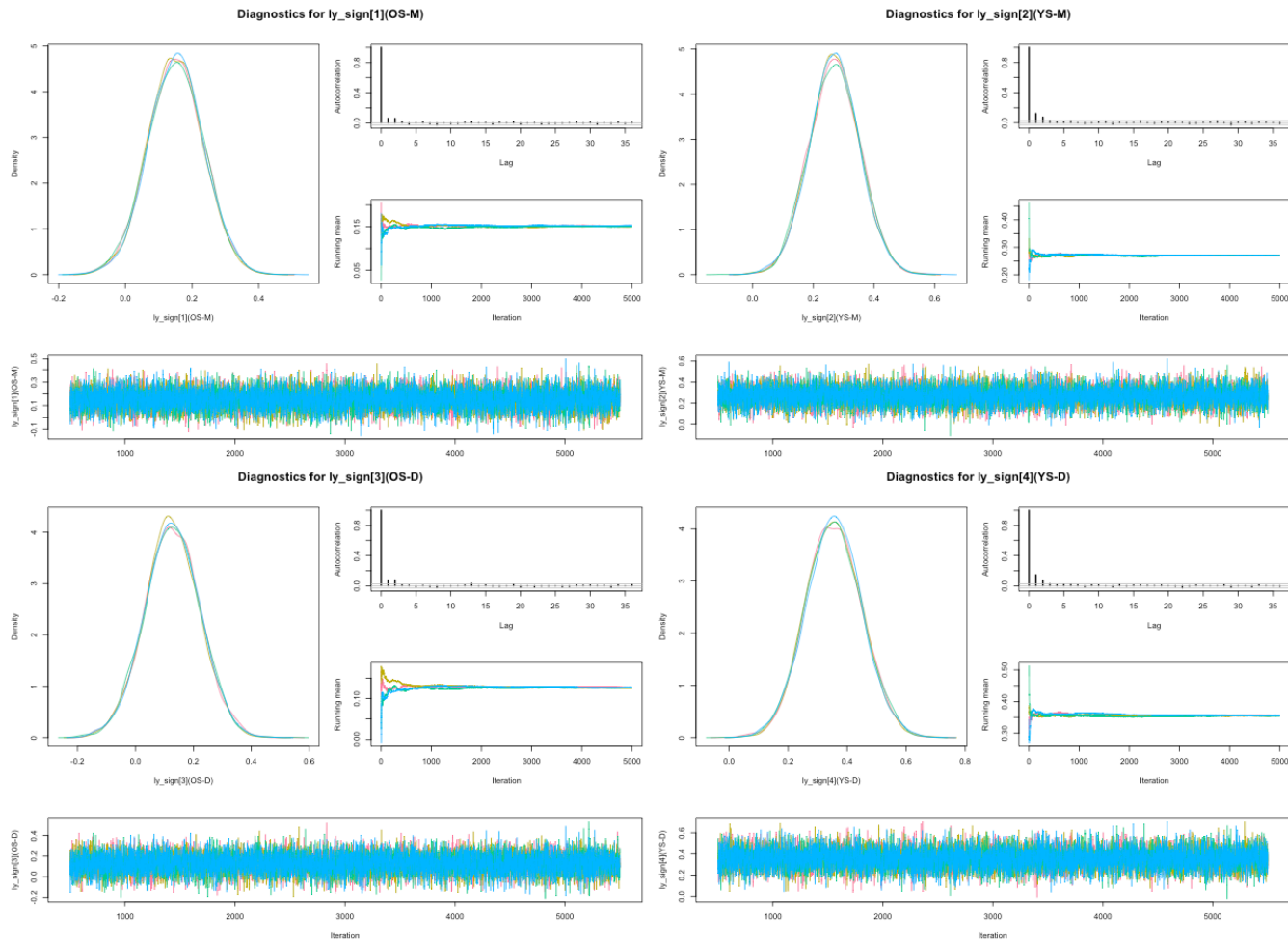


Figure 113. Model 3 MCMC Diagnostic Plots of Factor Loading Parameters

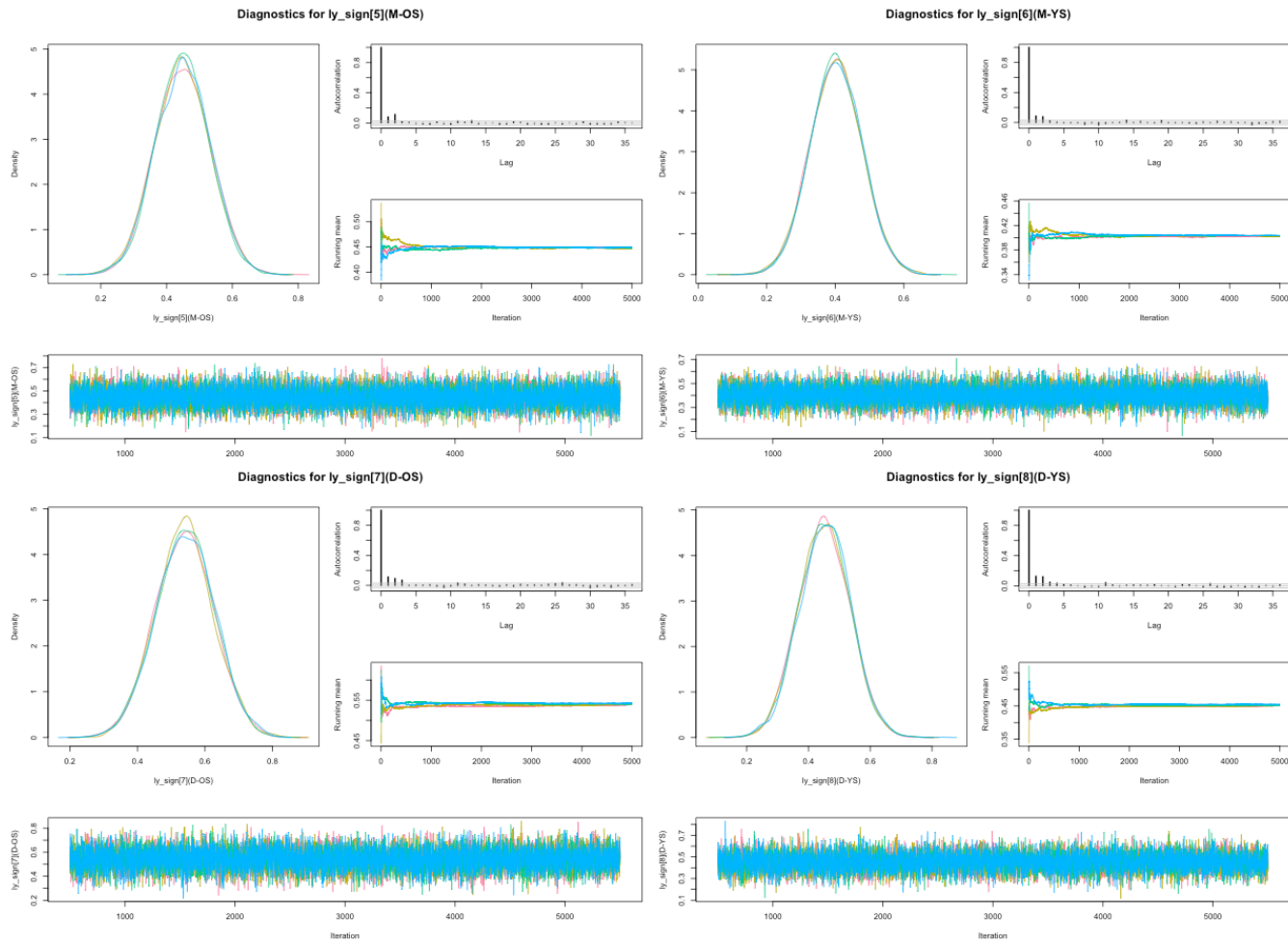


Figure 114. Model 3 MCMC Diagnostic Plots of Factor Loading Parameters

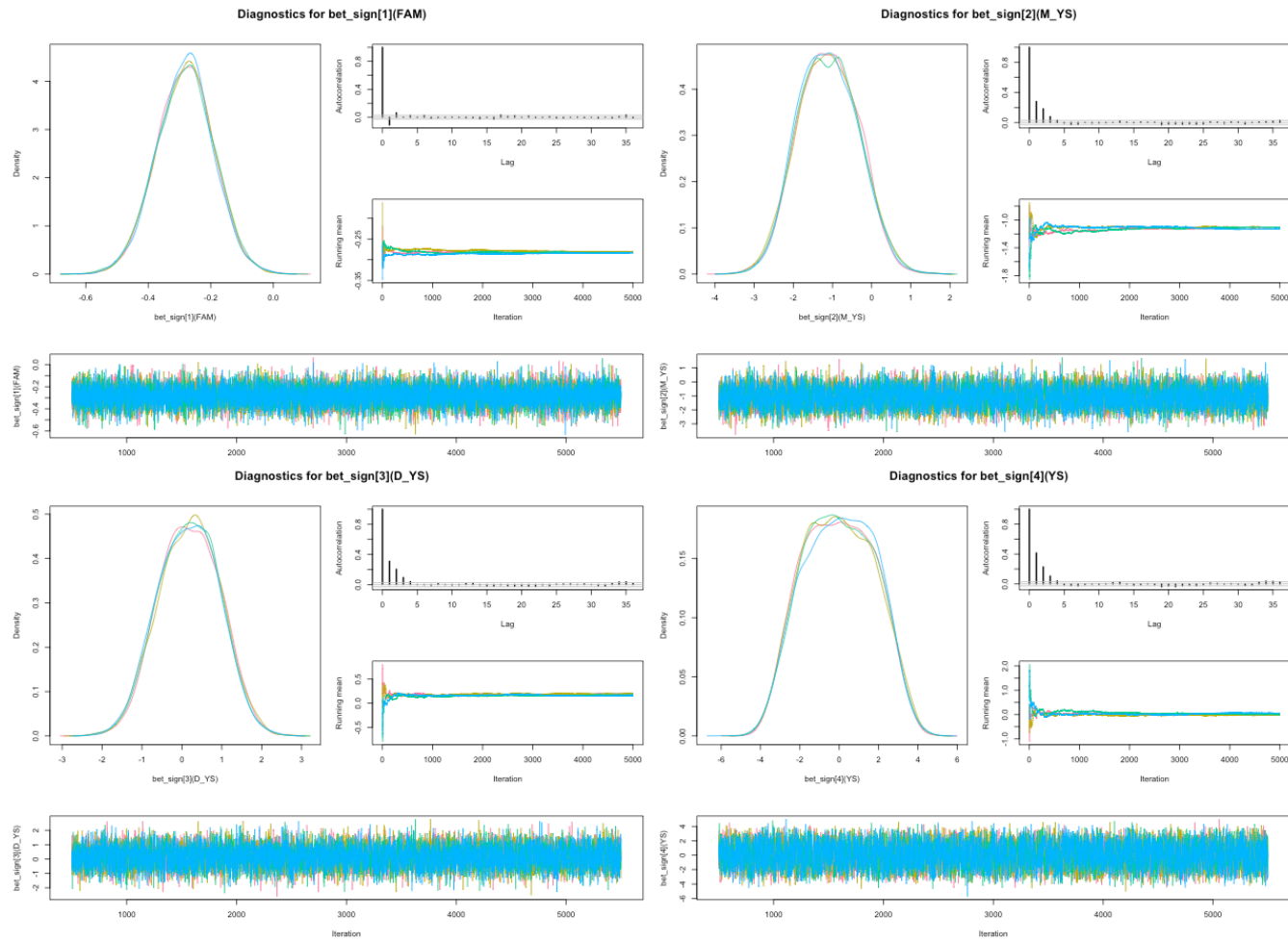


Figure 115. Model 3 MCMC Diagnostic Plots of Regression Coefficient Parameters

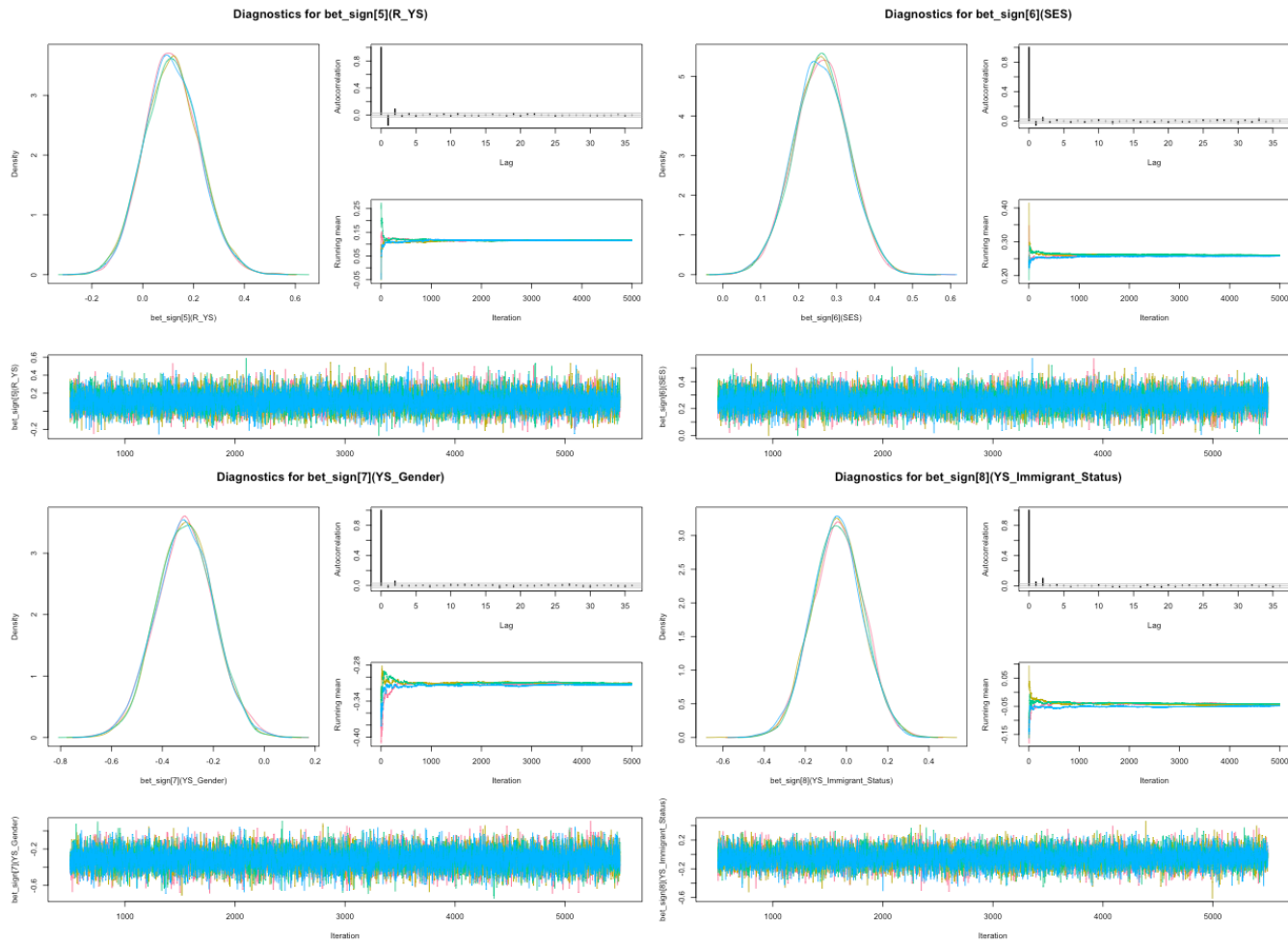


Figure 116. Model 3 MCMC Diagnostic Plots of Regression Coefficient Parameters

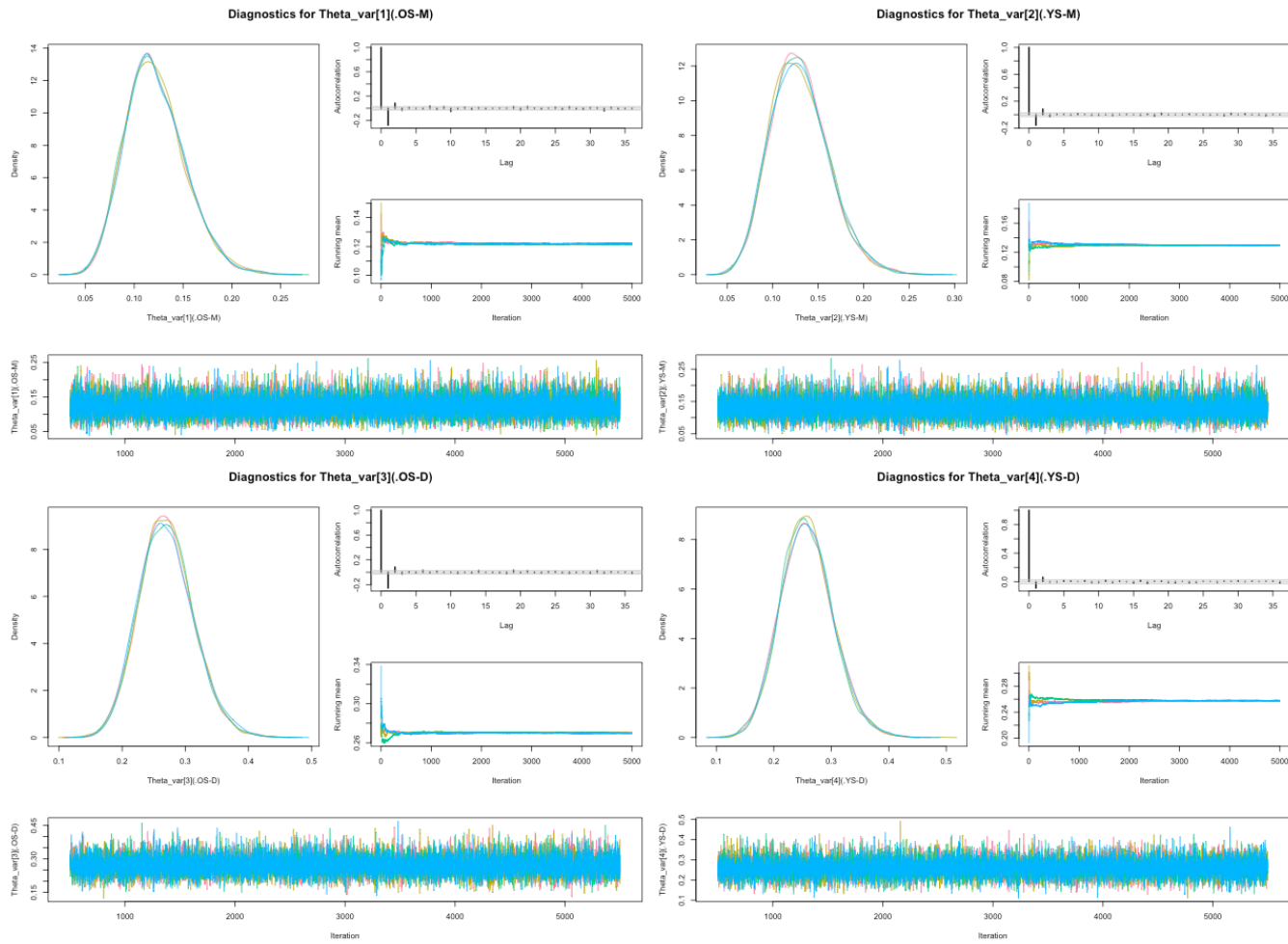


Figure 117. Model 3 MCMC Diagnostic Plots of Measured Variable Variance Parameters

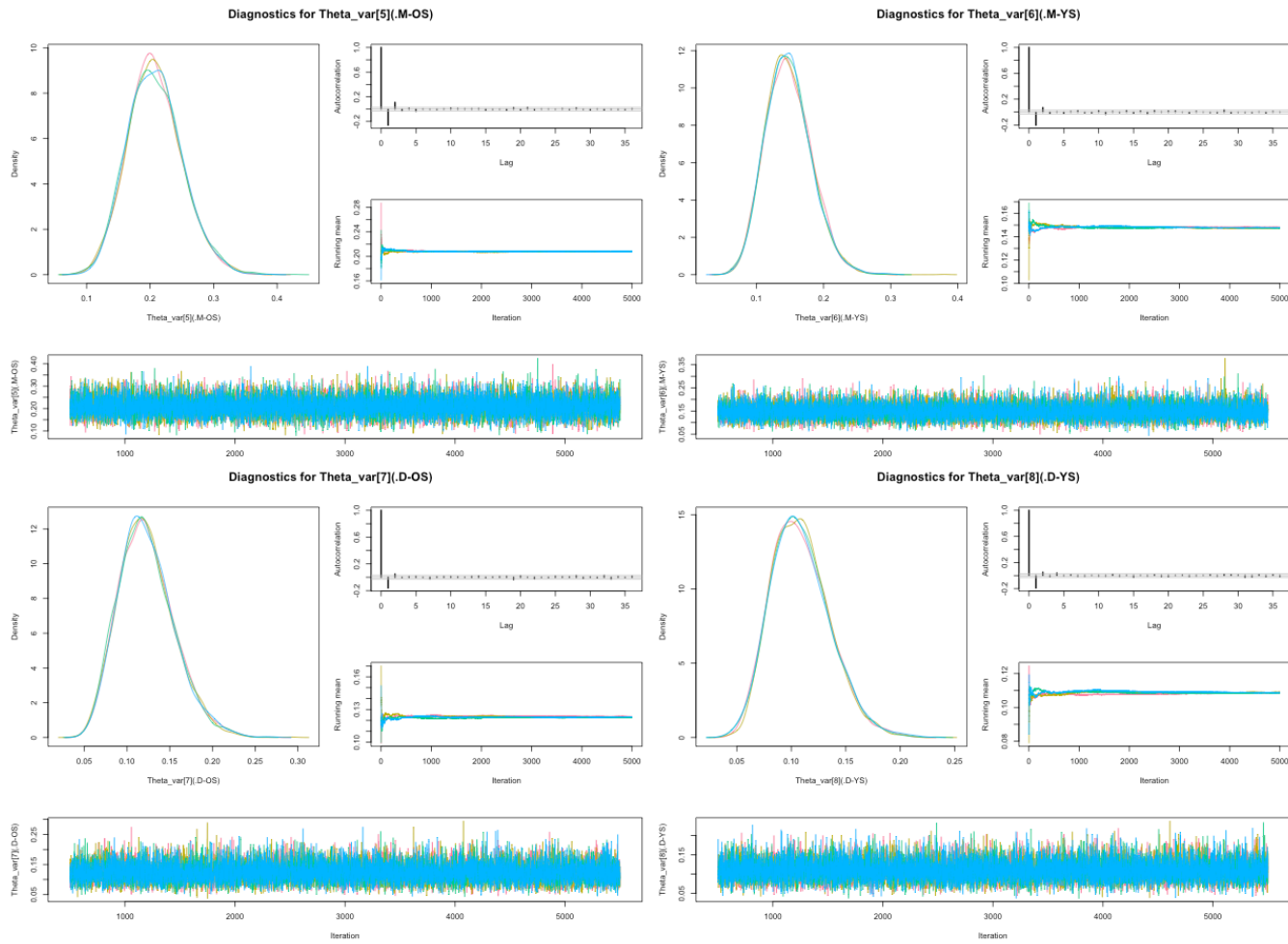


Figure 118. Model 3 MCMC Diagnostic Plots of Measured Variable Variance Parameters

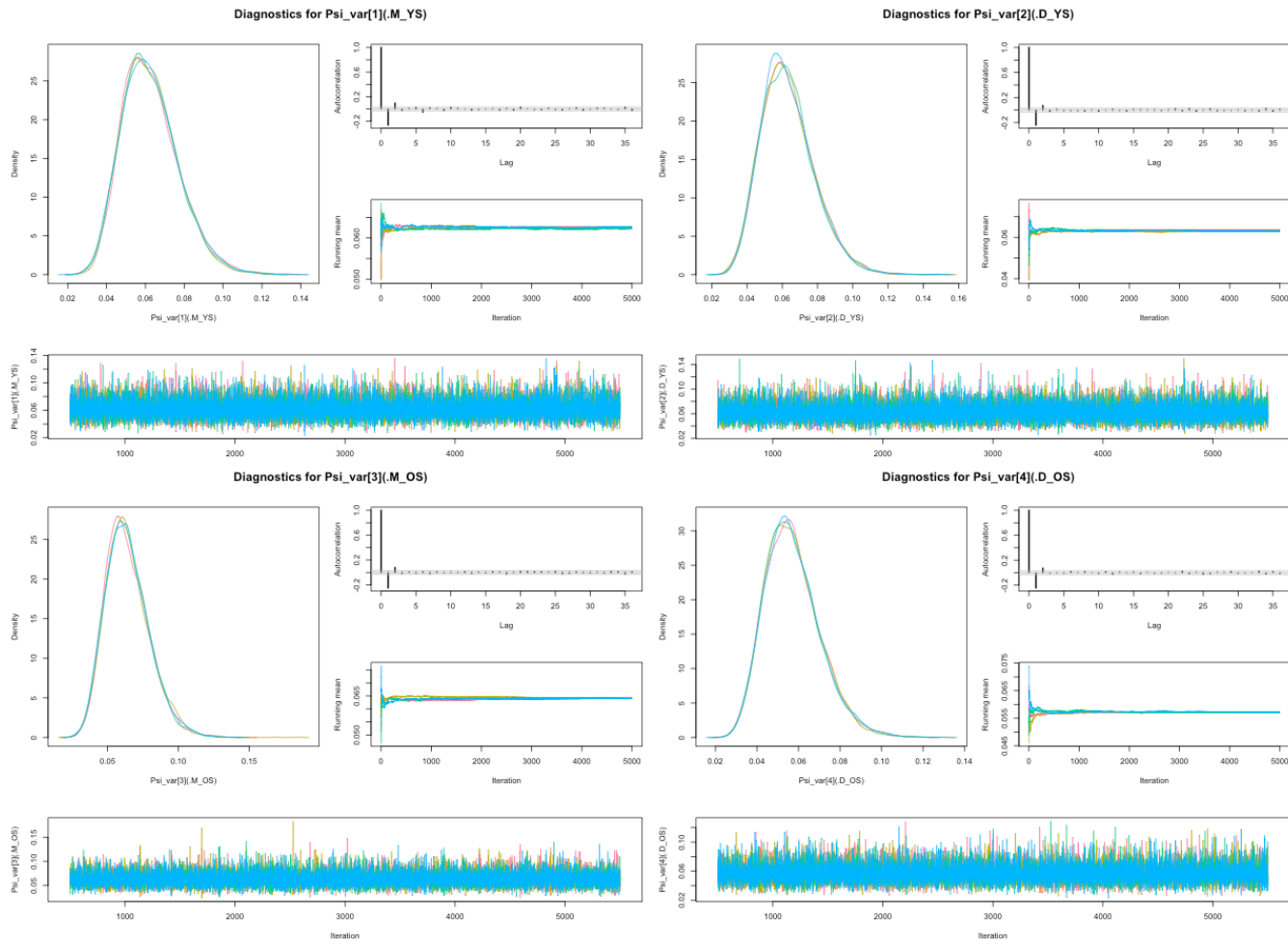


Figure 119. Model 3 MCMC Diagnostic Plots of Latent Variable Variance Parameters

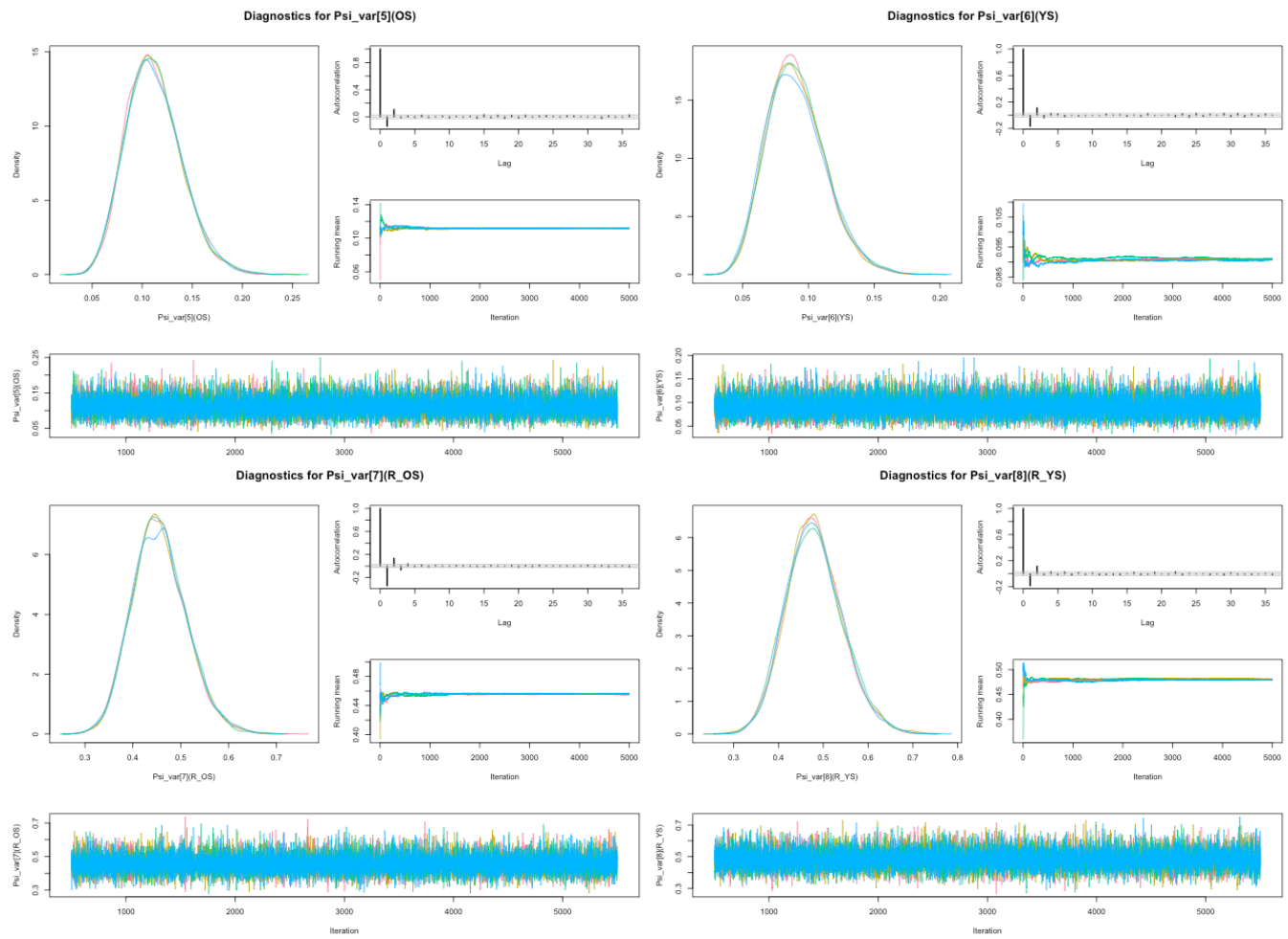


Figure 120. Model 3 MCMC Diagnostic Plots of Latent Variable Variance Parameters

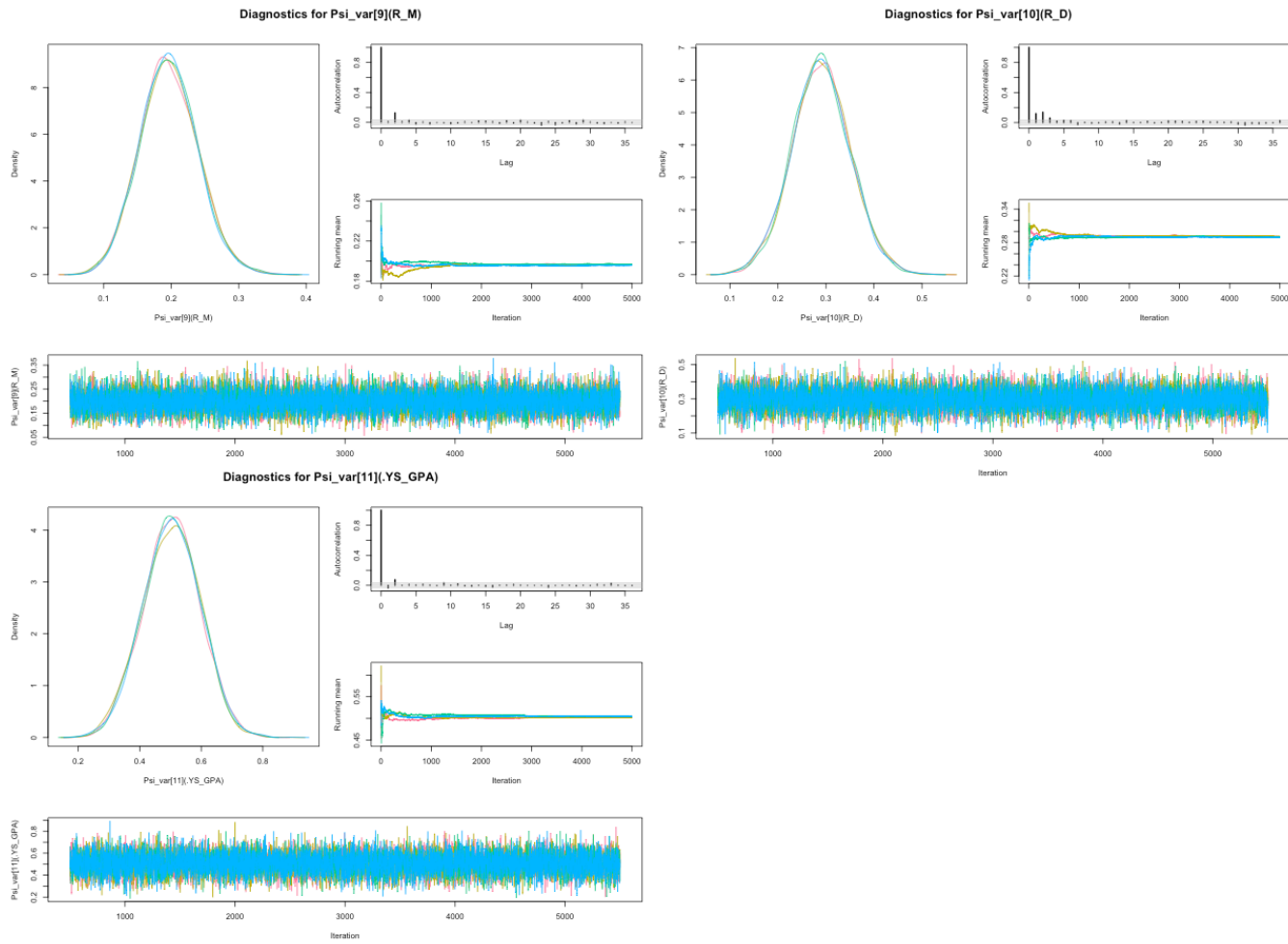


Figure 121. Model 3 MCMC Diagnostic Plots of Latent Variable Variance Parameters

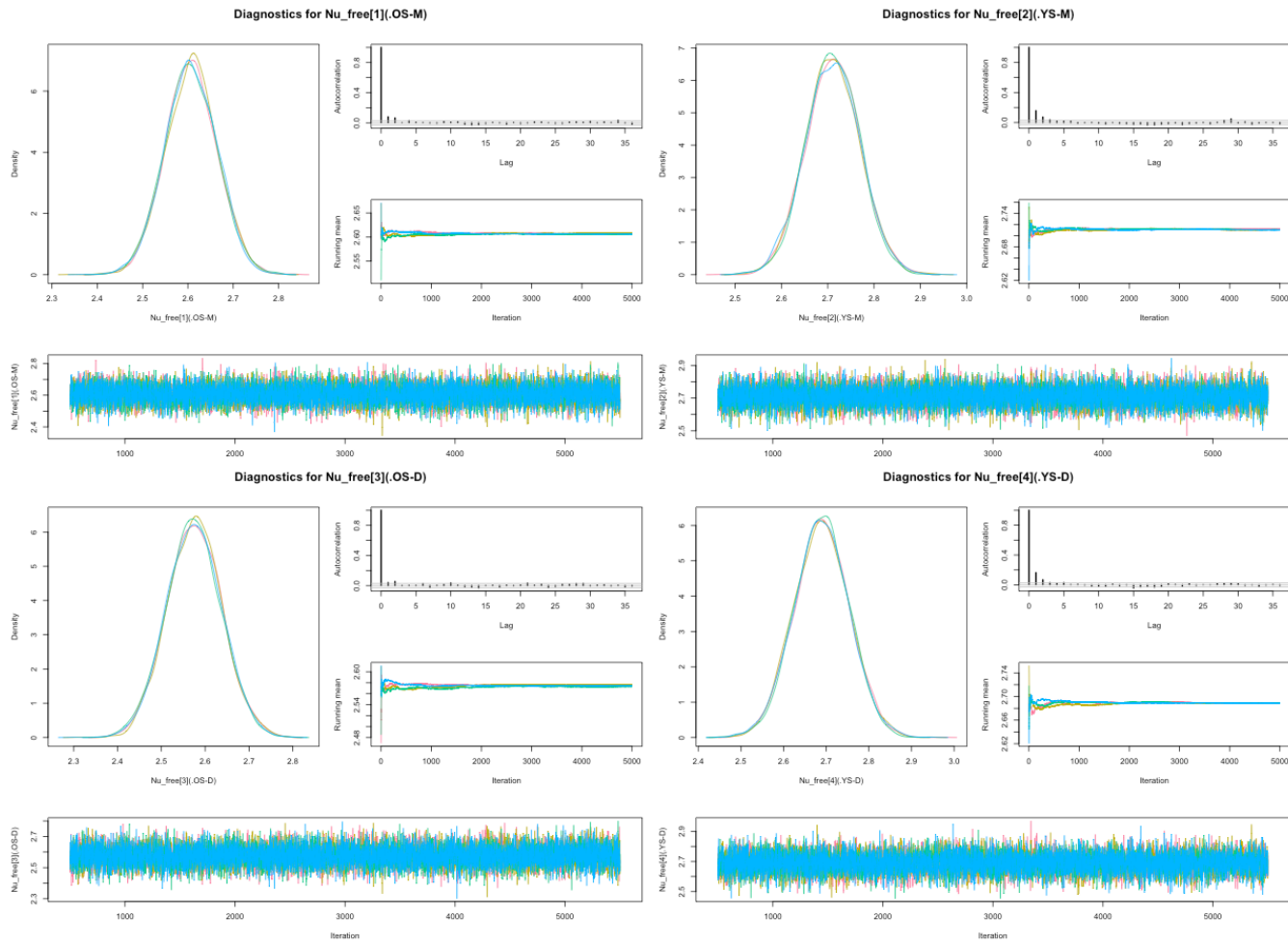


Figure 122. Model 3 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

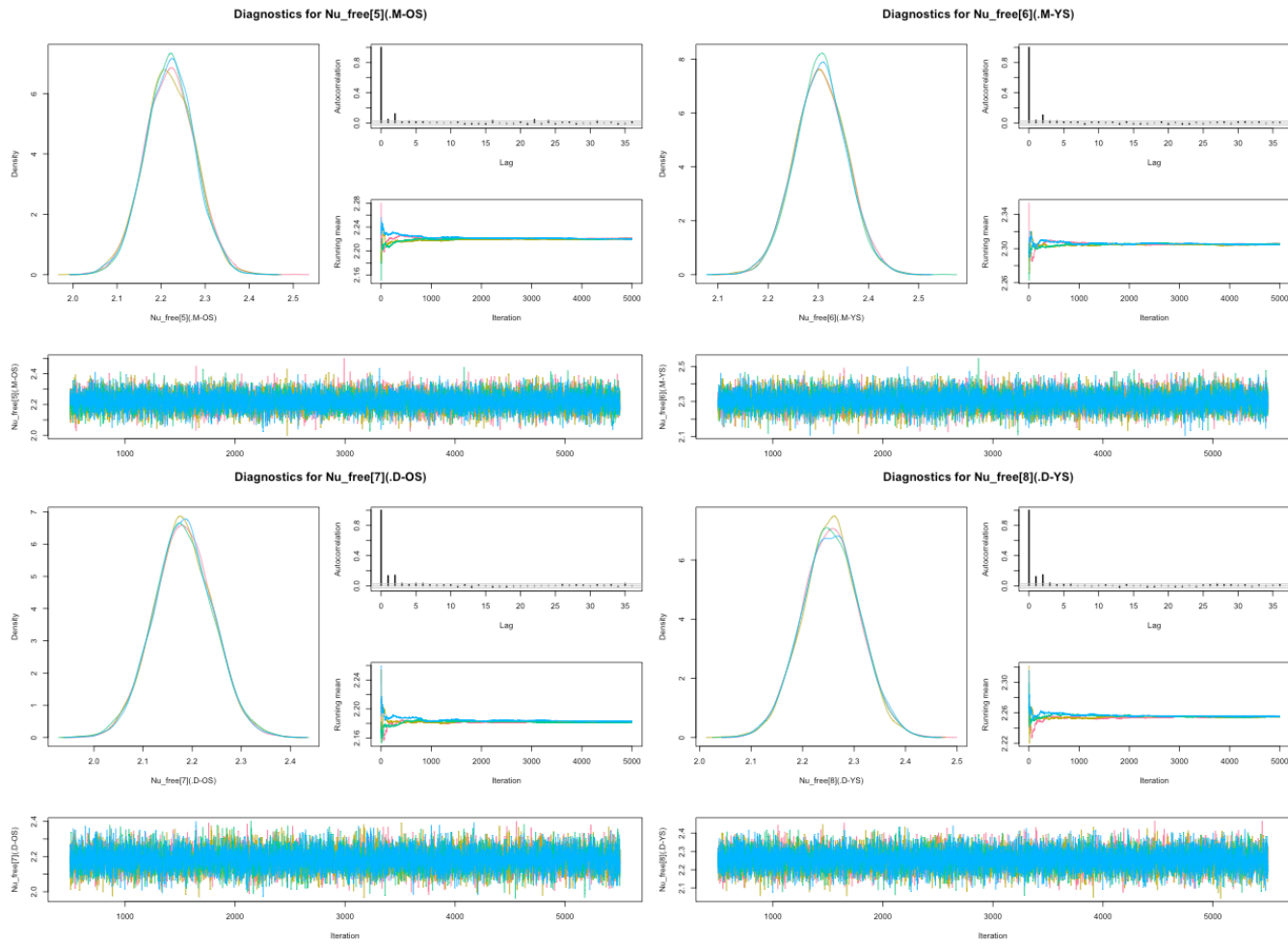


Figure 123. Model 3 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

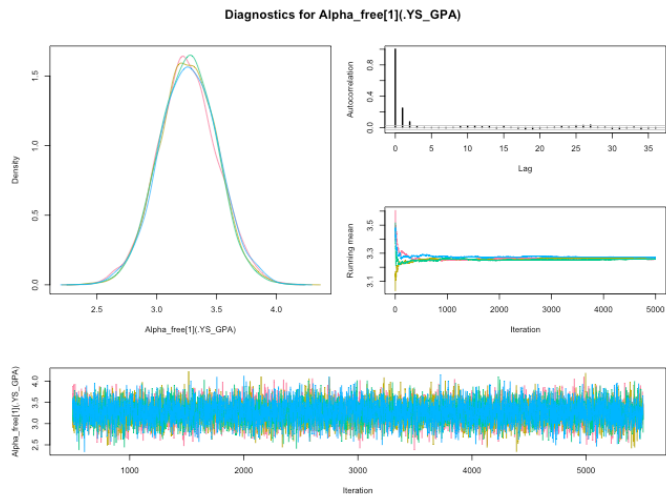


Figure 124. *Model 3 MCMC Diagnostic Plots of Regression Intercept Parameter*

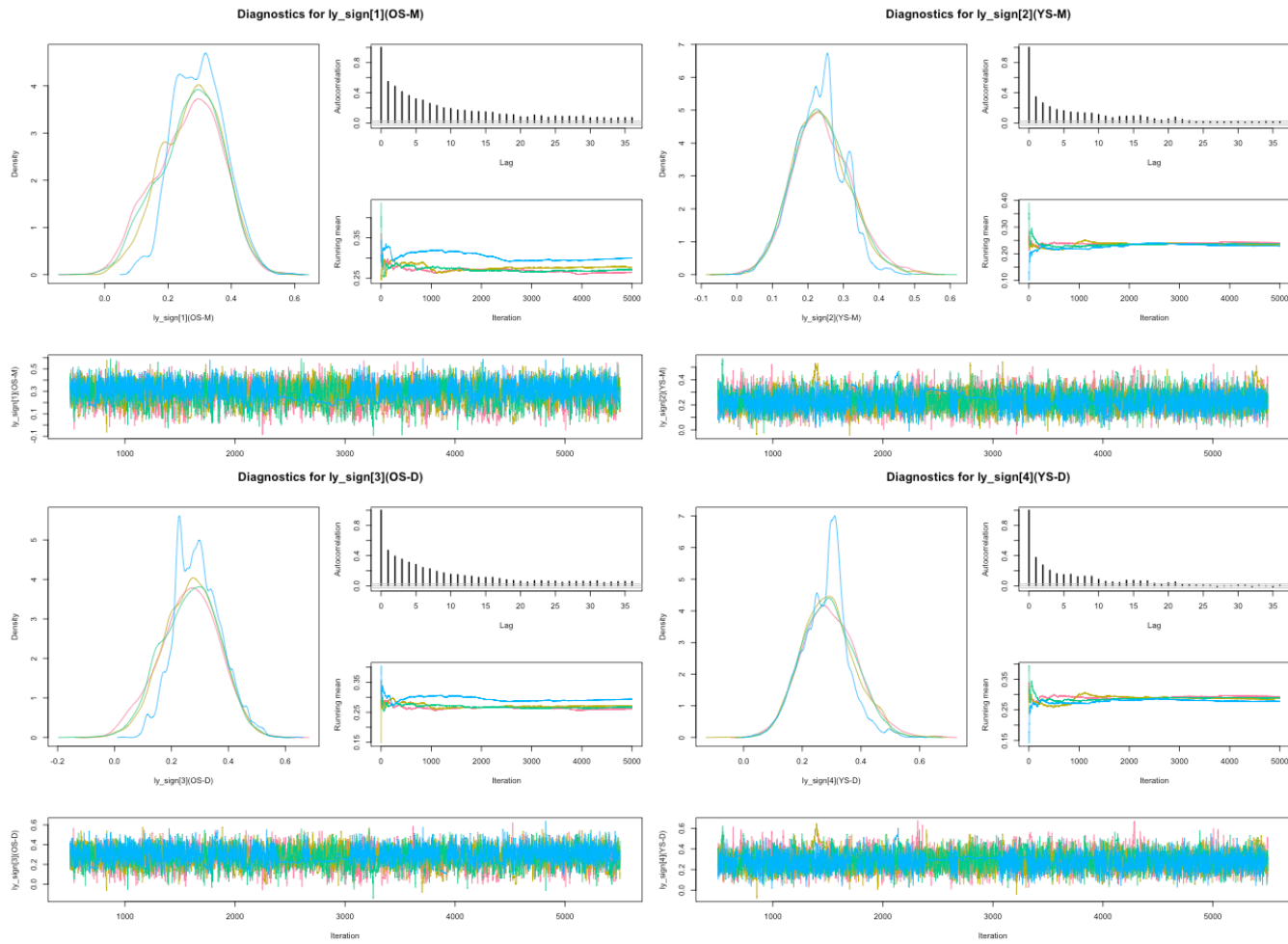


Figure 125. Model 4a MCMC Diagnostic Plots of Factor Loading Parameters

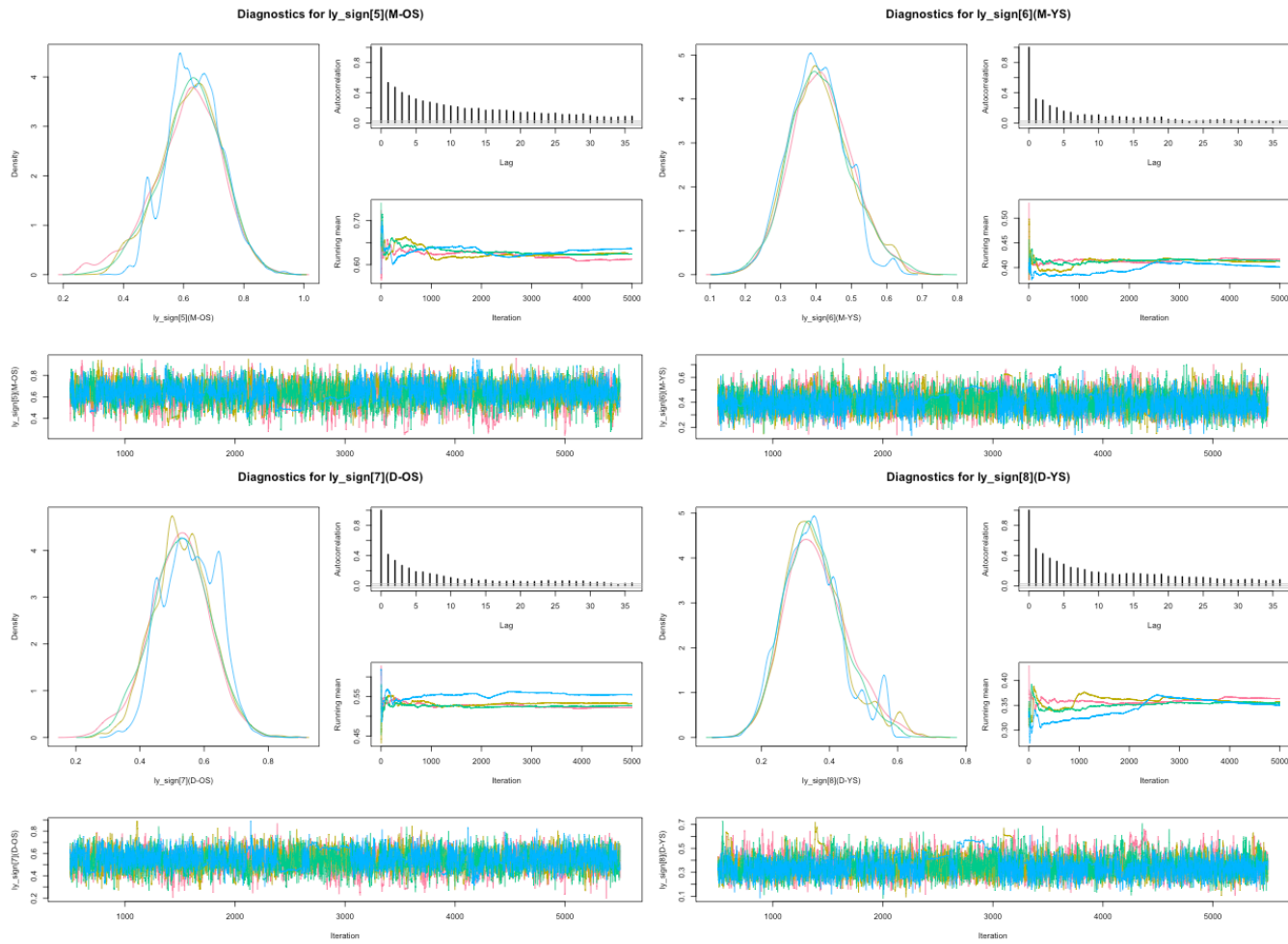


Figure 126. Model 4a MCMC Diagnostic Plots of Factor Loading Parameters

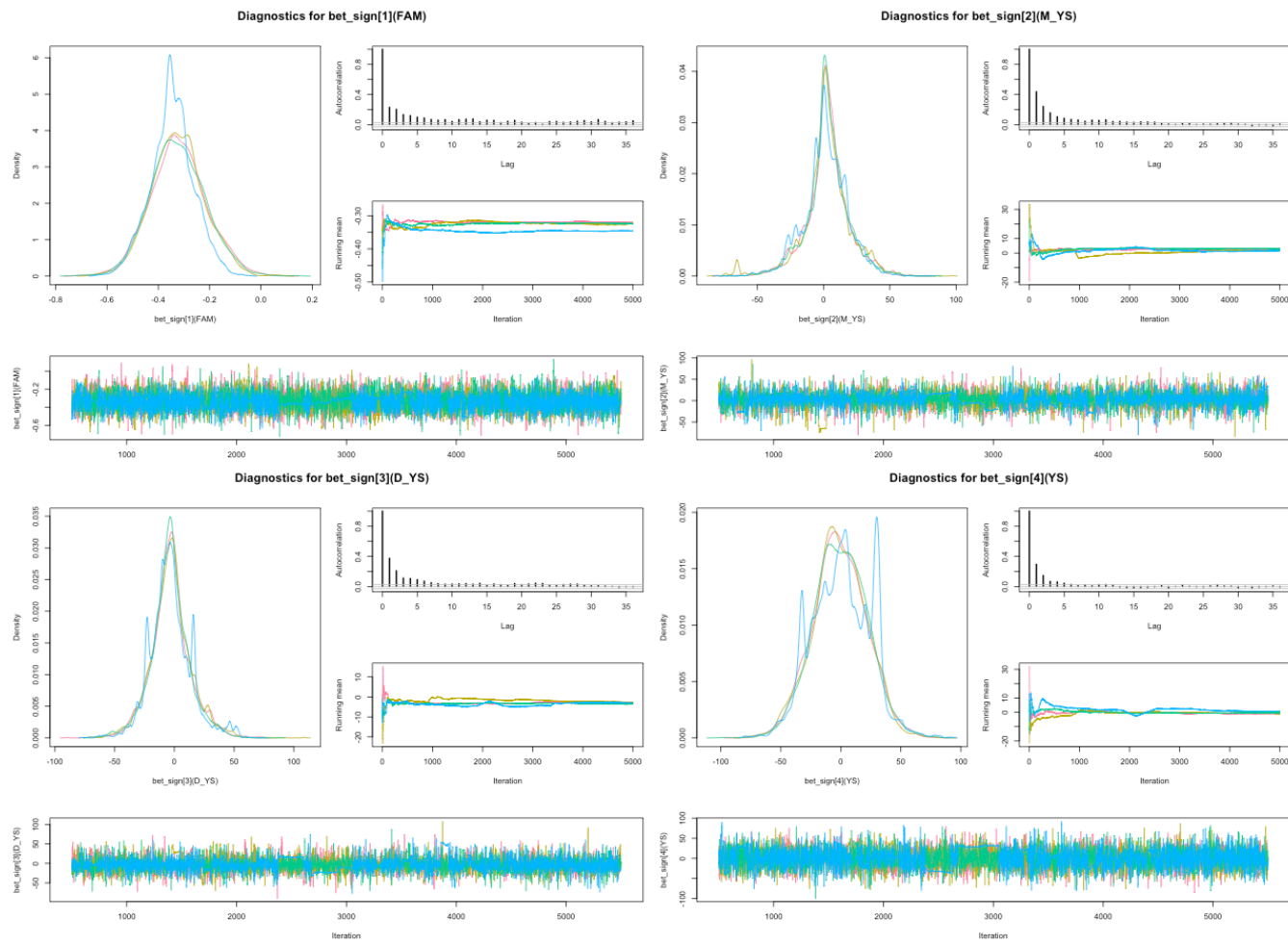


Figure 127. Model 4a MCMC Diagnostic Plots of Regression Coefficient Parameters

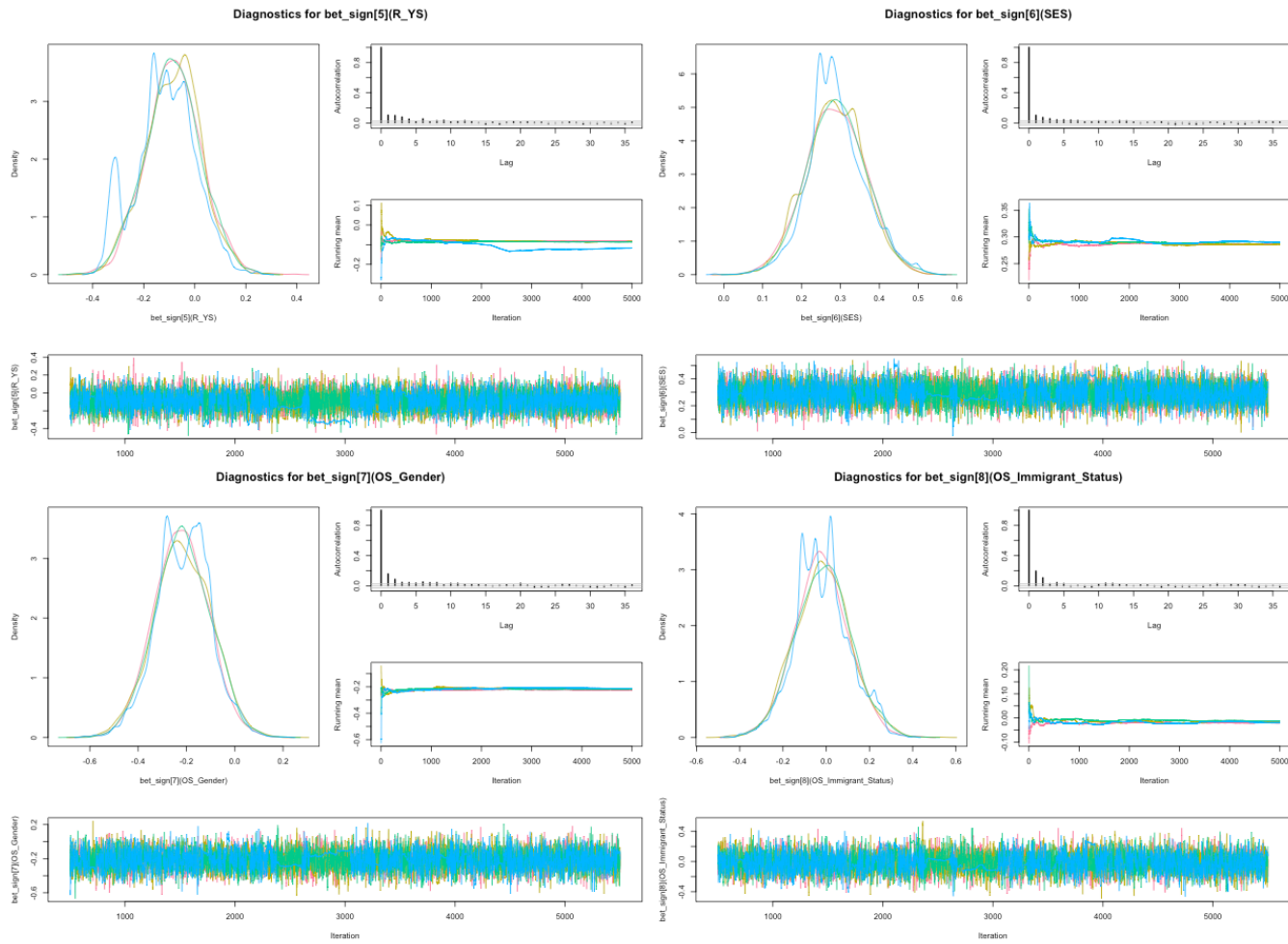


Figure 128. Model 4a MCMC Diagnostic Plots of Regression Coefficient Parameters

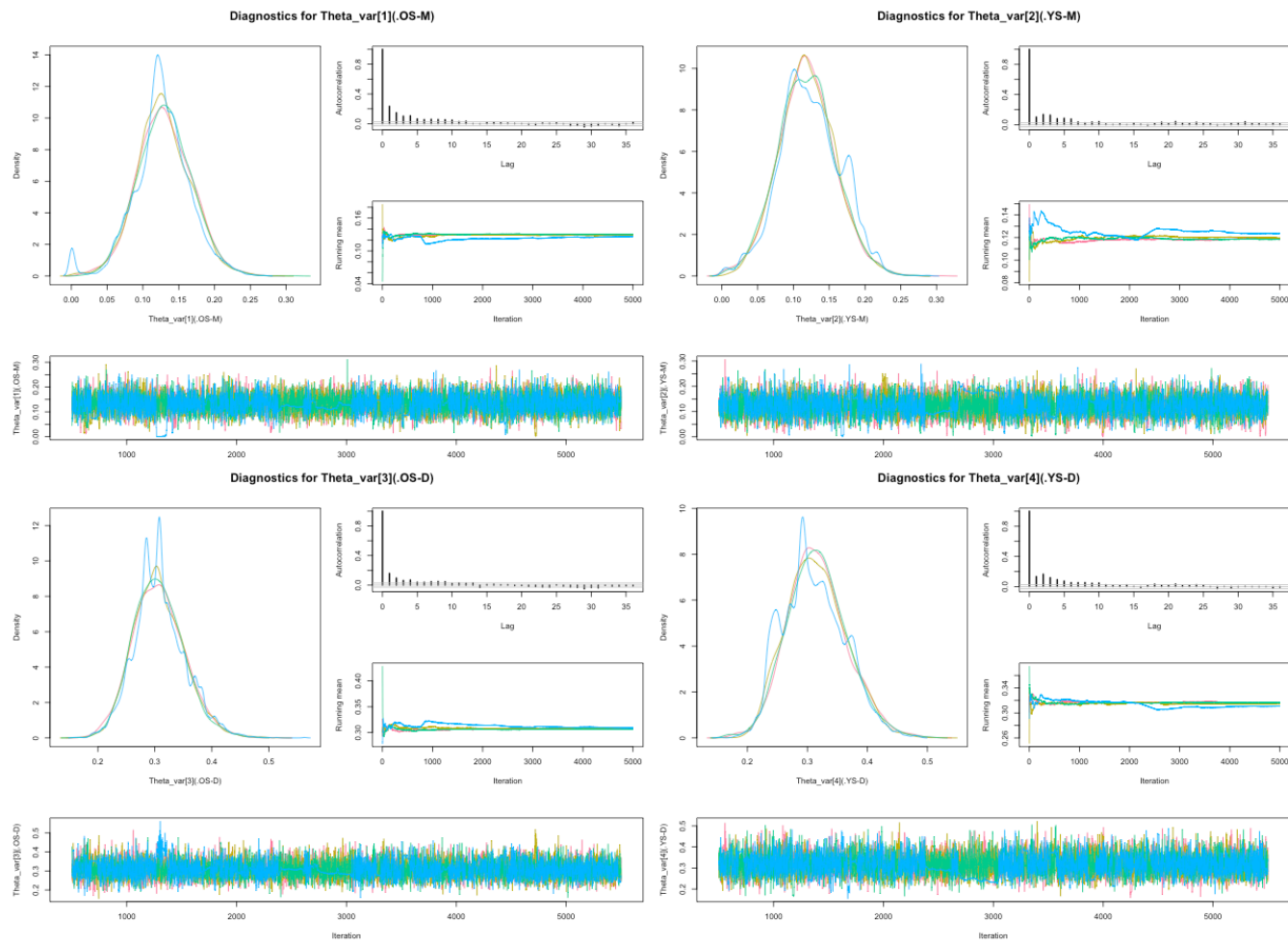


Figure 129. Model 4a MCMC Diagnostic Plots of Measured Variable Variance Parameters

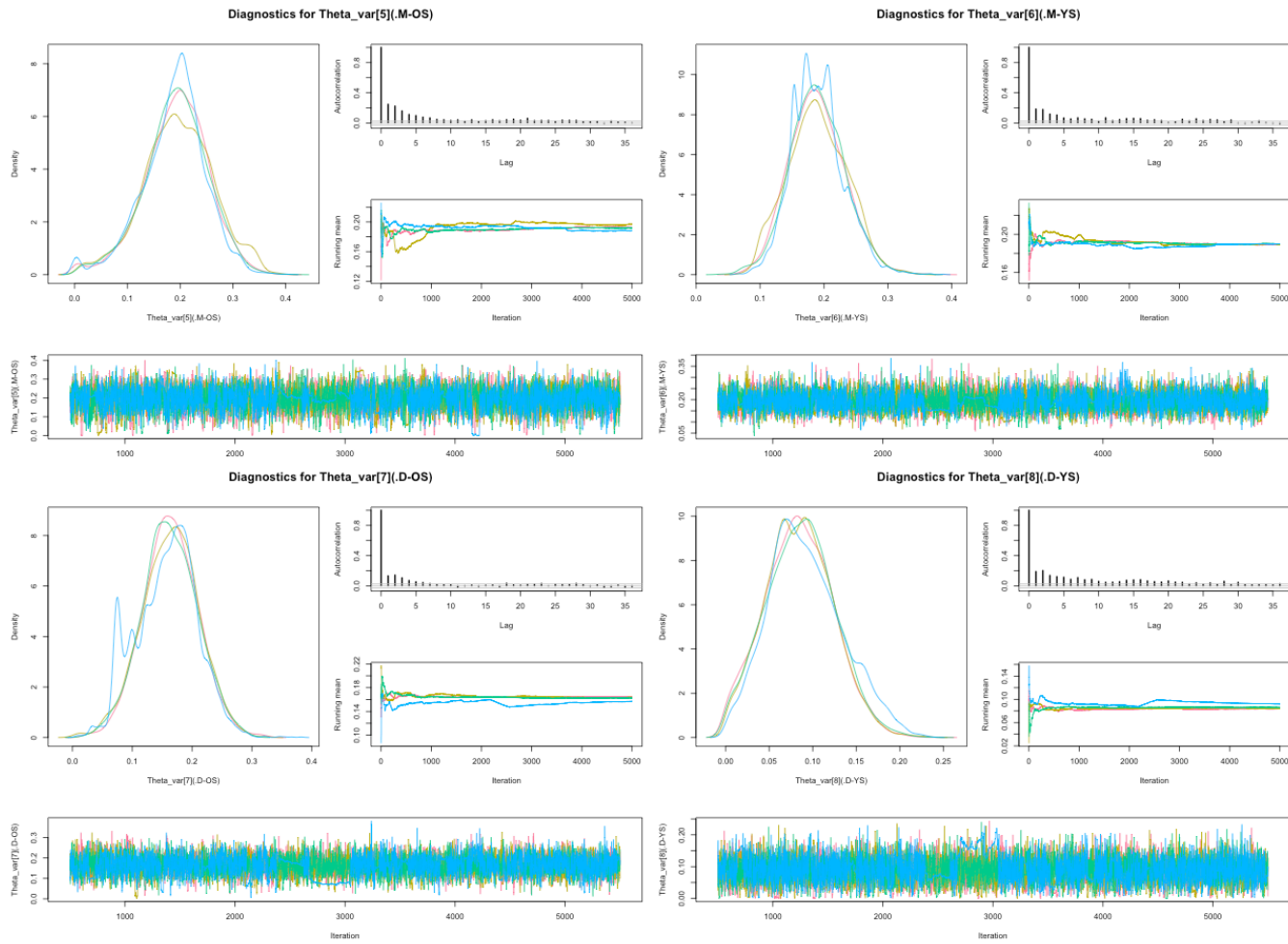


Figure 130. Model 4a MCMC Diagnostic Plots of Measured Variable Variance Parameters

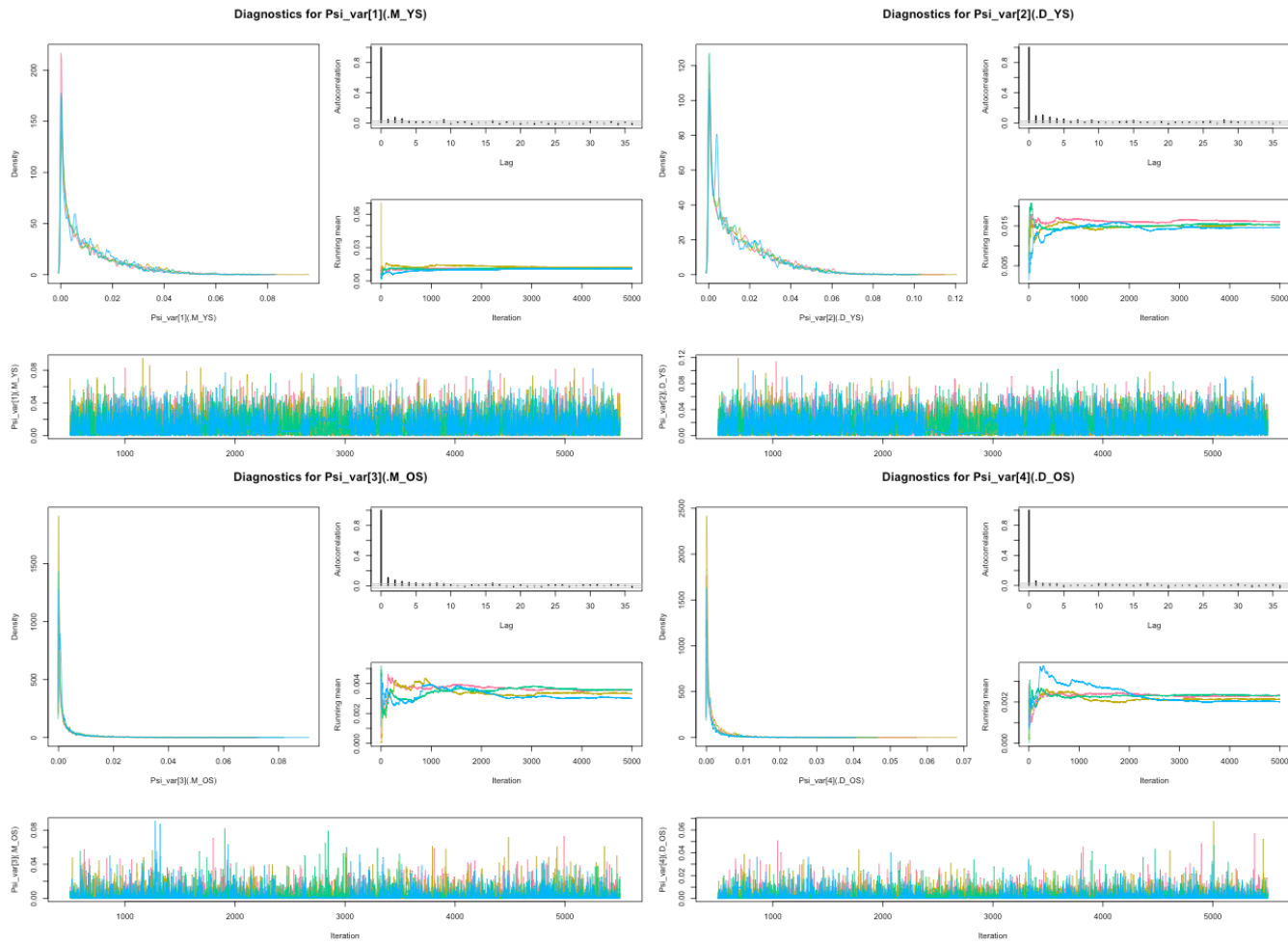


Figure 131. Model 4a MCMC Diagnostic Plots of Latent Variable Variance Parameters

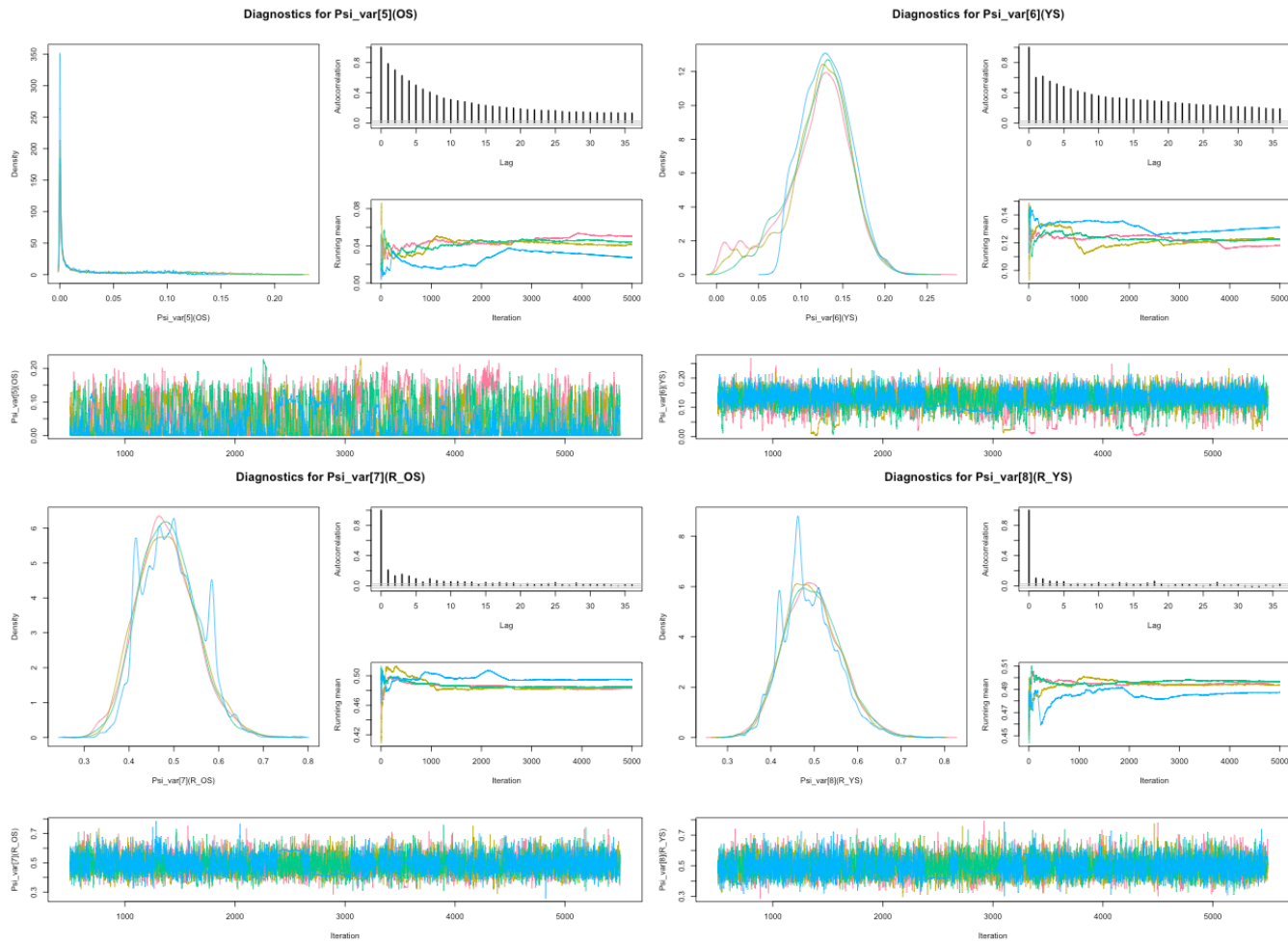


Figure 132. Model 4a MCMC Diagnostic Plots of Latent Variable Variance Parameters

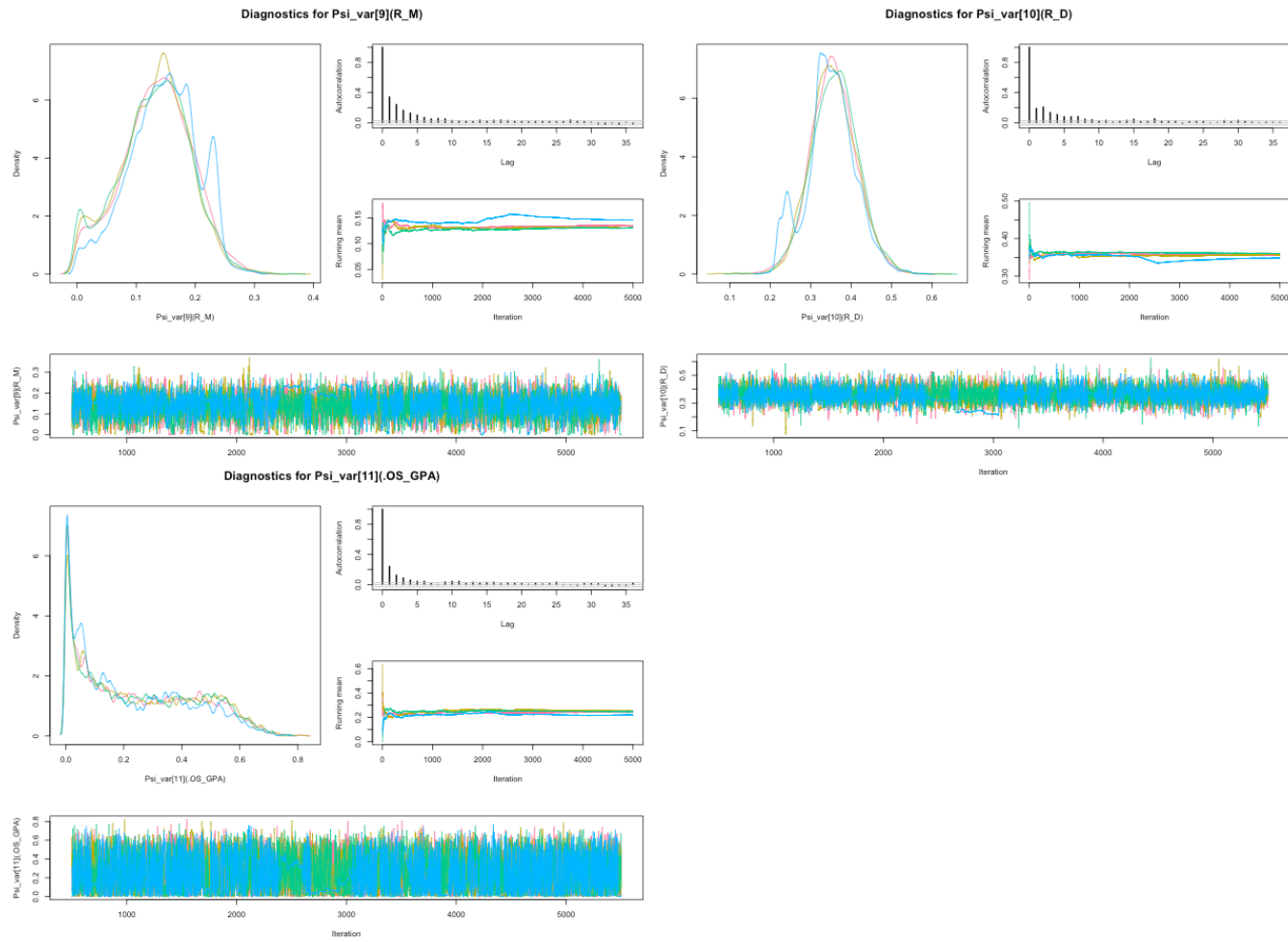


Figure 133. Model 4a MCMC Diagnostic Plots of Latent Variable Variance Parameters

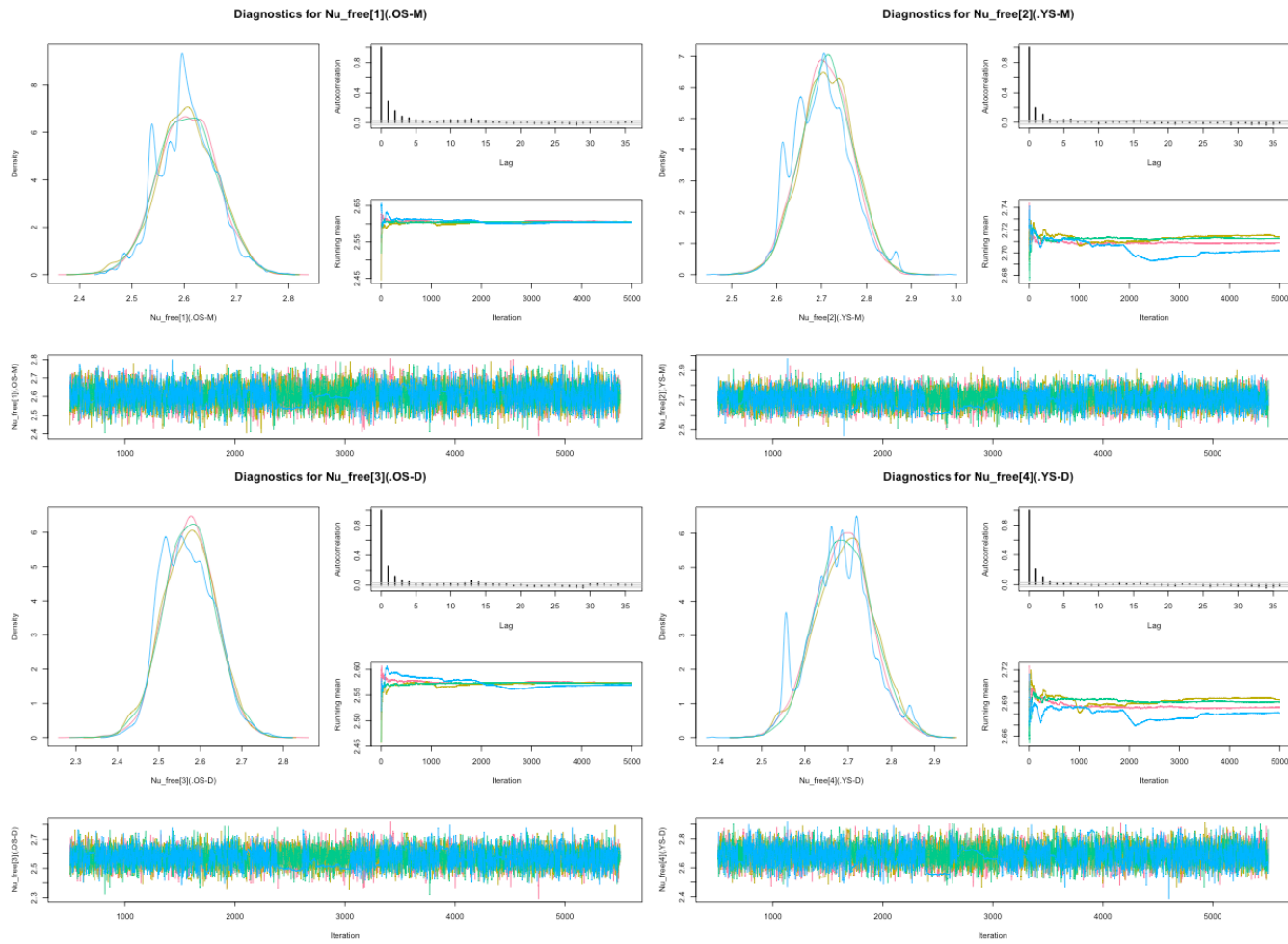


Figure 134. Model 4a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

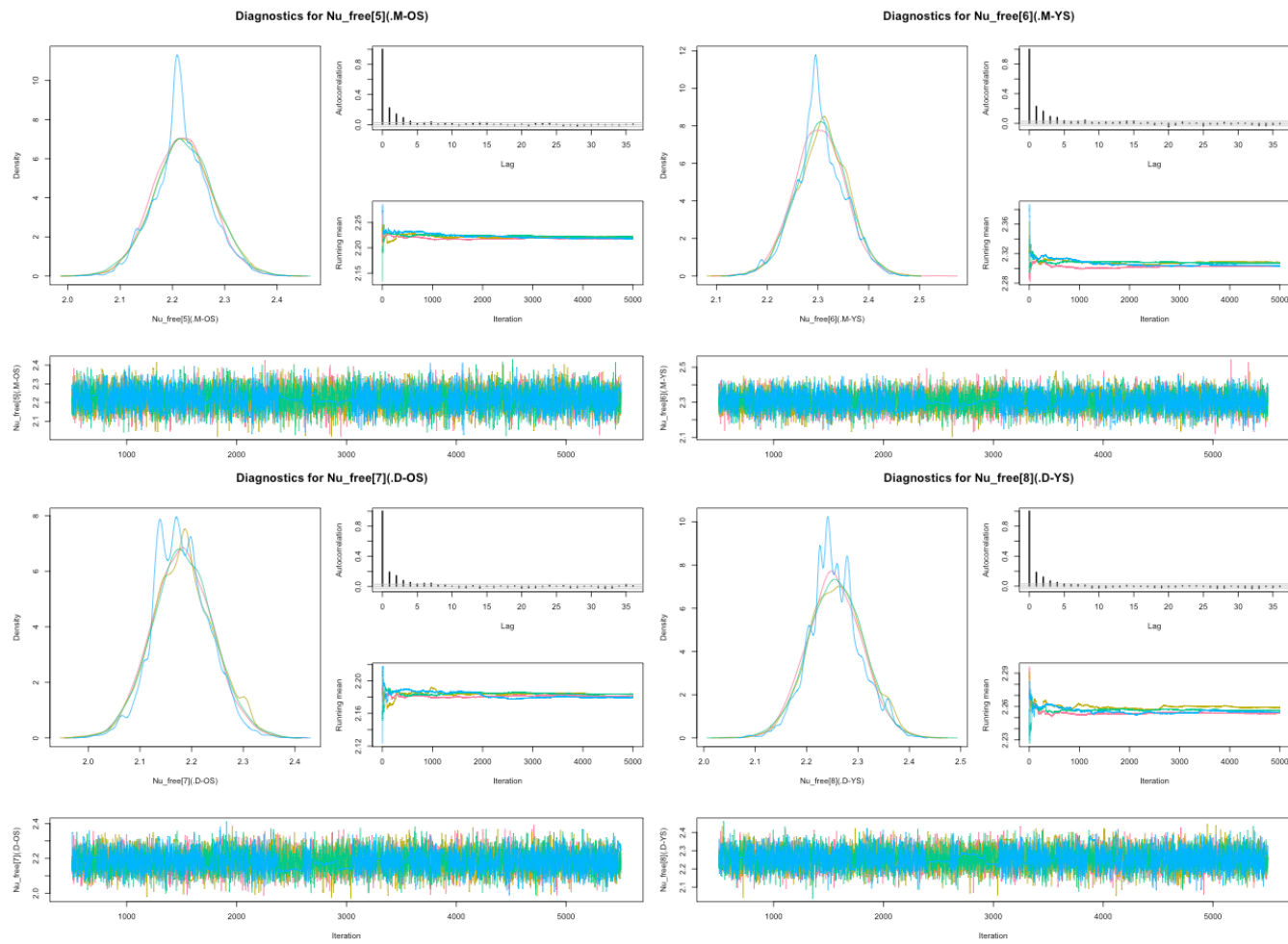


Figure 135. Model 4a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

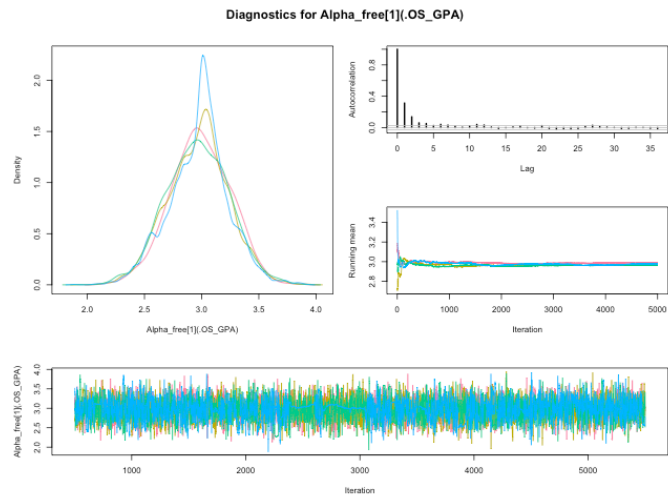


Figure 136. Model 4a MCMC Diagnostic Plots of Regression Intercept Parameters

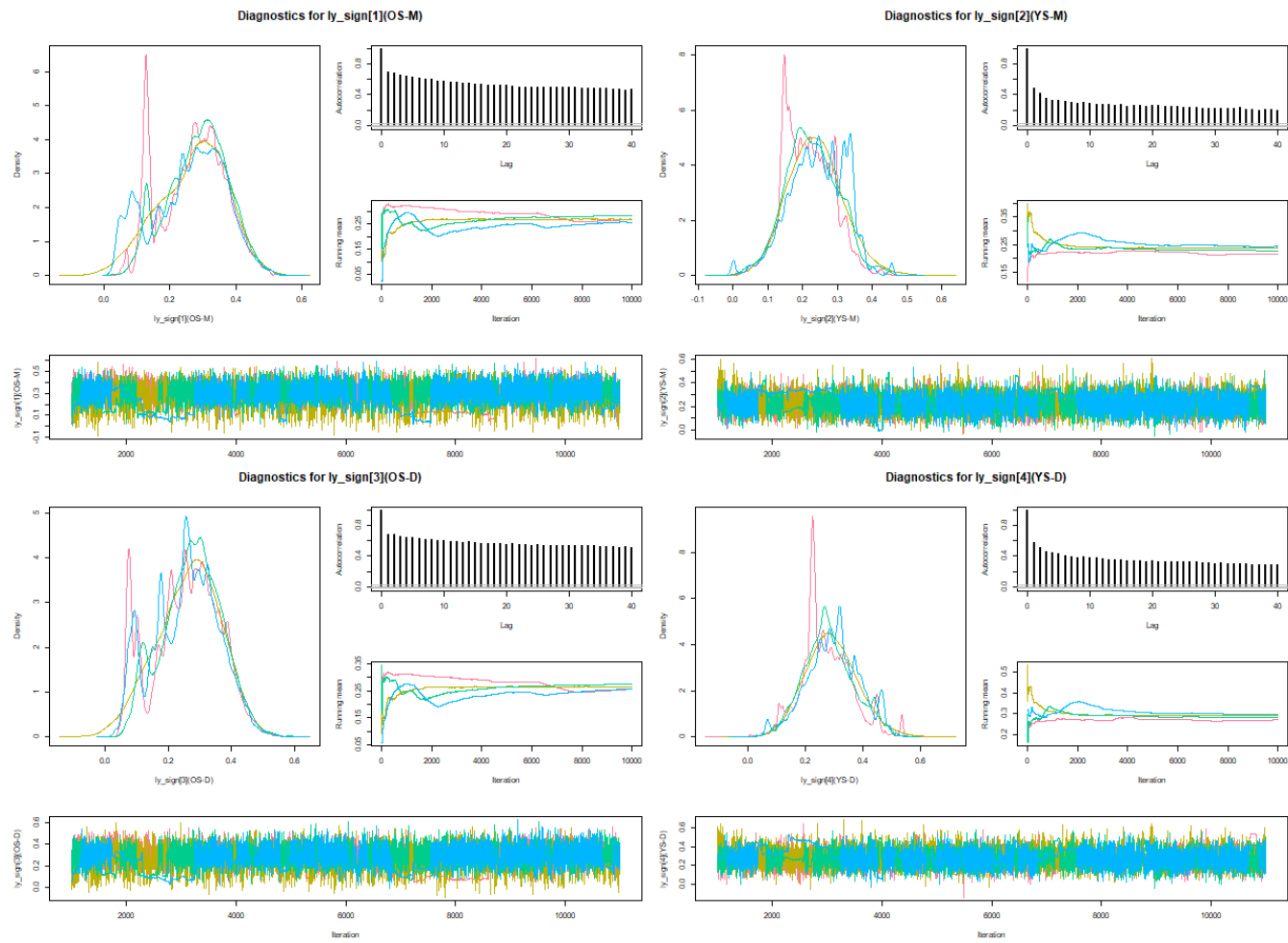


Figure 137. Model 4b MCMC Diagnostic Plots of Factor Loading Parameters

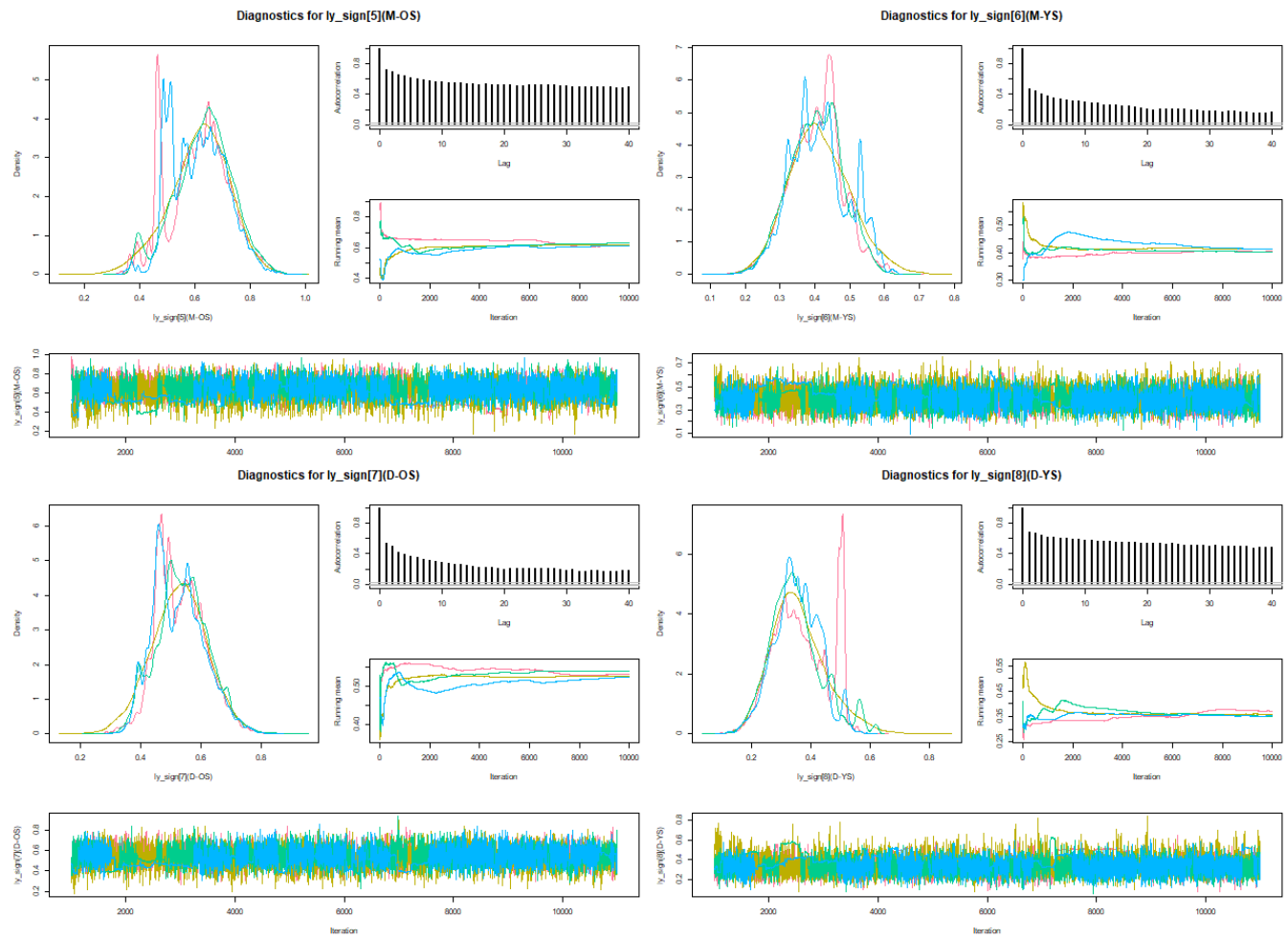


Figure 138. Model 4b MCMC Diagnostic Plots of Factor Loading Parameters

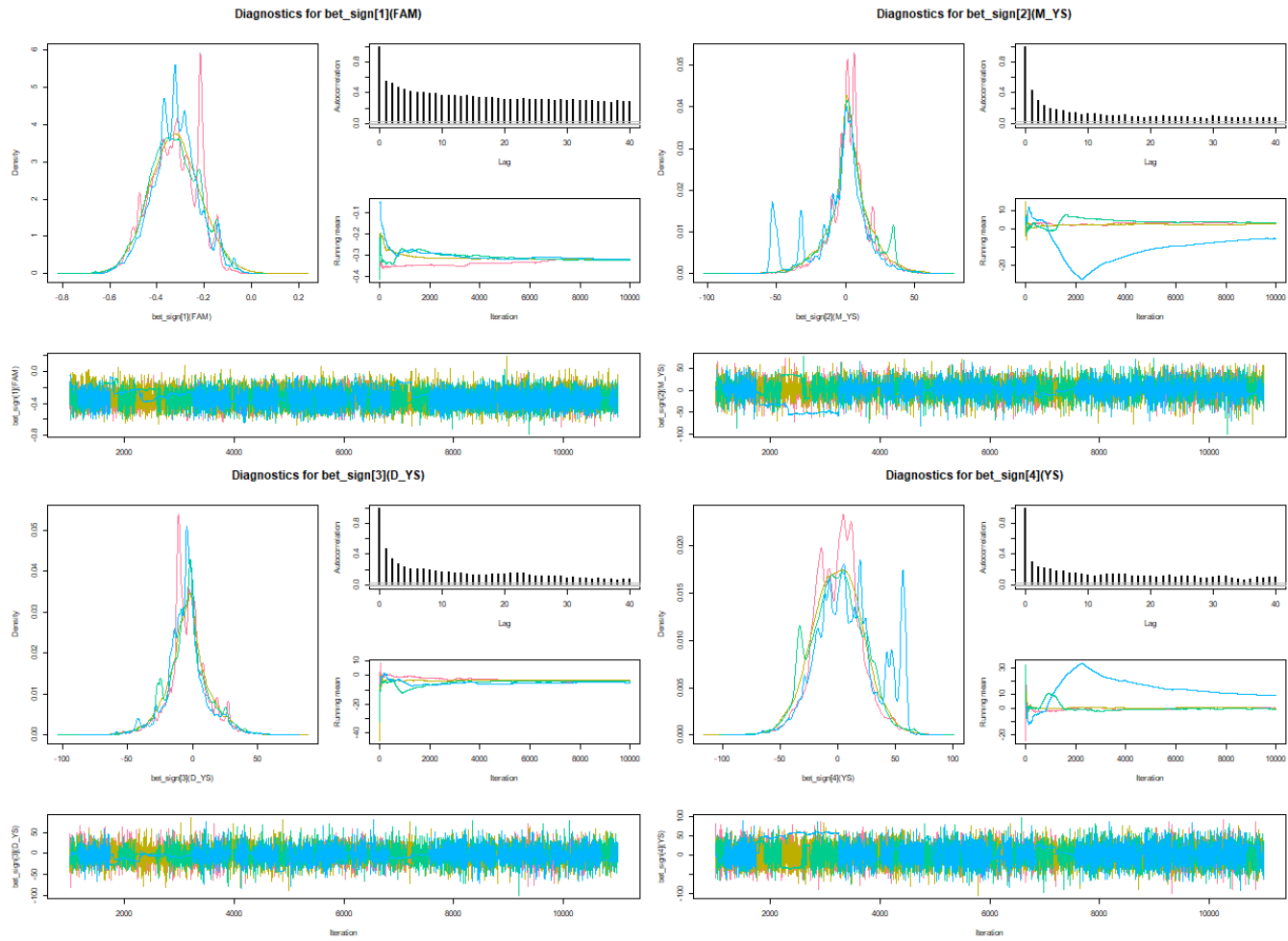


Figure 139. Model 4b MCMC Diagnostic Plots of Regression Coefficient Parameters

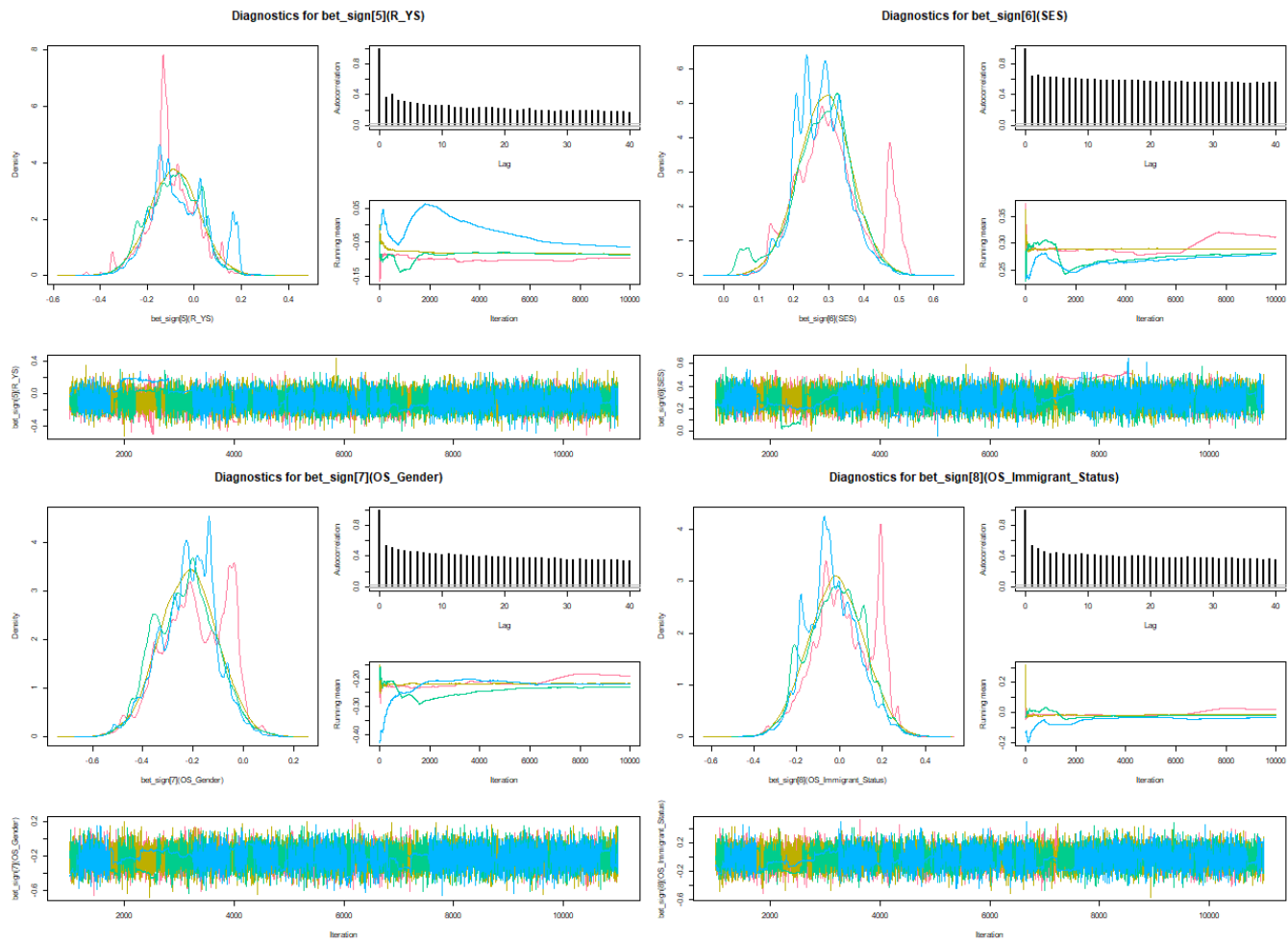


Figure 140. Model 4b MCMC Diagnostic Plots of Regression Coefficient Parameters

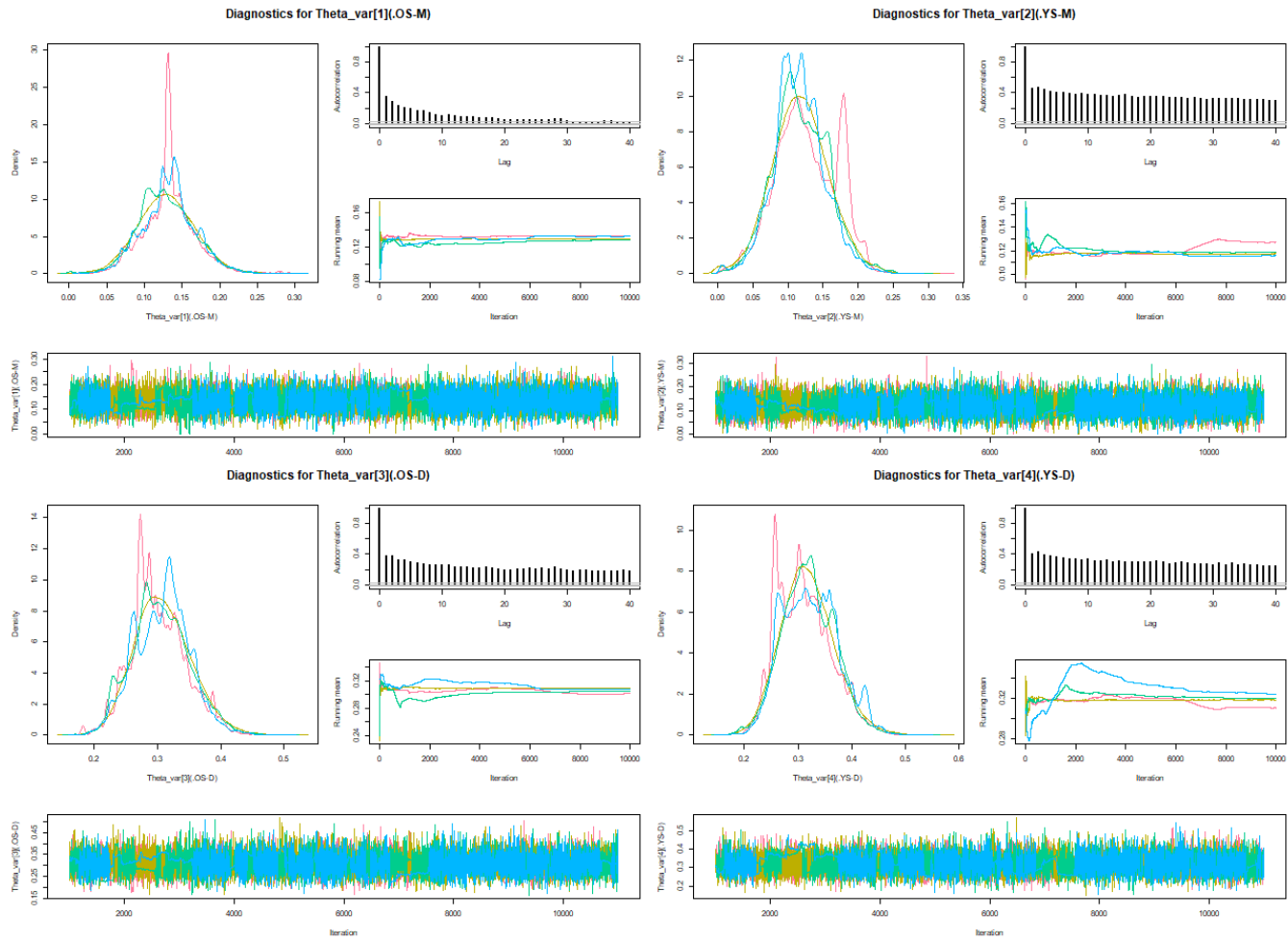


Figure 141. Model 4b MCMC Diagnostic Plots of Measured Variable Variance Parameters

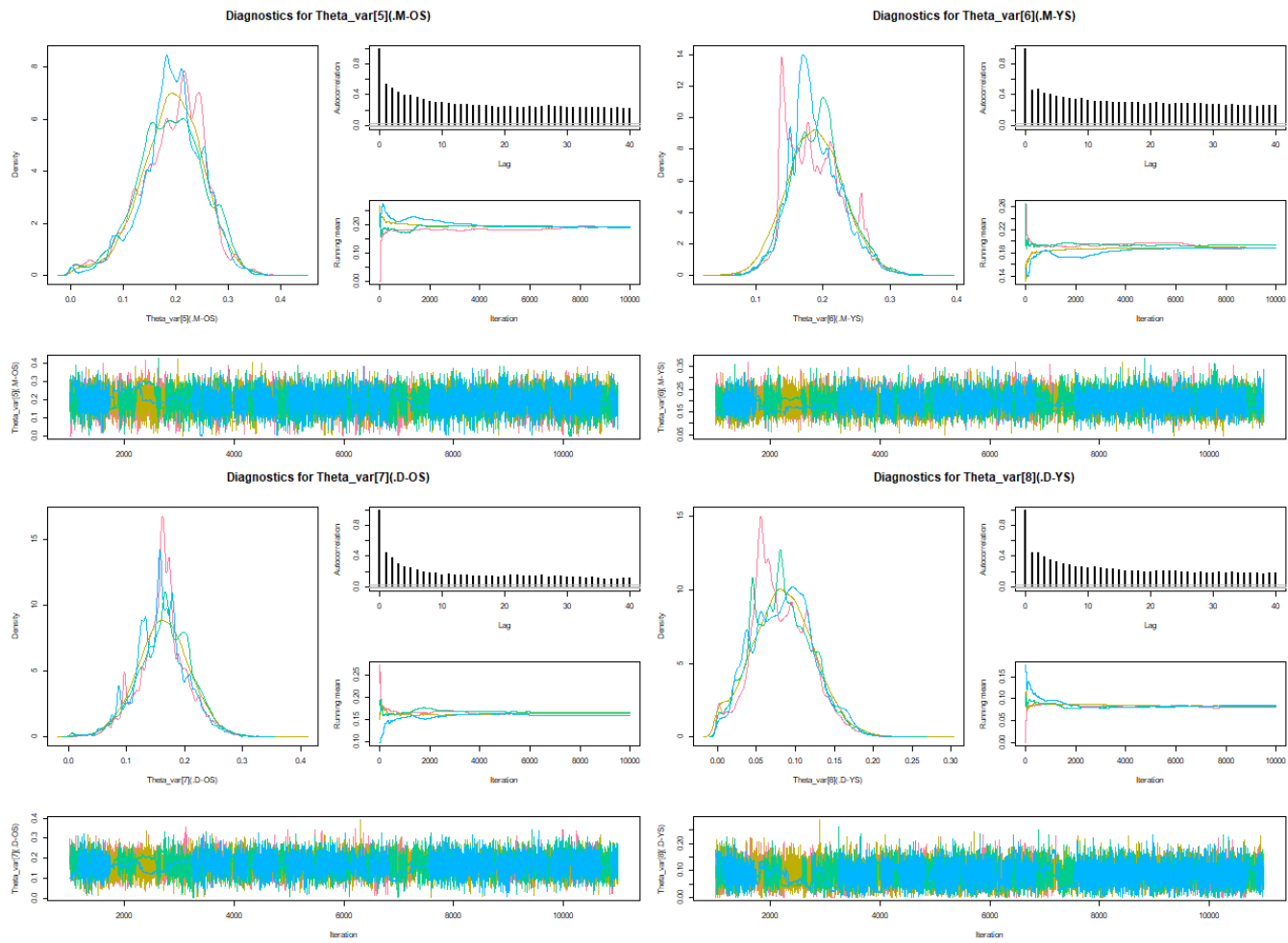


Figure 142. Model 4b MCMC Diagnostic Plots of Measured Variable Variance Parameters

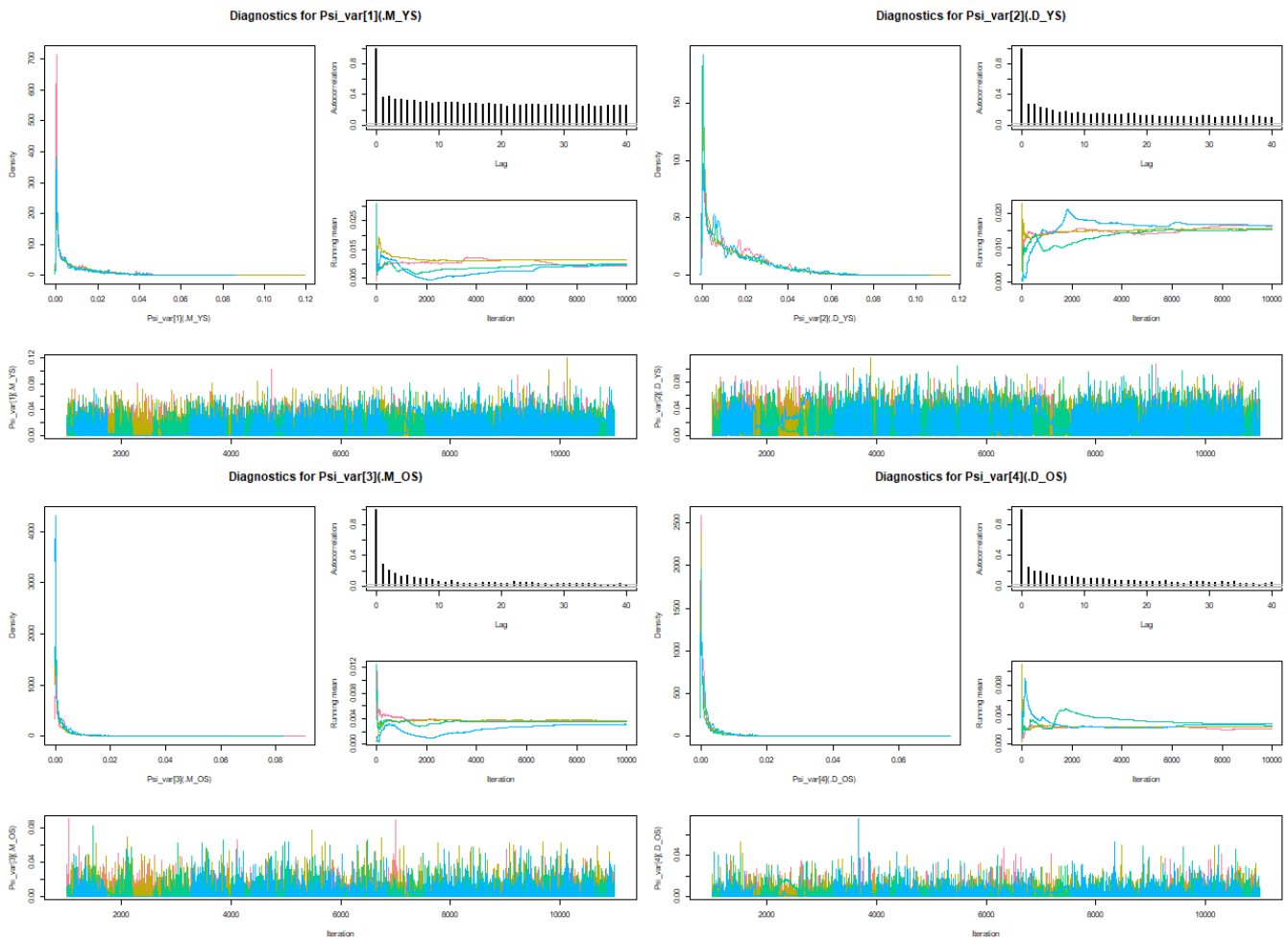


Figure 143. Model 4b MCMC Diagnostic Plots of Latent Variable Variance Parameters

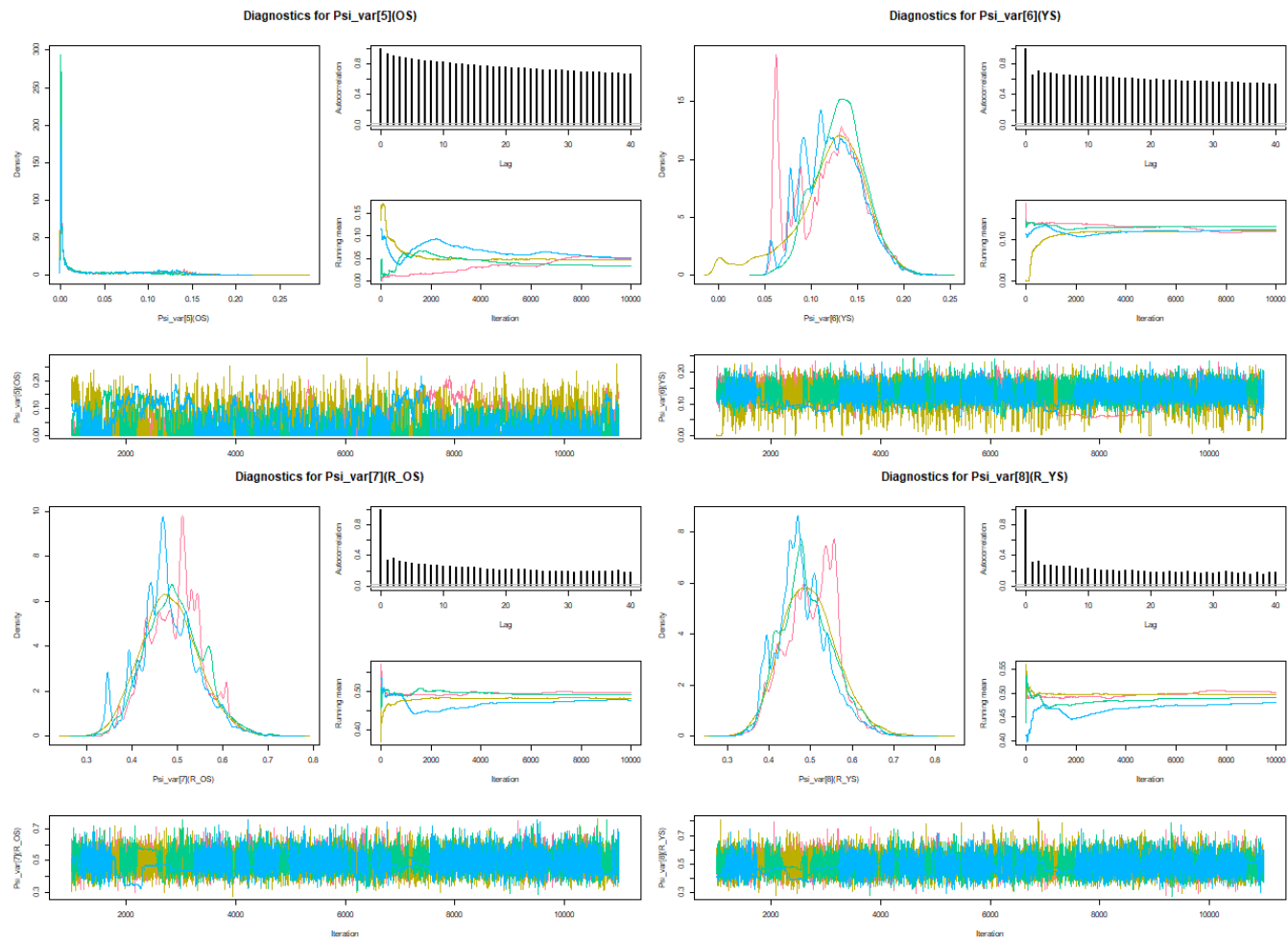


Figure 144. Model 4b MCMC Diagnostic Plots of Latent Variable Variance Parameters

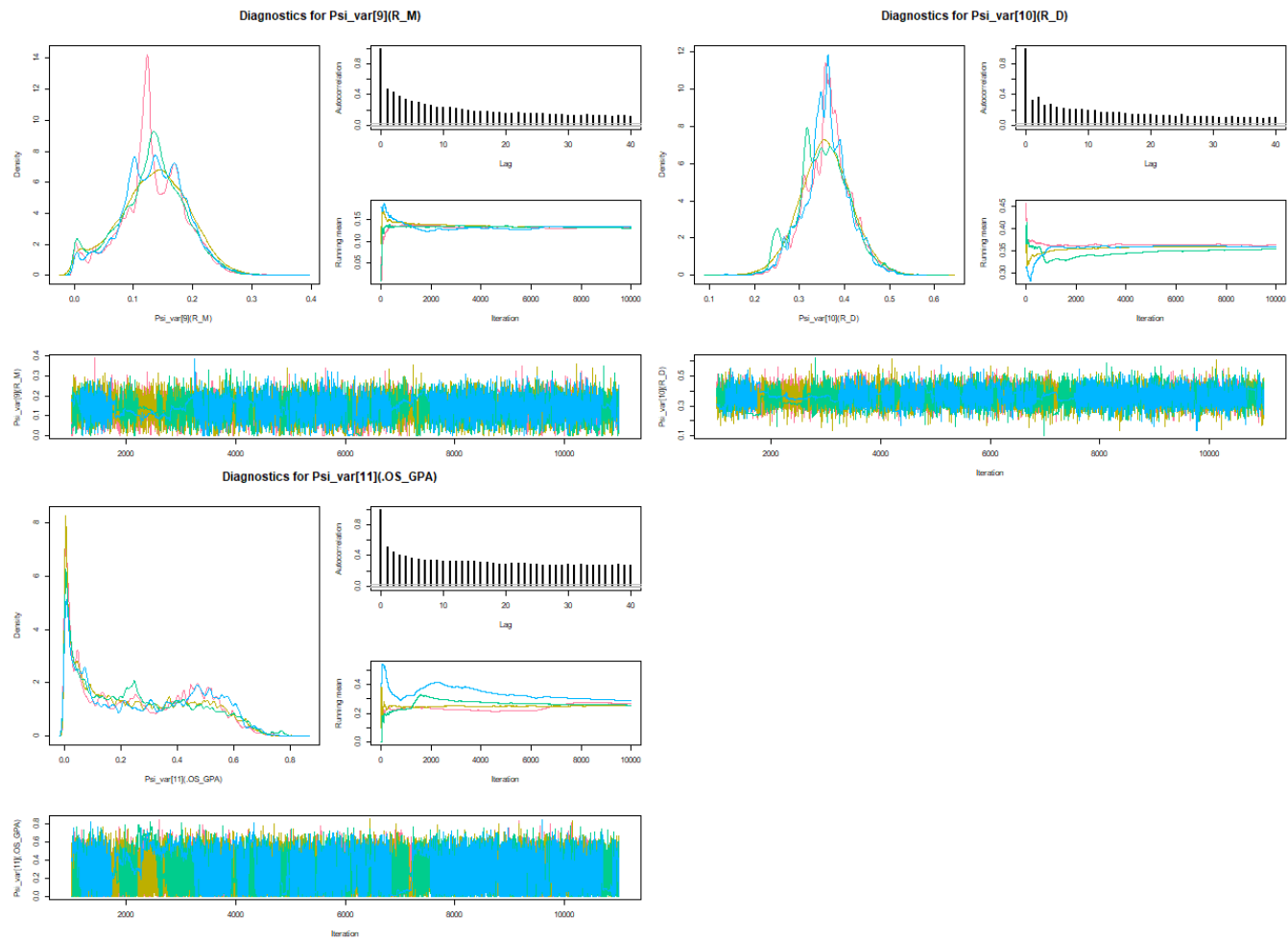


Figure 145. Model 4b MCMC Diagnostic Plots of Latent Variable Variance Parameters

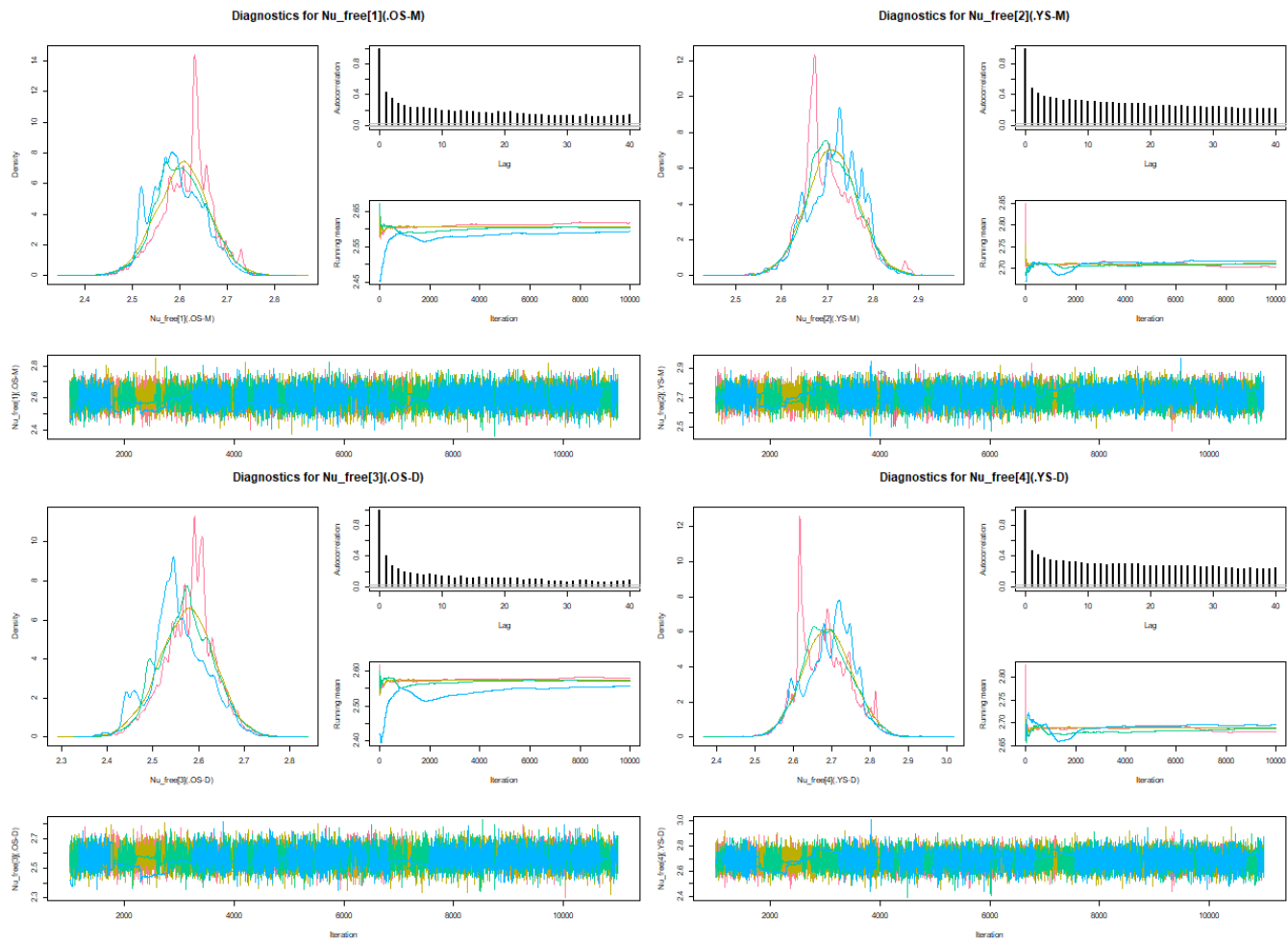


Figure 146. Model 4b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

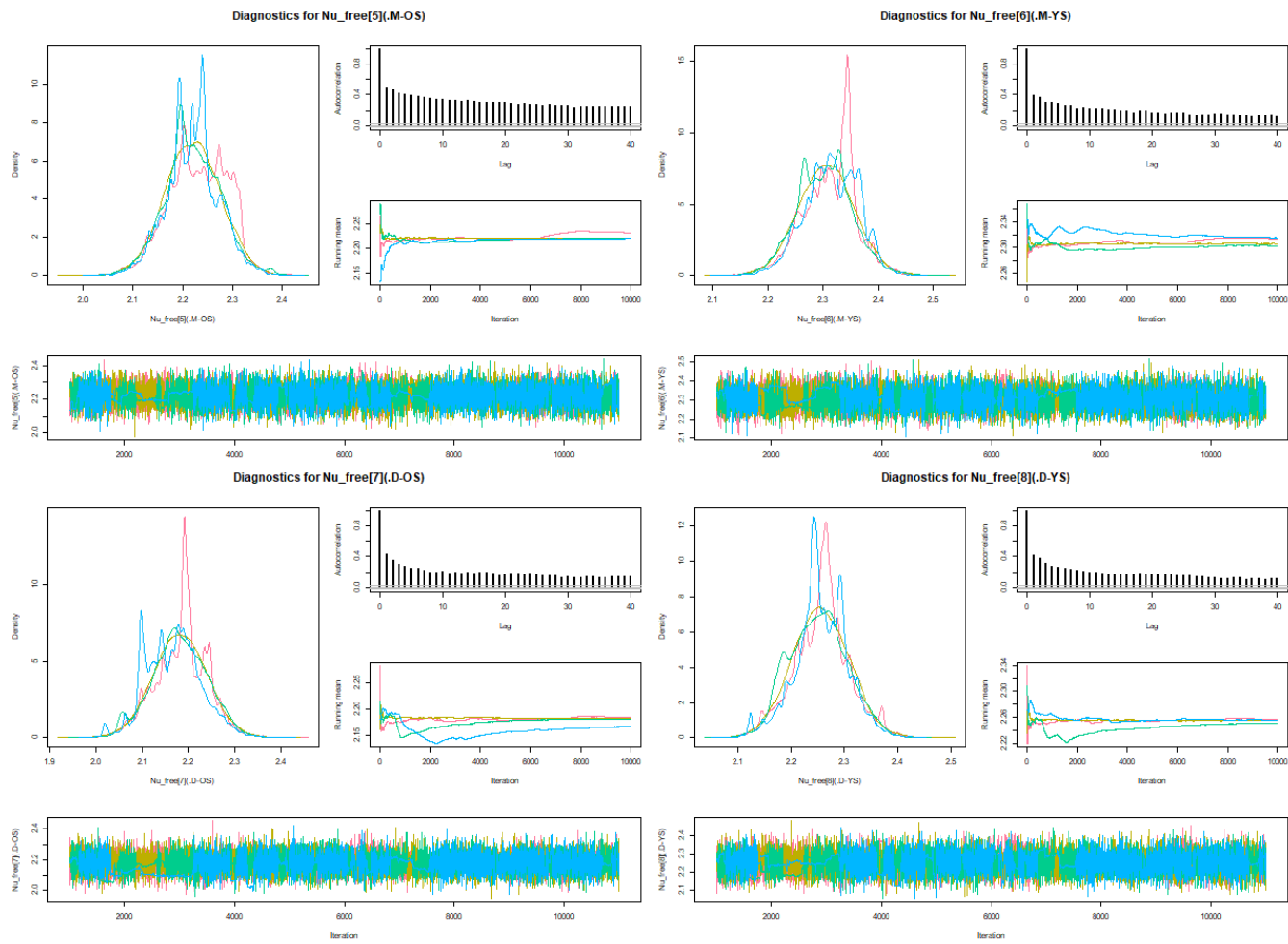


Figure 147. Model 4b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

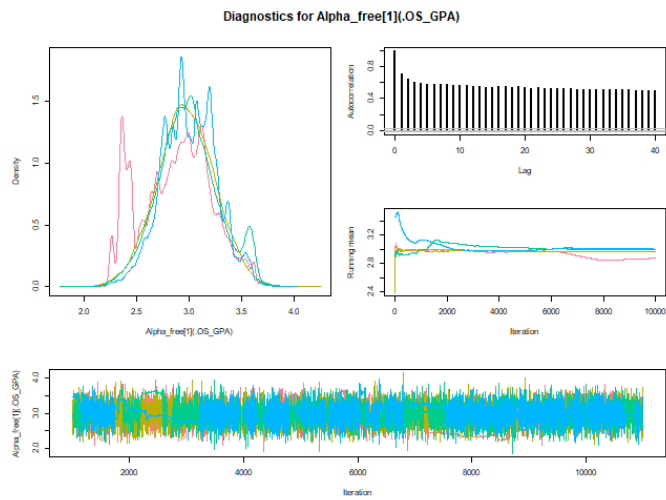


Figure 148. Model 4b MCMC Diagnostic Plots of Regression Intercept Parameter

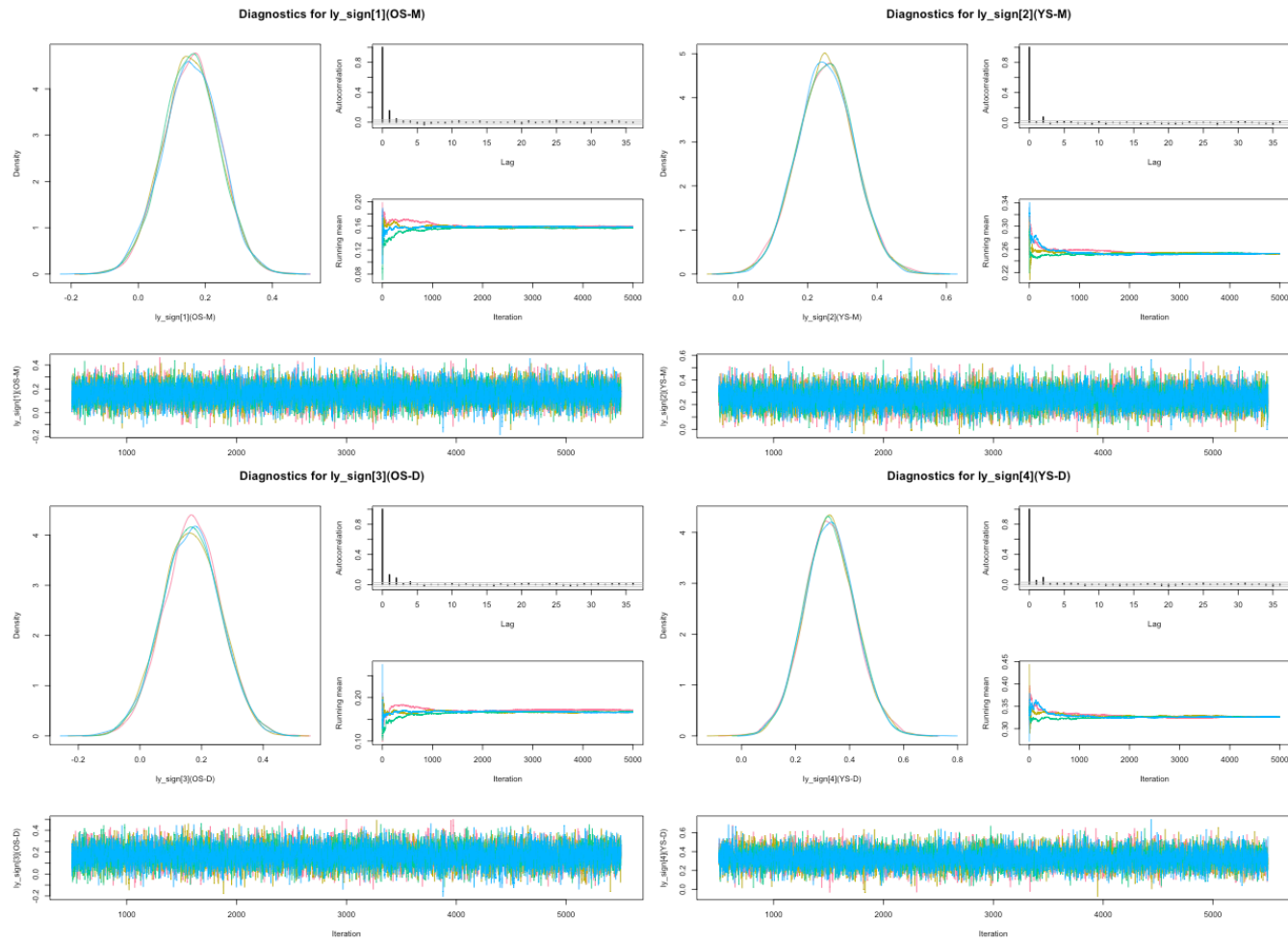


Figure 149. Model 4 MCMC Diagnostic Plots of Factor Loading Parameters

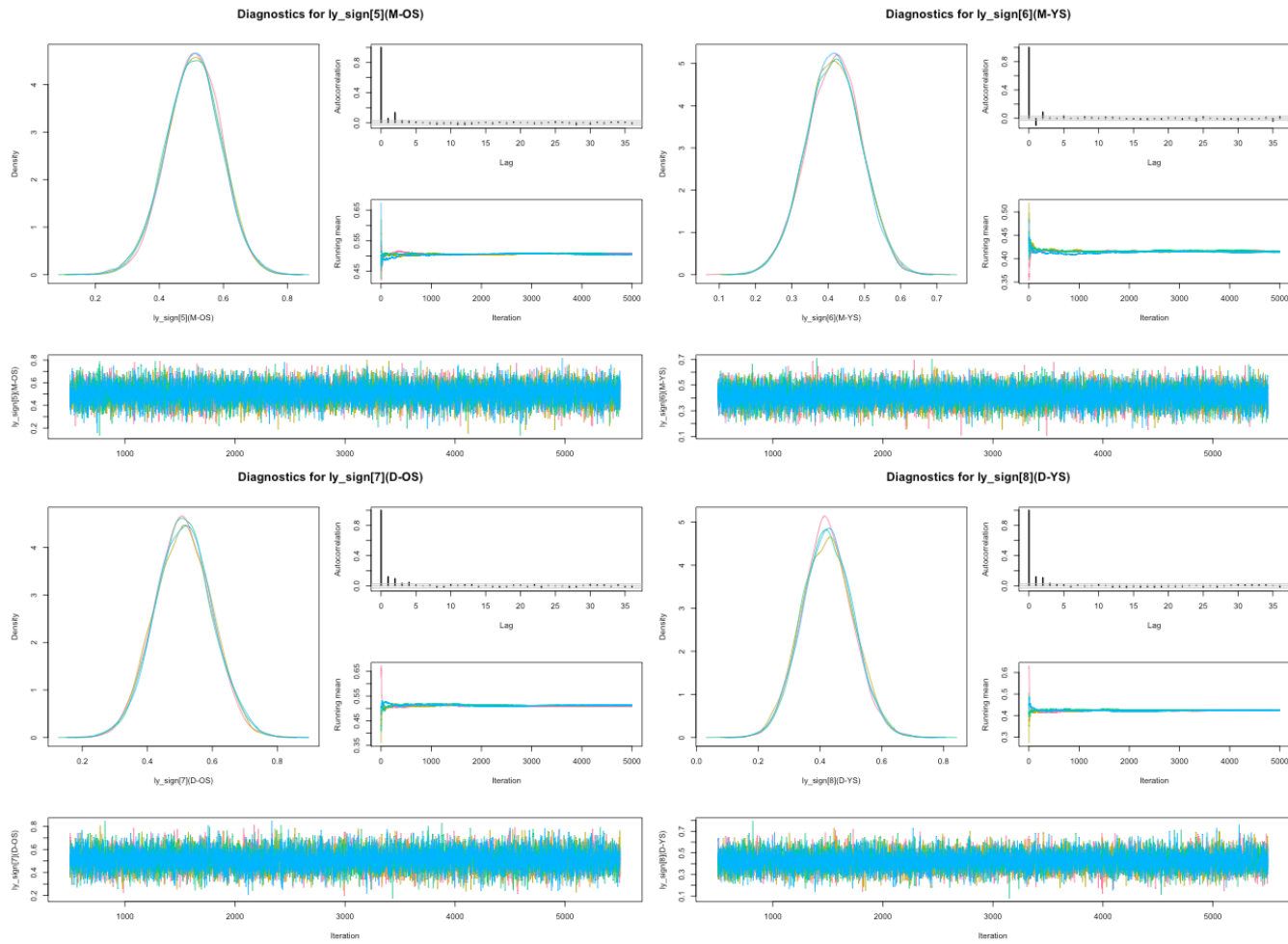


Figure 150. Model 4 MCMC Diagnostic Plots of Factor Loading Parameters

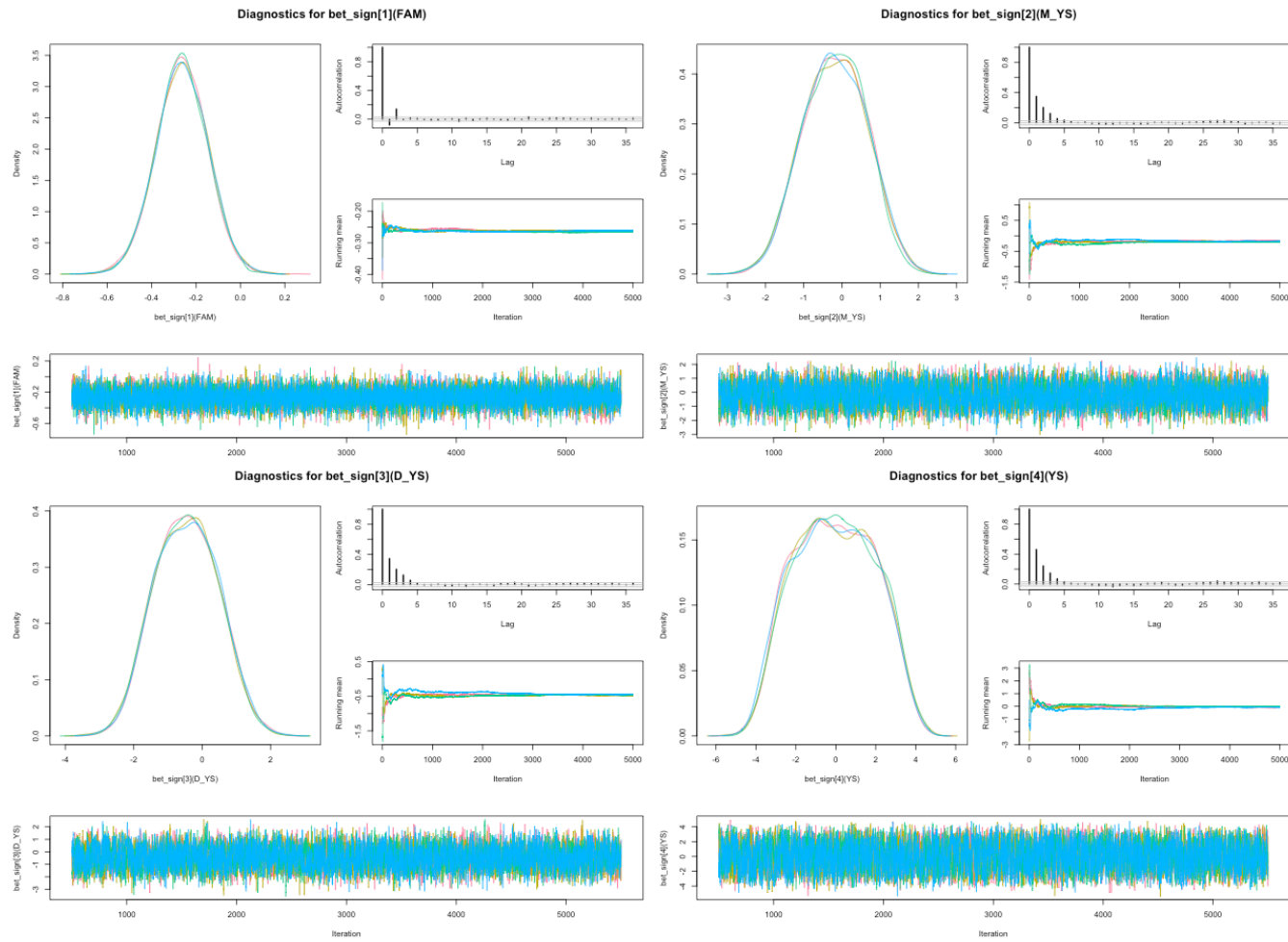


Figure 151. Model 4 MCMC Diagnostic Plots of Regression Coefficient Parameters

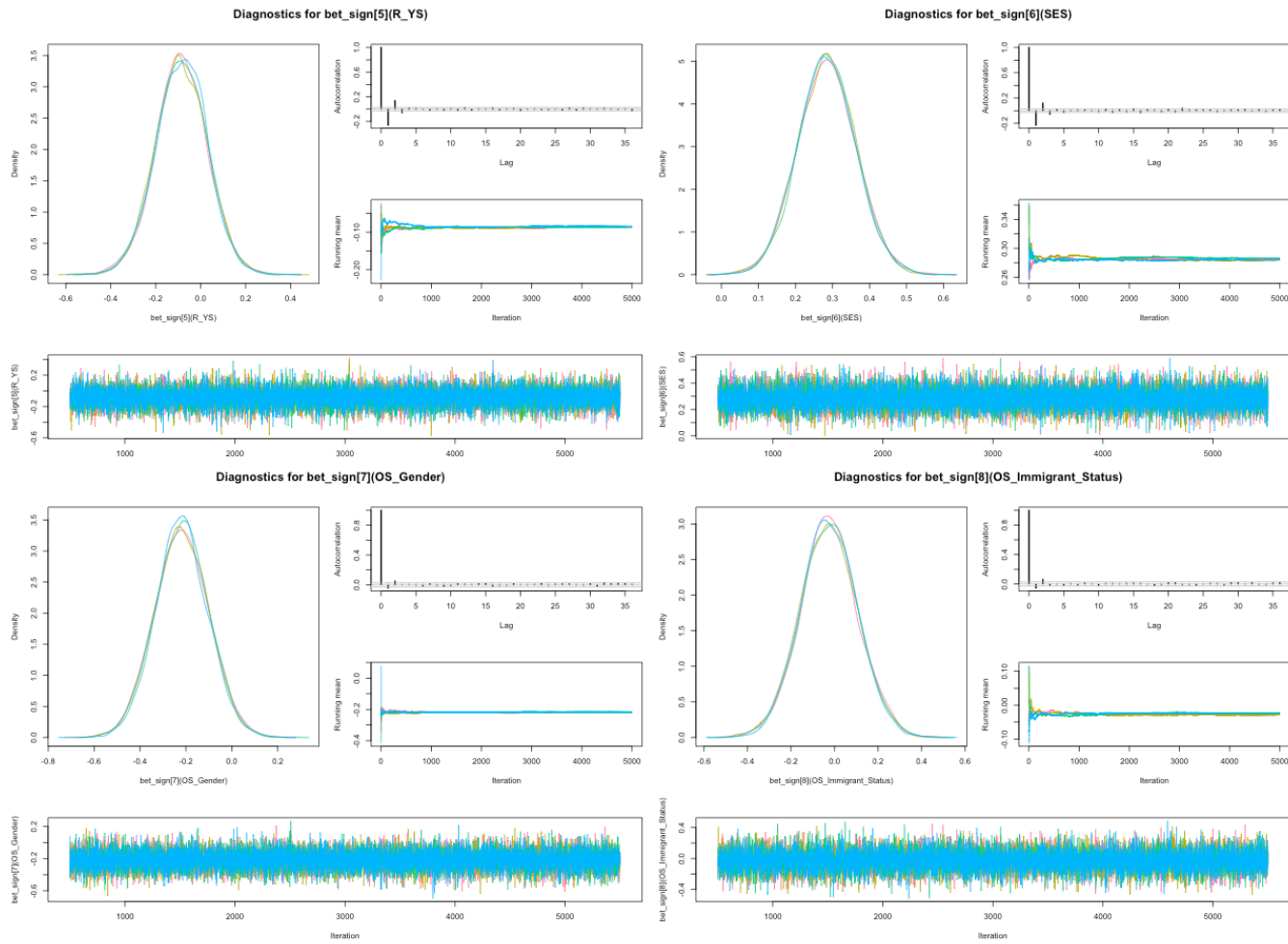


Figure 152. Model 4 MCMC Diagnostic Plots of Regression Coefficient Parameters

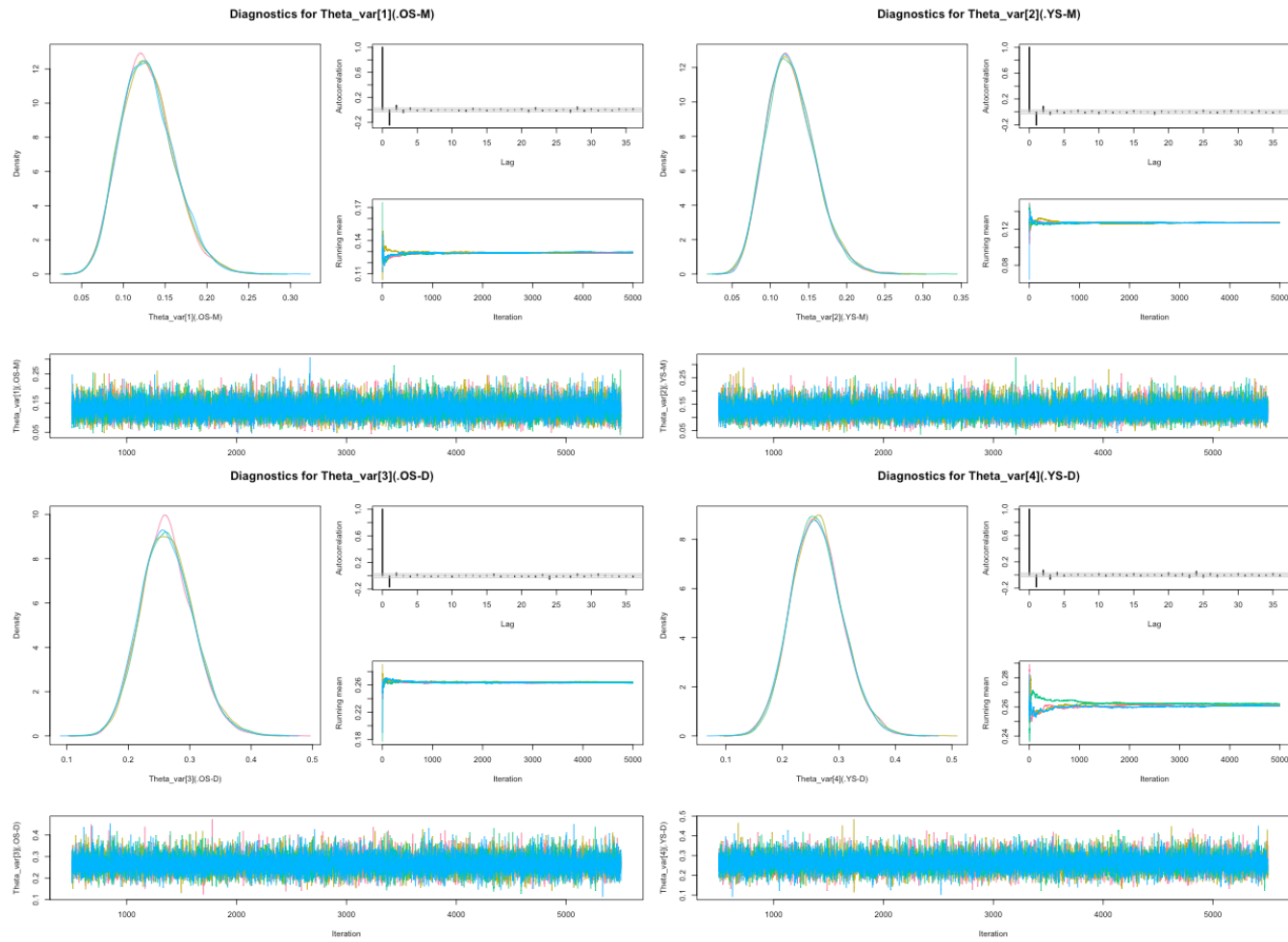


Figure 153. Model 4 MCMC Diagnostic Plots of Measured Variable Variance Parameters

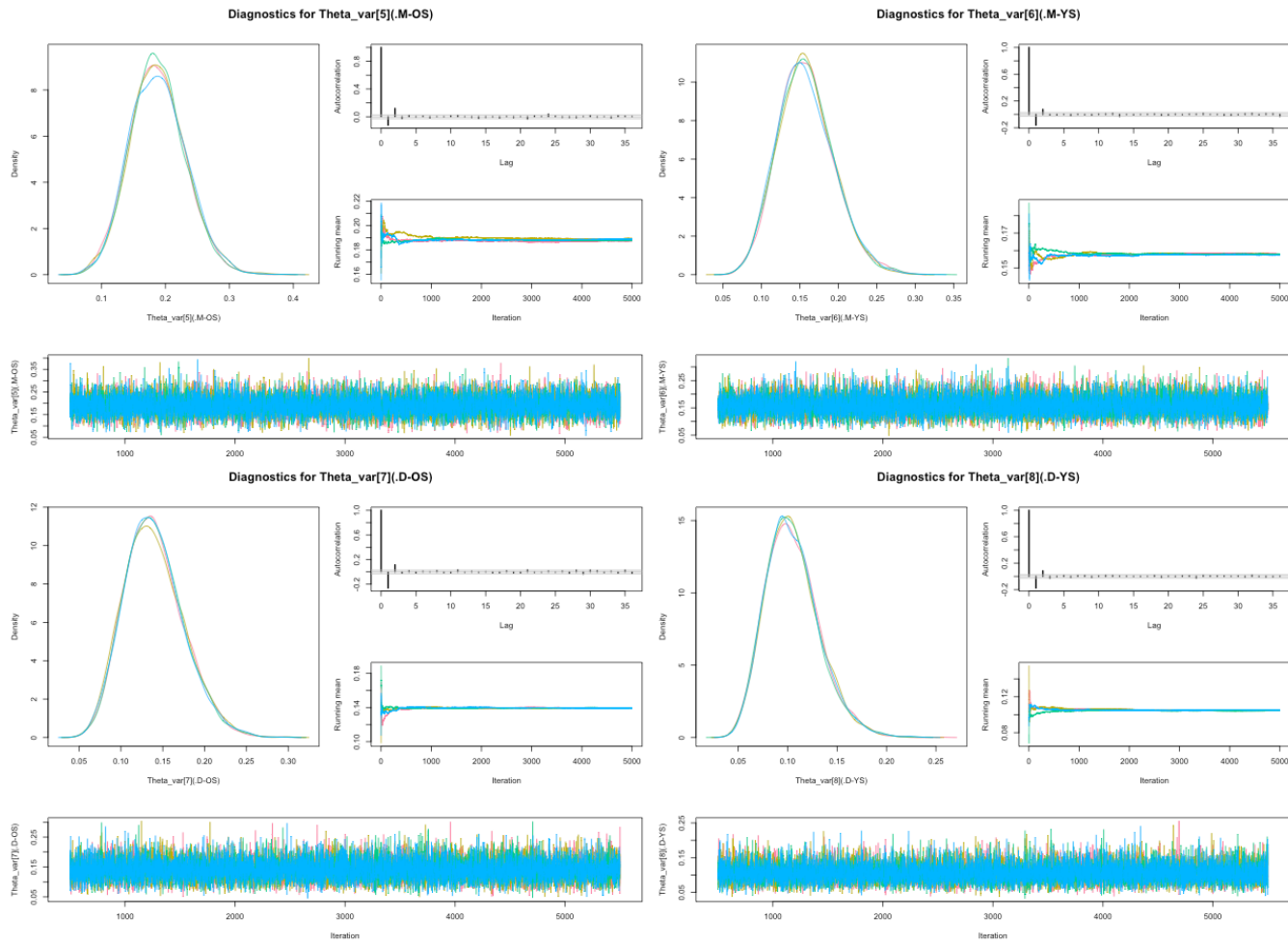


Figure 154. Model 4 MCMC Diagnostic Plots of Measured Variable Variance Parameters

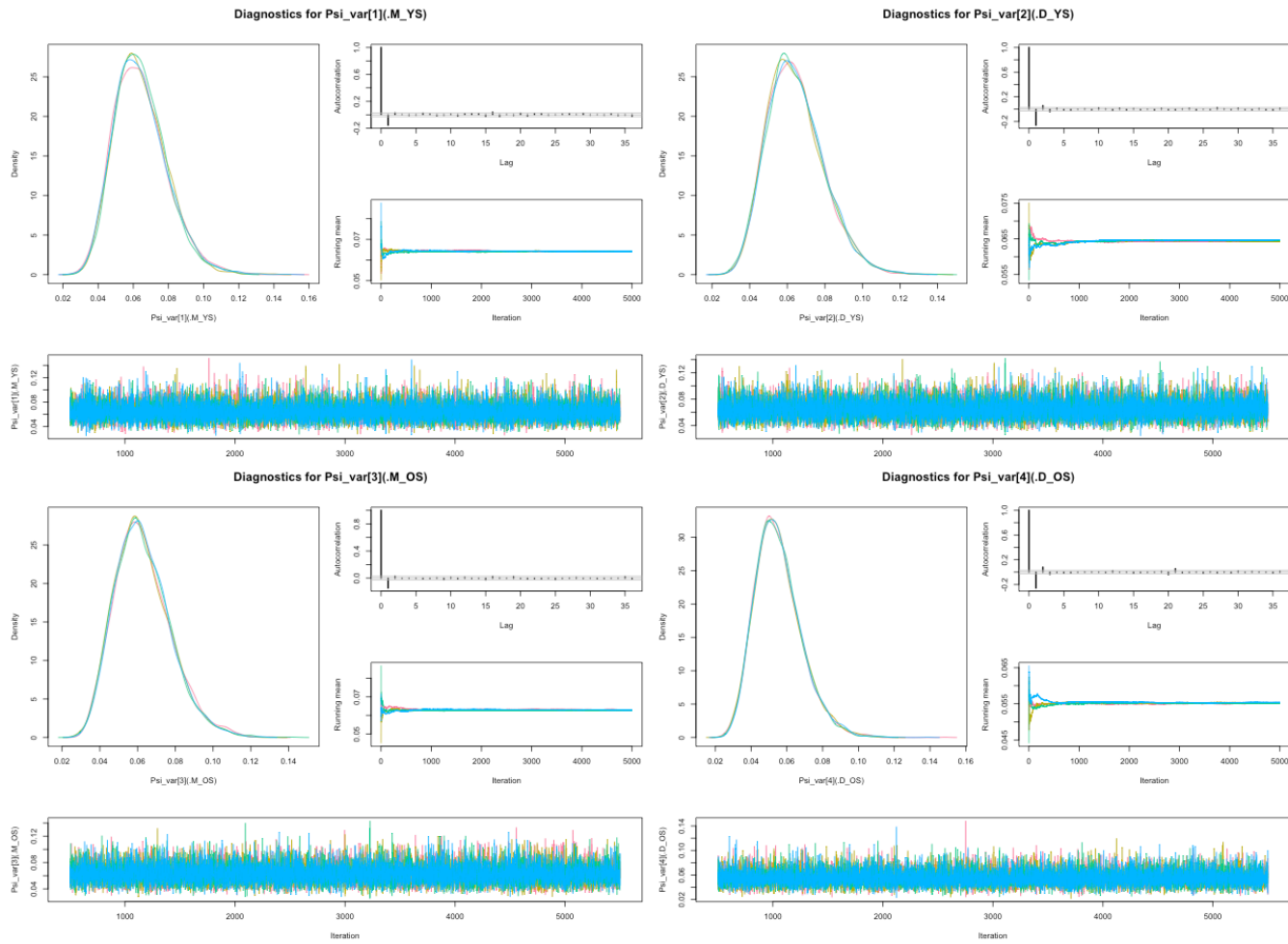


Figure 155. Model 4 MCMC Diagnostic Plots of Latent Variable Variance Parameters

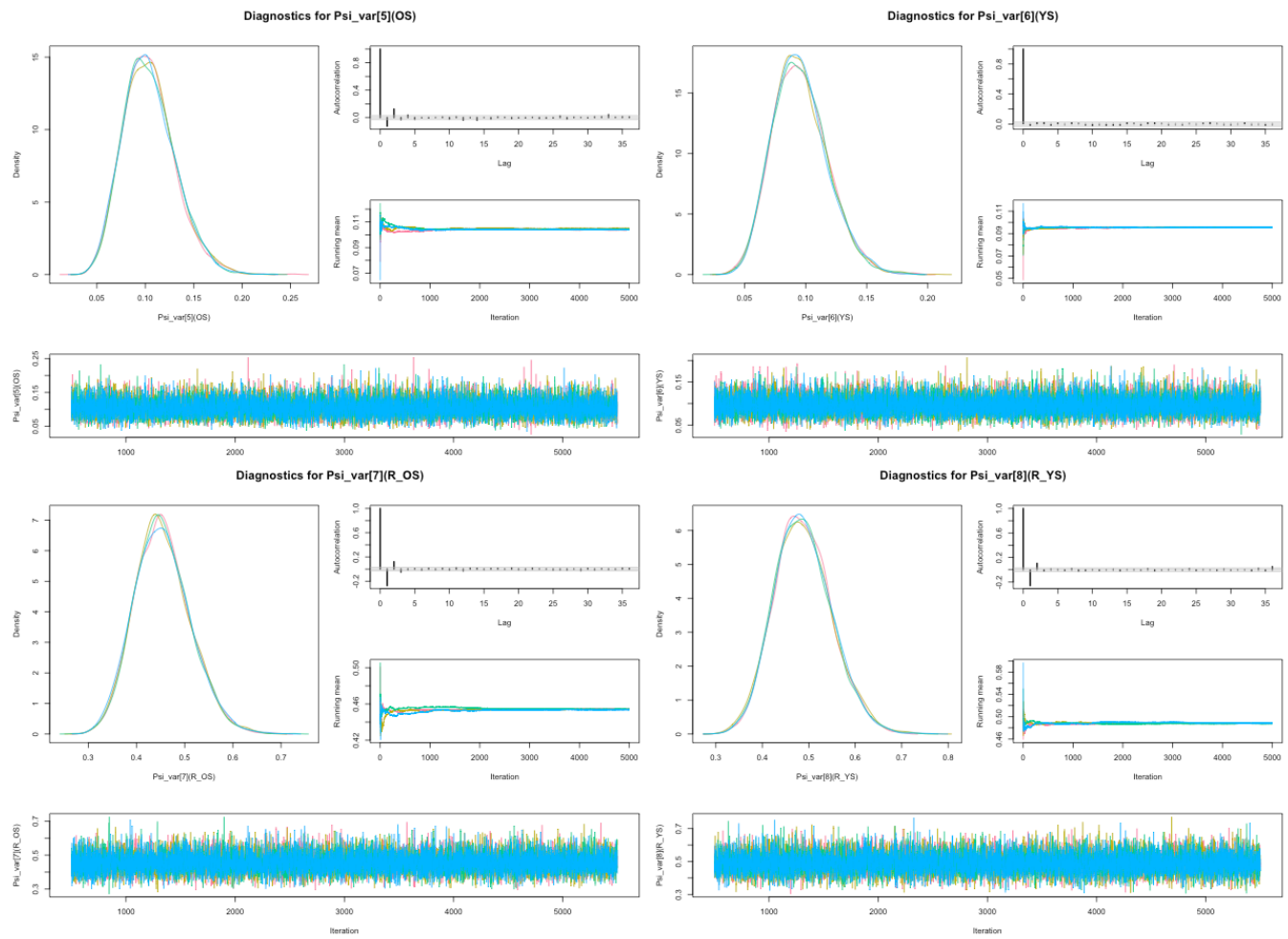


Figure 156. Model 4 MCMC Diagnostic Plots of Latent Variable Variance Parameters

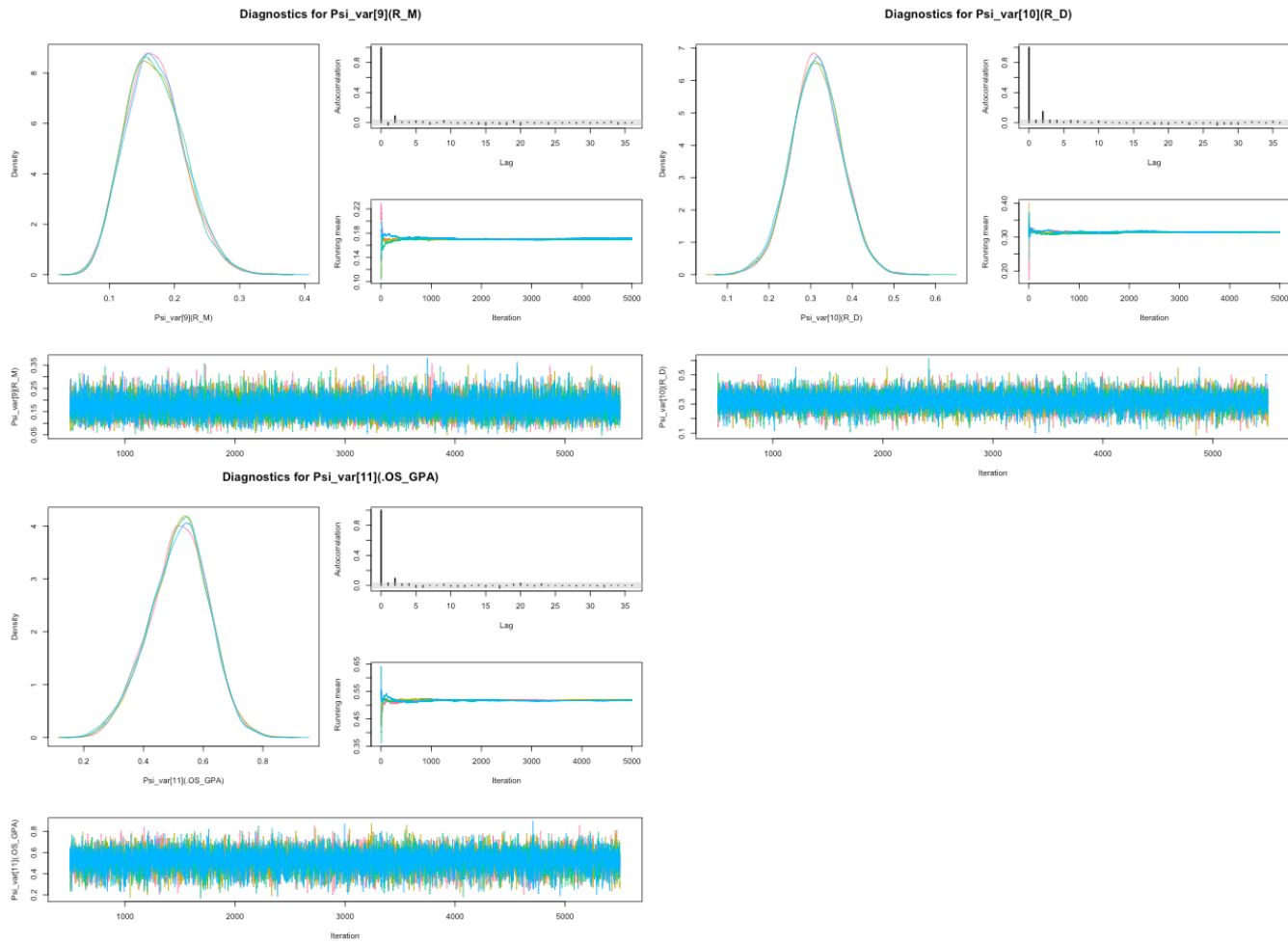


Figure 157. Model 4 MCMC Diagnostic Plots of Latent Variable Variance Parameters

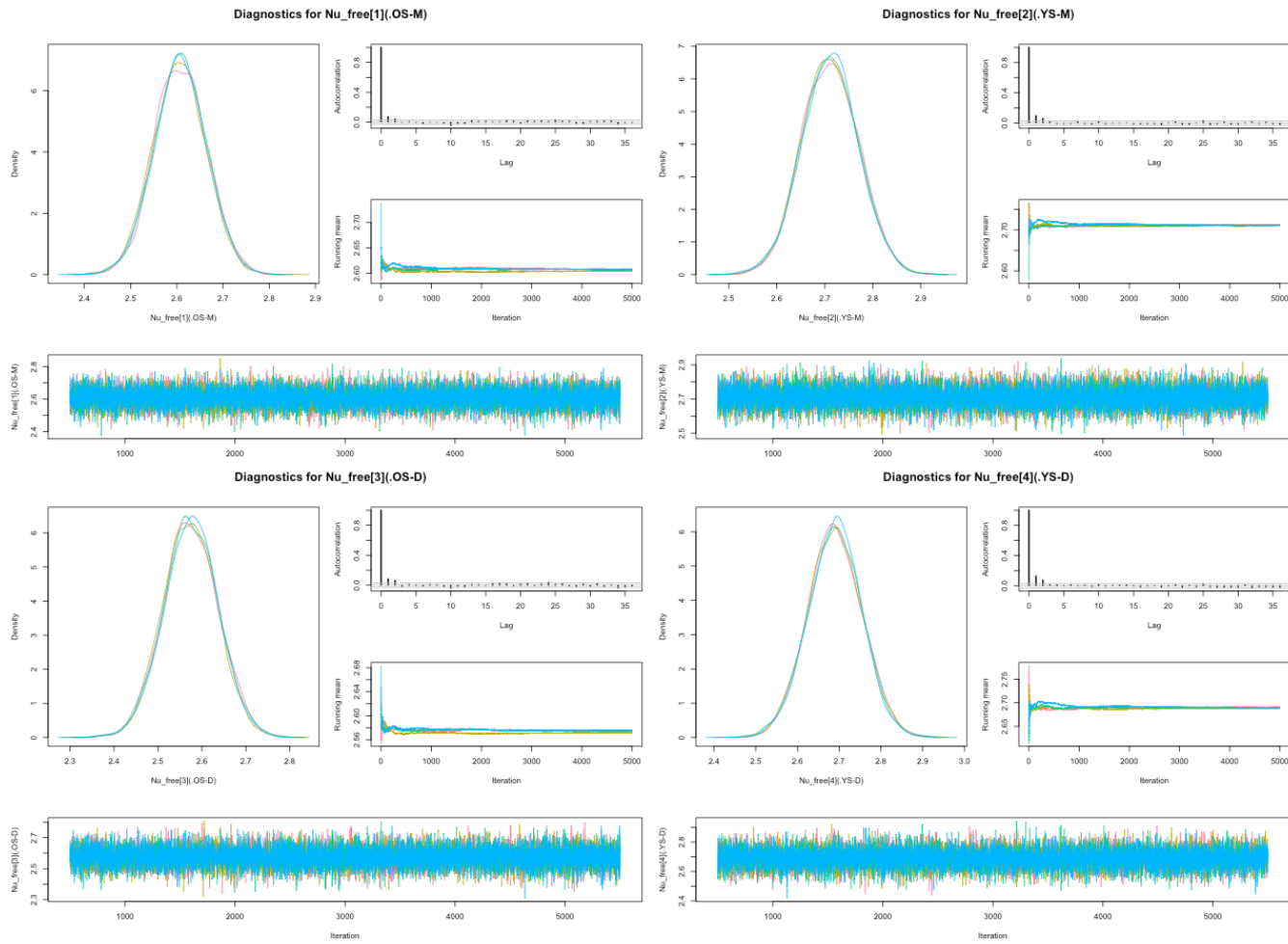


Figure 158. Model 4 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

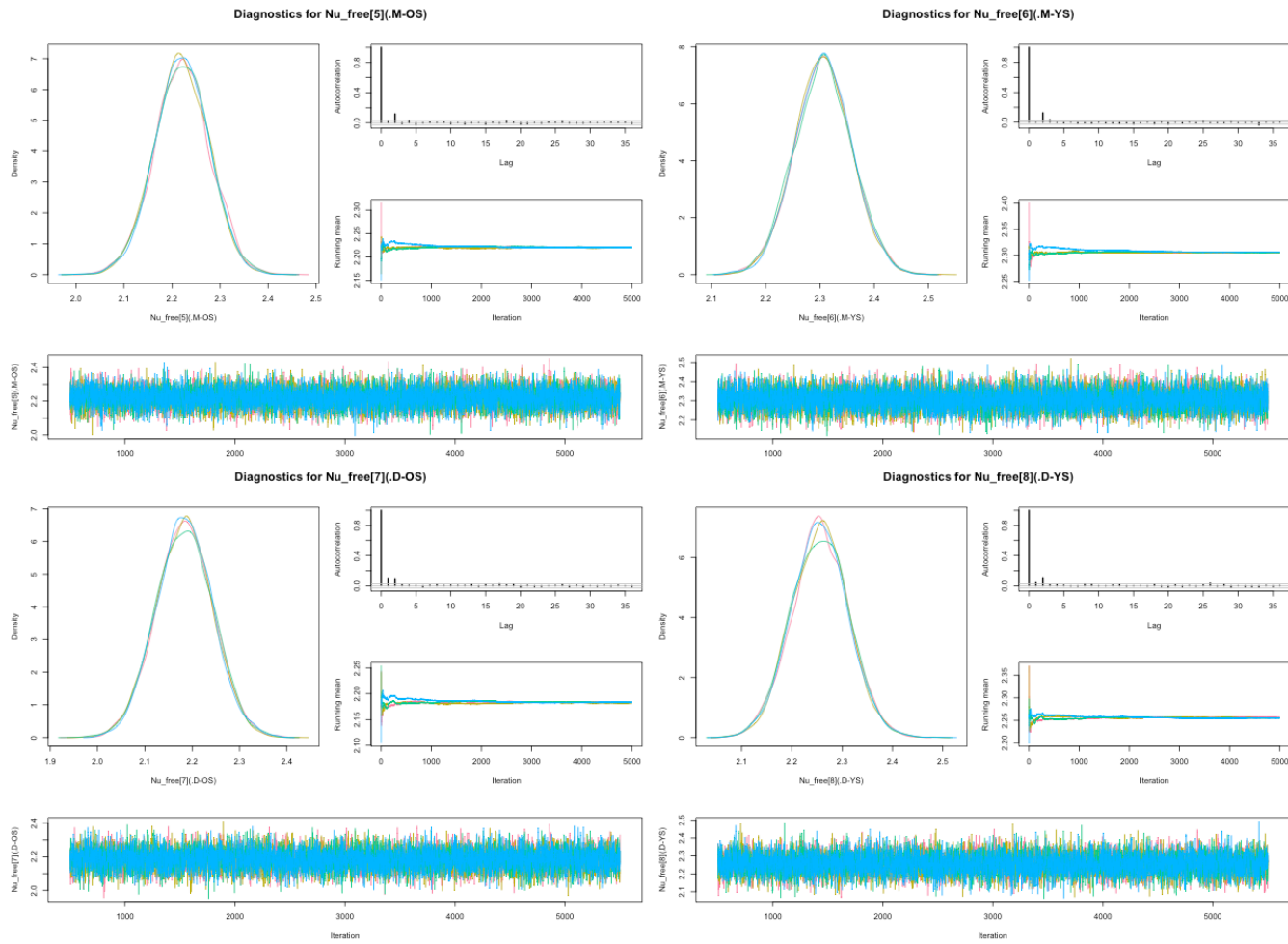


Figure 159. Model 4 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

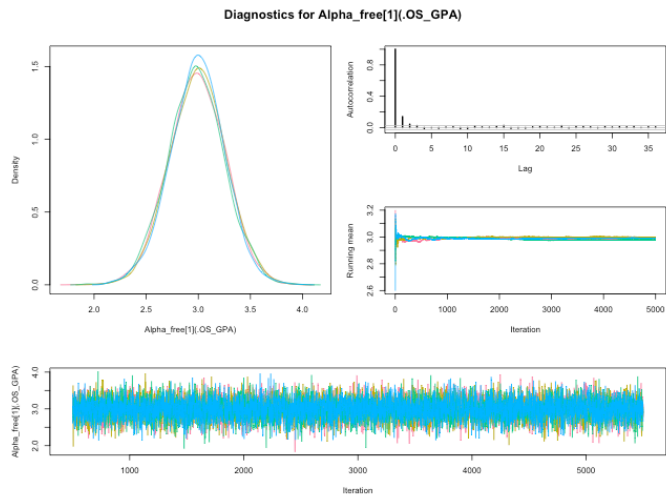


Figure 160. Model 4 MCMC Diagnostic Plots of Regression Intercept Parameter

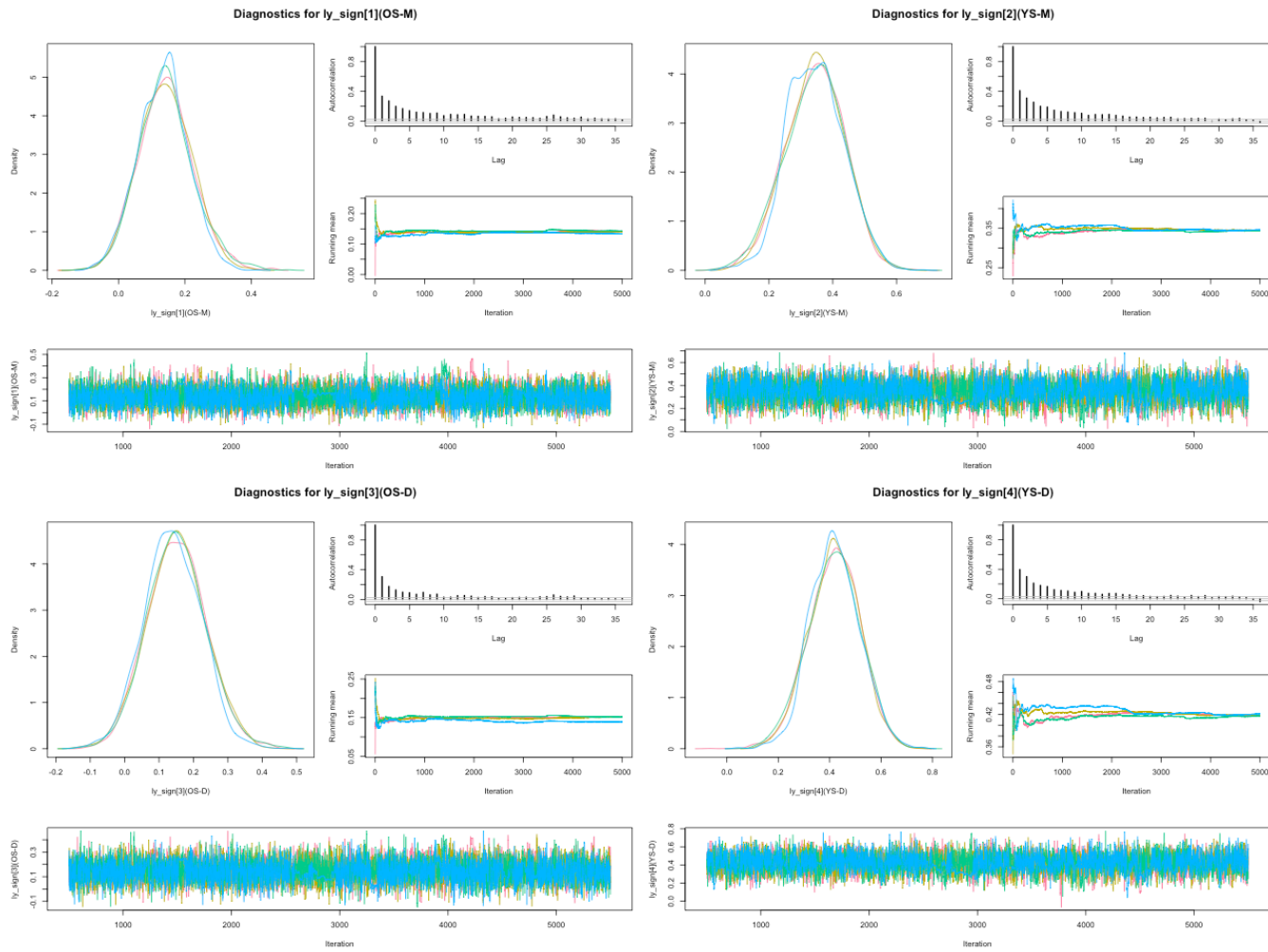


Figure 161. Model 5a MCMC Diagnostic Plots of Factor Loading Parameters

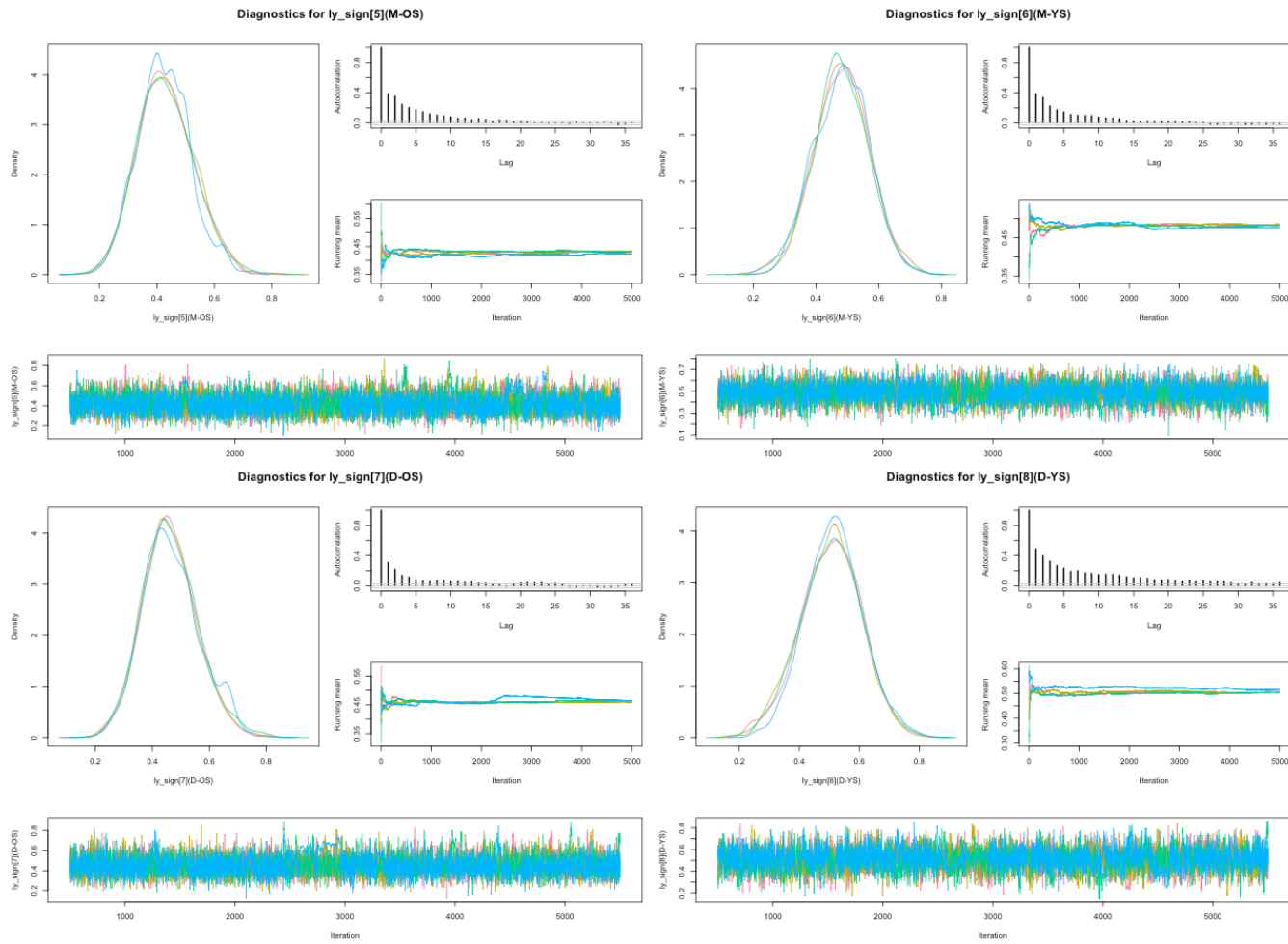


Figure 162. Model 5a MCMC Diagnostic Plots of Factor Loading Parameters

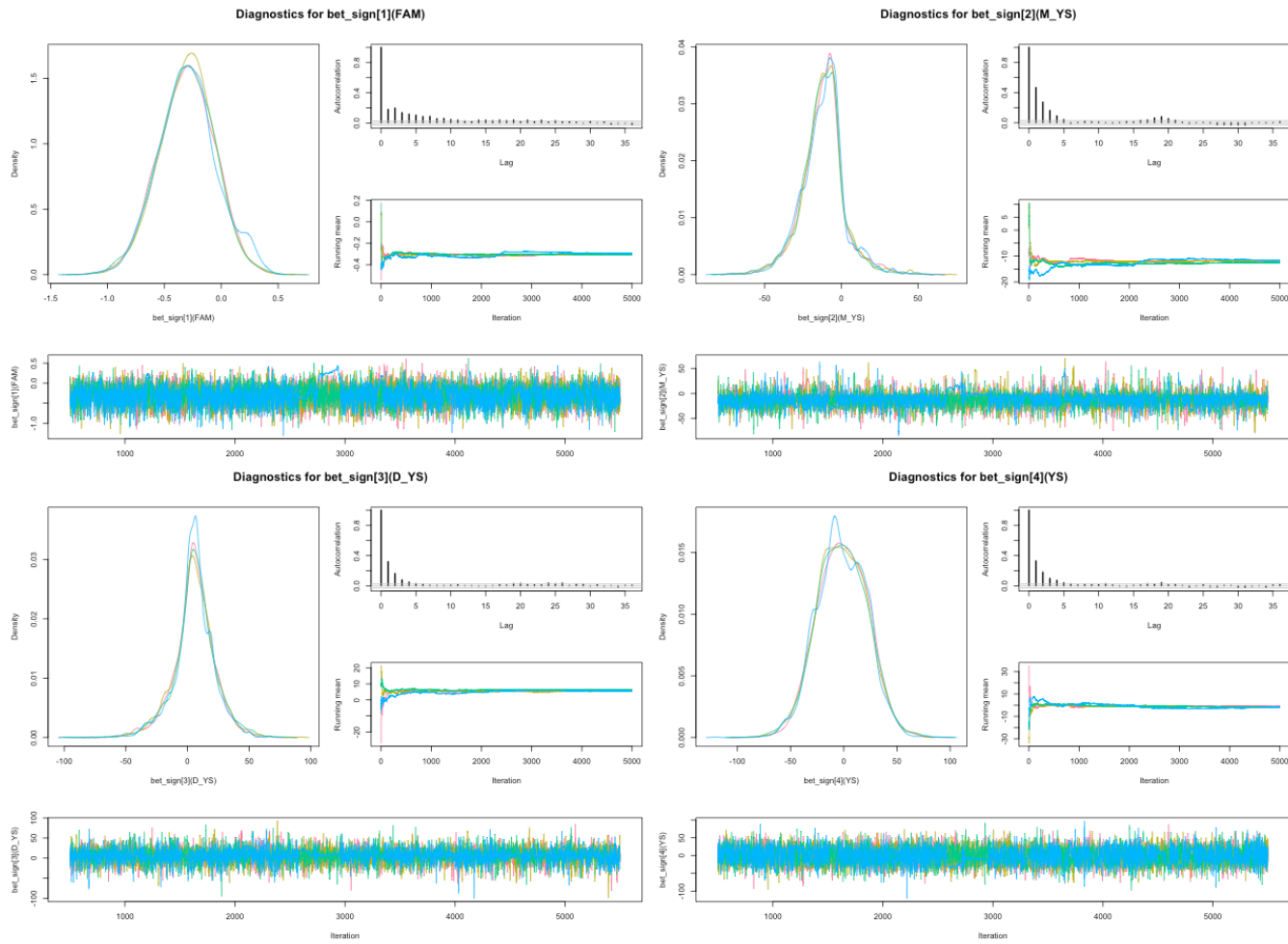


Figure 163. Model 5a MCMC Diagnostic Plots of Regression Coefficient Parameters

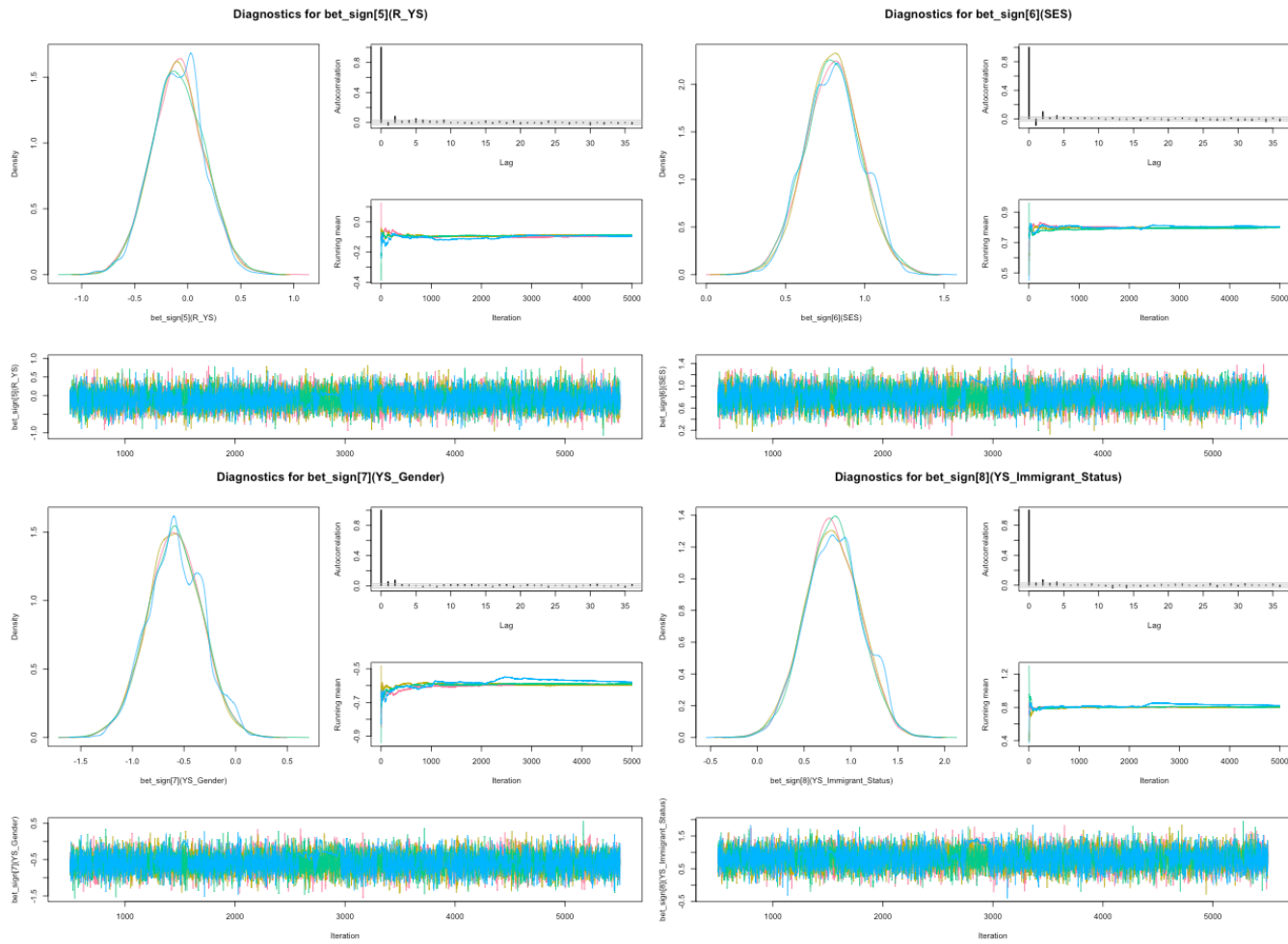


Figure 164. Model 5a MCMC Diagnostic Plots of Regression Coefficient Parameters

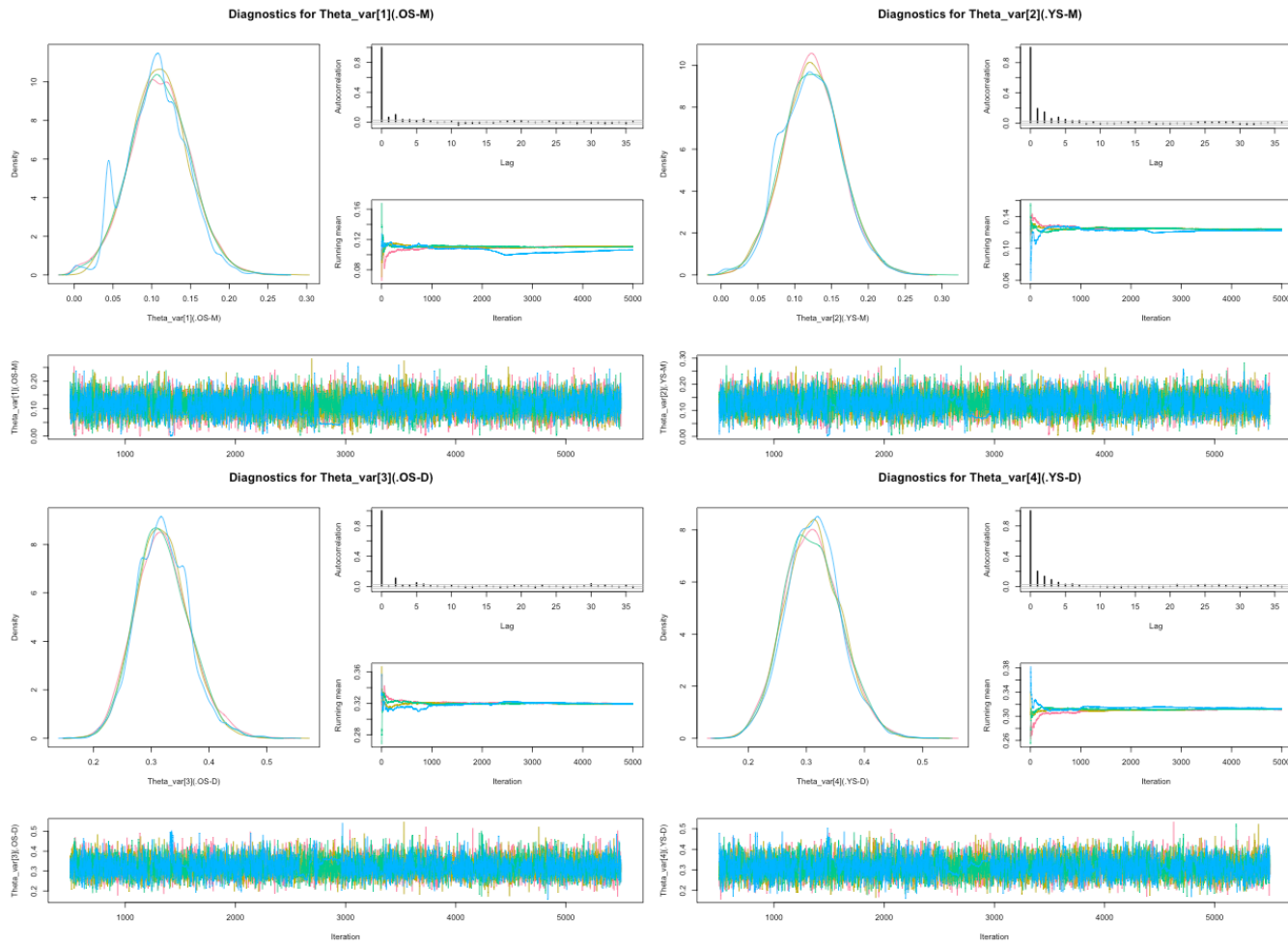


Figure 165. Model 5a MCMC Diagnostic Plots of Measured Variable Variance Parameters

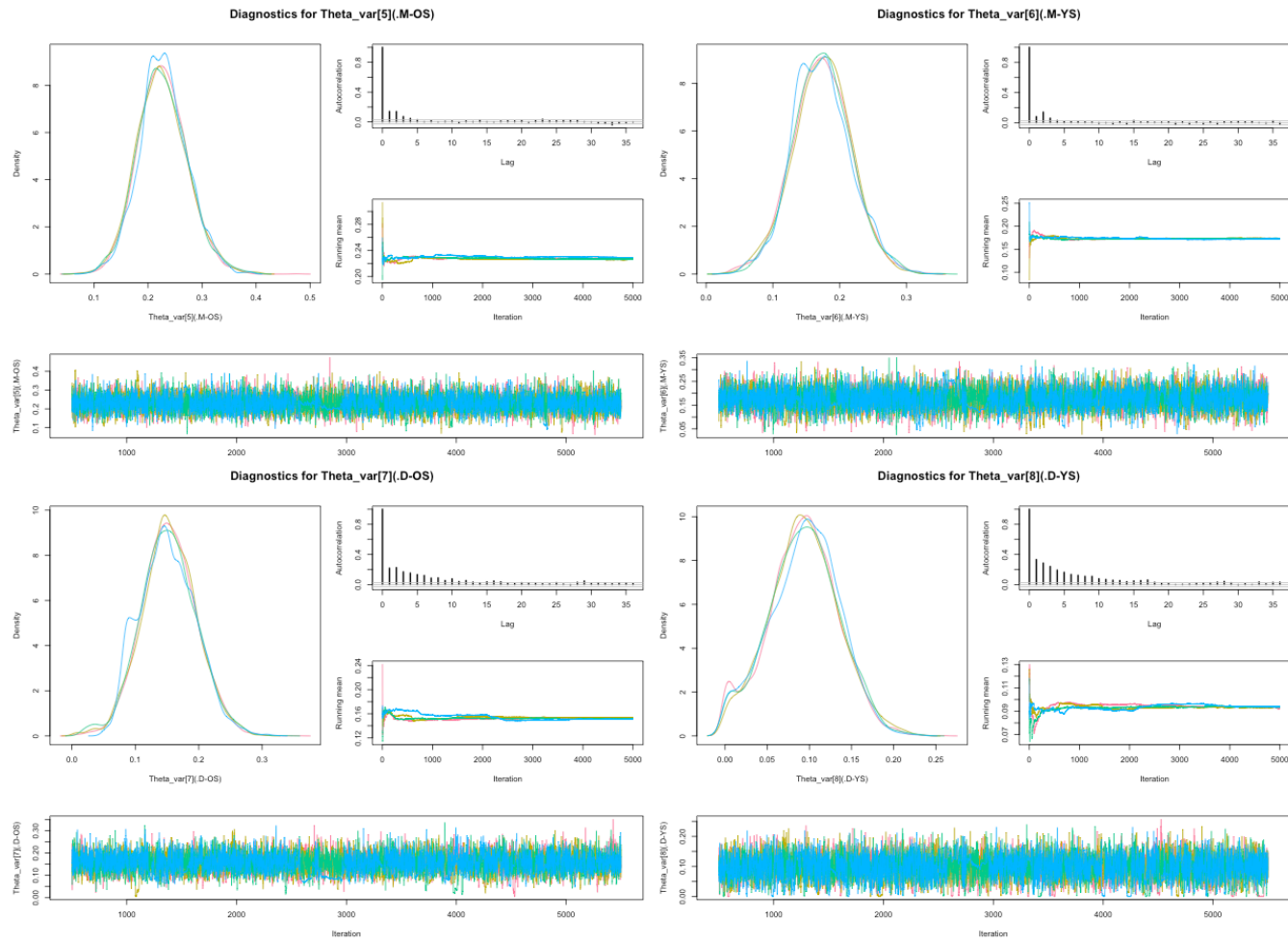


Figure 166. Model 5a MCMC Diagnostic Plots of Measured Variable Variance Parameters

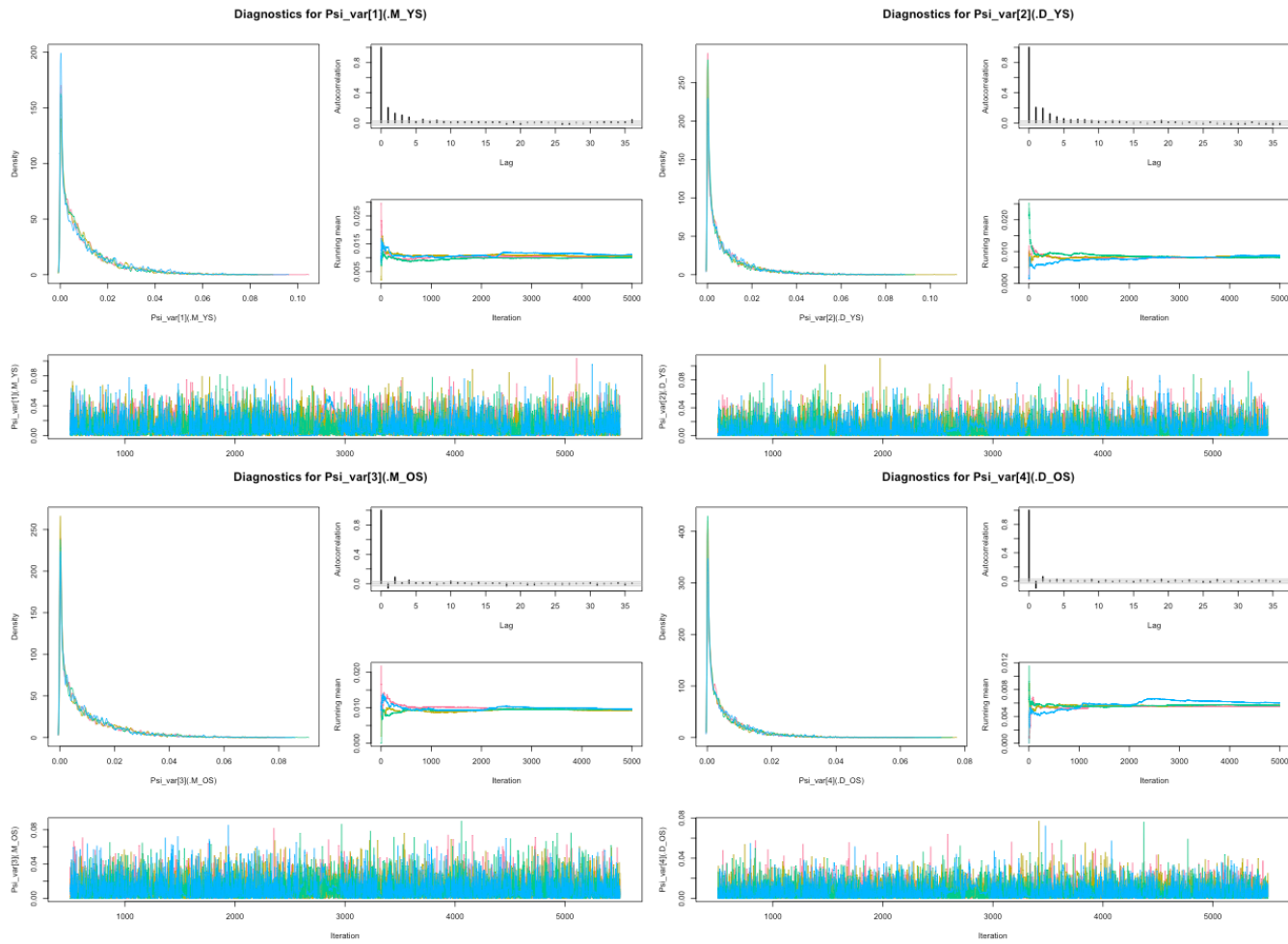


Figure 167. Model 5a MCMC Diagnostic Plots of Latent Variable Variance Parameters

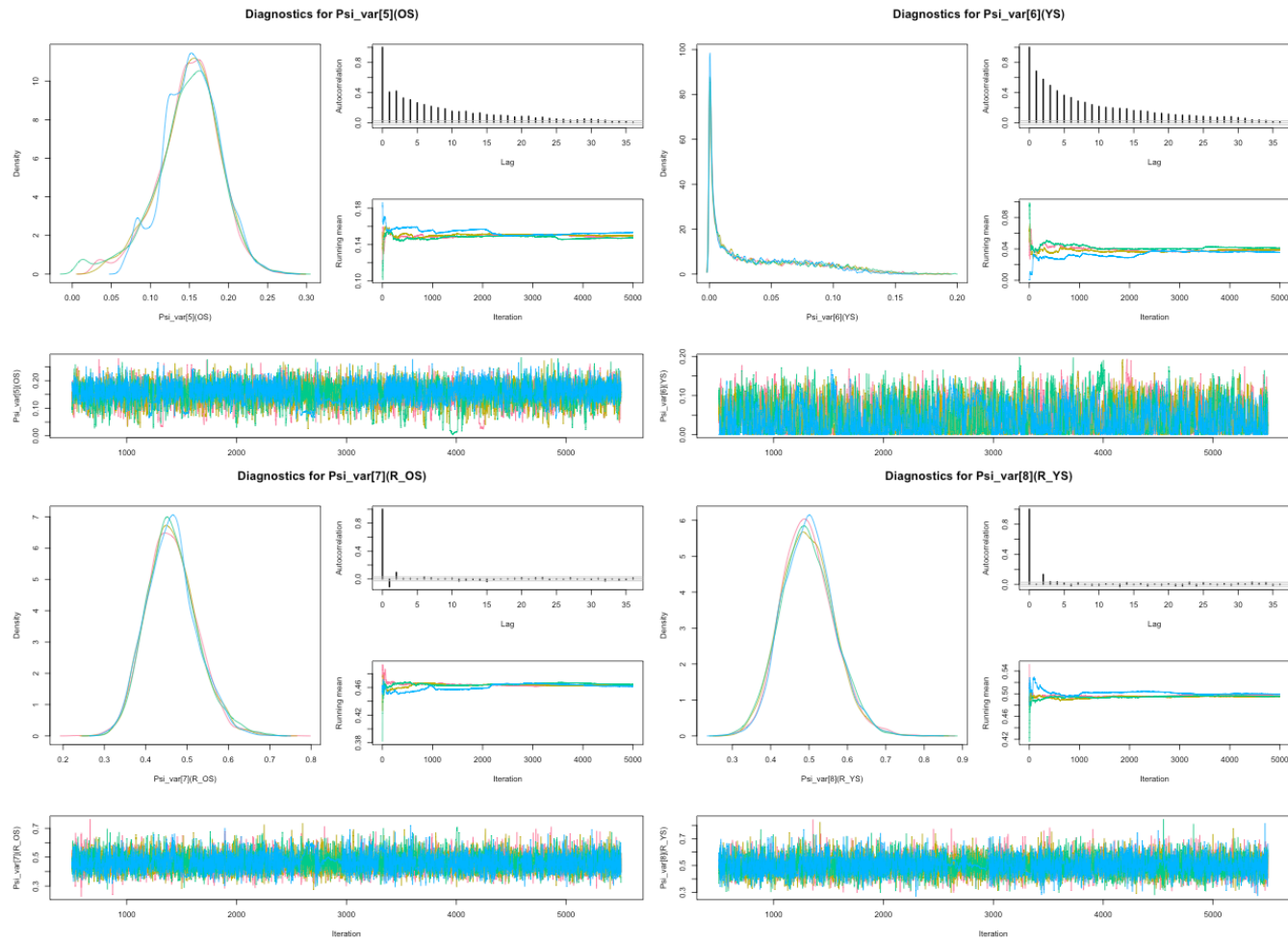


Figure 168. Model 5a MCMC Diagnostic Plots of Latent Variable Variance Parameters

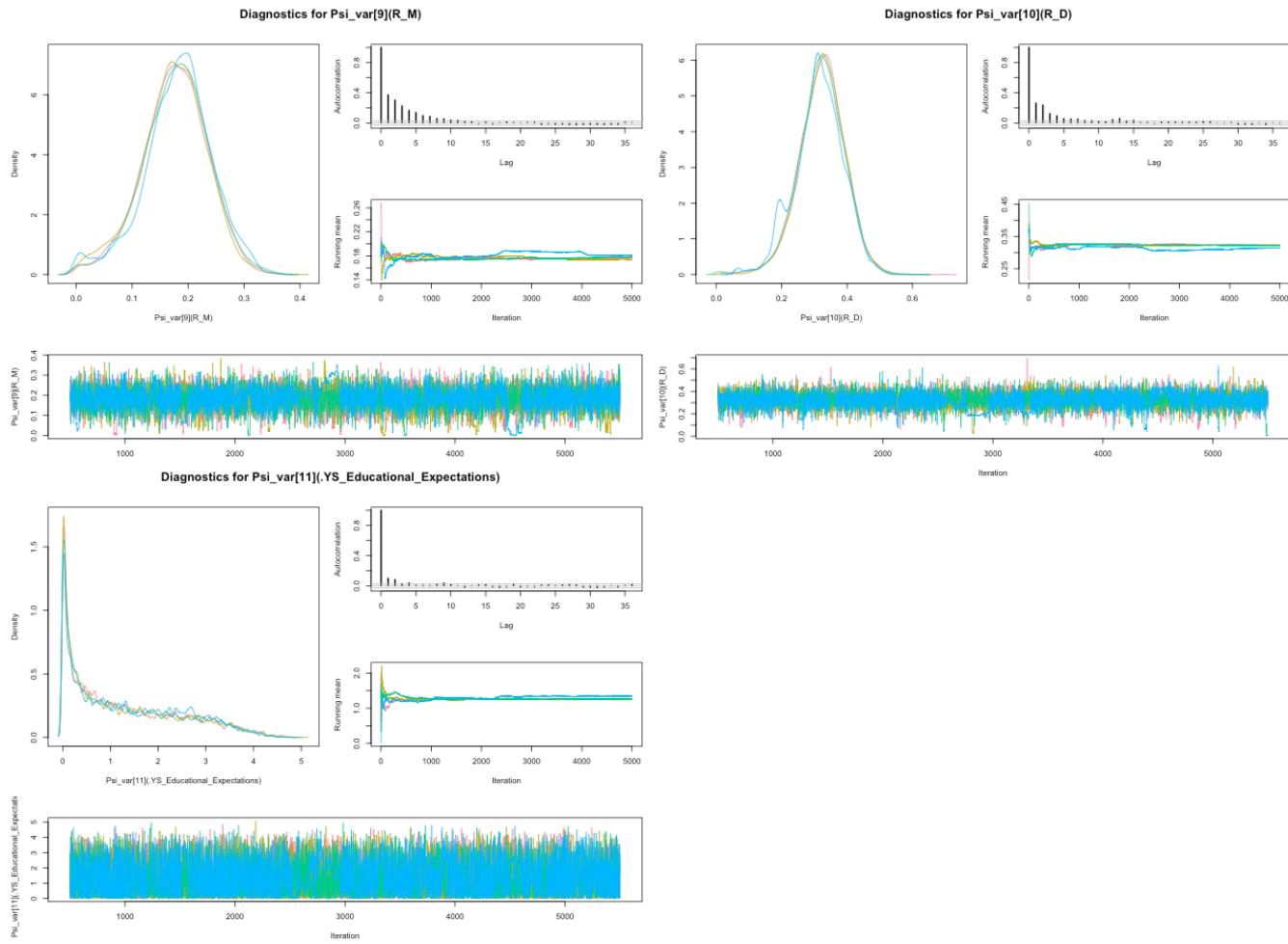


Figure 169. Model 5a MCMC Diagnostic Plots of Latent Variable Variance Parameters

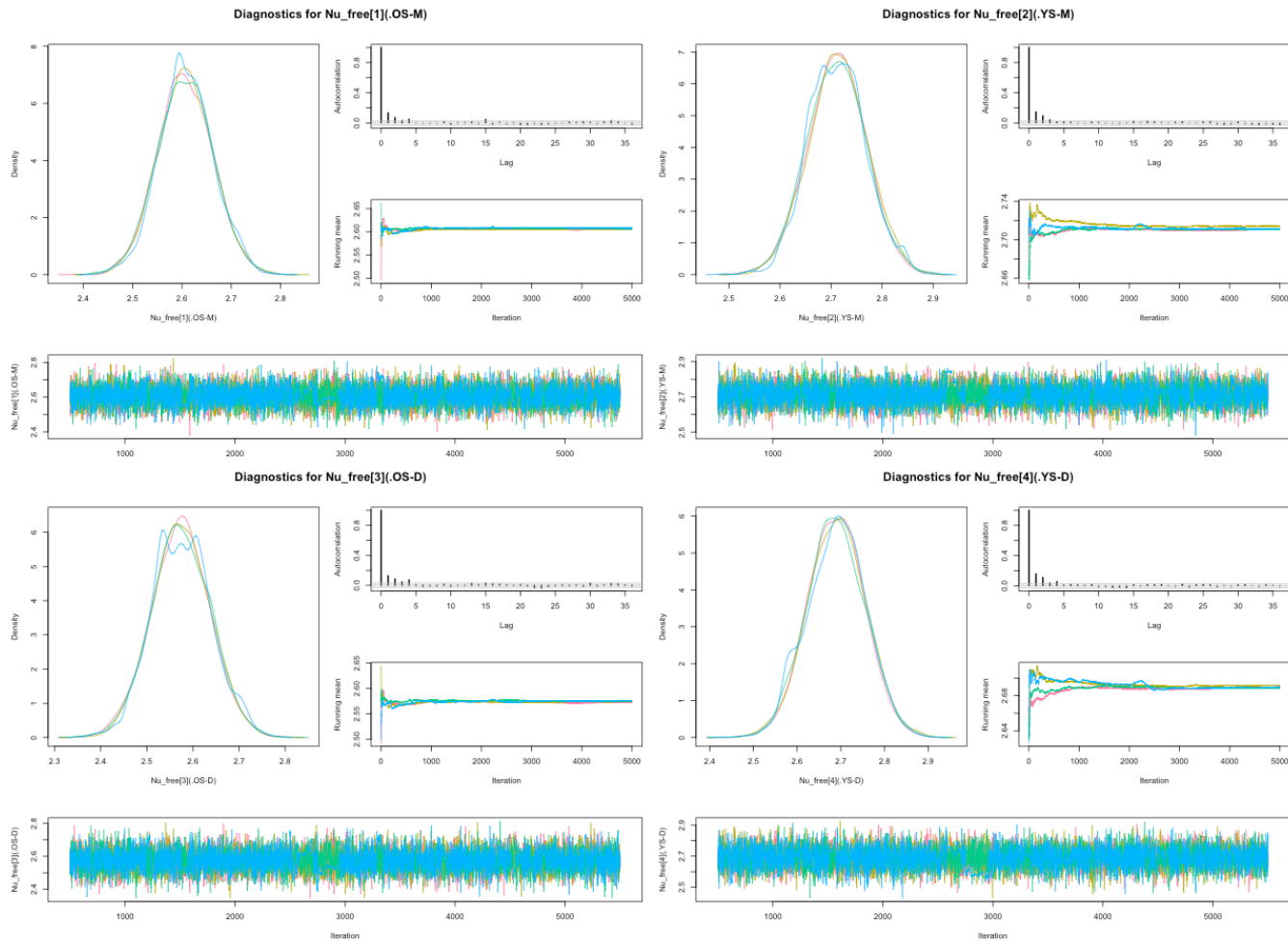


Figure 170. Model 5a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

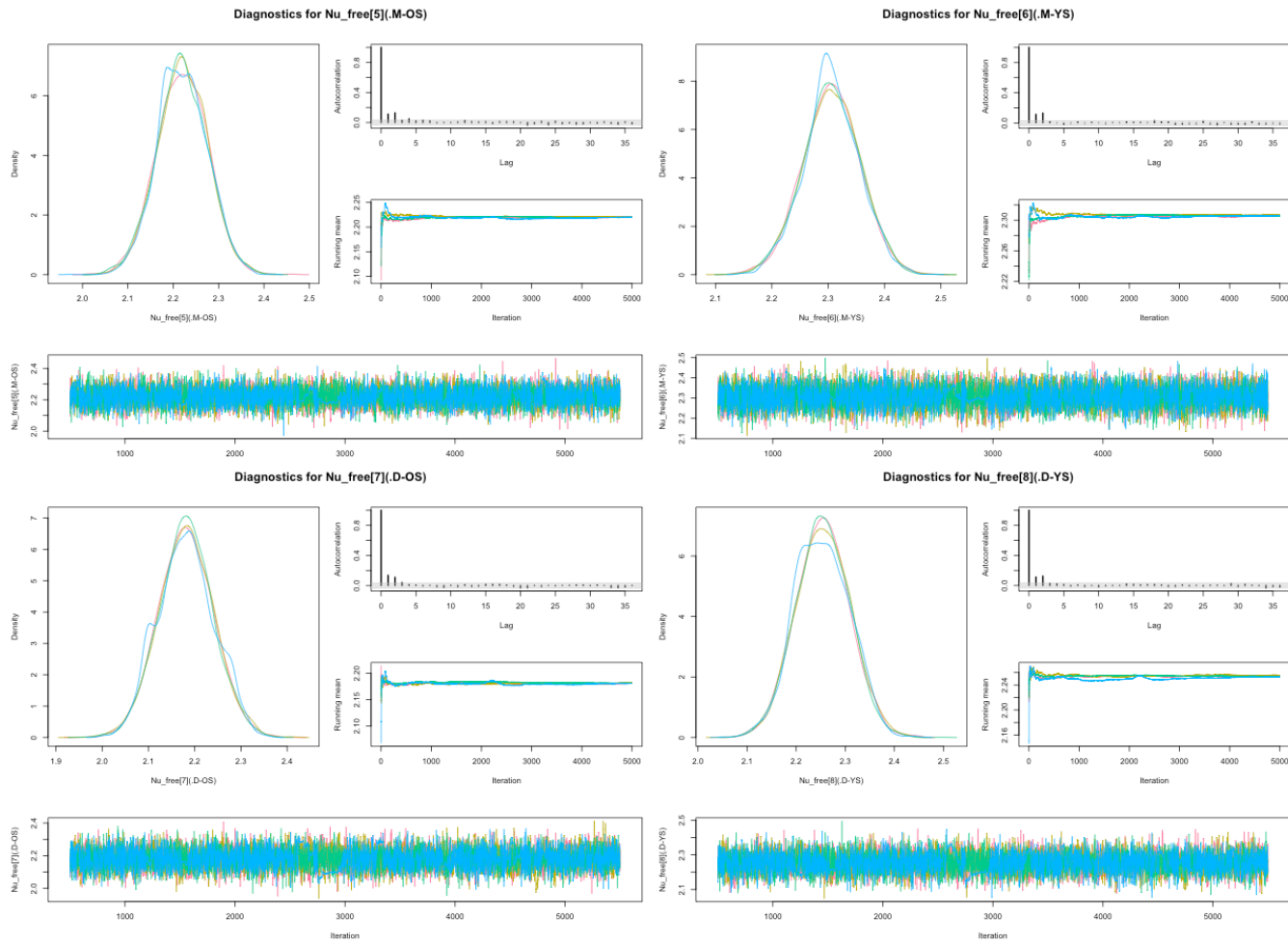


Figure 171. Model 5a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

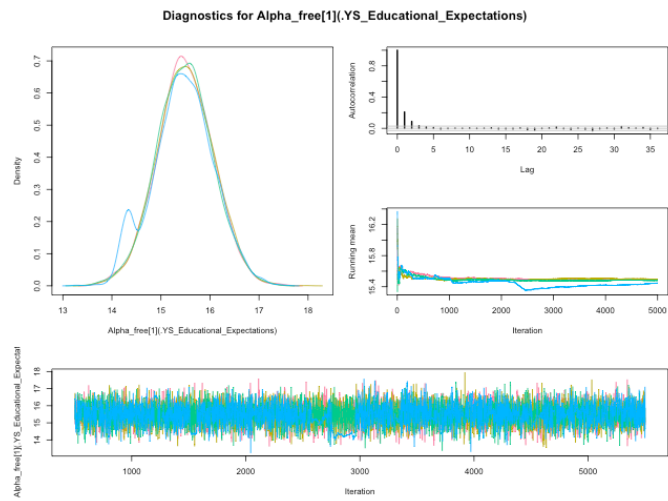


Figure 172. Model 5a MCMC Diagnostic Plots of Regression Intercept Parameter

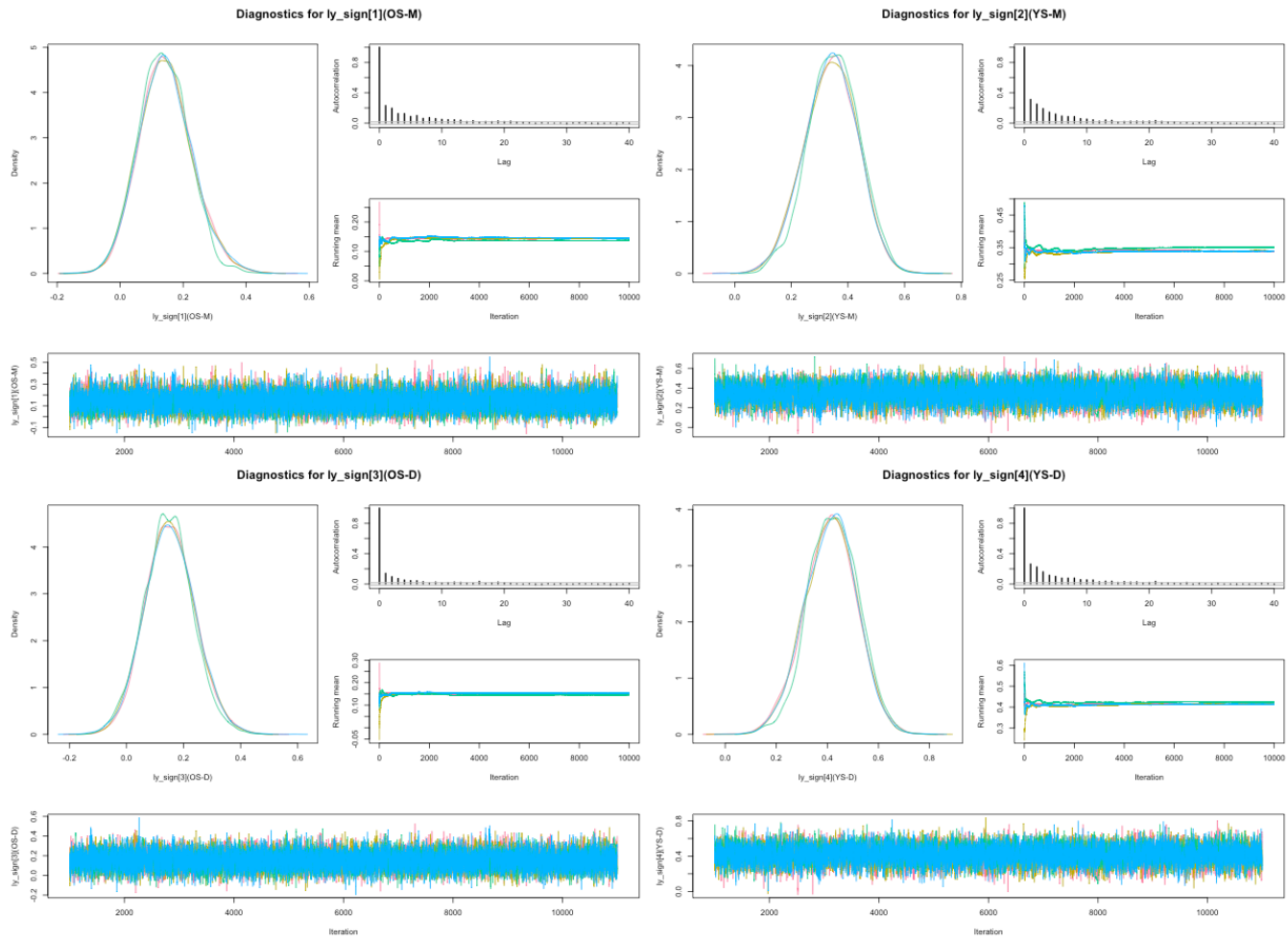


Figure 173. Model 5 MCMC Diagnostic Plots of Factor Loading Parameters

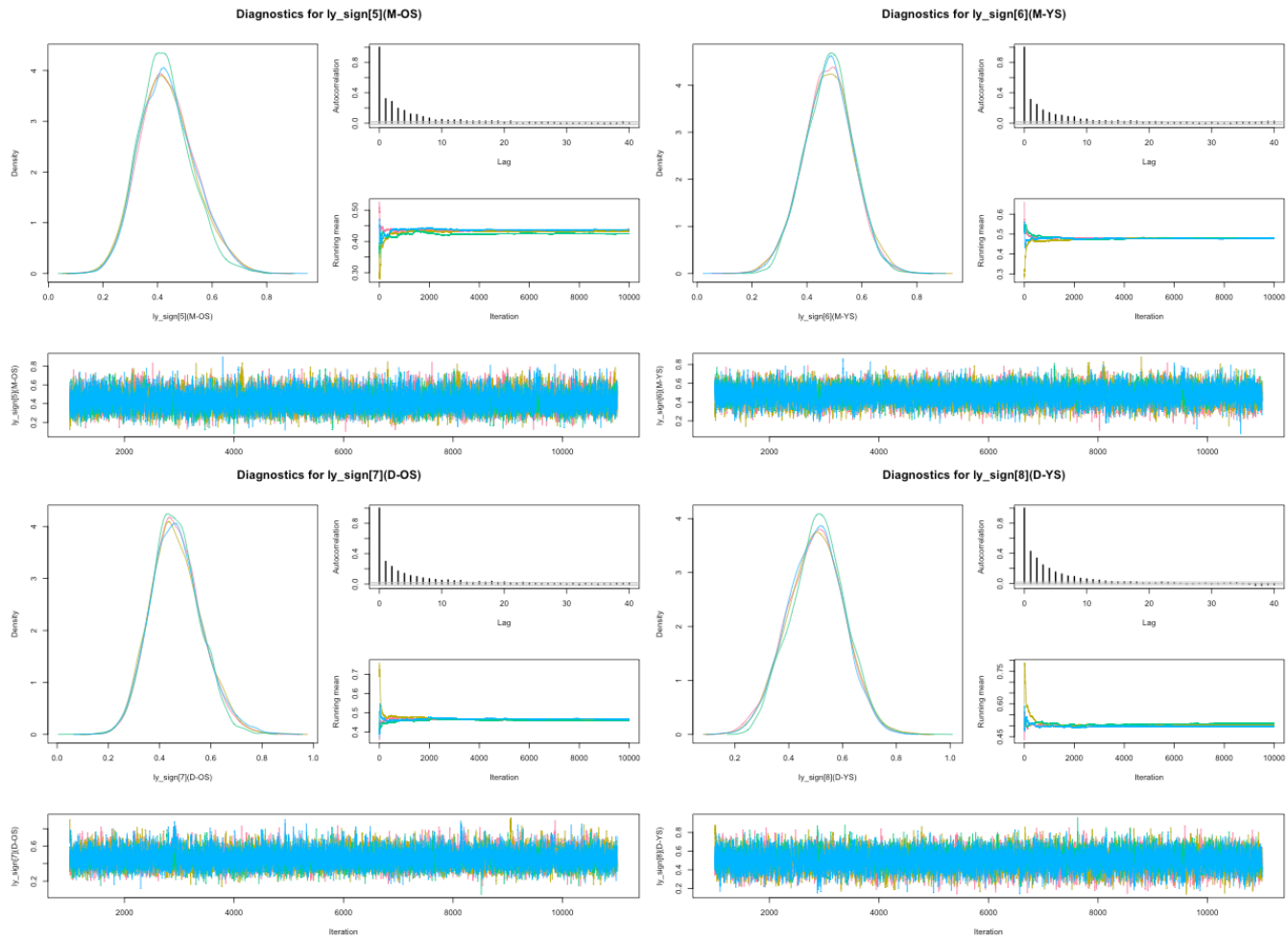


Figure 174. Model 5 MCMC Diagnostic Plots of Factor Loading Parameters

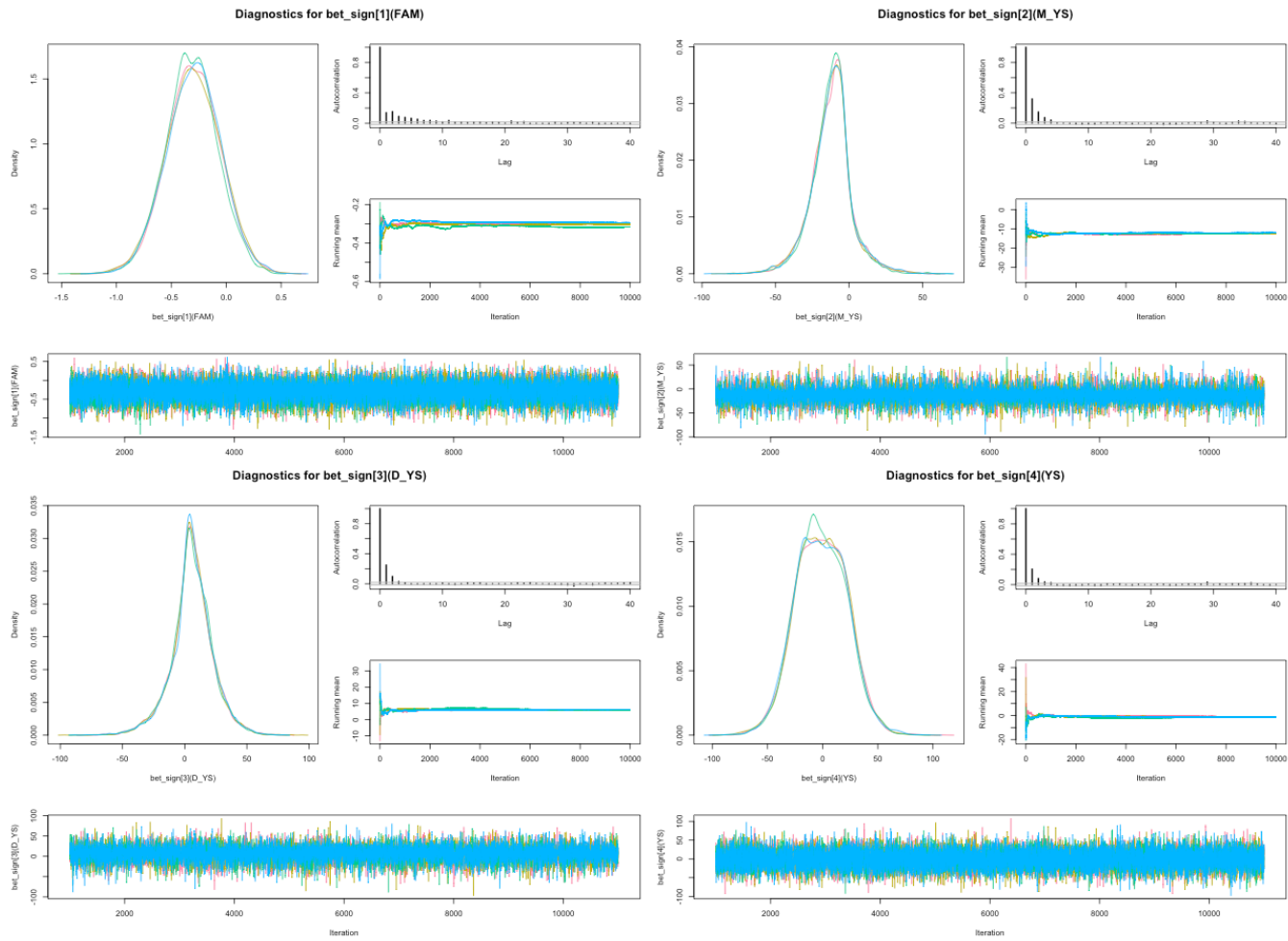


Figure 175. Model 5 MCMC Diagnostic Plots of Regression Coefficient Parameters

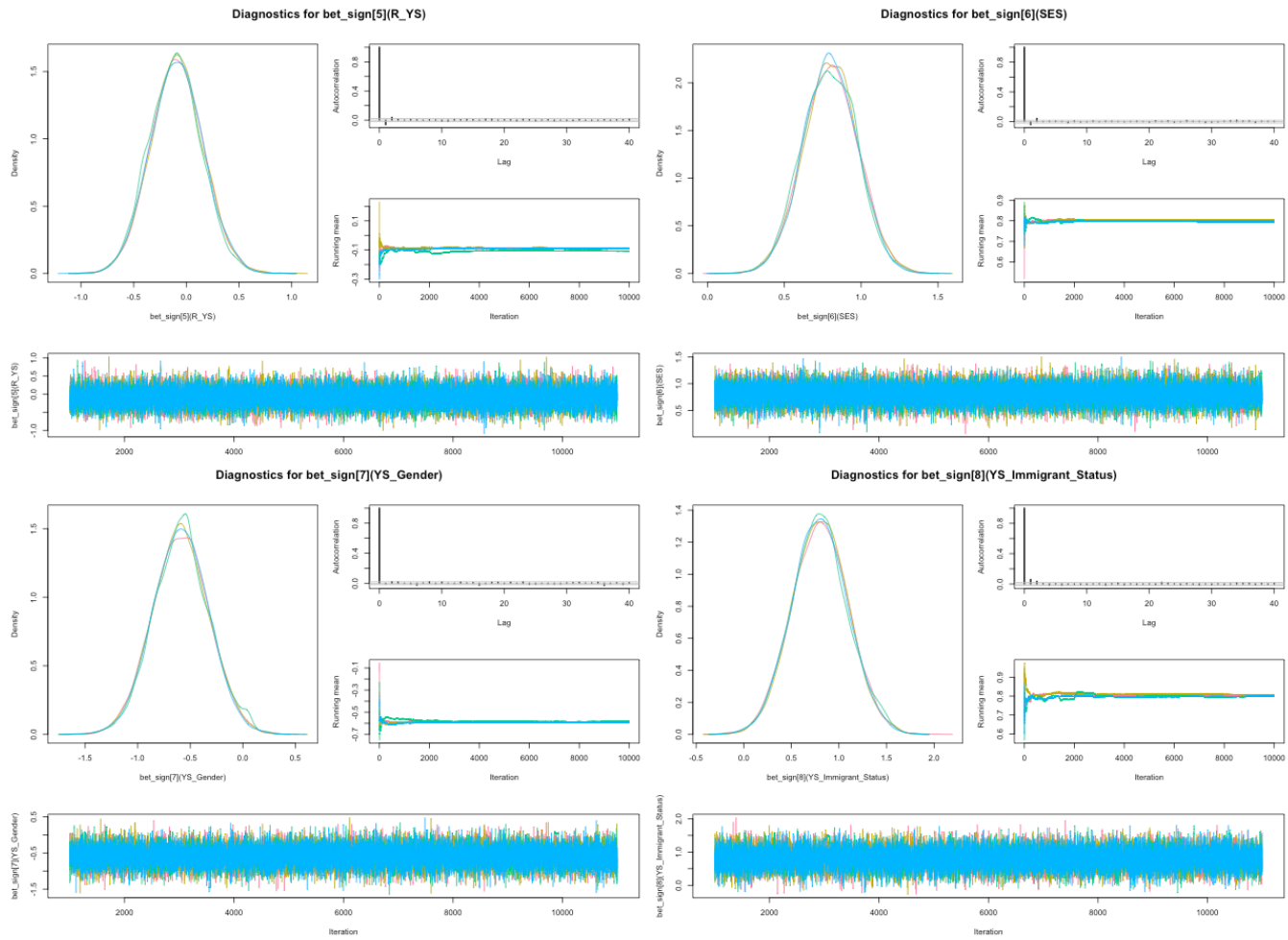


Figure 176. Model 5 MCMC Diagnostic Plots of Regression Coefficient Parameters

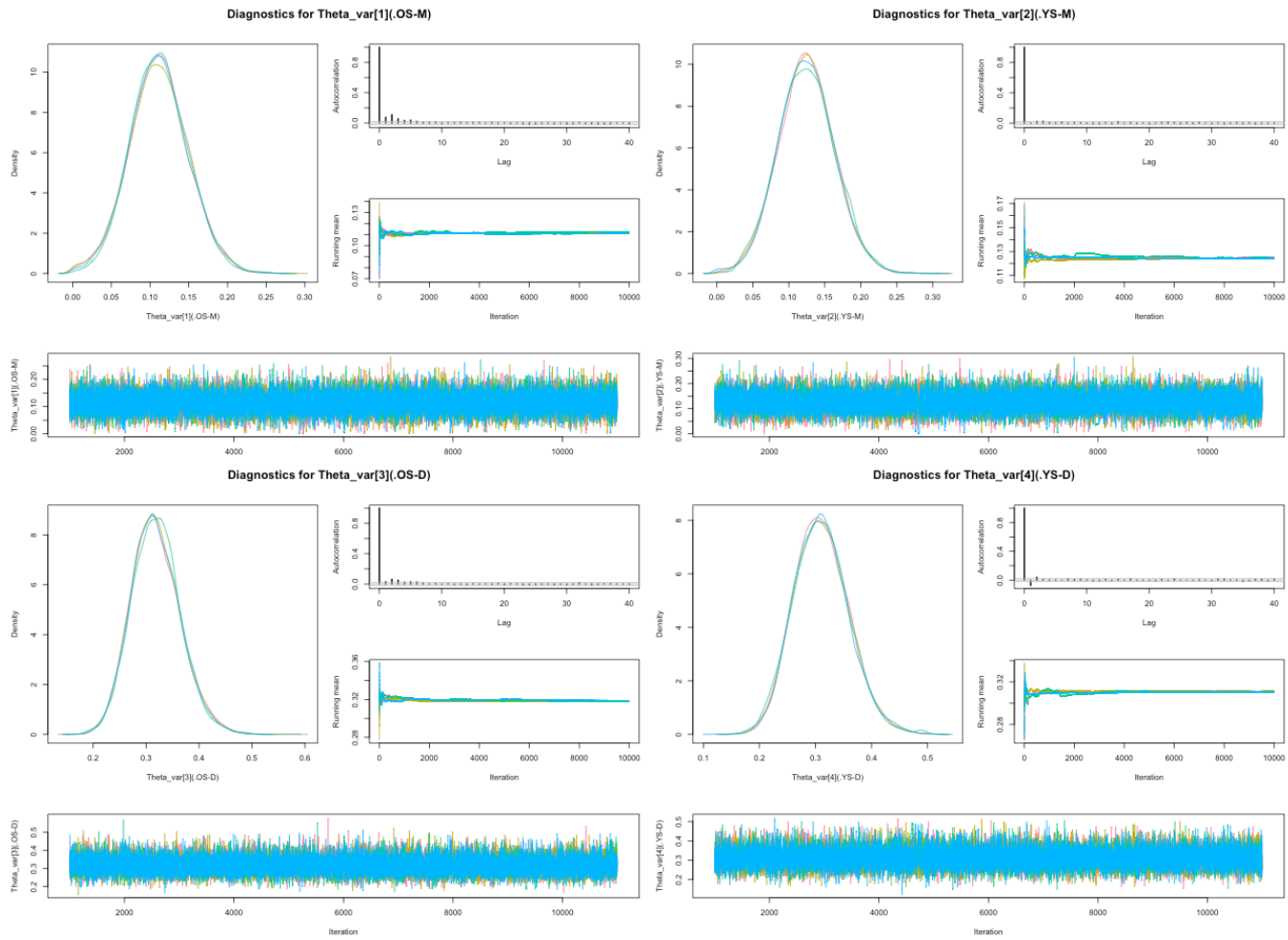


Figure 177. Model 5 MCMC Diagnostic Plots of Measured Variable Variance Parameters

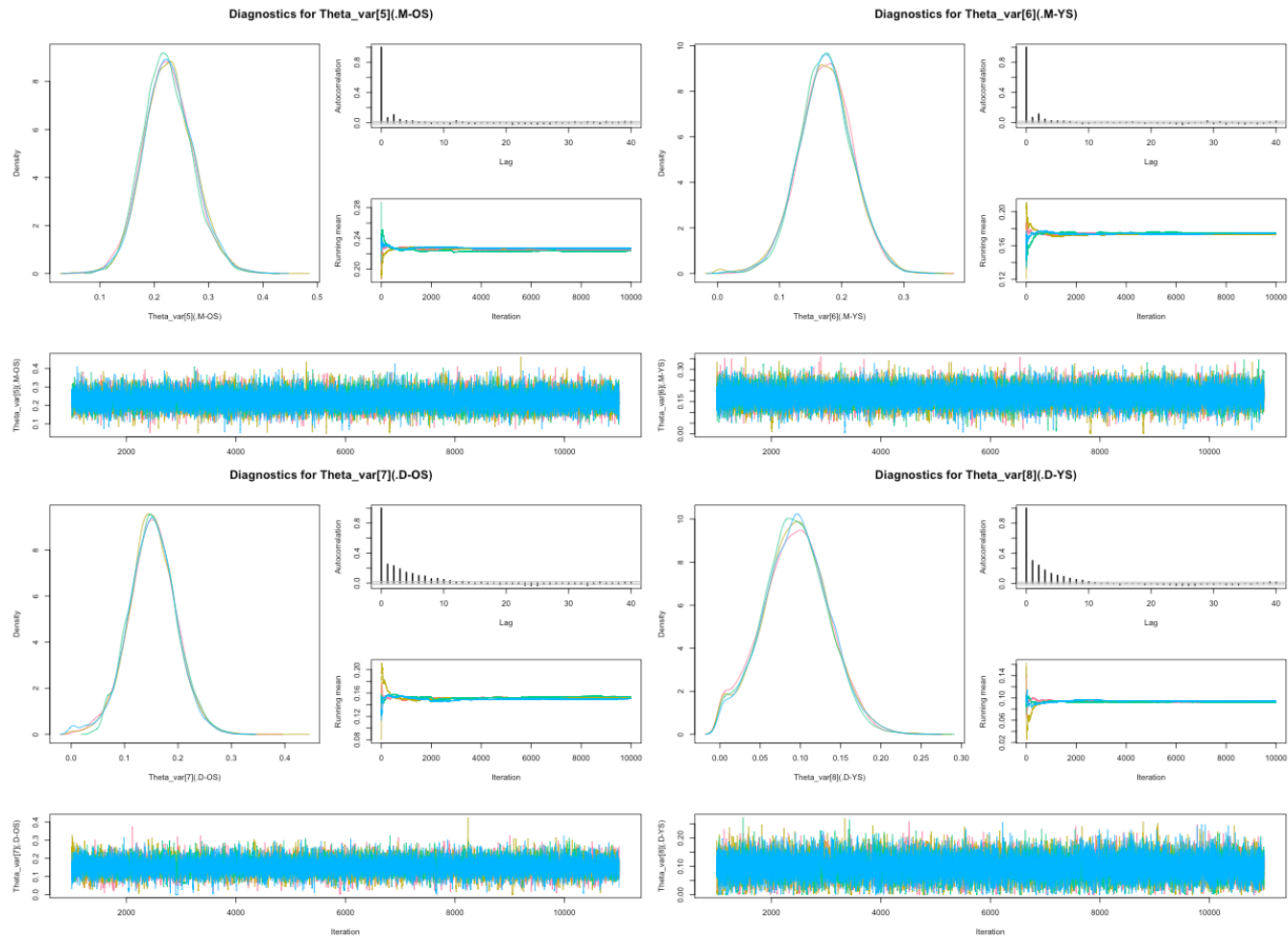


Figure 178. Model 5 MCMC Diagnostic Plots of Measured Variable Variance Parameters

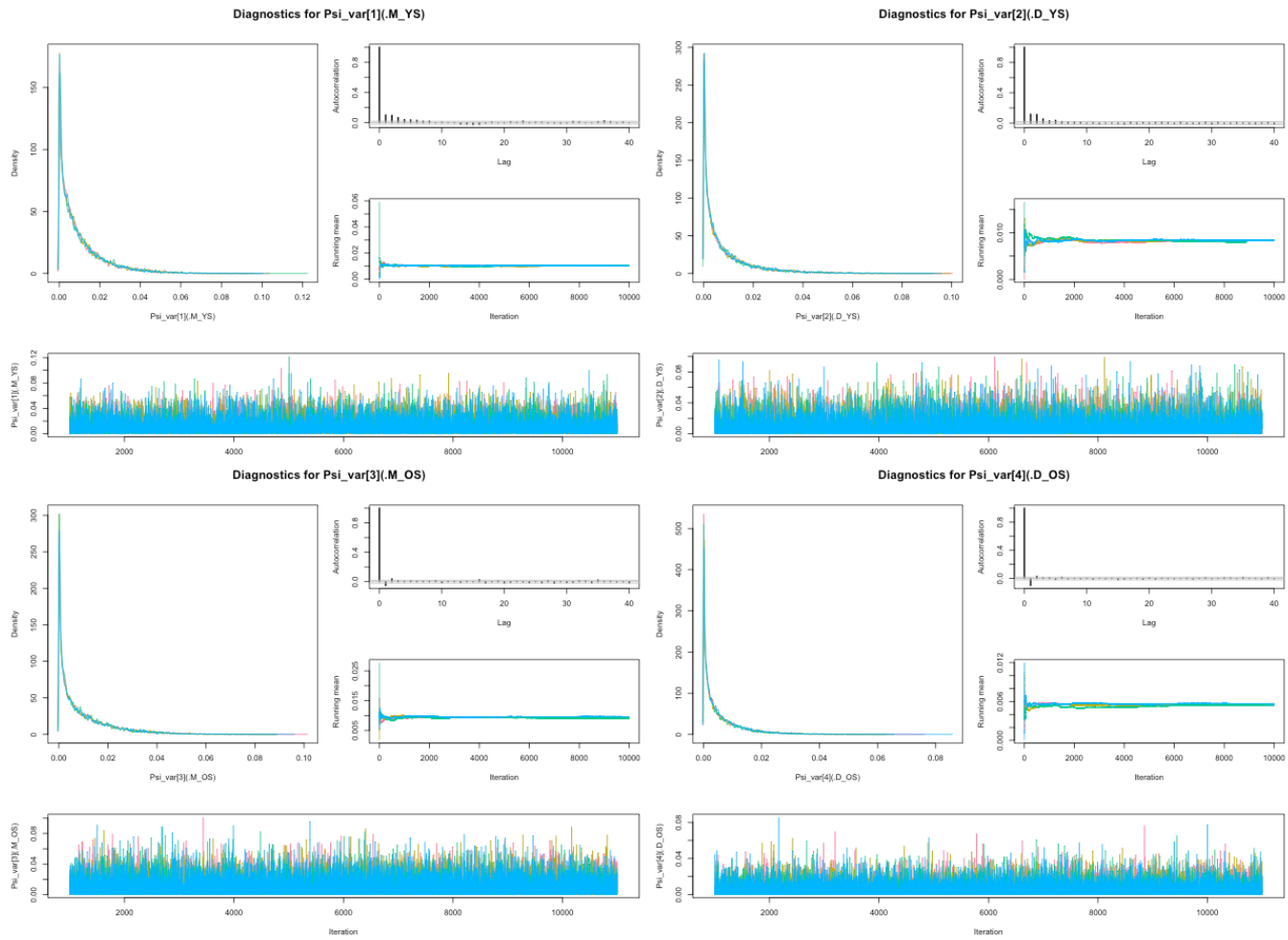


Figure 179. Model 5 MCMC Diagnostic Plots of Latent Variable Variance Parameters

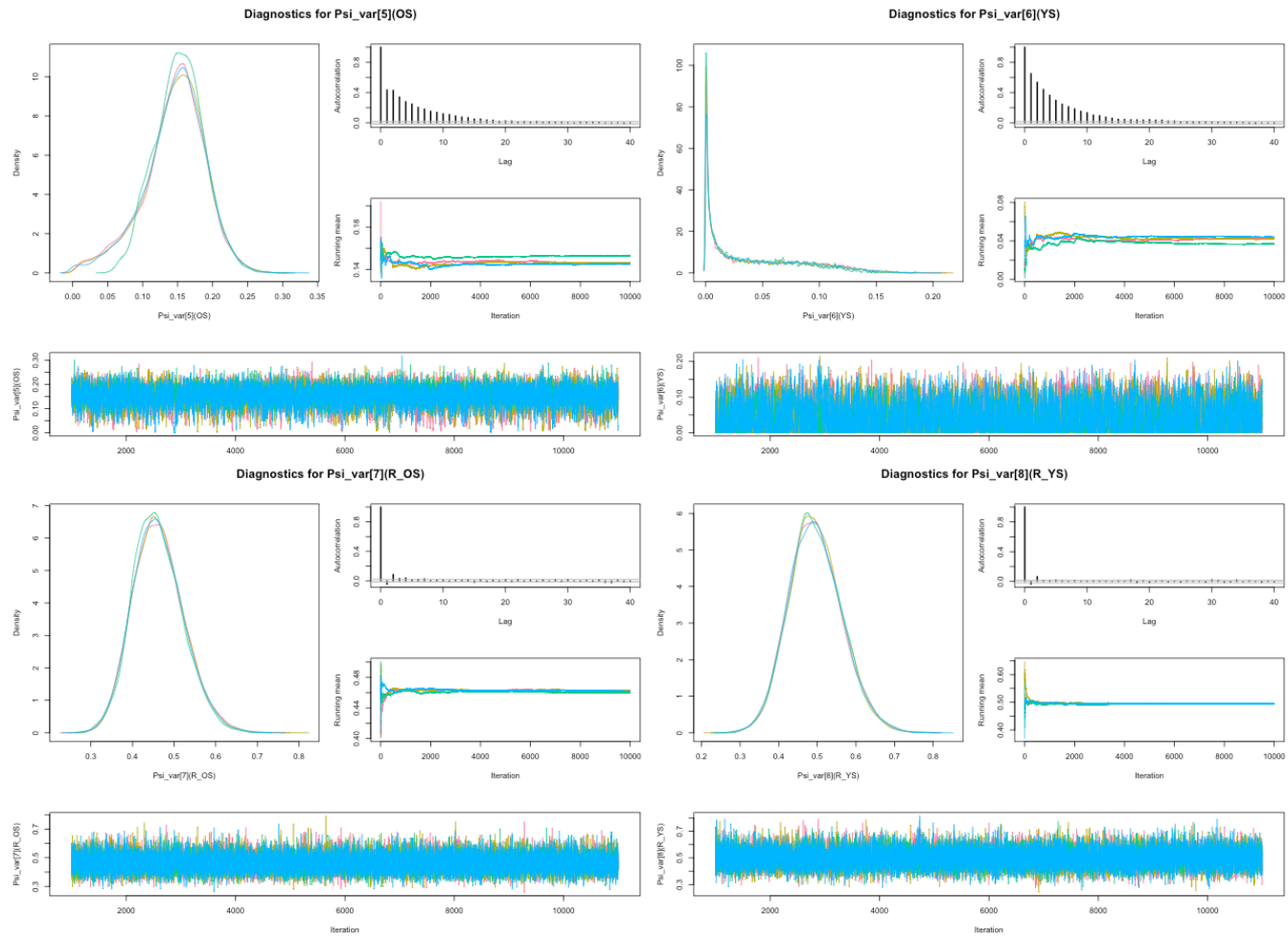


Figure 180. Model 5 MCMC Diagnostic Plots of Latent Variable Variance Parameters

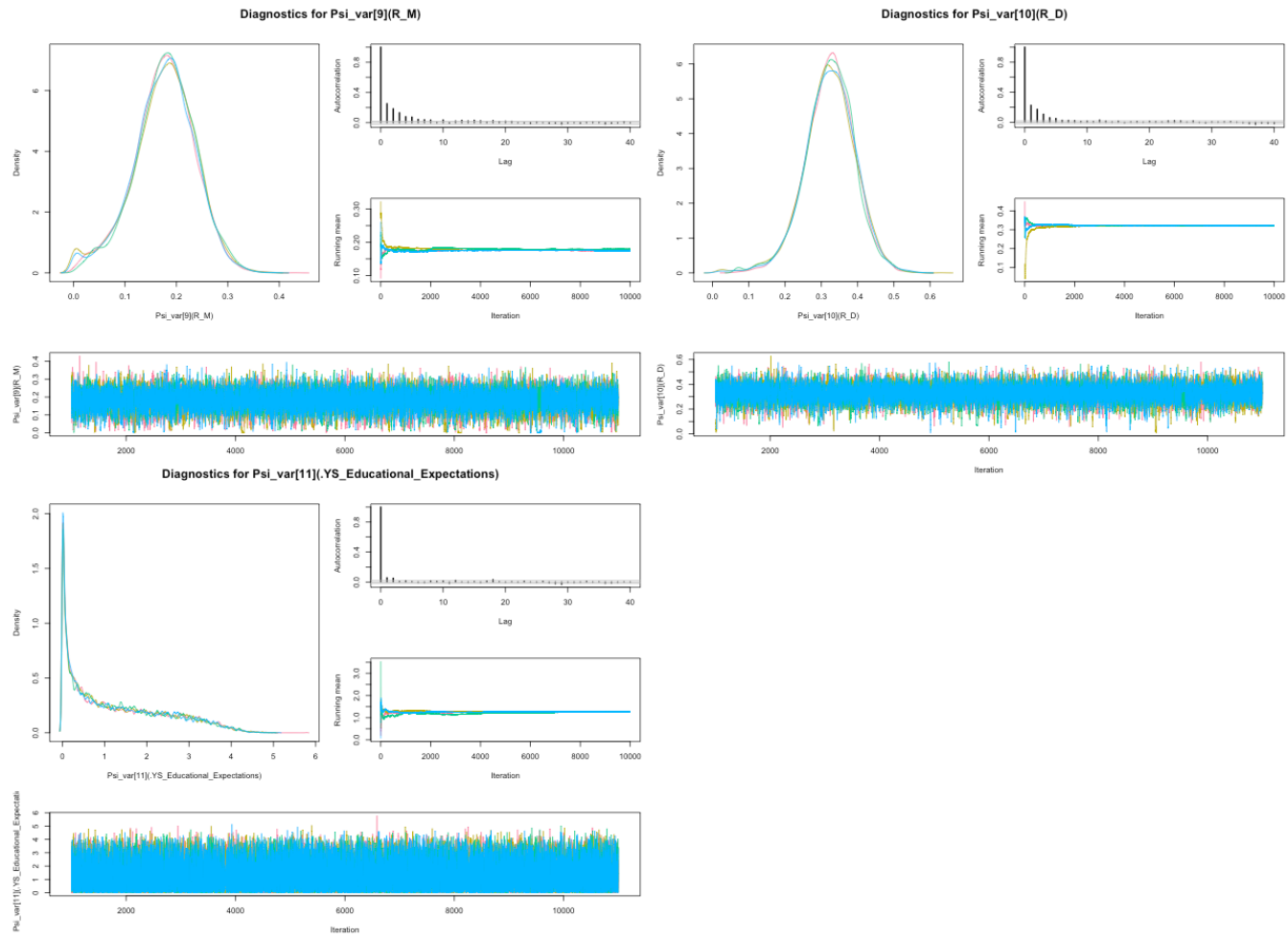


Figure 181. Model 5 MCMC Diagnostic Plots of Latent Variable Variance Parameters

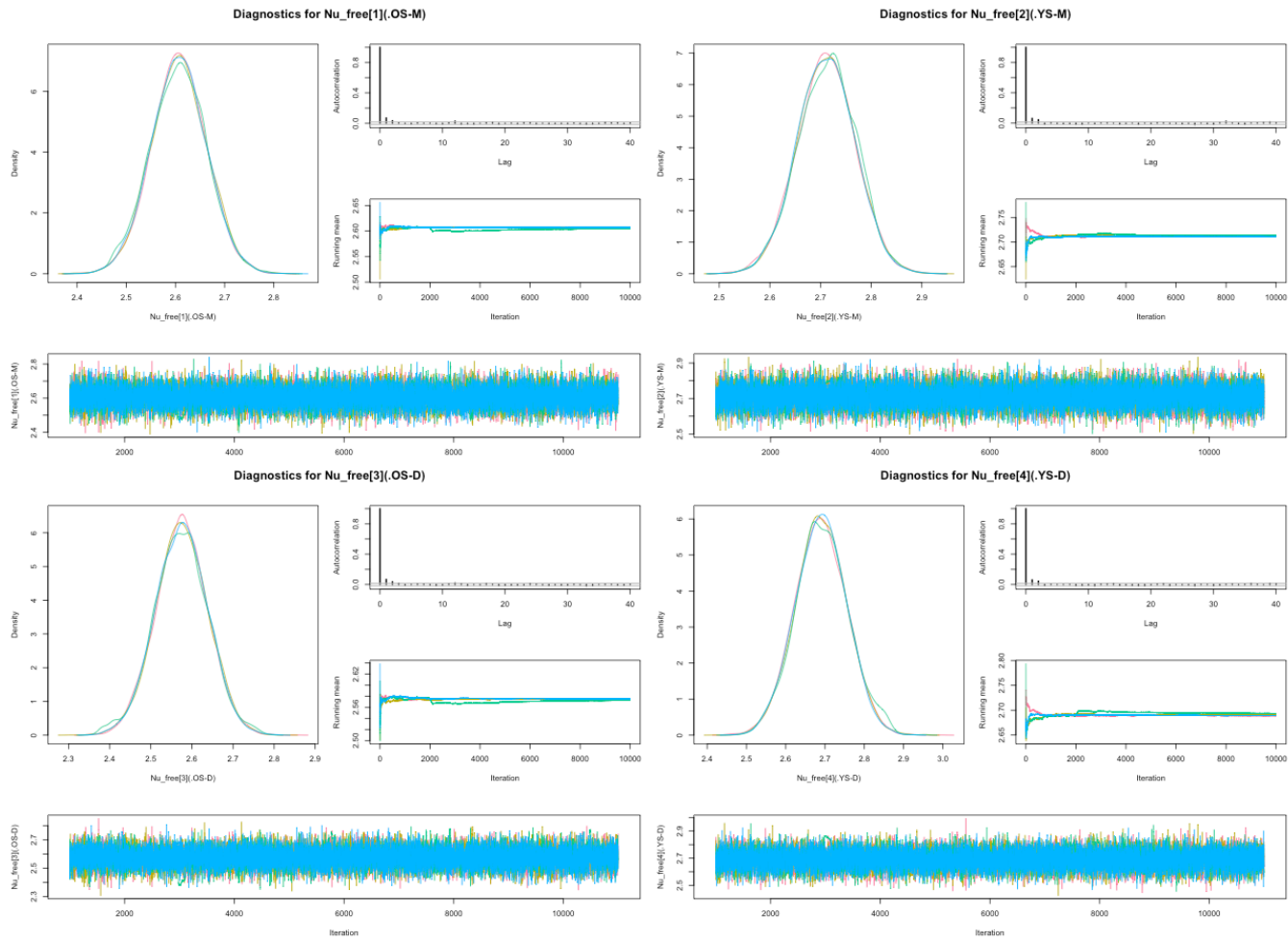


Figure 182. Model 5 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

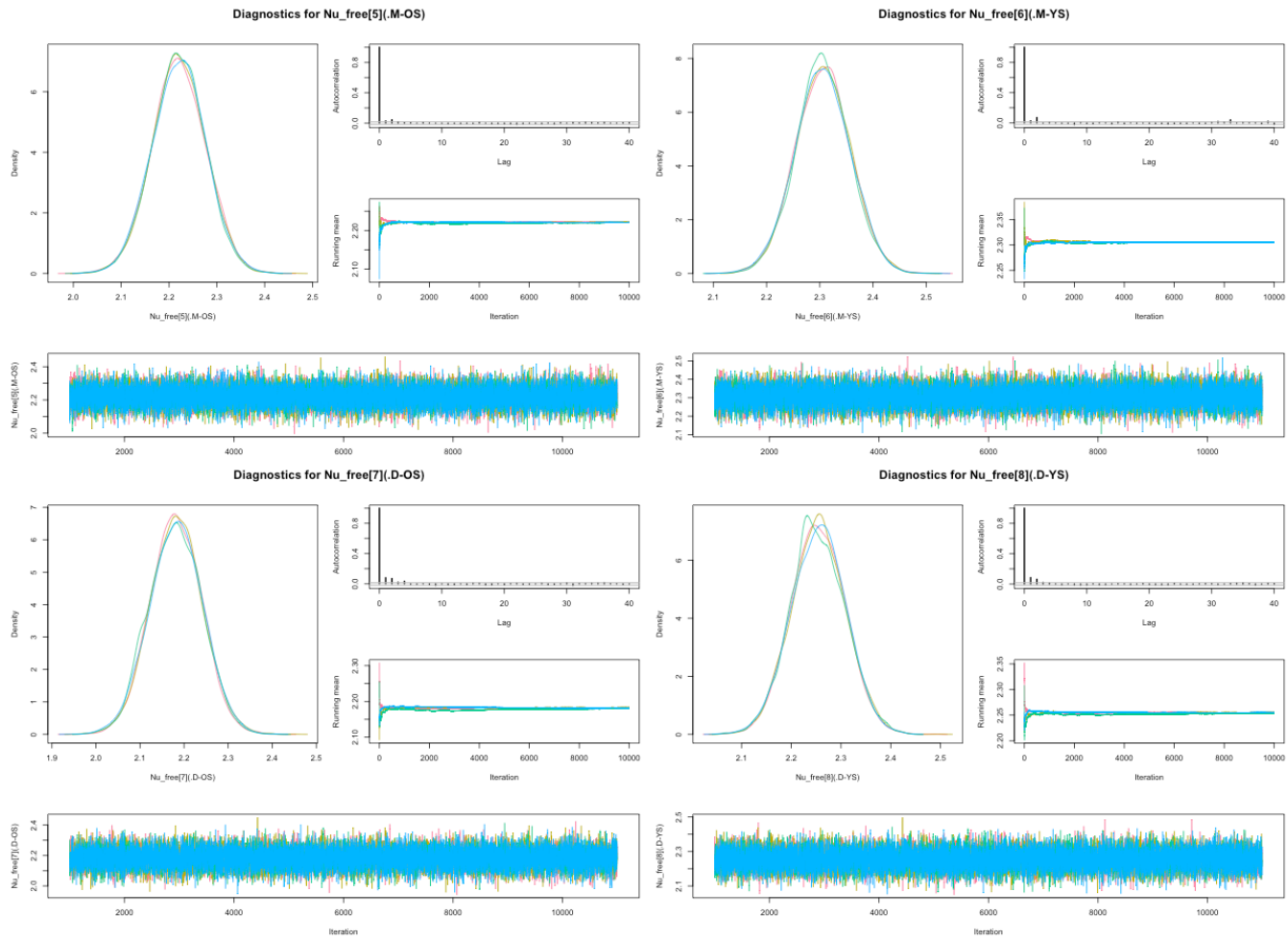


Figure 183. Model 5 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

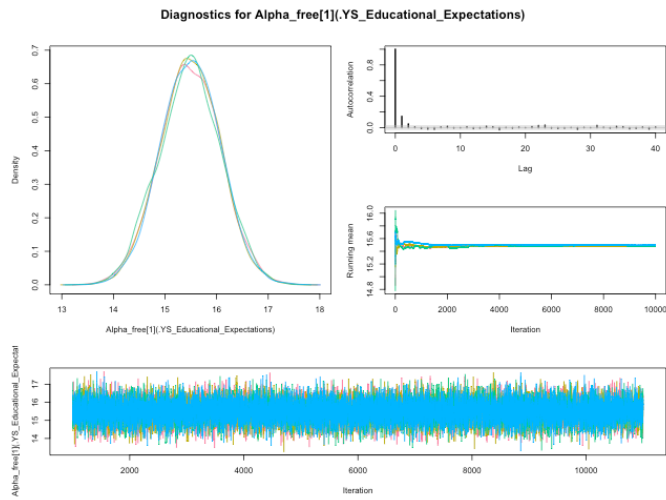


Figure 184. Model 5 MCMC Diagnostic Plots of Regression Intercept Parameter

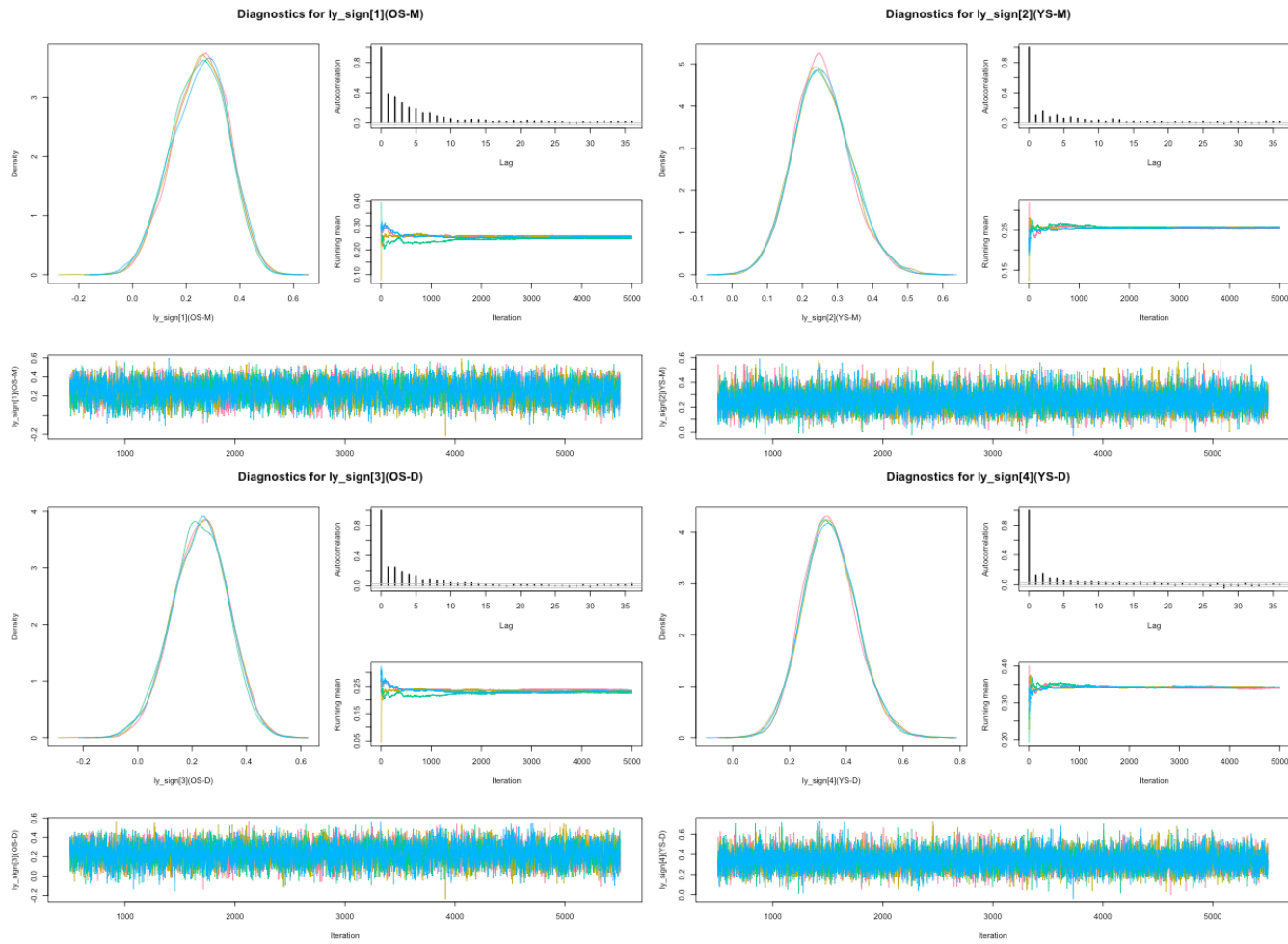


Figure 185. Model 6a MCMC Diagnostic Plots of Factor Loading Parameters

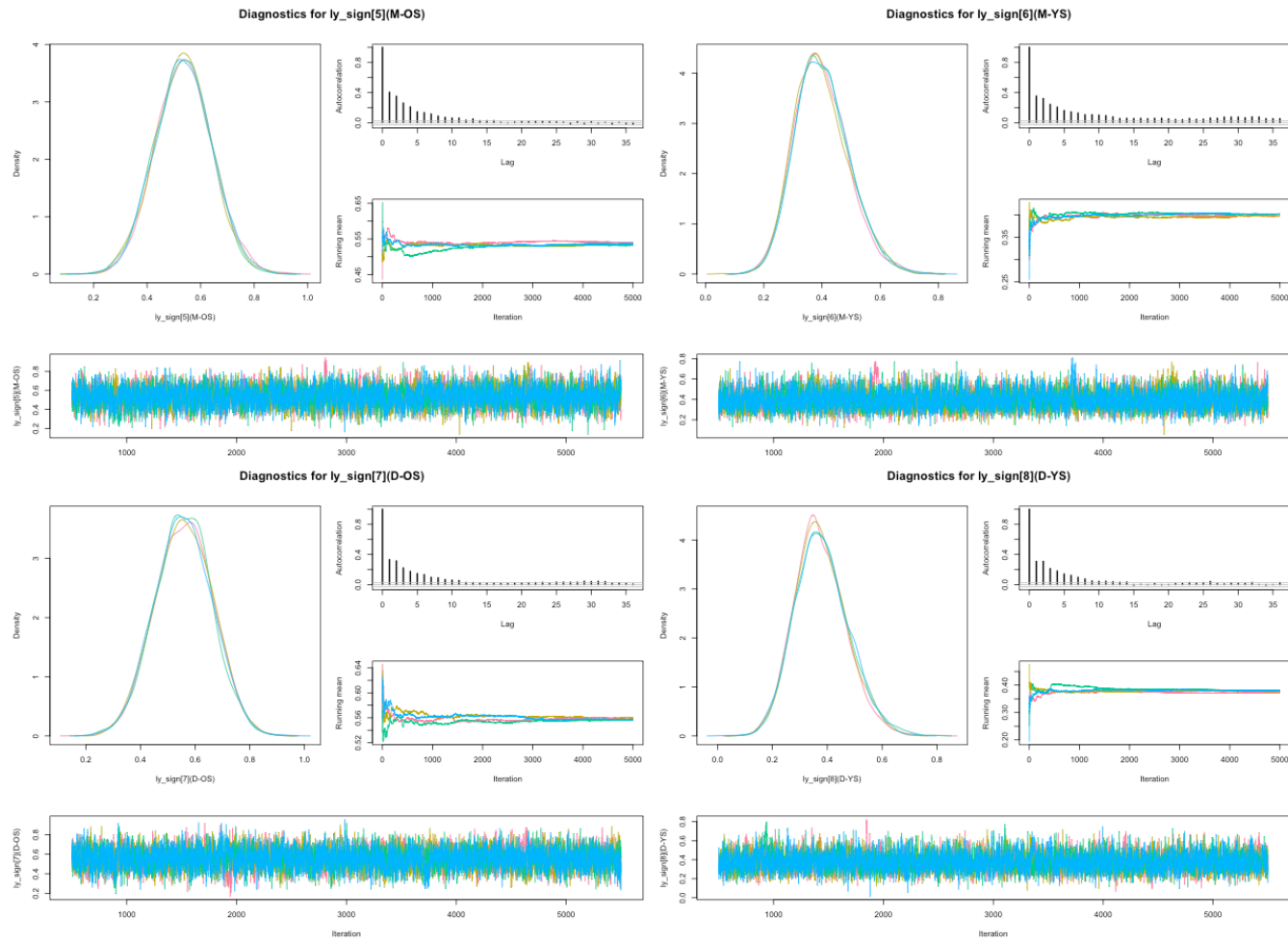


Figure 186. Model 6a MCMC Diagnostic Plots of Factor Loading Parameters

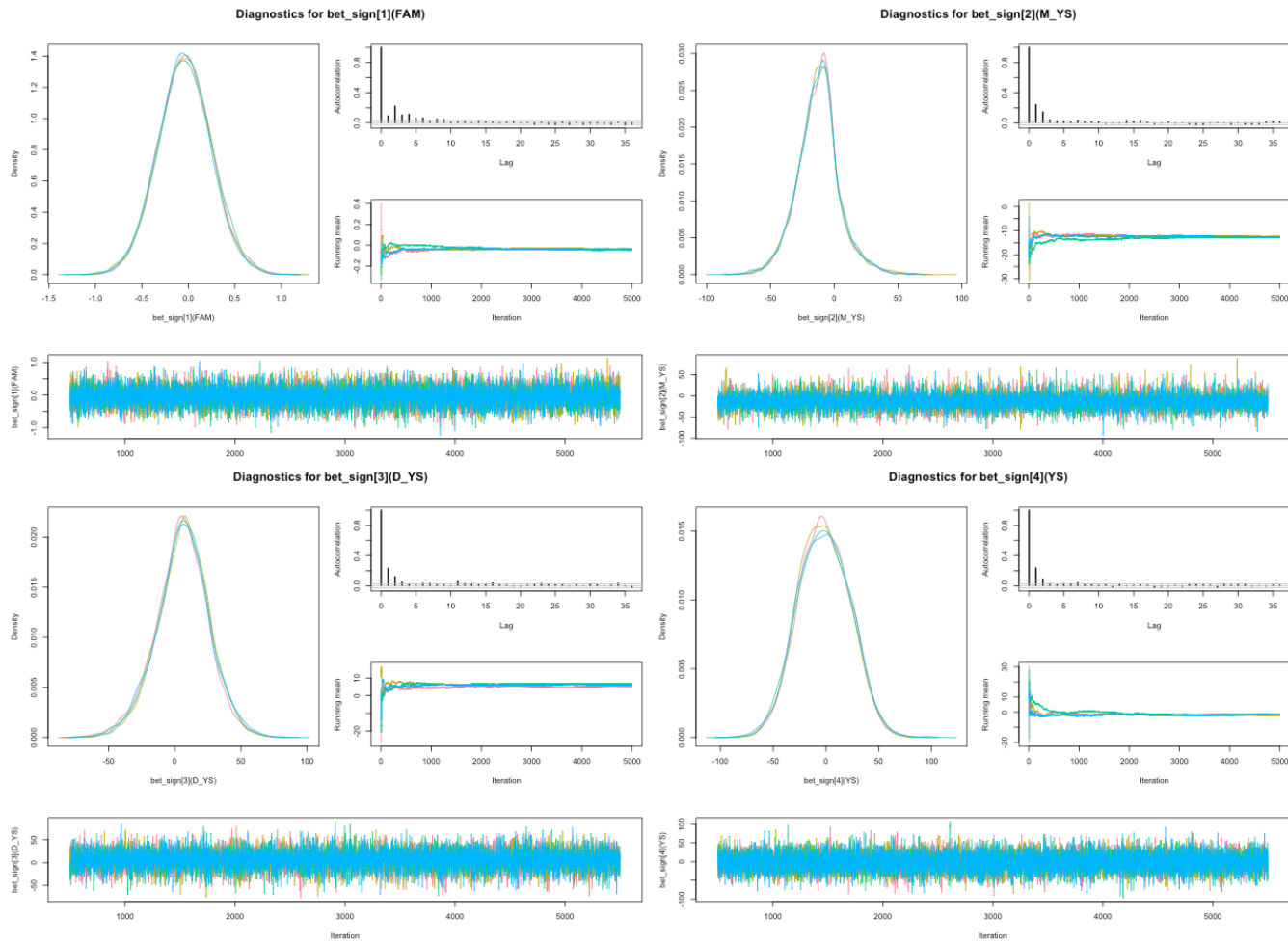


Figure 187. Model 6a MCMC Diagnostic Plots of Regression Coefficient Parameters

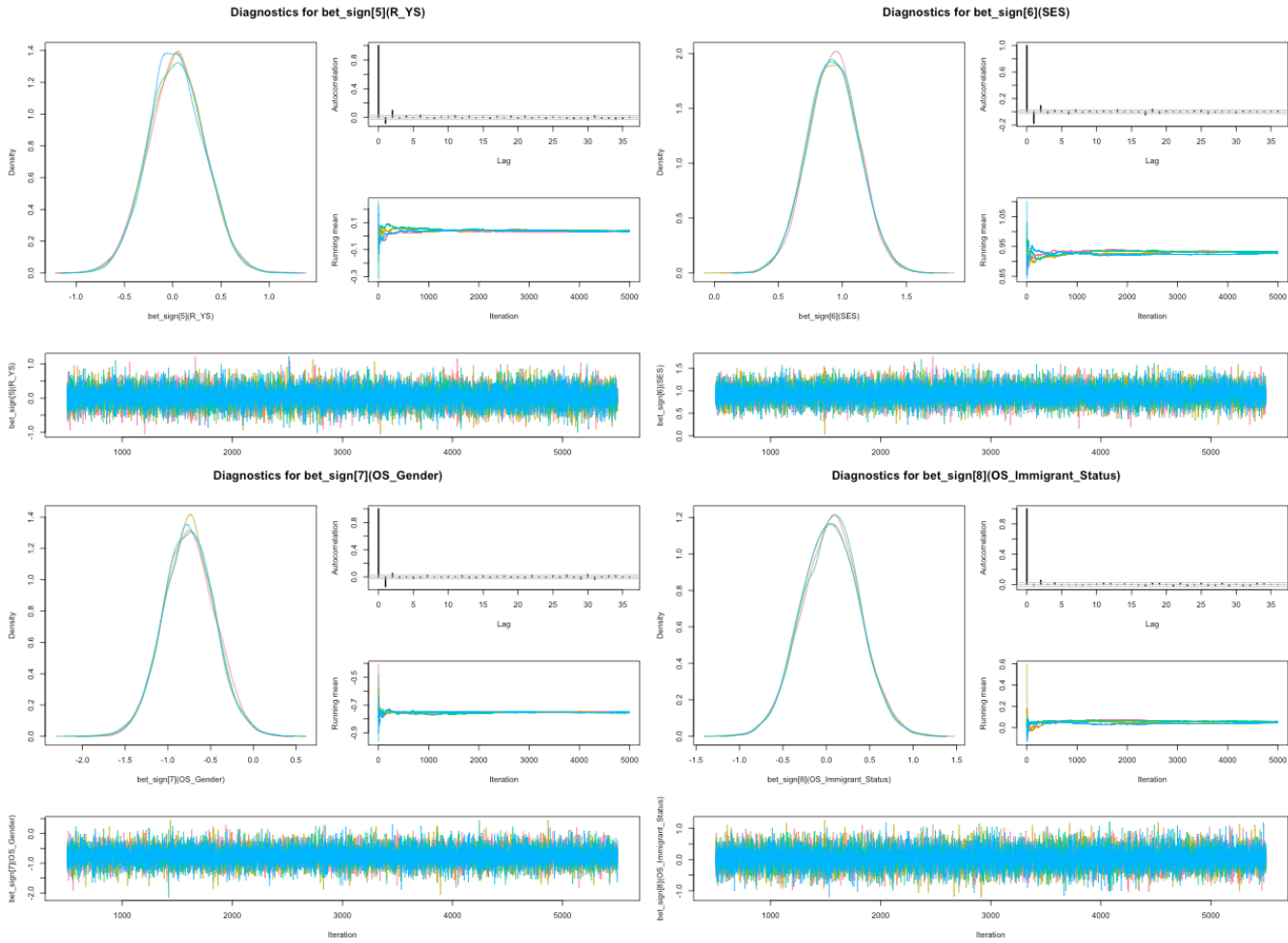


Figure 188. Model 6a MCMC Diagnostic Plots of Regression Coefficient Parameters

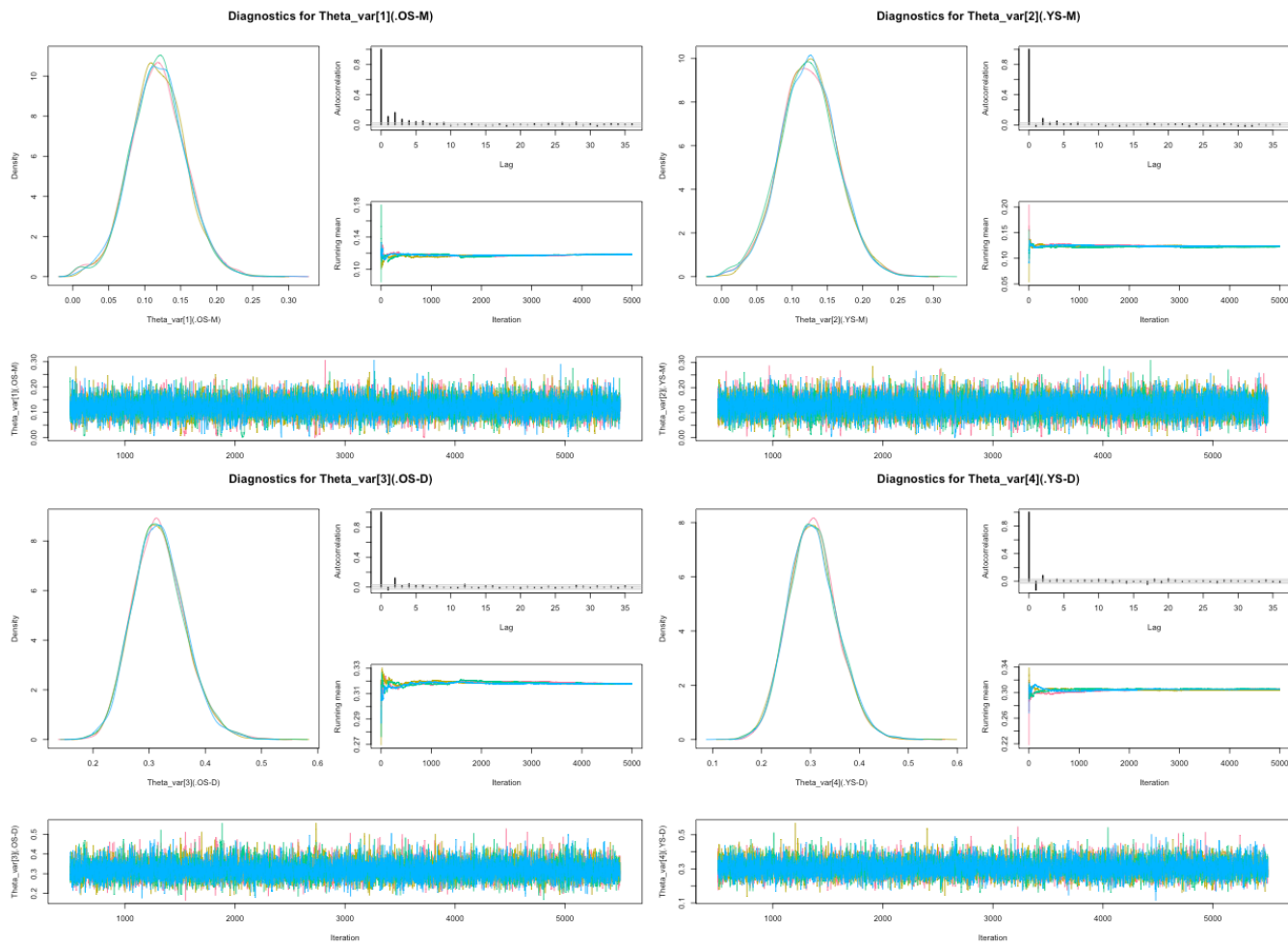


Figure 189. Model 6a MCMC Diagnostic Plots of Measured Variable Variance Parameters

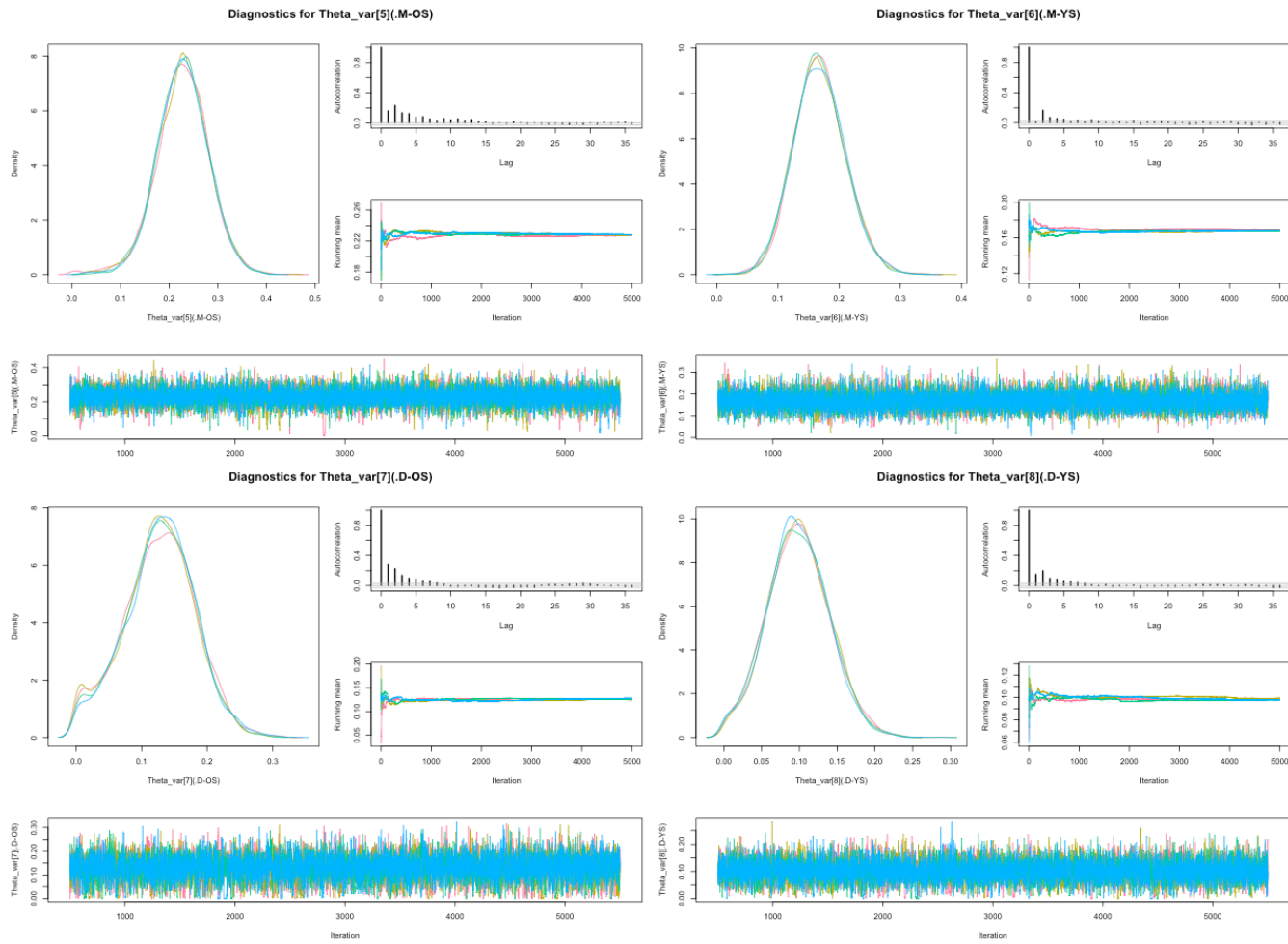


Figure 190. Model 6a MCMC Diagnostic Plots of Measured Variable Variance Parameters

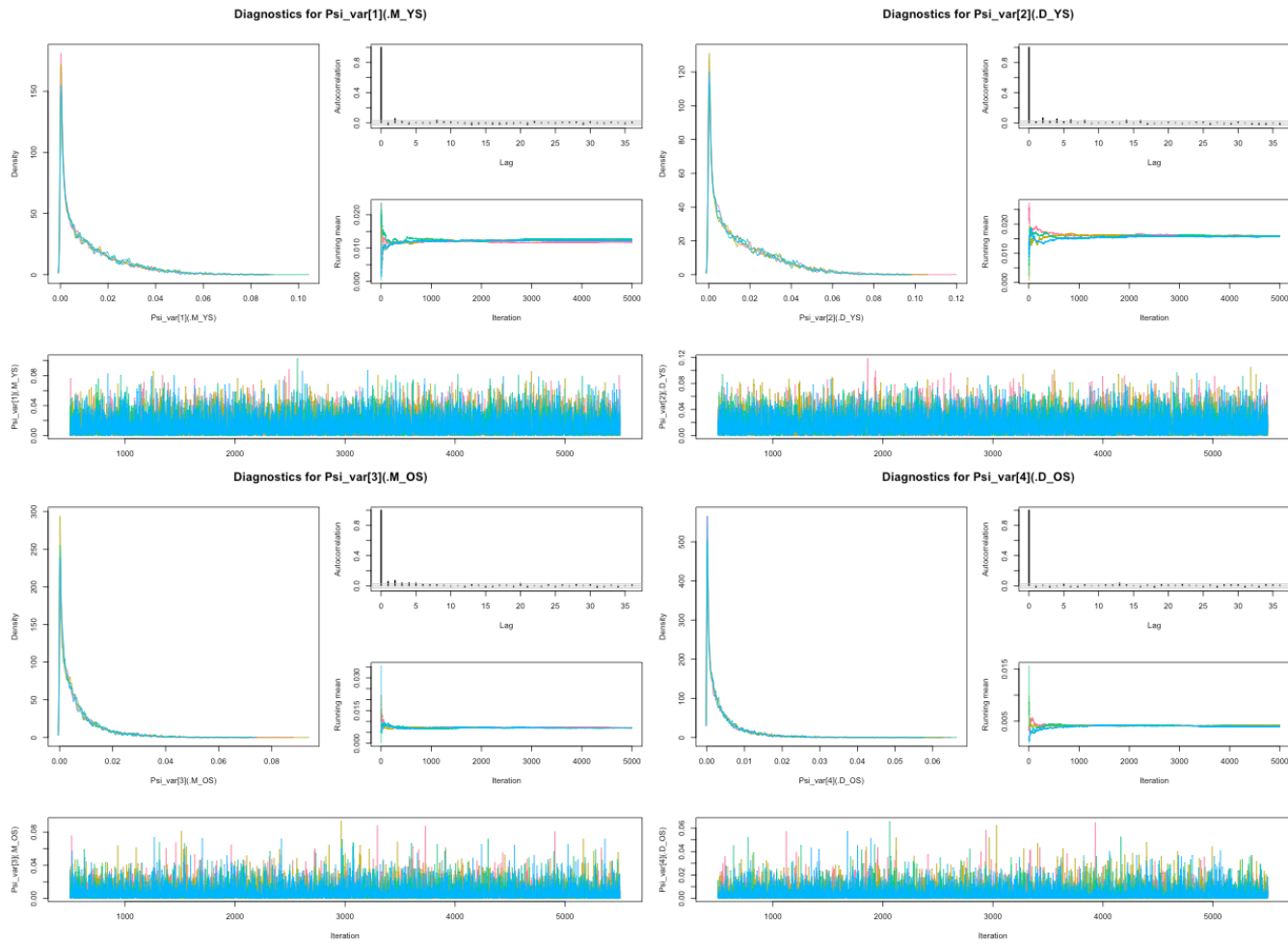


Figure 191. Model 6a MCMC Diagnostic Plots of Latent Variable Variance Parameters

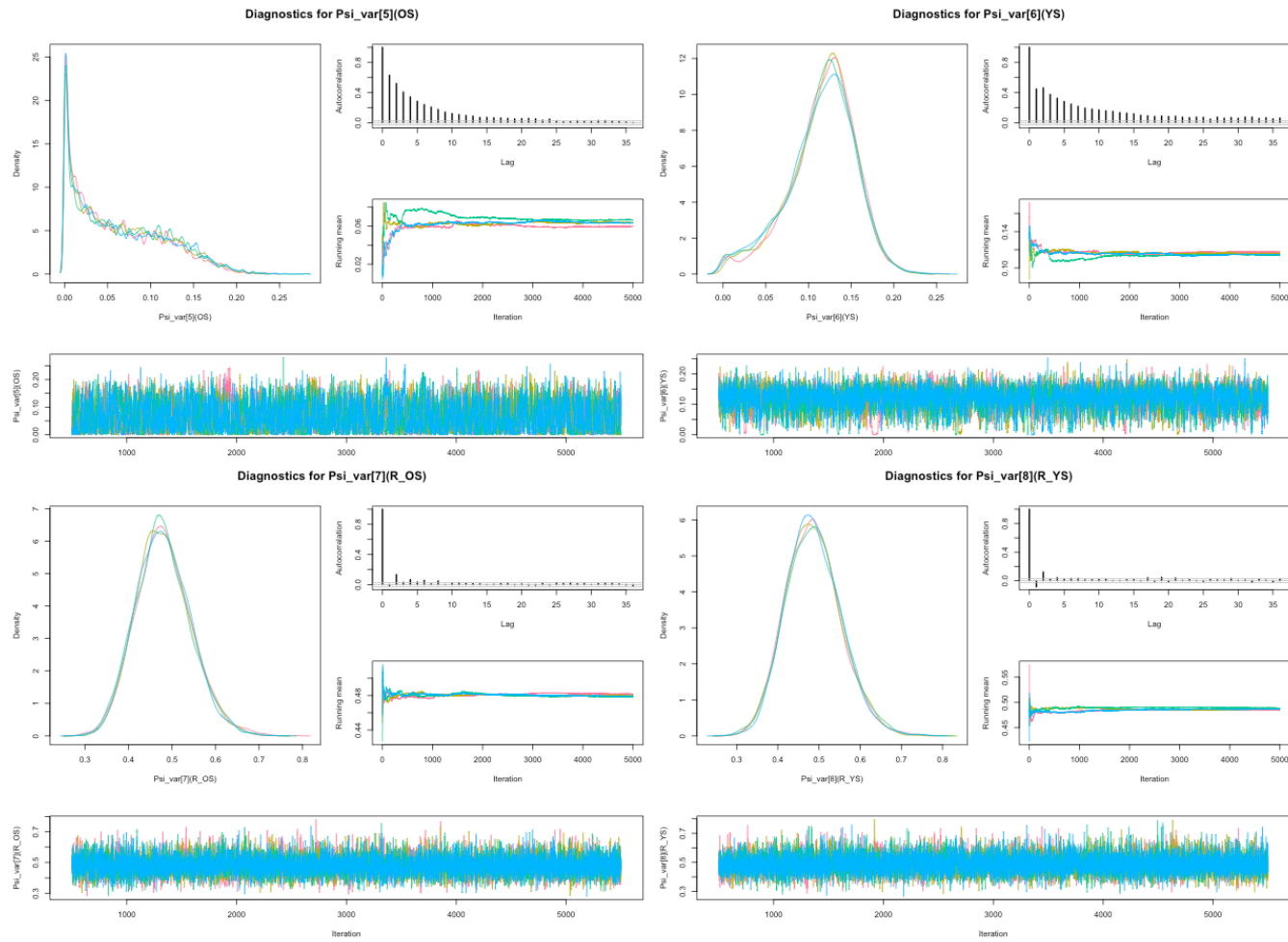


Figure 192. Model 6a MCMC Diagnostic Plots of Latent Variable Variance Parameters

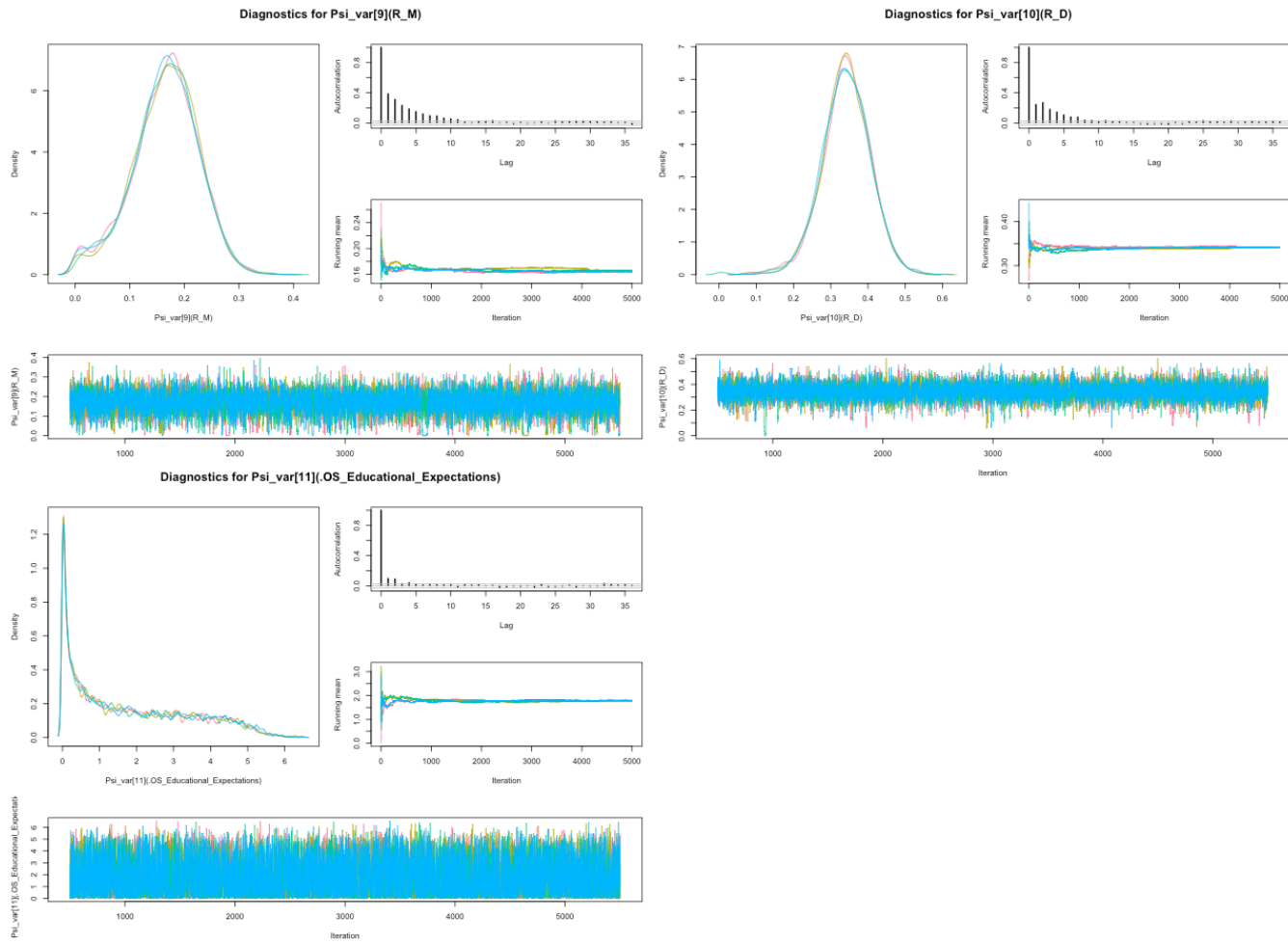


Figure 193. Model 6a MCMC Diagnostic Plots of Latent Variable Variance Parameters

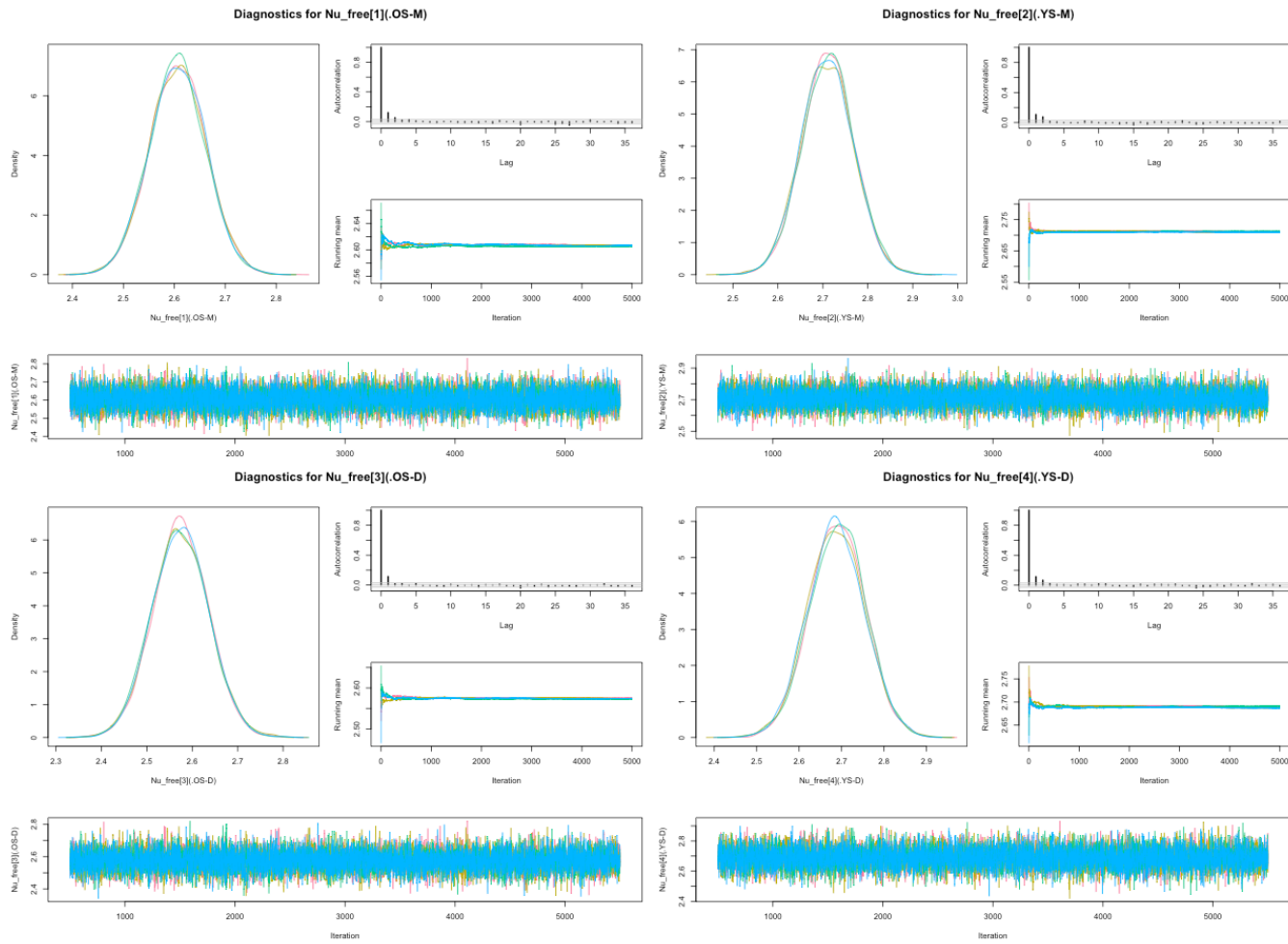


Figure 194. Model 6a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

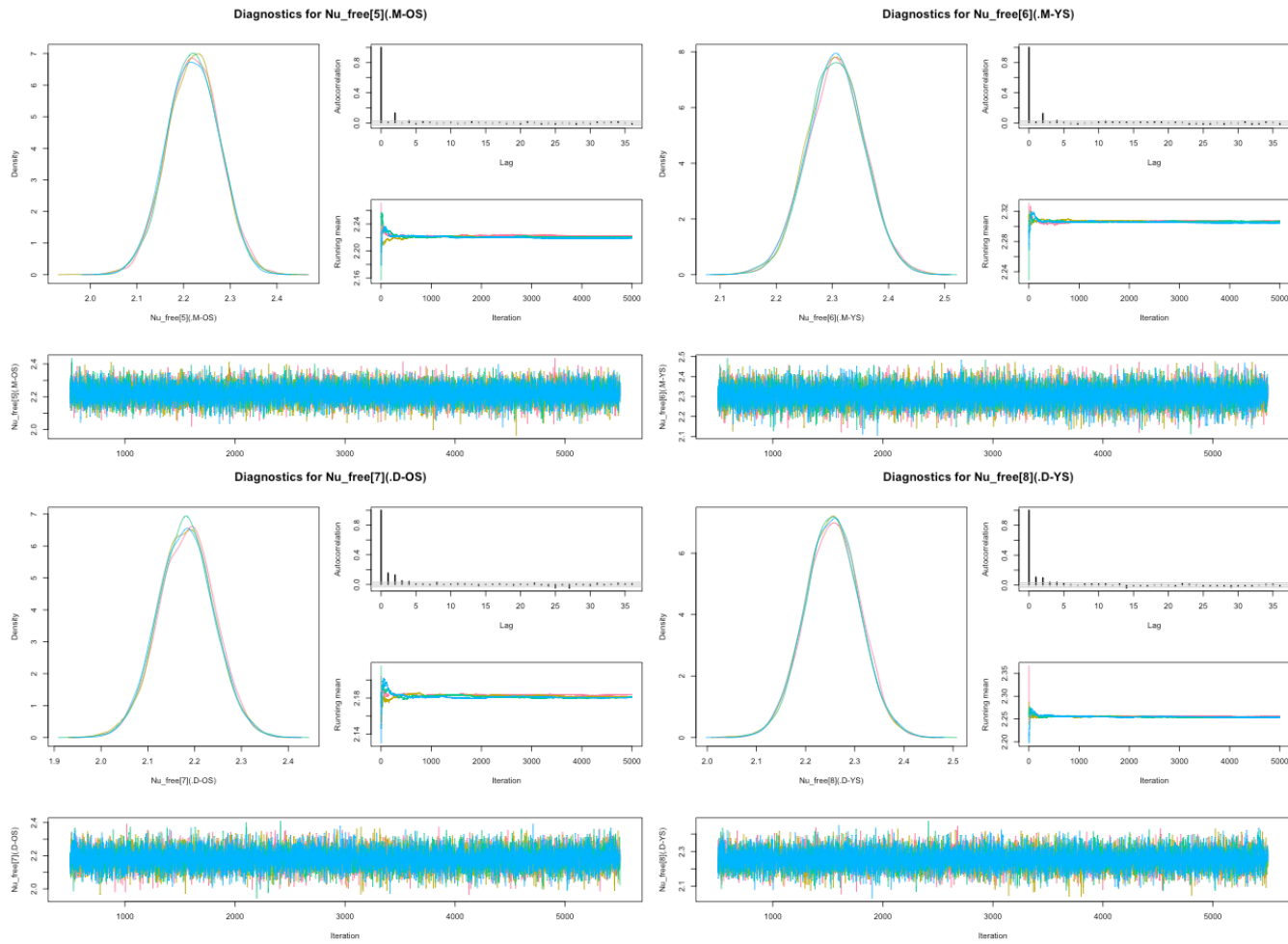


Figure 195. Model 6a MCMC Diagnostic Plots of Measured Variable Intercept Parameters

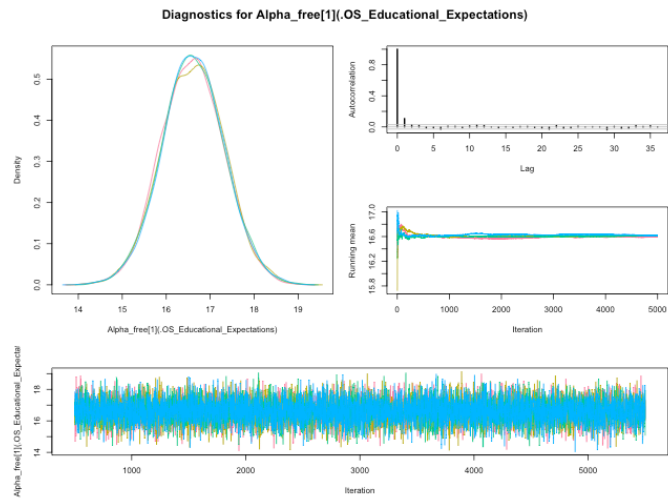


Figure 196. Model 6a MCMC Diagnostic Plots of Regression Intercept Parameters

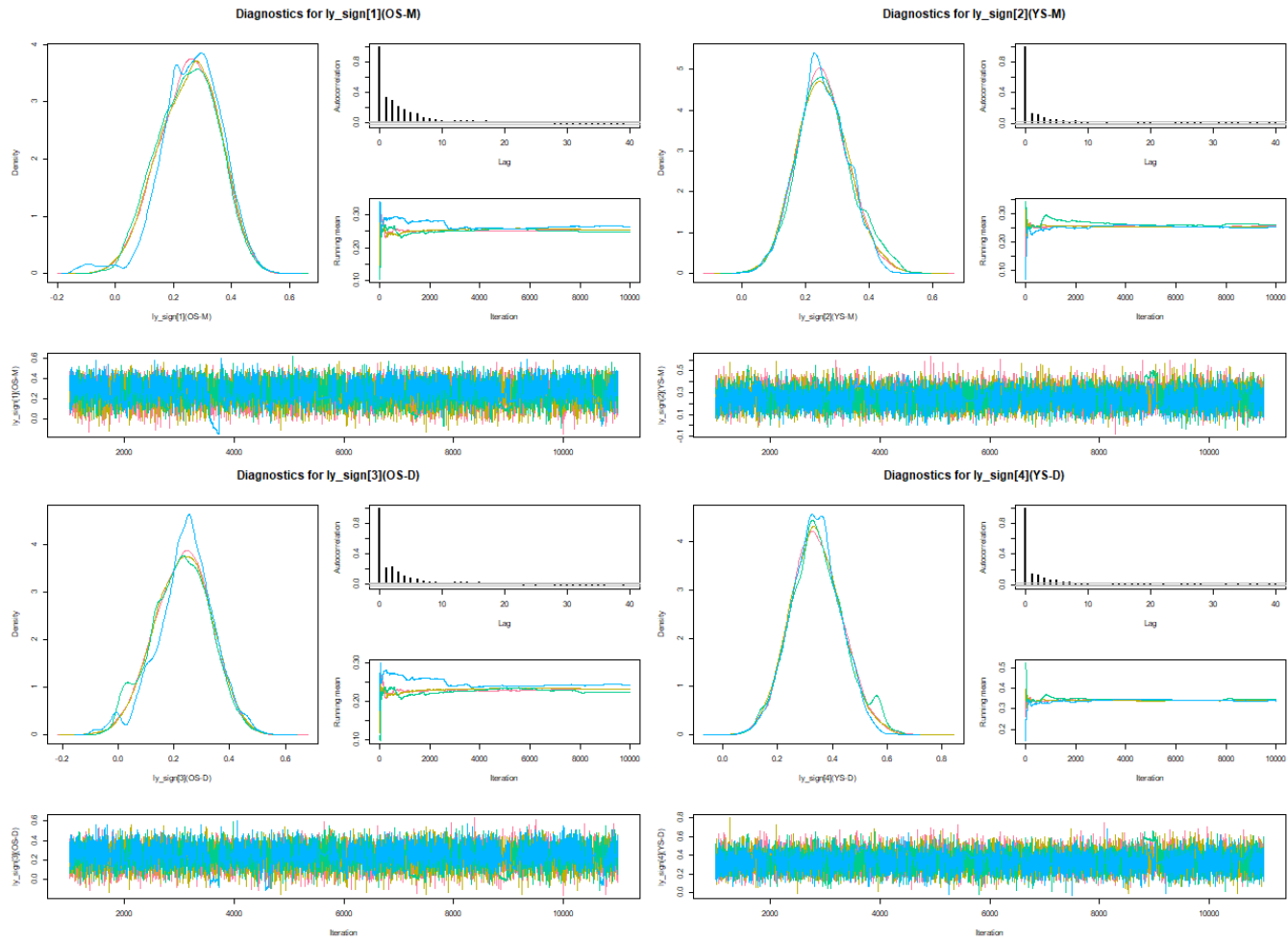


Figure 197. Model 6b MCMC Diagnostic Plots of Factor Loading Parameters

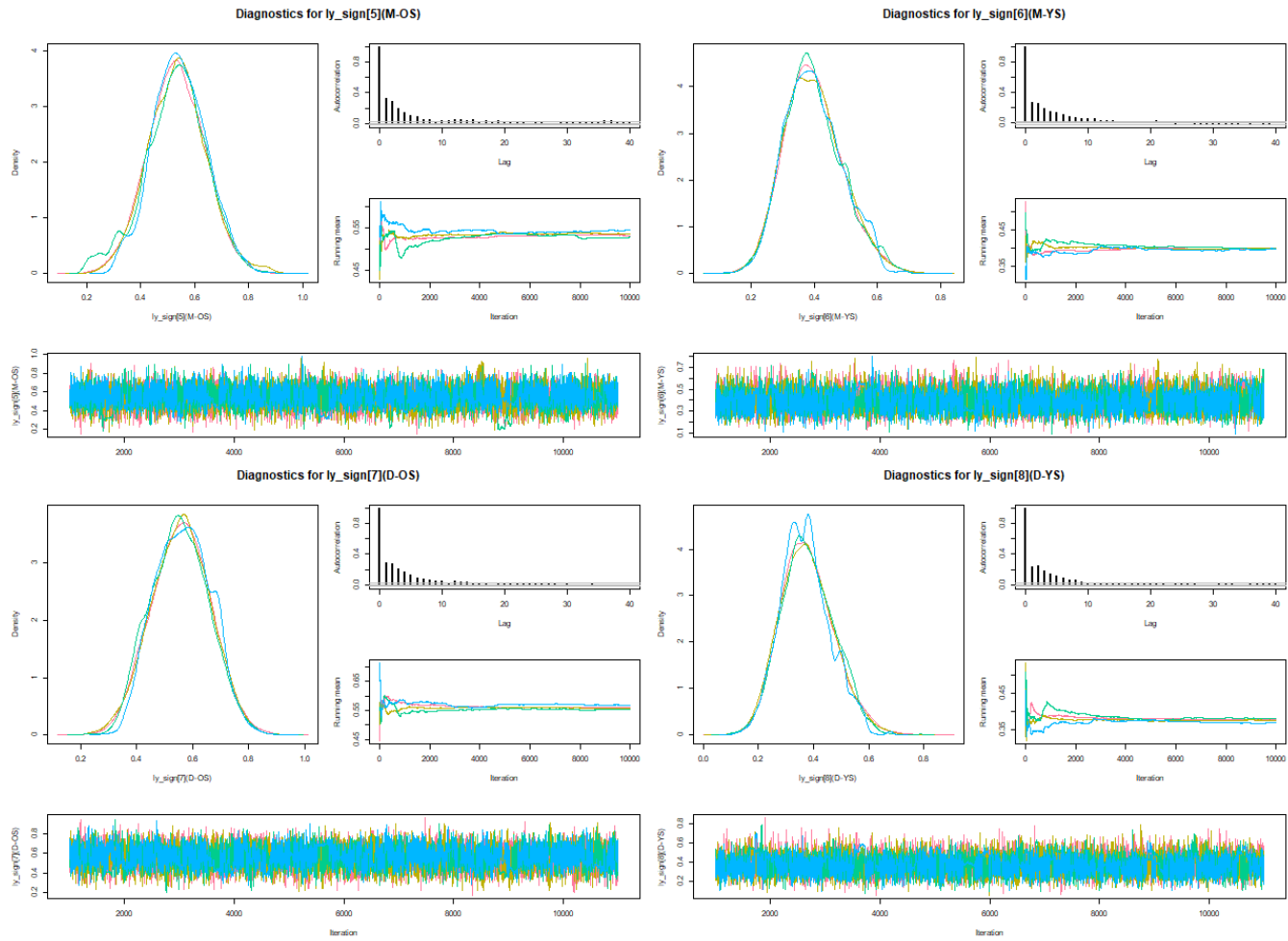


Figure 198. Model 6b MCMC Diagnostic Plots of Factor Loading Parameters

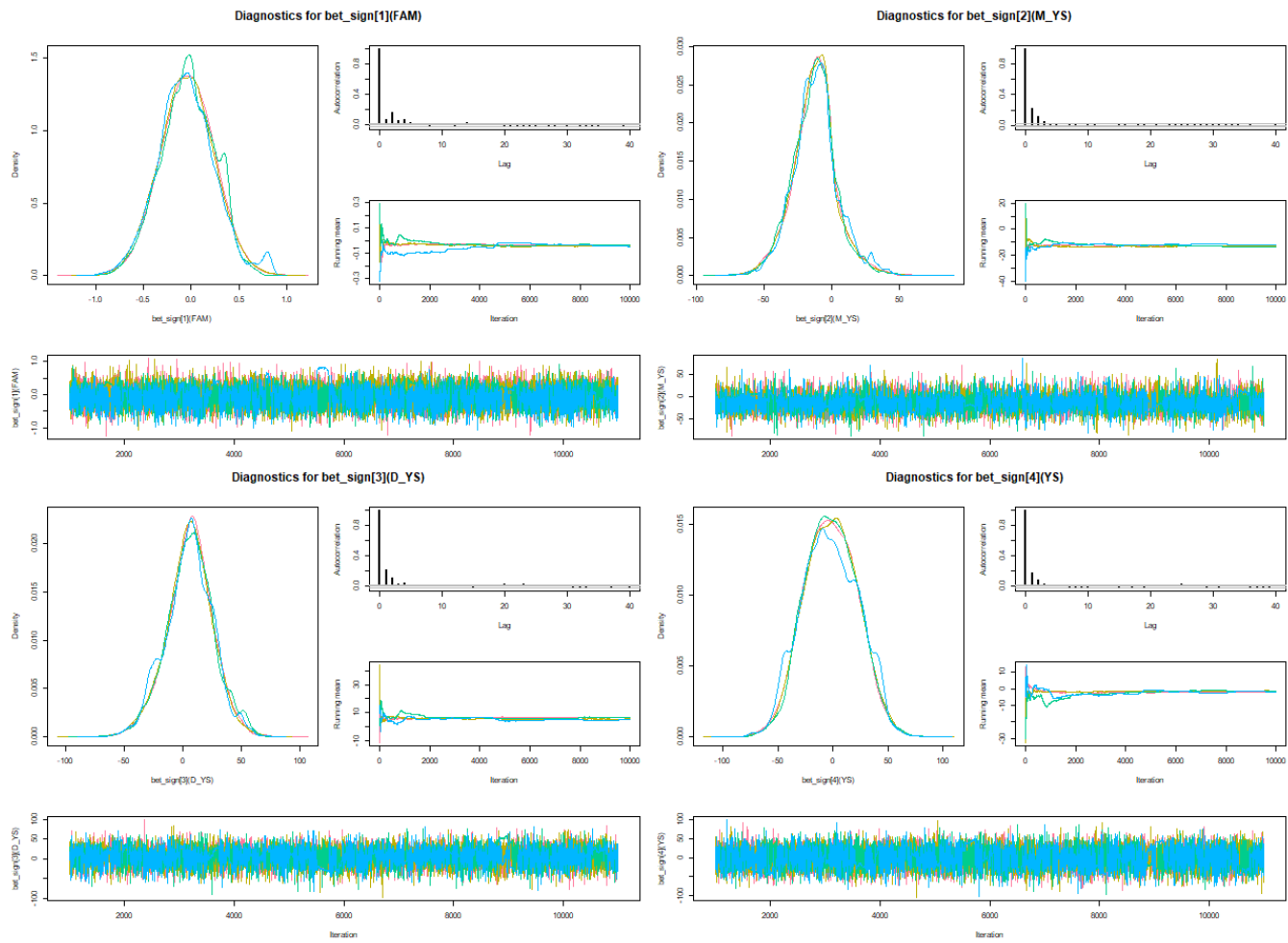


Figure 199. Model 6b MCMC Diagnostic Plots of Regression Coefficient Parameters

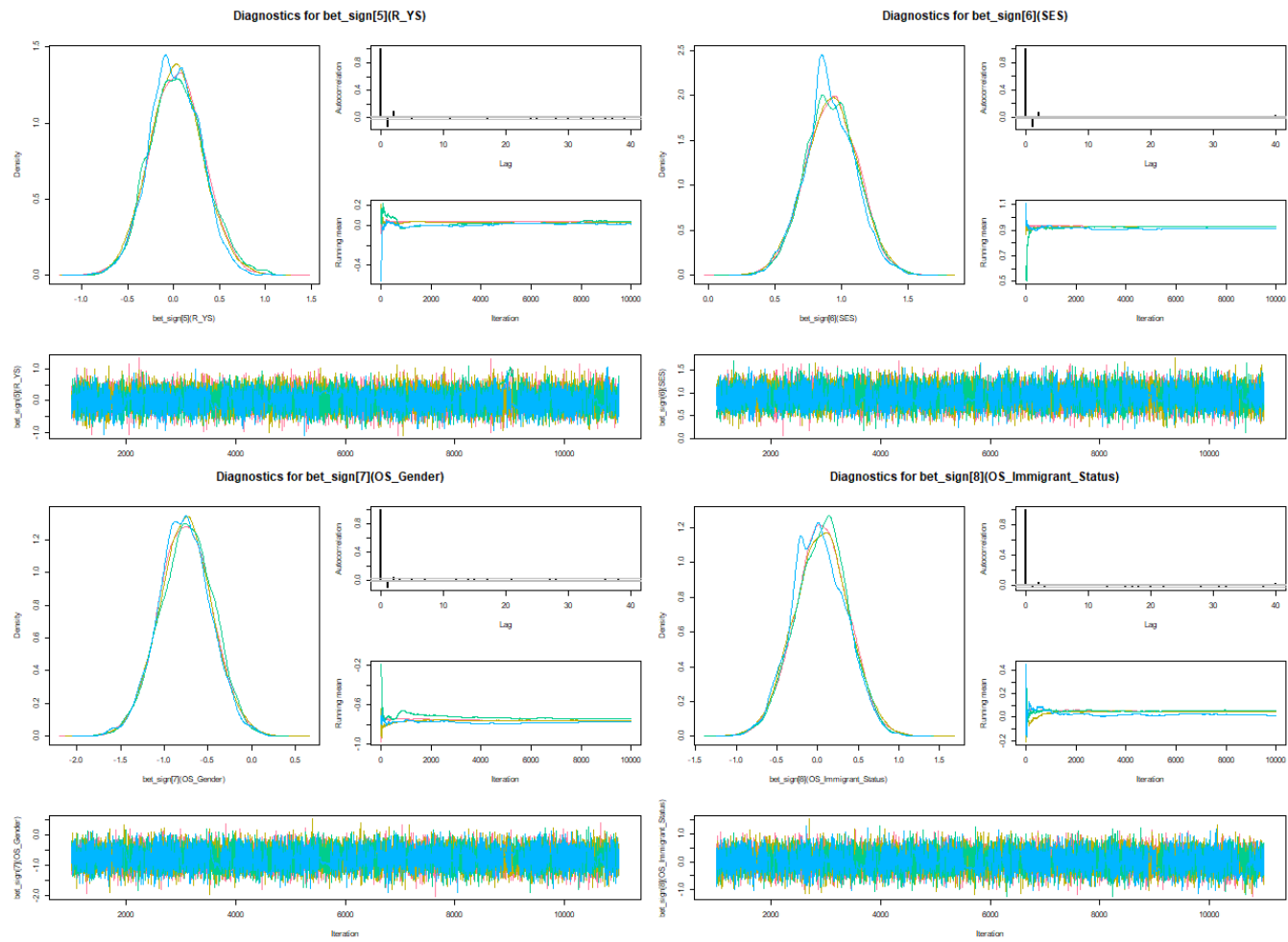


Figure 200. Model 6b MCMC Diagnostic Plots of Regression Coefficient Parameters

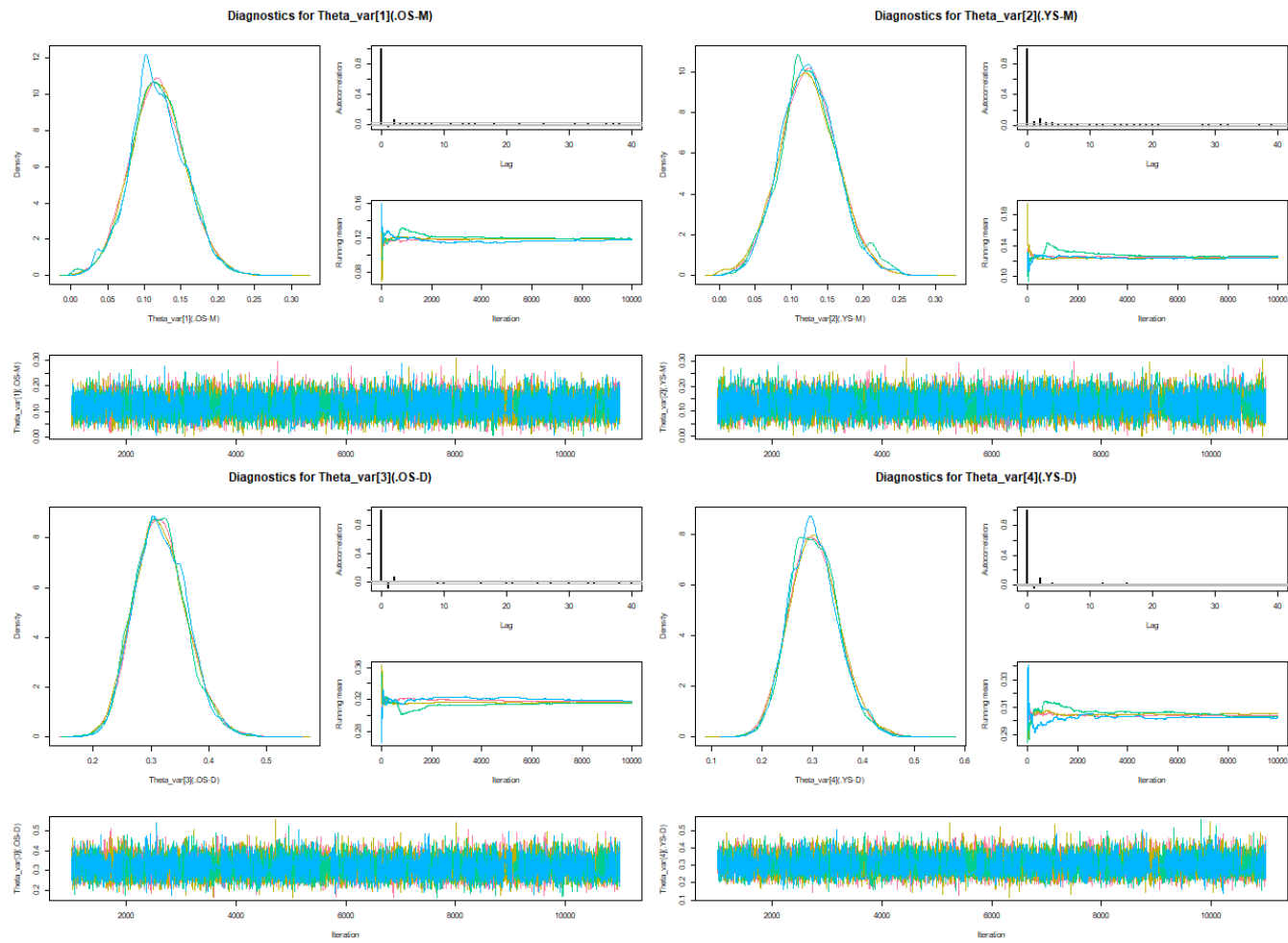


Figure 201. Model 6b MCMC Diagnostic Plots of Measured Variable Variance Parameters

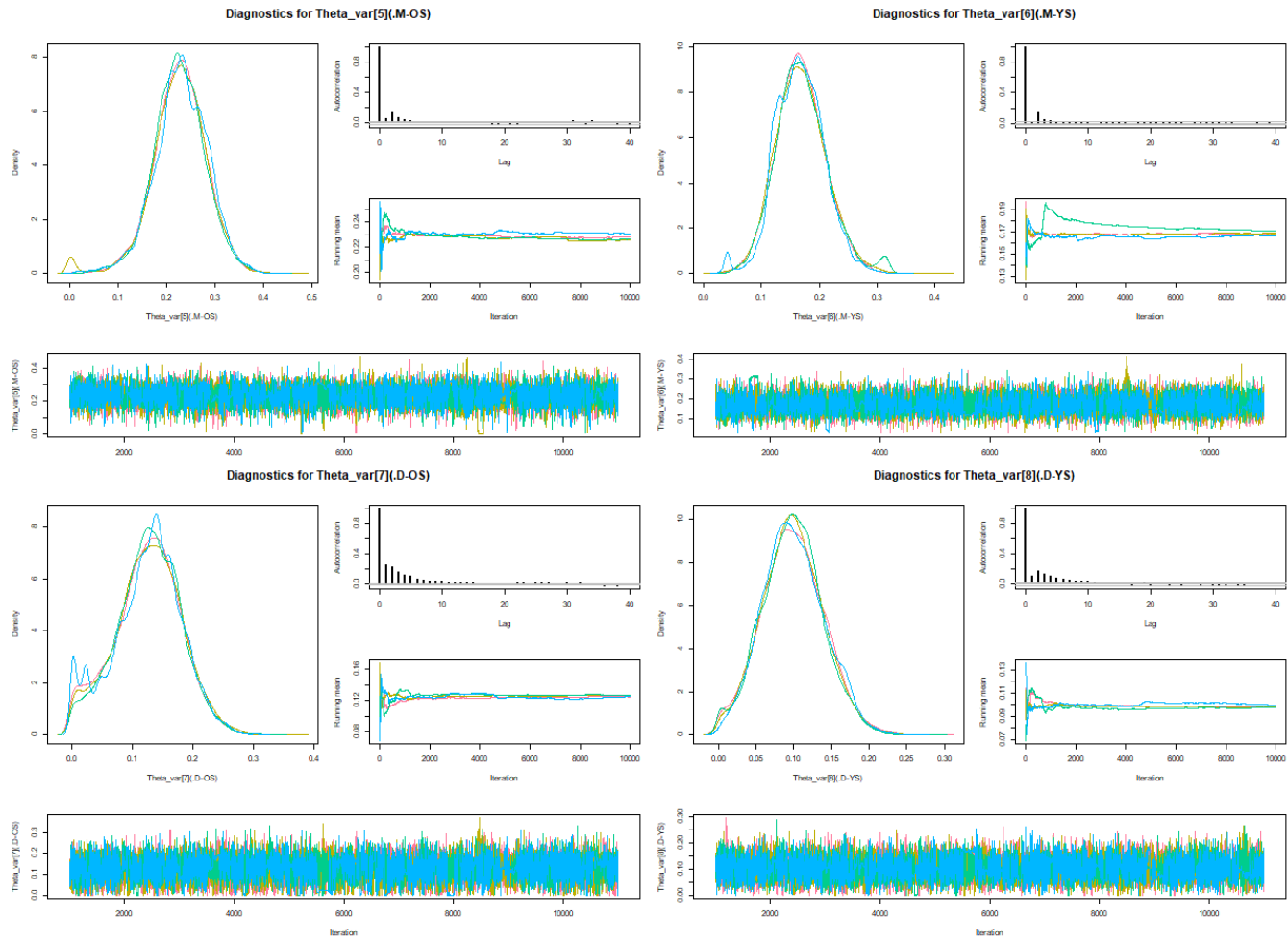


Figure 202. Model 6b MCMC Diagnostic Plots of Measured Variable Variance Parameters

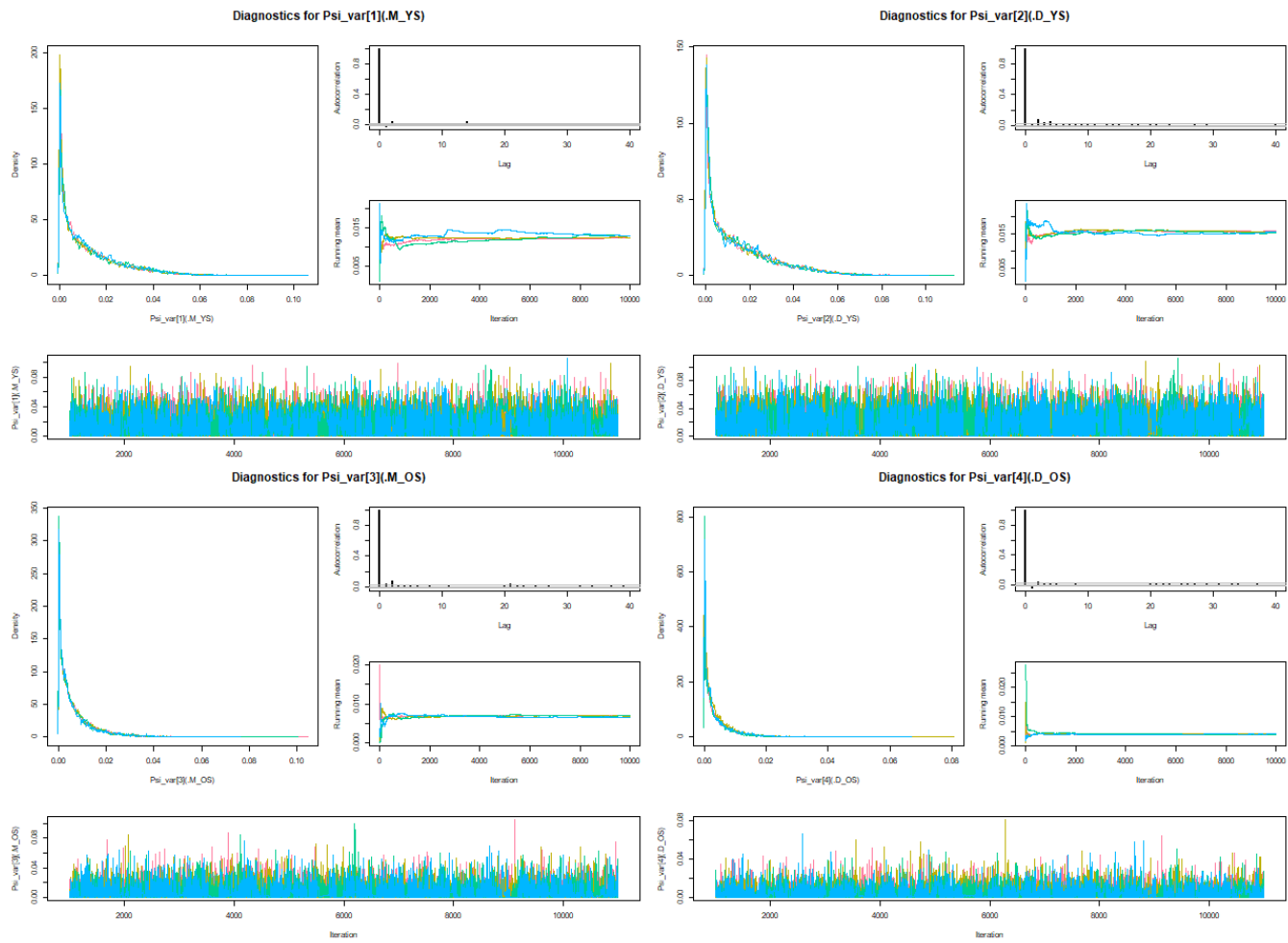


Figure 203. Model 6b MCMC Diagnostic Plots of Latent Variable Variance Parameters

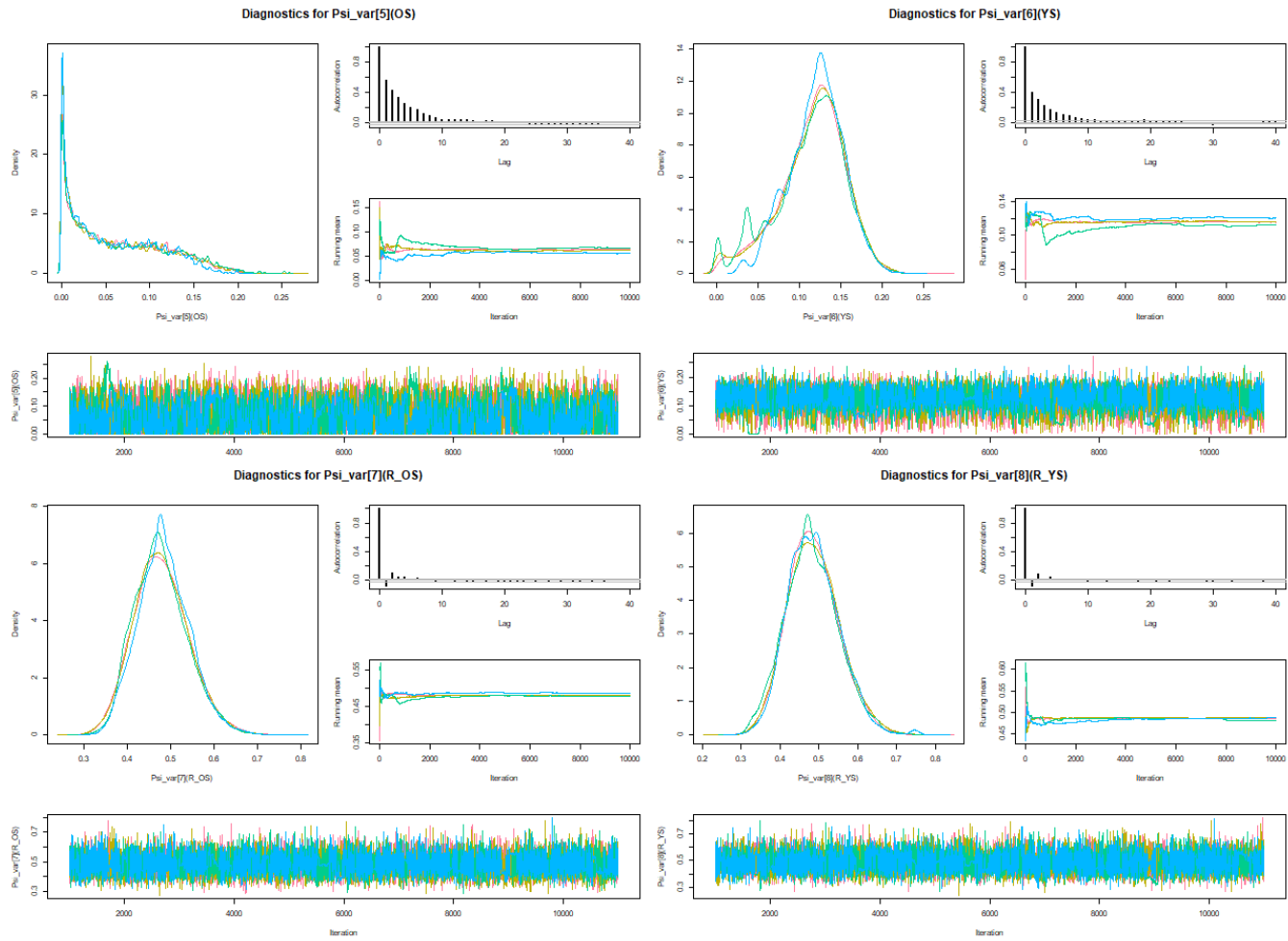


Figure 204. Model 6b MCMC Diagnostic Plots of Latent Variable Variance Parameters

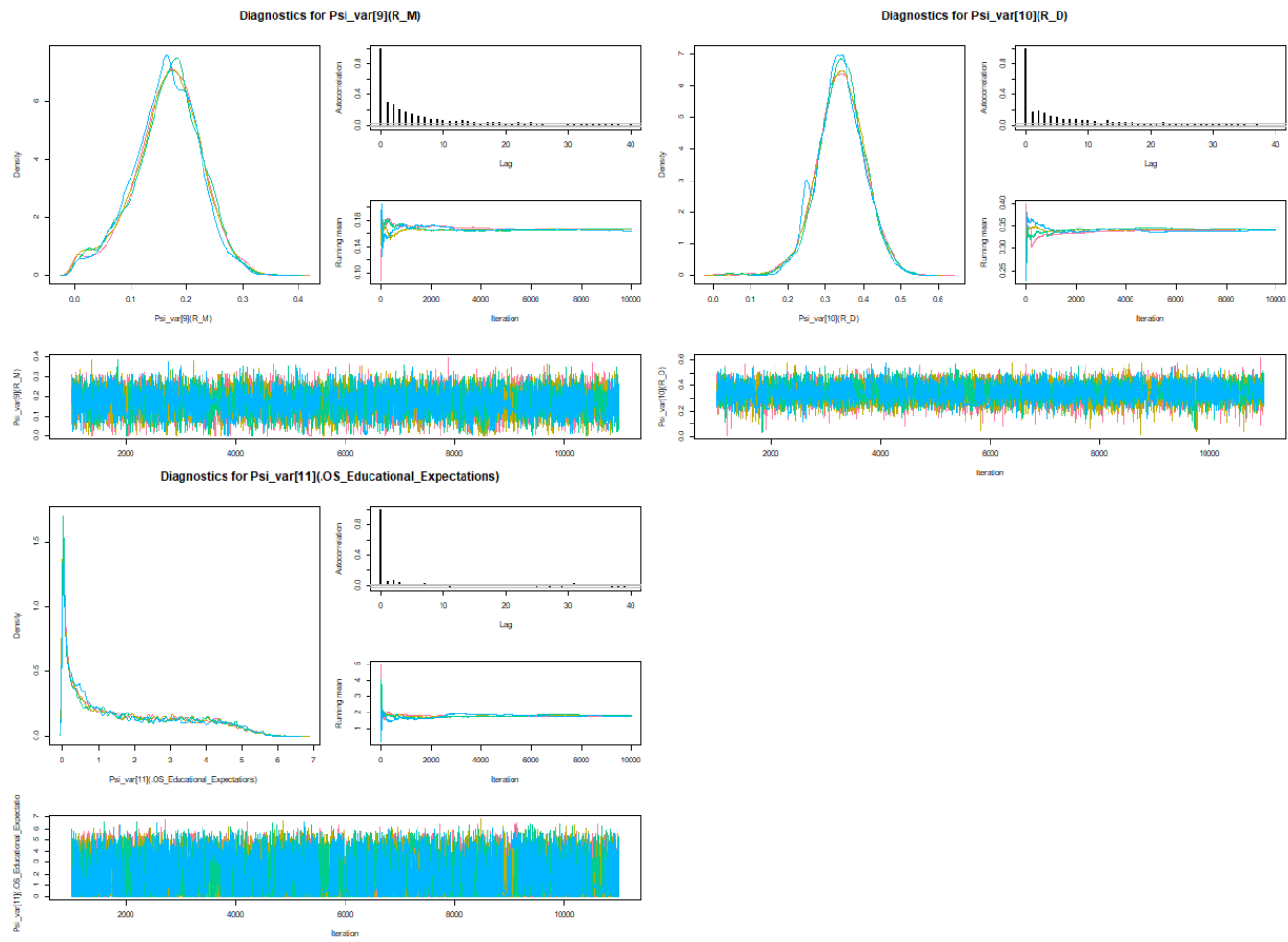


Figure 205. Model 6b MCMC Diagnostic Plots of Latent Variable Variance Parameters

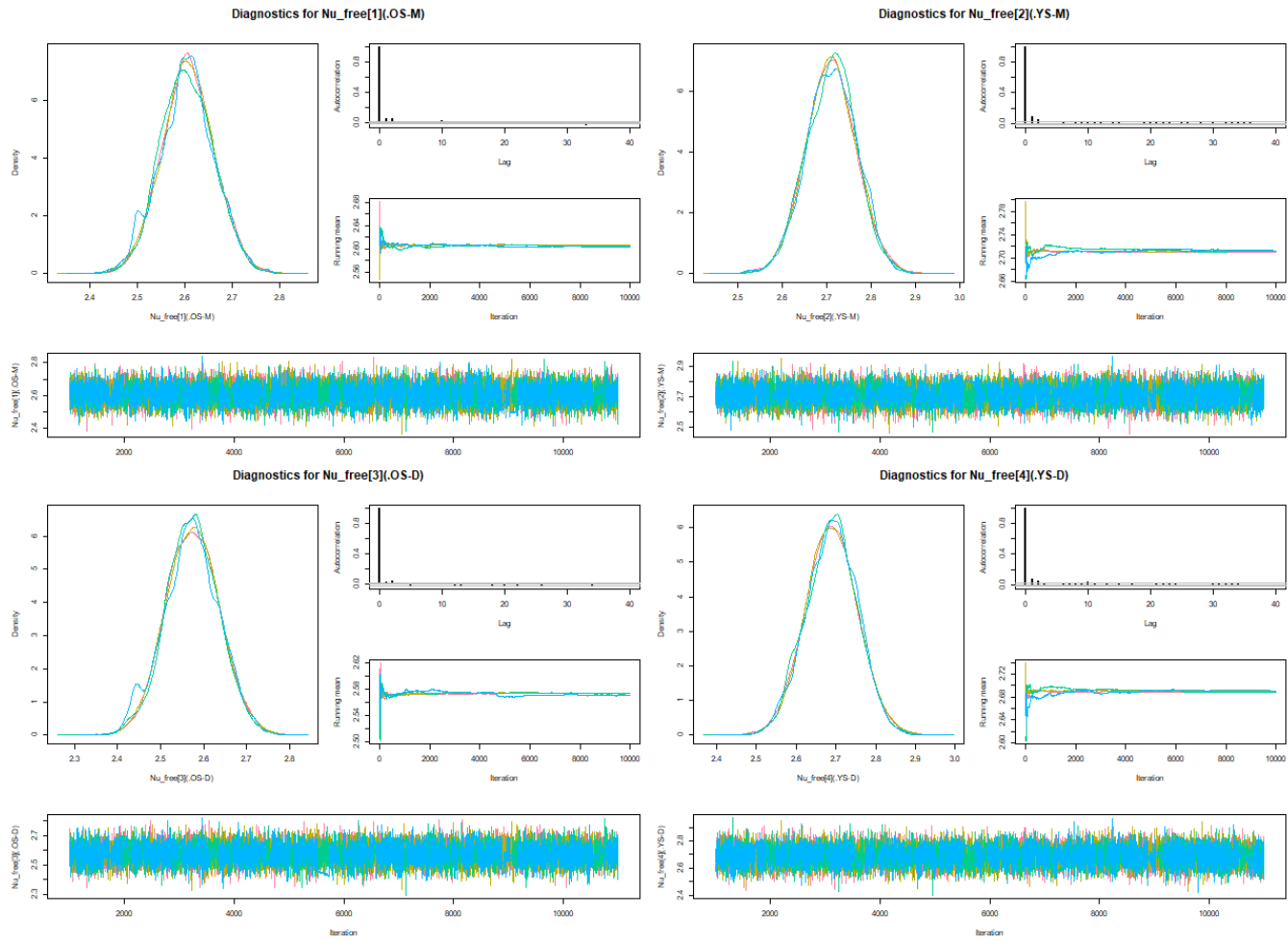


Figure 206. Model 6b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

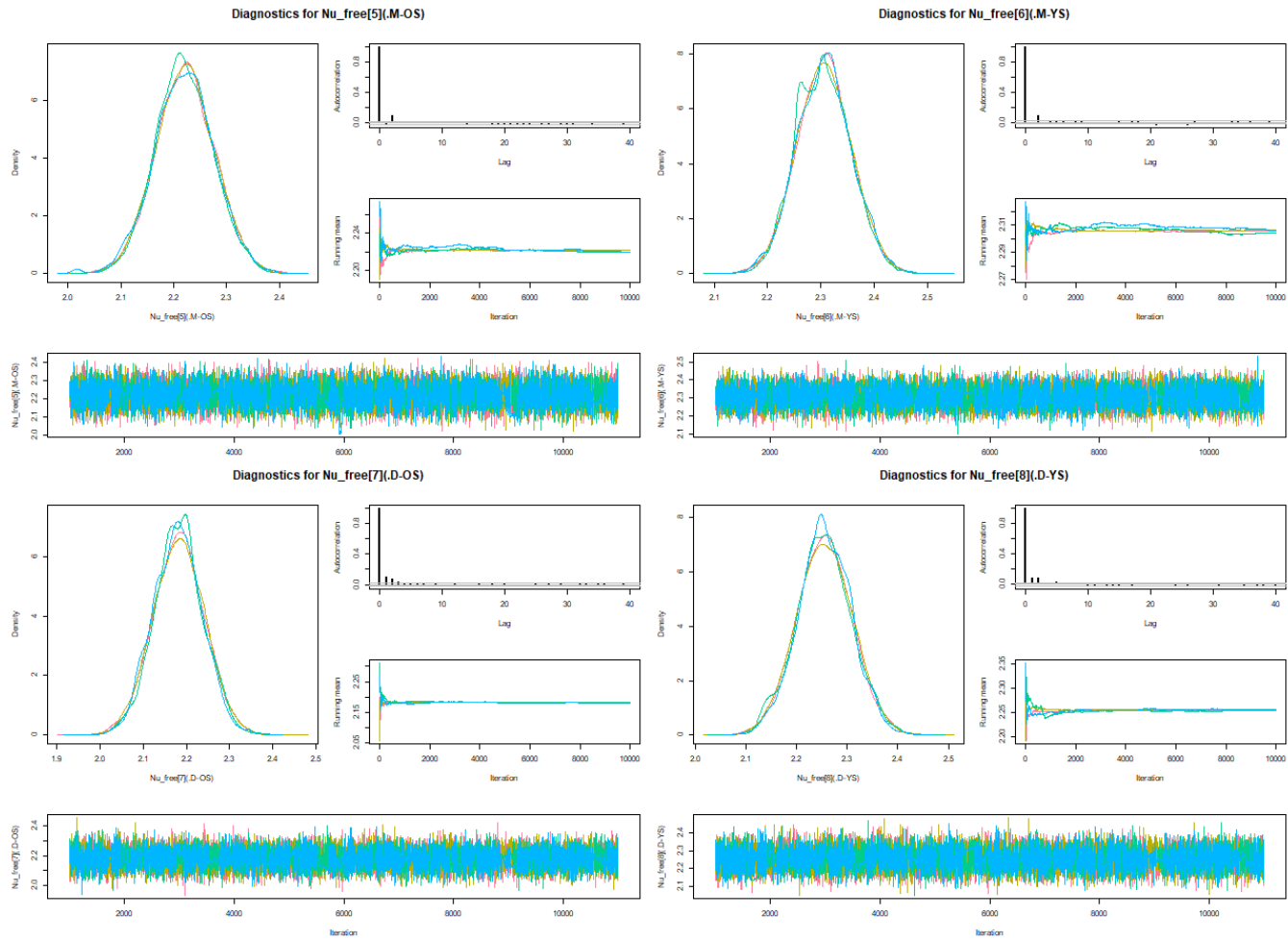


Figure 207. Model 6b MCMC Diagnostic Plots of Measured Variable Intercept Parameters

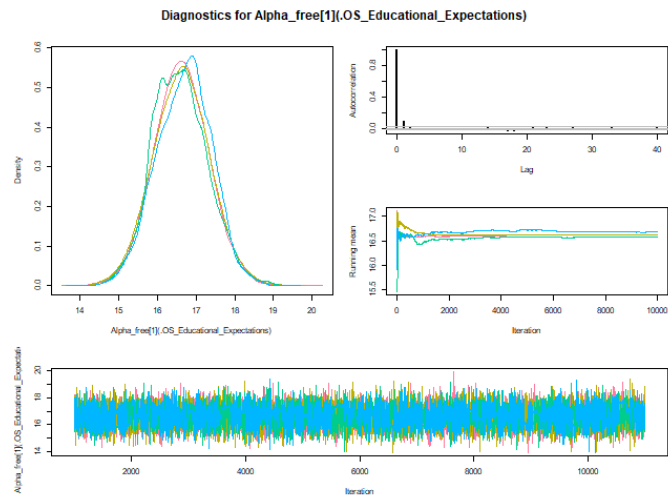


Figure 208. Model 6b MCMC Diagnostic Plots of Regression Intercept Parameter

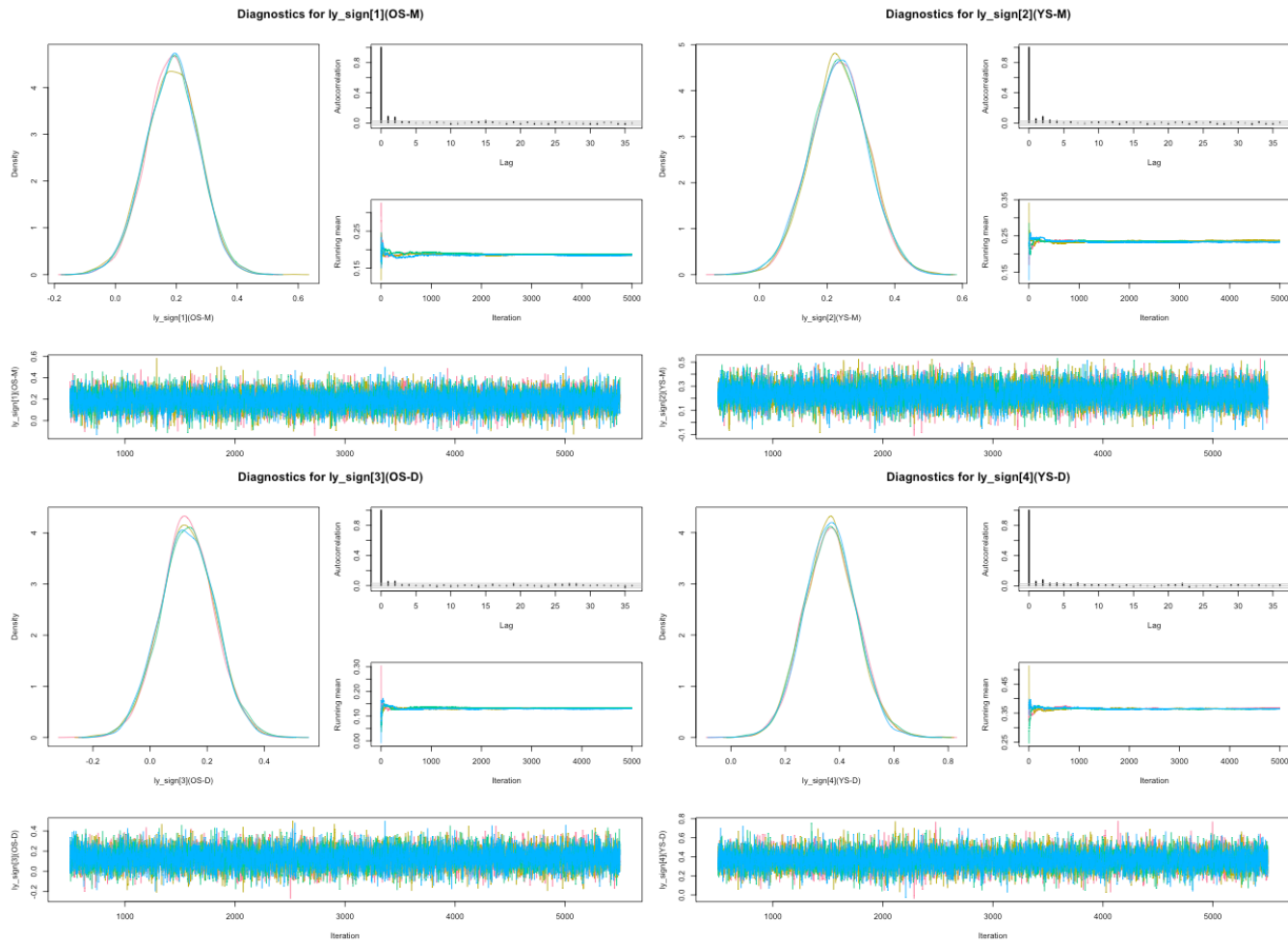


Figure 209. Model 6 MCMC Diagnostic Plots of Factor Loading Parameters

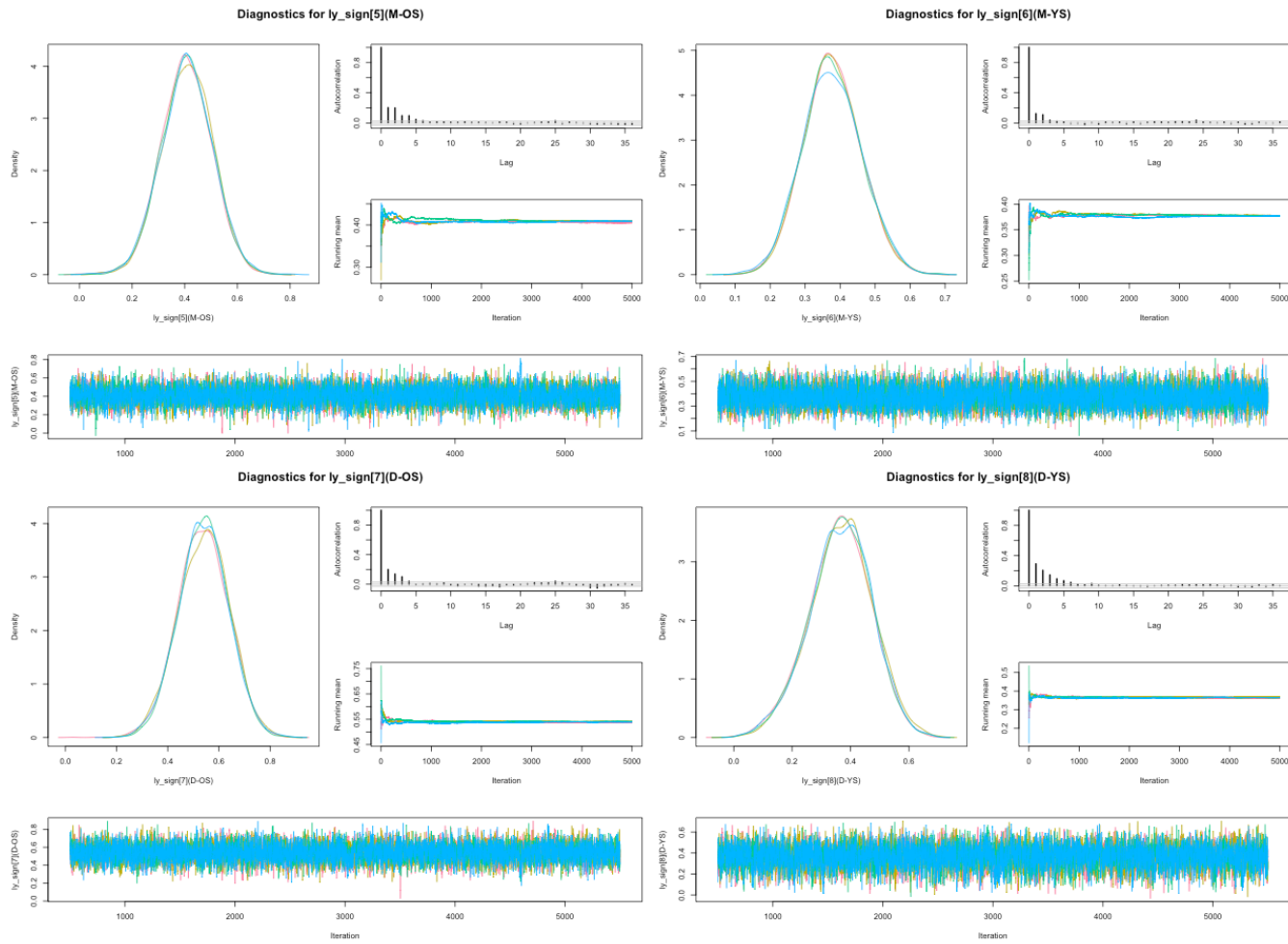


Figure 210. Model 6 MCMC Diagnostic Plots of Factor Loading Parameters

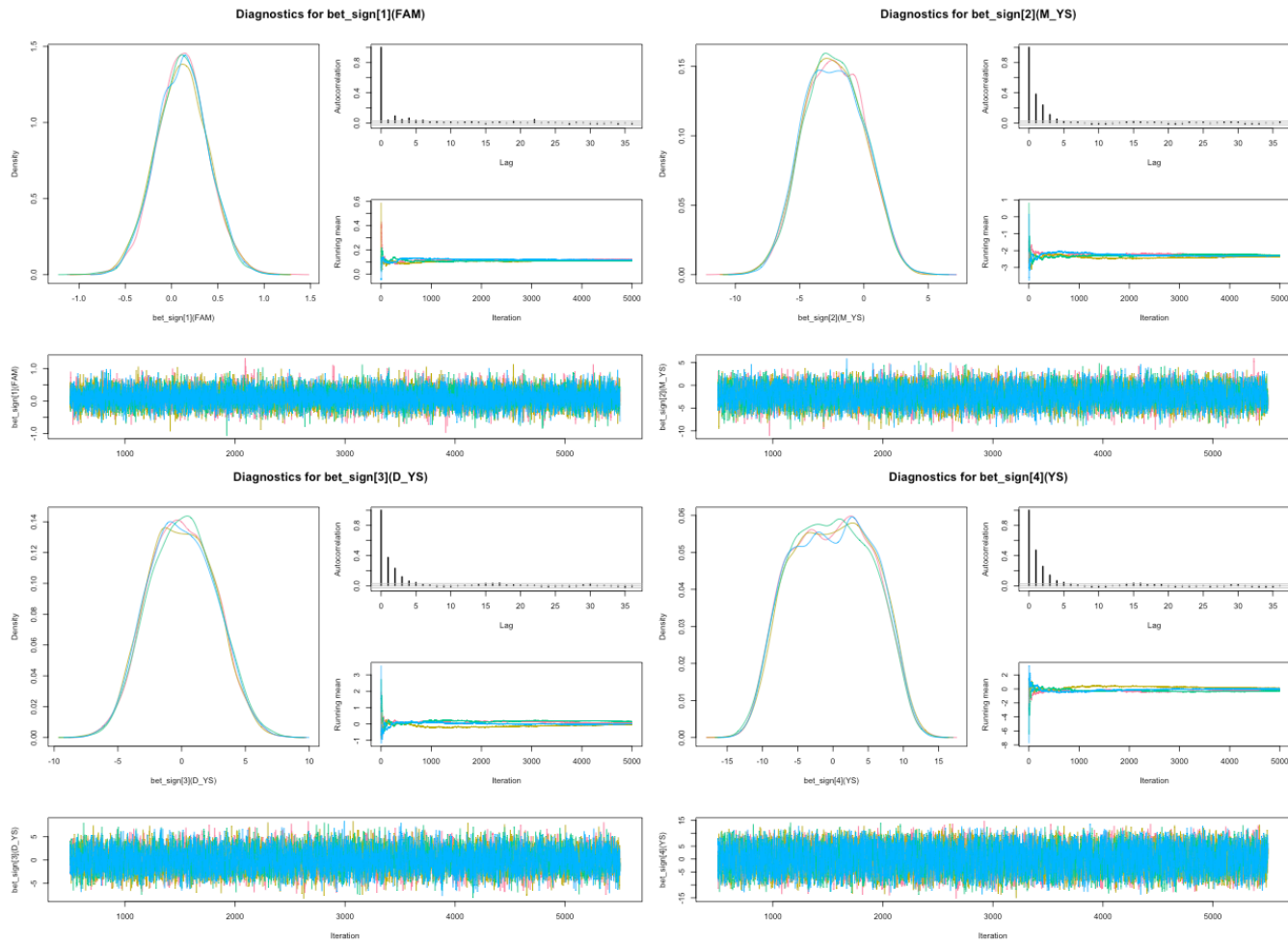


Figure 211. Model 6 MCMC Diagnostic Plots of Regression Coefficient Parameters

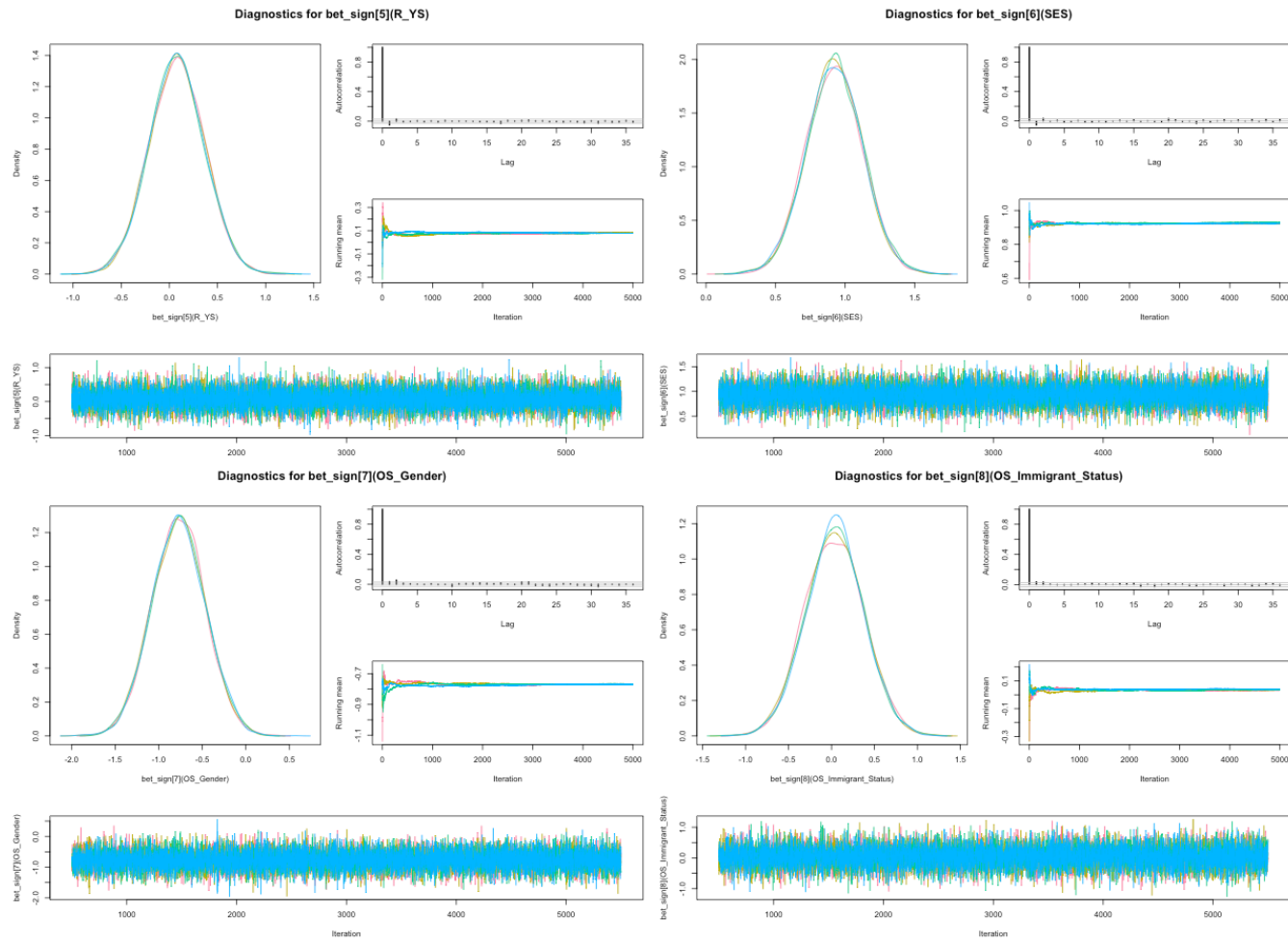


Figure 212. Model 6 MCMC Diagnostic Plots of Regression Coefficient Parameters

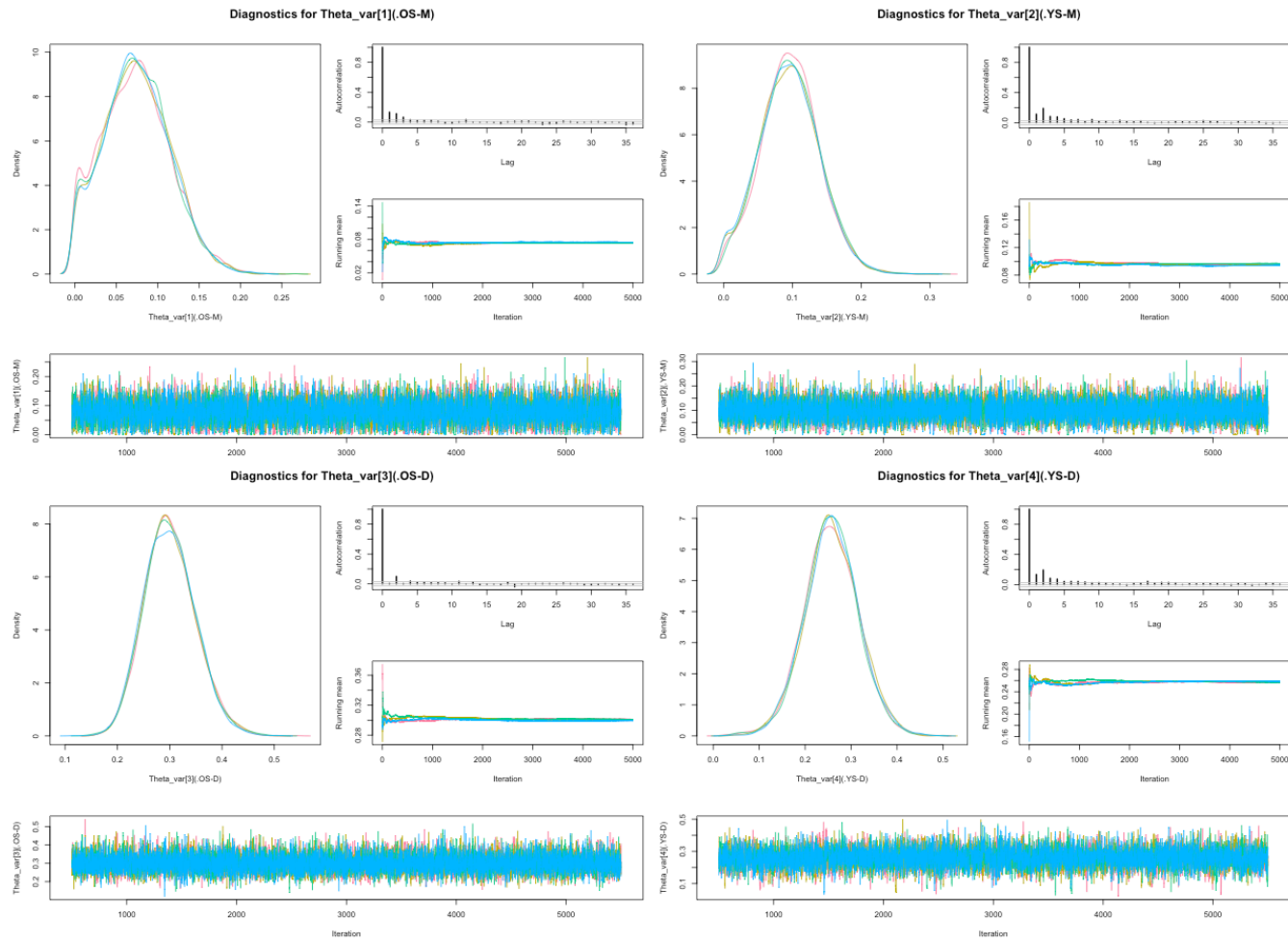


Figure 213. Model 6 MCMC Diagnostic Plots of Measured Variable Variance Parameters

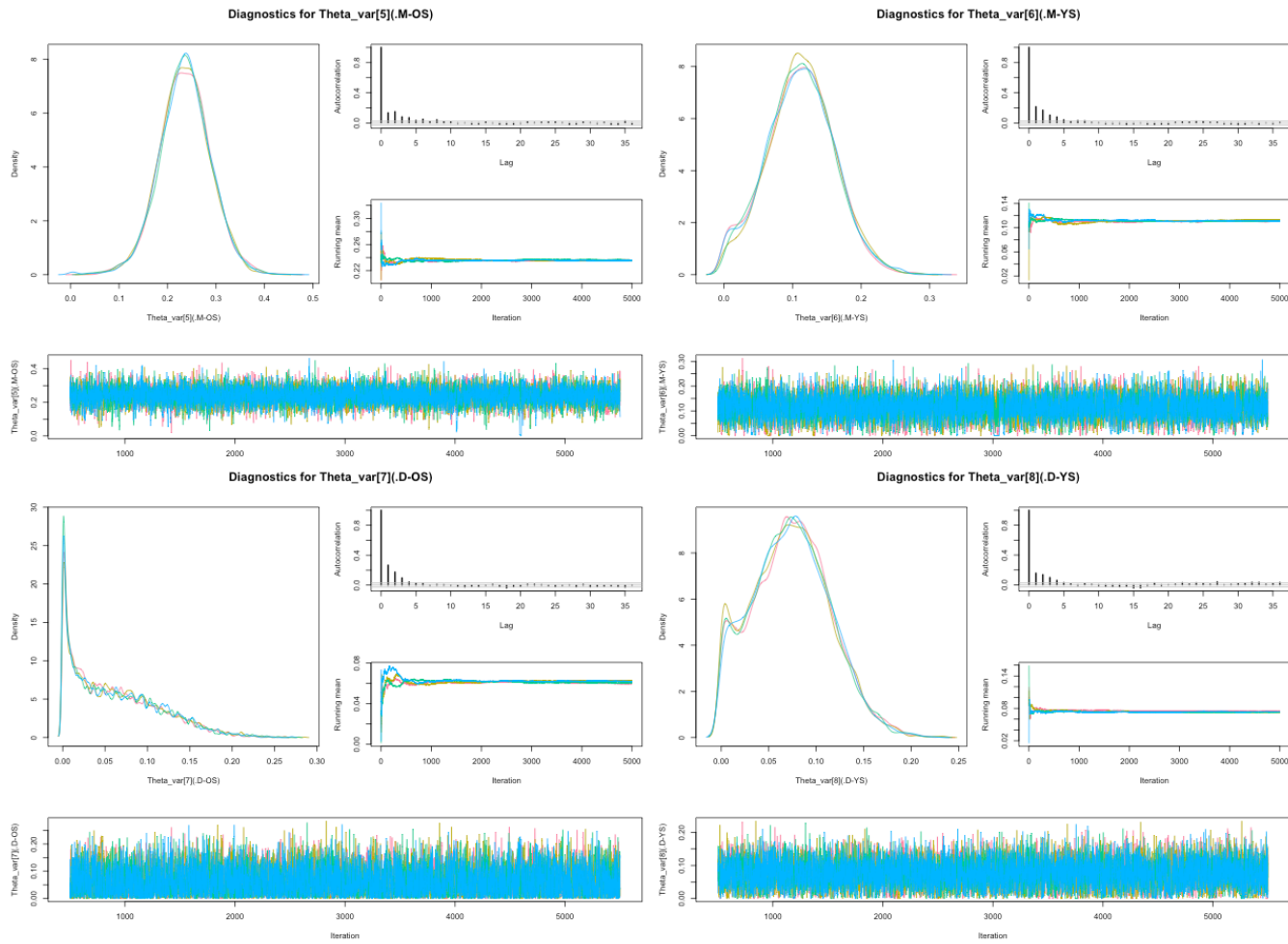


Figure 214. Model 6 MCMC Diagnostic Plots of Measured Variable Variance Parameters

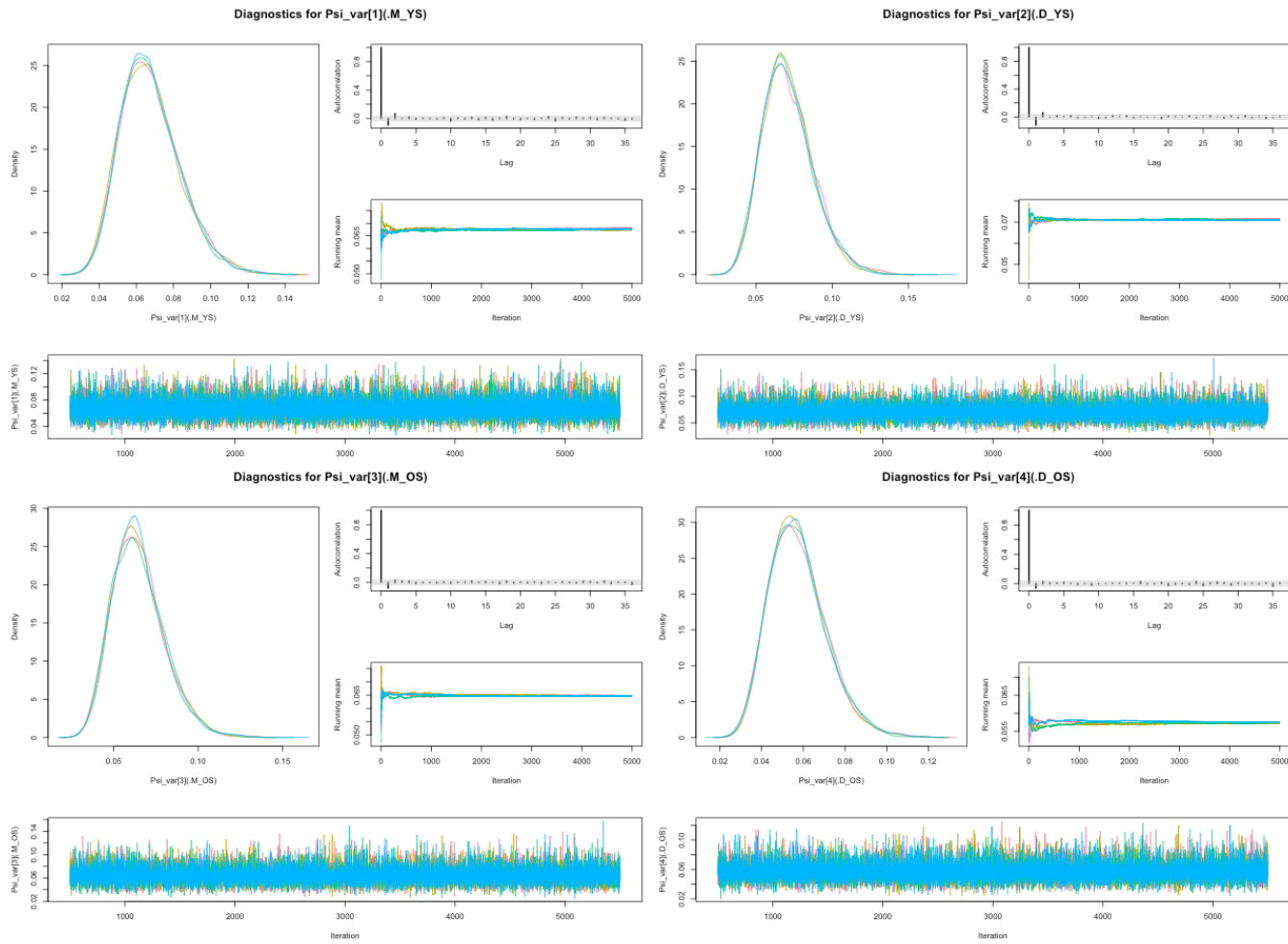


Figure 215. Model 6 MCMC Diagnostic Plots of Latent Variable Variance Parameters

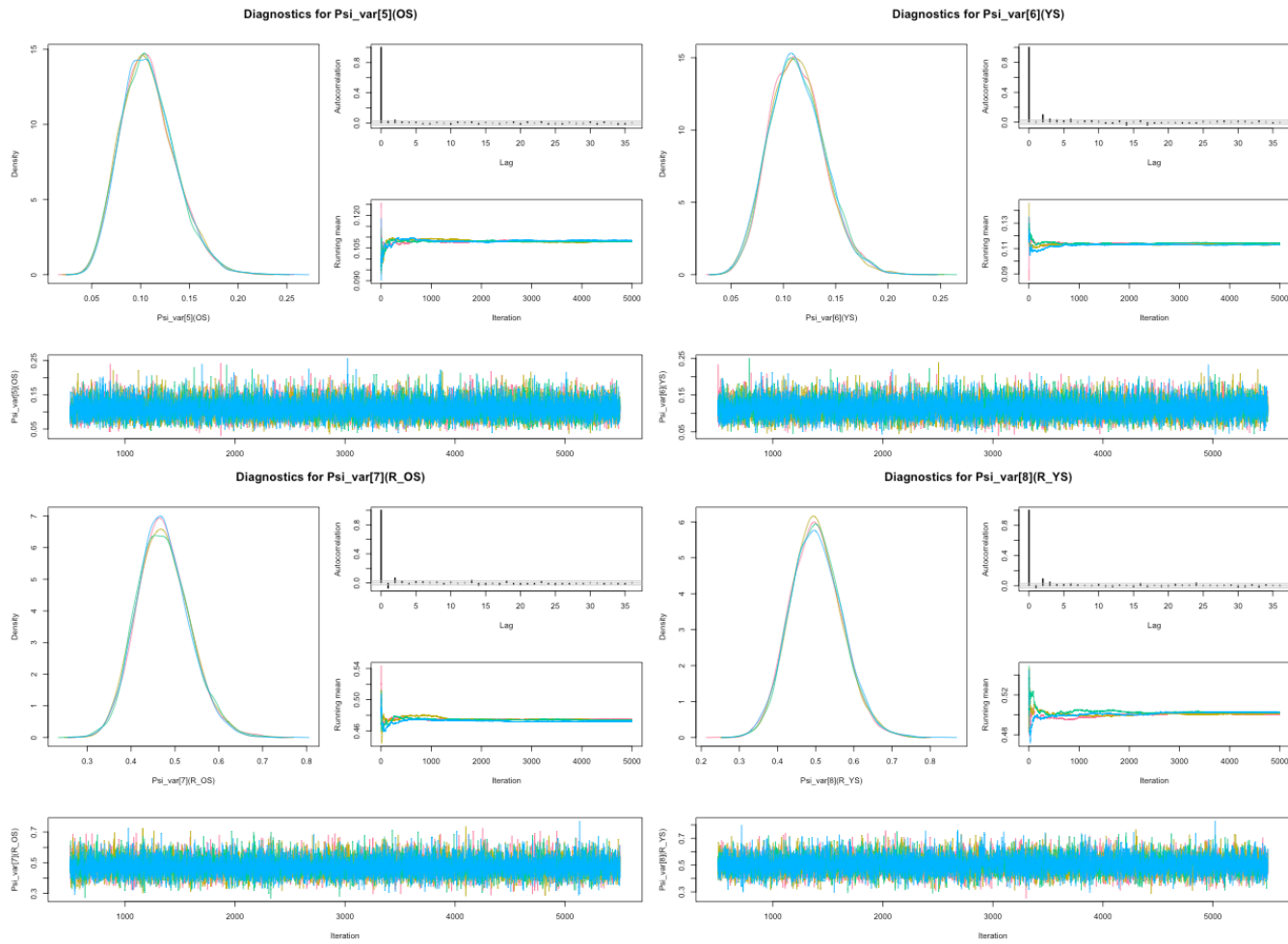


Figure 216. Model 6 MCMC Diagnostic Plots of Latent Variable Variance Parameters

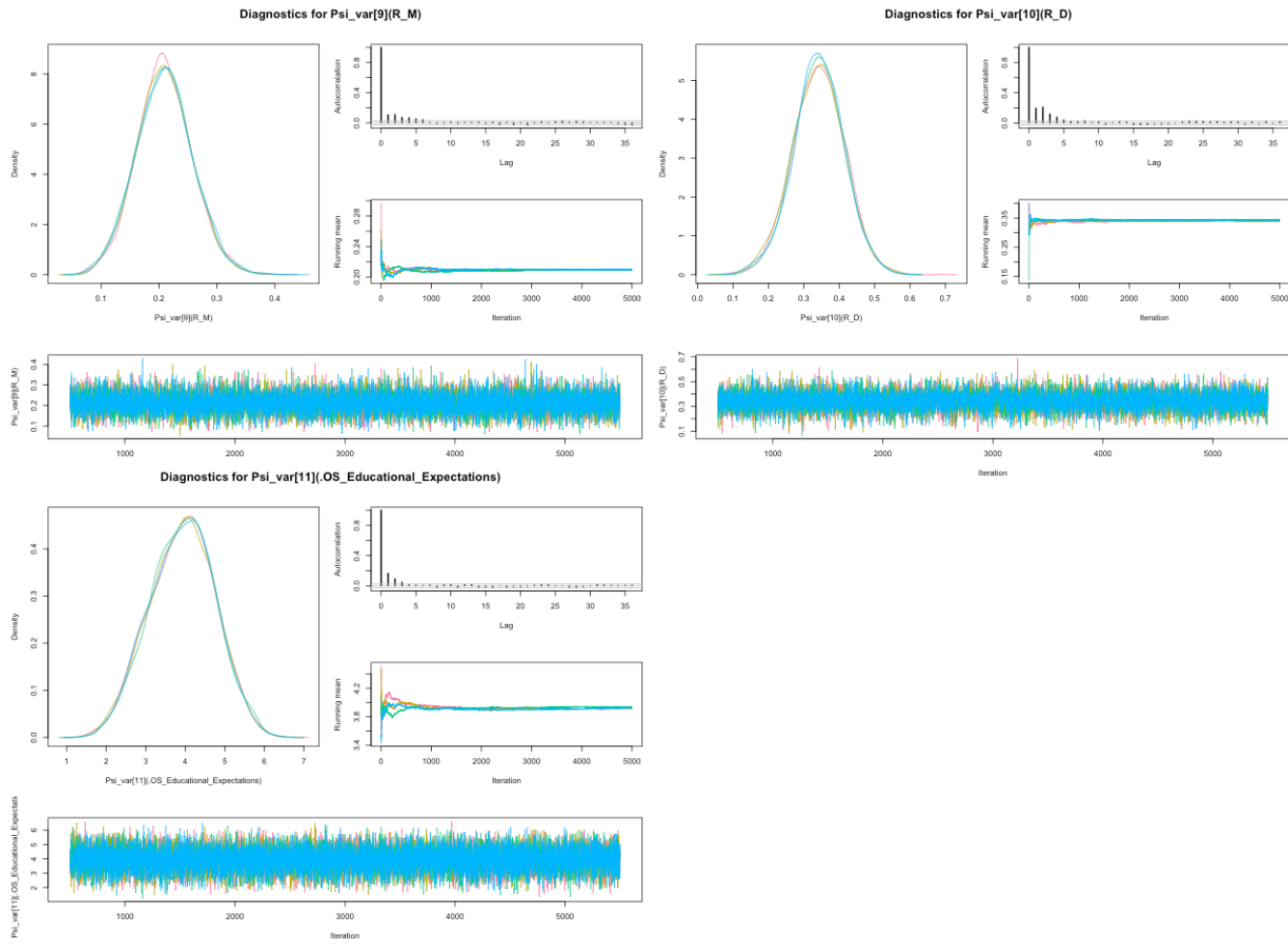


Figure 217. Model 6 MCMC Diagnostic Plots of Latent Variable Variance Parameters

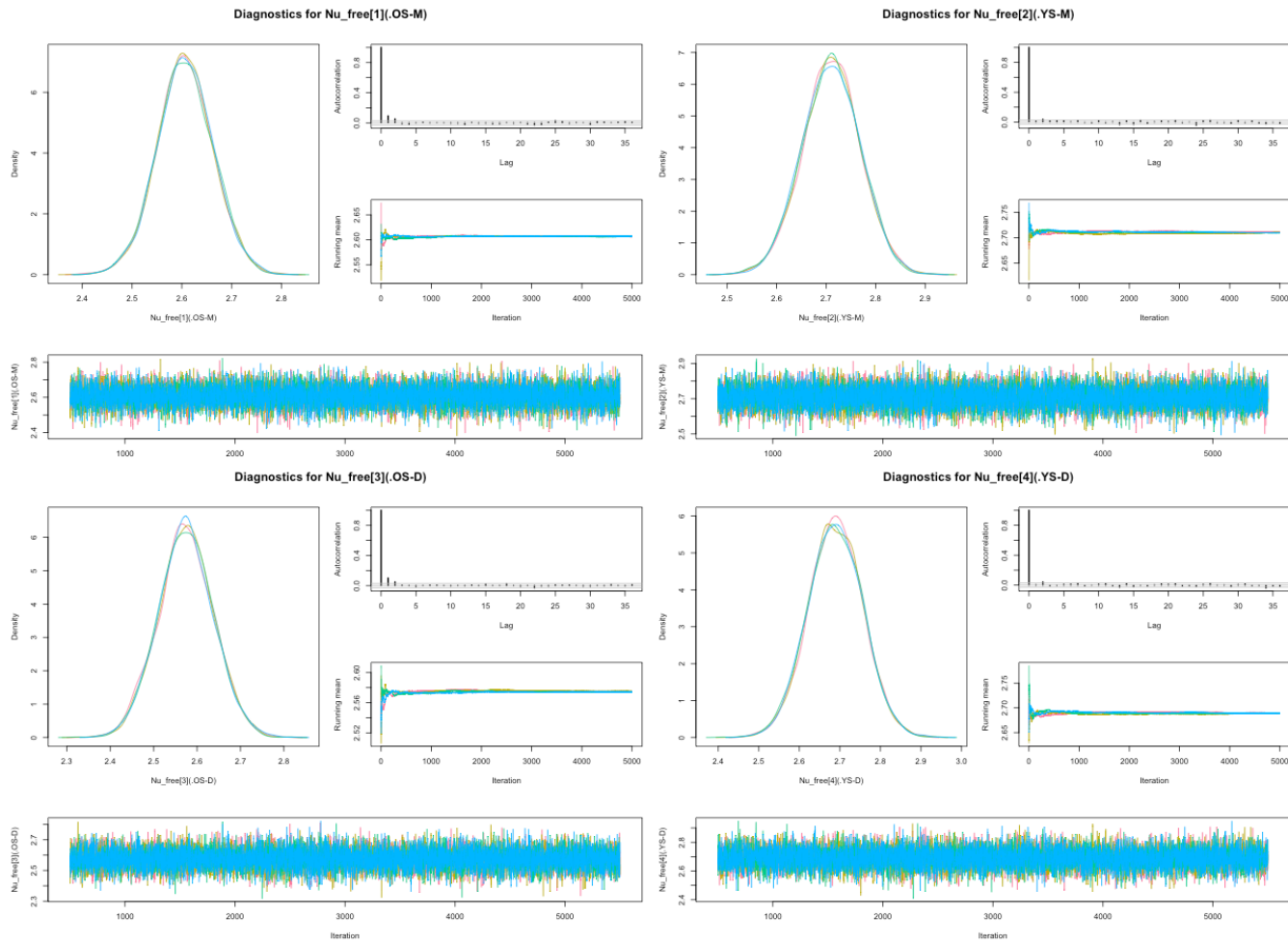


Figure 218. Model 6 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

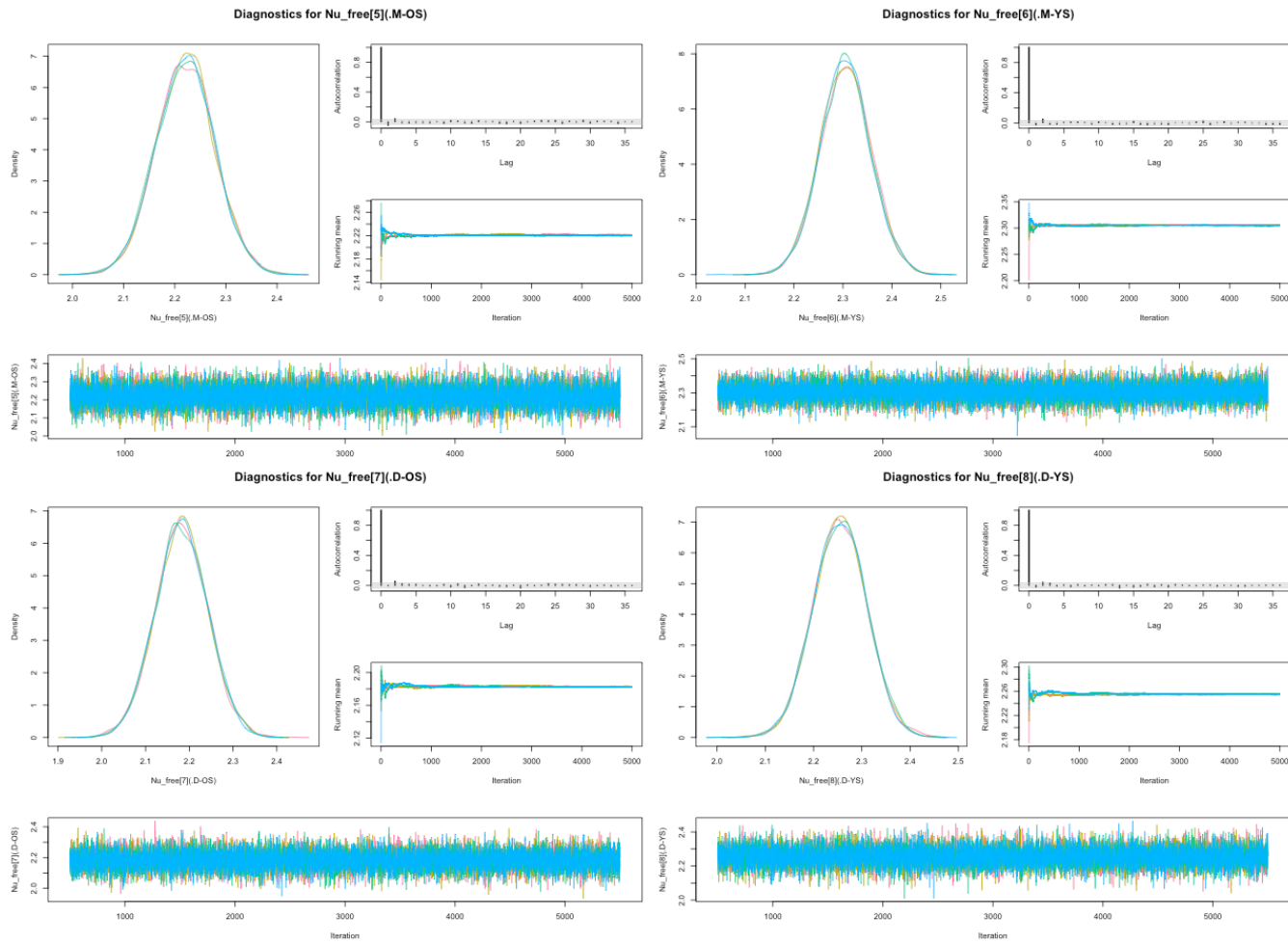


Figure 219. Model 6 MCMC Diagnostic Plots of Measured Variable Intercept Parameters

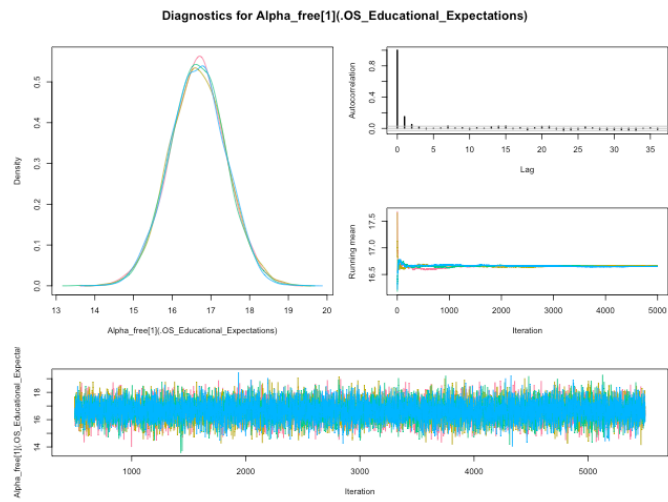


Figure 220. Model 6 MCMC Diagnostic Plots of Regression Intercept Parameter

APPENDIX E
IRB APPROVAL FORM



APPROVAL:CONTINUATION

[Kimberly Updegraff](#)

CLAS-SS: Social and Family Dynamics, T. Denny Sanford School of (SSFD)
480/965-6669
Kimberly.Updegraff@asu.edu

Dear [Kimberly Updegraff](#):

On 4/3/2023 the ASU IRB reviewed the following protocol:

Type of Review:	Modification and Continuing Review
Title:	Longitudinal Study of Mexican American Families
Investigator:	Kimberly Updegraff
IRB ID:	STUDY00015653
Category of review:	7
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	None

The IRB approved the protocol from 4/3/2023 to 4/2/2025 inclusive. Three weeks before 4/2/2025 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 4/2/2025 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the “Documents” tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator