The Role of Interparental Relationship Variability in Parent-Child Interactions: Results from A Sample of Mothers of Children with Autism Spectrum Disorder and Mothers with Neurotypical Children

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Abstract

Objective: The goal of this study was to examine how variability in interparental relationship functioning predicts the quality of parent-child interactions in daily life among families in which a child had Autism Spectrum Disorder (ASD), and families of neurotypical children.

Background: Parent-child interactions predict a host of key outcomes for children, and one contributor to the health of parent-child interactions is the quality of the relationship between the parent couple. Yet, prior research has exclusively focused on how *average* levels of parental relationship functioning predicts parent-child interactions, which neglects the importance of *variability* in the interparental relationship. **Method**: Drawing on a sample of 167 mothers, one group with a child with ASD (n = 85), and the other group with a neurotypical child (n = 82), we examined how weekly variability in mothers' relational experiences with their partner predicted their interactions with their children in daily life using multilevel modeling. **Results**: The association between interparental relational variability and mother child-interactions depended on mean levels of interparental relational functioning. Specifically, when mothers reported poor average relational functioning across a particular week, greater variability in their relationship across this same period was associated with benefits for mother-child interactions. This pattern was not seen in those with healthy interparental functioning. Moreover, moderation analyses suggested relational variability may be especially relevant for partner-child interactions of mothers of neurotypical children. **Conclusion**: These results suggest that (a) the association between variability in parents' relational experiences and parent-child interactions depends upon mean levels.

Keywords: parent-child relationships; family systems; autism spectrum disorders

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When it comes to the well-being and development of children, parent-child interactions are critical, as the quality of these interactions predicts a host of key developmental outcomes (Hollenstein et al., 2004; Kim et al., 2018; Sherill et al., 2017; Zemp et al, 2019). Although there are important differences between the two populations, parent-child interactions play an important role in the health and well-being of both neurotypical children (e.g., Hollenstein et al., 2004; Kim et al., 2018), and children with autism spectrum disorder (ASD; e.g., Spiker et al., 2002).

What, then, predicts the quality of parent-child interactions? One answer to this question is that the health of parent child-interactions depends in large part on the quality of the relationship between that child's parents. Numerous theories within the psychology and family science literature suggest that parent-child interactions do not occur within a vacuum, and instead depend upon the health and quality of the interparental relationship (e.g., Cox & Paley, 2003; Engfer, 1988). For instance, family systems theory (Cox & Paley, 2003) suggests that families are tight, interdependent systems, in which each sub-relationship within the family is dependent upon all other individuals and relationships within the family. According to family systems theory, if the relationship between two parents is characterized by stress, conflict, or a lack of positivity, these relational challenges will inevitably influence the way each parent interacts with their child. Similarly, the spillover hypothesis suggests that challenges between parent couples may spill over into other familial relationships, such as into the parent-child relationship (Engfer, 1988; Kouros et al., 2014). Moreover, although there are important differences in parent-child

interactions in families of neurotypical children and families of children with ASD, theory broadly suggests interparental interactions would contribute to parent-child interactions among both types of families.

In support of these theories, prior empirical research examining both neurotypical children and children with ASD has documented that the interparental relationship does contribute to the quality of parent-child interactions (Erel & Burman, 1995; Hartley et al., 2011; Hartley et al., 2018; Kim et al., 2018; Kouros et al., 2014; Mastrotheodoros et al., 2020; Nelson et al., 2017; Sears et al., 2016; Sherill et al., 2017). For instance, results of daily experience research demonstrates that, among neurotypical children, daily interparental conflict predicts greater daily parent-child conflict (Sherill et al., 2017; Zemp et al., 2018). Longitudinal studies similarly show that, across the course of time, tensions in parent relationships negatively influence relationships among neurotypical children and their parents (e.g., Gerard, et al., 2006). Among parents of children with ASD, research also demonstrates that a healthy interparental relationship promotes positive parenting, enhanced feelings of closeness with their child, and lower parenting related stress (e.g., Hartley et al., 2011; Hartley et al., 2018). Combined, then, the literature suggests that for both neurotypical children and children with ASD, the interparental relationship contributes beneficially to the parent-child relationship.

In light of research demonstrating that the quality of parent-child relationships and interactions predict a host of critical adjustment outcomes for children, such as externalizing symptoms, internalizing symptoms, and social competence (Carson & Parke, 1996; Gerard et al., 2006; Hollenstein et al., 2004; Neppl et al., 2019), it is critically important to illuminate the factors that contribute to healthy parent-child interactions (including among both neurotypical

children and children with ASD) to further understanding of child development and familial health.

The Potential Influence of Relational Variability on Parent-Child Interactions

Although research has extensively documented how interparental relational experiences influence parent-child interactions, prior research has exclusively examined how *mean levels* of interparental relationship functioning influence parent-child interactions. For instance, numerous recent studies have examined how interparental relationships contribute to parent-child relationships in daily life using a multilevel modeling approach (Kouros, et al., 2014, Mastrotheodoros et al., 2020; Nelson, et al., 2017; Sears et al., 2016; Sherill, et al., 2017). Generally speaking, these studies utilize a multilevel approach to examine how mean levels in key interparental relationship variables are associated with parent-child interactions while statistically accounting for the variability that exists within persons (and also, potentially, across time). Despite this, no prior research has specified *variability* (i.e., one's overall tendency to deviate from their average score across a particular period of time, often operationalized using a within-person standard deviation score) in interparental relational experiences as the primary predictor of parent-child interactions. As such, research to date has yet to examine how within-person interparental relational variability contributes to parent-child interactions.

Why might variability in interparental relationship experiences matter, above and beyond average levels of their relational functioning? One framework for understanding how variability in interparent relationships contributes to parent-child interactions is the relational turbulence model (Solomon & Knoblock, 2004). According to this model, changes in relationships contribute to greater relational uncertainty (i.e., questions, ambiguity, or doubts about one's relationship with another person). Relational uncertainty, in turn, theoretically creates irritations

and negative emotions, thereby undermining the relationship more broadly. While the relational turbulence model was originally proposed to explain why the transition from casual dating to a more serious romantic relationship is often challenging (Solomon & Knoblock, 2004), researchers (e.g., Girme et al., 2018) have hypothesized variability in established intimate relationships similarly creates greater relationship uncertainty and turbulence, therefore undermining broader well-being outcomes. In support of these ideas, a growing body of research in the relationship science literature suggests that variability in relational experiences negatively predict well-being even accounting for average levels of those same relational experiences (Arriaga, 2001; Arriaga et al., 2006; Campbell et al., 2010; Girme et al., 2018). For instance, Girme et al. (2018) demonstrated that fluctuations in attachment security were associated with lower relationship satisfaction across the course of time, even accounting for mean levels of attachment security, and numerous other studies have documented similar findings (Arriaga, 2001; Arriaga et al., 2006; Campbell et al., 2010).

Dovetailing on this work from the relationship science literature, to the extent that parents experience turbulence in their own relationships, we hypothesized that this variability is likely to influence their interactions with their children. Indeed, both the spillover hypothesis and family systems theory suggest that any variability in the interparental relationship is likely to have an influence on parent-child interactions. For instance, when a mother experiences turbulence in her relationship, the doubt, ambiguity, and negative mood associated with that turbulence may mean she behaves in a more self-focused and less responsive manner with her child, which undermines the quality of those interactions. As such, based on the relationship and family science literatures, our primary goal was to examine the possibility that greater fluctuations in the

parental relationship would be associated with parent-child interactions in a maladaptive manner (**Research Question 1**).

The Potential Benefits of Relational Variability: Variability-as-Respite

In addition to our primary hypothesis, we also explored one other possibility: what we term the *variability-as-respite hypothesis*. From the perspective of relational turbulence, greater relational variability is theoretically maladaptive for parent-child interactions, because of the way variability contributes to relational uncertainty. Importantly, researchers examining how relational variability contributes to key outcomes have emphasized that it is crucial to always examine how variability is associated with outcomes *depending on mean or average levels* of that same variable (i.e., test the interaction between mean levels and variability; e.g., Overall, 2020). In the current research, this means examining how relational variability predicts parent-child interactions dependent on the overall levels of interparental relational functioning across that same period. Why might testing such an interaction be important, theoretically? Consider the experience of two mothers across the course of a week: when it comes to negative relational experiences, Mother A reports a low overall (mean) level of negative relational experiences (which is indicative of better relational adjustment), but a high degree of variability (e.g., most days she reports little negativity, but reports two days characterized by high negativity). Based on the relational turbulence model, even though her mean levels are low, her high variability likely contributes to problems in their interactions with their children.

By contrast, consider Mother B: with respect to negative relational experiences, Mother B has a *high* overall (mean) level across the week (which indicates poor relational adjustment), but also has a high degree of variability (e.g., most days are high in negative partner interactions, but she reports two days without any negative experiences). In this case, we can imagine a prediction

that is contrary to those of the relational turbulence model, and one that is consistent with the *variability-as-respite* hypothesis. For couples who tend to be high in overall (average) levels of negative relational experiences across a particular period, variability may actually be beneficial, because it provides a break or respite from the consistently difficult experiences they have with their partner. Thus, while the relational turbulence model emphasizes consistency, or a lack of uncertainty, there may be some relational situations in which the need for a respite from the challenging circumstances usurps the problems associated with relational uncertainty. In these types of challenging relational situations, such as when negative relational experiences tend to be high in daily life, or when positive relational experiences tend to be low in daily life, we test the possibility that interparental relational variability may be associated *beneficially* with parent-child interactions (**Research Question 2**).

Relational Variability and Parent-Child Interactions in a Sample of Mothers of Children with Autism Spectrum Disorder and Aged-Matched Controls

To examine how variability in positive and negative aspects of parental relationships predict parent-child interactions, we drew on a sample of mothers in which one group had a child with autism spectrum disorder (ASD), and another group had a neurotypical child. This sample presents an excellent opportunity to not only examine how interparental relational variability predict parent-child interactions for the first time, but also to do so among two unique parent-child populations. While the theoretical frameworks that we draw upon provide reason to suggest that interparental relational variability will be associated with parent-child interactions among both populations, because of the unique challenges associated with parenting a child with ASD, it is possible that interparental relational variability may be less strongly predictive of parent-child interactions for parents of children with ASD, as compared to parents of neurotypical

children. This is because for parents of children with ASD, numerous factors other than the interparental relationship (and variability therein) may be more prominent in contributing to the parent-child relationship. For instance, prior research demonstrates that the severity of the child's autism symptoms plays a strong role in contributing to parent-child interactions among families of children with autism (Beurkens et al., 2013; McStay et al., 2014). While we believe that lower variability in the interparental relationship likely supports healthy parent-child interactions among parents of children with ASD, it may be a less strong contributor to the health of the parent-child relationship, because of intractable, ASD-related factors, such as child behavior problems (**Research Question 3)**. The unique sample we draw upon, which includes mothers of a child with ASD and mothers of a neurotypical child, allows us to explicitly test for differences between these two demographically matched sub-samples of mothers.

Current Study

Parent-child interactions play a critical role in the health and development of children, including in families of neurotypical children, and in families of children with ASD. Although prior research demonstrates interparental relational functioning contributes to the quality of parent-child interactions, no prior research as examined how interparental relational variability contributes to parent-child interactions. In doing so among families of a child with ASD and families of neurotypical children, this study addresses important gaps in our understanding of how healthy parent-child interactions arise in both of these populations.

We examined the hypothesis that variability in daily interparental relational experiences would predict parent-child interactions, even accounting for mean levels of interparental relational experiences (**Research Question 1**). We also tested for interactions between relational variability and mean levels of relational experiences in daily life (**Research Question 2**).

Finally, we examined whether the patterns we explored differed for families of children with ASD and families of neurotypical children (**Research Question 3**). To do so, we drew upon archival data from a longitudinal study of 167 mothers, which included one group of mothers of a child with ASD (n = 85), and another group of mothers of a neurotypical child (n = 82). At 3 waves of data collection, mothers provided up to 7 nightly reports (for a total of up to 21 total reports) of their (a) positive and negative relational experiences with their partner, and (b) interactions with their child. We examined whether within-person weekly variability in interparental relational experiences across each 7-day period predicted parent-child interactions in daily life.

Method

Participants

Participants for this research were recruited for the larger underlying study [study name masked for review], which was designed to examine the influence of chronic caregiving stress on aging and health. Recruitment was conducted in the [location masked for review] area via advertisements in schools, parenting publications, and in the autism clinic of an academic hospital. Data were collected from 2012 to 2015. For the primary study, 183 women were recruited, including 92 women raising a child with ASD, and 91 women raising a neurotypical child. In order to be eligible for the study, mothers must have been a non-smoker, 20 to 50 years old, and have at least one child ranging from age 2 to 15 years old. Women were ineligible for the study if they reported a major medical or psychiatric disorder, such diabetes, cancer, bipolar disorder, post-traumatic stress disorder, or eating disorder. Participants from the larger study were included in these analyses if they completed at least two or more daily assessments of positive or negative relational experiences with their partner on a particular week, as well as

complete assessments on the outcome variable, parent-child interactions. The final sample at the person level for these analyses was 167. At baseline, mothers included in our analyses were 42.35 years old on average (*SD* = 5.03). With respect to race, 80.1% of the sample identified as White, 3.6% of the sample identified as Black or African-American, 6.6% of the sample identified as Hispanic or Latina, 12.0% of the sample identified as Asian or Pacific Islander, 0.6% of the sample identified as Native American, and 1.2% of the sample identified as another race. In the neurotypical group, 27 mothers reported having one child, 44 reported having two children, 9 reported having three children, and 3 reported having four children. In the ASD group, 20 mothers reported having one child, 48 reported having two children, 13 reported having three children, and 4 reported having four children. Of participants included in the analyses, 95.2% reported were currently married to their partner, 2.4% were divorced, 0.6% was separated, and 1.2% reported they were never married. With respect to total household income, 2.4% of mothers reported less than $39,999 per year, 9.1% of mothers reported $40,000 to $79,999 per year, 7.2% of mothers reported $80,000 to $99,999, and 80.7% of mothers reported $100,000 or greater. If mothers had more than one child, they completed a number of assessments on a focal child. In the ASD group, this was always the child that had ASD. In the neurotypical group, this was the oldest child. The mean age of the focal child was 7.97 years old (*SD* = 3.35), and a greater proportion of mothers in the study reported that the focal child was a boy (113; 67.3%) as compared to a girl (54; 32.3%). With respect to the focal child, children with ASD were significantly older (*M* = 8.55, *SD* = 3.68) than neurotypical children (*M* = 7.37, *SD* = 3.68), t (154.14) = -2.30, p = .02. Mothers of children with ASD more likely to report having a focal child that was a boy (70 boys, 15 girls) than mothers of neurotypical children (43 boys, 39 girls) $\chi^2 = 17.07$ (1), $p < .001$.

Procedure

This research was approved by the IRB of [university name masked for review]. All participants provided informed consent prior to completing any study activities. Participants first came to a research laboratory, where they completed intake, and a number of assessments not relevant to this research. As part of the larger study, mothers completed 7 days of online daily assessments at 3 waves relevant to this research: baseline, 9-month follow-up, and 18-month follow-up. As such, mothers had up to three weeks of data available, and up to 21 total days of data available. The average number of daily surveys completed was 16.61 (SD = 5.33), and 67.9% of participants completed 16 or more daily surveys across the course of the 3 weeks of daily data collection. The key questionnaires of interest to this research included positive and negative daily interactions with their relationship partner, as well as daily interactions with their child or children. Participants were compensated $75 for participation in the study. Study materials, data analytic syntax, and study data can be found on the corresponding Open Science Framework page for this manuscript: https://osf.io/fz54d/?view_only=d365082b444141518a6af796f4c669d6.

Measures

Positive partner daily relational experiences. Mothers completed two items each evening, which were used as an indicator of positive relational experiences with their partner. All of the partners were living with the mother, and the parent of the mother's child. Across all three weeks of data collection, participants responded to the items "*To what extent were you satisfied with your partner today?*" and "*To what extent did you feel respected by your partner today?*" on a scale from 0 = *not at all* to 100 = *a lot*. The two items, which were highly correlated (r = .69) were first averaged to create an overall indicator of positive daily experiences with the

relationship partner. Then, we created weekly within-person means and standard deviations, which provided an indicator of the overall level of positive relational experiences, as well as the individual's tendency to deviate from their own mean for each week of diary reporting (baseline, 9-months, and 18-months).

Negative partner daily relational experiences. Mothers completed three items which were used to assess negative relational experiences with their marital partner. Across each of the three weeks of daily reporting, participants responded to the items "*To what extent did you experience tension with your partner today?*", "*To what extent did your partner criticize you today?*", and "*To what extent were you disappointed with your partner today?*" on a scale from 0 = *not at all* to 100 = *a lot*. The three items were averaged to create an overall indicator of negative experiences with the relationship partner in daily life, and the items demonstrated good internal consistency ($\alpha = .85$). As with the previous measure, we calculated weekly within-person means and standard deviations, which assessed (a) overall levels of negative relational experiences, and (b) the individual's tendency to deviate from their own mean each week.

Mother-child interactions. Positive mother-child interactions in daily life were assessed with the following item: *"Today, to what extent did you feel you had positive interactions with your child/children?"* Negative mother-child interactions in daily life were assessed with the following item: "*To what extent did you judge, criticize or blame yourself for any difficult interactions you may have had with your child/children today*?" Both of these items were assessed on a sliding scale from 0 = *not at all* to 100 = *a lot*. In the accompanying pre-registration for these analyses (see below), we state that we intended to use one additional item as an indicator of positive daily parent-child interactions ("*To what extent did you feel close/connected to your child/children today?*"), however subsequent to creating the pre-

registration we realized that this item was only included at the 18-month wave of data collection, and so this item is not included in subsequent analyses.

Child internalizing and externalizing symptoms. Across the course of the larger study, mothers reported on the focal child's internalizing and externalizing symptoms at three waves o data collection using a subscale of the Child Behavior Checklist Clinical Scales (Biederman et a;., 2010; Mazefsky et al., 2011). Mothers provided reports of their child's somatic symptoms ("*My child reports having headaches, stomachaches or other physical symptoms*.") and behavioral issues ("*My child Is defiant, disobedient, lies, or cheats*.") on a scale from 1 = *never* to 5 = *always*. If mothers provided multiple reports across the course of the study, we averaged them to get an overall indicator of the child's internalizing or externalizing symptoms across the course of the study.

Analysis Plan

Prior to conducting any analyses, we preregistered a secondary data analysis plan on aspredicted.org, which can be viewed at the following link: https://aspredicted.org/XG4_GCN. Our primary goal was to examine whether mothers' variability in their positive and negative relational experiences across the course of each week were associated with their reports of mother-child interactions in daily life, while controlling for mean levels of positive or negative relational experiences each week. Because each mother provided (a) up to 7 daily reports of parent-child interactions each week (for a total of 21 possible daily reports per individual), and (b) up to 3 person-level assessments of weekly variability in and mean levels relational experiences in their partner, we constructed a three-level multilevel model in which days and weeks were nested within persons. The key predictor variables in each model were (a) weekly, within-person standard deviations in positive or negative interparental relational experiences, (b)

weekly mean levels of positive or negative interparental relational experiences, and (c) the interaction between the two. With respect to construction of the analytic sample, we utilized all mothers who completed at least two daily reports of their (a) relational experiences with their relationship partner, and (b) daily interactions with their child. 74% of mothers completed 12 or more daily surveys, out of a total 21 possible daily surveys, and 90.6% of mothers completed 7 or more daily surveys. One of the advantages of multilevel modeling is that it allows for inclusion of participants in substantive analyses even if they were missing data across the course of time. Thus, although 90.6% of mothers completed 7 or more daily surveys, as long as participants had at least 2 assessments of their relational experiences and mother-child interactions at one of the three weeks where data was collected, they were included in substantive analyses. Mothers in the ASD group completed fewer daily surveys (M = 14.26, SD = 5.77) than those in the neurotypical group (M = 16.21, SD = 5.09) across the course of the study, t (160) = 2.28, p = .01.

We chose to examine variability in relational experiences over the course of a week for both theoretical and methodological reasons. From a theoretical perspective, an individual's within-person SD in their relational experiences across the course of a week is likely to capture the extent to which they experience the relationship as generally consistent or turbulent during that period. From a methodological perspective, because participants provided up to 7 reports of their relational experiences, examining variability across the course of the week is likely to provide the sufficient number of reports of relational experiences necessary to capture variability or turbulence as it occurs in a relationship. Additionally, in each model we controlled for (a) the wave of data collection (to account for the possibility that there may have been changes in the key associations of interest across the course of the study), and (b) group (i.e., whether mothers

were caretakers of a child with ASD or a neurotypical child). In order to examine whether there were significant differences between the sub-groups of families with a child with ASD (i.e., Research Question 3), in a second series of analyses, we included caregiving group as a as a moderator of each of the primary predictor variables in the main model.

All models were specified with random intercepts and fixed slopes, a variance components covariance structure for the random intercepts, and an auto-regressive covariance structure for the repeated effect. All predictor variables were mean centered for ease of interpretation of interaction effects. Effect sizes for individual coefficients are provided in the form of *r* values based on the method used by Kashdan and Steger (2006): $r = \sqrt{(t^2/t^2+\text{df})}$.

After conducting these primary analyses, we also completed both sets of primary analyses while including covariates in the models. In particular, because prior research demonstrates child characteristics, such as age, gender, and behavioral problems, may influence parent-child interactions, especially in families of children with ASD (Beurkens et al., 2013; McStay et al., 2014), we re-conducted each set of analyses while including child age, child gender, and child internalizing and externalizing symptoms as covariates. Results of these analyses are presented in the supplemental materials, and we inspected results to see if inclusion of these child characteristics altered the results of any of the primary analyses of interest.

We note here that we also preregistered a set of additional analyses that we chose not to include in the final manuscript. Specifically, the broader study included a follow-up wave of data collection at 24-months in which a subset of fathers completed the same surveys as their marital partners. We chose not to include these analyses as part of the final manuscript because the number of fathers (n = 61) included in that follow-up survey ultimately was not large enough to adequately power the analyses we pre-registered. Despite this, we have included the pre-

registered, dyadic analyses which included fathers in Supplemental Tables 8 and 9 for the purpose of transparency.

Finally, although we originally constructed a three-level model – with a random intercept for week and for persons – when predicting negative mother-child interactions, the three-level model failed to converge, because there was no meaningful variability across the different weeks. As such, for all analyses predicting negative mother-child interactions, we reverted to a two-level model, in which we included a random intercept for persons only.

As outlined by Bolger and Laurenceau (2013), power for daily, multilevel analyses includes considering both how many individuals are included in the study, and how many observations are included within-persons. All primary analyses included 167 individuals. The analyses predicting positive mother-child interactions included 2,748 total data points, and the analyses predicting negative mother-child interactions included 2,752 total data points. Our analyses, therefore, are likely well-powered to detect even small effects, including the two-way interactions of interest. With respect to the interactions by caregiving group, there were 82 mothers of neurotypical children who completed 1,430 daily observations, and 85 mothers of children with ASD who completed 1,322 daily observations.

Results

Descriptive statistics and bivariate correlations for primary study variables, aggregated across all waves of data collection, are presented in Table 1. We also provide descriptive statistics for primary study variables at each wave of data collection separately for each caregiving group in the supplementary materials in Table S1. As shown in Table 1, positive and negative mother-child interactions in daily life were moderately negatively correlated with each other. Consistent with the notion that greater relational variability reflects lower quality

relationships, mothers who tended to report greater mean levels of negative relational experiences also tended to report greater variability in negative relational experiences, whereas those who reported greater positive relational experiences reported lower variability in positive relational experiences. At the bivariate level, greater variability in negative relational experiences were negatively associated with positive mother-child interactions, whereas fluctuations in positive relational experiences were not associated with positive mother-child interactions. Fluctuations in negative relational experiences were associated with greater negative mother-child interactions, whereas fluctuations in positive relational experiences were not associated with negative mother-child interactions at the bivariate level. Mothers who had a child with autism reported more negative and less positive interactions with their children, greater negative and lower positive mean levels of relational experiences, and greater variability in negative relational experiences. Caregiving group was not associated with variability in positive relational experiences.

Research Questions 1 and 2: Do Mothers' Positive Interparental Relational Experiences Predict their Interactions with their Children?

Table 2 presents results of multilevel analyses examining whether variability in mothers' positive relational experiences predicted their daily interactions with their children. The top half of the table presents results predicting mothers' reports of daily positive interactions with their children. The wave of data collection was not associated with mothers reports of positive interactions with their children. Mothers who had a child with ASD were less likely to report positive interactions with their children, as compared to mothers with a neurotypical child. Mothers who reported greater weekly mean levels of positive interparental relational experiences were more likely to report positive interactions with their children in daily life. Variability in

positive interparental relational experiences was not associated with positive mother-child interactions in daily life, however the interaction between mean levels and variability in positive relational experiences was statistically significant in predicting positive mother-child interactions in daily life. This interaction is presented in Figure 1, and to decompose the interaction we examined the association between weekly within-person variability in positive relational experiences and positive mother-child interactions at low (-1 SD) and high (+1 SD) weekly mean levels of positive relational experiences. When mean levels of weekly positive relational experiences were high, the association between variability in positive relational experiences and positive mother-child interactions was not statistically significant (B = -0.15, r = .07, p = .15). By contrast, when mean levels of weekly positive relational experiences were low, greater variability in positive relational experiences was *positively* associated with positive mother-child interactions in daily life (B = .21, r = .11, p = .02), such that greater variability in positive relational experiences predicted *more* positive mother-child interactions.

The bottom half of Table 2 presents results of a multilevel analysis predicting mothers' reports of daily negative interactions with their children. The wave of data collection was not associated with mothers' reports of negative interactions with their children. Mothers who had a child with ASD were more likely to report negative interactions with their children, as compared to mothers with a neurotypical child. Consistent with prior research, mothers who experienced greater weekly mean levels of positive relational experiences were less likely to report negative interactions with their child or children in daily life. The main effect of variability in positive relational experiences was not statistically significant in predicting negative mother-child interactions in daily life, nor was the interaction between mean levels and fluctuations in positive

relational experiences was significant in predicting negative mother-child interactions in daily life.

We re-examined these analyses in which mothers' positive interparental relational experiences predicted their interactions with their children while including child's age, gender, internalizing symptoms, and externalizing symptoms, and results are presented in Supplementary Table S2. As shown there, even after inclusion of these covariates, the substantive pattern of findings was the same as those in the primary analyses.

Research Questions 1 and 2: Do Mothers' Negative Interparental Relational Experiences Predict their Interactions with their Children?

Table 3 presents results of multilevel analyses examining whether variability in mothers' negative relational experiences predicted their daily interactions with their children. The top half of the table presents results of analyses predicting mothers' reports of daily positive interactions with their children. As expected, mothers who reported greater weekly mean levels of negative relational experiences were less likely to report positive interactions with their children in daily life. Contrary to expectations, the main effect of fluctuations in negative relational experiences in predicting positive mother-child daily interactions was not statistically significant, however this main effect was qualified by a statistically significant interaction between mean levels and variability in negative relational experiences in predicting positive mother-child interactions in daily life. This interaction is presented in Figure 2 (Panel A), and we again examined this association at low and high mean levels of negative relational experiences. When mothers reported higher mean levels of weekly negative relational experiences, there was a positive association between weekly variability in negative relational experiences and mother-child positive interactions in daily life ($B = 0.18$, $r = .10$, $p = .04$), such greater variability was

associated with *more* positive mother-child interactions. By contrast, when mothers reported lower levels of negative weekly relational experiences, the association between weekly variability in negative relational experiences and positive mother-child interactions was not statistically significant (B = -0.17, r = .08, p = .11). These results essentially mirrored the analyses examining how positive interparental interactions predicted positive mother-child interactions: when the overall interparental relationship was *unhealthy* across a particular week (i.e., low mean levels of positive interactions or high mean levels of negative interactions), variability in the interparental relationship was actually beneficially associated with positive mother-child interactions (consistent with the variability-as-respite hypothesis).

The bottom half of the Table 3 presents results of an analysis predicting mothers' reports of daily negative interactions with their children. Mothers who reported greater weekly mean levels of negative relational experiences were more likely to report negative interactions with their children in daily life. Greater weekly within-person variability in negative relational experiences were not associated with negative mother-child interactions in daily life, however this main effect was again qualified by a significant interaction between mean levels and variability in negative relational experiences. This interaction is presented in Figure 2 (Panel B), and to decompose this interaction we plotted the association between weekly within-person variability in negative relational experiences and negative mother-child interactions at low and high mean levels of negative relational experiences. Again, consistent with the variability-as-respite hypothesis, when mean levels of negative relational experiences were high, the association between weekly fluctuations in negative relational experiences and mother-child negative interactions was negative and statistically significant (B = -0.43, r = .14, p = .003), such that greater variability predicted *fewer* negative mother-child interactions. When mean levels of

negative interactions were low, the association between weekly fluctuations in negative interactions and mother-child negative interactions was not statistically significant (B = 0.07, r = .02, p = .69). Results from analyses with covariates were consistent with the results from those without covariates (see Supplemental Table S3).

Research Question 3: Is the Association between Interparental Relational Experiences and Mother-Child Interactions Different Based on Caregiving Group?

Next, we conducted analyses to determine whether the association between relational variability and parent-child interactions differed depending on caregiving group. Tables 4 and 5 present results of analyses examining whether being the caregiver of a child with ASD versus a neurotypical child moderated the associations between weekly variability in relational experiences and mother-child interactions. These analyses also tested for a three-way interaction between mean levels of weekly relational experiences, variability in relational experiences, and group (caregiver of a child with ASD versus a neurotypical child). Results in the top half of Table 4 demonstrate that although the interaction between weekly fluctuations in positive relational experiences and group was not significant, the three-way interaction between mean levels in positive relational experiences, within-person variability in positive relational experiences, and group was significant in predicting positive mother-child interactions. This three-way interaction is presented in Figure 3, and we decomposed the interaction by examining the association between fluctuations in weekly positive relational experiences at low and high mean levels of positive relational experiences for each caregiving group. As shown in the left panel of Figure 3, regardless of whether mean levels of positive relational experiences were high (B = -.03, r = .01, p = .84) or low (B = .01, r = .00, p = .93), fluctuations in positive relational experiences were not associated with positive mother-child interactions in the group of mothers

of a child with ASD. In the group of mothers with a neurotypical child, when mean levels of positive relational experiences were high, greater weekly variability in positive relational experiences predicted fewer positive mother-child interactions in daily life (B = -.32, r = .09, p = .03). In the group of mothers with a neurotypical child, when mean levels of positive relational experiences were low, greater weekly variability predicted greater positive mother-child interactions in daily life (B = .76, r = .24, p < .001).

The bottom half of Table 4 presents results of analyses examining whether group moderated the association between fluctuations in positive relational experiences in predicting negative mother-child interactions. The interaction between weekly mean levels of positive relational experiences and group was not statistically significant, however the interaction between weekly within-person variability in positive relational experiences and group was statistically significant in predicting negative interactions between mothers and children in daily life. This interaction is presented in Figure 4. We decomposed the interaction examining the association between weekly within-person fluctuations in positive relational experiences and negative mother-child interactions for each caregiving group. Results demonstrated that for mothers with a child with ASD, the association between weekly variability in positive relational experiences and negative mother-child interactions in daily life was not statistically significant (B = 0.08, r = .02, p = .64). For mothers of a neurotypical child, greater weekly variability in positive relational experiences was associated with fewer negative mother-child interactions in daily life (B = -0.51, r = .12, p = .01). The three-way interaction between mean levels in positive relational experiences, within-person fluctuations in positive relational experiences, and group was not statistically significant in predicting negative mother-child interactions in daily life.

Results from analyses with covariates were consistent with the results from those without covariates. See Supplemental Table S4 and S5 for results.

Table 5 presents results of analyses examine whether caregiving group moderated the association between fluctuations in negative relational experiences in predicting mother-child negative interactions in daily life. As shown in Table 5, group was not a statistically significant moderator of the association between fluctuations in negative relational experiences and mother-child interactions in daily life. Moreover, the three-way interactions between negative relational experiences, within-person fluctuations in negative relational experiences, and group were not significant when predicting both positive and negative mother-child interactions.

We again re-conducted these analyses while controlling for child age, gender, internalizing symptoms, and externalizing symptoms. Results are presented in the supplemental materials in Tables S6 and S7. The substantive conclusions of these models were the same as presented above.

Discussion

Using three weeks of daily data from a sample of mothers in which one group had a child with autism spectrum disorder and one group had a neurotypical child, this study was the first to examine how fluctuations in interparental relationships predict parent-child interactions, including among families of neurotypical children, and among families of children with ASD. When examining the sample as a whole (while controlling for caregiving group), we found greater interparental relational variability actually predicted *better* mother-child interactions (more positive and fewer negative mother-child interactions) for mothers who reported lower quality relationships on average in daily life (i.e., lower positive or higher negative relational experiences). By contrast, interparental relational variability was not associated with parent-child

interactions for parents who reported generally higher quality relational experiences with their partner on average in daily life. This pattern remained consistent even when accounting for a number of child characteristics. Additionally, moderation analyses examining caregiving group provided some evidence that relational variability may be especially relevant for parent-child interactions in families of neurotypical children, but potentially less influential to parent-child interactions in families of a child with autism. Specifically, in two of four moderation analyses, a significant interaction emerged, whereby relational variability was not associated with parent-child interactions in the group of parents of a child with ASD. Taken together, these results suggest that (a) when interparental relationships are generally challenging, relational variability may provide respite that is beneficially associated with parent child interactions, and (b) that this broader pattern may be especially relevant for parent-child interactions in families with neurotypical children. The implications of these results are discussed below.

Understanding the Influence of Relational Variability on Parent-Child Interactions: A Contextual Perspective

Theory and prior research in the relationships and family science literatures provided reason to suggest that variability in the quality of the interparental relationship would be associated with parent-child interactions in a maladaptive manner. We were surprised, then, that results provided little evidence for this hypothesis. Instead, results suggested that (a) the association between relational fluctuations and mother-child interactions depend upon mean levels of relational experiences, and (b) for mothers who reported unhealthy (i.e., less positive or more negative) average levels of relationship functioning in daily life, relational variability was actually associated with parent-child interactions in a beneficial manner.

So, what can explain the interaction between mean levels and fluctuations in mothers' relational experiences, which we found was consistently associated with mother-child interactions? This finding suggests that the link between parental relational fluctuations and parent-child interactions is not unidimensional, or universal. Instead, the data provide some support for our exploratory *variability-as-respite* hypothesis, in which we suggested that greater variability offers a helpful break or "reset" from unhealthy relational functioning in daily life in a way that is helpful for parents (in this case, mothers) when they shift to interacting with their children. In this sense, if a mother is in a relationship characterized by a high overall degree of negativity, fluctuations may be welcome, and provide windows of opportunity for the mother to interact with their child or children in a positive manner. One other possibility is that these findings can be explained by compensatory processes, whereby individuals attempt to offset challenges in one familial relationship by creating positive experiences in another one (Erel & Burman, 1995; Johnson et al., 2022). That is, when parents report negative relational experiences at the mean level as well as a high degree of variability, they may report better interactions with their child because they actively work to cultivate positive parent-child interactions in order to compensate for volatility in the interparental relationship.

Notably, the contextual nature of these findings cohere with recent work in relationship science: while considerable research in relationship science tends to suggest that variability in relationships is associated with maladaptive outcomes, Overall (2020) recently suggested and provided evidence for the idea that relational variability is not always uniformly maladaptive, and can even be beneficial, depending upon the specific relational context in which this variability is occurring. Our results extend this idea into the familial context, suggesting fluctuations in the parental relationship are not uniformly maladaptive for parent-child

interactions, and in fact are even beneficially associated with these interactions for certain types of parents: specifically, parents who tend to have challenging relationships (i.e., relationships with a high degree of negativity or a low degree of positivity) on average in daily life.

Because we examined the influence of relational fluctuations among parents of a child with ASD and age-matched controls, our findings also shed light on what types of familial contexts may be sensitive to relational fluctuations. In two of the four moderation analyses we conducted, we found evidence of a significant interaction. Specifically, in those two analyses, relational variability did not predict mother-child interactions for mothers of a child with ASD, whereas for mothers with neurotypical children, relational variability was a significant predictor of their interactions with their children. Prior research examining parent-child interactions among children with ASD suggests that child characteristics – such as the severity of their autism symptoms – tend to be an especially potent contributor to the quality of parent-child interactions in these familial contexts (e.g., Beurkens et al., 2013; McStay et al., 2014). Indeed, in families of children with ASD, the primacy of child characteristics in influencing the quality of parent-child interactions may usurp the influence of turbulence in the interparental relational. Moreover, although it is beyond the scope of the current research, it is important to note that challenging child behavior can directly influence interparental relational functioning, including possibly influencing relational variability (i.e., there is the potential for bi-directionality among these variables). Given that this is the first study to examine how interparental relational variability contributes to parent-child interactions among a sample of mothers of children with ASD, future research should further explore the dynamic interplay of child characteristics, parent-child interactions, and interparent relational functioning (and variability) in daily life.

This research makes an important advance upon prior research in both the relationships and family sciences literatures. In the relationship science literature, prior research examining the outcomes of relational fluctuations had not previously examined how relationship fluctuations may extend beyond the two-person dyad. Here, we show that the parents' relationship fluctuations have implications beyond the parents themselves, and extend into the family system. As such, our results raise the possibility that relational variability may influence other aspects of people's lives beyond the two-person dyad, and future research should explore this possibility.

Strengths and Limitations

The current research has many strengths, including the longitudinal design with repeated measurements, and the community-based sample from a clinically-relevant population. Despite this, it is important to note a few limitations of this work. First, our analyses only included mother-child interactions, and did not include fathers. While we believe these results are likely applicable to father-child interactions, there are probably important nuances or differences in how relational fluctuations influence father-child interactions, meaning future research is needed to replicate and extend this work using samples of both mothers and fathers. Second, to asses mother-child interactions, we relied on one-item, self-report measures from mothers, and which may be biased. In this vein, we note that the item we used to assess negative parent-child interactions assessed whether mothers criticized or blamed themselves for the negative-interaction that occurred, which is slightly different from the way we assessed positive parent-child interactions (which simply asked whether the positive interaction occurred). Because of these limitations, future research may therefore benefit by supplementing mothers' reports of parent-child interactions with independent observations of parent-child interactions, or with child reports of these interactions (where age-appropriate). Finally, we note that our results are

correlational: while our theorized direction of associations is that parental relational fluctuations contribute to parent-child interactions, it is probable that parent-child interactions also contribute to relational fluctuations in a bi-directional manner. Third, the sample in this study was largely homogeneous in terms of racial, ethnic, and socioeconomic characteristics, meaning that future research is needed to replicate these results among samples of more diversity. Finally, the study did not include any families with same-sex parents nor families with single parents, limiting its application to a diversity of family structures.

Conclusion

The current research was the first to examine how daily variability in interparental relationships contribute to parent-child interactions among families of children with ASD, and families of neurotypical children. We found the association between interparental relational variability and parent-child interactions depended on average levels of relational functioning across each week, suggesting that the way in which fluctuations contribute to parent-child interactions depends upon the relational context in which those fluctuations occur. In particular, for low quality interparental relationships, high relationship variability that week predicted more positive interactions with the child. Given the importance of parent-child interactions to a host of child outcomes across the course of time, future research should continue to explore the factors that contribute to healthy relations between parents and their children.

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Table 1

Descriptive Statistics and Correlations for Primary Study Variables

	Variable	Mean	SD	1	2	3	4	5	6	7
1	Positive Mother-Child Interactions	76.21	16.93	-						
2	Negative Mother-Child Interactions	23.01	25.69	-.34**	-					
3	Negative Relational Experiences - Mean Levels	22.38	14.99	-.22**	.29**	-				
4	Negative Relational Experiences - Variability	13.40	8.43	-.08**	.11**	.57**	-			
5	Positive Relational Experiences - Mean Levels	69.63	16.28	.27**	-.13**	-.76**	-.41**	-		
6	Positive Relational Experiences - Variability	12.52	7.07	-0.01	-0.02	.28**	.56**	-.33**	-	
7	Caregiving Group	-	-	-.23**	.24**	.25**	.13**	-.22**	.01	-

Note. ** $p < .01$. For the caregiving group variable, mothers of a child with ASD were coded with a "1", and mothers of a neurotypical child were coded with a "-1'.

Table 2

Results of Multilevel Analyses Examining Whether Fluctuations in Mothers' Positive Relational Experiences Predict Mother-Child Interactions in Daily Life

				95% CI		
Outcome	Predictor	*B*	*p*	Lower	Upper	*r*
Positive Mother-Child Interactions	Intercept	77.69	.01	60.14	95.24	-
	Wave	-1.21	.43	-13.41	10.99	-
	Caregiving Group	-3.07	<.001	-4.03	-2.12	.29
	Positive Relational Experiences - Weekly *M*	0.21	<.001	0.14	0.28	.28
	Positive Relational Experiences - Weekly SD	0.03	.70	-0.11	0.17	.02
	Positive Relational Experiences Weekly *M* x SD	-0.01	.01	-0.02	-0.003	.12
Outcome	Predictor	*B*	*p*	Lower	Upper	*r*
Negative Mother-Child Interactions	Intercept	24.23	<.001	21.58	26.87	-
	Wave	-0.36	.74	-2.48	1.76	-
	Caregiving Group	5.55	<.001	3.79	7.31	.29
	Positive Relational Experiences - Weekly *M*	-0.17	.01	-0.30	-0.04	.13
	Positive Relational Experiences - Weekly SD	-0.15	.25	-0.41	0.11	.06
	Positive Relational Experiences - Weekly *M* x SD	0.01	.39	-0.01	0.02	.04

Note. *r* values for wave were not calculated here and for all subsequent models because of the small degrees of freedom for this variable. In this and all subsequent analyses, for the caregiving group variable, mothers of a child with ASD were coded with a "1", and mothers of a neurotypical child were coded with a "-1'.

Table 3

Results of multilevel analyses examining whether fluctuations in mothers' weekly negative relational experiences predict their interactions with their children in daily life.

				95% CI		
Outcome	Predictor	*B*	*p*	*Lower*	*Upper*	*r*
Positive Mother-Child Interactions	Intercept	77.57	.01	63.41	91.73	-
	Wave	-1.46	.37	-13.53	10.61	-
	Caregiving Group	-3.27	<.001	-4.25	-2.28	.30
	Negative Relational Experiences - Weekly *M*	-0.16	<.001	-0.24	-0.07	.18
	Negative Relational Experiences - Weekly SD	0.01	.91	-0.13	0.15	.01
	Negative Relational Experiences Weekly *M* x SD	0.01	.01	0.003	0.02	.13
Outcome	Predictor	*B*	*P*	*Lower*	*Upper*	*r*
Negative Mother-Child Interactions	Intercept	25.00	<.001	22.37	27.63	-
	Wave	-0.24	.81	-2.21	1.74	-
	Caregiving Group	4.70	<.001	3.07	6.34	.27
	Negative Relational Experiences - Weekly *M*	0.52	<.001	0.38	0.65	.33
	Negative Relational Experiences - Weekly SD	-0.18	.13	-0.41	0.05	.07
	Negative Relational Experiences Weekly *M* x SD	-0.02	.02	-0.03	-0.002	.11

Table 4

Results of Multilevel Analyses Examining whether Caregiving Group Moderated the Associated between Positive Relational Fluctuations and Mother-Child Interactions

				95% CI		
Outcome	Predictor	*B*	*p*	*Lower*	*Upper*	*r*
Positive Mother-Child Interactions	Intercept	77.40	.01	62.88	91.91	-
	Wave	-1.05	.43	-11.60	9.49	-
	Caregiving Group	-2.50	<.001	-3.50	-1.51	.24
	Positive Relational Experiences - Weekly *M*	0.21	<.001	0.14	0.28	.28
	Positive Relational Experiences - Weekly SD	0.10	.16	-0.04	0.25	.07
	Positive Relational Experiences Weekly *M* x SD	-0.02	<.001	-0.03	-0.01	.18
	Positive Relational Experiences - Weekly SD x Group	-0.11	.12	-0.26	0.03	.08
	Positive Relational Experiences - Weekly *M* x Group	0.01	.81	-0.06	0.08	.01
	PosRel *M* x PosRel SD x Group	0.02	.001	0.01	0.03	.16
Outcome	Predictor	*B*	*p*	*Lower*	*Upper*	*r*
Negative Mother-Child Interactions	Intercept	25.13	<.001	22.45	27.81	-
	Wave	-0.61	.57	-2.71	1.50	-
	Caregiving Group	5.37	<.001	3.53	7.21	.27
	Positive Relational Experiences - Weekly *M*	-0.21	.001	-0.34	-0.08	.16
	Positive Relational Experiences - Weekly SD	-0.21	.12	-0.48	0.06	.08
	Positive Relational Experiences Weekly *M* x SD	0.01	.19	-0.01	0.03	.06
	Positive Relational Experiences - Weekly SD x Group	0.30	.03	0.03	0.57	.11
	Positive Relational Experiences - Weekly *M* x Group	0.19	.01	0.06	0.31	.14
	PosRel *M* x PosRel SD x Group	0.00	.97	-0.02	0.02	.01

Note. PosRel = positive relational experiences

Table 5

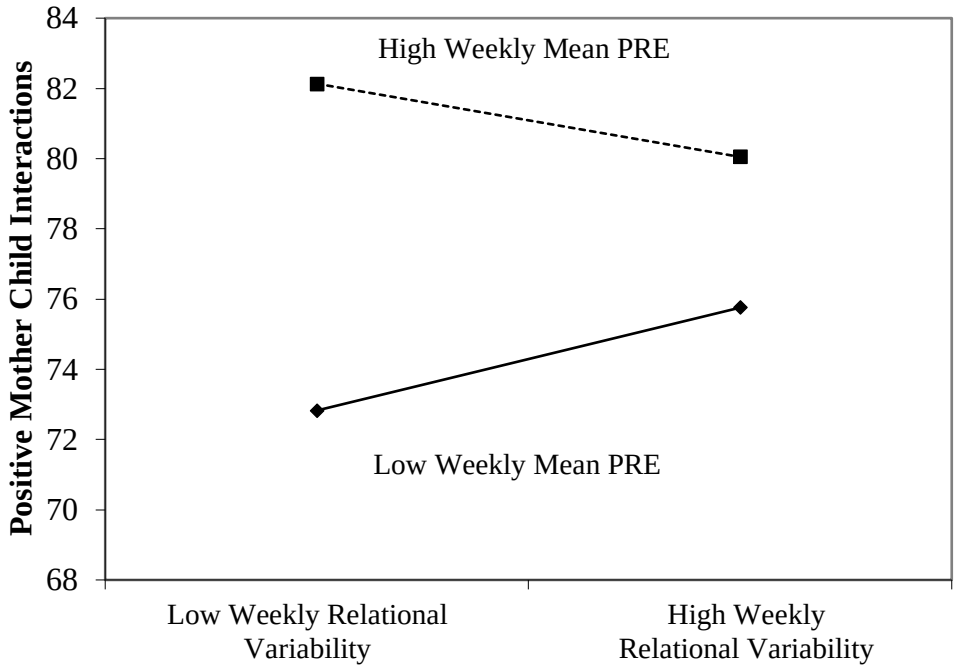
Results of Multilevel Analyses Examining whether Caregiving Group Moderated the Associated between Negative Relational Fluctuations and Mother-Child Interactions

				95% CI		
Outcome	Predictor	*B*	*p*	*Lower*	*Upper*	*r*
Positive Mother-Child Interactions	Intercept	77.33	0.01	63.46	91.21	-
	Wave	-1.49	0.36	-13.56	10.58	-
	Caregiving Group	-2.70	<.001	-3.84	-1.57	.22
	Negative Relational Experiences - Weekly *M*	-0.17	<.001	-0.26	-0.08	.19
	Negative Relational Experiences - Weekly SD	0.04	0.57	-0.10	0.18	.03
	Negative Relational Experiences Weekly *M* x SD	0.01	.008	0.01	0.02	.16
	Negative Relational Experiences - Weekly SD x Group	-0.14	.051	-0.28	0.00	.09
	Negative Relational Experiences - Weekly *M* x Group	0.06	.21	-0.03	0.14	.06
	NegRel *M* x NegRel SD x Group	-0.01	.08	-0.02	0.00	.09
Outcome	Predictor	*B*	*p*	*Lower*	*Upper*	*r*
Negative Mother-Child Interactions	Intercept	25.21	<.001	22.57	27.85	-
	Wave	-0.21	.83	-2.19	1.76	-
	Caregiving Group	4.40	<.001	2.50	6.29	.22
	Negative Relational Experiences - Weekly *M*	0.53	<.001	0.39	0.67	.33
	Negative Relational Experiences - Weekly SD	-0.20	.09	-0.44	0.03	.08
	Negative Relational Experiences Weekly *M* x SD	-0.02	.01	-0.03	-0.01	.13
	Negative Relational Experiences - Weekly SD x Group	0.20	.10	-0.04	0.44	.08
	Negative Relational Experiences - Weekly *M* x Group	-0.06	.40	-0.21	0.08	.04
	NegRel *M* x NegRel SD x Group	0.00	.60	-0.01	0.02	.03

Note. NegRel = negative relational experiences.

Figure 1

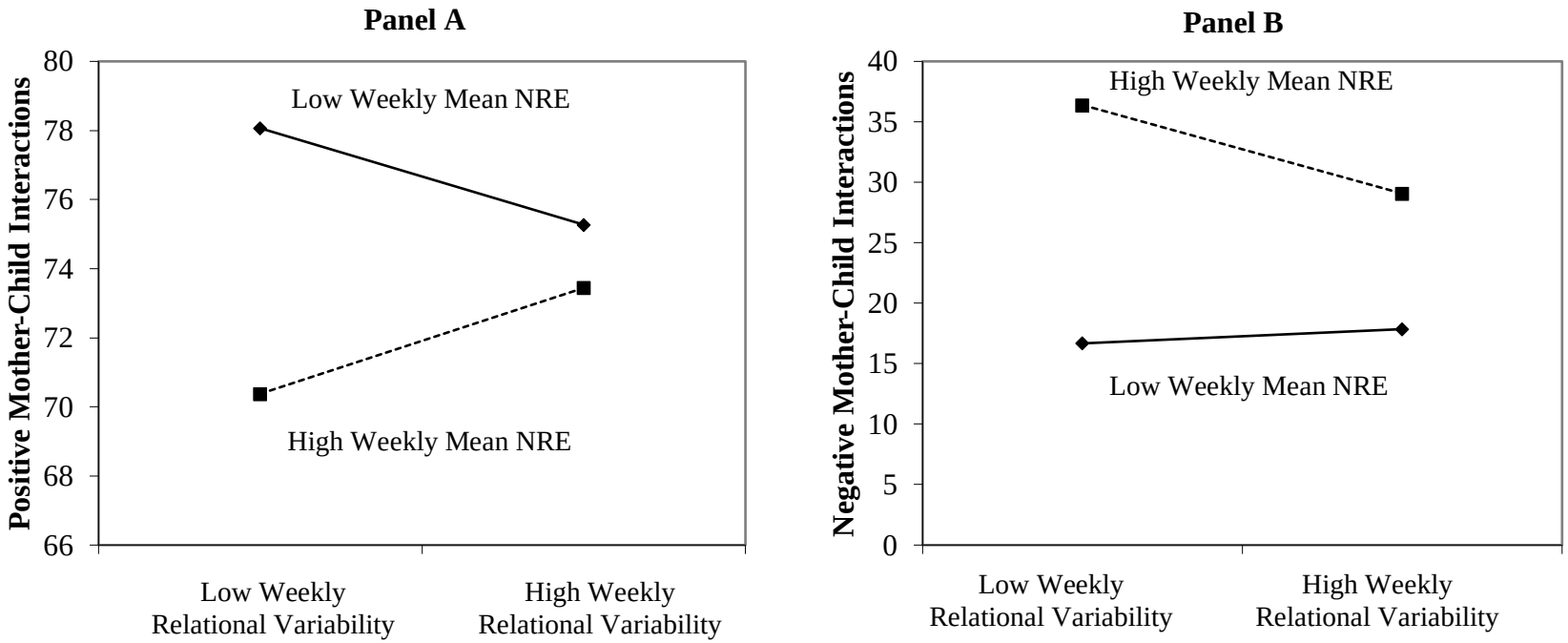
The Association between Variability in Weekly Positive Relational Experiences and Mother-Child interactions in Daily Life Depending on Weekly Mean Levels of Positive Relational Experiences.



Note. PRE = positive relational experiences.

Figure 2

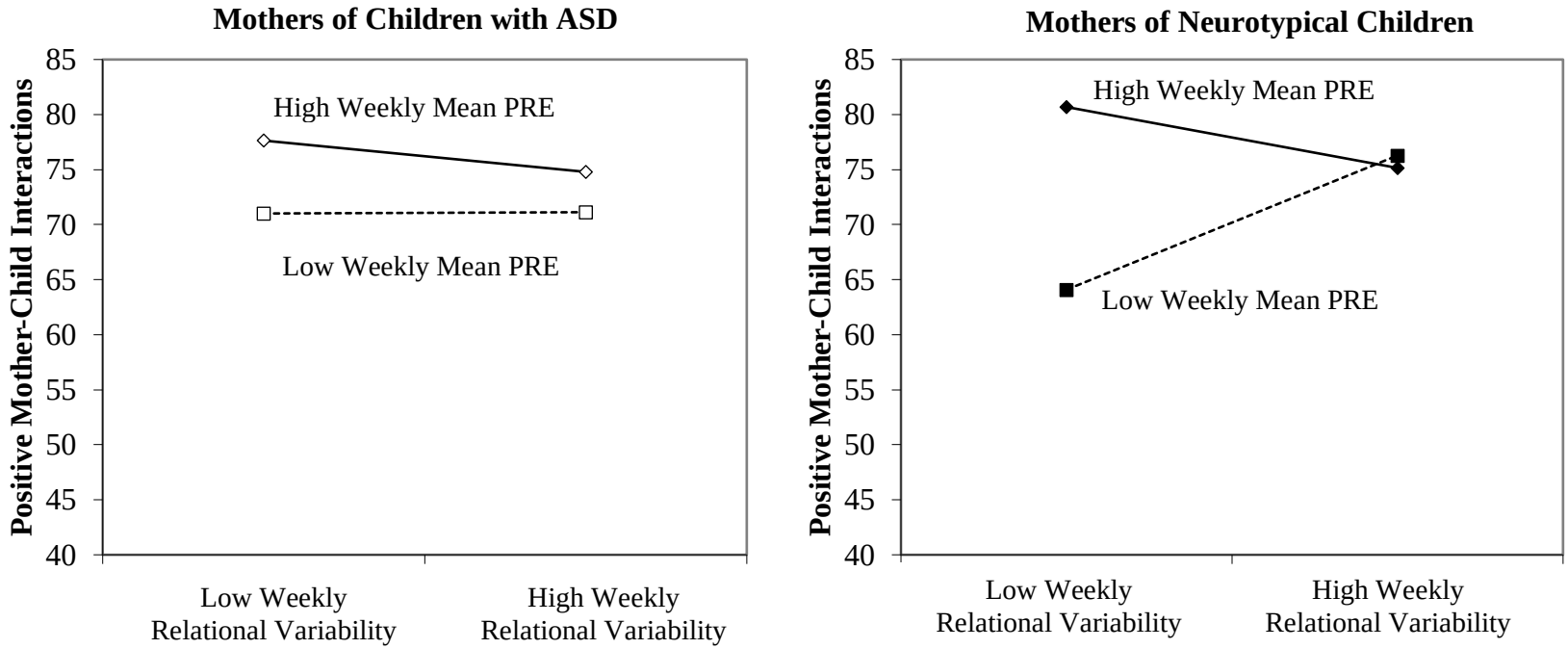
The Association between Variability in Weekly Negative Relational Experiences and Mother-Child Interactions in Daily Life Depending on Mean Levels of Negative Relational Experiences.



Note. NRE = negative relational experiences.

Figure 3

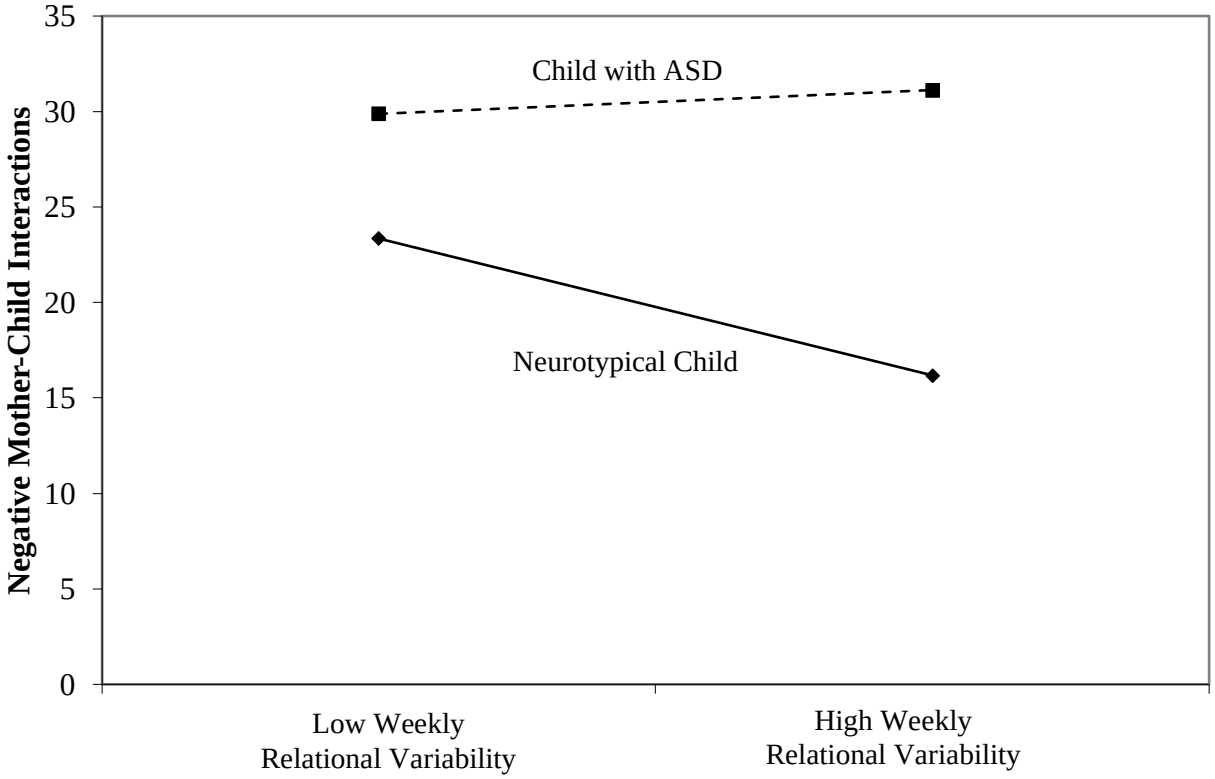
The Association between Fluctuations in Weekly Positive Relational Experiences and Mother-Child Interactions in Daily Life Depending on Weekly Mean Levels of Positive Relational Experiences and Caregiving Group.



Note. PRE = positive relational experiences. ASD = autism spectrum disorder.

Figure 4

The Association between Variability in Weekly Positive Relational Experiences and Negative Mother-Child Interactions in Daily Life Depending on Caregiving Group.



Note. ASD = autism spectrum disorder.