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Spillover of Marital Interactions and Parenting Stress in Families of Children with Autism Spectrum Disorder

S. L. Hartley, **L.M. Papp**, and **D. Bolt**

University of Wisconsin-Madison

Abstract

Objective—Few disorders appear to be more challenging on parents than autism spectrum disorder (ASD). Little is known about the extent to which parenting stress experienced by parents of children with ASD affects or is affected by marital quality. We examined daily spillover between level of parenting stress and marital interactions in a sample of 176 married couples (89.4% Caucasian, non-Hispanic) who have a child with ASD (aged 5–12 years and 85% male) via a 14-day daily diary approach.

Method—On each day of the daily diary, parents individually reported on eight positive and eight negative marital interactions and their level of parenting stress. Dyadic multilevel modeling analyses using hierarchical linear modeling were conducted to examine same-day and lagged-effect associations between number of positive and negative marital interactions and level of parenting stress.

Results—Having a day with a higher number of negative marital interactions was associated with a higher level of parenting stress for both mothers and fathers of children with ASD. Having a day with fewer positive marital interactions was associated with having a more stressful parenting day for mothers of children with ASD. Same-day spillover was moderated by parent gender and the functioning of the child with ASD. Spillover flowed bi-directionally for mothers of children with ASD.

Conclusions—Helping parents of children with ASD find ways to engage in positive marital interactions on stressful parenting days, and avoid having negative affect, tension and behaviors stemming from negative marital interactions spill into parenting experiences are important intervention targets.

Few disorders appear to be more challenging on parents than autism spectrum disorder (ASD). Estimated to occur in 1 in 68 children in the United States (Autism and Developmental Disabilities Monitoring Network [ADDMN], 2014), ASD involves impairments in social communication and repetitive behaviors and/or restricted interests (American Psychiatric Association, 2013), and is associated with co-occurring behavior problems such as inattention, disruptive behavior, and anxious affect (Hartley, Sikora, & McCoy, 2008; Simonoff et al., 2006). Moreover, one-third to one-half of children with ASD have intellectual disability (ID) (ADDMN, 2014). Parents of children with ASD report a higher level of parenting stress than parents of children without disabilities and parents of children with other types of disabilities (e.g., Ekas & Whitman, 2010; Hartley, Seltzer, Head, & Abbeduto, 2012a). Little is known about the extent to which the day-to-day level of parenting stress experienced by parents of children with ASD affects or is affected by other

family domains such as the marital relationship. Within the family systems perspective, the *spillover hypothesis* suggests that the tension, affect, and behaviors originating from one family domain spill into other domains (Cox, Paley, Harter, 2001; Repetti, 1987). The present study examined spillover between level of parenting stress and *negative* and *positive* marital interactions in couples who had a child with ASD using a 14-day daily diary.

Spillover between the parenting and marital domains is evident in families sampled from the general population. At a global level, cross-sectional (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009; Ponnet et al., 2013) and longitudinal studies spanning several years (e.g., Davies, Sturge-Apple, Woitach, & Cummings, 2009; Gerard, Kishnakumar, & Buehler, 2006) have found a positive association between higher levels of marital quality and more adaptive parenting behaviors (e.g., warm and responsive parenting) and parenting experiences (e.g., less parent-child conflict). Observational lab-based studies have similarly shown that the quality of marital interactions predicts the quality of parent-child interactions (e.g., Stroud, Durbin, Wilson, & Mendelson, 2011). Spillover between marital quality and parenting experiences has also been observed in samples from the general population as it naturally unfolds at a day-to-day level using daily diary studies (e.g., Almeida, Wethington, & Chandler, 1999; Kouros, Papp, Goeke-Morey, & Cummings, 2014). For example, mothers and fathers of typically developing children were found to be more likely to have tense parent-child interactions following a day with more marital tension (Almeida et al., 1999). These previous daily diary studies examined spillover using ratings of overall marital quality or *negative* marital interactions (e.g., marital conflict); virtually nothing is known about the daily spillover of *positive* marital interactions (e.g., sharing a joke or kiss/hug spouse) with parenting experiences. *Positive* and *negative* relationship qualities have been shown to be functionally independent dimensions (Fincham & Linfield, 1997; Robles, Shaffer, Malarkey, & Kiecolt-Glaser, 2006). Whether *positive* marital interactions affect or are affected by parenting experiences has yet to be examined.

Only a handful of studies have examined marital quality in the context of having a child with ASD. These studies suggest that parents of children with ASD have lower levels of marital satisfaction (Gau, Chou, Lee, Wong, & Wu, 2012) and an increased risk of divorce during later marriage (Hartley et al., 2010) as compared to parents of children without disabilities, although findings have varied (Freedman, Kalb, Zablotsky, & Stuart, 2012). There is also evidence that global marital satisfaction is negatively associated with global level of parenting stress in cross-sectional studies (e.g., Benson & Kersh, 2011; Harper, Dyches, Harper, Roper, & South, 2013; Hartley et al., 2011). Moreover, in a longitudinal study of 199 married mothers of adolescents and adults with ASD, child co-occurring behavior problems, which are strongly associated with level of parenting stress (Estes et al., 2013), negatively co-varied with marital satisfaction across 4 time points spanning 8.5 years (Hartley et al., 2012a). Little is known about how the associations between *positive* and *negative* marital interactions and level of parenting stress naturally and spontaneously unfold at a day-to-day level in families of children with ASD.

Moderators of Spillover

The likelihood of day-to-day spillover between marital interactions and level of parenting stress may vary across parents of children with ASD. Studies based on the general population have found that fathers are more vulnerable than mothers to spillover between global ratings of marital quality or *negative* marital interactions and parenting experiences (Coiro & Emery, 1998; Davies et al., 2009; Nelson et al., 2009; Stroud et al., 2011), suggesting that fathers have more difficulty than mothers containing negative affect, tension, and behaviors to one domain (Belsky et al., 1991; Davies et al., 2009). This may also be true in the context of having a child with ASD. Parent gender differences in spillover between *positive* marital interactions and parenting experiences has yet to be explored.

The child with ASD's functioning may also moderate spillover. Evidence from the broader stress spillover literature (Almeida et al., 1999; Bolger et al., 1989) suggests that spillover is more likely in the context of high stress as individuals have fewer resources for isolating negative affect, tension, and behaviors originating in one domain from being transferred to other domains. Within families of children with ASD, parents of children with more impaired functioning - more severe ASD symptoms, a higher level of co-occurring behavior problems, and the presence of ID – have been shown to experience higher levels of parenting stress (Bishop, Richler, Cain, & Lord, 2007; Estes et al., 2009), and may be less able to avoid spillover of negative affect, tension, and behaviors across domains. Co-occurring behavior problems (e.g., inattention and disruptive behavior) have been found to be more strongly associated with level of parenting stress than the child's ASD symptoms or intellectual functioning (e.g., Lecavalier et al., 2006); thus, high levels of child co-occurring behavior problems, in particular, may put parents of children with ASD at risk for spillover.

Temporal Flow of Spillover

Previous research on the general population has predominately found that spillover flows from the marital to the parenting domain. Indeed, global marital quality at one time point has been found to predict parenting experiences and child adjustment at later time points but not vice versa (Cui & Conger, 2008; Kaczynsk, Lindahl, Milk, & Laureneau, 2006; Schoppe-Sullivan, Schermerhorn, & Cummings, 2007; Stroud et al., 2011). Time-lagged daily diary studies based on the general population have similarly indicated that experiencing a day with lower marital quality or more *negative* marital interactions predicts a higher level of parent-child conflict and lower parent-child relationship quality the next day (Almeida et al., 1999; Kouros et al., 2014). For parents of children with ASD, having a day with a higher number of *negative* marital interactions may similarly lead to a day with a higher level of parenting stress. On the other hand, positive affect and behaviors originating in *positive* marital interactions may contribute to positive parenting interactions (e.g., warm and responsive) and resiliency in the face of child-related challenges (i.e., experience child behaviors and symptoms as less stressful). Thus, having a day with a higher number of *positive* marital interactions may lead to a lower level of parenting stress the following day in parents of children with ASD.

In the other direction, there are theoretical grounds to suggest that spillover *also* flows from the parenting to the marital domain in the context of having a child with ASD. In part, parenting stress can result from *negative* marital interactions about parenting (e.g., disagreements with spouse about handling child-related challenges). However, parenting stress can also originate from parenting experiences (e.g., difficult interactions with child with ASD or attempts to manage symptoms and co-occurring behavior problems) outside of marital interactions. Parents of children with ASD may have difficulty containing the negative affect, tension, and behaviors stemming from these stressful parenting experiences from carrying into marital interactions. Thus, for parents of children with ASD, a day with a higher level of parenting stress may lead to a day with a higher number of *negative* marital interactions. Alternatively, experiencing a high level of parenting stress may not necessarily lead to more *negative* marital interactions (e.g., argument or critical comment about spouse), but may be emotionally draining such that parents have fewer resources for engaging in *positive* marital interactions (e.g., taking the time to joke with spouse) the following day. Thus, research is needed to examine how both directions of spillover (i.e., from marital interactions to parenting stress and from parenting stress to marital interactions) may occur in families of children with ASD.

The present study provides the first exploration of daily spillover between level of parenting stress and marital interactions in parents of children with ASD via a 14-day daily diary. The study aims were to: 1) evaluate spillover between level of parenting stress and number of *positive* and *negative* marital interactions in couples who have a child with ASD; and 2) evaluate the moderating effects of the child with ASD's functioning (i.e., severity of ASD symptoms, level of co-occurring behavior problems, and ID status) on spillover. Spillover has been shown to be strongest in same-day models given the short duration of strong emotions (Larson et al., 1980), and thus study aims 1 and 2 were examined using both same-day models of spillover. An additional study aim was to: 3) elucidate the temporal flow of spillover by examining whether number of *positive* and *negative* marital interactions predict next-day level of parenting stress and/or if level of parenting stress predicts next-day number of *positive* and *negative* marital interactions. Study aim 3 was examined using time-lagged models of spillover.

We hypothesized that number of *positive* and *negative* marital interactions would be negatively and positively, respectively, associated with same-day level of parenting stress. Based on findings from the general population (e.g., Nelson et al., 2009), same-day spillover of *negative* marital interactions and level of parenting stress was expected to be stronger for fathers than mothers of children with ASD. Based on findings that spillover is stronger in the context of high stress (e.g., Almeida et al., 1999), spillover between number of *negative* marital interactions and level of parenting stress was predicted to be stronger for parents of children with ASD with more impaired functioning (i.e., higher severity ASD symptoms, higher level of co-occurring behavior problems, and ID). Spillover was hypothesized to flow in both directions. Specifically, a lower number of *positive* marital interactions and a higher number of *negative* marital interactions were hypothesized to predict a higher level of parenting stress the next day. In turn, a higher level of parenting stress was hypothesized to predict a lower number of *positive* and a higher number of *negative* marital interactions the next day. To ensure that the relation between level of parenting stress and number of *positive*

and *negative* marital interactions reflected spillover, as opposed to being fully accounted for by marital interactions about the child with ASD (i.e., disagreements about handling child-related challenges), we included a variable to reflect whether the topic of the most meaningful or important couple problem-solving interaction was about the child with ASD versus another topic (e.g., money, communication, intimacy, etc.).

Method

Parents in the present study participated in Time 1 of an ongoing longitudinal study involving 184 heterosexual couples (n = 368 parents) of children with ASD (aged 5–12 years). Recruitment strategies included mailings to families of children with an educational label of ASD in schools, fliers posted at ASD clinics and in community settings (e.g., libraries), and research registries. Eligibility criteria for the study included being a parent of a child aged 5–12 years with a diagnosis of ASD as documented by medical or educational record, in a long-term relationship in which both parents live together, and both parents must be available and willing to participate in the study. From this larger sample, both spouses from 176 couples took part in a 14-day daily diary and were included in the present analyses. Parents who opted out of the 14-day daily diary did not differ from the parents who completed diary entries in parent age, education, or race/ethnicity, child age, or household income (*p*-values ranged from .46–.81). In four families, the child with ASD had been adopted; all adoptions had occurred more than 5 years prior. Two of the couples were not married but in a longstanding relationship, having dated and lived together for at least 8 years. In 13 couples, one parent was a step-parent; in all cases the stepparent had played an active role in childcare for at least 3 years. All children had a documented diagnosis of ASD by an educational or medical specialist, which included the Autism Diagnostic and Observational Schedule (Lord et al., 2000), and were able to provide documentation of this evaluation. In addition, all children met or exceeded the ASD cutoff on the Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003) as reported on by parents. Twelve of the families had more than one child with ASD aged 5–12 years; in these families, the oldest child was selected as the target child. Table 1 presents the socio-demographic characteristic for the 176 families included in the study. Parents had a mean age of 37.45 years (*SD* = 3.52) and mean household income of $80 to $89K. Children with ASD had an average age of 8.81 years (*SD* = 1.53) and most were male (76.6%).

Parents attended a 2.5 hour home or lab visit in which they were interviewed and independently completed questionnaires about their marital relationship and parenting experiences in addition to other family dynamics. Following this visit, parents completed a 14-day daily diary in which they reported on daily experiences including their marital interactions and level of parenting stress. Parents were given the option of completing the daily diary online (94%) or using an IPod Touch that did not require internet access (6%). Parents were instructed to independently complete the diary at the same time each day for 14 consecutive days. The daily diary survey system recorded the day/time and completeness of each diary entry; only entries spaced 20–26 hours apart and for which questions of interest were completed were included in analyses (93% of total entries). Occasionally, multiple (partially completed) entries were made in a short period of time, likely reflecting internet or

submission issues; the last entry in this series was considered. Parents were paid $75 for completing this part of the study.

Measures

Family socio-demographics—Parents reported on their gender (mothers = 0, fathers = 1). The following family socio-demographics were reported on by parents and included in models to control for their between-person effects on number of *positive* and *negative* marital interactions and level of parenting stress. Parent race/ethnicity was coded as Caucasian, non-Hispanic (0) versus other (1). Parent educational level was coded: less than high school degree (0), high school diploma or General Equivalency Diploma (1), some college (2), college degree (3), some graduate school (4), and graduate/professional degree (5). Parents reported the date of their marriage, which was used to calculate the duration of their marriage in years. Parents also reported on the child with ASD's birth date, which was used to calculate age (in years).

Child with ASD Functioning—The child with ASD was considered to have ID if based on review of their medical and/or educational records they had been given a medical diagnosis of ID and/or met criteria for ID (i.e., based on IQ and adaptive behavior testing reported in these records). The severity of the child's ASD symptoms were assessed using the Social Responsiveness Scale – Second Edition (SRS-2; Constantino & Gruber, 2012). The SRS-2 is a 65-item self-reported questionnaire individually completed by mothers and fathers. Parents rate the severity of ASD symptoms during the past 6 months from 1 'Not True' to 4 'Almost Always True'. Sample item includes "Is aware of what others are thinking and feeling" The total standardized t-score was used in the present analyses. The SRS-2 has been shown to have high internal consistency in samples of children with ASD (Bruni, 2014) and had high internal consistency in the present sample (Cronbach α = .85). The severity of the child with ASD's co-occurring behavior problems was assessed through the Child Behavior Checklist (CBCL) versions 1–5 years or 6–18 years (Achenback & Rescorla, 2000, 2001). Mothers and fathers separately completed the CBCL using a 3 point scale with responses 'Not True' (0), 'Somewhat or Sometimes True' (1) and 'Very True or Often True' (2). Items are summed to create a standardized t-score. The CBCL has been shown to have good internal consistency in ASD samples (Greaves-Lord, van der Ende, Verhulst, Rescorla, & de Nijs, 2013) and also had high internal consistency in the present sample (Cronbach α = .81).

Positive and negative marital interactions—Parents were asked about the occurrence (0 = no, 1 = yes) of eight positive (e.g., shared a joke or funny story, gave a compliment, kissed or hugged, had sex, communicated positive feelings toward) and eight negative (e.g., avoided talking to or being around, made a critical comment, expressed frustration or anger, and was impatient or short tempered with) interactions with their spouse on each day of the 14-day daily diary. These items were summed into *Positive* Marital Interaction and *Negative* Marital Interaction scores. This procedure has been used in other studies of daily couple interactions and shown to have adequate internal consistency and convergent validity with measures of daily and global marital happiness (Quittner et al., 1998).

Child-Related Daily Couple Problem-Solving Interactions—On each day of the 14-day daily diary, parents independently reported on the topic of their most important or meaningful couple problem-solving interaction defined as interactions in which something had to be worked out and/or involved some 'give and take', a difference of opinion, or differing points of view (including misunderstandings). These interactions could be minor or major and mostly positive or mostly negative (Cummings et al., 2003). Parents were given a list of potential topics related to this interaction. A full description of these variables are reported on elsewhere (removed for review). For the present analyses, we coded whether a topic of this interaction was the child with ASD (1) (i.e., behavior of child, parenting issues, etc.), versus other topics (0) (i.e., habits, leisure, work, communication, other children, etc.).

Parenting stress—Each day of the 14-day daily diary, parents were asked to use a 7 point scale (1 "not stressful" to 7 "extremely stressful") in response to the item "Overall how stressful were your parenting experiences with [child name]". In order to evaluate the validity of this item, we examined the correlation between the average daily level of parenting stress on this single item and the Burden Interview (Zarit, Reever, & Bach-Peterson, 1980), a global measure of parenting stress that was given to study participants during the home or lab visit for purposes of the broader study. These measures were significantly positively correlated ($r = .66$, $p < .01$).

Data Analysis Plan

Overall, 8% of mothers and 12% of fathers had an individual item missing on a measure. In all but 4 cases, at least 90% of the items on the scale had been completed and thus the mean score on the scale was imputed for the missing items. Dyadic multilevel modeling (MLM) analyses (Bolger & Laurenceau, 2013) were conducted using HLM (Raudenbush et al., 2011) to account for the within-person nested structure and interdependent nature of data from mothers and fathers in couples. This approach allowed the models to be tested for mothers and fathers simultaneously. Spillover and potential moderators were first examined using same-day models, to best capture spillover of emotions when they are at their strongest (Larson et al., 1980). In line with studies on the general population, level of parenting stress was the dependent variable and number of *positive* and *negative* marital interactions were the predictors. Family socio-demographic variables (i.e., parent ethnicity, parent education, marital duration, and child age) and the child with ASD's functioning (i.e., severity ASD symptoms, level of co-occurring behavior problems, and ID status) were included at Level 2 to account for their between-parent effects on the initial status of dependent measures. The average daily number of *positive* and *negative* marital interactions were included at Level 2 to control for their between-person effects while assessing the within-person time-varying effects. The topic (about child with ASD [coded 1] vs. other [coded 0]) of the most meaningful or important couple problem-solving interaction was included in models to ensure that marital interactions about the child (i.e., disagreements about handing child-related challenges) did not fully account for spillover.

To clarify the temporal order of spillover, we then ran time-lagged MLM models in both directions – previous day level of parenting stress predicting number of *positive* and *negative* marital interactions the following day, and conversely, previous day number of *positive* and

negative marital interactions predicting level of parenting stress the following day. Only consecutive day entries were used in time-lagged models. In all models, Level 1 continuous variables were person-centered, and Level 2 continuous variables were grand-mean centered.

Results

Descriptive Statistics

Mothers and fathers completed an average of 13.96 (*SD* = 2.04) and 13.71 (*SD* = 2.74) days of the diary, respectively. The majority of parents (96.6%) completed at least 9 diary entries on consecutive days. An intercept only model was tested to examine average daily levels and variability in number of *positive* and *negative* marital interactions and level of parenting stress. Fathers (*M* = 1.63, *SE* = .09) reported a significantly higher average daily number of *positive* marital interactions than mothers (*M* = 1.54, *SE* = .09), χ^2 (1) = 7.54, *p* =.02. In contrast, mothers reported a significantly higher average daily number of *negative* marital interactions (*M* =0.50, *SE* =.07) than fathers (M = 0.37, *SE* = .04), χ^2 (1) = 9.52, *p* <.01. Mothers reported a significantly higher average daily level of parenting stress (*M* = 1.24, *SE* =.09) than fathers (*M* = 1.00, *SE* = .04), χ^2 (1) = 13.15, *p* <.01. There was not a significant correlation between mother and father's daily level of parenting stress (*r* = .21, *p* = .18). There was significant variability in number of *negative* marital interactions and level of parenting stress for both mothers and fathers, and significant variability in number of *positive* marital interactions for mothers. Intraclass correlation coefficients for unconditional models indicated that 62% of the variance in number of *positive* marital interactions, 81% of the variance in number of *negative* interactions, and 73% of level parenting stress occurred at the within-person level (level 1).

The average daily number of *negative* marital interactions was non-normally distributed, with skewness of 1.59 (*SE* = 0.19) for mothers and 1.50 (*SE* = 0.18) for fathers and kurtosis of 3.72 (*SE* = 0.62) for mothers and 2.38 (*SE* = 0.36) for fathers. We re-ran HLM models using a Poisson distribution of variable and square root transformation of *negative* marital interactions; the same pattern of findings emerged. Thus, we report the HLM models using the raw score for number of *negative* marital interactions (i.e., continuous distribution of dependent variable).

Same-day Models of Spillover

Table 2 presents the MLM examining the extent to which number of *positive* and *negative* marital interaction predicted same-day level of parenting stress. For mothers, there was a significant between-parent positive effect of level of child co-occurring behavior problems, average daily number of *negative* marital interactions, and average number of couple problem-solving interactions about the child with ASD on the intercept (initial level) of level of parenting stress. There was a significant between-parent negative effect of parent education and marital duration on the intercept of level of parenting stress for mothers. For fathers, there was a significant between-parent positive effect of level of child co-occurring behavior problems and average number of couple problem-solving interactions about the child with ASD on the intercept of level of parenting stress (see Table 2).

When controlling for the between-parent effects of family socio-demographics, child with ASD functioning, and average number of *positive* and *negative* marital interactions, and average number of couple problem-solving interactions about the child with ASD, mothers' number of *positive* and *negative* marital interactions were significantly negatively associated with same-day level of parenting stress, in a negative and positive direction respectively, at a within-person level. For fathers, at a within-person level, after controlling for the same set of within-person effects, number of *negative* marital interactions was significantly positively associated with same-day level of parenting stress. However, there was not a significant within-person association between fathers' number of *positive* marital interactions and same-day level of parenting stress. For both mothers and fathers, couples reported a higher level of parenting stress on days that they reported their most meaningful or important couple problem-solving interaction was about the child with ASD.

Moderators of Same-Day Spillover

Chi-square statistics were used to examine the strength of same-day associations between number of *positive* and *negative* marital interactions and level of parenting stress in mothers versus fathers in the MLM model. Number of *positive* marital interactions and level of parenting stress was more strongly related for mothers than fathers, χ^2 (1) = 7.54, $p < .01$. There was not a significant difference in the strength of the same-day association between number of *negative* marital interactions and level of parenting stress in mothers versus fathers (χ^2 (1) = 1.54, $p = .23$). The moderating effect of the child with ASD's functioning is shown in Table 2. For mothers, the child's severity of ASD symptoms moderated same-day spillover of number of *negative* marital interactions and level of parenting stress. As shown in Figure 1, there was only a significant positive association between number of *negative* marital interactions and level of parenting stress for mothers of children with a high severity of ASD symptoms. For fathers, the child's level of co-occurring behavior problems moderated same-day spillover of number of *negative* marital interactions and level of parenting stress. As shown in Figure 2, there was only a positive association between number of *negative* marital interactions and level of parenting stress for fathers of children with ASD with a high level of co-occurring behavior problems. Child ID status did not significantly moderate same-day spillover in mothers or fathers.

Time-Lagged Models of Spillover

Time-lagged MLM models of spillover were then tested accounting for the same set of between-parent effects. In the first models (Table 3), previous-day level of parenting stress was used to predict next-day number of *positive* marital interactions and *negative* marital interactions, controlling for the autoregressive effect of the previous-day number of *positive* and *negative* marital interactions. Previous day topic of (about child with ASD vs. other) of the most meaningful or important couple problem-solving interaction was included in models. For mothers, previous-day level of parenting stress significantly negatively predicted next-day number of *positive* marital interactions, but was not significantly related to next-day number of *negative* marital interactions. Previous-day level of parenting stress was not significantly predictive of next-day number of *positive* or *negative* marital interactions in fathers.

In the second model (Table 4), previous-day number of *positive* and *negative* marital interactions was used to predict next-day level of parenting stress, controlling for the autoregressive effect of previous-day level of parenting stress. In mothers, previous-day number of *negative* marital interactions significantly positively predicted next-day level of parenting stress. However, previous-day number of *positive* marital interactions was not significantly predictive of next-day level of parenting stress in mothers. Neither previous-day number of *positive* nor *negative* marital interactions was significantly predictive of next-day level of parenting stress in fathers. For fathers, if the most meaningful or important couple problem-solving interaction about the child with ASD the previous-day, a lower level of parenting stress was reported the following day.

Discussion

Substantial research has documented the heightened level of parenting stress experienced by parents of children with ASD (Ekas & Whitman, 2010; Hartley et al., 2012; Smith et al., 2010); yet little is known about how level of parenting stress affects or is affected by other family domains such as the marital relationship. The present study provides the first examination of the day-to-day natural and spontaneous unfolding of spillover between level of parenting stress and number of *positive* and *negative* marital interactions in couples who have a child with ASD. After controlling for between-family effects of family socio-demographics, the child with ASD's functioning, and the average daily number of *positive* and *negative* marital interactions, we found that higher levels of parenting stress occurred on days that mothers and fathers of children with ASD experienced a higher number of *negative* marital interactions. In other words, across our 14-day diary, having a *negative* marital day (e.g., made critical comments or avoided spouse) was linked to having a stressful parenting day for both mothers and fathers of children with ASD. Mothers of children with ASD also experienced a lower number of *positive* marital interactions (e.g., communicated positive feelings, did fun activity) on days that they experienced a higher level of parenting stress. At a within-person level, a higher level of parenting stress occurred on days when the most meaningful or important couple problem-solving interaction was about the child with ASD, reflecting overlap in the parenting and marital domains. However, spillover between marital interactions and level of parenting stress remained significant after controlling for this domain overlap (i.e., problem-solving discussions about the child with ASD).

In contrast to our hypothesis, parent gender did not moderate spillover of number of *negative* marital interactions and level of parenting stress. Moreover, spillover of number of *positive* marital interactions and level of parenting stress only occurred in mothers of children with ASD. This finding is in contrast to research on the general population reporting that spillover is strongest in fathers (Nelson et al., 2009; Stroud et al., 2011), although this effect has not always been found (Davies et al., 2004; Erel & Burman, 1995). There is a marked gender division of labor in families of children with developmental disabilities, with mothers taking the lion-share of childcare (Hartley, Mihaila, Otalora-Fadner, & Bussanich, 2014; Warfield, 2005). As a result of this division of labor, mothers of children with ASD may encounter more child-related challenges than fathers, and subsequently have more difficulty preventing stressful parenting experiences from spilling into marital interactions.

Spillover in mothers of children with ASD was moderated by child characteristics. In line with our hypothesis, there was a significant positive association between number of *negative* marital interactions and same-day level of parenting stress in mothers of children with a higher severity of ASD symptoms but not in mothers of children with a lower severity of ASD symptoms. Also in support of our hypothesis, there was a significant positive association between number of *negative* marital interactions and same-day level of parenting stress in fathers of children with a higher level of co-occurring behavior problems but not in fathers of children with ASD with a lower level of co-occurring behavior problems. Together these findings suggest that parents who experience more child-related challenges are at greater risk of spillover. In contrast to our hypothesis, child ID status did not moderate same-day spillover. Intellectual ability has often not been found to be associated with level of parenting stress in parents of children with ASD once severity of ASD symptoms and level of co-occurring behavior problems are accounted for (e.g., Lecavalier et al., 2006), thus may not alter risk of spillover. It is not clear why the child's ASD symptoms altered spillover in mothers but not fathers, while the child with ASD's co-occurring behavior problems altered spillover in fathers but not in mothers. This may reflect differences in the types of child-related challenges that mothers versus fathers of children with ASD experience as most stressful, in line with previous studies (citations).

The last study aim was to elucidate the temporal flow of spillover between level of parenting stress and number of *positive* and *negative* marital interactions in couples who have a child with ASD. We found that spillover flowed bi-directionally for mothers of children with ASD. Specifically, experiencing a day with a higher number of *negative* marital interactions predicted a higher level of parenting stress the following day, but not vice versa. Thus, the negative affect, tension, and behaviors originating from *negative* marital interactions carry into parenting experiences for mothers of children with ASD. This temporal flow - from *negative* marital interactions to parenting experiences - is consistent with studies on the general population (e.g., Cui & Conger, 2008; Schoppe-Sullivan et al., 2007). In the field of ASD, there is a tendency to attribute parent outcomes to child factors. Our findings highlight that marital quality also influences daily parenting experiences in families of children with ASD.

In the other direction, spillover flowed from parenting stress to *positive* marital interactions in mothers of children with ASD. Experiencing a day with a higher level of parenting stress predicted a lower number of *positive* marital interactions the following day, but not vice versa. Overall, these finding suggest that at a daily, within-person level, a higher level of parenting stress does not lead to more *negative* marital interactions, on average. Instead, a higher level of parenting stress reduces emotional resources, leaving mothers of children with ASD less likely to engage in *positive* marital interactions (e.g., taking the time to joke or be intimate). High levels of *positive* marital interactions are essential to healthy relationships, with studies highlighting a balance of 5 to 1 of *positive* to *negative* marital interactions (Gottman, Coan, Carrere, Swanson, 1993). This balance reflects findings that engaging in lots of *positive* marital interactions lessens the harmful effects of *negative* marital interactions (e.g., Johnson et al., 2005). These lagged spillover effects remained after controlling for the topic of the most meaningful or important couple problem-solving interaction the previous-day, reinforcing the finding that spillover holds even when marital

interactions do not pertain to discussions about the child with ASD. Despite evidence of same-day spillover between level of parenting stress and *negative* marital interactions in fathers of children with ASD, none of the time-lagged models were significant. This may mean that fathers of children with ASD are less likely than mothers to carry negative affect, tension, and behaviors from one day to the next.

There are several strengths to the study. A daily diary methodology was used to capture the spontaneous and natural spillover within the everyday lives of couples who have a child with ASD. Importantly, our dyadic data analysis approach accounted for the interdependent reports of mothers and fathers and also facilitated direct moderating comparisons of associations for mothers versus fathers. Both *positive* and *negative* marital interactions were examined and parents were asked about the occurrence of specific types of marital interactions as opposed to a global rating of marital adjustment, as has often been used in previous studies (e.g., Kouros et al., 2014). There are also several limitations. The present sample largely presents Caucasian, non-Hispanic parents of children with ASD. In part, this is reflective of ASD diagnostic rates; Caucasian, Non-Hispanic children are approximately 30% more likely than African American children and almost 50% more likely than Hispanic children to be diagnosed with ASD (ADDM, 2014). Our racial/ethnic breakdown also reflects the Midwestern state from which the sample was drawn. Future studies are needed to understand potential cultural differences in spillover. Studies also need to examine same-sex partnerships to understand any differences in patterns of spillover. Parents reported on their own *positive* and *negative* marital interactions. Further research using partner-reported or observed marital interactions are needed to replicate findings. Future studies should also consider using shorter time intervals (e.g., multiple times throughout the day) as this may better capture the spillover of strong emotions. It is important to note that the topic of the most meaningful or important daily couple problem-solving interaction is only partially related to the number of *positive* and *negative* marital interactions. Specifically, some but not all of these *positive* or *negative* marital interactions may have occurred in the context of this particular discussion. Finally, the present study did not include a comparison group and thus it is not clear if patterns found for *positive* marital interactions, or the magnitude of spillover for *negative* marital interactions, are unique to couples who have a child with ASD.

In summary, at a same-day level, there were associations between level of parenting stress and number of *positive* and *negative* marital interactions in both mothers and fathers of children with ASD. Same-day spillover was moderated by the child's severity of ASD symptoms and level of co-occurring behavior problems. In lagged models, there was evidence that this spillover flowed in bi-directional ways for mothers of children with ASD; specifically, experiencing a day with lots of *negative* marital interactions predicted a higher level of parenting stress the next day, whereas experiencing a day with lots of parenting stress predicted a lower number of *positive* marital interactions the next day. Helping mothers of children with ASD find ways to engage in *positive* marital interactions on stressful parenting days, when emotional resources may be low, is an important intervention target (e.g., increase respite care to allow for date nights). In addition, educational programs teaching emotional regulation strategies may help mothers and fathers of children with ASD avoid having bad marital days turn into bad parenting days. Findings from the present study may have relevance for couples experiencing other types of child-related challenges. For

example, couples who have a child with attention-deficit/hyperactivity disorder (ADHD) also report high levels of parenting stress and have an increased risk of divorce (Wymbs et al., 2008). The direction of spillover and moderators of spillover between the parenting and marital domains may occur in similar ways for parents of children with ADHD as for parents of children with ASD.

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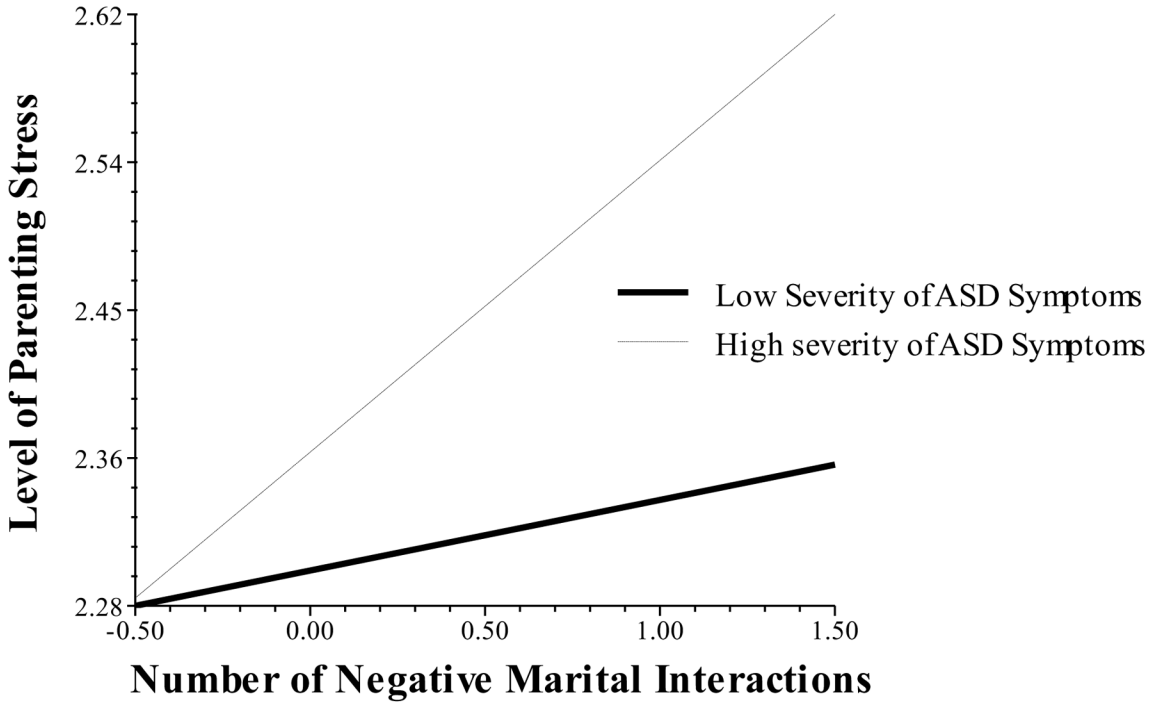

Figure 1.
Moderating effect of the severity of the child's ASD symptoms on same-day association between level of parenting stress and number of negative marital interactions in mothers.

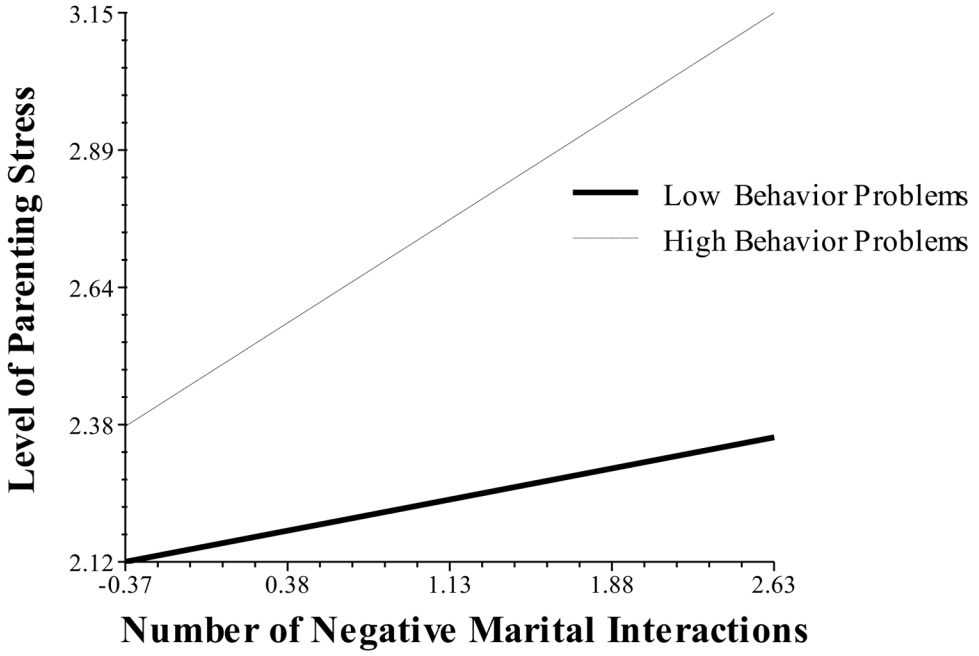

Figure 2.

Moderating effect of the child with ASD's level of co-occurring behavior problems on same-day association between number of negative marital interactions and level of parenting stress in fathers.

Table 1

Socio-demographic characteristics of Families of Children with Autism Spectrum Disorder

Couples (n = 176)	
Married (n,%)	174 (98.9%)
Both biological parents (n,%)	159 (90.3%)
Length of dating (M [SD])	14.56 (4.83)
Length of marriage (M [SD])	11.93 (4.81)
Household income (M [SD])	$80–89,999 ($30,000)
10–29K (n,%)	7 (3.9%)
30–49K (n,%)	15 (8.5%)
50–69K (n,%)	35 (19.9%)
70–99K (n,%)	32 (18.2%)
100–139K (n,%)	25 (14.2%)
140–159K (n,%)	16 (9.1%)
160K+ (n,%)	29 (16.5%)
Parents (n = 352)	
Mother age in yrs (M [SD])	38.69 (5.20)
Father age in yrs ((M [SD])	40.93 (5.80)
Education (n,%)	
Less than high school degree	13 (3.5%)
High school degree/GED	33 (8.7%)
Some college	60 (15.9%)
College Degree	167 (44.2%)
Some graduate school	22 (5.8%)
Graduate/professional degree	77 (19.0%)
Race/ethnicity (n[%])	
Caucasian, Non-Hispanic	336 (89.4%)
Hispanic	26 (6.9%)
African-American	4 (1.1%)
American Indian	1 (0.3%)
Asian or Pacific Islander	9 (2.4%)
Child with autism spectrum disorder (N = 176)	
Age in yrs (M[SD])	7.97 (2.30)
Male (n[%])	156 (85.2%)
ID (n[%])	64 (34.8%)
Age of diagnosis in yrs (M[SD])	4.02 (1.86)
Co-occurring Behavior Problems (M[SD])	65.44 (10.00)
Severity of ASD Symptoms (M[SD])	104.81 (29.71)

Note. ASD = autism spectrum disorder.

Table 2

Same-Day Dyadic Multilevel Model of Number of Positive and Negative Marital Interactions on Level of Parenting Stress

	Unstandardized Coefficient (Standard Error)	
	Mother	**Father**
Level 1		
Intercept	2.46 (0.21) **	1.77 (0.19) **
Time	−0.01(0.008)	−0.01 (0.007)
Number Positive Interaction	−0.08 (0.03) **	−0.005 (0.03)
Number Negative Interaction	0.11 (0.04) **	0.18 (0.04) **
CPS Interaction about Child with ASD	0.21 (0.07) **	0.24 (0.09) *
Level 2		
Intercept		
Child Age	0.20 (0.13)	−0.11 (0.10)
ID Status	−0.08 (0.19)	0.005 (0.16)
ASD Symptoms	0.003 (0.005)	0.005 (0.004)
Behavior Problems	0.04 (0.01) **	0.03 (0.01) **
Marital Duration	−0.29 (0.13) *	0.04 (0.10)
Parent ethnicity	0.29 (0.18)	0.25 (0.16)
Parent education	−0.11 (0.04) **	0.03 (0.03)
Mean Number Negative Interaction	0.18 (0.08) *	0.10 (0.10)
Mean Number Positive Interaction	−0.01 (0.05)	−0.05 (0.04)
Mean Number CPS Interaction about Child with ASD	0.55 (0.29) *	0.44 (0.22) *
Positive Interaction		
ID Status	0.05 (0.04)	0.03 (0.05)
ASD symptoms	0.001 (0.003)	0.001 (0.003)
Behavior problems	−0.002 (0.003)	0.001 (0.001)
Negative Interaction		
ID Status	−0.04 (0.05)	−0.03 (0.05)
ASD symptoms	0.003 (0.001) **	−0.002 (0.001)
Behavior problems	−0.002 (0.003)	0.008 (0.003) *
Level 2	Random effects (variance estimates)	
Intercept	1.03 **	0.56 **
Number Positive Interactions	0.02 **	0.01
Number Negative Interactions	0.02 *	0.02 *
CPS Interaction about Child with ASD	0.09	0.34 **

Note. ASD = autism spectrum disorder. CPS = couple problem-solving.

Mothers' and fathers' ratings of number of positive marital interactions and negative marital interactions were estimated simultaneously in one multivariate HLM. In Level 1, number of positive marital interactions and number of negative marital interactions were person-centered. The average daily number of positive marital interaction and number of negative marital interactions were included at Level 2.

*$p < .05$,

**$p < .01$.

Table 3

Time-Lagged Dyadic Multilevel Models of Previous-Day Level of Parenting Stress Predicting Next-Day Number of Positive and Negative Marital Interactions

	Unstandardized Coefficient (Standard Error)			
	Mother		Father	
	Positive	Negative	Positive	Negative
Level 1				
Intercept	2.98 (0.21)**	0.88 (0.21)**	3.54 (0.34)**	0.80 (0.15)**
Time	0.03 (0.01)**	−0.01 (0.008)	0.02 (0.01)	−0.02 (0.005)**
Previous Day Parenting Stress	−0.06 (0.02)*	−0.01 (0.03)	0.006 (0.04)	0.004 (0.03)
Previous Day Number Positive Interactions	0.17 (0.03)**	----------	0.14 (0.03)**	----------
Previous Day Number Negative Interactions	----------	0.09 (0.03)**	----------	0.14 (0.02)**
Previous Day CPS Interaction about Child with ASD	−0.02 (0.09)	0.009 (0.07)	−0.07 (0.10)	−0.05 (0.07)
Level 2				
Intercept				
Child Age	−0.13 (0.20)	−0.08 (0.19)	−0.24 (0.19)	−0.14 (0.09)
ID Status	0.03 (0.20)	0.33 (0.15)*	−0.25 (0.21)	0.16 (0.12)
ASD Symptoms	0.002(0.004)	0.002 (0.002)	0.003 (0.004)	−0.002 (0.002)
Behavior Problems	−0.001 (0.01)	−0.01 (0.007)	0.005 (0.01)	0.01 (0.006)*
Marital Duration	0.13 (0.19)	0.10 (0.11)	0.25 (0.19)	0.13 (0.09)
Parent Education	−0.006 (0.04)	0.04 (0.02)	−0.06 (0.04)	0.004 (0.02)
Parent Ethnicity	−0.02 (0.18)	0.04 (0.15)	−0.41 (0.29)	0.03 (0.15)
Mean Previous Day Parenting stress	−0.04 (0.08)	0.17 (0.06)**	−0.02 (0.12)	0.15 (0.06)*
Mean Number CPS Interaction about Child with ASD	−0.26 (0.29)	0.24 (0.23)	0.14 (0.34)	−0.33 (0.14)*
Level 2	Random effects (variance estimates)			
Intercept	1.71**	0.51**	1.44**	0.25*
Previous Day Number Positive Interactions	0.01	------	0.02**	------
Previous Day Number Negative Interactions	------	0.02**	------	0.01

	Unstandardized Coefficient (Standard Error)			
	Mother		Father	
	Positive	Negative	Positive	Negative
Previous Day Parenting Stress	0.03 *	0.02 **	0.03 *	0.02 *
CPS Interaction about Child with ASD	0.30 *	0.02	0.30	0.04

Note. ASD = autism spectrum disorder. CPS = couple problem-solving.

Two multivariate HLM models were conducted one model predicting number of positive marital interactions for mothers and fathers and one model predicting number of negative marital interactions for mothers and fathers. In Level 1, previous day level of parenting stress was person-centered. The average previous day level of parenting stress was included at Level 2.

* $p < .05$,

** $p < .01$.

Table 4

Time-Lagged Dyadic Multilevel Models of Previous-Day Number of Positive and Negative Marital Interactions Predicting Next-day Level of Parenting Stress

	Unstandardized Coefficient (Standard Error)	
	Mother	**Father**
Level 1		
Intercept	2.34 (0.23)**	2.16 (0.20)**
Time	−0.01 (0.009)	−0.02 (0.008)*
Previous Day Number Positive Interaction	0.02 (0.02)	0.005 (0.02)
Previous Day Number Negative Interaction	0.08 (0.03)**	0.02 (0.02)
Previous Day Parenting Stress	0.03 (0.03)	0.01 (0.03)
Previous Day CPS Interaction about Child with ASD	0.07 (0.08)	−0.16 (0.07)*
Level 2		
Intercept		
Child Age	0.29 (0.14)*	−0.009 (0.10)
ID Status	−0.02 (0.15)	−0.05 (0.11)
ASD Symptoms	0.007 (0.003)*	0.002 (0.003)
Behavior Problems	0.03 (0.009)**	0.03 (0.008)**
Marital Duration	−0.37 (0.13)**	−0.05 (0.10)
Parent Ethnicity	0.16 (0.20)	0.12 (0.15)
Parent Education	−0.09 (0.04)*	0.03 (0.03)
Mean Previous Day Number Negative Interaction	0.26 (0.09)**	0.13 (0.07)
Mean Previous Day Number Positive Interaction	−0.05 (0.05)	0.05 (0.04)
Mean Number CPS Interaction about Child with ASD	0.61 (0.23)*	0.58 (0.23)*
Level 2	Random effects (variance estimates)	
Intercept	0.70**	0.87**
Previous Day Number of Positive Interactions	0.01	0.02**
Previous Day Number of Negative Interactions	0.05**	0.05**
Previous Day Parenting Stress	0.03*	0.03*
Previous Day CPS Interaction about Child with ASD	0.09*	0.09

Note. ASD = autism spectrum disorder. CPS = couple problem-solving.

Mothers' and fathers' ratings of previous day number of positive marital interactions and negative marital interactions were estimated simultaneously in one multivariate HLM. In Level 1, previous day number of positive marital interactions and number of negative marital interactions were person-centered. The average previous day number of positive marital interaction and number of negative marital interactions were included at Level 2.

* $p < .05$,

** $p <$f01.