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ORIGINAL PAPER

Daily Couple Experiences and Parent Affect in Families of Children with Versus Without Autism

Sigan L. Hartley[1] · Leann Smith DaWalt[2] · Haley M. Schultz[3]

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Abstract We examined daily couple experiences in 174 couples who had a child with autism spectrum disorder (ASD) relative to 179 couples who had a child without disabilities and their same-day association with parent affect. Parents completed a 14-day daily diary in which they reported time with partner, partner support, partner closeness, and positive and negative couple interactions and level of positive and negative affect. One-way multivariate analyses of covariance and dyadic multilevel models were conducted. Parents of children with ASD reported less time with partner, lower partner closeness, and fewer positive couple interactions than the comparison group. Daily couple experiences were more strongly associated with parent affect in the ASD than comparison group. Findings have implications for programs and supports.

Keywords Autism · Parent · Couple · Marital · Daily Diary

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental condition that involves atypical social communication, restricted interests and repetitive behaviors, sensory sensitivities (American Psychiatric Association 2013) and often co-occurring emotional and behavioral problems such as anxiety and inattention (e.g., Park et al. 2014). Parents of children with ASD report positive parenting experiences (Kayfitz et al. 2010), but also an elevated level of child-related challenges such as managing the child's symptoms and co-occurring behavior problems, providing assistance with activities of everyday live, and navigating services (e.g., Doig et al. 2009; Hayes and Watson 2013). There is evidence that these child-related challenges influence a range of family dynamics including parents' couple relationship (e.g., Brobst et al. 2009; Hartley et al. 2010); however, these findings are based on broad markers of couple relationship quality, with virtually nothing known about the specific aspects of the couple relationship that are altered on an everyday basis. The couple relationship may have important associations with parent psychological well-being in families of children with ASD given that one's partner is also a co-parent and often the main source of support for child-related stressors (Bristol 1984). The goals of the current study were to compare the daily couple experiences of parents of children with ASD relative to a comparison group of parents of children without disabilities, and to investigate the within-person associations between daily couple experiences and same-day parent level of positive and negative affect using a 14-day daily diary.

Several studies now indicate that, as a group, parents of children with ASD are at risk for less satisfying and shorter-lived couple relationships. On average, parents of children with ASD report a lower global level of couple relationship satisfaction or adjustment (e.g., Brobst et al. 2009; Gau et al. 2012; Higgins et al. 2005; Santamaria et al. 2012) and experience a higher rate of divorce (Hartley et al. 2010) than parents of children without disabilities,

✉ Sigan L. Hartley
slhartley@wisc.edu

[1] Department of Human Development and Family Studies and Waisman Center, University of Wisconsin-Madison, 4101 Nancy Nicholas Hall, 1300 Linden Ave, Madison, WI 53706, USA

[2] Waisman Center, University of Wisconsin-Madison, Madison, WI, USA

[3] Department of Educational Psychology and Waisman Center, University of Wisconsin-Madison, Madison, WI, USA

albeit there is marked variability among parents of children with ASD (Lee 2009). However, virtually nothing is known about the specific couple experiences that accumulate overtime to result in these broad markers of poor couple relationship quality in parents of children with ASD. Daily diaries offer a methodology for capturing daily experiences as they naturally and spontaneously occur, and avoid many of the limitations with global retrospective ratings (Bolger et al. 2003). Diary diaries can provide nuanced information about the distinctive daily-level couple processes that are vulnerable in parents of children with ASD; this information is critical for identifying relevant and specific targets for couple relationship education programs and family supports. In the current study, we examined five dimensions of daily couple experiences—*time with partner, partner support, partner closeness, positive couple interactions*, and *negative couple interactions*—using a 14-day daily diary.

Although virtually nothing is known about differences and similarities in the daily couple experiences of parents of children with ASD relative to other groups, numerous studies have examined the daily parenting experiences of parents of children with ASD. Several studies have shown that, on average, parents of children with ASD spend more time in caregiving than their peers who have children without disabilities (Smith et al. 2010), including helping with activities of daily living, managing symptoms and co-occurring emotional and behavior problems, and participating in therapies (DeGrace 2004). There is also evidence that parents of children with ASD engage in role specialization (i.e., one parent focuses on employment and the other on childcare) resulting in a more disparate division of labor relative to families of children without disabilities (Dyer et al. 2009; Hartley et al. 2014; Warfield 2005). As a result of elevated caregiving and role specialization, parents of children with ASD may spend less *time with partners* on a daily basis than parents of children without disabilities. Parents of children with ASD also report high levels of parenting stress (Estes et al. 2009; Hoffman et al. 2009), and often feeling "exhausted" and "burned out" due to caregiving (Doig et al. 2009). Subsequently, parents of children with ASD may have fewer resources to devote toward providing *partner support* for dealing with problems and building *partner closeness* by sharing thoughts and feelings on a daily level than parents of children without disabilities.

Research on the general population indicates that satisfying and long-lasting couple relationships involve approximately five times more *positive* (e.g., joking, meaningful conversations, fun activities, etc.) than *negative* (e.g., critical comments, expressing anger, etc.) couple interactions (Gottman et al. 1998). This balance of *positive* to *negative couple interactions* reflects evidence that lots of *positive couple interactions* are needed to lessen the harmful effects of *negative couple interactions* (e.g. Johnson et al. 2005). It is not clear if the child-related challenges associated with ASD alter one or both of these dimensions. Parents experiencing other types of high child-related challenges (i.e., attention-deficit hyperactivity disorder or externalizing behavior problems) have been found to experience more *negative couple interactions*, such as couple conflict, than comparison groups (Jenkins et al. 2005; Wymbs and Pelham 2010), and this may also be true for parents of children with ASD. Virtually nothing is known about *positive couple experiences* in the context of high child-related challenges. Elucidating which dimension (*positive* vs. *negative couple interactions*), or if both dimensions, are altered in parents of children with ASD has critical program and support implications. Indeed, this information will lead to different treatment targets (e.g., reduce negative partner encounters vs. foster positive ones).

Research on the general population has shown that couple experiences are strong predictors of parent psychological well-being (Proulx et al. 2007). These associations may be particularly strong in contexts of high stress. Indeed, in studies examining other types of stressful contexts (e.g., health and financial stressors), having a supportive, close and positive couple relationship reduced the negative-effects of the stressor on psychological well-being (Caputo and Simon 2013; Harper et al. 2000; Simons et al. 1993). Given the often challenging nature of ASD, parents' daily couple experiences may have a particularly strong association with their same-day level of positive and negative affect, and more so than for parents of children without disabilities. To date, a handful of studies have found a positive association between ratings of global couple relationship quality and psychological well-being (Benson and Kersh 2011; Ekas et al. 2010; Weitlauf et al. 2014), and daily ratings of *partner support* and partner conflict and daily affect in parents of children with ASD (Timmons et al. 2016). However, these previous studies only included mothers, and thus we do not know if these associations are true for fathers, and did not include comparison groups to understand if associations are stronger in a context of high child-related challenges associated with ASD.

Our study aims were to: (1) compare the daily couple experiences (i.e., *time spent with partner, partner support, partner closeness, positive couple interactions*, and *negative couple interactions*) of parents of children with ASD relative to a comparison group of parents of children without ASD; and (2) examine group (parents of children with ASD vs. comparison group) difference in the same-day association between daily couple experiences and parent level of positive and negative affect. To address these study aims, 174 couples who had a child with ASD and 179 couples who had a child without a disability completed a 14-day daily diary. Parents of children with ASD were hypothesized to report a lower mean (i.e., average across

the 14-days) daily level of *time with partner, partner support*, and *partner closeness*, and higher number of *negative couple interactions* than the comparison group. At a within-person level, across the 14-days, experiencing a day with more good couple experiences—more *time with partner*, higher *partner support*, higher *partner closeness*, higher number of *positive couple interactions*, and lower number of *negative couple interactions*—was predicted to be associated with a higher parent level of positive affect and lower level of negative affect in both groups. However, group status (parents of children with ASD vs. comparison group) was hypothesized to moderate these associations; daily couple experiences were expected to be more strongly associated with same-day parent level of positive and negative affect in parents of children with ASD than in the comparison group.

Method

Participants in the present study completed Time 1 of a longitudinal study including 184 couples who had a child with ASD and 187 couples who had a child without a disability. Participants were recruited through mailings in schools, fliers posted at ASD clinics and in community settings (e.g. libraries), and research registries. Parents of children with ASD provided medical/educational records to document ASD diagnosis [and diagnostic evaluation had to have included the Autism Diagnosis Observation Schedule (Lord et al. 2000)]. Parents also completed the Social Responsiveness Scale—Second Edition (SRS-2; Constantino and Gruber 2012) to assess the child's current ASD symptoms. Five children in the ASD group had a SRS-2 Total t-score <60, and were removed from analyses as their current ASD symptoms were at a sub-clinical level. Screening questions were used to ensure that couples in the comparison group did not have children with a suspected or diagnosed developmental disability or who had received services for developmental delays (e.g. Birth-to-3 or special education services). Parents in the comparison group also completed the SRS-2; 8 target children in the comparison group had a SRS-2 Total t-score ≥60 and these families were removed.

Four couples of children with ASD and two couples in the comparison group opted out of the 14-day daily diary; these couples did not differ from couples who completed the diary in parent age, education, or race/ethnicity, child age, or household income. Analyses in the present study thus included 174 couples who had a child with ASD and 179 couples who had a child without a disability. The child with ASD had been adopted in four families (≥5 years prior). Two couples in ASD group were not married (lived together ≥8 years). In 13 couples, one parent was a stepparent (involved in parenting ≥3 years). Twelve families had more than one child with ASD aged 5–12 years; the oldest child with ASD was the target child. The socio-demographics for the 174 families are displayed in Table 1.

Procedures were identical for both parents of children with ASD and the comparison group. During a 2.5 h home or lab visit, parents were interviewed and independently completed questionnaires about socio-demographics and a variety of family dynamics. Parents separately completed a daily diary entry (10–15 min/entry) via online surveys (94%) or an iPod Touch (6%), format held constant across these delivery options, for 14 consecutive days in which they reported on daily couple experiences and level of positive and negative affect. Parents were instructed to complete the diary once per day, around the same time each day. Each entry was time stamped by the survey system.

Measures

Family Socio-Demographics

Parent education and household income were independently reported on by parents. These variables were included in models to control for any effect on outcomes of interest given that the groups (ASD vs. comparison group) differed on these variables. Parent education was coded 0 = '<high school degree', 1 = 'High school diploma/general equivalency diploma,' 2 = 'Some college,' 3 = 'College degree,' 4 = 'Some graduate school, 5 = 'Graduate/professional degree'. Parents reported their individual income, which were summed to create household income, coded 0 = '≤$9999' to 13 = '≥$160,000'.

Time with Partner

Each day of the 14-day daily diary, parents reported the hours and minutes spent with their partner, which was converted to a single score of number of hours.

Partner Support

Daily level of *partner support* was the summed total of seven questions asked each day of the daily diary. Six questions asked about the extent to which their partner: gave needed advice, gave their view on a problem, did something to help solve a problem, expressed care and concern, listened to feelings and thoughts, gave a compliment or told you that you did something well. The final item was an overall rating of support from partner. Items were rated from 0 = 'None' to 7 = 'A lot'. These questions were used in a daily diary study in the general population and shown to have adequate internal reliability (Quittner et al. 1998). In the current study, we also found good internal reliability

Table 1 Socio-demographic characteristics of the autism spectrum disorder (ASD) and comparison groups

	ASD (n = 174)	Comparison (n = 179)	t value or χ^2, p value
Mother			
Age in years [M (SD)]	38.71 (5.59)	38.76 (5.99)	t (350) = 0.32, p = .75
Race/ethnicity [N (%)]			
White, non-Hispanic	160 (89.9%)	150 (86.2%)	χ^2 (2, N = 351) = 1.13, p = .29
Other	18 (10.1%)	24 (13.8%)	
Education [N (%)]			
No HS degree	3 (1.7%)	5 (2.9%)	χ^2 (5, N = 349) = 9.70, p = .05
HS degree or equivalency	11 (6.2%)	10 (5.7%)	
Some college	31 (17.1%)	19 (10.2%)	
Associates or bachelor's degree	96 (53.9%)	81 (46.6%)	
Graduate degree	37 (20.8%)	59 (33.9%)	
Couple satisfaction	114.11 (30.47)	124.53 (29.32)	t (350) = 3.37, p < .01
Father			
Age in years [M (SD)]	40.44 (6.24)	40.51 (6.58)	t (350) = 0.33, p = .74
Race/ethnicity [N (%)]			
White, non-Hispanic	156 (87.6%)	146 (83.9%)	χ^2 (2, N = 350) = 1.01, p = .32
Other	22 (12.4%)	28 (16.1%)	
Education [N (%)]			
No HS degree	10 (5.6%)	4 (2.3%)	χ^2 (5, N = 349) = 7.22, p = .12
HS degree or equivalency	22 (12.4%)	14 (8.0%)	
Some college	25 (14.0%)	23 (13.2%)	
Associates or bachelor's degree	88 (49.4%)	85 (48.9%)	
Graduate degree	33 (18.5%)	48 (27.6%)	
Couple satisfaction	116.36 (26.62)	125.66 (25.00)	t (350) = 3.49 p < .01
Relationship length [M (SD)]	11.30 (5.23)	11.91 (4.64)	t (350) = 1.17, p = .24
Household income [M (SD)]	9.00 (3.19)	10.63 (2.85)	t (349) = 5.06 p < .01
Number of children [M (SD)]	2.41 (1.08)	2.55 (1.05)	t (350) = 1.22, p = .22
Target child			
Male [N (%)]	155 (87.3%)	146 (83.4%)	χ^2 (2, N = 351) = 0.75 p = .39
Age in years [M (SD)]	7.88 (2.24)	7.99 (2.35)	t (351) = 0.39, p = .70
Birth order [N (%)]			
Oldest	110 (61.8%)	105 (60.3%)	χ^2 (2, N = 351) = 0.01 p = .95
ID [N (%)]	65 (34.4%)	0 (0%)	χ^2 (2, N = 351) = 77.44, p < .01
SRS [M (SD)]	77.03 (11.48)	49.81 (8.25)	t (351) = 18.25, p < .01
CBCL [M (SD)]	64.80 (9.63)	49.61 (10.38)	t (350) = 20.76, p < .01
ABAS [M (SD)]	64.47 (17.38)	100.58 (16.18)	t (351) = 18.79, p < .01

HS high school, *ID* intellectual disability, *SRS* Social Responsiveness Scale total t-score score, *CBCL* child behavioral checklist total T-score, *ABAS* Adaptive Behavior Assessment System Standardized General Adaptive Composite Score. Couple satisfaction assessed through the couple satisfaction index (Funk and Rogge 2007). Overall, 34 parents (4.8%) had missing data on CBCL, SRS, ABAS, or couple satisfaction index. In all but 7 parents, ≥80% of the items on the measure had been completed and mean item score imputation was used in place of missing items to calculate sum scores for the measure

(ASD group: Cronbach α = 0.94; comparison group: Cronbach α = 0.92).

Partner Closeness

Daily perceived partner closeness was the summed total of eleven items rated on each day of the 14-day daily diary. Six items asked about the extent to which the parent disclosed or told facts and information, thoughts, and feelings to their partner, and their partner disclosed or told facts and information, thoughts, and feelings to them. Four questions asked about the extent to which the parent felt understood, validated, accepted, and cared for by their partner. The final item asked about overall closeness with partner. Items were rated from 0 = 'None' to 7 = 'A lot'. These questions had good internal reliability and variability in a

daily diary study in the general population (Quittner et al. 1998). These questions also had good internal reliability in the current study for the ASD (Cronbach α = 0.94) and comparison group (Cronbach α = 0.93).

Positive and Negative Couple Interactions

Parents indicated 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) couple interactions on each day of the 14-day daily diary. Items were summed into a *positive couple interaction* and *negative couple interaction* score. These items have been used in daily diary studies in the general population and had good internal consistency and convergent validity (Quittner et al. 1998). In the current sample, we found adequate internal consistency for both the *positive couple interaction* (ASD group: Cronbach α = 0.70; comparison group: Cronbach α = 0.71) and *negative couple* interaction (ASD group: Cronbach α = 0.68; comparison group: Cronbach α = 0.67) score.

Positive and Negative Affect

A modified (i.e., daily level as opposed to past week) version of the Positive and Negative Affect Scales (PANAS; Watson et al. 1988) was completed each day of the 14-day daily diary. The PANAS includes 10 items that assess positive affect (e.g., enthusiastic) and 10 items that asses negative affect (e.g., distressed), rated 1 = 'None of the Time' to 5 = 'All of the time'. Items are summed to create a total positive and negative affect score. The PANAS has been found to have good reliability and validity in the general population (Watson and Clark 1997). We found high internal consistency in the current sample for both positive affect (ASD group: Cronbach α = 0.92; comparison group: Cronbach α = 0.91) and negative affect (ASD group: Cronbach α = 0.88; comparison group: Cronbach α = 0.89).

Data Analysis Plan

Distributions of study variables and histograms of residuals were examined to assess normalcy of data. To address the first study aim, we conducted a one-way multivariate analysis of covariance (MANCOVA) to compare the mean (i.e., average across the 14-days) level of the dimensions of daily couple experiences in mothers and fathers (total of 10 dependent variables) by group (ASD vs. comparison). Covariates included parent education and household income.

To address the second study aim, two dyadic multilevel models (MLMs), using Hierarchical Linear Modeling software (Raudenbush et al. 2011), predicting parents' level of positive affect and negative affect were conducted. This approach allowed us to account for the within-person nested structure of daily diary data and the dyadic nature of couple data (mothers and fathers, within-couples) (Bolger and Laurenceau 2013), and enabled us to control for between-parent effects when examining same-day within-person effects. Intercept-only models were tested first, followed by full models. Level 1 variables included mother (1 = *mother*, 0 = *father*), father (1 = *father*, 0 = *mother*), mother day (0–13), father day (0–13), and the five dimensions of daily couple experiences in mothers and in fathers. The intercept was removed at Level 1, to allow us to create separate intercepts for the mother and father dummy variables (i.e., coded 0 vs. 1; see above) in Level 2 (Bolger and Laurenceau 2013). Level 2 variables included group (ASD = 1; comparison = −1) and control (parent education and household income) variables. The mean (i.e., average across the 14 days) of the five dimensions of daily couple experiences were included at level 2 to examine and control for between-parent effects when assessing within-person associations. Finally, the cross-level interactions of each dimension of daily couple experiences (level 1) × group (level 2) were entered to evaluate whether the same-day associations differed by group. Level 1 continuous variables were group-mean centered and dichotomous variables were un-centered. Level 2 dichotomous variables were un-centered and continuous variables were grand-mean centered.

Results

Descriptive Statistics

The majority of daily diary entries were spaced 20–26 h apart (96.3% of all entries). Overall, 90.1% of parents in the ASD group ($M = 13.82$, $SD = 2.53$) and 89.2% in the comparison group ($M = 13.76$, $SD = 2.34$) completed 14 days of the daily diary. The average daily number of *negative couple interactions* was non-normally distributed, with skewness of 1.55 ($SE = 0.17$) for the ASD and 1.49 ($SE = 0.18$) for the comparison group and kurtosis of 3.05 ($SE = 0.48$) for the ASD and 2.87 ($SE = 0.32$) for the comparison group. Other variables had a normal distribution. Overall, 4.2% of daily diary entries had missing items on the daily couple experience or parent affect measures of interest. Entries with missing items for that measure were dropped when calculating the mean for each daily couple experience for the MANCOVA. All entries were included

in MLMs as HLM handles missing Level 1 data (Bolger and Laurenceau 2013).

Group Difference in Mean Level of Daily Couple Experiences

Table 2 presents the mean and standard deviation for the mean level (i.e., average across the 14 days) of each dimension of daily couple experience in mothers and fathers by group. The omnibus one-way MANCOVA indicated a significant overall difference in dependent variables by group, F (1, 338) = 2.00, $p = .03$, partial $\eta^2 = 0.06$. There was a significant group difference in mean daily levels of mothers' *time with partner* [F (1, 388) = 7.99, $p = .005$], fathers' *time with partner* [F (1, 388) = 5.77, $p = .017$], fathers' *partner closeness* [F (1, 388) = 7.60, $p = .006$], mothers' *positive couple interactions* [F (1, 388) = 9.44, $p = .002$], and fathers' *positive couple interactions* [F (1, 388) = 7.29, $p = .007$]. Parents of children with ASD evidenced poorer daily couple experiences in all dimensions (i.e., less *time with partner*, lower *partner closeness*, and fewer *positive couple interactions*). There was not a significant group difference in mean daily levels of *partner support* or *negative couple interactions* for mothers or fathers, nor was there a significant group difference in mean daily level of *partner closeness* for mothers.

Same-Day Association Between Couple Experiences and Positive Affect

Given the non-normal distribution of *negative couple interactions*, the dyadic MLM was conducted using both the raw score and Poisson distribution and square root transformation for this variable; the same pattern of findings emerged and thus only the raw score are reported. The dyadic MLM was originally run using only mother and father intercept and the group variable to examine group difference in daily level of positive affect. There was a significant effect of group on level of positive affect in mothers and fathers. Parents of children with ASD reported a lower initial level of positive affect (mothers: $M = -0.83$, $SD = 0.31$, $p = .005$; fathers: $M = -0.92$, $SD = 0.28$, $p = .002$) than the comparison group. Intraclass correlation coefficients indicated that

Table 2 Means and standard deviations for daily couple experiences in mothers and fathers of children with ASD and in comparison group

	Mother			Father		
	ASD	Comparison	F value	ASD	Comparison	F value
Time with partner [*M*, (*SD*)]	3.94 (3.64)	4.38 (3.87)	7.99**	3.73 (2.01)	4.00 (1.92)	5.77*
Median	3.50	4.00		0.51–13.45	0.41–9.62	
Range	0.04–12.70	0.50–11.11				
Partner support [*M*, (*SD*)]	32.60 (14.09)	33.78 (13.37)	2.74	32.37 (11.58)	33.07 (10.57)	1.92
Median	32.00	33.00		32.00	33.00	
Range	8.00–64.0	9.50–63.50		9.0–63.31	8.62–58.77	
Partner closeness [*M*, (*SD*)]	17.31 (5.43)	17.97 (5.43)	2.20	16.93 (4.73)	18.04 (4.33)	7.60**
Median	17.00	18.00		17.00	18.00	
Range	3.47–43.07	0–30.50		0–27.14	0–34.43	
Positive couple interactions [*M*, (*SD*)]	2.84 (1.87)	3.48 (1.95)	9.44**	3.27 (1.39)	3.60 (1.34)	7.29**
Median	3.00	3.00		3.00	4.00	
Range	0–6.29	0–6.79		0.27–6.00	0–6.64	
Negative couple interactions [*M*, (*SD*)]	0.94 (1.33)	0.83 (1.22)	1.44	0.75 (0.70)	0.67 (0.68)	0.19
Median	0.00	0.00		0.00	0.00	
Range	0–4.75	0–4.29		0–3.58	0–4.21	
Positive affect	26.98 (8.10)	28.66 (8.05)	10.54**	29.43 (7.88)	29.90 (7.58)	8.21**
Median	27.00	29.00		30.00	30.00	
Range	10–50	10–50		10–50	10–50	
Negative affect	15.19 (5.48)	14.40 (5.18)	8.59**	13.65 (4.86)	13.27 (3.98)	8.05**
Median	14.00	13.00		12.00	12.00	
Range	10–48	10–48		10–46	10–42	

F values reflect univariate results from the multivariate analysis of covariance examining group differences in the mean level of the five dimensions of daily couple experiences at the couple level (i.e., mothers and father variables entered in one model)

ASD autism spectrum disorder

*p < .05; **p < .01

64% of the variance in level of positive affect occurred at the within-person level.

Table 3 displays the full dyadic MLM examining within-person associations between same-day couple experiences and level of positive affect in mothers and fathers across the 14-days (within-person level). Effect size was calculated: r = sqrt [t^2/(t^2 + df)]; small effect: $r > .10$, medium effect: $r > .24$ and large effect $r > .37$ (Kirk 1996). For mothers and fathers there was a significant negative between-parent effect of mean daily *negative couple interactions* on the intercept (initial level) of level of positive affect. For fathers there was also a significant positive between-parent effect of mean daily *positive couple interactions* and *partner closeness* on the intercept of fathers' level of positive affect. At Level 1, there was a significant (small effect) negative association between Day and level of positive affect in mother. Perhaps, as a result of the newness of the daily diary, mothers were more likely to notice and/or report higher levels of positive affect early on in the 14-day daily diary.

When accounting for control variables and the between-person effects of the mean level of daily couple experiences, mother and father *negative couple interactions* (small effect) significantly negatively co-varied with level of positive affect at a within-person level. This finding means that on days when mother and fathers reported more *negative couple interactions* relative to their usual level, they also reported less positive affect. In addition, mother and father *partner closeness* (medium effect) and *positive couple interactions* (small effect) significantly positively co-varied with level of positive affect. These findings mean that on days when mothers and fathers reported higher *partner closeness* and more *positive couple interactions* than their usual level, they experienced more positive affect. In contrast, mothers' and fathers' *time with partner* and *partner support* did not significantly co-vary with same-day level of positive affect across the 14-days. There was a significant cross-level interaction between group and mothers' *time with partner* to predict same-day level of positive affect. As shown in Fig. 1, *time with partner* was more strongly positively related to level of positive affect in mothers of children with ASD than mothers in the comparison group.

Same-Day Associations Between Couple Experiences and Negative Affect

The dyadic MLM predicting negative affect was conducted using both the raw score and Poisson distribution and square root transformation for daily number of *negative couple interactions*; the pattern of findings was the same and thus only the model using raw score are reported. The dyadic MLM was first conducted using only mother and father intercept and the group variable. There was a significant effect of group such that parents of children with ASD reported a higher initial level of negative affect (mothers: $M = 0.74$, $SD = 0.28$, $p = .007$; fathers: $M = 0.79$, $SD = 0.29$, $p = .004$) than the comparison group. Intraclass correlation coefficients indicated that 59% of the variance in level of negative affect occurred at the within-person level.

Table 3 also displays the full dyadic MLM examining within-person associations between same-day daily couple experiences and level of negative affect in mothers and fathers across the 14-days. For mothers there was a significant negative between-parent effect of mean daily *partner closeness* and a positive between-parent effect of mean daily *negative couple interactions* and the intercept (initial level) of level of negative affect. For fathers, there were significant positive between-parent effects of mean daily *partner support* and *negative couple interactions* on the intercept of level of negative affect. In addition, fathers of children with ASD had a higher initial level of negative affect than fathers in the comparison group. At Level 1, there was a significant (small effect) negative association between Day and level of negative affect in mothers. Perhaps mothers were more emotionally aware early on in the daily diary, noticing and/or reporting higher levels of negative affect, in addition to higher levels of positive affect (as reported above).

When accounting for the between-parent effects of control variables and mean level of daily couple experiences, *partner support* (small and medium effect) and *positive couple interactions* (medium effect) were significantly negatively associated with same-day level of negative affect, while number of *negative couple interactions* (large effect) was significantly positively associated with same-day level of negative affect, in mothers and fathers. This finding means that on days that mothers and fathers reported more *partner support* and *positive couple interactions* than their usual level, they also reported lower negative affect. In addition, mothers' *time with partner* significantly negatively co-varied with same-day level of negative affect when other variables were at their mean level. In other words, on days when mothers spent more time with their partner relative to their usual level, they experienced less negative affect. Fathers' *partner closeness* (small effect) significantly negatively co-varied with same-day level of negative affect. Thus, on days when fathers had felt closer to their partner than their usual level, they also reported less negative affect. Finally, there were significant cross-level interactions between group and mothers' *time with partner*, mothers' *partner support*, and fathers' *partner closeness* to predict same-day level of negative affect (small effects). As shown in Figs. 2, 3 and 4, the association between daily couple experiences and level of negative

Table 3 Same-day dyadic multilevel models of daily couple experiences on level of positive affect and level of negative affect

	Daily positive affect				Daily negative affect			
	Mother		Father		Mother		Father	
	Unstandardized coefficients (standard error)	Effect size *r*	Unstandardized coefficients (standard error)	Effect size	Unstandardized coefficients (standard error)	Effect size	Unstandardized coefficients (standard error)	Effect size *r*
Level 1								
Intercept	28.13 (0.56)**	0.95	29.01 (0.51)**	0.96	14.27 (0.32)**	0.94	13.94 (0.34)**	0.93
Day	−0.11 (0.05)*	0.09	−0.08 (0.05)	0.04	−0.08 (0.03)*	0.08	−0.06 (0.05)	0.02
Same-day time with partner	0.0009 (0.0005)	0.10	0.0003 (0.0007)	0.02	−0.001 (0.0004)**	0.15	0.0002 (0.0004)	0.03
Same-day partner support	−0.01 (0.01)	0.05	0.01 (0.02)	0.06	0.05 (0.01)**	0.31	0.04 (0.009)**	0.23
Same-day partner closeness	0.12 (0.02)**	0.31	0.11 (0.02)**	0.32	−0.02 (0.01)	0.06	−0.04 (0.01)**	0.18
Same-day positive CI	0.28 (0.08)**	0.20	0.23 (0.08)**	0.16	−0.33 (0.06)**	0.34	−0.21 (0.05)**	0.28
Same-day negative CI	−0.28 (0.09)**	0.18	−0.29 (0.09)**	0.18	0.79 (0.08)**	0.51	0.76 (0.06)**	0.57
Level 2								
Group	−0.48 (0.54)	0.08	−0.77 (0.49)	0.09	0.32 (0.35)	0.05	0.76 (0.32)*	0.14
Parent education	−0.26 (0.20)	0.11	0.10 (0.17)	0.04	0.12 (0.35)	0.05	0.12 (0.09)	0.08
Household income	0.16 (0.14)	0.05	0.18 (0.11)	0.09	−0.15 (0.09)	0.10	−0.002 (0.06)	0.00
Mean daily time with partner	0.0008 (0.003)	0.07	−0.005 (0.003)*	0.12	−0.004 (0.002)	0.01	−0.002 (0.001)	0.07
Mean daily partner support	0.10 (0.06)	0.01	0.05 (0.05)	0.06	0.02 (0.04)	0.04	0.05 (0.02)*	0.12
Mean daily partner closeness	0.12 (0.12)	0.11	0.43 (0.11)**	0.22	−0.16 (0.06)**	0.15	−0.09 (0.06)	0.09
Mean daily positive CI	0.30 (0.38)	0.05	1.09 (0.35)**	0.18	−0.12 (0.25)	0.03	0.11 (0.19)	0.04
Mean daily negative CI	−0.79 (0.40)*	0.12	−1.50 (0.41)**	0.21	0.85 (0.23)**	0.21	1.64 (0.29)**	0.32
Same-day time with partner								
X group	0.01 (0.0005)*	0.12	−0.0002 (0.0007)	0.02	−0.001 (0.0004)*	0.13	0.0006 (0.004)	0.10
Same-day partner support								
X group	−0.01 (0.01)	0.07	0.01 (0.02)	0.02	0.03 (0.01)*	0.13	0.009 (0.009)	0.06
Same-day partner closeness								
X group	−0.0005 (0.02)	0.00	0.008 (0.02)	0.01	−0.02 (0.01)	0.07	−0.03 (0.01)*	0.13

Table 3 (continued)

	Daily positive affect				Daily negative affect			
	Mother		Father		Mother		Father	
	Unstandardized coefficients (standard error)	Effect size *r*	Unstandardized coefficients (standard error)	Effect size	Unstandardized coefficients (standard error)	Effect size	Unstandardized coefficients (standard error)	Effect size *r*
Same-day positive CI								
X group	0.11 (0.08)	0.09	0.02 (0.08)	0.01	0.01 (0.06)	0.01	0.004 (0.04)	0.00
Same-day negative CI								
X group	−0.05 (0.09)	0.03	−0.07 (0.09)	0.05	0.13 (0.08)	0.10	0.01 (0.06)	0.01
Random effects (variance estimates)								
Level 2								
Intercept	6.72 (45.23)**		5.70 (32.44)**		3.60 (12.96)**		3.36 (11.34)**	
Daily time with spouse	0.002 (0.00)		0.005 (0.00)		0.003 (0.000)		0.05 (0.002)	
Daily partner support	0.12 (0.01)**		0.13 (0.02)**		0.13 (0.02)**		0.05 (0.002)	
Daily partner closeness	0.19 (0.04)*		0.14 (0.02)**		0.11(0.01)		0.08 (0.006)*	
Same-day positive CI	0.56 (0.32)		0.56 (0.32)		0.56 (0.32)		0.20 (0.04)	
Same-day negative CI	0.65 (0.42)		0.53 (0.28)*		0.84 (0.70)**		0.84 (0.70)**	

ASD autism spectrum disorder, *CI* couple interactions, *Group coded* parents of children with ASD (1) and comparison group (−1). Mother and father level of positive affect and level of negative affect were estimated simultaneously in one multivariate model. In Level 1, daily couple experiences (time with partner, partner support, partner closeness, positive couple interactions and negative couple interactions) were person-centered. The mean (i.e., average across the 14-days) of each daily couple experience was included at Level 2. Effect size was calculated with the following equation: $r = \text{sqrt}\,[t^2/(t^2 + df)]$; small effect: $r > .10$, medium effect: $r > .24$ and large effect $r > .37$ (Kirk 1996)

*p < .05, **p < .01

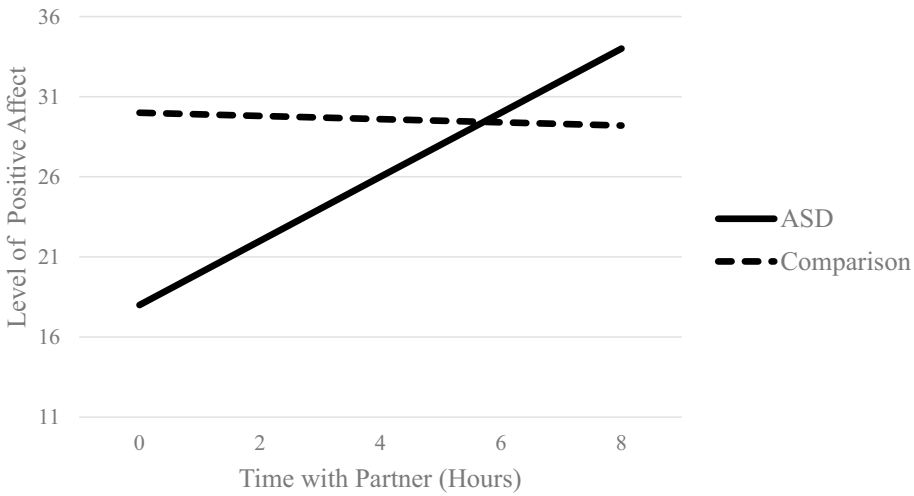

Fig. 1 The moderating effect of group [parents of children with autism spectrum disorder (ASD) vs. comparison group] on the same-day association between time with partner and level of positive affect in mothers

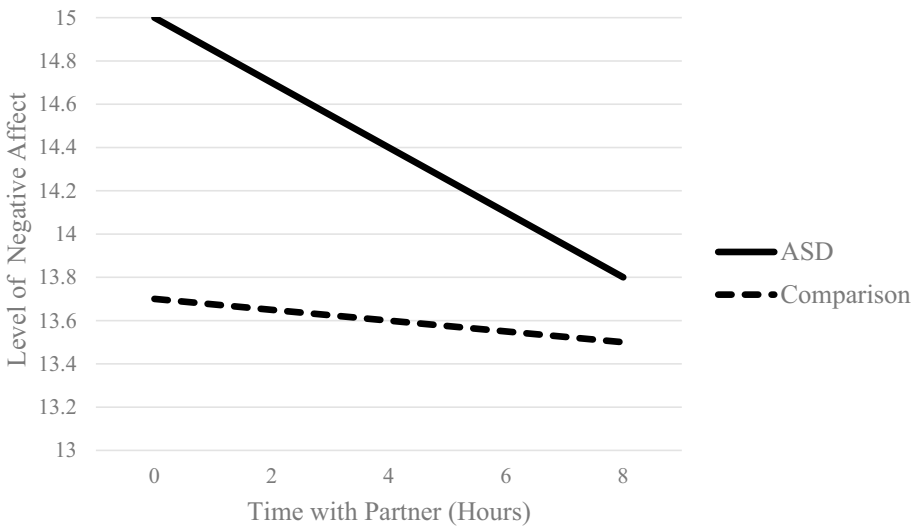

Fig. 2 The moderating effect of group [parents of children with autism spectrum disorder (ASD) vs. comparison group] on the same-day association between time with partner and level of negative affect in mothers

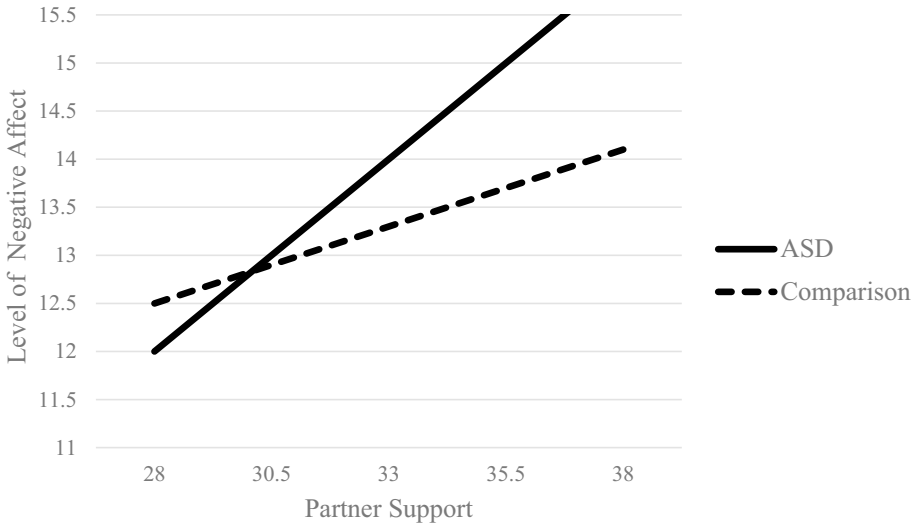

Fig. 3 The moderating effect of group [parents of children with autism spectrum disorder (ASD) vs. comparison group] on the same-day association between partner support and level of negative affect in mothers

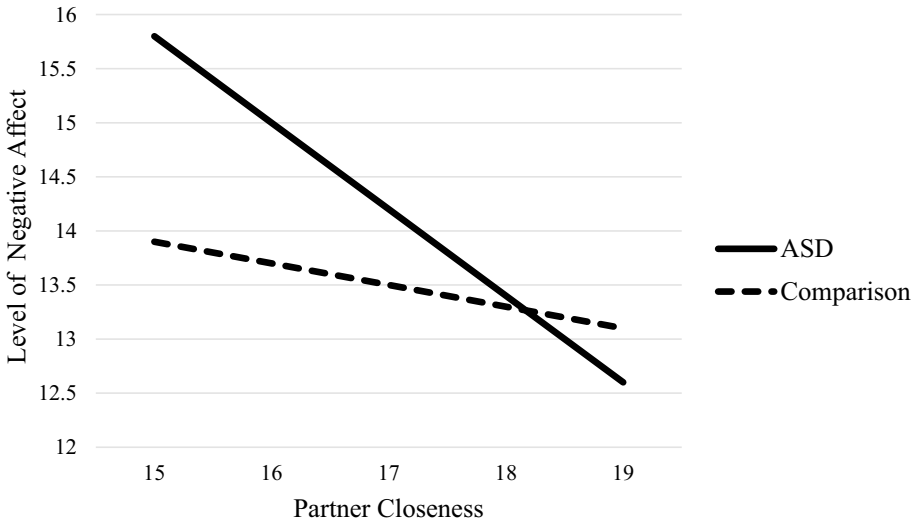

Fig. 4 The moderating effect of group [parents of children with autism spectrum disorder (ASD) vs. comparison group] on the same-day association between partner closeness and level of negative affect in fathers

affect was stronger in parents of children with ASD than the comparison group.

Discussion

The current study built on previous research by identifying similarities and differences in the daily couple experiences of parents of children with ASD relative to parents of children without disabilities, and examining their association with positive and negative affect using a 14-day daily diary. We found that mothers and fathers of children with ASD reported a lower mean daily level of *time with partner* than parents in the comparison group, in support of our hypothesis. This difference may reflect the heightened level of childcare associated with ASD (Smith et al. 2010), which may reduce available time for spending with one's partner. Moreover, the disparate division of labor observed in families of children with ASD and other types of disabilities (Dyer et al. 2009; Warfield 2005), may mean that mothers and fathers spend less time in joint activities.

In contrast to our hypothesis, there was not a difference in mean daily level of *partner support* between parents of children with ASD and the comparison group. Thus, the reduced *time with partner* experienced by parents of children with ASD does not detract from feeling supported by one's partner. However, in support of our hypothesis, fathers of children with ASD reported a lower mean daily level of *partner closeness* than fathers in the comparison group. *Partner closeness* centered on feeling connected with one's partner (e.g. sharing thoughts and feelings, and feeling accepted), whereas *partner support* centered on assistance from partner with problems (e.g. advice, help with problems, and encouragement). Thus, while fathers of children with ASD perceived that their partner assists them with problems at the same level as their peers who have children without disabilities, they do not feel as connected to their partner. Given more limited *time with partner*, perhaps couples of children with ASD prioritize resolving problems, as opposed to sharing feelings and thoughts. Substantial research suggests that partner disclosure of thoughts and feelings is critical for fostering intimacy in relationships (e.g., Laurenceau et al. 1998). Thus, over time, lower daily partner disclosures may lead parents of children with ASD to feel more distant from their partner. It is not clear why mothers of children with ASD were not at risk for low *partner closeness*. There is evidence of gender differences in how adults achieve *partner closeness* (e.g., Barrett et al. 1998); perhaps reduced *time with partner* takes a greater toll on fathers' daily partner closeness more so than mothers' in families of children with ASD.

On average, across the 14-days, mothers and fathers of children with ASD reported a similar mean daily number of *negative couple interactions* (e.g., critical comments or expression of anger/frustration), but a lower mean number of *positive couple interactions* (e.g., joking, intimate acts, and fun activities) than parents in the comparison group. Thus, in contrast to our hypothesis, a reduced number of *positive couple interactions*, but not a heightened number of *negative couple interactions*, may contribute to the increased risk for unsatisfying and shorter-lived couple relationships in parents of children with ASD (e.g., Brobst et al. 2009; Hartley et al. 2010). In the general population, it has been estimated that couples in satisfying and long-lasting relationships experience approximately five times more *positive* than *negative couple interactions* (Gottman et al. 1998). In our study, on average, parents of children with ASD experienced a ratio of 3 to 1 *positive* to *negative couple interactions* whereas the comparison group experienced 4.4 to 1. Reduced *time with partner*, as well as

drained parent resources, may mean that parents of children with ASD have fewer opportunities and less energy than their peers of children without disabilities to joke, do a fun activity, or be intimate with their partner.

For the most part, daily couple experiences co-varied in expected directions across the 14-days with same-day parent level of positive and negative affect in models including both groups. However, *time with partner* and *partner support* did not significantly co-vary with level of positive affect in mothers nor in fathers, and fathers' *time with partner* and mothers' *partner closeness* did not co-vary with level of negative affect in the full models. *Negative couple interactions* had the strongest associations with level of negative affect (large effect), while *partner closeness* had the strongest associations with level of positive affect (medium effect) for both mothers and fathers. Interestingly, *partner support* and *partner closeness* had opposite associations with parent level of affect. At a within-person level, days with higher *partner closeness* were associated with higher positive and lower negative affect, indicating that feeling closer to one's partner is linked to better mood. In contrast, days with higher *partner support* were associated with lower positive and higher negative affect, possibly because the parent was experiencing more problems for which they needed assistance, and thus required higher *partner support*.

In support of our hypothesis, associations between daily couple experiences and parent affect were stronger in parents of children with ASD than in the comparison group. Specifically, experiencing a day with more *time with partner* was associated with a higher level of positive and lower level of negative affect in mothers of children with ASD but not in mothers in the comparison group. Similarly, experiencing a day with more *partner closeness* was associated with a lower level of negative affect in fathers of children with ASD but did not in fathers in the comparison group. While experiencing a day with more *partner support* was associated with a higher level of negative affect in mothers in both groups, this association was stronger in mothers of children with ASD. Thus, in line with studies on other types of stressors (e.g., Harper et al. 2000), couple experiences have stronger links with parent psychological well-being in the context of having a child with ASD than in the context of having a child without disabilities, as these experiences may serve a critical stress-buffering role (Caputo and Simon 2013).

Strengths of the present study include a relatively large sample involving both mothers and fathers, a daily diary methodology that captures daily couple experiences as they spontaneously and naturally unfold, and the use of dyadic MLMs. There were also study limitations. The sample consisted primarily of Caucasian, non-Hispanic and well-educated parents, which reflects the Midwestern state from which the sample was drawn and broader trends in ASD diagnosis [i.e., Caucasian, Non-Hispanic children more likely to receive diagnosis (ADDM 2014)]. Future research should examine diverse racial/ethnic groups. The present study is based on parent report and subject to errors of single-reporter bias. Future studies should examine bi-directional time-order pathways between daily couple experiences and parent affect in order to tease out how daily couple experiences shape parent affect, and, in turn, how parent affect may influence the nature of daily couple experiences from one day to the next.

In conclusion, we found that mothers and fathers of children with ASD spent less time with their partner and had fewer positive couple interactions than parents of children without disabilities and fathers of children with ASD felt less close with their partner than fathers of children without disabilities. There were no group differences in perceived daily partner support or number of negative couple interactions. Daily couple experiences (and particularly *negative couple interactions* and *partner closeness*) were associated with partner affect and these associations were stronger in the ASD than comparison group. Our findings have important implications for programs and supports for parents of children with ASD. Efforts to foster adaptive daily couple experiences may lead to marked improvements in the psychological well-being of parents of children with ASD. Such efforts should focus on: (1) debunking myths (see Hartley et al. 2010) that parents of children with ASD are fated to experience dismal couple relationships by disseminating evidence that vulnerabilities are limited in scope and degree, and many couples report positive couple relationships. (2) Acknowledging the difficulty of juggling multiple demands (e.g., child with ASD, siblings, employment, couple relationship, etc.) and of having limited time with one's partner. (3) Encouraging parents to carve out time to share feelings and thoughts and connecting with their partner, as opposed to only working through daily life demands. For example, couples could reserve 5 min in the evening for sharing stories from their day. (4) Supporting parents in creating opportunities for *positive couple* interactions such as doing a fun activity together or taking a moment to text/email a joke or give their partner a complement over their lunch hour. Achieving these goals may require reducing care demands and emotional stressors by increasing the availability of respite care, family supports (e.g., paid providers to help with childcare and/or household tasks), and/or financial assistance to reduce time and emotional burdens experienced by parents. These goals do not need to be achieved through increasing couple alone time. Instead, they could be achieved by fostering positive and fun family-wide activities (i.e., involving not only partners, but also the child with ASD and other family members), and promoted through child-directed interventions (e.g., child's

social and language therapy provided in context of the family playing a game together)

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Author contributions All authors contributed sufficiently to the scientific work. SLH concieved of the study and prepared the manuscript, LSD contributed to analyses and writing, and HMS assisted in conducting the study and also contributed to writing.

Compliance with Ethical Standards

Conflict of interest Authors Hartley, Smith, and Schultz declare no conflict of interest.

Ethical Approval All procedures in studies involving human participants were in accordance with ethical standards of the institutional and/or national research committee and with the 964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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