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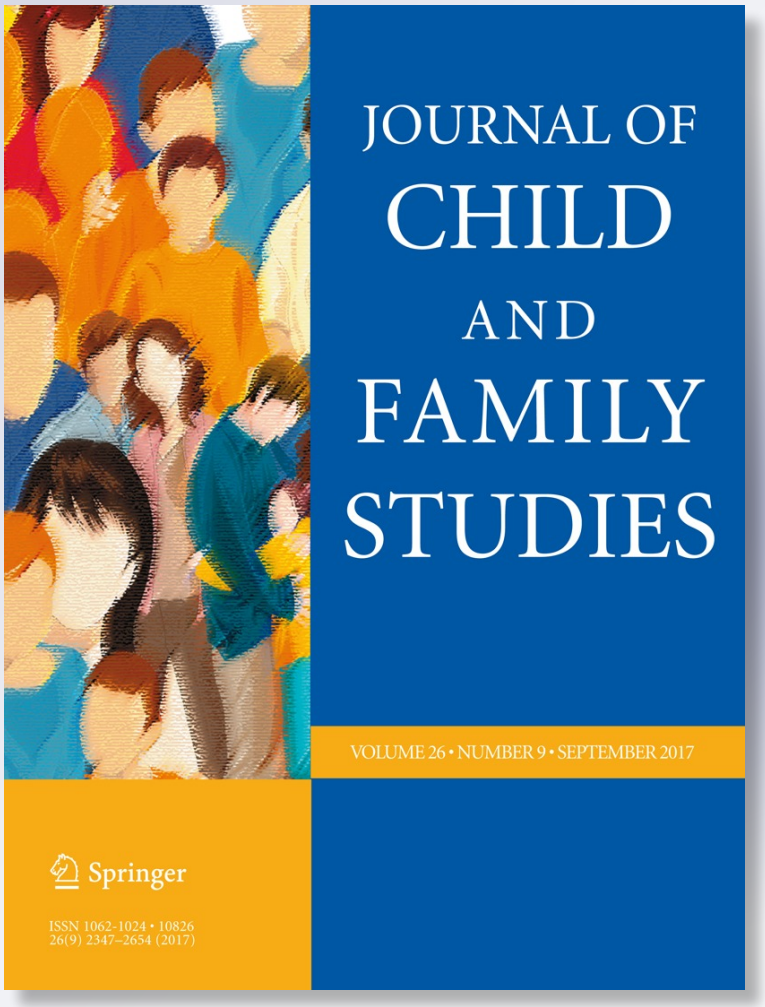

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ORIGINAL PAPER

Predicting Parent-Child Aggression Risk in Mothers and Fathers: Role of Emotion Regulation and Frustration Tolerance

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Abstract Efforts to identify targets that could be instrumental for child abuse prevention programs have often implicated stress as a key risk factor. However, existing research has not adequately considered the role of emotion dysregulation and frustration intolerance in predicting parents' risk to engage in parent-child aggression (PCA). In addition, research in this field continues to focus heavily on mothers, with limited attention to fathers. Thus, the current study investigated whether perceived stress and distress, emotion dysregulation, and frustration intolerance independently predicted risk of PCA in a sample of 81 couples; moreover, the study evaluated whether emotion regulation or frustration tolerance mediated or moderated the association between stress and PCA risk. Findings indicated that each of the risk factors uniquely predicted PCA risk after controlling for demographic factors; neither emotion dysregulation nor frustration intolerance moderated the association between stress and PCA risk but emotion regulation did partially mediate this association. No significant differences in the pattern of these relationships were observed between mothers and fathers. Future research directions are discussed, including methodological considerations as well as evaluating how emotion regulation skills training and improved parental frustration tolerance may prevent parent-child aggression.

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Keywords Child abuse potential · Child maltreatment risk · Emotion regulation · Frustration tolerance · Physical abuse · Fathers

Introduction

Physical child maltreatment often transpires during episodes of intensifying physical discipline (Durrant et al. 2009; Kadushin and Martin 1981). Consequently, many postulate that all physical parent-child aggression (PCA) can be conceptualized on a continuum: physical discipline on one endpoint gradually intensifying toward physical child abuse at the other endpoint (Gershoff 2010; Graziano 1994; Greenwald et al. 1997; Rodriguez 2010; Straus 2001; Whipple and Richey 1997). To avert child abuse in the first place, identifying what prompts a parent to progress from earlier points along the continuum toward harsher PCA and abuse is critical. *Child abuse potential* is a term coined to approximate the probability that a parent may approach the abusive endpoint of such a continuum (Milner 1994). Increased child abuse potential is linked to harsh parenting styles (Haskett et al. 1995; Margolin et al. 2003; Rodriguez et al. 2016a, 2016b) and abusive discipline tactics (Rodriguez 2010). PCA risk can thus be operationalized broadly to capture more of the PCA continuum, incorporating child abuse potential and harsh parenting style and practices.

Ecological theories of the factors contributing to physical child abuse often center on elements of the parent's intrapersonal level of functioning (Belsky 1980, Belsky 1993; Sidebotham 2001). One of the most well-documented intrapersonal qualities identified in exacerbating parental child abuse risk involves stress (Black et al 2001;

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Finzi-Dottan and Harel 2014; Rodriguez and Green 1997; Rodriguez and Richardson 2007; Smith Slep and O'Leary 2007; Stith et al. 2009; Tucker and Rodriguez 2014; Whipple and Webster-Stratton 1991). Yet clearly physical abuse does not inevitably ensue from stress. A theoretical discussion of the role of stress in promoting child abuse could be informed by the transactional model of stress and coping (Lazarus and Folkman 1984, 1987), which posits that when confronted with stress, an individual is induced to react to the stressor, implementing strategies directed toward tackling the perceived stressor.

Research has been inconsistent on the nature of stress that contributes to child abuse risk (Whipple and Webster-Stratton 1991), with ample evidence demonstrating that stress specific to the parenting role is predictive of abuse risk (e.g., Begle et al. 2010; Crouch and Behl 2001; Guterman et al. 2009; Rodriguez and Green 1997; Whipple and Webster-Stratton 1991). Nonetheless, parenting stress can be confounded by the personal experience of being overwhelmed more broadly than by the parenting role alone. The stress that parents encounter is unlikely to be confined to the parent-child relationship. Indeed, one's personal level of stress influences the connection between stress perceived from raising one's child and abuse risk (Holden and Banez 1996). Abusive parents report experiencing greater distress in both parenting and non-parenting related categories than comparison parents (Bauer and Twentyman 1985; Justice and Calvert 1990). Thus, investigating the personal experience of stress broadly, rather than parenting stress narrowly, is important in understanding abuse risk, including parents feeling overwhelmed, feeling hassled, and experiencing symptoms of psychological distress.

In response to perceived stress, one can engage conscious and unconscious efforts to modulate the emotional reaction, known as *emotion regulation* (Gross and Thompson 2007). Remarkably minimal research has considered the role of emotion regulation in relation to PCA risk. Emotion regulation difficulties relate to greater maternal rejection and lower maternal warmth (Sarıtaş et al. 2013). Negative emotional states appear to degrade self-regulation abilities (Baumeister et al. 2007), wherein exposure to stress can interfere with effective emotion regulation abilities (Raio et al. 2013) and increase emotion dysregulation over time (e.g., Herts et al. 2012; Kelly et al. 2008). With regard to PCA risk more directly, poorer emotion regulation partially mediated the relationship between borderline personality features and greater child abuse potential (Hiraoka et al. 2016) and between substance abuse and elevated child abuse potential (Hien et al. 2010). These limited findings suggest that parents' emotion regulation abilities may serve a mediating role in child abuse risk, although such a relation has not been considered between perceived stress and distress and PCA risk. In other words, those with heightened stress may have increased PCA risk in part because stress compromises their emotion regulation abilities, rendering them unable to effectively manage their distress.

However, the transactional model of stress and coping also implies that emotion regulation, in response to stress, could function as a moderator to mitigate that stress. Although emotion regulation mediated the relationship between substance abuse and child abuse potential, moderation was not observed (Hien et al. 2010). However, emotion regulation ability has been shown to moderate the relation between stress and well-being for adult males, although not for females (Extremera and Rey 2015). Effective emotion regulation through cognitive reappraisal decreases the effects of adversity on distress (Boyes et al. 2015) and the effects of stress on depression (Troy et al. 2010). Hence, although inconsistent in the existing literature, emotion regulation could theoretically moderate the role of stress on PCA risk.

Another quality that may influence one's response to stress is an ability to withstand the discomfort generated from the stressor, or one's tolerance of frustration (Harrington 2011). Frustration arises when one is blocked from attaining a goal, which can prompt negative affect that could translate into aggressive tendencies (Berkowitz 1989, 2012). Low frustration tolerance uniquely predicted maternal child abuse potential in an at-risk sample (McElroy and Rodriguez 2008) as well as across a variety of samples (Rodriguez et al. 2015). Frustration itself is linked with emotion regulation difficulties in new mothers (Russell and Lincoln 2016). However, research has yet to consider whether a parent's ability to tolerate frustration could serve as a moderator or mediator between perceived stress and PCA risk. Similar to its effect on emotion regulation, elevated stress could wear down frustration tolerance, representing a mediator with PCA risk. Alternatively, through the transactional model of stress, strong frustration tolerance could represent an alternative reaction to perceived stress that reduces PCA risk through moderation. None of these relationships for frustration tolerance has been considered in connection with PCA risk.

One methodological limitation that has confounded current PCA research stems from the target of most research studies—the literature on abuse risk and harsh parenting has been dominated by investigations of factors pertinent to mothers, not fathers. However, many have urged that we begin more actively including fathers (Coohey 2000; Guterman and Lee 2005; Haskett et al. 1996; Lee et al. 2008; Stith et al. 2009) in order to identify potential gender differences. The emerging literature on fathers suggests largely comparable risk profiles to mothers (Rodriguez et al. 2016a, 2016b; Schaeffer et al. 2005; Smith Slep and

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O'Leary 2007). However, many specific relationships have not been considered directly, such as the role of emotion regulation or frustration tolerance in PCA risk for fathers. Some suggest that personal distress is less problematic for maltreating fathers than mothers (Pittman and Buckley 2006), but a study of PCA risk with a community sample indicated that perceived stress, negative life events, and depressive symptoms were independent predictors of PCA risk for mothers and fathers (Smith Slep and O'Leary 2007). The relationships between perceived stress and distress, emotion regulation, frustration tolerance, and PCA risk have not yet been considered simultaneously for both mothers and fathers.

Another limitation in current research on PCA risk stems from a reliance on self-report measures. Self-reports can be hampered by participant response distortions, which is particularly problematic in research on factors related to PCA risk (DeGarmo et al. 2006). In contrast to such an explicit approach to assessment, using implicit assessments or behavioral simulations to simulate the constructs of interest is more ambiguous to the respondent and thereby less susceptible to participant response manipulation (Camilo et al. 2016; DeGarmo et al. 2006; Fazio and Olson 2003). Moreover, although researchers often rely on a single measure to estimate a construct of interest, multiple indicators can be advantageous (Little et al. 1999). Weakness of a single measure can be balanced by a different measure, including managing the potential item or conceptual overlap between independent and dependent variables.

The present study investigated whether perceived stress, frustration intolerance and emotion dysregulation predicted elevated PCA risk in a sample of mothers and fathers. The current study included multiple measures for PCA risk and stress as well as analog approaches in the research design. First, we considered whether elevated stress, emotion dysregulation, and frustration intolerance independently contributed to heightened PCA risk. Second, consistent with the transactional model of stress and coping, we evaluated interactive effects to determine whether the effect of perceived stress on PCA risk was moderated by either emotion regulation or frustration tolerance. Specifically, we assessed whether effective emotion regulation abilities or high frustration tolerance reduced the effect of perceived stress and distress on parents' PCA risk. Finally, we examined whether the effect of perceived stress on PCA risk was partially mediated by either emotion regulation or frustration tolerance. In other words, we considered whether the relation between parents' perceived stress and PCA risk was partly because the parent does not exert strong emotion regulation skills or because the parent does not adequately tolerate frustrating situations. Additionally, differences between mothers vs. fathers on these hypothesized relationships were evaluated.

Method

Participants

Participants were 81 mother-father dyads enrolled in a parenting study of couples raising preschoolers in the U.S. Southeast. Mean age for mothers was 33.85 years (SD = 5.20) and for fathers, 35.99 years (SD = 7.35). Parents predominantly identified as Caucasian (mothers, 76.5%; fathers, 80.2%); other parents identified as African-American (mothers, 19.8%; fathers 18.5%) or Asian (1.2% of both mothers and fathers); additionally, some parents also identified as Hispanic/Latino (mothers, 6.2%; fathers, 1.2%). Most parents were biologically related to their preschooler (mothers, 98.8%; fathers, 92.6%). Median educational level for both parents was a 4-year college degree; parents were raising an average of two children on a median annual family income of $65,000.

Procedure

Families were recruited for a parenting study from flyers distributed at various sites in the community, including day care centers, and from newspaper advertisements. Families who were married and/or cohabitating parents of 3–6 year old children were eligible to participate; this child age range represents greater risk for physical maltreatment (US DHHS 2016). Interested parents contacted the lab to schedule a 90-minute data collection session in their home. Each member of the couple completed all questionnaires and analog tasks on individual laptop computers with headphones in separate, private rooms. Parent responses were automatically entered into a database tagged with a randomly assigned family identification number to ensure anonymity in responding. Each couple received $60 as compensation for participation. All study procedures were approved by the university institutional review board.

Measures of PCA-Risk

Brief child abuse potential inventory (BCAPI)

The BCAPI (Ondersma et al. 2005) involves 34 items derived from the longer 160-item CAPI (Milner 1986), a frequently-used measure of child abuse risk. Participants are asked to indicate whether they agree/disagree with each item; 24 of these items contribute to the BCAPI Abuse Scale score. The authors of the abbreviated version report strong concordance ($r = .96$) between the BCAPI and CAPI Abuse Scale scores (Ondersma et al. 2005). Higher BCAPI Abuse Scale scores are indicative of elevated abuse risk. Internal consistency for the BCAPI Abuse Scale in the present sample was acceptable, at $\alpha = .80$ for mothers and $\alpha = .78$ for fathers.

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Adult—Adolescent Parenting Inventory-2 (AAPI-2)

Given that the CAPI does not explicitly address parenting, the AAPI-2 (Bavolek and Keene 2001) was included as a tool utilized in child protective services as a measure of child abuse risk (English and Graham 2000). The AAPI-2 includes 40 items on which participants indicate their level of agreement using a 5-point Likert scale. Higher scores were oriented to convey parenting attitudes consistent with abusive parenting. In the current sample, internal consistency for the AAPI-2 Total scores was strong for both mothers and fathers ($\alpha = .89$).

Parent-Child Conflict Tactics Scale (CTS-PC)

The CTS-PC asks parents to indicate what strategies they have used to address conflict with their children, including physical assaults, psychological aggression, and non-violent discipline (Straus et al. 1998). Respondents indicate how frequently they have used 22 behaviors in the past year with their preschooler. Participant responses of 0, 1, or 2 are assigned those respective values, whereas more frequent use is weighted for subsequent categories: 3–5 times scored 4; 6–10 times scored 8; 11–20 times scored 15; >20 scored 25. The present study concentrated on the 13 physical assault items to estimate physical parent-child aggression use. Given the wide range of physical tactics assessed, the current sample obtained modest internal consistency (mothers' $\alpha = .70$; fathers' $\alpha = .74$). These total scores were square-root transformed given evidence of skewness in their distribution.

Parenting Scale

Parents report on their discipline style on 30 items on the Parenting Scale (Arnold et al. 1993). Discipline styles on this measure are characterized as overreactive, lax, or verbose. Each item is displayed on a 7-point paired-alternate option of parental response to a child discipline situation; parents indicate to what degree their own style matches either depicted response. Given the focus on PCA, the current study utilized the 10-item Overreactivity subscale as this subscale describes reactions in which parents are likely to escalate physical discipline (Salari et al. 2012 for review). Higher scores reflect greater discipline overreactivity. Internal consistency for the Overreactivity subscale was .74 for mothers and .79 for fathers in the current sample.

Response Analog to Child Compliance Task (ReACCT)

The ReACCT is a computerized analog task designed to measure parents' inclination to respond with PCA when children are depicted as non-compliant or compliant (Rodriguez 2016). The ReACCT task was created to induce time urgency, simulating a situation where being late is costly and time-consuming. The overall scene involves the parent imagining they are running late and need to direct their child to get ready to go to preschool. A series of scenes then follow where their child is depicted as either complying or not complying with the parent's request. Each non-compliant scene displays an increment of how late they are whereas successfully securing child compliance earns a displayed bonus. Instructions indicated parents could hypothetically earn a bonus for each instance of compliance but warned noncompliance increases delay. After reading the child's compliance or noncompliance in the scene, the parent selects either adaptive (e.g., praise for compliance) or aggressive (e.g., spanking, hitting with an object) discipline strategies. Scores are weighted for the extent of severity of aggressive strategies selected. For the current study, parents' responses on the ReACCT Noncompliance subscale were selected for analysis. Across several samples of varying risk, ReACCT scores are associated with reports of abusive physical discipline tactics and child abuse risk (Rodriguez 2016).

Measures of Stress

Perceived Stress Scale (PSS)

The PSS presents ten items inquiring whether participants believe their lives have been overwhelming, uncontrollable, or unpredictable within the last month (Cohen et al. 1983). Respondents utilize a 5-point Likert scale from 1 to 5; total scores are computed by averaging across items, with higher scores reflecting greater perceived stress. The current study obtained acceptable internal consistency for the PSS (mothers' $\alpha = .84$; fathers' $\alpha = .83$).

Daily Hassles and Uplifts Scale (DHUS)

The DHUS includes 53 frequently endorsed events (e.g., involving the household, finances, work) in which participants were asked in this study to indicate the extent to which they experienced each as a hassle in the past week, on a 4-point Likert scale from (0) *none* to (4) *a great deal* (De Longis et al. 1988). Higher scores indicate greater sense of daily hassles in their life. In this study, internal consistency was high for the Hassles Scale for both mothers and fathers ($\alpha = .91$ and $\alpha = .93$, respectively).

Revised Symptom Checklist-90 (SCL-90-R)

The SCL-90-R presents 90 mental health symptoms (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety,

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paranoid ideation, and psychoticism) (Derogatis 1977, 1994). Participants report on a 5-point Likert scale (from 0 = not at all to 4 = extremely) whether they are bothered by any of the symptoms. Overall symptom distress can be determined for a Global Severity Index by averaging the individual items. The SCL-90-R evidenced high internal consistency in this study: $\alpha = .93$ for mothers and $\alpha = .92$ for fathers.

Measure of Emotion Regulation

Negative Mood Regulation Scale (NMRS)

The NMRS presents 30 items intended to measure one's ability to regulate negative emotions (Catanzaro and Mearns 1990). Participants are presented with a sentence stem, "When I'm upset, I believe that…" and they must indicate the extent to which they agree with how much they utilize the strategies to manage their distress on a 5-point Likert scale. Higher scores were oriented to reflect worse regulation of negative mood. In the current study, the NMRS demonstrated good internal reliability (mothers' $\alpha = .89$; fathers $\alpha = .88$).

Measure of Frustration Tolerance

Frustration Intolerance Task (FIT)

The FIT is an analog approach to assessing frustration tolerance to child-relevant situations (Rodriguez et al. 2015). The task presents a scenario of needing to leave a grocery store because their child is having a temper tantrum. Parents are presented a computerized maze of grocery store aisles and are instructed to navigate the maze in order to exit the store—however, no solution to the maze is possible. During their search for an exit, they hear a child having a temper tantrum through headphones. Overlaid on the screen is a large "QUIT" button. Parents are instructed to continue searching for an exit unless they decide to quit the task, with a maximum search time of 10 min. Frustration tolerance is measured by the number of seconds until quitting the task, with *higher* scores indicative of *greater* frustration tolerance. Across different samples, lower FIT scores were associated with child abuse risk, harsher physical discipline tactics, and physiological heart rate reactivity (Rodriguez et al. 2015).

Data Analyses

Preliminary analyses were conducted using SPSS 22 for Windows. Mplus 7.0 was utilized to perform an initial confirmatory factor analysis (CFA) to verify that measures significantly loaded onto their respective underlying constructs for both mothers and fathers. Based on results from this CFA, composite scores for each construct were generated using standardized values for each measure score weighted by their CFA loading, separately for mothers and fathers. For mothers, composites were weighted as follows: Stress (.76, PSS; .90, DHUS; and .79, SCL-90-R); PCA Risk (.85, BCAPI Risk; .23, AAPI-2 Total; .41, PS Overreactivity; .14, CTS-PC Physical Assault; and .16, ReACCT Noncompliance). For fathers, composites were weighted as follows: Stress (.57, PSS; .71, DHUS; and .81, SCL-90-R); PCA Risk (.89, BCAPI Risk; .42, AAPI-2 Total; .30, PS Overreactivity; .41, CTS-PC Physical Assault; and .35, ReACCT Noncompliance). Emotion regulation and frustration tolerance scores were standardized for the primary analyses, with interaction terms created using standardized multiplicative values.

Results

Descriptive statistics and correlations among all variables appear in Table 1. Correlational results mirror the factor loadings of the CFA.

We next examined whether several demographic characteristics were associated with PCA risk and thus needed to be controlled in the primary analyses. PCA risk was regressed onto parents' age, minority status (given that few participants identified as Hispanic or Asian/Pacific Islander, race/ethnicity was collapsed such that 0 = Caucasian, 1 = non-Caucasian), years of education, and sex (0 = mothers, 1 = fathers) in a two-level model in HLM 7.0 that controlled for the non-independence of couples' data in the second level of the model and allowed for a randomly varying intercept. Results indicated that PCA risk was positively associated with minority status ($B = 0.48$, SE = 0.05, $t(75) = 1.99$, $p = .05$) and negatively associated with age ($B = -0.02$, SE = 0.01, $t(75) = -2.06$, $p = .04$) and education ($B = -0.10$, SE = 0.05, $t(75) = -2.09$, $p = .04$). Consequently, these demographic variables were controlled for in all primary analyses.

To examine whether stress, emotion regulation, and frustration tolerance independently predict PCA risk, parents' PCA risk composite scores were regressed onto their stress composite scores, emotion regulation scores, frustration tolerance scores, and demographic variables in a similar two-level model (see Table 2). As the table reveals, elevated PCA risk was positively associated with stress and negatively associated with emotion regulation and frustration tolerance. Notably, subsequent analyses indicated that parents' sex did not moderate the association between PCA risk and stress ($B = 0.07$, SE = 0.11, $t(71) = 0.61$, $p = .54$), emotion regulation ($B = 0.00$, SE = 0.10, $t(71) = 0.40$, $p = .97$), and frustration tolerance ($B = -0.13$, SE = 0.10, $t(71) = -1.31$, $p = .19$).

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Table 1 Means, standard deviations, and correlations among measures

	Moms *M* (SD)	Dads *M* (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. BCAPI	3.37 (3.41)	3.57 (3.52)		.38***	.27*	.30**	.32**	.49***	.43***	.64***	−.60***	−.14
2. AAPI	84.33 (16.76)	96.83 (16.83)	.26*		.18	.40***	.47***	.27*	.18	.08	−.27*	−.15
3. PS-Over	3.49 (1.03)	2.47 (0.78)	.27*	.38***		.40***	.15	.35**	.37***	.20	−.17	−.09
4. CTSPC	9.17 (15.26)	11.17 (20.47)	.08	.52***	.30**		.49***	.32**	.32**	.16	−.19	−.27*
5. ReACCT	−5.63 (11.06)	−5.43 (11.69)	.10	.45***	.26*	.48***		.16	.13	.06	−.18	−.21
6. PSS	2.34 (0.51)	2.26 (0.51)	.62***	.21	.44***	.12	.22*		.42***	.43***	−.61***	−.03
7. DHUS	80.91 (15.93)	80.73 (16.54)	.72***	.09	.35***	.05	.15	.71***		.60***	−.34**	−.08
8. SCL-90-R	24.78 (20.37)	22.77 (24.14)	.65***	−.03	.28*	.00	.07	.58***	.73***		−.56***	.04
9. NMRS	115.17 (13.6)	113.26 (12.75)	−.25*	−.28*	−.37***	−.16	−.11	−.47***	−.39***	−.31**		−.01
10. FIT	298.53 (176.83)	356.57 (170.25)	−.04	−.05	−.24*	.14	−.30**	−.06	−.13	.03	.19	

Note: Mothers below the diagonal; Fathers above the diagonal

1 = Brief Child Abuse Potential Inventory; 2 = Adult–Adolescent Parenting Inventory-2; 3 = Parenting Scale, Overreactivity; 4 = Parent-Child Conflict Tactics Scale, Physical Assault; 5 = Response Analog to Child Compliance Task, Noncompliance Scale; 6 = Perceived Stress Scale; 7 = Daily Hassles Uplifts Scale; 8 = Revised Symptom Checklist; 9 = Negative Mood Regulation Scale; 10 = Frustration Intolerance Task

*$p < .05$, **$p < .01$, ***$p < .001$

Table 2 Multiple regression results of stress, emotion regulation, and frustration for PCA risk

Effect size			
	B	*t*	*r*
Age	−.01†	−1.80	.20
Minority status	.49**	3.31	.36
Education	−.13**	−3.39	.37
Stress	.51**	7.15	.64
Emotion regulation	−.14*	−2.30	.26
Frustration tolerance	−.11*	−2.08	.24

Note: For the *t*-test, $df = 74$

†$p < .10$, *$p < .05$, **$p < .01$

To examine whether the implications of parents' stress for their PCA risk depends on their emotion regulation, parents' PCA risk composite scores were regressed onto their mean-centered stress composite scores, mean-centered emotion regulation scores, the Stress × Emotion Regulation interaction, and demographic variables in a similar two-level model. Although PCA risk was positively associated with stress and negatively associated with emotion regulation, it was not significantly associated with the Stress × Emotion Regulation interaction ($B = 0.04$, SE = 0.05, $t(74) = 0.92$, $p = .36$) suggesting that the implications of parents' stress for their PCA risk do not depend on their emotion regulation. Notably, a subsequent analysis indicated that parents' sex did not further moderate the null association between PCA risk and the Stress × Emotion Regulation interaction ($B = -0.09$, SE = 0.09, $t(69) = -1.00$, $p = .32$).

To examine whether parents' stress interacted with frustration tolerance, parents' PCA risk composite scores were regressed onto their mean-centered stress composite scores, mean-centered frustration tolerance scores, the Stress × Frustration Tolerance interaction, and demographic variables in a similar two-level model. Although PCA risk was positively associated with stress and negatively associated with frustration tolerance, it was not significantly associated with the Stress × Frustration Tolerance interaction ($B = -0.05$, SE = 0.06, $t(74) = -0.84$, $p = .40$), suggesting that the implications of parents' stress for their PCA risk do not depend on their frustration tolerance. Notably, a subsequent analysis indicated that parents' sex did not further moderate the null association between PCA risk and the Stress × Frustration Tolerance interaction ($B = -0.17$, SE = 0.13, $t(69) = -1.28$, $p = .20$).

To address whether parents' emotion regulation mediates the association between their stress and PCA risk, we computed asymmetric confidence intervals for the mediated effect by following the procedure described by MacKinnon et al. (2007). This procedure requires conducting two additional sets of analyses: (a) regressing the mediator (e.g.,

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emotion regulation) onto the independent variable (i.e., stress), and (b) regressing the dependent variable (i.e., PCA risk) onto the mediator, controlling for the independent variable. First, we tested whether stress predicted the expected mediator—parents' emotion regulation—by regressing parents' emotion regulation scores onto their stress composite scores and demographic variables in a similar two-level model. Consistent with the first criterion necessary for establishing mediation, parents' stress was significantly negatively associated with their emotion regulation, $B = -0.53$, SE $= 0.08$, $t(77) = -7.02$, $p < .01$. This effect was not further moderated by parents' sex, $B = 0.19$, SE $= 0.15$, $t(74) = 1.24$, $p = .22$. Second, we tested whether parents' emotion regulation predicted their PCA risk, controlling for their stress, by regressing parents' PCA risk composite scores onto their emotion regulation scores, stress composite scores, and demographic variables in a similar two-level model. Consistent with the second criterion necessary for establishing mediation, parents' emotion regulation was significantly negatively associated with their PCA risk, $B = -0.16$, SE $= 0.06$, $t(75) = -2.53$, $p = .01$. This effect was not further moderated by parents' sex, $B = -0.02$, SE $= 0.10$, $t(72) = -0.17$, $p = .87$. Finally, we multiplied these two effects together to obtain an estimate of the mediated effect, $B = 0.08$, and computed the 95% confidence interval [0.02, 0.16] that indicated that the mediated effect was significant.

To address whether parents' frustration tolerance mediates the association between their stress and PCA risk, we again computed asymmetric confidence intervals for the mediated effect. First, we tested whether stress predicted the expected mediator—parents' frustration tolerance—by regressing parents' frustration tolerance scores onto their stress composite scores and demographic variables in a similar two-level model. For the first criterion necessary for establishing mediation, parents' stress was not significantly associated with their frustration tolerance, $B = -0.04$, SE $= 0.07$, $t(77) = -0.57$, $p = .57$, suggesting that parents' frustration tolerance does not mediate the association between their stress and PCA risk.

Discussion

The current investigation evaluated whether parents' personal stress and distress, emotion dysregulation, and frustration intolerance predicted increased PCA risk in a community sample of mothers and fathers as well as evaluating for mediation or moderation. Results partially supported the hypotheses, demonstrating that all three qualities independently contributed to higher PCA risk. However, although neither emotion regulation nor frustration tolerance were found to moderate the role of perceived stress on PCA risk, the effect of personal stress on parents' PCA risk was partially mediated by parents' emotion regulation but not by their frustration tolerance. These findings were comparable between mothers and fathers.

Although minimal research has considered connections between emotion regulation and PCA risk, the current findings that emotion regulation partially mediated the effect of perceived stress and distress are consistent with previous findings that parents' emotion regulation skills partially mediated symptoms of psychopathology and child abuse potential (Hiraoka et al. 2016; Hien et al. 2010). Given that emotion regulation demonstrated such effects, the present findings highlight that emotion regulation abilities have been overlooked in the bulk of research on PCA, warranting further attention in both PCA research and prevention programs. Although the transactional model of stress and coping (Lazarus and Folkman 1984, 1987) implies emotion regulation could serve a mitigating role on stress, previous research examining emotion regulation as a potential moderator has been inconsistent. Yet the present findings suggest that emotion dysregulation abilities do not moderate PCA risk, echoing the findings of one of the few studies to consider emotion regulation as a moderator of substance use on abuse potential specifically (Hien et al. 2010). Thus, although the proposition that emotion regulation could serve as a moderator for PCA risk is theoretically consistent, current research has not yet demonstrated such effects.

Research had not previously considered the role of frustration tolerance as either a mediator or moderator between stress and PCA risk. The present findings suggest that frustration intolerance may operate independently from the stress response to elevate PCA risk but not serve as either a mediator or moderator. These results are consistent with the limited prior research linking frustration intolerance and PCA risk (McElroy and Rodriguez 2008; Rodriguez et al. 2015), extending those findings to fathers. Given that frustration with infant crying is associated with maternal emotion dysregulation (Russell and Lincoln 2016), further research inquiry considering the role of frustration tolerance appears warranted.

Given comparatively less attention to fathers in the extant research, this study assessed the relationships between PCA risk and perceived stress, emotion regulation, and frustration tolerance in fathers. Interestingly, no gender differences were observed in the hypothesized relationships, as parents' sex did not moderate any associations. This finding supports the emerging literature on fathers' PCA risk which suggests broadly comparable PCA risk profiles to mothers (Rodriguez et al. 2016a, 2016b; Rodriguez et al. 2017; Schaeffer et al. 2005; Smith Slep and O'Leary 2007). Nonetheless, research needs to continue to investigate risk factors for fathers more comprehensively given the chronic dominance of mothers in the literature on PCA risk.

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The multiple-indicator, multimethod approach and inclusion of fathers are strengths in this study, although a number of limitations are worth noting. Our conceptualization of the PCA risk included the BCAPI—a measure with strong concordance with the full measure (Ondersma et al. 2005); but the BCAPI demonstrated modest correspondence with the behaviorally oriented CTSPC in this study, comparable to the concordance observed with the full CAPI (Rodriguez 2010). In part, this finding likely reflects the impact of social desirability responding on the CTSPC or potential weaknesses in the BCAPI. Estimating PCA risk is challenging, which is why we relied on multiple measures wherein the BCAPI was only one contributor; future research, however, could explore measurement of PCA risk more heavily weighted toward actual abusive parenting behavior. In addition, the present findings derive from data at a single time point; guided by theory that stress would precede strategies to manage stressors (Lazarus and Folkman 1984, 1987), we proposed emotion regulation and frustration tolerance could act as mediators or moderators. However, longitudinal designs are needed to clarify the temporal order and permit clearer causal interpretations.

In terms of sample characteristics, the current sample of parents predominantly identified as Caucasian and were, on average, well-educated; thus future research should consider samples with greater socioeconomic and racial/ethnic diversity. The current sample was also drawn from the community to consider factors that may be relevant for prevention programs targeting those lower on the PCA continuum. Nevertheless, replication in an at-risk sample is needed to determine whether the relationships between PCA risk and perceived stress, emotion regulation, and frustration tolerance found in the present study apply to those further on the PCA continuum. For example, a lower-income sample would be expected to encounter greater daily stress and thus results could differ from our sample for the effects of both emotion dysregulation and frustration. In addition, although we studied 162 parents nested into couples, a larger sample size would also permit structural equation modeling approaches rather than our data reduction into composite scores. Finally, although the subjective nature of personal stress and distress seem most suitably assessed with self-report, future research should consider whether there are alternative strategies for the assessment of emotion regulation. For example, alternative informants to report on an individual's emotion regulation abilities, as is often done when assessing children (Renk 2005), could be an option; furthermore, an analog approach to assessing emotion regulation would be a particularly intriguing direction.

Overall, the aim of the study was to identify intrapersonal-level risk factors for parents who may be engaging in practices appearing earlier on the PCA continuum, in order to prevent parents from escalating their physical discipline to physical abuse. Emotion regulation appears to be an important factor that may explain in part the relationship between parents' perceived stress and their risk for harsher PCA or physical abuse. Thus, a potential avenue for future research could investigate the effects of enhancing parents' emotion regulation skills. Such research could determine whether parents who are unable to manage their stress effectively could learn to better modulate their emotions to minimize distress and thereby reduce their risk to engage in parent-child aggression. Moreover, frustration can provoke anger, with anger management included as a component of some abuse intervention and parenting programs (Donohue et al. 1998; Sanders et al. 2004). Future research could study whether young parents in prevention programs could benefit from improved handling of frustration to avert escalation into anger that could escalate parent-child aggression.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 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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