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Exposure to Childhood Traumas Ups the Odds of Giving Birth to Daughters

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Abstract

Purpose—This study examined the likelihood of giving birth to a daughter as a function of women's exposure to four categories of stressors: Childhood Trauma, Adult Trauma, Chronic Stressors, and Recent (adverse) Life Events. Hypothesis 1 stated that that exposure to Recent Life Events (near conception) and to childhood traumas would increase women's chances of having a girl baby. Hypothesis 2 stated that the relation between stress and gender outcome is mediated by persistent PTSD symptoms.

Method—The final sample was comprised of 225 women. The design was Prospective Observational. At first contact, women were retained if they were < 27 weeks pregnant and met initial inclusion criteria. In interview 2, at 27–30 weeks, women were excluded for positive diagnoses of anxiety disorders besides PTSD with or without depression (Structured Clinical Interview for DSM disorders). In interview 3 (30–34 weeks), reports on stress categories (Social Stress Indicator Questionnaire, SSI) and PTSD symptoms (Post Traumatic Checklist) were obtained. Infant Gender was obtained from medical records. The relation between stress categories and the distribution of girl/boy infants was examined with Chi Squares and Logistic Regression analyses. Mediation was tested with the macro PROCESS (Hayes 2012).

Results—Childhood Trauma was the only stress category that increased the odds of having a girl; with an odds ratio of > 3.0 for women who had been exposed to more than two such events. PTSD symptoms (partially) mediated the relation between Childhood Trauma and infant gender.

Conclusions—Findings suggest that women's exposure to childhood trauma contributes to the determination of the sex ratio at birth and that PTSD symptoms are part of the cause.

Keywords

Sex ratio; Prenatal stress; Childhood trauma; PTSD; Pregnancy; Gender

Introduction

Events that elicit stress in human populations are associated with a reduced secondary sex ratio (SSR), defined as the proportion of male to female live births. These events include earthquakes (Fukuda 1998; Saadat 2008; Torche and Kleinhaus 2012), terrorist attacks (Catalano et al. 2005), and declining economies (Catalano 2003; Catalano and Bruckner 2005; Catalano et al. 2012). Further, these findings converge with case-control studies showing that women who experience stressful experiences (e.g., death of a partner or child, Hansen et al. 1999; interpersonal violence, Morland et al. 2008) close to conception are more likely to give birth to a girl than a boy.

Evolutionarily, an increased prevalence of females born to mothers exposed to stress may be adaptive because males born into stressful environments father, on average, fewer children (and provide their own mother with fewer grandchildren) than do daughters (see Trivers and Willard, 1970, also Gabler and Volland 1994; Lummaa 2001). This is because males in stressful surrounds are more likely to die before reproduction compared with females despite having received more parental resources (Clutton-Brock 1991; Helle et al. 2009; Powe et al. 2010). Added to this, females living in stressful conditions might be better off having (weaker) female than male children because weak females will probably have some offspring, whereas weak males may have none at all (Waldron 1983; Wells 2000). The SSR also has important implications for competition for mates; and this can influence the manner, effort, and urgency with which individuals seek out a partner (Griskevicius et al. 2012), consider life-plans that do not require one (Durante et al. 2012), and/or are motivated to save money and accumulate wealth in order to “beat out” the competition (Wei 2013).

These considerations suggest that that the SSR can impact many life-strata and provide an incentive to identify conditions that predict shifts in the SSR in hopes of learning more about why and when they occur. For this, we asked women, late in pregnancy, to rate their exposure to an extensive set of stressors, categorized as (1) Adult Traumas, (2) Childhood Traumas, (3) (ongoing) Chronic Stressors, and (4) Recent Life Events. We then related the women’s scores on each stress-category to their infant’s gender, recorded after childbirth. Our hypothesis was that Recent Life Events would be a strong predictor based on the fact that most shifts in SSR have been documented during or in the wake of adverse events (e.g., brief wars: Zorn et al. 2002). This said, there are data that support chronic stressors (e.g., job strain, Ruckstuhl et al. 2010) as candidates. Finally, though childhood trauma has never been studied in relation to the SSR, there is strong evidence that early trauma can adversely affect women’s mental and physical health (e.g., Hillis et al. 2004), which could increase odds of having a daughter in some women (Subbaraman et al. 2010).

The second aim of our study was to test symptoms of Posttraumatic Stress Disorder (PTSD) as a mediator of the relation between trauma and the proportion of girl infants born to our sample. PTSD was nominated because it is a psychiatric disorder that is triggered by traumatic events. It also has physiological correlates (e.g., low cortisol, Seng et al. 2005) and promotes risky habits and behaviors (Seng et al. 2008) that can perturb health and reproduction (Morland et al. 2007; Seng et al. 2005; Seng et al. 2011; see review in Alder et al. 2007). Till now, only one study (Subbaraman et al. 2010) has examined the relation between a diagnosis of anxiety (including but not exclusively PTSD) and the SSR. The sample was comprised of women (> 80% high school graduates or less) diagnosed with psychiatric disorders within county mental health systems and a comparison group without diagnoses. Results of the study showed an association between SSR and a diagnosis of anxiety disorders, but only among African-American women—not among the other subgroups sampled in the study. Also noteworthy is the association between moderate levels

of psychological distress (including but not specific to anxiety) and a low SSR, based on self-ratings of 6629 pregnant women on a standardized questionnaire (Obel et al. 2007).

Notably, SSRs have almost entirely been studied through the lens of demography and epidemiology, with a reliance on national and other public registers for data. These studies provide the core evidence that SSR can vary with contextual adversity, but they do not allow direct comparison of stress conditions, as we propose. This is because most relevant studies targeted one event or circumstance within the category that we call Recent Life Events; no previous study has considered trauma that occurred years before conception as a potential cause; and no study has compared psychosocial stressors that differ in “kind” and time of exposure.

For this, we joined the few researchers of the SSR (e.g., Gómez-Gil et al. 2011; Mathews et al. 2008; James 1985) who have collected data directly from individuals in smaller samples in order to procure more detailed and personal information than is usually available in large data banks. In addition, based on a diagnostic interview, we were able to exclude women with a life-time history of anxiety besides PTSD, in order to avoid “mixing” disorders that may have different effects, singly or in combination, on women’s antenatal health and fetal development (e.g., Grant et al. 2008). We also excluded women with other attributes/habits (e.g., smoking, Fukuda et al. 2002) that have been related to a low SSR. Using the designated sample, we hoped to extend the extant literature by providing a relatively clean view of the effects of trauma events and trauma-related distress (PTSD) on the proportion of girl vs. boy babies born to the sample.

Method

All procedures were approved by institutional IRBs. Subjects were recruited by advertisement in newspapers, health clinics, and prenatal classes. Women who were accepted into the study (see below) were slated to be interviewed three times. In the first (phone) interview, at the time of the women’s first inquiry (weeks pregnant: mode: 24 weeks, median 18 weeks gestation), the protocol of the study was explained and, if the women were interested in participating, they were screened for some factors that may affect the SSR. On these bases, inclusion criteria were: (1) no serious pregnancy complications, (2) no smoking (Fukuda et al. 2002) and no drinking (alcohol) during pregnancy, except for one ceremonial glass of wine per week (Dickinson and Parker, 1994), (3) natural conception (Dean et al 2010), (4) pregnant with a single fetus (Bulmer, 1970), (5) has fewer than 7 children (James and Rostron, 1985), and (6) younger than 45 years of age (Rueness et al. 2012). In interview 2, at 27–30 weeks gestation, women were diagnosed for anxiety and mood disorders and excluded for positive diagnoses besides PTSD with or without depression. Comorbid depression was “allowed” because approximately 50% of persons with lifetime PTSD also suffer from major depression disorder (MDD) (Kessler et al. 1995).

Women who met screening criteria were interviewed a third time in our laboratory at 27–34 weeks gestation. There, they filled out questionnaires on trauma, stressors, and present and past symptomology. Infant gender was recorded from medical files and confirmed by the mothers in a short postpartum phone call.

Exclusion and Attrition

717 women, pregnant less than 27 weeks, called to inquire about the study. Of these, 528 went onto the second stage. The other 189 did not continue beyond interview 1 they were not interested in participating (30) or because: they smoked during pregnancy ($n = 63$), drank more than “allowed” by criteria (14), were pregnant with multiple fetuses and/or conceived by fertility treatments (30), had more than six “older” children (6), and/or had

long-term/chronic health problems (e.g., Crohn's disease, cancer, type 1 diabetes, heart disease, lupus) or pregnancy complications (46) that put mother and/or infant at high risk according to the expert opinion of Dr. David Mankuta, head of delivery rooms at Hadassah Hospital, Jerusalem. Pregnancy complications that merited exclusion included gestational diabetes, fetal heart disturbance, or an anomaly in placenta function or structure or level of amniotic fluid.

In stage 2, 226 of 528 women were excluded. Of those, 186 women were excluded based on SCID diagnoses (see section on exclusion, above). Exclusion was most prevalent for diagnoses of Specific Phobia (SP, 27), MDD (41), Obsessive Compulsive Disorder (4), Social Phobia (2), Panic with or without SP (5) and Generalized Anxiety Disorder (3). In addition, 40 women were excluded for medical reasons that emerged between the first and second interview (e.g., women assigned to bed rest by their own physician (4), gestational diabetes (4)). Of the remaining 302 women who passed stage 2, 280 were reached by phone at 30–32 weeks, and 250 agreed to participate. The other 30 refused due to discomfort and/or the fear of traveling to the hospital, which took up to 2 hours, during late pregnancy. In the end, 244 completed stage 3, and medical records were collected on 225. The other records could not be found by the hospital clerks.

Participants

The women in the final sample were 28.30 (SD = 2.08) years of age and had completed 15.43 (SD = 2.08) years of education. The range in parity was 0–6, with a mean of 1.16 (SD = 1.30), and the families' median monthly salary was approximately \$3,000/month, which is about average by Israeli standards (Central Bureau of Statistics 2012). Women in the final sample had completed more years of education than did the women who were excluded or who dropped out of the study (15.42 vs. 14.98, respectively; $p < .05$); but these two groups did not differ in age or parity ($p > .10$). According to the SCID (stage 2), 17 women in the final sample had lifetime PTSD without depression; 7 were diagnosed with lifetime PTSD and MDD. The remaining women had no clinical diagnoses.

Assessment Tools

Social Stress Indicator Questionnaire (SSI)—This self-administered questionnaire (Turner et al. 1995) considers four categories of stressors: (1) Recent life events, defined here, as adverse events that occurred from 3 months prior to conception through the first trimester of pregnancy (34 items, example: Was there trouble with the law?); (2) Chronic (ongoing) stressors (51 items, example: You are trying to take on too many things at once, (3) Childhood traumas (with childhood defined as < 18 years of age; 8 items; example: Did your parents divorce?); and (4) Adult traumas (> 18 years of age; 11 items, e.g., Did you ever have a major illness that required you to stay more than a week in the hospital?). Per instructions, subjects marked “yes” or “no” in regards to each trauma and life event and recorded the date of the exposure. For items in the section on chronic stress, subjects rated each item according to their relevance to self (0- not true, 1- somewhat true, 2- very much true).

A score for each stress category was derived by counting the number of endorsements. In addition, an intensity score was derived for the category of chronic stressors by summing the ratings across items.

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID)—This modular, semi-structured interview (First et al. 1996) for the diagnosis of psychiatric disorders provides lifetime and current diagnoses. In the present study, we used modules for diagnosis of anxiety disorders and mood disorders. Interviewers were graduate students in clinical

psychology, certified clinicians, or well-trained psychology undergraduates. Training was extensive; supervision was weekly, and all diagnoses were rechecked by a staff clinician. Previous studies have confirmed the reliability of the SCID administered by telephone (Crippa et al. 2008)

Posttraumatic Checklist (PCL)—The PCL (Weathers et al. 1994) is a self-report rating scale for assessing the 17 DSM-IV symptoms of PTSD. Participants are asked to rate the severity of symptoms (e.g., How much have you been bothered by repeated, disturbing memories, thoughts or images of a stressful experience?) on a scale from 1- not at all to 5- extremely. The tool has acceptable psychometric properties, including internal consistency, test-retest reliability, convergent validity, and discriminant validity (e.g., Ruggiero et al. 2003). In this study, subjects filled out one questionnaire for their worst lifetime trauma. Internal consistencies across items within each DSM-IV symptom cluster and across all 17-items were high (cluster range Cronbach $\alpha = .89-.93$; full scale, $\alpha = .91$). For the final score of PTSD symptoms, ratings on the PCL were summed, as is standard protocol (National Center for PTSD, 2007).

Statistical Analyses

To address hypothesis 1, Chi Square (X^2) tests were used to test for a linear association between number of events per category to which participants were exposed and the proportion of girls born to the sample. We also used logistic regression analyses to derive odds ratios (ORs) with 95% confidence intervals (CIs) of having a female offspring (dependent variable, 0- boy, 1- girl) in relation to each stress category. For these analyses, mothers' and fathers' age and education and parity (scored as continuous variables) were examined as covariates, and retained if they contributed significantly to the model. Findings of a significant relation between a stress category and infant gender prompted testing of a second model targeting the same category but adjusted for the three others.

To address hypothesis 2, we used the SPSS script (PROCESS) developed by Hayes (2013) to test PTSD as a mediator of the relation between childhood trauma (predictor) and gender of the index child (outcome). The macro undertakes regression models to derive the total, direct (child trauma to infant gender) and indirect effects (child trauma through PTSD symptoms to infant gender). Following standard procedures, the estimate of the indirect (mediated) effect was quantified as the product of two OLS regression coefficient: one estimating PTSD from childhood trauma and the second estimating infant gender from PTSD, while controlling for childhood trauma. A bias-corrected 95% bootstrap confidence interval (CI) for the product of these paths provided evidence of mediation.

Results

Preliminary analyses

225 women had complete data on infant gender and stressors (hypothesis 1) and 218 had complete data on PTSD symptoms (hypothesis 2). Missing values were not imputed. No differences in age, parity or education were found between women who gave birth to girl babies and those who gave birth to boys ($ps > .10$). PCL scores of mothers who delivered boys and those who delivered girls were not significantly different ($M [SD]$: boys: 29.38 [11.03]; girls 30.19 [11.83], $p > .05$).

Hypothesis 1: Stressors and infant Gender

Childhood trauma—Subjects endorsed a range of zero to five items in this category. Table 1 shows the percentages of girl infants born to women in each cell. The proportion of girl infants ranged from 41.5% among women who endorsed no childhood trauma to 64.3%,

72.7%, 75.0%, and 100% among women who endorsed 2, 3, 4, or 5 child traumas, respectively. Correspondingly, the logistic model (without covariates) indicated that Childhood Trauma predicted the likelihood of having a girl, with an overall predictive success estimated at 59% (61% boys, 56% girls; $X^2(1, N = 225) = 11.29, p = .002$; Table 2). To estimate the ORs of endorsing one or two or more childhood traumas, we categorized the number of child traumas endorsed into 0, 1, and 2 + traumas and reran the logistic regression, entering 0 vs. 1 and 0 vs. 2 as contrasts (dummy variables). Results from the unadjusted model showed that exposure to one childhood trauma increased the odds of giving birth to a girl infant by a factor of 1.5 (95% CI: 0.87–2.79) and exposure to two or more childhood traumas, increased the odds by a factor of more than 3 (95% CI: 1.50–6.47) (Fig 1).

These positive findings prompted two control (logistic) analyses: The first, using (continuous) Childhood Trauma as the target predictor (second step), adjusted for the other three stress scores (first step), showed that the full model ($X^2(4, N = 225) = 13.31, p = .01$) and the unique contribution of Childhood Trauma remained significant, even when the other scores were controlled ($B = .39, SE = .13, Wald = 9.03, p = .003, Exp(B) = 1.48, CI\ 95\% (1.15–1.91)$). In the second control test, we excluded women who had endorsed any adult trauma and then compared the number of girls vs. boys born to these women ($n = 51$) vs. those who endorsed one childhood trauma ($n = 24$) vs. those who had endorsed two or more ($n = 21$). Results show that women in the latter group gave birth to twice as many girls than boys ($n\ boys = 7 (33.3\%); n\ girls = 14 (66.7\%)$), whereas women who had experienced no traumas in childhood or one trauma gave birth to 24/51 (47.1%) and 12/24 (50%) girls, respectively. Results of a $2 \times 3 X^2$ across groups was not significant, ($X^2(2, N = 91) = 2.35, p > .10$), possibly due to low power.

Finally, in a supplemental analysis, we found that the proportion of males to females born to women in our sample with two or more childhood traumas was significantly different than the 105 males to 100 females born to women across Israel, according to population estimates made in 2013 (Central Intelligence Agency, 2013) ($z = 2.69, p < .001$). There was not a significant difference between the estimates of the population SSR and the proportion of males/females born to women who reported exposure to one childhood trauma.

Adult trauma—Participants endorsed between zero and four adverse events during adulthood (from age 18 to 3 months prior to pregnancy). As shown in Table 2, there was no discernable trend between the number of adverse events experienced and the odds of giving birth to a daughter. In one exploratory analysis, we tested the association between one item on the list, Witnessing Violence, and the likelihood of having a girl infant since declines in SSR have followed violence in the form of terror and brief wars (Grant, 2009). Indeed, of the 17 women who endorsed the item 82.4% gave birth to a daughter ($X^2(1, N = 225) = 6.77; p = .009$).

Recent life events—Table 1 shows the proportion of girls born to mothers who experienced recent adverse life events. As shown there and in Table 2, these kinds of events did not predict the likelihood of having a girl baby.

Chronic stressors—The proportions of girl infants as a function of endorsed chronic stressors (0–6) are presented in Table 1. As seen in Table 2, the unadjusted logistic regression model showed a discernable trend ($Wald = 2.96, p = .09$), but adjustment for the other three stress categories, reduced the effect substantially (last step of regression: $B = .02, SE = .03, Wald = .35, p = .56, Exp(B) = 6.89, CI\ 95\% (.97–1.07)$).

For more information, logistic regression analyses compared the distribution of girl vs. boy infants (dependent variable) in relation to summed ratings (“intensity”) of chronic stressors (ratings 0–2, across 50 items), instead of their frequency. Results revealed a significant linear effect of “intensity” (last step of regression: $B = 1.92$, $SE = .90$, $Wald = 4.58$, $p = .03$, $Exp(B) = 6.89$, $CI\ 95\% (1.17–39.25)$) in an unadjusted model, but not in the model adjusted for other stress categories ($B = 1.23$, $SE = 1.01$, $Wald = 1.49$, $p = .22$, $Exp(B) = 3.42$, $CI\ 95\% (.47–24.08)$), nor in the model restricted to women without childhood trauma. ($B = 1.33$, $SE = 1.36$, $Wald = .96$, $p = .33$, $Exp(B) = 3.78$, $CI\ 95\% (.26–54.80)$).

Additive effects of Life Stressors—To assess the relation between (total) lifetime stress and the distribution of boy and girl infants at birth, we entered all (4) stress categories into a logistic regression as predictors. The results of this analysis revealed a significant effect (omnibus test of model coefficients: $X^2(4, N = 225) = 12.18$, $p = .016$) of life stressors, although as shown above, only childhood trauma was significant on its own.

Hypothesis 2: PTSD Mediation model

Results showed that Childhood Trauma was associated with PTSD symptoms ($b = 9.26$, $SE = 1.89$, $B = .30$, $T = 4.89$, $p = .0001$, $CI(95) 5.53–12.99$) and that PTSD symptoms were associated with infant gender ($b = .46$, $SE = .14$, $Wald = 11.00$, $p = .007$). The unadjusted effect of Childhood Trauma on infant gender was .40 ($SE = .15$, $z = 2.73$, $p = .006$). The strength of the mediated effect of Childhood Trauma on gender through PTSD was estimated by the product of the pathways a (from Childhood Trauma to PTSD symptoms) $\times$ b (PTSD symptoms to infant gender) (Effect = .08, Boot $SE = .05$), and this indirect effect approached significance according to the normal theory based test ($Z = 1.69$, $p = .09$). Notably though, the 95% CI obtained from the value of $a \times b$ by bootstrapping did not include zero (Boot $CI(95) .005–.21$), which suggests that PTSD symptoms made some contribution to the relation between childhood trauma and the birth of girl infants.

Discussion and Conclusions

This study examined the likelihood of having a girl baby as a function of mothers’ exposure to childhood trauma, adult trauma, ongoing chronic stressors, and recent life events. We also considered PTSD symptoms as a potential mediator of the association between stress/trauma and the proportion of girl infants born to our sample.

Results show that the more traumas women had been exposed to during childhood, the more likely they were to give birth to a girl baby; and the association between childhood trauma and infant gender remained solid even after adjusting for exposure to other categories of stressors. Our data suggest that persistent PTSD symptoms mediate this association, which suggests a mechanism that bridges the effects of maternal childhood trauma into adulthood. These findings are intriguing and potentially important, though they need to be regarded with caution since they are the first evidence for a role of childhood trauma in determining sex ratio at birth; and the sample was relatively small. However, these considerations notwithstanding, our findings are consistent with cumulating research results showing profound effects of early trauma on humans’ neurophysiology, behavior, and a myriad of survival-related functions (e.g., stress reactivity and regulation, neuroendocrine and immune function, and physical and mental health) that can persist throughout life (Wadhwa et al. 2001; Pikarinen et al. 2007; Hillis et al. 2004). Relevant to the present discussion, the consequences of a history of early childhood trauma could foster “maternal conditions” (e.g., lack of personal resources, risk for mental health issues) favoring the birth of girl infants (e.g., Cameron 2004; James 2010; Wells 2000).

Contrary to expectations, we found no evidence of an association between exposure to recent life events and the birth of girl infants, even though exposure to these events would have occurred just before conception out to the end of first trimester, which has been considered one of the most “sensitive” periods for the “manipulation” of the sex ratio (e.g., Glynn et al., 2001). Further, our findings were negative with regards to the category of Chronic Stressors and Adult Trauma, although one select item in the latter category, Witnessing Violence, was associated with a prevalence of girl infants at birth, and this is consistent with some previous findings (review in Grant 2009). Future research should continue to examine Chronic Stressors, given that we found a trend association ($p=.09$).

Mediation by PTSD was weak but reliable, suggesting that PTSD plays some role in linking trauma-exposure to a shift in the SSR but that there are other contributing factors that may be stronger mediators than the subjective distress of PTSD. Among the most likely are atypical levels of corticotropin releasing hormone (CRH) and cortisol that are associated with PTSD and which have been shown to impact important aspects of reproduction, including the timing of delivery and weight of infants at birth (Morland et al. 2007; Seng et al. 2011; Wadhwa 2005). In addition, PTSD could affect women’s antenatal health via immune dysfunction (review in Pace and Heim, 2011), altered gene expression (Bloomfield 2011), and maladaptive health behaviors (Owen et al. 2005; Seng et al. 2008; Yampolsky et al. 2010) - any one of which could ultimately lead to a disproportional loss of weaker embryos/fetuses, which are more likely male (Elsmén et al. 2004). Other possibilities include stress-related increases in androgens during pregnancy, which could affect fetal development especially among males (James, 2012). Finally, there is circumstantial evidence that the greater vulnerability of male fetuses to maternal stress may be related to the minimalist response in “their” placenta (i.e., few gene, protein, or functional changes), which ultimately ensures continued growth in a less than optimal maternal environment, but a greater risk of IUGR, prematurity or death, especially if stress is chronic or recurrent (Clinton, 2010; Sandman et al. 2012, see review in Aiken and Ozanne 2013).

Before closing, we note a number of limitations of this study. First, the sample was relatively small, which may explain some of the negative results. Second, generalizability of the findings may be limited by the fact that the sample was Israeli, which may have influenced the prevalence of traumas or symptoms; and the women were excluded for risky health habits, chronic health problems, serious pregnancy complications, and mood and anxiety disorders besides PTSD (with or without MDD). Third, results may have been different had we defined the time frame of childhood traumas more narrowly or the time frame of recent events, more broadly. Finally, reports of childhood trauma were retrospective, which makes them prone to error, although some researchers have argued against significant bias, at least for reporting traumas, such as child abuse (Fergusson 2013). In this regard, we note that, from intake, women were aware of the personal nature of questions that they would be asked; and importantly, their openness was facilitated by the relationship forged with the interviewers during the course of the women’s pregnancy.

Despite these caveats; our findings are novel and advance what we know about stress and the SSR, and more generally – about the link between stress, women’s mental health, and reproductive function. Future studies should attempt to replicate the findings and identify more specifically the characteristics of childhood trauma, including type and timing, which predict shifts in SSRs. It also will be important to learn more about the implications of sex ratio shifts on human development, for instance in regards to differences in men and women’s health through the lifespan and longevity (e.g., Catalano 2011). Finally, we add that integration of research on SSR into developmental and clinical research seems appropriate and timely, given a contemporary perspective of development as shaped by evolutionary-based adaptations to different environmental contexts (e.g., Ellis and Bjorklund

2012), with the end goal of assuring that parents' genes will pass on to their offspring. Based on our studies, among others, it seems that such adaptations may begin as early as conception, or even before.

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Fig 1.
Percent girl and boy infants born to women with 0, 1, 2 + childhood traumas

Table 1

Percent girls (n) born to mothers exposed to counts of traumas and stressors

	Number of traumas/stressors					
	0	1	2	3	4	5
Childhood Trauma	41.5 (118)	51.6 (62)	64.3 (28)	72.7 (11)	75.0 (4)	100.0 (2)
Adult Trauma	52.1 (96)	42.9 (70)	52.4 (42)	61.5 (13)	50.0 (4)	x
Life Events	45.6 (103)	54.1 (74)	50.0 (32)	50.0 (12)	100 (1)	66.7 (3)
Percentiles						
	1	2	3	4	5	6
Chronic Stressors	52.9 (34)	39.0 (41)	47.1 (34)	43.2 (44)	60.0 (35)	59.5 (37)

Table 2

Results of logistic regression for stress categories

	B	S.E.	Wald	df	p	Exp (B)	Lo 95% CI	Hi 95% CI
CHILDHOOD TRAUMA	.46	.14	10.03	1	.002	1.58	1.19	2.09
constant	-.36	.17	4.30	1	.04	.70		
ADULT TRAUMA	.04	.13	.07	1	.79	1.04	.79	1.35
constant	-.04	.18	.05	1	.82	.96		
RECENT LIFE EVENTS	.14	.13	1.06	1	.30	1.15	.88	1.48
constant	-.13	.18	.51	1	.47	.88		
CHRONIC STRESSORS	.041	.024	2.96	1	.09	1.04	.99	1.09
constant	-.39	.26	2.29	1	.13	.67		