

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Child Abuse & Neglect

journal homepage: www.elsevier.com/locate/chiabuneg

Research article

Positive childhood experiences predict less psychopathology and stress in pregnant women with childhood adversity: A pilot study of the benevolent childhood experiences (BCEs) scale

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ARTICLE INFO

Keywords:

Childhood
Adversity
Developmental psychopathology
Pregnancy
Resilience

ABSTRACT

This pilot study examined the psychometric properties of the Benevolent Childhood Experiences (BCEs) scale, a new instrument designed to assess positive early life experiences in adults with histories of childhood maltreatment and other adversities. A counterpart to the Adverse Childhood Experiences (ACEs) questionnaire, the BCEs was developed to be multiculturally-sensitive and applicable regardless of socioeconomic position, urban-rural background, or immigration status. Higher levels of BCEs were hypothesized to predict lower levels of psychopathology and stress beyond the effects of ACEs in a sample of ethnically diverse, low-income pregnant women. BCEs were also expected to show adequate internal validity across racial/ethnic groups and test-retest stability from the prenatal to the postnatal period. Participants were 101 pregnant women ($M = 29.10$ years, $SD = 6.56$, range = 18–44; 37% Latina, 22% African-American, 20% White, 21% biracial/multiracial/other; 37% foreign-born, 26% Spanish-speaking) who completed the BCEs and ACEs scales; assessments of prenatal depression and post-traumatic stress disorder (PTSD) symptoms, perceived stress, and exposure to stressful life events (SLEs) during pregnancy; and demographic information. Higher levels of BCEs predicted less PTSD symptoms and SLEs, above and beyond ACEs. The BCEs showed excellent test-retest reliability, and mean levels were comparable across racial/ethnic and Spanish-English groups of women. Person-oriented analyses also showed that higher levels of BCEs offset the effects of ACEs on prenatal stress and psychopathology. The BCEs scale indexes promising promotive factors associated with lower trauma-related symptomatology and stress exposure during pregnancy and illuminates how favorable childhood experiences may counteract long-term effects of childhood adversity.

1. Introduction

The enduring role of early life experiences on lifespan development has been well-documented, both in terms of the negative effects of early adversity on long-term maladaptation, and the beneficial influences of positive early experiences on subsequent

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<http://dx.doi.org/10.1016/j.chiabu.2017.09.022>

Received 10 May 2017; Received in revised form 5 September 2017; Accepted 18 September 2017
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Table 1
BCEs Items and Frequencies for Prenatal Sample and Postnatal Follow-up.

<i>When you were growing up, during your first 18 years of life...</i>			
Item	Question	Prenatal (n = 101)	Postnatal (n = 77)
1	Did you have at least one caregiver with whom you felt safe?	90%	96%
2	Did you have at least one good friend?	87%	92%
3	Did you have beliefs that gave you comfort?	69%	75%
4	Did you like school?	67%	81%
5	Did you have at least one teacher who cared about you?	82%	90%
6	Did you have good neighbors?	59%	71%
7	Was there an adult (not a parent/caregiver or the person from #1) who could provide you with support or advice?	78%	81%
8	Did you have opportunities to have a good time?	86%	91%
9	Did you like yourself or feel comfortable with yourself?	67%	79%
10	Did you have a predictable home routine, like regular meals and a regular bedtime?	81%	82%

wellbeing (Masten & Cicchetti, 2016; Sroufe, Egeland, Carlson, & Collins, 2005; Waters & Cummings, 2000). Regarding the former, a wealth of research has demonstrated that childhood exposure to maltreatment, intimate partner violence, and other forms of interpersonal dysfunction (e.g., parental psychopathology, addiction, and absence) within the family environment predict long-term problems with mental health, relationships, and parenting into adulthood (Belsky, Conger, & Capaldi, 2009; Narayan, Englund, Carlson, & Egeland, 2014; Narayan, Englund, & Egeland 2013; Thornberry, Freeman-Gallant, Lizotte, Krohn, & Smith, 2003). These effects have been confirmed both prospectively (e.g., Radke-Yarrow, 1998; Sroufe et al., 2005) and retrospectively, such as via the Adverse Childhood Experiences (ACEs) study, which found that higher numbers of 10 different childhood adversities portend poorer adulthood health and wellbeing (Center for Disease Control and Prevention, 2016; Felitti et al., 1998).

Research has also focused on understanding how positive early life experiences may confer resilience in the context of adversity. Resilience investigators have identified several key favorable early experiences, including healthy attachment bonds, effective parenting behaviors, and other resources within communities and societies, as comprising conceptual “short lists” of positive childhood influences on long-term development (Masten, 2001, 2014; Wright, Masten, & Narayan, 2013). Currently, there is a need to aggregate these positive influences into a brief yet effective index, similar to the 10-item ACEs composite but reflecting favorable early experiences, that may counteract or outweigh the long-term effects of early adversity.

The present study introduces the Benevolent Childhood Experiences (BCEs) scale (Narayan, Ghosh Ippen, Rivera, & Lieberman, 2015), a new instrument that assesses favorable experiences between birth to age 18 characterized by internal and external perceived safety, security, and support; and positive and predictable qualities of life (Table 1). Similar to the ACEs questionnaire (CDC, 2016), the BCEs scale yields a cumulative score of up to 10 positive childhood experiences. This study tested the psychometric properties of the BCEs scale in a high-risk and ethnically diverse sample of low-income pregnant women with high levels of childhood adversity. Examining the BCEs in a high-risk perinatal sample not only informs understanding of the BCEs in relation to the well-established ACEs questionnaire, but it also affords the opportunity to examine the predictive validity of the BCEs for adulthood psychopathology and stress during the sensitive developmental period of pregnancy.

1.1. Theoretical perspectives on the role of positive childhood experiences

According to a developmental psychopathology (DP) perspective, early social experiences such as attachments with caregivers; relationships with peers, teachers and extended kin; and a positive sense of self provide the foundation for future healthy relationships and integration of social experiences (Cicchetti & Toth, 2009; Masten, 2006; Sroufe, 1979; Waters & Cummings, 2000). Positive self and relational experiences are particularly important in the context of early adversities such as maltreatment and violence exposure because they serve to buffer adaptation (Luthar, Crossman, & Small, 2015; Masten, 2014; Wright et al., 2013). Positive childhood experiences comprising the BCEs scale would be expected to contribute to resilient functioning, defined as manifestations of sustained or restored positive functioning despite or in the aftermath of adversity (Masten & Cicchetti, 2016; Narayan, 2015; Wright et al., 2013). Higher levels of BCEs would not directly index or measure resilience, which cannot be quantified as a state or trait, but would signal higher potential for more resilient outcomes.

Developmental psychopathologists distinguish between mechanisms of resilience operating through promotive versus protective factors. Promotive factors are evident by direct or main effects and are associated with favorable outcomes for individuals in both low- and high-risk contexts, whereas protective factors typically serve as moderators or buffers that reduce the probability of harm as risk rises (Masten & Cicchetti, 2016; Narayan, 2015; Narayan, Sapienza, Monn, Lingras, & Masten, 2015; Wright et al., 2013). Presently, BCEs were operationalized as promotive factors that directly reduce risk for psychopathology and stress for all women in this sample, including those who experienced low and high levels of childhood adversity.

Empirical evidence supports favorable childhood experiences as promotive factors for positive functioning in adulthood. A recent study conducted on women from the original ACEs study found that increasing numbers of family-specific strengths, such as closeness, support, loyalty, protection, and love, predicted lower odds of adolescent pregnancy and adult psychosocial maladjustment (e.g., occupational, financial, familial, and emotional problems; Hillis et al., 2010). A study of low-income pregnant women also

found that more retrospectively-reported favorable childhood influences, such as having positive parental relationships, and being hugged or complimented predicted lower levels of depression (Chung, Mathew, Elo, Coyne, & Culhane, 2008).

Promotive factors are also evidence amidst concurrent childhood adversity. Among maltreated children, higher levels of parental sensitivity and more consistent, higher quality interactions with second caregivers and extended kin were promotive of less behavioral problems at school entry, stronger academic performance through elementary school, higher educational attainment, and lower levels of psychopathology into adulthood (Appleyard, van Dulmen, Egeland, & Sroufe, 2005; Collishaw et al., 2007; Sroufe et al., 2005). Similar promotive effects of positive caregiving have been linked to decreased behavioral problems and stronger social skills in children exposed to violence (Howell, Graham-Bermann, Czyz, & Lilly, 2010; Lieberman, Van Horn, & Ozer, 2005). Internally focused characteristics, such as a favorable sense of self, also serve promotive functions amidst childhood adversity. A positive self-concept (as measured by elevated youth-reported self-esteem) directly predicted maltreated children's adaptive functioning (behavioral, peer, and academic competence) during the school years (Cicchetti & Rogosch, 1997). Together, these studies illustrate the importance of effective relationships and a positive self-concept as promotive factors for adjustment during adversity.

In addition to the DP perspective, the current study drew heavily from the ecological systems and ecological-transactional perspectives, which emphasize that nested, interactional resources support the positive development of youth who have experienced adversity. These perspectives argue that developmental adaptation stems not only from internal and familial factors, but also from relationships with friends, at school, and in the community (Bronfenbrenner, 1977; Cicchetti & Lynch, 1993). Accordingly, the BCEs scale includes not only internal (e.g., positive sense of self, positive core beliefs) and familial (e.g., safe caregiver, predictable home routine) resources and experiences, but also positive relationships with friends, teachers, neighbors, and extended kin or mentors. Indeed, empirical evidence shows that positive peer and teacher relationships and perceived community support benefit youth exposed to severe adversities (Annan, Blattman, & Horton, 2006; Duraković-Belko, Kulenović, & Dapić, 2003; Pianta, Steinberg, & Rollins, 1995; Sroufe et al., 2005).

1.2. Development of the BCEs scale

In addition to the DP perspective and theories on resilience, the development of the BCEs scale was informed by previous research instruments and studies indexing positive childhood experiences. For instance, the Protective and Compensatory Experiences (PACES) survey (Morris & Hays-Grudo 2014) contains some similar items regarding the availability of safe and loving caregivers, close friends, non-parental trusted caregivers, and stable home environments (as well as non-similar items pertaining to childhood involvement in social clubs and hobbies, and availability of educational resources). Two aforementioned studies also tallied the sum of four queried positive influences in childhood (PICs; Chung et al., 2008) or seven dimensions of family-specific strengths (Hillis et al., 2010).

The BCEs scale was specifically developed to address several shortcomings in previous instruments indexing positive childhood experiences. Foremost, it is intended for cross-cultural use, including for individuals who grow up in rural or developing regions. This priority was motivated by the observation that, for a significant proportion of foreign-born mothers receiving mental health services at the program where this study was conducted, many of the positive experiences on the PACES or PIC scales were either not a routine part of upbringing in their cultures or reflected culturally-bound parenting practices (e.g., receiving frequent hugs, participating in civic groups or clubs). Moreover, several items on previous instruments, such as access to educational resources or participation on sports teams, presume that schools or communities have financial capital, thus confounding positive childhood experiences with socioeconomic status (SES). Our intention in developing the BCEs was to measure elements of favorable early experiences that were neither linked to or a proxy for higher SES.

The BCEs was also created for non-English-speakers. The developers of the BCEs scale, three of whom are multilingual and three of whom are licensed psychologists, drew from their clinical experiences with foreign-born, multicultural families to generate 10 items believed to be multi-culturally sensitive. Then, the developers translated and back-translated the BCEs items in English and Spanish to correspond to a third-grade reading level.

Finally, it was important that the BCEs be reliable even if retrospectively reported. Typically, objective life experiences or the presence of resources can be retrospectively reported with adequate reliability if assessed in the format, "Did this happen, yes or no?" or "Was this present in your childhood, yes or no?" (Hardt & Rutter, 2004; Narayan, Kalstabakken et al., 2017), whereas retrospective details of events (e.g., frequency, severity, etc.) are less reliable. Accordingly, all BCEs items assess the presence or availability of objective experiences and resources.

1.3. The perinatal period as a key developmental transition

Developmentally, pregnancy is a transformational period during which women experience emotional and psychological transitions, in addition to profound biological and hormonal changes, that shape and organize their expectations for parenthood (Lieberman, Díaz, & Van Horn, 2009; Narayan, Rivera et al., 2017; Slade, Cohen, Sadler, & Miller, 2009). During pregnancy, women are particularly likely to reference and reflect on their own childhood experiences of love and support as they prepare to become mothers (Lieberman et al., 2009; Narayan, Oliver Bucio, Rivera, & Lieberman, 2016). Women who have experienced early adversity, such as maltreatment and violence exposure, are especially at risk for negative or harmful relationship dynamics, distorted prenatal attributions, and obstetric complications during pregnancy (Huth-Bocks, Krause, Ahlfs-Dunn, Gallagher, & Scott, 2013; Leeners, Richter-Appelt, Imthurn, & Rath, 2006; Narayan, Hagan, Cohodes, Rivera, & Lieberman, 2016). As such, pregnancy is a pivotal period linking the legacy of early adversity across generations, and a period of heightened potential to deter this transmission by uncovering promotive processes.

Very little research, however, has documented links between positive early experiences in the early lives of pregnant women and better health and wellbeing during their pregnancies (Chung et al., 2008; Hillis et al., 2010; Narayan, Oliver Bucio et al., 2016; Narayan, Rivera et al., 2017). Presently, the extant literature has mostly focused on pathways linking early adversity, including higher rates of ACEs and specific subtypes of maltreatment, to prenatal health risk behaviors, such as higher rates of substance use, teen and unintended pregnancy, delivery complications, and preterm birth (Chung et al., 2010; Dietz et al., 1999; Hillis et al., 2004; Leeners et al., 2006; Wosu, Gelaye, & Williams, 2015). Some research has also linked early adversity to exposure to traumatic and stressful life events during pregnancy (Castro, Peek-Asa, García, Ruiz, & Kraus, 2003; Narayan, Hagan et al., 2016) and prenatal depression and anxiety (Benedict, Paine, Paine, Brandt, & Stallings, 1999; Lang, Rodgers, & Lebeck, 2006). PTSD symptoms during pregnancy have been linked to a history of childhood maltreatment in a few studies (e.g., Seng, Low, Sperlich, Ronis, & Liberzon, 2009; Sumner, Wong, Schetter, Myers, & Rodriguez, 2012), but remain an understudied mechanism for the intergenerational transmission of adversity. Understanding whether higher levels of BCEs predict less exposure to stressful life events and fewer PTSD and depression symptoms during pregnancy, as well as offset the long-term effects of ACEs on pregnant women's functioning, is important to deterring intergenerational adversity.

Preliminary support for the BCEs has already shown that pregnant women without clinical levels of depression or PTSD symptomatology during pregnancy (i.e., total symptoms that do not meet clinical cutoffs for psychiatric diagnoses) reported significantly higher levels of BCEs than women with clinical levels of prenatal depression and PTSD symptoms (Narayan, Rivera et al., 2017). The current study extends these findings by expanding the predictive validity of the BCEs, while also accounting for childhood ACEs, and examining the psychometric properties of the BCEs, including its test-retest reliability and cross-cultural validity.

1.4. The current study

This study tested promotive pathways linking higher levels of BCEs to lower levels of psychopathology (i.e., prenatal depression and PTSD symptoms) and stress (i.e., perceived stress, exposure to stressful life events [SLEs]) during pregnancy, above and beyond the effects of ACEs. It was hypothesized that higher levels of BCEs would a) predict lower levels of psychopathology and stress during pregnancy, and b) remain predictive while accounting for ACEs and covariates. The extent to which BCEs offset the effects of ACEs was also tested, with the hypothesis that clusters of women with higher levels of BCEs, even despite high ACEs, would have less prenatal psychopathology and stress than clusters of women with low BCEs and high ACEs. Psychometrically, levels of BCEs were hypothesized to be comparable across racial/ethnic groups and U.S.- versus foreign-born pregnant women, reflecting multicultural generalizability, and demonstrate adequate prenatal to postnatal test-retest reliability.

2. Method

Participants were 101 pregnant women ($M = 29.10$ years, $SD = 6.56$, range = 18–44; 37% Latina, 22% African-American, 20% White, 7% Asian/Pacific Islander, 1% American Indian, 13% biracial/multiracial; 37% foreign-born, 81% of whom were born in Mexico, or Central or South America). All women were planning to deliver their babies at an urban county hospital that predominantly serves low-income families who receive public health insurance or are uninsured. Women were recruited as part of a larger study on the intergenerational transmission of risk and resilience through the pregnancy period and perinatal mental health service needs and utilization. They were eligible to participate if they spoke either Spanish (26%) or English (74%), were in their second (47%) or third trimester (53%), and were at least 18 years old. The hospital's institutional review board approved all study procedures, and women provided informed consent. They completed two study interviews, the first during pregnancy (prenatal; Wave I) and the second when babies were three to four months old (postnatal; Wave II). Interviews included standardized instruments and semi-structured interviews on mental and physical health, childhood and adulthood experiences and adversity, demographics, and other topics. Women were orally administered all instruments in their language of preference (Spanish or English) so reading level would not affect responses, and they were compensated with gift cards.

2.1. Measures: predictors

2.1.1. Benevolent childhood experiences (BCEs)

During Waves I and II, women completed the BCEs scale (Narayan, Ghosh Ippen et al., 2015), a 10-item checklist of positive experiences between ages 0–18 years (see Table 1). Items pertained to perceived relational and internal safety and security (e.g., at least one safe caregiver, beliefs that gave comfort), positive and predictable quality of life (e.g., enjoyment of school, regular meals and bedtime), and interpersonal support (e.g., a teacher who cared, a supportive non-caregiver adult). One-quarter (26%) of women completed the BCEs in Spanish. Positively endorsed items were summed for a total BCEs score.

2.1.2. Adverse childhood experiences (ACEs)

During Wave I, women completed the ACEs Calculator, a short version of the ACEs questionnaire, which is disseminated by the nonprofit organization, Health Presentations, an affiliate of the CDC (CDC, 2016; NCJFCJ, 2006). The ACEs Calculator includes 10 yes/no questions about adversity between 0 to 18 years, five items pertaining to child maltreatment (verbal/emotional, physical and sexual abuse, emotional and physical neglect) and five items pertaining to child exposure to family dysfunction (domestic violence, parental divorce/separation, substance use, mental illness, and incarceration). Positively endorsed items were summed for a total 10-point ACEs score, as well as two 5-point sub-scores for childhood maltreatment and family dysfunction experiences used in the cluster

analyses.

2.2. Measures: outcomes

2.2.1. Prenatal depression

Pregnant women completed the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Segovsky, 1987), a 10-item checklist of depression symptoms on 0–3-point scales reflecting severity of symptoms. The EPDS is designed to assess perinatal depression symptoms in the past week not otherwise accounted for by biological or hormonal changes associated with pregnancy (e.g., fatigue, appetite fluctuations). The present study used raw scores, which can range from 0 to 30, with higher scores indicating more depression. Approximately 46% of the sample reported prenatal depression in the clinical range (total scores ≥ 10), a cutoff recommended by the American Academy of Pediatrics (Earls, 2010).

2.2.2. Prenatal PTSD

During pregnancy, women completed the PTSD Checklist for the DSM-5 (PCL-5; Weathers et al., 2013); a 20-item checklist of PTSD symptoms in the past month on 0–4-point scales of increasing symptom intensity ranging from *Never* to *Extremely*. Total possible scores range from 0 to 80, with a recommended cutoff of ≥ 33 for clinical levels of PTSD (National Center for PTSD, 2017). Although the current analyses used continuous raw scores, approximately 29% of women met clinical criteria for PTSD.

2.2.3. Prenatal perceived stress

Women's perceived stress scores were assessed with the Perceived Stress Scale (PSS; Cohen, Karmarck, & Mermelstein, 1983), a 10-item scale that assesses difficulties managing and coping with current stress. Items are reported on 0–4-point scales of increasing frequency from *Never* to *Very Often* in the past month. Scores range from 0 to 40, and in the present sample, approximately 30% of women reported perceived stress that was approximately 1 standard deviation above national norms for women (i.e., scores ≥ 21 , Cohen et al., 1983). Similar to psychopathology symptoms, raw scores were used in the analyses.

2.2.4. Prenatal stressful life events (SLEs)

A cumulative score of prenatal stressful or traumatic life events was computed based on women's responses to 10 events/experiences that occurred during this pregnancy: an unplanned pregnancy (62%), exposure to community violence (e.g., witnessing/hearing or experiencing robbery, mugging, gang violence, gunshots, etc., 29%), physical or sexual perpetration of aggression against a romantic partner (23%), currently unpartnered with the baby's father (22%), a period of homelessness (19%), a physical assault by a romantic partner or stranger (18%), an incarceration (7%), a sexual assault by a romantic partner or stranger (6%), the death of a parent, relative, or friend (6%), and falling below the federal poverty guideline (70%) at the time of the prenatal interview. The latter was computed with participants' reported current monthly income converted to annual income and the number of people in their household that the income supported. Cutoffs were then determined with the federal criteria put forth by the U.S. Department of Health and Human Services (2017a, 2017b). To compute the prenatal SLE index, positively endorsed items were summed. Scores ranged from 0 to 7 SLEs during pregnancy, and continuous scores were used in analyses.

2.3. Measures: covariates

Demographic covariates included language, and maternal age and education level. Two pregnancy-related covariates were primiparous status (21%), and the number of weeks pregnant at the time of the prenatal interview (range = 13–41 weeks). Primiparous status was included because women in their first pregnancy might experience stressors or psychopathology differently than women who were previously pregnant one or more times. Number of weeks pregnant was included because women farther into their pregnancies might have experienced more SLEs.

2.4. Data analytic plan and missing data

First, bivariate associations between BCEs and all outcomes were examined. Second, *t*-tests examined whether mean levels of BCEs differed across participants' language, racial/ethnic groups, or between U.S.- versus foreign-born women. Next, the predictive validity of the BCEs for the prenatal stress and psychopathology outcomes was tested with four hierarchical linear regressions (for prenatal depression and PTSD symptoms, perceived stress, and SLEs). For each regression, the five covariates were entered in the first step, the total BCEs score was entered in the second step, and the total ACEs score was entered in the third step. All regressions were examined for influential cases using Cook's $d \geq 4/n$ (Cook & Weisberg, 1982; Rawlings, 1988).

Following the regressions, a person-oriented cluster analysis examined whether subgroups of women differed on mean levels of BCEs and ACEs, with ACEs "unpacked" into experiences of childhood maltreatment versus family dysfunction. This process of "unpacking" risk (e.g., Masten & Narayan, 2012; Narayan, Kalstabakken et al., 2017) provides understanding about whether higher levels of BCEs can offset effects of each type of ACEs (experiences of childhood maltreatment, family dysfunction, or both) on prenatal psychopathology and stress. This person-oriented cluster approach, which has been done previously in comparably sized samples of women who have high levels of stress and adversity (Narayan, Hagan et al., 2016; Narayan, Ghosh Ippen, Harris, & Lieberman, 2017) allows for clearer, more specific understanding about whether unique, within-sample groups share meaningful patterns (Bogat, Levendosky, & von Eye, 2005; Narayan, Labella, Englund, Carlson, & Egeland, 2017), such as whether BCEs may offset the long-term

effects of ACEs for some women in this sample, but not others. Because no specific number of clusters was expected, an exploratory two-step approach was used, which first minimizes the distance between cases and then uses hierarchical clustering to determine the number of clusters that best fit the data. BCEs, childhood maltreatment, and family dysfunction were entered as the cluster indicators, and overall fit was determined with the log-likelihood procedure and the silhouette measure of cohesion and separation, with good fit considered to be ≥ 0.50 (Norusis, 2005-2012). Analyses of covariance (ANCOVA) tests then examined whether cluster groups differed on mean levels of prenatal psychopathology and stress, controlling for the same covariates.

Finally, the test-retest stability of the BCEs was examined with bivariate correlations between prenatal and postnatal BCEs and difference scores to identify the number of women for whom the BCEs scores changed. All analyses were conducted in SPSS Version 24.

Missing prenatal data was very minimal and ranged from 0% on the demographic and pregnancy covariates, to 2% on the predictors and outcomes. Missing data were imputed across 20 datasets using fully conditional specification. All regressions were re-conducted with imputed data and results were pooled across all 20 sets (Rubin, 1987; Schafer & Graham, 2002). To further examine the robustness of the effects given the negative skew of the BCEs data and the non-normality of the dependent variables, all regressions were subsequently re-conducted in MPlus with bootstrapping across 1,000 datasets (Muthén and Muthén, 1998-2017). For the cluster analysis, two women were not included because they did not provide data on BCEs and ACEs, so the final cluster solution reflects data from 99 women. Results from the raw, imputed, and bootstrapped datasets were compared, and no differences were noted, nor were there any influential cases. Accordingly, results from the raw data are reported below.

3. Results

3.1. Descriptive statistics

Bivariate correlations are shown in Table 2. Higher levels of BCEs were significantly inversely associated with all four prenatal outcomes: depression symptoms, $r = -0.24$, $p < 0.05$; PTSD symptoms, $r = -0.37$, $p < 0.01$; perceived stress, $r = -0.26$, $p < 0.01$; and total number of prenatal SLEs, $r = -0.37$, $p < 0.01$. BCEs and ACEs were significantly but only modestly associated, $r = -0.36$, $p < 0.01$. Approximately 28% of the sample endorsed all 10 BCEs. While only 2% of the sample endorsed all 10 ACEs, 94% of women endorsed at least one ACE, 73% endorsed at least one type of childhood maltreatment ($M = 1.90$, $SD = 1.74$), and 85% endorsed at least one type of family dysfunction ($M = 2.18$, $SD = 1.48$).

Independent t-tests showed that mean levels of BCEs did not significantly differ by language of administration, $t(97) = -0.33$, $p = n.s.$; for mothers who were English-speaking ($M = 7.80$, $SD = 2.07$) or Spanish-speaking ($M = 7.96$, $SD = 2.37$); or by place of birth, $t(97) = -0.75$, $p = n.s.$, for mothers who were U.S.-born ($M = 7.72$, $SD = 2.13$), versus foreign-born ($M = 8.06$, $SD = 2.16$). Mean levels of BCEs also did not differ between the three main racial/ethnic groups in this sample, $F(2, 77) = 0.67$, $p = n.s.$, for mothers who identified as Latina ($M = 7.97$, $SD = 2.17$), White ($M = 7.70$, $SD = 2.16$), or African-American ($M = 7.27$, $SD = 2.37$).

3.2. Predictive validity

Results from the first regression (depression symptoms), indicated that after controlling for the covariates, higher levels of maternal BCEs significantly predicted lower levels of prenatal depression symptoms ($\beta = -0.21$, $p < 0.05$), but this effect did not hold

Table 2
Bivariate Correlations between all Variables for 101 Pregnant Women.

	1	2	3	4	5	6	7	8	9	10	11
IVs and DVs											
1. BCEs	–										
2. Depression sxs.	-.24*	–									
3. PTSD sxs.	-.37**	.73**	–								
4. Perceived stress	-.26**	.70**	.65**	–							
5. SLEs	-.37**	.37**	.51**	.36**	–						
6. ACEs	-.37**	.25*	.41**	.31**	.37**	–					
Covariates											
7. Spanish language	.03	-.21*	-.17	-.14	-.35**	-.12	–				
8. Age	.04	.05	-.05	-.08	-.20*	-.14	.22*	–			
9. Education	.14	.03	.01	.11	-.21*	-.06	-.18†	.22*	–		
10. Weeks pregnant	.16	-.14	-.16	-.13	-.09	.06	.09	-.04	.03	–	
11. First pregnancy	-.05	-.13	.03	.02	-.06	.03	-.13	-.30**	.13	.02	–
Descriptives											
Mean or%	7.84	9.14	22.49	16.92	2.66	4.08	26%	29.10	12.62	28.09	21%
SD	2.14	5.92	17.50	7.70	1.82	2.67	NA	6.56	2.56	7.65	NA
Missing (n)	2	2	1	2	5	2	0	0	0	0	0

Note: IVs = Independent variables, DVs = dependent variables, Sxs. = Symptoms, SD = standard deviation.

† $p < .10$, * $p < .05$, ** $p < .01$.

Table 3
Hierarchical Regressions for Prenatal PTSD Symptoms and Stressful Life Events (SLEs) during Pregnancy.

	PTSD Symptoms						Stressful Life Events (SLEs)					
	B	SE	β	R ²	F	ΔR^2	B	SE	β	R ²	F	ΔR^2
Step 1: Covariates				.05	.45	.05				.21	4.87*	.21**
Spanish language	−5.90	4.37	−.15				−1.66	.42	−.39**			
Age	−.05	.31	−.02				−.01	.03	−.04			
Education	−.05	.75	−.01				−.19	.07	−.28**			
Weeks pregnant	−.34	.23	−.15				.02	.02	−.07			
First pregnancy	.43	4.64	.10				.04	.45	.01			
Step 2: BCEs				.17	3.16**	.12**				.30	6.36**	.09**
Spanish language	−5.27	4.10	−.13				−1.52	.41	−.36**			
Age	−.09	.30	−.03				.02	.03	−.06			
Education	.35	.71	.05				−.16	.07	−.23*			
Weeks pregnant	−.22	.22	−.10				−.01	.02	−.02			
First pregnancy	−.82	4.37	−.02				−.04	.43	−.01			
BCEs	−2.95	.80	−.36**				−.26	.08	−.31**			
Step 3: ACEs				.26	4.54**	.09**				.34	6.58**	.04*
Spanish language	−3.93	3.92	−.10				−1.40	.40	−.33**			
Age	.01	.28	.01				−.01	.03	−.03			
Education	.35	.67	.05				−.16	.07	−.22*			
Weeks pregnant	−.31	.21	−.14				−.01	.02	−.05			
First pregnancy	−.31	4.16	−.01				−.01	.42	.00			
BCEs	−1.96	.82	−.24*				−.19	.08	−.23*			
ACEs	2.13	.65	.32**				.15	.06	.23*			

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

above and beyond the effects of maternal ACEs (BCEs, $\beta = -0.17$, $p < 0.10$). However, results from the second regression (PTSD symptoms) revealed that after the covariates, higher levels of BCEs significantly predicted lower levels of prenatal PTSD symptoms above and beyond the effects of maternal ACEs ($\beta = -0.24$, $p < 0.05$). In this model (Table 3), higher levels of maternal ACEs independently predicted higher levels of prenatal PTSD symptoms ($\beta = 0.32$, $p < 0.01$). This model accounted for approximately 26% of the variance (R^2) in prenatal PTSD symptoms ($p < 0.01$).

Results from the third regression (perceived stress) showed that higher levels of BCEs predicted lower levels of prenatal perceived stress ($\beta = -0.27$, $p < 0.05$), but this effect dropped to non-significance when ACEs were included in the final step ($\beta = -0.17$, $p = 0.10$). However, similar to PTSD symptoms, results from the fourth regression (SLEs) indicated that higher levels of BCEs significantly predicted lower levels of prenatal SLEs above and beyond maternal ACEs ($\beta = -0.23$, $p < 0.05$; Table 3). ACEs were also a significant predictor of prenatal SLEs ($\beta = 0.23$, $p < 0.01$). This model accounted for 34% of the variance (R^2) in prenatal SLEs ($p < 0.01$).

3.3. Cluster analysis of BCEs and ACEs

Results from the cluster analysis indicated a three-cluster solution with good fit (average silhouette = .50). The solution identified three clusters (see Table 4 for descriptive statistics): those with high BCEs, but maltreatment and family dysfunction mostly absent (Cluster 1, “High BCEs,” $n = 38$); those with high BCEs, and maltreatment and family dysfunction present (Cluster 2, “High Both,” $n = 34$); and those with moderate BCEs and maltreatment and family dysfunction present (Cluster 3, “High ACEs,” $n = 27$; See Table 4).

ANCOVA tests revealed significant differences between clusters for PTSD symptoms, perceived stress, and SLEs, but not depression symptoms (see Table 4). After accounting for the covariates, means on prenatal PTSD symptoms differed across clusters, $F(2, 91) = 7.26$, $p < .01$, $\eta^2 = .14$. Post-hoc pairwise contrasts indicated that both the “High BCEs” cluster and the “High Both” cluster had significantly lower levels of PTSD symptoms than the “High ACEs” cluster. Means on perceived stress also differed across clusters, $F(2, 91) = 4.70$, $p < .05$, $\eta^2 = .09$. Here, post-hoc pairwise contrasts indicated that the “High BCEs” cluster had significantly lower levels of perceived stress than the “High ACEs” cluster and the “High Both” cluster. Finally, means on prenatal SLEs also differed across clusters, $F(2, 88) = 4.20$, $p < .05$, $\eta^2 = .09$. Similar to PTSD symptoms, both the “High BCEs” cluster and the “High Both” cluster had significantly lower prenatal SLEs than the “High ACEs” cluster. (Of note, applying the Bonferroni correction ($\alpha' = .05/3 = .017$) to the pairwise contrasts involving the “High Both” cluster dropped these contrasts to non-significant because they were all significant at $p < .05$). Finally, the “High ACEs” group also had significantly higher total ACEs ($M = 6.59$, $SD = 2.01$) than the “High Both” group ($M = 5.06$, $SD = 1.65$) and the “High BCEs” group ($M = 1.42$, $SD = .92$).

3.4. Test-Retest stability

Postnatal BCEs scores were available for approximately 76% of the sample ($n = 77$; $M = 8.39$, $SD = 1.97$; see Table 1 for

Table 4
Descriptive Statistics for the Clusters.

Cluster Indicators	Cluster 1 High BCEs (<i>n</i> = 38)	Cluster 2 High Both (<i>n</i> = 34)	Cluster 3 High ACEs (<i>n</i> = 27)	F- or χ^2 statistic	Significant Contrast
BCEs	8.61 (1.46)	9.00 (1.10)	5.30 (1.82)	56.91**	1 vs 3**, 2 vs 3**
ACEs – Maltreatment	.58 (.79)	1.76 (1.37)	3.93 (1.11)	72.78**	All
ACEs – Family Dys.	.84 (.72)	3.29 (.87)	2.67 (1.44)	57.05**	1 vs 2**, 1 vs 3**
Demographics					
Spanish language	34%	17%	26%	n.s.	NA
Age	30.29 (6.71)	28.18 (6.55)	28.59 (6.55)	n.s.	NA
Education	12.71 (2.42)	12.88 (2.32)	12.22 (3.12)	n.s.	NA
Weeks pregnant	27.21 (7.94)	29.41 (7.22)	27.19 (7.69)	n.s.	NA
First pregnancy	18%	29%	15%	n.s.	NA
Dependent Variables					
Depression Sxs	8.04 (.97)	8.99 (1.03)	10.89 (1.15)	n.s.	NA
PTSD Sxs	15.57 (2.71)	22.58 (2.89)	31.65 (3.20)	7.36**	1 vs 3**, 2 vs 3*
Perceived Stress	14.10 (1.22)	17.93 (1.30)	19.61 (1.44)	4.70*	1 vs 2*, 1 vs 3**
SLEs	2.25 (.27)	2.52 (.29)	3.45 (.33)	4.20*	1 vs 3**, 2 vs 3*

Note: For the cluster indicators and demographic covariates, means and standard deviation are shown, whereas for the dependent variables, adjusted marginal means, controlling for the covariates, and standard errors are provided. Dys. = Dysfunction, Sxs. = Symptoms. Contrasts significant at $p < .05$ would drop to non-significance with the Bonferroni correction ($\alpha' = .05/3 = .017$).

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

frequencies of BCEs reported at the postnatal interview), which is consistent with other attrition rates of low-income samples of pregnant women (McDonnell & Valentino, 2016). Approximately 24% of women were unable to complete their postnatal interviews due to not reliably responding to phone calls or text messages ($n = 10$), being completely unreachable with the contact information they provided during the prenatal interview ($n = 10$), not wanting to revisit difficult topics ($n = 1$), being too overwhelmed with current responsibilities ($n = 1$), being incarcerated ($n = 1$), or having miscarried ($n = 1$).

Independent *t*-tests and chi-square tests examined whether participants who completed the postnatal interview differed on demographic characteristics, psychopathology and stress, and ACEs. Results revealed that participants who completed versus did not complete the postnatal interview did not differ on language, race/ethnicity, age, weeks pregnant, or first pregnancy; prenatal psychopathology or stress; total number of ACEs, childhood maltreatment, or family dysfunction; or recent markers of instability, such as homelessness or incarceration during pregnancy. The only two distinguishing variables were total BCEs $t(97) = 3.52, p < 0.01$, and educational attainment, $t(99) = 4.02, p < 0.01$. During the prenatal interview, mothers who completed the postnatal interview reported higher levels of BCEs ($M = 8.22, SD = 1.93$) than those who did not complete the postnatal interview ($M = 6.50, SD = 2.33$), as well as higher educational attainment ($M = 13.16$ years, $SD = 2.40$) than those who did not complete the postnatal interview ($M = 10.92$ years, $SD = 2.32$).

Partial correlations between prenatal and postnatal BCEs scores, controlling for number of days between prenatal and postnatal administration ($M = 194.77$ days, $SD = 58.00$, range = 91–311), indicated excellent test-retest stability ($r = .80, p < .01$). Fisher's "r to z" tests indicated comparable (non-significant) test-retest stability for English-speaking ($r = .80, p < .01, n = 59$) and Spanish-speaking women ($r = .78, p < .01, n = 18$), and for White ($r = .76, p < .01, n = 18$), African-American ($r = .86, p < .01, n = 17$), and Latina women ($r = .73, p < .01, n = 26$). However, Fisher's tests showed that test-retest stability was significantly higher for U.S.-born ($r = .86, p < .01, n = 51$) than for foreign-born women ($r = .59, p < .01, n = 26; z = 2.43, p < .05$).

Difference score analyses indicated that 44% ($n = 34$) of the follow-up sample reported the exact same total prenatal and postnatal BCEs score, and 83% ($n = 64$) of the follow-up sample reported postnatal BCEs scores within one point of their prenatal BCEs scores. Changes in BCEs scores were significantly but very modestly associated with changes in depression symptoms (but not PTSD symptoms or perceived stress) from prenatal to postnatal administration ($r = -.26, p < .05$), such that rising levels of reported BCEs related to falling levels of depression symptoms.

4. Discussion

This study tested the internal and external validity of a new instrument, the BCEs scale, expected to predict better long-term psychological functioning from women's childhoods to their pregnancies. Descriptively, mean levels of BCEs did not differ by language, country of origin, or race/ethnicity. These findings suggest that the BCE items are multiculturally appropriate as a cumulative index of positive childhood experiences.

Findings regarding predictive validity showed that higher BCEs scores were significantly correlated with lower prenatal depression and PTSD symptoms, perceived stress, and stressful life events (SLEs). However, after accounting for ACEs, BCEs scores only significantly predicted the trauma-related outcomes, prenatal PTSD symptoms and SLEs, not the internalizing-related outcomes of depression symptoms and perceived stress. Although these findings are correlational and must be interpreted cautiously, they suggest a potential for BCEs to be linked to trauma-specific perinatal pathways: Women who reported higher numbers of BCEs reported lower numbers of prenatal trauma symptoms, as well as exposure to fewer stressful or traumatic experiences during pregnancy. There are likely at least two interpretations of these findings. First, it is possible that women who have more favorable childhood experiences

and resources are at reduced risk for experiencing PTSD symptoms and being exposed to stressful or traumatic life events while pregnant, even if they also experienced childhood adversity. Essentially, BCEs may outweigh the effects of ACEs on PTSD symptoms and SLEs, thereby reducing both negative outcomes. Alternatively, it is also possible that women with lower levels of symptomatology and stress exposure during pregnancy *report* having greater numbers of favorable childhood experiences. This alternate interpretation is unlikely, however, because at the bivariate level, BCEs scores were only very modestly associated with current depression symptoms and perceived stress, suggesting that total levels of BCEs and current distress are mostly independent.

Findings from the cluster analysis further clarify the extent to which BCEs may counteract, or offset, the effects of ACEs on psychopathology and stress during pregnancy. The cluster analysis revealed that the women in this sample fell into three groups, those with high levels of BCEs and very low levels of both types of ACEs (childhood maltreatment and family dysfunction), nicknamed the “High BCEs” cluster; those with high BCEs, and high childhood maltreatment and family dysfunction, the “High Both” cluster; and those with only moderate BCEs and high childhood maltreatment and family dysfunction, the “High ACEs” cluster. Notably, these clusters did not differ on mean levels of depression symptoms during pregnancy, ruling out the possibility that women who were more depressed were more likely to minimize reports of BCEs and maximize reports of ACEs. The clusters did differ, however, on mean levels of PTSD symptoms, perceived stress, and SLEs during pregnancy. The “High BCEs” cluster reported the lowest means on all three outcomes, the “High ACEs” cluster reported the highest means, and the “High Both” cluster reported means that fell between the “High BCEs” and “High ACEs” clusters. The observation that the “High BCEs” cluster reported the lowest levels of psychopathology and stress provides support for BCEs as promotive factors for better functioning during pregnancy, even for women who had low levels of childhood adversity.

Higher BCEs also seemed to be beneficial for women with heightened childhood adversity, indicating the BCEs are also beneficial in risky contexts. The “High Both” cluster reported significantly lower PTSD symptoms and fewer SLEs than the “High ACEs” cluster. Alternatively, the “High ACEs” cluster’s mean levels of PTSD symptoms were almost in the clinical range, and women in this cluster also experienced an average of one more SLE during pregnancy than the “High Both” cluster. Whereas the “High Both” cluster reported an average of nine BCEs, the “High ACEs” cluster reported an average of only five BCEs, yet both groups reported substantial childhood maltreatment and family dysfunction. These findings suggest that higher levels of BCEs may begin to offset the effects of childhood maltreatment and family dysfunction on prenatal PTSD symptoms and SLEs. Additionally, five BCEs may itself represent a lower bound or marker of vulnerability; having only five of these 10 total BCEs across one’s childhood may signal risk for future impairment. Specifically, pregnant women who have only five BCEs may be limited in positive childhood resources and experiences to draw on as templates for caregiving, and as a result may be more susceptible to the harmful effects of their childhood adversity on their symptomatology and stress during pregnancy. These findings should be interpreted cautiously because contrasts involving the “High Both” cluster did not meet the stringent Bonferroni correction (although all means for the “High Both” cluster were in the expected direction), and should be replicated with a larger sample.

Psychometrically, the BCEs had excellent test-retest reliability across the prenatal and postnatal periods. This stability was comparable across language and between the three major racial/ethnic groups comprising this sample. The only discrepancy in test-retest stability pertained to significantly lower correlations between prenatal to postnatal BCEs scores in foreign-born versus U.S.-born women. Although the test-retest correlation for foreign-born women was adequate, this discrepancy suggests that foreign-born women’s reports of BCEs may be slightly less stable over time. Additionally, slight changes in BCEs scores over time for a subset of the sample may modestly correspond to changes in their depressive symptoms.

Although completely unexpected, attrition analyses revealed that mean levels of BCEs reported during pregnancy were higher for women who returned for the follow-up interviews than those who did not. Women who returned reported approximately 1.5 more BCEs. These findings suggest that the BCEs scale is a meaningful set of childhood experiences linked to remaining engaged in perinatal research and reflecting on the birth of a new baby. Women who had a more supportive, positive, and predictable childhood may have had greater willingness to reflect on the childhood they were beginning to create for their babies.

4.1. Strengths and limitations

The BCEs scale is expedient to administer and culturally relevant to women of various racial/ethnic backgrounds, languages, and countries of origin. It illustrates the well-documented role of positive early experiences as promotive factors for better long-term functioning following adversity (Appleyard et al., 2005; Pianta et al., 1995; Sroufe et al., 2005), and extends these promotive processes to pregnancy. In addition, the BCEs was only modestly associated with ACEs, indicating that adverse and positive childhood experiences are relatively orthogonal and independently contribute to variation in long-term functioning. The independence of BCEs and ACEs was also evident in the person-oriented cluster analyses: many women had high levels of both. Favorable childhood experiences do not preclude childhood adversity, and childhood adversities do not preclude children from experiencing safety, security, and predictability. Rather, positive and adverse childhood experiences often occur in tandem, so individuals who have a preponderance of BCEs compared to ACEs may have the best odds of resilient outcomes. (The “High Both” group had an average of nine BCEs and five ACEs, whereas the “High ACEs” group had an average of five BCEs and 6.5 ACEs). These findings inform understanding of the differential impact of adversities and favorable experiences on children: individuals whose ACEs outweigh their BCEs may be particularly vulnerable to long-term maladaptation.

Despite these strengths, several limitations exist. Foremost, the BCEs scale was retrospectively self-reported. While retrospective reports of objective life events maintain good reliability (Hardt & Rutter, 2004), some mothers may have overestimated or underestimated their BCEs. Importantly, however, the BCEs showed excellent test-retest reliability across the perinatal period, when variability in thinking and reflecting about childhood is likely elevated in most women. Another limitation is the potential ceiling

effects of the BCEs scale. Over one quarter of women ($n = 28$) reported all 10 BCEs. While it is noteworthy that BCEs were so prevalent even in a very disadvantaged sample – a finding which points to the high potential for resilience – it is likely that in less traumatized or low-income samples, rates of BCEs may show even less variability. The BCEs may not be as useful in more affluent samples; however, this needs to be tested.

4.2. Implications and conclusions

Interdisciplinary work from public health, neuroscience, developmental psychology, and medicine has increasingly focused on the importance of childhood adversity in programming the behavioral, psychological, and biological mechanisms that shape health across the life-course and into the next generation, often at great personal and social cost (Shonkoff et al., 2012). Moving beyond a risk paradigm, resilience researchers have simultaneously called for better understanding of individual, family, and community level factors that can offset the deleterious effects of early adversity (Luthar et al., 2015; Masten, 2014; Narayan, 2015). To that end, this study addresses an important gap in the resilience literature—the need for efficient, cross-culturally, empirically valid measures of favorable early experiences for high-risk populations. To our knowledge, the BCEs scale is the first instrument to use a multi-culturally sensitive framework and target better psychosocial outcomes during pregnancy. Pregnancy is a pivotal period of developmental transformation for mothers and infants, and our findings shed light on the life-course processes linking a mother's positive childhood experiences to the prenatal environment of her fetus. In parallel with universal pediatric screening for ACEs (Burke, Hellman, Scott, Weems, & Carrion, 2011), the BCEs scale could provide a valuable opportunity for resilience-based perinatal screening with meaningful predictive value to lower PTSD symptoms and exposure to stressful life events during pregnancy. Such outcomes have direct implications for protecting the neuroendocrine development of the fetuses, improving mothers' ability to provide a healthy postnatal environment, and deterring the intergenerational transmission of adversity by thwarting risk during the prenatal period (Bowers & Yehuda, 2016; Narayan, Rivera et al., 2017). The BCEs scale provides a first step in identifying promotive childhood influences early in the lives of pregnant women to increase the odds of long-term and intergenerational trajectories of resilience in mothers and babies.

Acknowledgments

This research was supported by a grant from the Coydog Foundation. We thank the women who participated in this study and shared their stories with us, and our clinical and community partners who helped to make this study possible.

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