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## Toxic Stress and Vulnerable Mothers: A Multilevel Framework of Stressors and Strengths

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### Abstract

Toxic stress is associated with poor health outcomes that extend across the lifespan. While caregivers can protect their children from toxic stress through supportive caregiving, this can be challenging for vulnerable mothers living in socioeconomically disadvantaged environments. We aim to advance the science of toxic stress prevention by exploring the stressors and strengths experienced by vulnerable mothers through application of a theoretical framework, Bronfenbrenner's bioecological model. Following Arksey and O'Malley's five-stage scoping study framework, 179 articles were included. Key information was abstracted and each article was reviewed for relevance to the bioecological model. Results revealed that the sources of stress and strength are multilayered, transactional, and have a complex influence on caregiving in families at risk for toxic stress. Future research should include empirical investigations of the complex relationships among these stressors and strengths, and the development of preventive interventions to support vulnerable families at risk for toxic stress.

### Keywords

Stress; psychological; mothers; family; healthcare disparities

Research over the last twenty years has made abundantly clear the link between childhood adversity and lifelong health outcomes (Felitti et al. 1998, McEwen 2008a). For example, adverse childhood experiences, like abuse and neglect, are associated with adult diseases like obesity, diabetes, and cancer, and persistent childhood stressors like poverty are associated with altered brain structure and impaired development (Hertzman & Boyce, 2010; Hughes et al., 2017; Shonkoff et al. 2012). Supportive caregivers can play a key role in protecting children from the harmful effects of adversity, but this may be challenging for vulnerable mothers who experience multiple psychosocial stressors (Johnson et al. 2013, Shonkoff et al. 2012). In this review, we use a bioecological model (Bronfenbrenner & Ceci 1994) to better understand sources of stress and strengths for vulnerable mothers. The application of a

theoretical framework, as well as our emphasis on strengths, offers a novel approach towards understanding the complex factors that influence stress and resilience in vulnerable families.

## Toxic Stress in Childhood

In an effort to understand how stress impacts development over time, researchers have proposed a conceptual taxonomy consisting of three types of stress response in early childhood (See Online Supplementary Figure 1) (Shonkoff et al. 2012). In a toxic stress response, persistent elevation of a child's stress response system results in a complex release of glucocorticoids, catecholamines and inflammatory cytokines that disrupt development of the brain and neuroendocrine, immune, metabolic, and cardiovascular systems (Juster, McEwen & Lupien 2010; McEwen 2008b). A toxic stress response is consequently associated with impaired health and developmental outcomes throughout the lifespan, including obesity, growth delay, and impaired cognitive skills in childhood, and depression, alcoholism, diabetes, and cardiovascular disease in adulthood (Garner, 2013; Johnson et al. 2013). Given the vast array of consequences associated with a toxic stress response in early childhood, prevention of toxic stress is critical for promoting health and reducing health disparities in vulnerable families.

## Preventing Toxic Stress Among Vulnerable Families

In environments of adversity, caregivers can play a crucial role in toxic stress prevention. Evidence from human and animal models demonstrates that positive caregiving characteristics and a secure maternal-child relationship can help protect children against a toxic stress response (Johnson et al. 2013; Shonkoff et al. 2012). The presence of a supportive caregiver has also been identified as an essential component for the development of resilience, or the ability to thrive despite the presence of adversity (National Scientific Council on the Developing Child, 2015). However, providing this protection can be tremendously challenging for caregivers who are vulnerable due to poverty, young age, or ethnic minority status. Vulnerable caregivers, particularly mothers, are faced with a multitude of unique stressors that occur on individual, community and societal levels. For example, impoverished or young mothers may experience vulnerability due to a lack of tangible or personal resources, while ethnic minority mothers may experience structural racism or interpersonal discrimination. Mothers who experienced toxic stress during their own childhoods may also be poorly equipped to manage stressful situations as adults (Johnson et al., 2013). The result is a paradoxical situation in which vulnerable mothers are charged with the dual responsibility of managing their own poorly regulated stress response systems, while also protecting their children from the effects of exposure to multiple stressors. Thus, in order to support vulnerable mothers to protect their children from a toxic stress response, we must first understand the complexity of their environmental stressors and the strengths that promote effective coping.

While childhood trauma or adversity may occur within any demographic or social class, socially and economically marginalized families are at an increased risk for adverse experiences, and thus may significantly benefit from toxic stress prevention and intervention efforts. Guided by Bronfenbrenner's bioecological model (Bronfenbrenner & Ceci, 1994),

we will review the current health sciences literature on vulnerable mothers' stressors and strengths, identify gaps in knowledge requiring further investigation, and develop a research agenda that will guide future investigations of factors that impact caregiving in families at risk for toxic stress (Shonkoff et al. 2012).

According to Bronfenbrenner's bioecological model, an individual's development is influenced by one's surrounding environment (Bronfenbrenner & Ceci, 1994). Bronfenbrenner's model consists of four interconnected structures surrounding the individual: the microsystem, mesosystem, exosystem, and macrosystem. The microsystem, situated most closely to the individual, is theorized to have the most direct influence on development. In each following layer of the model, the influence of each system becomes less direct (See Figure 1) (Bronfenbrenner & Ceci, 1994; Rosa & Tudge, 2013). In this scoping study, the use of the model serves three primary purposes: to guide the selection and classification of studies for review, to organize the study findings, and to provide a theoretical basis for analysis of results. The mesosystem is excluded as it describes interactions between two or more microsystems, and thus is unlikely to yield any additional information.

## Purpose

The aim of this scoping study is to advance the science of toxic stress prevention by exploring the stressors and strengths experienced by vulnerable mothers through application of a theoretical framework. For the purposes of this study, vulnerable mothers are defined as those who are at a disproportionate risk for experiencing toxic stress due to poverty, young maternal age, or ethnic minority status. With a focus on both stressors and strengths, this framework may be used to direct future lines of research and develop interventions and policies to prevent exposure and adverse outcomes of toxic stress through both stress-reduction and strengths-based approaches.

## Methods

This scoping study follows the methodological framework introduced by Arksey & O'Malley (2005) which includes five stages: identifying the research question, identifying relevant studies, study selection, charting the data, and collating, summarizing, and reporting results. We also used enhancements to the methodology as suggested by Levac, Colquhoun, and O'Brien (2010), including use of a medical librarian to improve the search strategy and an iterative process for study selection and data charting. Scoping studies have been proposed as a method to identify literature about a broad topic, synthesize a wide range of research material, and identify gaps in the literature. They also may be used to achieve conceptual clarity, guide policy decisions, or direct more focused lines of research. Scoping studies typically address broad research questions, include a variety of study designs, and allow for intellectual creativity (Arksey & O'Malley 2005; Davis, Drey & Gould 2009; Fawcett, 2013).

## Identifying the Research Question

This scoping study is guided by two overarching research questions: first, “what is in the literature regarding sources of stress for vulnerable mothers?” and second, “what is in the literature regarding coping mechanisms or strengths for vulnerable mothers?” These broad research questions allow for a comprehensive approach, with direction from the theoretical framework to provide organization and clarity.

## Identifying Relevant Studies

**Search strategy.**—After consultation with a medical librarian, electronic database searching and hand searching of reference lists were used to identify relevant literature. Electronic databases (SCOPUS, CINAHL, MEDLINE and PSYCHINFO) were searched in the Fall of 2017 with the following terms as keywords: mother\*, maternal, parent\*, caregiver\*, poverty, poor, low-income, welfare, Medicaid, vulnerable, minority, underserved, stress, challenges, coping, resilience, protective, and strengths. Terms were searched in combination with Boolean operators until each database was exhausted and no additional references were obtained.

**Eligibility.**—Timeframe and language were applied as eligibility criteria using electronic limits in the databases. Studies were also limited to those conducted in the United States, in order to provide results generalizable to the U.S. population. A timeline of 1996 to the present was chosen based on the establishment of The Personal Responsibility and Work Opportunity Act, the most significant welfare reform policy to date. This policy places a five-year lifetime limit on the timeframe for receiving government assistance, and requires persons to obtain employment within two years, at which time benefits are reduced or terminated entirely (Baratz & White 1996). The requirements of this policy have a profound impact on vulnerable mothers, and thus the findings of this review reflect sources of stress and strength under contemporary U.S. social policies.

## Study Selection

**Inclusion and exclusion criteria.**—Initial database searching yielded 2161 results; after eligibility criteria were applied and duplicates were removed, 409 sources remained. The researchers then reviewed each study for relevance to the research questions and inclusion/exclusion criteria were applied (Online Supplementary Figure 2). At this stage, studies were included if the authors investigated vulnerable mothers as previously defined. Studies examining only fathers or other caregivers were excluded; however, studies including multiple groups (other caregivers, non-vulnerable mothers) were included if findings specific to vulnerable mothers were presented. Studies were excluded if the maternal stress examined was related to a non-generalizable condition, such as HIV status or preterm birth. Studies with outcomes pertaining exclusively to pregnancy or children were also excluded. For example, a number of studies examined maternal stress and its impact on child behavior; unless the study offered insight into the source of stress for the mother, these studies were excluded.

## Charting the Data

After abstract review, 167 studies were selected for inclusion. An additional 12 studies were added through hand-searching of reference lists. In total, 179 studies with varying designs were identified for use in the scoping review. Next, key information from each article was applied to a table for organization and synthesis. The information extracted included the Social Ecology level, methodology, population, findings, and additional relevant information. Studies that addressed more than one level of the theoretical model were categorized accordingly (Figure 2). For example, in a study of multiethnic mothers living at or below the federal poverty level, Dunkel Schetter et al. (2013) identified multiple sources of stress including personal life events (categorized as individual) and racism (categorized as macrosystem). A second reviewer randomly assessed 10% of studies for application to the model, and conflicting results were discussed until reviewers reached an agreement on proper categorization. An example of data charting is provided (Table 1) and a complete table of references is available online (Online Supplementary Table 1).

## Collating, Summarizing and Reporting Results

A numerical summary of the designs and population characteristics of the included studies is presented in Table 2. Studies categorized within each level of the bioecological model were examined for patterns and unique themes. Results are reported according to the identified stressors and strengths within each level of the model. A summarization of findings is presented in Table 3, with a schematic of relationships presented in Figure 3.

**Quality appraisal.**—The purpose of a scoping study is to obtain the “breadth” of available literature, rather than the “depth,” and thus scoping studies do not serve to assess the quality of the literature reviewed (Arksey & O’Malley 2005). The scoping methodology was selected for the current study based on the breadth of available literature and the overall aim: to provide a framework for understanding vulnerable mothers’ stressors and strengths that will direct future scientific inquiry on toxic stress prevention.

## Results

### Stress in the Individual

**Physiological disruptions related to a history of toxic stress.**—Exposure to persistent stress in early childhood may disrupt development of the brain’s stress-response system, including brain architecture and the hypothalamic-pituitary-adrenal axis (Johnson et al., 2013). Due to these physiological disruptions, mothers who were raised in environments of adversity as children may have difficult managing responses to stress as adults (Shonkoff, Boyce & McEwen 2009). Furthermore, mothers who experienced the effects of toxic stress are more likely to be impaired in their ability to form healthy coping mechanisms, utilize available social supports, and become productive members of society (Evans & Kim 2013; Shonkoff et al. 2012). Thus, physiological disruptions related to a history of toxic stress may function as an individual source of stress, amplifying the effects of a stressful environment and prohibiting an effective coping response.

**Traumatic personal history & mental health disorders.**—A mother's personal history of trauma may have consequences for long-term mental health. Adverse childhood experiences, such as abuse, neglect or household dysfunction (caregiver substance abuse or mental illness, witnessing violence, parental imprisonment), have been linked with a number of poor outcomes including adolescent pregnancy, parenting stress, and child removal by social services (Ammerman et al., 2013; Esparza & Esperat, 1996; Nicholson et al., 2006; Osborne & Rhodes, 2001). Mothers living in poverty have three times higher rates of post-traumatic stress disorder (PTSD) than women from the general population (Bassuk et al., 1998). Mothers living in poverty also have higher rates of depression and substance use, which may be a vicious cycle; while depression and substance abuse can result from exposure to chronic stress, they also contribute to greater stress for mothers at risk (Bassuk et al., 1998; Eshbaugh, 2010; Scafidi et al., 1997). Thus, traumatic personal history and mental health disorders not only contribute to maternal stress, but also may interfere with effective stress management.

### Strengths of the Individual

**Self-efficacy and empowerment.**—Self-efficacy is described as the belief that one has control over one's own outcome (Eshbaugh, 2010). Vulnerable mothers have expressed improved self-efficacy resulting from successful breastfeeding or fulfilling multiple role responsibilities (Black et al., 2009; Cricco-Lizza, 2008; Gichia, 2000), and vulnerable mothers with higher levels of mastery experience less depression, less stress in the parent-child relationship, and have children with better developmental outcomes (Choi & Jackson 2012; Eshbaugh, 2010, Orthner & Neenan, 1996). Helping others may also be a source of empowerment for vulnerable mothers. In an ethnographic study of black, low-income, urban mothers, investigators found that the ability to help others, like donating a child's clothes, significantly promoted a sense of self worth (Cricco-Lizza, 2008). A qualitative study of low-income single mothers identified volunteer work as a coping mechanism used by several mothers, both as a source of empowerment and a distraction from their own economic problems. One woman in the study stated, "helping to empower those people...makes me feel like I'm still human...it gives me a sense of strength within myself" (Broussard, Joseph & Thompson, 2012).

**Personal resources: optimism, spirituality and resourcefulness.**—Vulnerable mothers use personal resources such as optimism, spirituality and resourcefulness to cope with stressors. Optimism has been demonstrated to buffer against financial-related stress and depression in studies of Mexican American and African American mothers (Marsiglia et al., 2011; Odom & Vernon-Feagans, 2010; Taylor et al., 2010; Taylor et al., 2012). Spirituality may provide a source of comfort during times of stress, assist with coping with trauma, and function as a resource for resiliency in overcoming problems (Abdou et al., 2010; Kiser et al., 2008; Vandsburger, Harrigan & Biggerstaff, 2008). Resourcefulness is also a common source of strength for vulnerable mothers. Lee, Katras, and Bauer (2009) described the creative strategies used by low-income rural mothers to provide their children with a "normal" birthday party, such as planning ahead, searching for discounts and pooling resources. Mothers have also described using techniques to "manage the appearance of



poverty,” such as placing food bank bags inside of commercial grocery bags (McIntyre, Officer & Robinson, 2003).

### **Stress in the Microsystem**

**Unpredictable and absent partners.**—The relationship with a child’s father is a frequently cited source of stress for vulnerable mothers. In a qualitative study of rural low-income mothers, participants described the men in their lives as “inconsistent and disappointing” (Wijnberg & Reding 1999). Even when a child’s father is involved, mothers have expressed feelings of isolation, as they continue to hold the majority of parenting responsibilities. Mothers in poor relationships with their partners are more likely to report depressive symptoms, perceived stress, use of drugs and smoking than those in good relationships (Bloch et al., 2010). Also of grave concern is the presence of intimate partner violence, as higher levels of relationship violence are associated with increased economic hardship, neighborhood disorder, household disrepair, and psychological distress (Hill, Mossakowski & Angel, 2007; Renner, 2009; Salomon, Bassuk & Huntington, 2002). Not only may intimate partner violence contribute to psychological or physical injury, but it can worsen daily stressors and even prohibit successful employment attainment (Brush, 2000; Lutenbacher 2002).

**Family conflict and trauma.**—While the family unit is often a source of support, family relationships can be conflicted, frustrating, and stressful for many vulnerable mothers (Brotsky, 1999; Cramer & McDonald, 1996). Women who had unreliable relationships with their parents as children often continue to have conflicted relationships with family members in adulthood (Brotsky, 1999). In some cases, families may even refuse to recognize or protect against abuse, leading to further stress and potentially physical harm (Cramer & McDonald 1996; Duffy, 2010; Wijnberg & Reding, 1999).

Co-residence and shared caregiving with the child’s grandparents can often contribute to positive outcomes, especially for adolescent mothers (Hess, Papas, & Black 2002; Oberlander, Black & Starr, 2007). However, in conflicted family units, mothers who continue to reside with their own parents may experience more stress than support. Kalil and Danziger (2000) found that for adolescent mothers, grandmother co-residence did not decrease depression, parenting stress, childcare problems or domestic violence. The stress related to grandmother co-residence may be the result of a number of processes. Increased maternal grandmother involvement has been associated with decreased father involvement over time, which may contribute to further conflict and stress (Kalil, Ziol-Guest & Coley, 2005). Co-residence with one’s parents may also reflect personal factors that both contribute to stress and prohibit a mother from living independently, such as young age, single parenthood, or a history of mental illness (Dunifon, Ziol-Guest & Kopko 2014; Oberlander et al. 2009; Piontak 2014).

**Children and childcare.**—Elevated stress in vulnerable mothers has been associated with an increased number of children in the home, children with a difficult temperament or behavioral problems, and the hassles of finding childcare (Jackson, 2000; Orthner & Neenan 1996; Raver & Leadbeater, 1999; Wijnberg & Reding, 1999). Poverty is associated with an

increased risk for childhood disability, which can result in increased stress and depression for vulnerable mothers (Lloyd & Rosman, 2005; Morris & Coley, 2004). Children with a disability or chronic health condition may contribute to daily stress by quickly depleting both physical and emotional resources for a mother (Morris & Coley, 2004). For example, mothers of children with asthma experience more life stressors than mothers of children without asthma, and poor asthma control has been associated with poor quality of life for low-income single mothers (Bellin et al., 2013; Shalowitz et al., 2006).

### Strengths in the Microsystem

**Intimate partner support.**—Although an unavailable or unstable partner can greatly contribute to maternal stress, partner presence can also have a positive impact on vulnerable mothers. Emotional support from a partner has been associated with decreased maternal depression and parenting stress, as well as improved maternal mastery and child behavioral development (Choi & Jackson 2012; Harmon & Perry 2011; Jackson, 1999; Murry et al., 2001). A father's engagement with his children may be largely dependent on the quality of the mother-father relationship, as fathers are more likely to be involved over time when the child's mother has a positive relationship with the child's father and his family (Jackson, et al., 2009; Kalil, Ziol-Guest & Coley, 2005). Of note, emotional support has been demonstrated to have a greater impact on maternal stress than instrumental or financial support (Manuel et al., 2012; Ryan, Tolani & Brooks-Gunn, 2009). The benefit of partner support is also not limited to the child's biological father, as decreased maternal depression is associated with emotional support from other romantic partners as well (Gonzalez & Barnett, 2014).

**Family support and cohesion.**—In families with a history of trauma, family relationships can be a significant source of stress. However, when relationships are cohesive, family members can be a source of both tangible and emotional support (Jarrett, 1998; Mistry et al., 2008). In a study of vulnerable mothers with adolescents, mothers who reported greater family cohesion also had less parenting stress (Anderson, 2008). In a qualitative study of families living in poverty by Vandsburger et al. (2008), participants identified "their mutual love and affection for each other, their feelings of closeness, standing together for each other, and their ability to communicate openly with each other as resources they used or as their family strengths" (p. 28). By pooling resources, extended families can provide a stable support network for financial, physical, and emotional needs (Lee, Katras & Bauer, 2009; Seiling, 2006).

**Supportive social networks.**—The importance of social networks that extend beyond the immediate family has been demonstrated in a number of contexts, particularly for mothers with limited or unreliable family supports. For example, social networks have been found to improve maternal responsiveness and buffer against psychological distress (Evans, Boxhill & Pinkava 2008; Prelow et al. 2010). Budd, Holdsworth, and Hogan-Bruen (2006) found that for adolescent mothers living in foster care, satisfaction with social support predicted lower parenting stress. Members of a church community were occasionally identified as a source of support for vulnerable mothers (Brodsky, 1999; Odom, Vernon-



Feagans, 2010), but other sources of support were often not specifically identified in the studies reviewed.

### Stress in the Exosystem

**Inability to meet basic needs: finances, housing and nutrition.**—A number of stressors at the exosystem level affect a mother's ability to meet the basic needs of her family. Primary sources of this stress include financial strain, housing insecurity, and food insecurity (Bloom et al., 2013; Duffy, 2010; Hall, 2009; Stevens, 2010). A study of housed and homeless mothers found that housing insecurity is related to high rates of stress and depression (Banyard, Graham-Bermann, 1998). Stevens (2010) found that food insecurity in young mothers is related to income, affordable food sources, housing, and transportation. These exosystem-level stressors create an environment for many women in which meeting their family's daily needs can be a significant challenge.

**Unsafe neighborhoods.**—Another significant source of stress for mothers living in poverty is the neighborhood environment. Unsafe neighborhood environments cause mothers to worry about the safety of their children and prevent children from playing outside (Abrams & Curran, 2009; McAllister, Thomas, Wilson, & Green, 2009). In a study of Latina mothers and children enrolled in a Head Start program, Aisenberg (2001) found that 80.6% of children had been exposed to at least one act of community violence, 71% had heard gunshots near their home, and 9.7% had heard gunshots near the Head Start site. Unsafe neighborhoods also have an impact on maternal mental health and the maternal-child relationship. Neighborhood stress and disorder have been associated with psychological distress and an increased risk for problem drinking in low-income mothers (Kotchick, Dorsey & Heller, 2005; Mulia et al., 2008). Mitchell et al. (2010) found a direct effect of witnessed violence on mothers' depressive symptoms and aggression, which in turn had indirect effects on harsh disciplinary practices. Parental perception of social disorganization, including the physical disorder and lack of safety in a neighborhood, has also been associated with perceived parenting stress, adolescent depressive symptoms, and adolescent delinquency (Ford & Rechel 2012; Guterman et al., 2009).

**Social isolation.**—Social isolation can also be a source of stress for vulnerable mothers. Housing developments may be geographically isolated, resulting in limited access to necessities (McAllister et al., 2009). Availability or affordability of public transportation may create a barrier to obtaining quality food, limit employment opportunities, or affect relationships among friends and family members who live distances apart (Duffy, 2010; Hall, 2009; Zekeri, 2007). Mothers living in rural areas with diminished social networks may be particularly vulnerable to social isolation, and face added daily hassles such as securing adequate food or finding available babysitters (Wijnberg & Reding, 1999; Zekeri, 2007). Mothers may also experience self-imposed isolation if they avoid social contact due to a history of depression, trauma, or perceived neighborhood violence (Lesser, Koniak-Griffin & Anderson, 1999; Rankin & Quane, 2000).

## Strengths in the Exosystem

**Public programs and nonjudgmental service providers.**—In the healthcare literature reviewed, very few studies investigated the strengths of the exosystem to support vulnerable mothers. Teitler, Reichman, and Nepomnyaschy (2004) found that low-income single mothers rely very heavily on public support programs, and Stevens (2010) identified food banks and federal programs as resources used by mothers to cope with food insecurity. The delivery of social services can also impact maternal stress; Hill and Cain (2012) found that mothers exhibited lower levels of psychological distress when they perceived their welfare caseworker to be interested, caring, and helpful.

## Stress in the Macrosystem

**Limited employment opportunities.**—At the macrosystem level, the limited availability of secure, well-paying jobs is a major source of stress for many vulnerable mothers. Social disorganization and low quality school systems often limit opportunities for quality education, and available employment opportunities are often low paying, offer no benefits, and have unpredictable hours. (Ainsworth, 2002; Bassuk, 1996; London et al., 2004) The caregiving responsibilities of single motherhood present an added challenge to maintaining regular employment or obtaining safe and affordable childcare (Ciabattari, 2007; Morris & Coley, 2004). Work absences related to childcare responsibilities often result in a loss of employment for mothers juggling multiple roles (Anderson et al., 2006). Furthermore, due to low wages or limited benefits, employment may not actually reduce a mother's financial strain, even when moving from welfare to work (Gyamfi, BrooksGunn & Jackson, 2001; London et al., 2004).

**Racism, stigma and acculturative stress.**—Stress related to racism, stigma and acculturation presents a daily challenge for many vulnerable mothers. In addition to structural disadvantage, daily experiences of racism can also be significant sources of stress (Abdou et al., 2010; Nomaguchi & House, 2013; Rosenthal & Lobel, 2011). For vulnerable mothers, experiencing racial discrimination is associated with depression, risk-taking behaviors, family conflict, and psychological distress (Murry et al. 2001; Odom, Vernon-Feagans, 2010; Umana-Taylor, Updegraff & Gonzales-Backen, 2011). Vulnerable mothers also may experience stress related to acculturation or stigma, and language barriers or poverty-related shame may prevent women from seeking assistance from social programs or mental health services (Anderson et al., 2006; Gudmunson et al., 2010).

**Gendered caring responsibilities.**—Societal expectations largely place the burden of caregiving on women (Lee & Tang, 2015). This is particularly challenging when paternal involvement is limited, variable, or nonexistent. These caregiving responsibilities not only create an obstacle to maintaining employment, but the stress associated with single motherhood can have a negative effect on overall health (Brush, 2000; Bernstein, 2001; Rousou et al., 2013). Women are also often charged with an additional burden of caring for ill or older relatives. This multigenerational caregiving responsibility can further deplete emotional and physical resources, and has been associated with increased caregiver stress and risk for mental illness (Riley & Bowen, 2005). With the expectation to be the primary caregiver for two generations, a situation exacerbated by a lack of financial resources,

women are burdened with gender-specific responsibilities that may contribute to a lifetime of structural disadvantage.

### Strengths in the Macrosystem

**Benefits of ‘welfare to work’ policies.**—In this review, very few studies included sources of support for vulnerable mothers at the macrosystem level. There is some evidence to suggest, however, that the employment required through ‘Welfare to Work’ policies can have positive impacts on maternal mental health. While not always financially beneficial for mothers, employment has been associated with reduced parenting stress, improved self-esteem, and increased social integration (Gyamfi, Brooks-Gunn & Jackson, 2001; London et al., 2004).

### Discussion

The sources of stress and strength for vulnerable mothers are multilayered and complex. The application of a theoretical model allows for a focused examination of the factors influencing each ecological level, while also providing an overall picture of the complex interplay of maternal stressors and strengths. Within this model, it is important to be aware that these stressors and strengths are transactional in nature and have a complex influence on caregiving in vulnerable families (see Figure 3). For example, discrimination related to racism at the macrosystem level may have a direct or indirect influence on maternal mental health symptoms at the individual level, family relationships at the microsystem level, and use of social programs on the exosystem level (Murry et al. 2001; Odom & Vernon-Feagans, 2010). Conversely, individual-level optimism can buffer against depression related to racism at the macrosystem-level (Odom & Vernon-Feagans, 2010). Thus, the layers of the theoretical model must be seen as fluid, dynamic, and interpreted within the context of the individual family.

The results of this scoping study may inform research on toxic stress prevention in a number of ways. First, researchers can continue to examine sources of stress and strength for vulnerable mothers, and work to fill in gaps in knowledge identified for each level of the bioecological model. For example, on the microsystem level, social support was defined in a very general sense in many of the studies reviewed, thus limiting usefulness for future research studies and the development of interventions. Future research with vulnerable mothers should include explicit descriptions of social support, such as support offered by friends, coworkers, or church-based support groups. The role of social networks should also be examined in association with stress-related outcomes. At the exosystem and macrosystem levels, large gaps in knowledge highlight the need for community based participatory research, as community participants and stakeholders may best describe these stressors and strengths.

Toxic stress prevention also requires an examination of the relationships among stressors, strengths, and caregiving for each level of the bioecological model. In this scoping study, personal trauma history, family conflict, and unsafe neighborhoods were among the many stressors associated with parenting stress and harsh parenting styles in vulnerable families (Ammerman et al., 2013; Guterman et al., 2009; Kalil & Danziger, 2000). While the

relationship between maternal stressors and harsh or neglectful caregiving should continue to receive attention in research studies, research on toxic stress prevention must extend beyond simply identifying and preventing negative parenting behaviors. In order to promote optimal outcomes for children in vulnerable families, maternal strengths and positive components of caregiving must receive equal attention in the literature.

The results of this scoping study may also be used to guide the development of preventive interventions and social policies that may reduce stress, enhance strengths, and promote protective caregiving in vulnerable families. Previously unrecognized individual sources of strength, such as the empowerment related to volunteerism, offers exciting potential for the development of innovative interventions to support and empower vulnerable mothers. Future research regarding the role of social programs in reducing maternal stress can also provide valuable insight for future policies and interventions that may have a macro-level impact on socially and economically marginalized families. However, stressors identified at the macrosystem level, including racism, stigma, and gendered caring responsibilities, also represent challenges to implementing effective policies. An upstream approach to reducing maternal stress will require consideration of these barriers and efforts to address them; policies such as paid parental leave, a minimum living wage, and modified work requirements for mothers receiving public assistance will be crucial for promoting strengths in vulnerable families (National Scientific Council on the Developing Child, 2004).

Finally, findings of this scoping study can provide a basis for future biobehavioral research on the causal relationships among ecological stressors and strengths, maternal caregiving, and indicators of a toxic stress response in children. Indicators of toxic stress may include primary mediators of the stress response, such as cortisol or inflammatory cytokine levels, or health and developmental outcomes associated with toxic stress, such as obesity, growth delay, or impaired cognitive skills (Juster, McEwen & Lupien, 2010; Shonkoff et al., 2012). With a focus on the complex pathways that promote toxic stress prevention, biobehavioral research can significantly contribute to promoting health and reducing health disparities among vulnerable families.

This scoping study does not provide an exhaustive list of ecological stressors, but an overview of stressors and strengths to guide future research on toxic stress prevention. Following the scoping review methodology, we used broad search terms related to stress, coping, and our target population, but did not include keywords related to specific causes of stress (homelessness, adverse childhood experiences) or known consequences of stress (depression, trauma). While great pains were taken to represent a wide range of data sets, methodologies, and research groups, it is possible that important aspects of the literature were missed using this approach. Due to the breadth of literature included, studies were not evaluated individually for their validity or rigor, and thus interpretation of the results may be limited. Future integrative or systemic reviews targeting stressors or strengths within each level of theoretical framework will make a valuable contribution to literature in this area.

This scoping study only included studies conducted with mothers in the United States. While this enhances the generalizability of the study to the U.S. population, the stressors and strengths experienced by vulnerable mothers in other cultures require future examination.

Understanding the unique stressors and strengths experienced by other caregivers, such as fathers, grandparents or foster parents, is also an important area for future research. Finally, this study is limited by a focus on literature from the health sciences. Gaps noted in this review, such as a lack of information on strengths at the exosystem and macrosystem levels, may be better addressed by the social sciences, economics or health policy literature. Future reviews on the sources of stress or strength for vulnerable mothers would be strengthened by the use of literature from a diversity of fields.

Advancing the science of toxic stress prevention is crucial for promoting the health of vulnerable families. Researchers can use the presented model and study findings to pose research questions and empirically investigate relationships among maternal stress, protective factors, and indicators of a toxic stress response in children. By examining maternal stressors and strengths through the lens of toxic stress prevention, researchers can utilize their unique perspective and significantly contribute to a critical area of research in the fields of toxic stress and family health.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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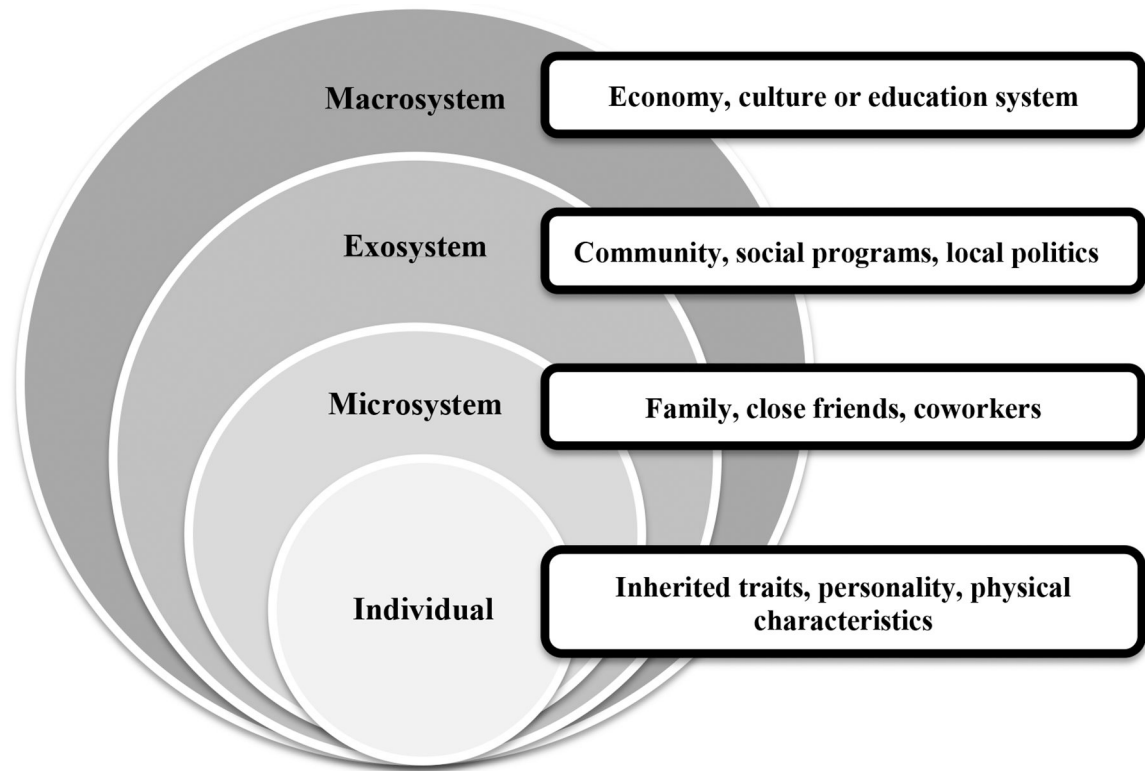
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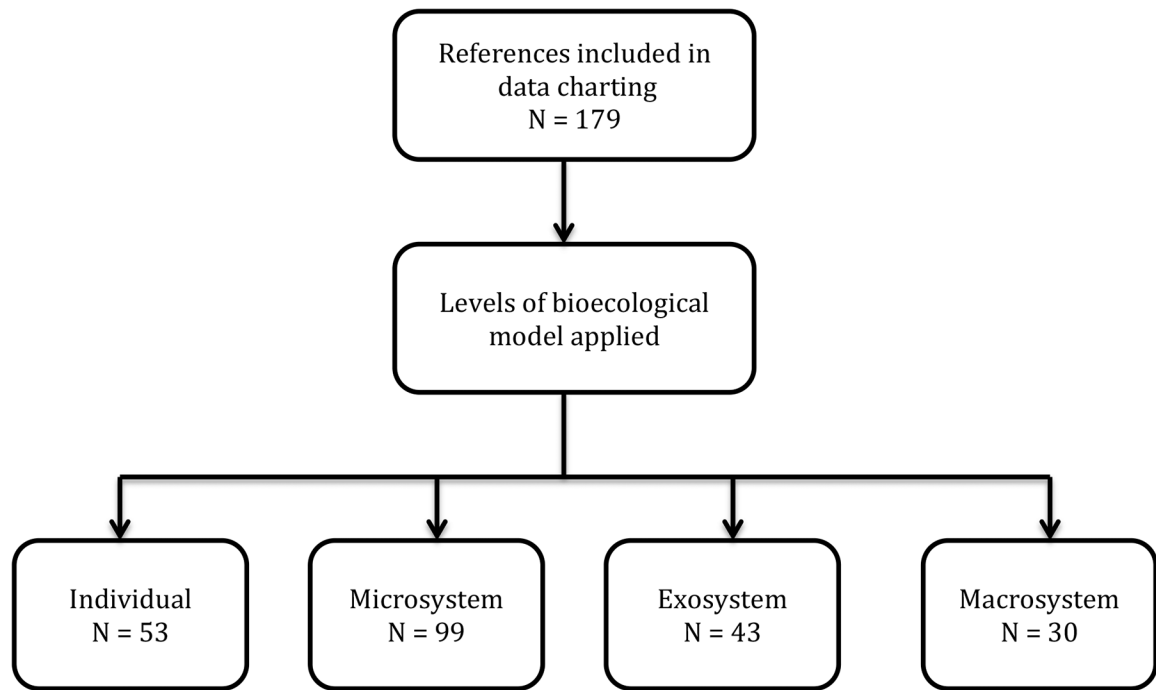
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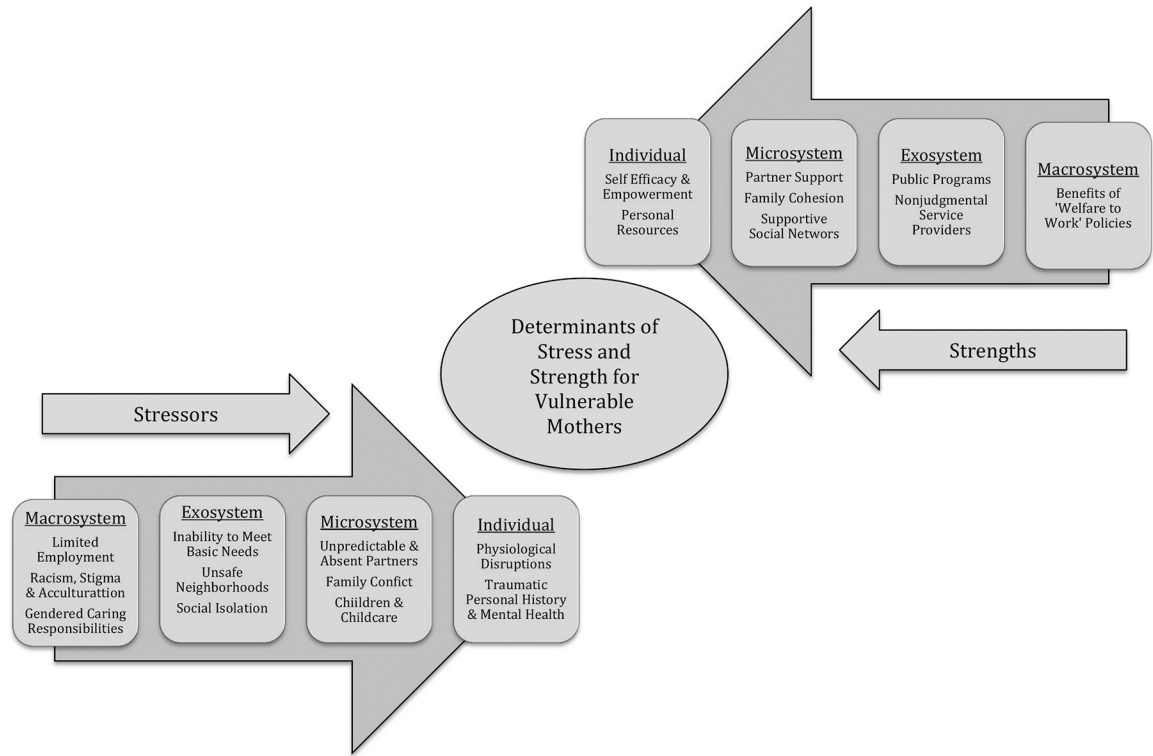


**Figure 1:**  
Bioecological Model





**Figure 2:**  
Data charting according to bioecological model



**Figure 3:**  
Determinants of Stress and Strength for Vulnerable Mothers

Table 1:

## Sample of Data Charting

Reference	Social Ecology Level	Methodology	Population/ Key Findings	Other Notes
Abrams, S. L., & Curran, L. (2009). And you're telling me not to stress? A grounded theory study of postpartum depression symptoms among low-income mothers. <i>Psychology of Women Quarterly</i> , 33, 351–362. doi:10.1111/j.1471-6402.2009.01506.x	Microsystem, Exosystem	Grounded theory	19 low-income mothers, evaluated post-partum depression symptoms. Core experience as “feeling overwhelmed” due to mothering in materially and socially stressful conditions.	Mothering alone/ lack of father support Navigating social services Unsafe living environments Financial concerns
Ammerman, R. T., Shenk, C. E., Teeters, A. R., Noll, J. G., Putnam, F. W., & Van Ginkel, J. B. (2013). Multiple mediation of trauma and parenting stress in mothers in home visiting. <i>Infant Mental Health Journal</i> , 34, 234–241. doi:10.1002/imhj.21383	Individual Microsystem	Cross-sectional design, self-report measures	208 first-time mothers enrolled in a home visiting program, found maternal childhood trauma was related to parenting stress, and the relation between childhood trauma and parenting stress was separately mediated by both depression and social support.	Maternal history of trauma Mediation of social support
Jarrett, R. L., & Jefferson, S. M. (2004). Women's danger management strategies in an inner-city housing project. <i>Family Relations</i> , 53, 138–147. doi:10.1111/j.0022-2445.2004.00004.x	Exosystem	Qualitative, interpretive framework	18 single mothers living in public housing. Describes nature of community violence, including location and perpetrators. Also strategies used to deal with violence and the impact this has on the family.	Community violence in public housing. Strategies for avoiding violence include monitoring the environment, active avoidance, self-imposed curfews.
Umana-Taylor, A. J., Updegraff, K. A., & Gonzales-Backen, M. A. (2011). Mexican-origin adolescent mothers' stressors and psychosocial functioning: Examining ethnic identity affirmation and familism as moderators. <i>Journal of Youth and Adolescence</i> , 40, 140–157. doi:http://dx.doi.org/10.1007/s10964-010-9511-z	Microsystem , macrosystem	Cross-sectional design, self-report measures	207 Mexican-origin adolescent mothers. Examined associations between cultural and economic stressors in adolescent mothers. Mothers experiencing more discrimination and acculturative stress also had higher depression and more risk-taking behaviors	Discrimination, acculturation and mental health

**Table 2:**

## Description of Studies Selected for Inclusion

Description	N
<b>Study Design</b>	
Quantitative	115
Qualitative	32
Mixed Methods	5
Literature Review	12
Other	6
<b>Racial/ethnic minority groups represented</b>	
Black/African American	112
Hispanic/Latina	73
Asian/Pacific Islander	12
American Indian/Alaska Native	15
Multiracial/Other	17
<b>Maternal age of sample</b>	
Adults only	84
Adolescents only (Under age 18)	16
Included both adolescents and adults	29

*Note:* Maternal age & racial/ethnic background of participants not reported in all studies

**Table 3:**

## Study Findings

	<b>Individual</b>	<b>Microsystem</b>	<b>Exosystem</b>	<b>Macrosystem</b>
<b>Stressors</b>	Physiological Disruptions Traumatic Personal History & Mental Health Disorders	Unpredictable & Absent Partners Family Conflict & Trauma Children and Childcare	Inability to Meet Basic Needs Unsafe Neighborhoods Social Isolation	Limited Employment Opportunities Racism, Stigma & Acculturative Stress Gendered Caring Responsibilities
<b>Strengths</b>	Self Efficacy & Empowerment Personal Resources	Intimate Partner Support Family Support and Cohesion Supportive Social Networks	Public Programs Nonjudgmental Service Providers	Benefits of 'Welfare to Work' Policies