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Career Readiness: A Potential Pathway through which Urban Youth Exposure to Stress Influences Adult Health

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Abstract

A growing body of research provides support for the detrimental effects of stress during childhood on future adult health, however, less is known about how stress disrupts normal developmental processes. This pathway may be particularly relevant for urban adolescents who are exposed to additional contextual stressors. This study will longitudinally explore how psychological stress from multiple domains influences urban adolescents' career readiness. Two hundred youth (ages 14-21) completed surveys assessing their school, family, neighborhood and health stress. Path analysis using a parallel process model found that school and neighborhood stress at 6 months were significantly associated with decreased career readiness at 15 months. Health stress at baseline was related to an increased report of career readiness at 15 months, which was moderated by parental closeness. These findings suggest that experiences of stress for urban youth negatively impact their planning for the future, particularly in the absence of supportive parental relationships.

Keywords

Future; Stress; Adolescent; Urban; United States

Career Readiness: A Potential Pathway through which Urban Adolescent Exposure to Stress Influences Adult Health

A growing body of research provides support for the detrimental effects of stress during childhood and adolescence on future adult health (Anda et al., 2006; Chartier, Walker J.R., & Naimark B., 2007; Felitti et al., 1998; Hudson et al., 2003) and about the potential biological mechanisms through which stress impacts health (Carpenter et al., 2007; Carrion & Wong, 2012). However, less is known about how stress disrupts normal developmental processes. Understanding the impact of stress on the achievement of the developmental milestones of adolescents, who due to increased autonomy find themselves in additional situations and environments that cause stress, may be particularly important in elucidating

additional mechanisms through which exposure to stress may impact adult functioning. This study will longitudinally explore how psychological stress from multiple domains (e.g., health, school, parents, neighborhood) influences adolescents' career readiness. Having goals and plans for the future has been linked to positive health and educational outcomes (Borowsky, Ireland, & Resnick, 2009; Seginer, 2008) and is a normative part of adolescent development (Erickson, 1968). While the emergence of a movement in the United States towards common expectations for knowledge and skills acquisition during high school has increased focus on career readiness (National Governor's Association, 2012), less is known about its determinants.

The Influence of Childhood Stress on Adult Health

The Adverse Childhood Experiences study, is a seminal body of work which linked the experience of stress in childhood to a broad array of negative health outcomes. One of the most important findings of this study was a dose-response relationship between experience of a variety of childhood stressors and a wide range of poor health outcomes in adulthood for a large, fairly generalizable sample of adults. The authors hypothesized a common causal pathway through which stress experienced in childhood led to impairment of neural networks and neuroendocrine systems, which subsequently resulted in poor health outcomes (Anda et al., 2006; Felitti et al., 1998). The common pathway refers to the “allostatic load” of the individual, or the wear and tear on the body of the increased physiologic responses to stress (McEwan & Stellar, 1993). Since this study, other studies have provided evidence that stress is related to impairment as defined by a disrupted hypothalamic-pituitary-adrenal (HPA) axis response to stress (Carpenter et al., 2007).

Studies attempting to understand potential developmental pathways through which stress negatively impacts adult wellbeing have been less abundant. Exposure to stress among U.S. adolescents has been related to increased subjective weathering, defined as perceived assumption of adult responsibilities at an earlier age than expected, which increases the risk of mental health problems in emerging adulthood (Foster, Hagan, & Brooks-Gunn, 2008). Similarly, a more recent study identified a significant association between experience of stress and perceived life satisfaction in urban adolescents (Vera et al., 2012). Other studies that highlight potential developmental consequences focus on the consequences of the disruption to the neuroendocrine networks that stress causes. Among youth with post traumatic stress symptoms, higher levels of cortisol, the neuroendocrine response to stress, have been related to decreased hippocampal and pre-frontal cortex volumes, which in turn have been related to poorer memory and executive functioning (Carrion & Wong, 2012). These findings have been validated by studies showing that children exposed to stress were more likely to display poor school performance (Saigh, 1997; Schwab-Stone et al., 1995), score lower on reading tests (Delaney-Black et al., 2002), and have a decreased verbal IQ (Saigh, Yasik, Oberfield, Halamandaris, & Bremner J.D., 2006).

Stress and Career Readiness

One of the main developmental tasks of adolescence and early adulthood is identity formation, or the integration of the current, past, and future selves (Erickson, 1968). One important component of this process is the development of plans for the future, including

vocational and career plans (Nurmi, 1991). Acquisition of the knowledge, skills, and behaviors necessary to achieve these plans has been termed career readiness and includes both academic preparation (i.e., specific coursework and extracurricular involvement) and non-cognitive factors such as motivation, engagement, and self-efficacy (Lombardi, Conley, Seburn, & Downs, 2013). A variety of measures of career readiness exist, from measures assessing acquisition of knowledge (e.g., grade point average, collect admission exam scores) to measures assessing individuals' commitment to career choices as well as their understanding of the skills needed to be successful in the workplace (Ladany, Melincoff, Constantine, & Love, 1997; Lombardi et al., 2013). Research has linked greater future thought with improved health and educational outcomes such as reduced drug use, sexual risk taking behaviors, involvement in violence, and improved educational and vocational outcomes (Borowsky et al., 2009; Seginer, 2008). Perceived parental acceptance and autonomy granting has been associated with adolescents' motivation to engage in future thoughts and behaviors (Seginer, Vermulst, & Shoyer, 2004).

While limited research has explored predictors of career readiness, the experience of stress in childhood is thought to decrease future thought. The subjective weathering hypothesis includes beliefs of a foreshortened life expectancy (Burton, Allison, & Obeidallah, 1995) and deficiencies in the pre-frontal cortex are thought to be related to difficulties in accomplishing goal-directed activities (Carrion & Wong, 2012). For youth exposed to extreme stressors, "persistent (and often distorted) negative beliefs and expectations about oneself or the world" is included as an element the diagnostic criterion for post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2013). Studies have demonstrated an association between the experience of PTSD symptoms and poorer perceptions of the future (Lavi & Solomon, 2005; Solomon & Lavi, 2005). However, it is unclear whether decreased future thought is a consequence of PTSD or an independent reaction to the experience of stress (Saigh, 1997). Therefore, more work is needed to understand how the experience of stress influences youths' perceptions and actions around their future.

Sources of Stress for Urban Adolescents

The developmental time period of adolescence may represent a particularly sensitive time period for the effects of stress. First, adolescents are potentially exposed to a greater number of stressors due to increased autonomy from parents, the heightened importance of peer/significant others relations, the rapid physical body changes of puberty, as well as the increased academic demands of high school. While all of these tasks represent developmentally normative changes as a result of biological, cognitive, and social development, they do present increased opportunities for the experience of stress (DiClemente, Santelli, & Crosby, 2009). The most common stressors in adolescence include both major life events such as the death or injury of a family member as well as more normative chronic hassles including feeling socially isolated, family financial problems, and having parents argue (Vera et al., 2012). Second, these same normative developmental changes may result in difficulties in coping with stress. Adolescents utilize different coping strategies than adults, and may have a more limited range and skill in application of these strategies (Rasmussen, Aber, & Bhana, 2004).

Urban adolescents may be a particularly vulnerable population as they are exposed to additional stresses in the form of day-to-day hassles associated with poverty as well as more extreme environmental stressors, such as exposure to neighborhood violence (Rich et al., 2009). A study of urban, African-American adolescents identified over 100 different types of stress including both context specific stressors (e.g., those associated with urban poverty) and developmentally normative stressors (Allison et al., 1999). Research exploring stress particular to urban environments has often focused on exploring the consequences of exposure to neighborhood violence (Allison et al., 1999). Because of its unpredictable and uncontrollable nature, exposure to violence is hypothesized to be a particularly detrimental stress; associations have been found with both externalizing and internalizing behavior in youth (see Cooley-Strickland et al., 2009). Exposure to both direct and indirect violence has also been related to precocious role exits (e.g., running away from home, dropping out of high school, contact with the criminal justice system) (Haynie, Petts, Maimon, & Piquero, 2009). Improved family and school environments where youth feel they have someone to communicate with that cares about them have been cited as protective factors for coping with neighborhood violence (Cooley-Strickland et al., 2009; Lindstrom Johnson, Finigan, Bradshaw, Haynie, & Cheng, 2013).

While neighborhood violence is an extreme source of stress for urban youth, other more universal sources of stress including family relationships and school success are also frequently noted by urban youth (Allison et al., 1999; Vera et al., 2012). While usually not assessed on its own, limited studies of school stress demonstrate an association between school stress and negative health and educational outcomes (Kaplan, Liu, & Kaplan, 2005; Torsheim & Wold, 2001). Family stress is also frequently discussed for urban youth, but more frequently as an outcome of economic stress (e.g., (Gutman, McLoyd, & Tokoyawa, 2005).

An additional possible source of stress for urban youth is living with a chronic health condition. Studies have shown that youth with mental health conditions, including ADHD (Loe & Feldman, 2007) and depression (Marmorstein & Iacono, 2001), are more likely to have difficulties in school. Results have been more mixed for chronic health conditions such as asthma. Studies suggest that youth with asthma are more likely to miss school (Bonilla et al., 2005), but there is less conclusive evidence about its effects on academic success (Taras & Potts-Datema, 2005). As minority youth disproportionately experience chronic health conditions (Perrin, Bloom, & Gortmaker, 2007), understanding this source of stress in the lives of urban youth is critical.

Current Analyses

Our study therefore looks at four domains of stress commonly experienced by urban adolescents (e.g., family stress, school stress, neighborhood stress, and health stress) and attempts to understand their relationship to youths' thoughts and plans for the future. As suggested we use measures of stress that include both daily hassles of life as well as major life events (Ruffin, 1993). Additionally, the measurement of different domains of stress rather than accumulated stress across domains has been suggested as important for understanding the impact of stress on different developmental outcomes (Allison et al.,

1999; Monroe & Simons, 1991) and may facilitate the development of more tailored interventions to improve outcomes. We hypothesize that there will be a significant association between baseline and six-month report of stress and that all domains of stress will be negatively related to youths' career readiness at 15 months. Additionally, we hypothesize that increased parental closeness and social support will moderate the effect of stress on career readiness for all domains.

Method

Participants

Participants were recruited from an urban pediatric primary care clinic in an academic institution. The clinic serves a primarily African-American population of children and adolescents between the ages of 0-24 with more than 90% on medical assistance. Participants were eligible for inclusion in a randomized-controlled trial to improve both health and educational outcomes if they were between the ages of 14 and 21, had attended or were currently attending high school in the local school system, and were not currently enrolled in a self-contained classroom (indicating the receipt of intense special education services). Recruitment occurred by mail with follow-up phone call between 2008-2011. Seventy-one percent of approached patients were eligible for participation and of those 68% (n=200) were enrolled in the study. All participants were included in the analyses; intervention status was controlled for in all models.

Participants provided written consent if over the age of 18 and parental consent and participant assent if under the age of 18. Procedures for this study were approved by the Johns Hopkins School of Medicine Institutional Review Board.

Data Collection Procedure

Data come from baseline, six-month, and 15-month assessments that asked about health and educational outcomes as well as contextual factors hypothesized to influence these outcomes. Each assessment took approximately one hour to complete and participants received a monetary remuneration for their time. All assessments took place in the clinic and were proctored by a trained research assistant. In order to improve the validity of data collection, participants completed an audio assisted computer interview for the majority of questions, with more complex questions asked by the research assistant.

Measures

Exposure to stress was measured across varying ecological contexts including health, family, school, and neighborhood.

In accordance with the Health Services and Research Administration's definition of children with special health care needs (MacPherson et al., 1998), **health stress** was assessed by a series of questions that asked if the adolescent had ever been diagnosed with a series of illnesses. A summed variable of health stress was created and then dichotomized to compare report of any chronic health conditions versus no report.

Family and school stress were assessed using the Life Changes questionnaire (Conduct Problems Prevention Research Group, 1999; Conduct Problems Prevention Research Group, 1992). A series of questions asked participants if they had experienced a list of stressful events over the past 12 months and whether each event had caused a minor or major disruption in their lives. Factor analytic techniques identified two factors (CFI=.84, TLI=.98, RMSEA=.03 for the final model): family stress ($\alpha=.71$) and school stress ($\alpha=.64$). Exact items can be seen in Table 1. A scale was created for each factor by summing items with a higher score indicating greater experience of stress.

Neighborhood stress was assessed using five items from the Perceived Neighborhood Violence Scale (Sampson, Raudenbush, & Earls, 1997), a self-report instrument assessing frequency of exposure to neighborhood violence. Parent and youth participants indicated how often a series of violent events occurred in their neighborhood over the past year (see Table 1). Response choices ranged from very often (5) to never (1). Items were summed with a higher score indicating greater exposure to neighborhood violence. This measure was created for an urban African-American population and has been proven to be highly reliable (Mujahid, Diez Roux, Morenoff, & Raghunathan, 2007). The reliability in our sample was similarly high ($\alpha=.82$).

Career readiness was assessed using the My Vocational Situation Survey (Holland, Daiger, & Power, 1980). The My Vocational Situation Survey has 17 questions that measure a youth's understanding of their strengths, weaknesses, and goals. Item examples include "I do not know what my strengths and weaknesses are" and "My estimates of my abilities and talents vary a lot from year to year." For each of these measures participants respond by answering either true or false. Items were summed with higher scores indicating greater career readiness. This construct has been used in studies of urban African-American youth with high degrees of reliability and validity (see Gushue et al., 2006). The reliability for our sample was also high (KR=.71).

Potential moderating variables assessed in the relationship between experience of stress in various ecological contexts and career readiness included both parental closeness and social support. Parental closeness was measured using an eight-item scale adapted from the National Longitudinal Study of Adolescent Health (Harris et al., 2009). Youth were asked to respond on a four-point scale from strongly disagree to agree about their relationship with their parents. Example items include "your parents make you feel better when you are upset," "your parents listen to what you have to say," or "your parents want to hear about your problems." Items were summed with higher scores indicating greater parental closeness ($\alpha=.90$). Social support was assessed using six questions adapted from Add Health (Harris et al., 2009) that asked about the presence of an additional supportive adult in their life (e.g., teachers, mentors). Example questions include "whether youth had an adult in their life with whom they can talk to about personal problems" or "is there when they need help." Items were on a similar scale as parental closeness and were summed so that a higher score indicated a greater presence of social support ($\alpha=.85$).

Potential control variables included both demographic information (e.g., intervention status, age, race, gender, current grades, and maternal educational attainment) as well as youth's

report of academic engagement. Current grades and academic achievement measures were adapted from the Communities That Care survey (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002). The academic achievement scale was created by summing together six items that assessed the meaningfulness of schoolwork, interest in classes, and the importance of what they were learning. Students responded on a scale of 1 to 5 indicating either the frequency of feelings (i.e., almost always to never) or their level of importance or interest (i.e., not at all to very). Items were reverse coded and summed with a higher score indicating greater academic engagement ($\alpha=.66$).

Analytic Strategy

Path analysis using a parallel process model was conducted in *Mplus* 7.0 which adjusts for missing data using full information maximum-likelihood estimation (FIML) under the assumption that data are missing at random (Muthen, 1998-2013). Model fit statistics (Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), and root-mean-square error of approximation (RMSEA)) were used to evaluate the fit of the model. A good fitting model has CFI and TLI values above .95 and RMSEA values below .05 (Kline, 2005).

As suggested by Muthen & Muthen (Muthen, 1998-2013), in order to build and test a parallel process model, we first separately analyzed each process (e.g., each contextual stress variable) without covariates and then with covariates (i.e., age, gender, race, maternal education, and academic engagement). Upon obtaining adequate fit, models were combined and tested for fit both without and with covariates. Only significant covariates were included in the final model. Interactions between parental closeness and social support and each of the contextual stress variables were tested separately in the final model. All continuous variables were mean-centered prior to the creation of interaction terms to avoid potential issues with collinearity when testing for interactions among continuous variables (Jaccard & Turrisi, 2003). Standardized coefficients are presented throughout the paper.

Results

Descriptive statistics

Sample demographic descriptives can be found in Table 1. The mean age of the sample was 16.68 (SD 2.03). The sample was primarily African-American youth (96%) and included slightly more female participants (60%) than male participants. Approximately 60% of youth reported receiving mostly A's and B's on their last report card, and a similar percentage of youth reported having a mother who had a high school education or less. At baseline, youth reported high levels of parental closeness ($M=26.56$; $SD= 5.47$) and social support ($M=18.56$; $SD=2.51$).

Descriptive information about the experience of stress at baseline for the sample can also be found in Table 1. Over 32.5% of the sample reported being told that they had a chronic health condition in their lifetime. It should be noted that many youth reported multiple chronic health conditions (18.7%). Over 70% of youth reported experiencing one type of family stress over the past year with some youth reporting experiencing multiple types of family stress. Slightly fewer youth reported experiencing school stress (68.5%), again with

some youth reporting experiencing multiple types of school stress. Some youth reported high exposure to neighborhood violence over the past six months; 20% of youth reported that a violent fight between neighbors often occurred in their neighborhood.

The sample mean for the My Vocational Situation Survey at the 15-month assessment was 10.53 (SD 3.69), which is similar to other studies of African American youth (Gushue, Scanlan, Pantzer, & Clarke, 2006). Significant differences were not identified between baseline and 15-month scores or between the intervention and control group at either time point.

Correlations among variables

Correlations between main analytic variables can be seen in Table 2. Significant associations were found for the experience of stress at baseline and 6-month indicating a stability in youths' report of stress in the various contexts. Report of stress also significantly co-varied between contexts, particularly for family and school stress and family and neighborhood stress. Both baseline and 6-month experiences family, school, and neighborhood stress variables were associated with decreased career readiness at 15 months. This association was particularly strong for the experience of school stress. Report of a chronic health condition was associated with increased career readiness at 15 months. Fewer significant associations were found between the moderating variables of parental closeness and social support and the experience of stress or career readiness.

SEM models

Due to the complexity of the desired final model, a multi-stage process was used in development. Adequate fit was found for each contextual stress variable both in a model without covariates and then with covariates. Gender was significantly related to report of family stress at baseline with girls reporting greater family stress. Youth with higher grades, greater academic engagement, and mothers who had completed more schooling reported less school stress at baseline. Controlling for these factors as well as intervention status, each of the contextual stress variables were significantly related to career readiness at 15 months (health stress $\beta = .16$, SE .08; family stress $\beta = -.20$, SE .08; school stress $\beta = -.28$, SE .08; neighborhood stress $\beta = -.23$, SE .08).

Good fit was also found for models that combined the four contextual stress variables both with and without covariates (without covariates CFI .96, TLI .95, RSMEA .05; with covariates CFI .95, TLI .94, RSMEA .04). See Figure 1. Report of experience of family, school, and neighborhood stress at baseline was significantly associated with report of stress in the same context at six months. Significant associations were found between report of family stress and school stress as well as between family stress and neighborhood stress at both baseline and six months and thus were modeled. Report of a chronic illness at baseline was significantly associated with greater career readiness at 15 months ($\beta = .15$, SE .07). Conversely, neighborhood stress and school stress were significantly related to less career readiness at 15 months ($\beta = -.16$, SE .08 and $\beta = -.22$, SE .08 respectively).

Only one significant adequate fitting interaction model was identified (CFI .92, TLI .91, RSMEA .04). For youth who experienced health stress (i.e., identified as having a chronic

health condition), report of greater family closeness was associated with improved career readiness ($\beta=.24$, SE .09).

Discussion

As hypothesized, exposure to stress for urban youth was related to decreased career readiness at 15 months. However, only school stress and neighborhood violence were independently related to decreased career readiness, emphasizing the importance of understanding the specific causal pathways through which stress influences negative outcomes. No negative associations were found between family and health stress and career readiness, in fact health stress was related to increased career readiness. Additionally, for some youth their report of stress appeared chronic as evidenced by strong associations between baseline and 6-month reports of stress. These findings highlight the value of understanding developmental pathways through which exposure to stress during adolescence could impact adult health and wellbeing.

Similar to other studies of African-American urban youth, youth in this study reported experiencing stressful major life events as well as chronic daily hassles (Vera et al., 2012), and developmentally normative (e.g., parent conflict) and context specific (e.g., exposure to neighborhood violence) stress (Allison et al., 1999). While Allison et al. (1999) categorized sources of stress by their broadest negative impact, this study elucidates the potential overlap of stressful experiences in the lives of urban youth. At least 10% of the sample reported exposure to the majority of sources of stress. Additionally, significant correlations were found between youth report of school stress, neighborhood stress, and parent stress (see Table 2). This overlap of stressful experiences is similar to a study of trajectories of youth stress, which found levels of perceived stress among African-American youth to be fairly consistent, particularly for relatively short time frame examined in this study (Schmeelk-Cone & Zimmerman, 2003).

The regularity of stressful experiences among youth in this sample make the finding that school and neighborhood stress were associated with decreased career readiness to be even more disconcerting. While exposure to stress has been associated with involvement in delinquent behaviors (Hoffman, Cerbone, & Su, 2000; Youngstrom, Weist, & Albus, 2003) and with decreased academic performance (Schmeelk-Cone & Zimmerman, 2003; Windle, M. & Windle, R.C., 1996), this is one of the first studies to associate experience of stress with decreased career readiness. Schmeelk-Cone and Zimmerman's (2003) finding of decreased odds of high school graduation could be partially mediated by a decreased career readiness of their African-American youth sample. Career readiness therefore may be an underexplored mechanism through which stress negatively impacts adolescents' transition to adulthood. In addition to being an important marker of preparedness for college or vocational careers (National Governor's Association, 2012), increased career readiness has been associated with decreased involvement in violence for urban youth (Lindstrom Johnson, Jones, & Cheng, In Press). Career readiness may be particularly relevant for urban youth who are more likely to attend under resourced schools, have access to fewer community resources, and be exposed to fewer career options and more violence and drug use (Hooker & Brand, 2010; Ladany et al., 1997; U.S. Department of Justice, 2011).

Highlighting these barriers to success, only school and neighborhood stressors were associated with decreased career readiness for urban youth. While school stress is cited as a source of stress for adolescents and is commonly included in lists of stressful events, it is not usually assessed on its own. In one of the largest studies of this construct, school stress for Norwegian youth was related to increased likelihood of health complaints (Torsheim & Wold, 2001). Interestingly this study also found evidence that the mean classroom level of academic stress also had a significant influence on reports of health complaints. Studies of U.S. youth have found that academic stress was longitudinally associated with poorer academic outcomes (Kaplan et al., 2005) and there is a larger body of literature supporting that events such as those included in our school measure (e.g., suspension and failing a class) are associated with negative educational and academic outcomes (Iselin, 2010). Additionally, disparities in both academic achievement and suspensions by race and geographic location are widely acknowledged in the U.S. public school system (U.S. Department of Education, 2012). These findings suggest that the influence of school stress on urban African-American youth on career readiness may be compounded by the similar experiences of school stress by their peers.

In contrast to school stress, neighborhood stressors have been extensively studied, particularly for urban African American youth. A recent meta-analysis on the effects of exposure to violence found strong effects on externalizing behaviors and PTSD for adolescents (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009). These were particularly strong for measures such as ours that captured direct witnessing of violence. Unfortunately less information is available about the influence of violence exposure on developmental outcomes. Our findings that exposure to violence are related to decreased career readiness compliment the work of Haynie et al. (2009), who found that exposure to violence was related to “precocious role exits” and suggest that a limited future orientation may be an additional negative consequence of exposure to violence. While no significant association was found for family stress, family stress was significantly correlated with the experience of school stress and neighborhood stress. These relationships are supported by more general work attempting to understand the negative influence of poverty on child wellbeing, which has suggested that neighborhood distress influences adolescent positive development (which included academic success) through parent psychological distress and parent relations (Gutman et al., 2005). While our measures did not directly capture parent/child relations the strong associations between family stress and neighborhood and school stress supports interconnectedness between adolescents' experience of stress in multiple domains.

A somewhat surprising finding was that the experience of health stress was related to increased career readiness at 15 months. The causal pathway for this finding is somewhat difficult to tease out due to the fact that many youth had been diagnosed with multiple chronic illnesses. One possibility is that youth who have been diagnosed with a chronic illness may be more aware of their strengths and weaknesses, and therefore score higher on our measure of career readiness. This suggest further studies including additional measures of future orientation may be of value. However, while this finding runs counter to literature that has suggested negative academic outcomes (e.g., Loe & Feldman, 2007; Marmorstein & Iacono, 2001), it is in line with studies that have shown limited effects of chronic physical

health conditions on markers of successful transition to adulthood. In a large, representative study of U.S. youth the presence of a chronic health condition had limited impact on adult employment, educational attainment, personal income, or self-esteem (Gortmaker, Perrin, Weitzman, Homer, & Sobol, 1993). One possible explanation for our finding is that the challenge of having a chronic disease might serve as a protective factor for other negative influences on career readiness (Fergus & Zimmerman, 2005). In line with this challenge model hypothesis, the association between diagnosis with a chronic disease and increased career readiness was strengthened for youth who reported greater family closeness. This was the only “support” variable that was found to moderate the relationship between experience of stress and career readiness. It is possible that children with chronic illness necessarily require greater family involvement and greater attention to career planning.

Strengths and Limitations

This study is not without limitations. While it does make use of multiple data points, which has been identified as a gap in the field of stress research (Grant et al., 2003) all data collection occurred over a relatively short time span. Additional longitudinal research that covers a wider span of time is needed to fully understand the influence of various stressors on adolescents' successful transition to adulthood. Another limitation is the wide age range of participants. Generalizability is also a concern as the sample was drawn from an urban hospital-based clinic population. Studies focused on more representative samples of urban adolescents and studies generalizable to the U.S. population are needed.

As is a concern for the field in general (Grant et al., 2003), our measurement of stress differed between sources of stress. School and family stress took into consideration adolescents' perception of the event as stressful, while presence of a chronic health condition and exposure to neighborhood violence did not. This could partially explain differences in associations with career readiness. However, the measurement style utilized for each source of stress was aligned with those most commonly found in the literature. As has been noted elsewhere, the need for measurement work on common scales for stress assessment is a gap in the field (see (Grant et al., 2003; McMahon, Grant, Compas, Thurm, & Ey, 2003). An additional measurement limitation may explain the lack of moderation for support variables. As suggested by (Zimmerman, Ramirez-Valles, Kinga, & Maton, 2000), our measure of family support/social support may not have captured the broad kin network typical of African-American families and therefore may have underestimated the impact of family/social support.

Implications

This study contributes to a growing body of literature attempting to understand the role of stress in the lives of African-American urban youth (Schmeelk-Cone & Zimmerman, 2003). Additionally, it uses a longitudinal design to explore specificity between stressors and developmental outcomes as well as moderating processes, both aspects of stress research that have been cited as important future research (Grant et al., 2003; McMahon et al., 2003; Schmeelk-Cone & Zimmerman, 2003). Our findings suggest that school and neighborhood stress have negative implications for adolescents' career readiness, but that health stress may serve a protective role. We also found limited evidence for family support as a moderator of

the stress-outcome process except for health stress. This study is novel in its exploration of the influence of stress on the developmental outcome of career readiness. Biological evidence supports an association between the experience of stress and decreased career readiness (Carrion & Wong, 2012; Foster et al., 2008). Career readiness represents a developmentally important task in the transition to adulthood and therefore decreased career readiness may represent an additional pathway through which stressful experiences in childhood are related to adverse health outcomes in adulthood.

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Figure 1.

The Influence of Stress on Career Readiness (n=200) Note: Standardized estimates presented. CFI= .95 TLI=.94, RSMEA= .04 Parentheses indicate standard errors of the estimate.

Table 1
Baseline Descriptive Statistics (n=200)

Sample Characteristic	Mean (SD)Frequency (%)
DEMOGRAPHIC CHARACTERISTICS	
<i>Age</i>	16.68 (2.03)
<i>Gender</i>	
Males	80 (40%)
Females	120 (60%)
<i>Race</i>	
African-American	192 (96%)
Caucasian	4 (2%)
Other	4 (2%)
<i>Academic Achievement</i>	
Mostly A's and B's	118 (59%)
Mostly C's and D's	82 (41%)
<i>Maternal Education</i>	
Did not graduate high school	40 (21.2%)
Graduated high school	78 (40.2%)
At least some college	73 (38.6%)
STRESS	
<i>Chronic Health Condition</i>	65 (32.5%)
Learning Disability	8 (4%)
ADHD	31 (15.4%)
Mental Health problem	12 (6.0%)
Medical Health problem	28 (14%)
<i>Family Stress</i>	2.48 (2.60)
Family member in trouble with the law	48 (24%)
Family member's drug/alcohol use	36 (18%)
Getting along with a parent	74 (37%)
Getting along with siblings	71 (35.5%)
Parental conflict	57 (29.5%)
Parental separation	35 (17.5%)
Family financial troubles	67 (33.5%)
<i>School Stress</i>	1.76 (1.91)
Family move	60 (30%)
School change	52 (26%)
School suspension/expulsion	51 (25.5%)
School disciplinary action	31 (15.9%)

Sample Characteristic	Mean (SD)Frequency (%)
Failed a class	88 (44%)
<i>Exposure to Neighborhood Violence</i>	9.93 (4.29)
A fight in which a weapon was used	29 (14.5%)
A violent argument between neighbors	40 (20%)
A gang fight	11 (10%)
A sexual assault	7 (3.5%)
A robbery or mugging	27 (13.5%)

Notes: Descriptive statistics provided are at Baseline.

Eleven participants did not know maternal education level.

Exposure to neighborhood violence presents the number of participants who reported that these events occurred very often or often.

Table 2

Correlations among independent and dependent variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10
1. Health stress (baseline)	----									
2. Family stress (baseline)	.09	----								
3. Family stress (6 months)	.01	.56***	----							
4. School stress (baseline)	.01	.41***	.34***	----						
5. School stress (6 months)	-.06	.18***	.40***	.42***	----					
6. Neighborhood stress (baseline)	-.07	.24***	.15*	.16*	.06	----				
7. Neighborhood stress (6 months)	-.03	.17***	.31***	.11	.19*	.60***	----			
8. Career readiness (15 months)	.15*	-.19*	-.19*	-.25***	-.28***	-.13 ^t	-.23*	----		
9. Parental closeness (baseline)	-.14*	-.28***	-.25***	-.13 ^t	.01	-.10	-.08	.11	----	
10. Social support (baseline)	-.17*	-.18*	.13	-.07	.02	.04	.04	.04	.59***	----

Note: Pearson correlation coefficients were calculated for continuous variables and point biserial correlation was used for continuous-dichotomous associations.