

Recent findings from CTAPS researchers

A second look at success in adversity: Is there a cost for resilience?

Children who grow up to achieve positive outcomes despite difficult experiences in life are often called “resilient”. Success in school, good mental health, and positive behavior, however, may sometimes mask an unrecognized threat to children’s physical health.

In this study, family socioeconomic status (SES) and self-control in childhood were examined as they related to young people’s mental, behavioral, and physical health. Rural African American youth from low-SES families who were highly self-controlled experienced good mental health and avoided negative behavior in young adulthood. On the outside, they appeared to be resilient. A look at these youth’s physical health, however, told another story. Results indicated that self-controlled children from low-SES families with positive behavioral health outcomes also developed physical health problems. Compared with young people from low-SES families who lacked strong self-control as children, and with young people from high-SES families, the “wear-and-tear” on outwardly resilient young people’s physical well-being was greater. This suggests that, despite an outward appearance of good adjustment, the path to success in difficult environments sometimes takes a toll on the inside. For some, resilience may be only “skin deep”.

Brody, G.H., Yu, T., Chen, E., Miller, G.E., Kogan, S.M., & Beach, S.R. (2013). Is resilience only skin deep? Rural African Americans’ socioeconomic status–related risk and competence in preadolescence and psychological adjustment and allostatic load at age 19. *Psychological science*, 24(7); 1285-93.

Family-strengthening program reduces chronic inflammation in African American children

Studies have shown that family-centered prevention programs strengthen family relationships, promote children’s mental health, and reduce risky behaviors. New research suggests that, in addition to these benefits, family-centered prevention programs may also improve children’s long-term physical health.

In this study, 272 African American children 11 to 12 years of age and their primary caregivers took part in a 7-week program designed to help caregivers improve their parenting skills, support children in making good choices, and encourage stronger family relationships. All of these families lived in low-income communities in the rural South.

The families were followed for 8 years. When the children turned 19 years of age, blood samples were collected from them and examined for measures of chronic inflammation. Such

inflammation can indicate an ongoing response of the immune system to chronic stress and can lead to health problems such as heart disease, diabetes, and stroke in the future. The researchers found that youth who participated in the program showed fewer signs of chronic inflammation than did those who did not take part in it. The positive changes in parenting that followed participation in the study may be partially responsible for lowering inflammation in the youth. This suggests that improved parenting could be very important in protecting low-income African American children from some chronic diseases.

Miller, G.E., Brody, G.H., Yu, T., & Chen, E. (2014). A family-oriented psychosocial intervention reduces inflammation in low-SES African American youth. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(31); 11287-92.

Instant gratification and stress: A drug-risky recipe

Making healthful choices in life is important for everyone. Sometimes those healthful choices require people to decide between getting an immediate reward or getting a greater reward later. Some people choose the immediate reward, whereas others choose the greater, postponed reward.

This study examined the interaction of choice behavior with biological markers of stress to predict drug use among young, rural African American men. Young African American men who experienced high levels of life stress and preferred smaller immediate rewards to greater postponed rewards were more likely to have increased drug use one year later. Other young African American men experiencing high levels of life stress who preferred greater postponed rewards to smaller immediate rewards had not increased drug use one year later. This study suggests that the ability to resist immediate gratification, despite high stress levels, may be important in avoiding drug use. This study also shows a need for stress-reduction prevention programs for African American youth.

Brody, G.H., Yu, T., MacKillop, J., Miller, G.E., Chen, E., Obasi, E.M., & Beach, S.R.H. (2014). Catecholamine levels and delay discounting forecast drug use among African American youths. *Addiction*, *109*(7); 1112-1118.

Low-income African American girls at higher risk of sexually transmitted infections

Female adolescents are at greater risk for acquiring sexually transmitted infections (STIs) than other groups of the population. Frequent sexual activity, stressful relationships, and mental health problems can place them at risk for STIs.

This study focused on the possibility that chronic stress associated with low socioeconomic status (SES) might increase young women's risk for STIs. Data were analyzed from 1927 young African American women 14 to 20 years of age, who took part in a prevention trial examining rates of new and repeated STI infections. Results from the study showed that young women living in low-income families or poor neighborhoods were, in fact, more likely to acquire a new or repeated STI. Regardless of women's sexual activities, previous STI history, age, mental health, or coping behaviors, low SES was still associated with STIs.

Results from this study indicate the need for more research on the ways in which chronic stress and life in a low-income family can contribute to STI risk for adolescent girls. Girls in low-SES environments, for instance, may have less access to resources and information on safer sexual behaviors. The chronic stress associated with life in a low-SES environment also may weaken girls' immune systems and increase their susceptibility to STIs.

Sales, J.M., Smearman, E.L., Swartzendruber, A., Brown, J.L., Brody, G., & DiClemente, R.J. (2014). Socioeconomic-related risk and sexually transmitted infection among African-American adolescent females. *Journal of Adolescent Health, 55*(5); 698-704.

Family-centered prevention improves child health in the presence of maternal depression

Family-centered prevention programs have been shown to strengthen family relationships, promote children's mental health, and reduce risky behaviors in adolescents. New research suggests that, in addition to these mental and behavioral health benefits, such prevention programs may improve some children's long-term physical health. In particular, children living with mothers who experience high levels of depressive symptoms may be at greater risk for poor physical health, yet also benefit more from family-centered prevention programs.

The sample for this study was composed of 399 African American children and their primary caregivers, who lived in the rural South. When the children were age 11, approximately half of their families participated in a 7-week program designed to help caregivers improve parenting skills, support children in making good choices, and encourage stronger family relationships.

Families from the study were then followed over a 9-year period. At age 20, blood samples were collected from the youths and examined for characteristics that show premature biological aging of cells. Elevated maternal depressive symptoms forecast accelerated cellular aging among youths in the control condition, but not among SAAF participants. The results indicated that reductions in harsh parenting accounted for SAAF's protective effects on epigenetic aging.

These findings suggest that family-centered prevention programs aimed at buffering the effects of risky family processes, including harsh parenting, in families with high levels of maternal depression may improve future physical health outcomes for children.

Brody, G. H., Yu, T., Chen, E., Beach, S. R. H., & Miller, G. E. (2016). Family-centered prevention ameliorates the longitudinal association between risky family processes and epigenetic aging. *Journal of Child Psychology and Psychiatry*, 57(5), 566-574. DOI:10.1111/jcpp.1249

Advancing understanding of substance use through behavioral economics

Most research on alcohol abuse has been conducted within the addiction, public health, psychology, and neuroscience fields. Recently, findings from another field of study – microeconomics – have begun to shed new insights into research on alcohol abuse. As outlined in this review article, the application of behavioral economics to the study of alcohol abuse emphasizes the roles of decision-making and addictive disorders, specifically as they relate to two types of tendencies.

One of these tendencies is expressed when individuals desire a substance too strongly, continuing to seek the substance despite high personal costs. This reflecting their overvaluing or excessive demand for the substance.

A second tendency involves an inability to delay gratification. Here, an individual has a strong preference for smaller immediate rewards rather than larger delayed rewards. Individuals with substance use problems characteristically report such a preference. Incorporating these concepts from microeconomics has led to the development of promising interventions and treatments focused on helping individuals reduce excessive preferences for substance use by heightening the desire to take part in activities that do not involve substance use, as well as by using direct rewards to reinforce pro-treatment outcomes.

Gray, J.C., & MacKillop, J. (2015). Using behavioral economics to understand alcohol use disorders: a concise review and identification of research priorities. *Current Addiction Reports*, 2, 68-75. DOI:10.1007/s40429-015-0045-z

Pathways to HIV-related behavior among heterosexual, rural Black men

Understanding why some individuals engage in HIV-risk behaviors, whereas others do not, is critical in curbing rates of HIV infections, particularly among high-risk groups such as rural African Americans. This study investigated the ways in which life in a rural area may increase young African American men's exposure to risk factors for HIV-related behavior, as well as the psychological and social influences linking personal and community risk factors to such behavior. Men who were exposed to risk factors such as highly upsetting experiences in childhood and life in a run-down, disadvantaged neighborhood took part in types of sexual activity that were likely to lead to HIV infection. High impulsivity and a tendency to view others with hostility and distrust acted as a link between men's negative experiences and their high-risk sexual behavior. This study suggests that paying attention to the personal and community risk factors that predict HIV-related behavior may help to reduce HIV infection rates.

Kogan, S. M., Cho, J., Barnum, S., Barton, A. W., Hicks, M., & Brown, G. L. (in press). Pathways to HIV-Related Behavior Among Heterosexual, Rural Black Men: A Person-Centered Analysis Archives of Sexual Behavior. DOI: 10.1007/s10508-015-0661-7

Decreasing Substance use Risk among African American Youth: Parent-based Mechanisms of Change

Research has long shown that substance use among youth in the U.S. is a serious problem. In this study, researchers investigated the potential for a culturally sensitive, couple and parenting-focused intervention program for decreasing African American youth risk for substance use and vulnerability. The program focused on preventing family stress-spillover and increasing protective factors that may enhance resilience among youth. Youth whose parents participated in the program reported increased parental monitoring, positive racial socialization, and positive self-concept. In addition, youth self-reported decreased conduct problems and substance use. While study findings are not related to effects on lifetime substance use, results did suggest the potential for culturally sensitive family-based couple and parenting interventions to enhance parenting behaviors related to substance use onset and vulnerability among youth.

Beach SR, Barton AW, Lei MK, Mandara J, Wells AC, Kogan SM, Brody GH. Decreasing Substance use Risk among African American Youth: Parent-based Mechanisms of Change. *Prevention science : the official journal of the Society for Prevention Research*. 2016 July;17(5):572-83. PubMed PMID: 27129477.

Testing the biological embedding hypothesis: Is early life adversity associated with a later proinflammatory phenotype?

Adversity experienced in early life may be a risk factor for negative health outcomes later in life. The biological embedding model of adversity suggests that when certain adversity is experienced, immune cells, or monocytes, in the body become programmed to overreact, creating a “proinflammatory phenotype” which may increase vulnerability to chronic diseases. Researchers in this study collected blood samples from one hundred and forty seven adolescent girls across a 2.5 year period. To assess inflammatory responses from the blood samples, monocytes were stimulated with bacteria and were then tested for production of cytokine interleukin-6, proteins secreted in the body to stimulate the process of healing. Researchers also added hydrocortisone, a glucocorticoid, to assess the blood cells’ receptivity to anti-inflammatory aid. Results from this study found that early life adversity is associated with increased risk for the proinflammatory phenotype and for decreased sensitivity to glucocorticoids. These findings suggest that early life adversity may increase susceptibility of chronic diseases over the life span.

Ehrlich KB, Ross KM, Chen E, Miller GE. Testing the biological embedding hypothesis: Is early life adversity associated with a later proinflammatory phenotype?. *Development and psychopathology*. 2016 November;28(4pt2):1273-1283. PubMed PMID: 27691981.

Viral challenge reveals further evidence of skin-deep resilience in African Americans from disadvantaged backgrounds

Previous research suggests that outward indicators of resilience in disadvantaged African American youth, such as doing well in school, may only be skin-deep. Early life adversity may set one’s health for increased odds of negative health outcomes later on in life. This study examines further into the phenomenon of skin-deep resilience, looking at upper respiratory infections in African Americans.

European Americans were also included in the study. Data were collected on five hundred and fourteen healthy adults who were given a rhinovirus that causes upper respiratory infection. Participants also completed questionnaires assessing socioeconomic background, conscientiousness, psychosocial adjustment and lifestyle factors. Results from this study found that healthy African Americans from disadvantaged backgrounds who appeared to be outwardly resilient were more susceptible to illness associated with the rhinovirus. The characteristics associated with resilience, such as higher conscientiousness and higher psychosocial adjustment, were also found to be associated with increased susceptibility of illness. These same results were not found in European American participants.

Miller GE, Cohen S, Janicki-Deverts D, Brody GH, Chen E. Viral challenge reveals further evidence of skin-deep resilience in African Americans from disadvantaged backgrounds. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association*. 2016 November;35(11):1225-1234. PubMed PMID: 27505193; PubMed Central PMCID: PMC5067971

Trauma-Informed HIV Prevention and Treatment

This study is a review of intervention programs designed to address trauma in HIV-related prevention and treatment. Current research has found a pervasiveness of traumatic experiences among HIV-infected individuals and its correlation to increased risk for many negative health related outcomes. In particular, this study examined levels of intervention, target populations, and types of trauma addressed in the programs. While recent acknowledgment of violence on HIV outcomes among women improved effectiveness of HIV services and care for women, a review of eight studies found gaps in the research pertaining to violence experienced by men or transgendered individuals. More research is needed and should include trauma informed care among men and all groups with HIV and trauma, regardless of types of trauma experienced.

Sales JM, Swartzendruber A, Phillips AL. Trauma-Informed HIV Prevention and Treatment. *Current HIV/AIDS reports*. 2016 December;13(6):374-382. PubMed PMID: 27704251; PubMed Central PMCID: PMC510714.

Adversity in Childhood, Family-Centered Prevention and Prediabetes Risk

Research has shown that early life adversity may be a risk factor for negative health outcomes later in life. This study examined whether supportive parenting could play a role in disease risk prevention. Three hundred and ninety rural African Americans and their 11-year old children participated in a supportive parenting intervention program, or a control group. At age 25, each child participant provided a blood sample and a survey about adverse experiences in childhood. Children who had participated in the supportive parenting prevention program showed no association between adversity and increased risk for prediabetes. Children who had reported to experience high adversity in childhood and who did not receive the supportive parenting prevention program were 3.54 times more likely to have prediabetes than other participants were. These findings suggest that while early life adversity may increase susceptibility of chronic diseases, family centered prevention programming may provide a strategy to prevent negative health consequences over the life span.

Brody GH, Yu T, Chen E, Miller GE. Family-centered prevention ameliorates the association between adverse childhood experiences and prediabetes status in young black adults. *Preventive medicine*. 2017 July;100:117-122. PubMed PMID: 28431967; PubMed Central PMCID: PMC5492943.

Health Disparities and Economic Forces in Metabolic Syndrome Risk

Research suggests that while morbidity and mortality from cardiovascular disease has declined over the years, the highest rates are found in lower-income Black communities in the rural Southeast. This indicates possible health disparities and inequalities across groups. In this study, 328 Black youth from rural Georgia who were 16 or 17 years old when the Great Recession began participated in an on-going prospective study to examine socioeconomic forces and factors that may influence cardiovascular disease risk. At age 25, researchers collected health data from the participants using the International Diabetes Federation's Guidelines for metabolic syndrome – a classification marked by diseases such as cardiovascular disease and diabetes. Results from this study found that metabolic syndrome prevalence was lowest among youth whose families maintained stable economic conditions across the Recession. In addition, data also found that metabolic syndrome prevalence was greatest among youth whose families began the Recession in poverty, and sank into greater economic hardship afterwards. The findings from the study suggest that broader economic forces may influence greater disparities experienced among at risk communities for cardiovascular disease.

Miller GE, Chen E, Yu T, Brody GH. Metabolic Syndrome Risks Following the Great Recession in Rural Black Young Adults. *Journal of the American Heart Association*. 2017 September 6;6(9). PubMed PMID: 28877875; PubMed Central PMCID: PMC5634270.

Cannabis Use and Heavy Drinking Among Rural African American Youth and Class Membership

This study examined 518 African American youth and possible predictors of cannabis and heavy drinking behavior across adolescence and young adulthood. Data collected included stress and psychosocial assessments as well as substances use questionnaires over a 9-year period. Findings from this study suggest that higher levels of stress hormones and perceived stress were associated with greater reports of substance use over time. In addition, participants who reported a steep increase of cannabis use and heavy drinking during the transition to adulthood reported greater increases in deviant peer class membership affiliation.

Barton AW, Brody GH, Zapolski TCB, Goings TC, Kogan SM, Windle M, Yu T. Trajectory classes of cannabis use and heavy drinking among rural African American adolescents: multi-level predictors of class membership. *Addiction (Abingdon, England)*. 2018 February 17. PubMed PMID: 29453937.

The Role of Supportive Parenting on Poverty and Substance Use Outcomes

Years of research suggest that growing up in poverty is associated with higher stress and increased risk for substance use later on in life. This study examines whether supportive parenting may protect against the stress experienced in poverty. Three hundred eighty five African American families living in rural Georgia participated in a 14-year prospective study. Families who participated in the study lived in impoverished communities. Data found that a high number of years living in poverty was associated with increased stress, but only for those who received low levels of supportive parenting. This finding suggests that supportive parenting may play a key role in protecting against the negative outcomes associated with poverty, and may decrease risk of substance use during adulthood.

Barton AW, Yu T, Brody GH, Ehrlich KB. Childhood poverty, catecholamines, and substance use among African American young adults: The protective effect of supportive parenting. *Preventive medicine*. 2018 March 16;112:1-5. PubMed PMID: 29555186.

Experiences of Social Discrimination and Psychosocial Brain Functioning

Social discrimination is a psychological stressor associated with negative physical and mental health outcomes. This study uses resting state functional magnetic resonance imaging (fMRI) technology to examine social discrimination and brain functioning of the amygdala – an area of the brain that is central to psychosocial functions. Seventy-four adults participated in fMRI scanning and self-report surveys of discrimination. Data from the study found that greater experiences of social discrimination were associated with elevations in spontaneous amygdala activity and functional connectivity. These findings were independent of other factors examined during the study such as race, ethnicity, sex, and other psychological factors such as current stress, depression and anxiety. Further research is needed to explore the relationship between social discrimination and psychosocial brain functioning.

Clark, US, Miller, ER, Hegde, RR. Experiences of Discrimination are Associated with Greater Resting Amygdala Activity and Functional Connectivity. 2451-9022.

Adversity in Childhood, Family-Centered Prevention, and Prediabetes Risk

Individuals exposed to adverse childhood experiences (ACEs) are vulnerable to various physical and mental health problems later in life. Not all individuals exposed to ACEs, however, go on to experience worsened health. The current study was designed to better understand why. To do so, researchers examined whether families' participation in a program designed to enhance supportive parenting during adolescence would eliminate or reduce the association between ACEs and prediabetes status in young adulthood. Participants in the study were three hundred and ninety African American families living in the rural southeastern United States. When children were 11 years old, approximately half of the sample was randomly assigned to participate in a supportive parenting intervention program, and the other half was assigned to a control condition. Fourteen years later, when youth were age 25, follow-up assessments occurred that included a blood sample to assess prediabetes risk. Results indicated that greater adverse childhood experiences were associated with an increased risk for prediabetes, but only for individuals who did not participate in the program (i.e., the control condition). Specifically, children

who did not receive the supportive parenting prevention program were 3.54 times more likely to have prediabetes than participants who had similar childhood adversity scores and did receive the supportive parenting program. These findings suggest that while early life adversity may increase susceptibility of chronic diseases like diabetes, family centered prevention programming may provide a strategy to prevent negative health consequences over the life span.

Brody GH, Yu T, Chen E, Miller GE. Family-centered prevention ameliorates the association between adverse childhood experiences and prediabetes status in young black adults. *Preventive medicine*. 2017 July;100:117-122. PubMed PMID: 28431967; PubMed Central PMCID: PMC5492943.

Health Disparities and Economic Forces in Metabolic Syndrome Risk

Some of the country's highest rates of morbidity and mortality from cardiovascular disease are found in lower-income black communities in the rural Southeast. A growing body of research suggests these disparities originate in the early decades of life, and partly reflect the influence of broader socioeconomic forces acting on behavioral and biological processes that accelerate cardiovascular disease progression. Using a natural experiment research design, this study examined metabolic syndrome in rural black young adults as a function of their family's economic conditions before and after the Great Recession. The study followed 328 black youth from rural Georgia, who were 16 to 17 years old when the Great Recession began. When youth were 25, metabolic syndrome prevalence was assessed using the International Diabetes Federation's guidelines. Results indicated that metabolic syndrome prevalence was lowest among youth whose families maintained stable economic conditions across the Recession. In addition, metabolic syndrome prevalence was greatest among youth whose families began the Recession in poverty, and sank into greater economic hardship afterwards. The findings from the study provide further evidence that broader economic forces may contribute to health disparities evident in at risk communities.

Miller GE, Chen E, Yu T, Brody GH. Metabolic Syndrome Risks Following the Great Recession in Rural Black Young Adults. *Journal of the American Heart Association*. 2017 September 6;6(9). PubMed PMID: 28877875; PubMed Central PMCID: PMC5634270.

Cannabis Use and Heavy Drinking Among Rural African American Youth and Class Membership

Compared to the general population, African Americans report less of substance use during adolescence, yet report more substance use-related problems and relatively high use during adulthood. To better understand these counterintuitive findings, the current study investigated the developmental course of African Americans' marijuana use and heavy drinking. A total of 518 African Americans participated in this study that began when youth were 16 years old and followed participants over nine years until they were 25. For both marijuana use and heavy drinking, 3 general group trajectories were identified: low use, moderate use, and high use. In addition, for both marijuana use and heavy drinking, one group exhibited rapid growth around age 18. Individuals in different trajectory groups differed on a number of factors, including stress biomarkers, perceived stress, and psychosocial risk factors (e.g., racial discrimination, parent-child conflict). Results also indicated that participants in groups with a rapid increase in substance use during the transition to adulthood reported greater increases in deviant

peer affiliation during that same time. Results underscore the relevance of both biological and perceived markers of stress—in addition to often-studied psychosocial factors—for African American young adults' substance use patterns.

Barton AW, Brody GH, Zapolski TCB, Goings TC, Kogan SM, Windle M, Yu T. Trajectory classes of cannabis use and heavy drinking among rural African American adolescents: multi-level predictors of class membership. *Addiction* (Abingdon, England). 2018 February 17. PubMed PMID: 29453937.

The Role of Supportive Parenting on Poverty and Substance Use Outcomes

African Americans use drugs less frequently than do Caucasians during adolescence yet engage in similar or even higher levels of substance use in adulthood. To date, most explanations for this “racial crossover effect” have focused on the effects of stress that African Americans experience as they transition to young adulthood. However, emerging research has begun to suggest that, for some young people, vulnerability to drug use in young adulthood exists “beneath the skin” from the weathering of biological systems at earlier life stages. The current study examined this question using a 14-year prospective study involving rural African American youth and their primary caregivers. Results indicated that more years spent living in poverty during childhood predicted higher age 19 catecholamine levels (a biological marker of stress) that, in turn, predicted increases in drug use during young adulthood. In addition, high levels of supportive parenting were found to protect African American youth from poverty-related biological weathering and its subsequent effects on increases in substance use during adulthood. Thus, results from the study indicate that (1) growing up in poverty is associated with biological markers of stress among some rural African American youth that, in turn, forecast elevations in drug use in young adulthood, and (2) the presence of a caring, supportive parent is key protective factor that protects children who grow up in poverty from evincing impaired physical health profiles in adulthood.

Barton AW, Yu T, Brody GH, Ehrlich KB. Childhood poverty, catecholamines, and substance use among African American young adults: The protective effect of supportive parenting. *Preventive medicine*. 2018 March 16;112:1-5. PubMed PMID: 29555186.

Experiences of Social Discrimination and Psychosocial Brain Functioning

Social discrimination is a psychological stressor associated with negative physical and mental health outcomes. Despite growing concerns about the prevalence and impact of discrimination for individual well-being, little is known about how experiences with discrimination may affect brain functioning. In order to better understand this issue, the current study utilized resting state functional magnetic resonance imaging (fMRI) technology to examine social discrimination in relation to brain functioning of the amygdala – an area of the brain that is central to psychosocial functions. Seventy-four adults participated in fMRI scanning and self-report surveys of discrimination. Results from the study found that greater experiences of social discrimination were associated with elevations in amygdala activity and stronger connectivity between the amygdala and several other brain regions. These findings were independent of other factors such as current stress, depression, anxiety, and race. Results suggest that social discrimination affects brain function in a manner that is similar to, but still distinct from, other types of psychological stressors.

Clark, US, Miller, ER, Hegde, RR. Experiences of Discrimination are Associated with Greater Resting Amygdala Activity and Functional Connectivity. 2451-9022.