

How Poverty Affects the Brain and Behavior

August 31, 2015

Poverty holds a seemingly unbreakable grip on families, neighborhoods, cities, and entire countries. It stretches from one generation to the next, trapping individuals in a socioeconomic pit that is nearly impossible to ascend. Part of the fuel for poverty's unending cycle is its suppressing effects on individuals' cognitive development, executive functioning, and attention, as four scientists demonstrated during the inaugural International Convention of Psychological Science, held March 12–14 in Amsterdam, the Netherlands.

In an Integrative Science Symposium on cognition, behavior, and development in socioeconomic contexts, the researchers shared findings on the psychological effects of living with scarce resources and low socioeconomic status (SES) versus abundance and security. But speakers also emphasized that evidence on causes and effects of poverty already is sufficient to inform policies designed to alleviate economic disparities.

"We know a lot," said psychological scientist Cynthia García Coll, a child development researcher who is provost at Carlos Albizu University in San Juan, Puerto Rico. "There's a moral issue here. How much more do we have to talk about the fact that poverty is not good for human beings?"

The bulk of the symposium centered on the effects that money, in scarcity and often even in abundance, can have on the mind. And researchers opined that studies at the crossroads of psychology and economics exemplify true integrative science.

"If we keep this interaction between child development scientists, economists, neuroscientists, [and] cognitive scientists going," said APS William James Fellow Martha J. Farah, "I think it's very likely that we will develop a better grasp of how poverty impacts brain development and people's life chances and what kind of intervention tools might be effective."

Brain Development

Indeed, decades of research have already documented that people who deal with stressors such as low family income, discrimination, limited access to health care, exposure to crime, and other conditions of low SES are highly susceptible to physical and mental disorders, low educational attainment, and low IQ scores, noted Farah, a University of Pennsylvania professor. But studying the effects of childhood poverty on brain development, Farah has investigated whether growing up in disadvantaged environments depresses cognitive processes equally or whether certain abilities are more compromised than others. She and her colleagues have found that memory is particularly vulnerable to life in low SES settings. And one of the specific factors impacting memory is parents' ability to be responsive and supportive under the stressful circumstances of poverty.

In her lab, Farah and her colleagues examined data from a developmental study that had been tracking a

cohort of children for more than 20 years. When the children were age 4 and age 8, research assistants made home visits to record various details about their upbringings. They looked, for example, at cognitive stimulation in the home, such as the presence of books or educational toys. They interviewed mothers and caregivers and observed their interactions with their children. They paid particular attention to how much warmth and care each child received from a mother or caregiver.

Farah's team then examined results of cognitive tests given to the children when they were in middle school, and found that large amounts of cognitive stimulation at earlier ages enhanced the children's language development. They also found that high levels of parental nurturing at ages 4 and 8 promoted better memory performance by middle school.

Farah cited more recent research showing a link between SES and hippocampal volume — an indicator of memory performance. A 2012 interdisciplinary study led by Columbia University cognitive neuroscientist Kimberly Noble, for example, identified smaller hippocampal volume among low SES children and adolescents compared with their high SES peers.

A major implication of the cognitive neuroscience research on development, Farah said, is that it challenges the widely held notion that the poor have only themselves to blame for their circumstances.

“Surveys have shown that a very common view about why poor people are poor is that they don't try hard enough, they're irresponsible, they make poor decisions, they don't stay in school, et cetera,” she said. “But ... neurons don't deserve blame or credit. They don't expend effort. They don't have good or bad behaviors. They just behave according to the laws of the natural world.”

Studies also show that poverty in the earliest years of childhood may be more harmful than poverty later in childhood, García Coll said. She cited studies from scientists like developmental researchers Greg Duncan (University of California, Irvine) and Katherine Magnuson (University of Wisconsin–Madison), who have found the first 5 years of life to be the most sensitive period for the damaging influences of economic deprivation. Duncan's longitudinal research, for example, has shown that low family income is more associated with difficult circumstances in adulthood when it occurs before age 5 as opposed to later in childhood.

Exceptions

Examining the other end of the spectrum, some researchers have found that adolescents from highly affluent families show particular vulnerabilities to psychological problems across multiple domains. APS Fellow Suniya S. Luthar of Arizona State University, for example, has found that economically privileged youth are more distressed — with high rates of substance abuse, mood disorders, and rule-breaking behaviors — than their peers.

Some of these findings were demonstrated in a project called the New England Study of Suburban Youth, an ongoing longitudinal assessment of about 350 suburban middle school students. Luthar and her colleagues began studying this population in 1990 and have found that health and behavior issues, popularly nicknamed “affluenza,” emerge around 7th grade and can get worse over time.

García Coll has focused much of her research on the children of immigrants and has found in some

samples that first-generation immigrant adolescents had lower levels of juvenile delinquency, better test scores and academic performance, and more positive attitudes compared with their American-born peers.

“There’s something about acculturating to a society,” she said, “where they consider you poor, minority, and/or deficient, and they’re not giving you any support for who you are or whom you should become — a bicultural individual. But at home you’re getting some hope, at least. There’s an immigrant dream.”

But, she added, these advantages steadily decline in subsequent generations, a pattern called the immigrant paradox. This means children and grandchildren of immigrants will have increasing rates of health and behavior problems if we do not intervene.

“It’s something I call, ‘becoming American might be hazardous to your health,’” she said.

This generational trend emerges even in sexual behavior. Using longitudinal data on Latino individuals in the United States, García Coll and her colleagues measured adolescent sexual risk behavior by asking participants questions about their sexual behaviors, including use of condoms and birth control, age of first intercourse, and number of sexual partners. They found that risky behavior among third-generation teens, particularly girls, was higher than that of first- and second-generation adolescents, even when controlling for variables such as family income, parents’ education, and age of onset of puberty.

Scarcity and Bandwidth

APS Fellow Eldar Shafir of Princeton University takes a different perspective on poverty, looking at its impact on behavior and decision-making. And the data show that poor people make far more astute decisions than popularly believed; they weigh tradeoffs, pay special attention to prices, and juggle resources carefully, he said. But their intense focus on stretching their scarce resources can absorb all their mental capacity, leaving them with little or no “cognitive bandwidth” to pursue job training, education, and other opportunities that could lead them out of poverty.

In a series of experiments, the results of which were published in 2013 in *Science*, Shafir and his colleagues found that an individual preoccupied with money problems showed a decline in cognitive function akin to a 13-point drop in IQ (similar to losing an entire night’s sleep).

The researchers began their study in a New Jersey mall, randomly recruiting 400 participants of various income levels. They asked subjects to ponder how they would solve hypothetical financial problems, such as paying for a car repair. Some participants were assigned an “easy” scenario, such as the mechanic’s bill running just \$150, while others were assigned a “hard” scenario, like the repair costing \$1,500. The participants mulled over these scenarios as they performed some tests designed to measure fluid intelligence and cognition. Subjects were divided into “poor” and “rich” groups based on their income.

The researchers found that in financially manageable scenarios both groups performed equally well on the tests. But when faced with difficult scenarios, participants in the poor group performed significantly

worse on the tests compared with those in the rich group.

To confirm these results and explore poverty's influence in natural settings, the researchers then tested more than 460 sugarcane farmers in India, who typically find themselves poor before the annual harvest but wealthy afterward. Each farmer performed better on cognitive tests postharvest compared to preharvest, Shafir said.

“Basically, when these guys with the same education, the same health, had plenty, they functioned about 10 IQ points higher than when they had scarcity,” he said.

This type of problem clearly shows up in major financial decisions, Shafir's research shows. In a 2012 study, he and a team of behavioral economists attempted to explore the reasons that cash-strapped borrowers frequently are attracted to and besieged by predatory lending practices (e.g., payday loans). The experimenters randomly assigned student volunteers to either a rich or poor role. Those in the poor group had less of a resource — time — available in a money-making game. The participants played multiple rounds of the game, and in some conditions could borrow time from future rounds, but with interest. (For example, for some participants, a borrowed second of time would actually cost 2 seconds from the next round.)

The researchers found that rich participants tended to avoid high-cost borrowing, but poor participants were quick to take a loan, overborrowed, ran out of time faster, and ultimately left the lab with less money when the game was completed. Behavior like this often is attributed to the poor being myopic and exhibiting less control, except that here the “poor” participants were Princeton students. Scarcity can affect even the privileged.

Shafir suggested that policies and services aimed at helping the poor should factor in the weight that poverty has on a person's cognitive function. This could include simplifying the typically complicated job applications and other forms that are especially challenging to fill out for people with overly taxed mental resources. Without those accommodations, society is actually hampering a person's ability to succeed, he argued.

“And if you look at it that way,” Shafir said, “we are constantly violating the International Bill of Human Rights, which obligates us to do what we know can lead to improvement in the life conditions of the less fortunate and [the] disenfranchised.”

A Data Hub to Measure Well-Being

Despite the dramatic economic growth, immense technological progress, and substantial increases in average disposable income seen in numerous countries over the last 50 years, doubts have been raised, both in the social sciences and in society at large, as to whether people in those nations really are better off.

Social scientists in Europe have built an empirical way to “map out” societal trends, giving psychological scientists, economists, and other researchers data that they can use to better understand the causes and consequences of social transformation, says sociologist Jürgen Schupp of the German

Institute for Economic Research (DIW Berlin).

Schupp, who spoke in the Integrative Science Symposium on cognition, behavior, and development in socioeconomic contexts during the International Convention of Psychological Science in March, directs the research unit of DIW Berlin's Socio-Economic Panel (SOEP) Study. That project began in 1984 as a longitudinal, multiple-cohort study of private households. Among the data captured in the SOEP are living standards, availability and quality of work, societal distribution of prosperity, educational opportunities, health and life expectancy, and subject experiences of life satisfaction.

The results, which present longitudinal indicators of such trends as household income growth and the length of time individuals live in poverty, have become major parts of government economic reports.

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