

Assignment # 1

Child Poverty and Epigenetics

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The purpose of this assignment is to analyze, from a biopsychological perspective, the roles of both genetic and environmental factors in brain development. You will be asked to integrate material from your textbook, articles from the popular media, and a short video clip to analyze an important problem faced by a large segment of our population.....The effects of child poverty on brain development. Through this assignment, you will acquire important skills that you will need in order to successfully complete the Summative Assessment for this course. This assignment will be completed in groups of no more than 2 students. The instructor will be placing you in your groups. Students may not choose their own groups, and may not change groups once assigned.

The Problem Under Investigation:

It has long been shown that children living in poverty may score up to 10-15 IQ points lower than children living in wealthier conditions, thus resulting in lower educational attainment (Gutman, Sameroff & Cole, 2003). There are many reasons for these differences, including lower quality education, poor nutrition, poor access to medical care, exposure to violence and pollutants, among many other factors (Gutman et al 2003). Many researchers believe that the levels of stress hormones produced when faced with chronic poverty accounts for these differences, but you believe that the problem goes much deeper than that.....as an epigeneticist, you believe that the stress caused by poverty may actually cause genomic changes, which then ultimately interfere with brain development. Intervention then must come early....perhaps even before the child is born!!! In order to obtain funding for more research in this area, you must put together a sound, well researched argument that shows the role of epigenetics in the link between poverty and brain development.

In order to do this, you must answer the following questions, using the following sources:

- Your textbook (Module 4.1) and class notes
- The following video clip <https://www.youtube.com/watch?v=38OUCtzkT4Q&t=20s>
- the article entitled “The Neuroscience of inequality: Does poverty show up in children’s brains” by Mike Mariani (2017),
- the article entitled “Early Life Experiences: It’s in your DNA” by Robert Martone (2018),
- The article entitled “Poor Wealth may Epigenetically mean Poor Health” by Tim Barry (2019).

Questions:

1. Based on the presentation by Moshe Szyf, as well as your textbook and class notes, what is the difference between DNA and epigenetics?
2. Using the same sources as those used for question 1, explain how epigenetic changes help the person or animal to adapt to his environmental conditions (make sure to provide examples)? In contrast, how might such epigenetic changes be harmful in the development or health of the person or animal (give examples)?
3. Using findings reported in the article by Mike Mariani (2017), explain in what ways a chronic stressor like poverty may interfere with brain development. Which parts of the brain are most impacted by poverty? Make sure to cite findings of at least 3 studies discussed in this article.
4. Using information from Szyf's presentation, your textbook and class notes, the article by Martone (2018) and the article by Barry (2019), explain how a early life stress, for example, a chronic stressor like poverty might produce genomic changes and change genetic expression? How early in life might these genomic changes occur? How might these genomic changes impact general mental and physical health?
5. How might genomic changes caused by poverty explain the differences we see in the brains of children living in poverty vs. those living in affluence?
6. What evidence does Szyf provide that suggests that epigenetic changes might be reversed? What implications does this evidence have for helping those who live in poverty?