

«La neuro-imagerie confirme l'impact de la pauvreté sur le cortex» Neuroimaging confirms the impact of poverty on the cerebral cortex.

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The American pediatrician Kim Noble will examine how supplemental income—to be allocated to poor families—can impact the cerebral development of newborn babies.

Kim Noble, trained as a pediatrician, directs the [NEED Lab](#) at [Teachers College,] Columbia University. The laboratory studies the impact of early experiences on child learning and development.

QUESTION: What is the current state of knowledge on the impact of poverty on the cerebral development of children?

Kim Noble: Several studies, conducted on children from childhood to adolescence, have shown that socio-economic inequalities affect the development of language, memory and self-control. It is important to point out, however, that this phenomenon has not been examined in very early life. This comes as no surprise given the working hypothesis that post-natal experiences are what matter, even if the evidence is scant.

Our lab's neuroimaging studies confirm the association between socio-economic factors and brain development. The changes are perceptible on the areas of the brain that support language, memory, and self-control. The surface area of the cerebral cortex is significantly reduced among children living in poverty.

Various factors are involved in the relationship between poverty and brain development. Studies are underway to determine their relative impact. Our laboratory is particularly focused on two factors which seem of paramount importance: the quality and quantity of the home language environment, as well as exposure to stress (both physiological and perceived).

QUESTION: You're about to embark on a study to assess whether it is possible to prevent these kinds of brain disorders by providing poor families with a supplemental income. How are you going to proceed in your research?

Kim Noble: The study will proceed with 1,000 mothers who, at the time they give birth, are living in poverty in various localities across the United States. After a random assignment, half of the mothers will receive a large monthly income supplement of \$333; the other half will receive a nominal supplement of \$20/month. We'll monitor their children during the first three years of their lives, when the developing brain is most sensitive to differences in experience.

The hypothesis—that income supplementation will improve the development and wellbeing of young children—is simple, and yet this ambitious study is without precedent. The total cost of the project is approximately \$16 million, and we are hopeful that NIH will fund the majority of the research. The budget for the supplemental income, however, will be covered by private funding and philanthropy. Approximately \$13 million has been raised or close-to-raised thus far, and we are actively seeking funding for the remaining \$3 million. If we are successful, the study can begin in 2017.

QUESTION: Are you concerned that the families receiving only \$20/month might leave the study, for lack of incentive?

Kim Noble: To be more precise, in addition to the monthly payments, all families will receive compensation for their participation at various stages of the research: \$50 upon the child's birth; \$50 upon each control—implemented on the child's first and second birthdays—and \$200 on the child's third birthday, constituting the end of the study. In our pilot study of 30 families, we found that in the control group, even the \$20 monthly supplement was considered helpful. In both groups, the retention rate of the research participants was high.

QUESTION: Why not start the compensation payments during pregnancy, to improve prenatal conditions and protect, as early as possible, the development of the baby's brain?

Kim Noble: We thought carefully about that option. But, for logistical reasons, it is more feasible to conduct the study beginning with childbirth, when most women are giving birth in a hospital where they can be followed, unlike the prenatal phase when it's relatively more difficult to find and track women for a research study.

The main objective of the neuroscience of poverty is to identify the mechanisms that cause inequality. It is crucial to produce the evidence to inform and implement policies that can help all children reach their full potential. Poverty is perhaps one of the greatest obstacles to children achieving this goal.

http://www.lemonde.fr/sciences/article/2017/03/13/la-neuro-imagerie-confirme-l-impact-de-la-pauvrete-sur-le-cortex_5093877_1650684.html#g0BAFXRHT6BogDf1.99