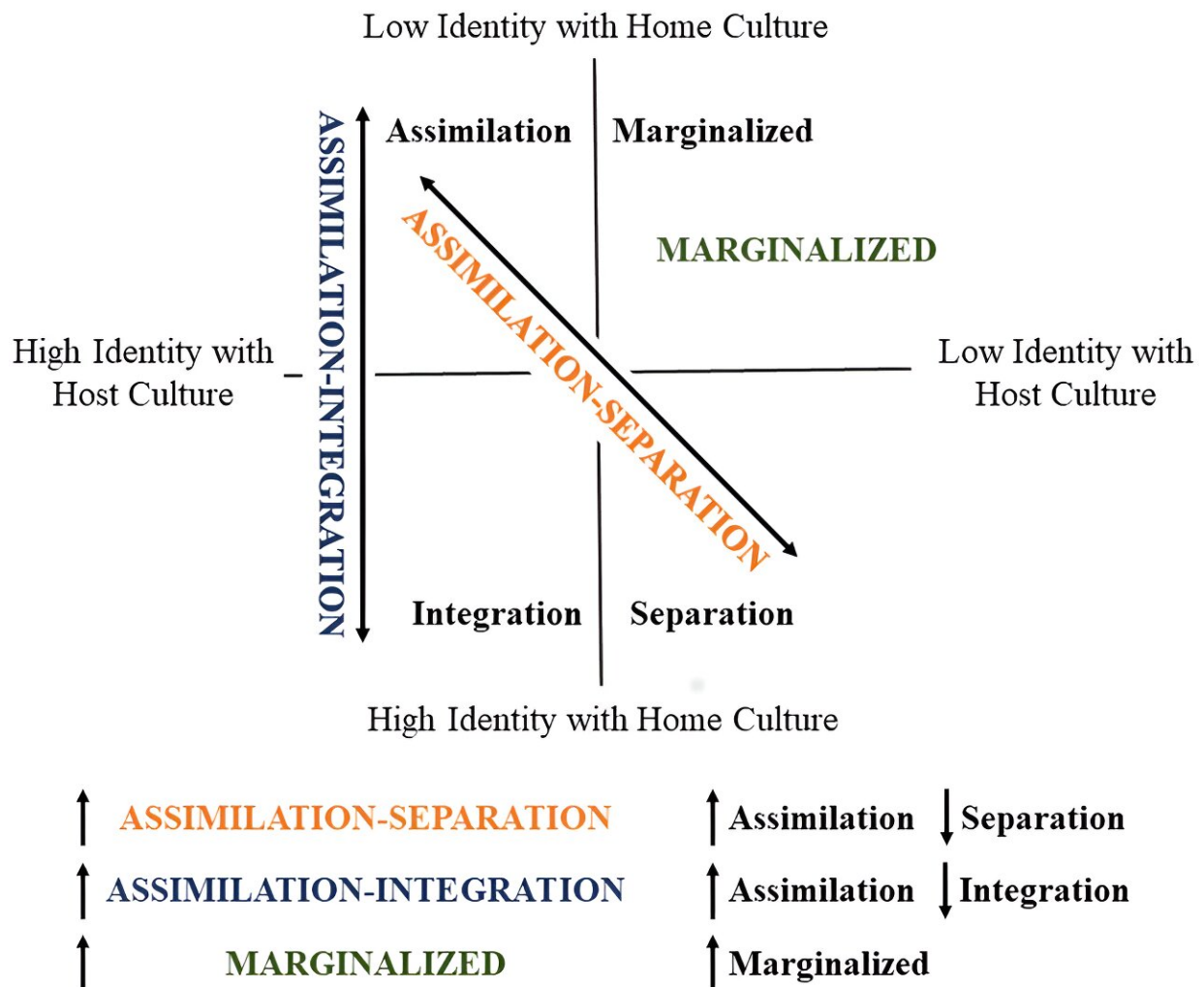


Discrimination during pregnancy can affect infant's brain circuitry

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Acculturation factors projected onto Berry's model of acculturation. In Berry's multidimensional model of acculturation (see Supplementary), not all four types may be present in any given population, which is reflected in our factor analyses. ASSIMILATION-INTEGRATION and ASSIMILATION-SEPARATION each

project into two categories with Berry's model of acculturation. Higher scores in either factor converge to higher assimilation, but lower scores on ASSIMILATION-INTEGRATION and ASSIMILATION-SEPARATION diverge to separation and integration, respectively. MARGINALIZED reflected only the marginalized type of acculturation. Credit: *Neuropsychopharmacology* (2023). DOI: 10.1038/s41386-023-01765-3

Experiences of discrimination and acculturation are known to have a detrimental effect on a person's health. For pregnant women, these painful experiences can also affect the brain circuitry of their children, a new study from Yale and Columbia University finds. These effects, the researchers say, are separate from those caused by general stress and depression.

The [study was published](#) in the journal *Neuropsychopharmacology*.

Previous research has shown that not only are high levels of stress and depression harmful to the person experiencing them, but they can also have long-lasting effects on their children if experienced during pregnancy. In recent years, studies have also revealed that [discrimination](#) and acculturation—or the changes that occur due to migration and the subsequent balancing of multiple, [different cultures](#)—can affect the [adult brain](#). What's less clear is how children might be affected by their parents' experiences of discrimination and acculturation.

For the new study, the researchers assessed the degree of discrimination, acculturation, and distress experienced by 165 people while pregnant using established questionnaires. The participants were 14 to 19 years old, mostly Hispanic (88%), and lived in or near the Washington Heights neighborhood of New York City. The researchers then performed [magnetic resonance](#) imaging (MRI) to evaluate [brain connectivity](#) in 38

of the participants' infants after birth.

The first step, researchers said, was to determine whether discrimination and acculturation are distinct from other types of stress or depression.

"We thought that some of these experiences might go hand-in-hand or overlap, in which case it would be difficult to measure the effects of discrimination or acculturation on their own," said Dustin Scheinost, associate professor of radiology and biomedical imaging at Yale School of Medicine and senior author of the study.

Scheinost and his colleagues from Columbia and Children's Hospital of Los Angeles used a data analysis program that assessed all of their separate questionnaire measures of acculturation, discrimination, stress, depression, [childhood trauma](#), and [socioeconomic status](#), and organized them into groups by how similar the data analysis program determined them to be. Doing this, researchers say, helped them understand the degree to which different measures might be used to evaluate similar experiences.

"That analysis clustered measures of stress and depression and separately pulled out discrimination and acculturation measures as their own distinct variables," said Scheinost. "That told us that while these experiences of discrimination are related to stress and depression, they are separate enough that we can look at their unique effects."

When the research team analyzed the MRI images of the infants' brains, they found differences in the children whose parents reported experiencing discrimination while pregnant.

The amygdala is an area of the brain associated with emotional processing and it's very vulnerable to prenatal stress, said the researchers. Prior research has found that early experiences of adversity can have

measurable impacts on amygdala connectivity in infants, children, adolescents, and adults. A growing body of evidence also suggests the amygdala is involved in ethnic and racial processing, such as differentiating faces of people from different races or ethnicities, for example.

When the researchers assessed connectivity between the amygdala and another region of the brain called the [prefrontal cortex](#), which is associated with higher-order functioning, they found that children of people who experienced more discrimination while pregnant had weaker connectivity between the two brain regions.

"Our finding was consistent with what you expect to see in the brain of those affected by early life adversity either pre- or postnatally," said Scheinost.

The takeaway, said Scheinost, is that while discrimination and acculturation affect the brain in ways other types of stress do, there is something unique and important about these particular experiences that should be better understood. Future research, he said, should focus on whether other populations are affected in similar ways and what underlies the effects.

"We don't fully know why this happens," said Scheinost. "So we need to investigate the biological mechanisms that carry these experiences of adversity from parent to offspring."

More information: Marisa N. Spann et al, The effects of experience of discrimination and acculturation during pregnancy on the developing offspring brain, *Neuropsychopharmacology* (2023). [DOI: 10.1038/s41386-023-01765-3](https://doi.org/10.1038/s41386-023-01765-3)

Provided by Yale University

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