

Infographic: How social isolation forced by the coronavirus affects the brain?

[B]efore COVID-19 began its global spread, millions of people were already what researchers consider to be socially isolated—separated from society, with few personal relationships and little communication with the outside world. According to European Union statistics, more than 7 percent of residents say they meet up with friends or relatives less than once a year.

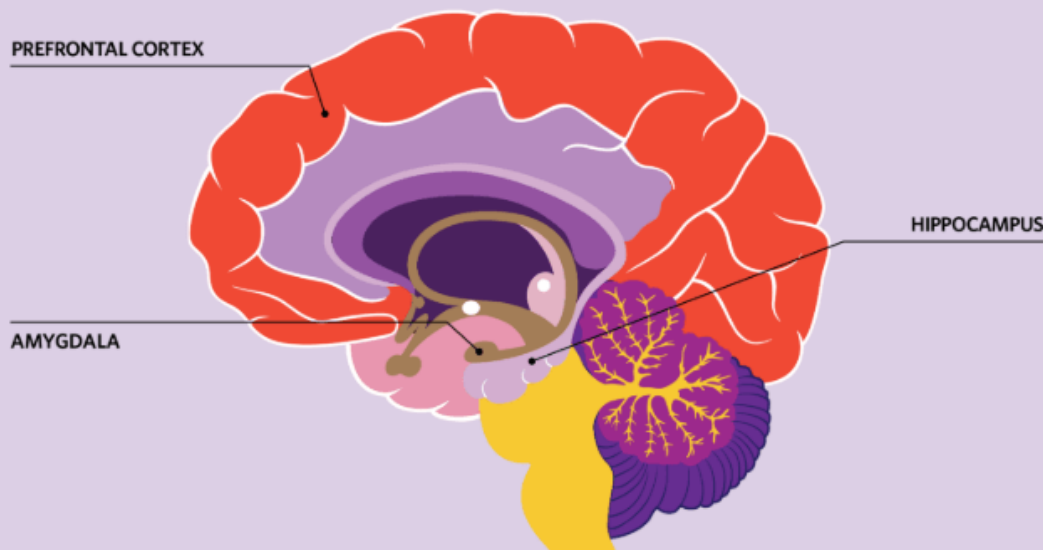
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These figures are concerning to public health experts, because scientific research has revealed a link between social isolation—along with negative emotions such as loneliness that often accompany it—and poor health... Alongside myriad connections to poor physical health, including obesity and cardiovascular problems, a range of possible effects on the human brain have now been documented: Social isolation is associated with increased risk of cognitive decline and dementia, as well as mental health consequences such as depression and anxiety.

It'll be years before researchers understand whether and how measures enacted during the pandemic play into any of these risks. The sort of isolation people are experiencing right now is unprecedented, and is compounded with other pressures, such as fear of disease and financial strain. But now more than ever, it's important to study the effects of social isolation, and potential means to mitigate it, says [Stephanie Cacioppo](#), a social neuroscientist and cognitive psychologist at the University of Chicago. "We're a social species," she says. "We really need others to survive."

THE ISOLATED BRAIN

Studies of animals and people experiencing isolation have identified several brain structures that appear to be affected by a lack of social interaction. Although these studies can't identify causal relationships—and don't always agree with one another—they shine a light on some of the mechanisms by which physical isolation, or feelings of loneliness, could impair brain function and cognition.



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PREFRONTAL CORTEX: In some studies, people who are lonely have been found to have reduced brain volumes in the prefrontal cortex, a region important in decision making and social behavior, although other research suggests this relationship might be mediated by personality factors. Rodents that have been isolated from their conspecifics show dysregulated signaling in the prefrontal cortex.

HIPPOCAMPUS: People and other animals experiencing isolation may have smaller-than-normal hippocampi and reduced concentrations of brain-derived neurotrophic factor (BDNF), both features associated with impaired learning and memory. Some studies indicate that levels of the stress hormone cortisol, which affects and is regulated by the hippocampus, are higher in isolated animals.

AMYGDALA: About a decade ago, researchers found a correlation between the size of a person's social network and the volume of their amygdala, two almond-shaped brain areas associated with processing emotion. More-recent evidence suggests the amygdalae are smaller in people who are lonely.

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