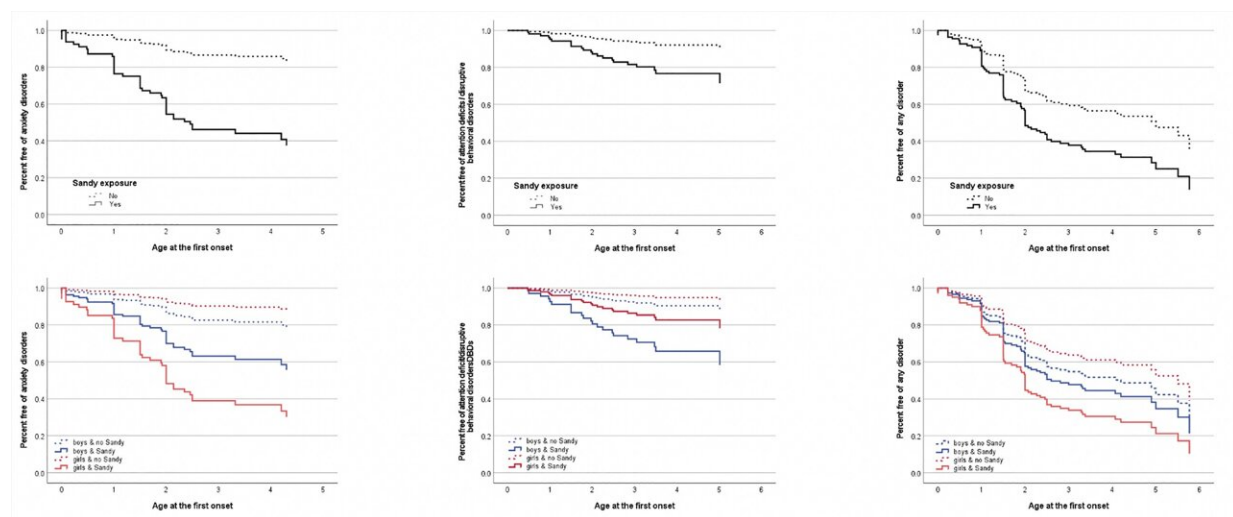


# Children exposed to disasters in the womb have higher rates of developmental psychopathology in a sex-specific manner

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The top panels show the patterns of onset of disorders over time for anxiety disorders, attention deficit/disruptive behavioral disorders, and any of the disorders we examined in relation to exposure to SS in-utero. The bottom panels show sex-specific age of onset for anxiety disorders, attention deficit/disruptive behavioral disorders, and any disorder. Solid lines represent exposed [SS(+)] and dotted lines unexposed [SS(-)]. Red lines represent female, and blue lines male children. Credit: Yoko Nomura

New data from the longitudinal Stress in Pregnancy Study (SIP Study) have identified earlier onset and higher rates of developmental

psychopathology among children whose mothers were pregnant with them during Superstorm Sandy. In addition, the child's biological sex determined specific patterns of elevated risks.

According to the findings, published today in the *Journal of Child Psychology and Psychiatry*, children prenatally exposed to Superstorm Sandy, the natural disaster that hit metropolitan New York in October 2012, had substantially increased risks for depression, anxiety, and attention deficit/[disruptive behavior disorders](#) compared to children who were not.

Further, male children had distinctly and substantially elevated risks for attention deficit and disruptive behavioral disorders (including attention deficit/[hyperactivity disorder](#), [conduct disorder](#), and oppositional defiant disorder), while female children had elevated risks for anxiety disorders, phobia, and depressive disorders (including separation anxiety disorder, generalized anxiety disorder, and dysthymia).

Researchers analyzed data collected from 163 preschool-aged children from diverse racial and economic backgrounds, 40.5% of whom were exposed to Superstorm Sandy in utero and 59.5% of whom were not. The team conducted structured clinical interviews with the children's parents and reviewed available diagnostic health data on the participating children, whose median age at the initial clinical interview was 3.19 years.

"We've known for some time that maternal stress during pregnancy plays a key role in the mental health development of the child," said the study's principal investigator Yoko Nomura, a [psychology professor](#) at the CUNY Graduate Center and Queens College.

"The SIP Study leveraged an unfortunate climate-related disaster and conducted a natural experiment to examine the impact of prenatal stress

in utero on subsequent development and risks for developmental psychopathology during early childhood. Understanding these connections and distinctions grows more necessary every day with the increased frequency of natural disasters driven by climate change."

The team's recent findings, as well as those from a previous SIP Study examining underlying differences in placental transcriptomes, could help clarify the link between exposure to the effects of a natural disaster in the womb and the early risks of developmental psychopathology. Although the underlying mechanisms through which in-utero exposure to a natural disaster negatively impacts early mental health development are still unclear, the growing body of research points to the important relationship between environmental and genetic effects.

"Our ongoing study elucidates the impact of environmental stress on the psychiatric development of preschool children and the elevated risks for early psychopathology in this population," said Jeffrey Newcorn, M.D., professor of psychiatry and pediatrics, and director of the Division of ADHD and Learning Disorders at the Icahn School of Medicine at Mount Sinai, a co-author on the study.

"Most strikingly, the type of mental health problems very much depended on the biological sex of the child."

Taken together, the SIP Study findings should serve as an important resiliency-strategy resource that informs [health care professionals](#), policymakers, and educational institutions on the need for infrastructure that supports pregnant women and families exposed to climate-related natural disasters in order to mitigate early mental health risks and promote healthy childhood development.

**More information:** Yoko Nomura et al, Prenatal exposure to a natural disaster and early development of psychiatric disorders during the

preschool years: stress in pregnancy study, *Journal of Child Psychology and Psychiatry* (2022). [DOI: 10.1111/jcpp.13698](https://doi.org/10.1111/jcpp.13698)

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