

European College of Neuropsychopharmacology (ECNP) – press release

[Baby heartbeat reveals the stress of having a depressed or anxious mother](#)

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Type of study: not peer-reviewed/experimental study/people

Scientists have shown that the babies of mothers dealing with anxiety or depression exhibit physiologically stronger signs of stress than babies of healthy mothers, when given a standard stress test. These babies show a significantly increased heart rate, which researchers fear may lead to imprinted emotional stresses as the child grows up.

The interaction of mother and infant, especially in the early months of life, plays a huge role in healthy development. Some mothers, particularly those suffering from mood disorders such as depression, anxiety, or post-natal depression, have difficulties regulating infant's negative affection, which is believed to create insecurities in the children as they grow older. Mood disorders (such as irritability, changing moods, mild depression) are common during the pregnancy and the postpartum period, occurring in 10-20% of women.

The effect of "emotionally distant" mothers for infants was demonstrated in the famous "Still Face Test" (see notes), first devised in the 1970's; mothers were asked to playfully interact with their babies, and then spend a period where they "blank" all interaction, before resuming normal contact. During the second phase (Still-Face episode) babies showed heightened negative emotionality as well as a reduction of social engagement and avoiding behaviours.

Now in a preliminary finding, German researchers have shown that during the period where the mother withdraws attention, babies of anxious or depressed mothers had a significant rise in heart rate, on average 8 beats per minute more than that of the babies of healthy mothers. These babies were also classified by their mothers as having a more difficult temperament than healthy babies.

"To our knowledge this is one of the first times this physical effect has been seen in 3 months old infants. This may feed into other physiological stress systems leading to imprinted psychological problems", said researcher Fabio Blanco-Dormond of the University of Heidelberg.

The researchers recruited a total of 50 mothers and their babies: 20 mothers exhibiting depression or anxiety disorders around the time of birth, and 30 healthy controls. Each mother- baby couple underwent the *Still Face Paradigm*. Mothers were asked to play with their babies for 2 minutes, then to cut off all interaction while maintaining eye contact. After 2 more minutes mothers then resumed playful interaction. Throughout the test researchers measured the heart rates of both mother and baby.

“We found that if a mother was anxious or depressed, their baby had a more sensitive physiological response to stress during the test than did the babies of healthy mothers. This was a statistically significant increase of an average of 8 beats per minute during the non-interactive phase”.

This is a preliminary finding, so we need to repeat it with a larger sample to make sure that the results are consistent. This is our next step”, said Fabio Blanco-Dormond.

Commenting, Professor Veerle Bergink, Director of Women's Mental Health Program at the Icahn School of Medicine at Mount Sinai, New York, said:

“This work means that it is important to diagnose and treat depressive and anxiety disorders in new mothers, because it has an immediate impact on the stress system of the baby. Prior studies showed not only short term, but also long term adverse effects of postpartum mood disorders on the children. Most postpartum mood disorders start during, or even before pregnancy, and early diagnosis is therefore important”.

Professor Bergink was not involved in this work, this is an independent comment.

Notes

To see an edited video of the Still Face Test, see <https://tinyurl.com/y4s8ldoe> This is included here with the permission of ZEROTOTHREE <https://www.zerotothree.org/> Inclusion here does not give permission for reuse.

The work is part of the COMPARE Study, which examines families in which the mothers have had depression and / or anxiety disorders around the time of birth. This study is in cooperation between the University of Heidelberg, the Ludwigs-Maximilians University of Munich, the University of Wien and the University of Ulm.

Notes for Editors

European College of Neuropsychopharmacology (ECNP)

The ECNP is an independent scientific association dedicated to the science and treatment of disorders of the brain. It is the largest non-institutional supporter of applied and translational neuroscience research and education in Europe. Website: www.ecnp.eu

The 33rd annual ECNP Congress – ECNP Virtual- takes place from 12th to 15th September. It is Europe's premier scientific meeting for disease-oriented brain research. In 2020 it is a virtual congress. The regular congress annually attracting up to 6,000 neuroscientists, psychiatrists, neurologists and psychologists from around the world. Congress website: <https://www.ecnp.eu/Congress2020> The 2021 congress is scheduled to take place in Lisbon next September.

Conference Abstract : P.246 Heart rate variability in mothers with affective disorders and their infants during the still-face-paradigma

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The influence of mothers' psychopathology on their infants' behavior has been topic of research of several studies. In the same way the use of heart rate variability to measure the ability of the hearth to adapt to physical stress has also been focus of scientific interest. However, literature regarding the electrophysiological regulation of the hearth on mothers with affective disorders and their infants is very scarce.

To this end, a number of 50 mothers were evaluated using the Diagnostic Interview for Mental Disorders. 20 of them presented one or more affective disorders and the other 30 built the control group. We measured the heart rate variability (using an electrocardiogram) of mothers and their infants at 3 months of age during the Still-Face-Paradigm, a six minutes task that engages mother and child in playful and stressful situations. In addition, we controlled for the children's own behaviour assessed subjectively by their caregivers using the Infant-Behaviour-Questionnaire. During the first two minutes of the Still-Face-Paradigm mothers were able to interact with their babies in a playful way, while their infants were seated on a baby-rocker. No direct physical contact was allowed during any of the three phases. The beginning of the next phase was signalled to the mothers by a knock on the door; during the following two minutes (stressful phase) mothers were told to gaze at their infants, without making any gestures or mimics. The last phase consisted again of a two minutes playful interaction between mothers and their babies.

For the data analysis we used Kubios HRV (version 2.0) to extract RMSSD, a standard time domain that reflects the parasympathetic activity of the vagal nerve on the heart, as well as the heart rate during the different phases. Applying non-parametric measures and adjusting for artefacts and sociodemographic data (number of children, age at the time of birth, income, birth weight, etc.) we found important differences between the children's heart rate during the second phase of the Still-Face-Paradigm and their results in the Infant-Behaviour-Questionnaire: Children of mothers suffering from an affective disorder had significantly higher heart rates during the still-gaze situation ($p=0.048$; $r=0.29$) and were classified by their primary caregivers as having a more difficult temperament richer in negative affection ($p=0.041$; $r=0.3$). Furthermore, mothers on the control group had notoriously higher heart rates during all three phases and the mothers' mean heart rate differed significantly between groups ($p=0,04$; $\eta^2 = 0,09$)

These differences between infants and mothers of clinical and control groups showed us that infants with a primary caregiver suffering from an affective disorder have more difficulties learning to cope with stress measurable at a very early age. And that "healthy" mothers are more active when interacting with their babies as well as more reactive to their infant's needs during stressful situations. This puts in evidence not only the psychological but also the physiological consequences of negative interactions between mothers and their infants and calls for early intervention to prevent further consequences.