

## RESEARCH SUMMARY

### **Stress, cortisol and well-being of caregivers and children in home-based child care: a case for differential susceptibility**

M.G. Groeneveld, H.J. Vermeer, M.H. van IJzendoorn & M. Linting (2010)

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The “gut feeling” that young children may be affected by the stress of those who care for them has been borne out by several recent studies that suggest that stress in parents will have a negative effect on their children’s physical and mental health. There have, however, been few studies of the possible effect of stress in non-family caregivers on the young children in their charge. In the Netherlands, many young children attend home-based childcare settings in which each worker looks after a fairly small number of children under four years of age: this is a responsible job that requires an enormous amount of attention and that may therefore cause stress. Harriet Vermeer and her colleagues from the Centre for Child and Family Studies at Leiden University, the Netherlands, have conducted what may be the first study of the relationships between caregivers’ stress and children’s wellbeing in this setting. They also sought to determine whether these relationships were altered by the perceived temperaments of the children involved.

The physiological response to stress in humans and other mammals involves the activation of a complex biochemical response system known as the hypothalamic-pituitary-adrenal axis, which results in the release of the hormone cortisol from the adrenal gland near the kidneys. Cortisol is secreted in saliva, and the measurement of salivary cortisol levels is a simple and non-invasive way of measuring an individual’s response to stress. There is normally a constant daily pattern in cortisol secretion, with the highest levels measured in the morning and the lowest in late evening. This pattern is observed in small children cared for at home but may be disrupted, with elevated cortisol levels in the afternoons, in childcare settings. Interestingly, one study has suggested that the cortisol levels of infants are associated with those of their mothers but not of their fathers.

Vermeer and her colleagues enrolled forty-four children between 20 and 40 months of age and their non-related, home-based carers in the study. Each participating child had a different care-giver. Saliva samples were taken from both the child and the care-giver during a morning and an afternoon of childcare and cortisol levels measured. For each child and each care-giver, the difference between the cortisol levels was divided by the level recorded in the morning to give a value called the ratio of diurnal change or RDC. For example, a morning cortisol reading of 3.69 nmol/L and an evening reading of 3.34 nmol/L would give an RDC value of  $[(3.34 - 3.69)/3.69]$ , which is -0.09. Positive RDC values indicate an increase in cortisol during the day, which is associated with high stress levels; negative RDC values indicate a decrease.

Each child was videoed for 10 minutes at three time points during one childcare day and these videos were used to estimate the children’s well-being, using a seven-point scale running from “very low” (e.g. the child was observed to be crying) to “very high”

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(e.g. the child was smiling or laughing). The three values for each child were aggregated to give a score for “observed well-being”, and each carer completed a questionnaire assessing the study child’s “reported well-being”. Carers also completed questionnaires to assess their general mood on the study day and their workload-related and general stress levels a few weeks afterwards. Finally, the parents of each child completed a questionnaire to assess their child’s temperament. Complex, multi-variable statistical analysis was carried out to determine associations between the children’s and care-givers’ cortisol levels, care-givers’ reported stress and children’s temperaments and well-being.

As expected, most care-givers’ cortisol levels remained fairly stable during the day while the children’s levels tended to rise between the morning and afternoon measurements. No significant association was found between the children’s cortisol levels and those of their care-givers. However, significant associations were found between the children’s well-being and their care-givers’ stress levels. Low levels of reported well-being in the children, assessed using questionnaires, were found to be correlated with all three care-giver stress indices: workload, general stress, and RDC. However, low levels of observed well-being as assessed from the videos were found to be correlated only with high levels of general care-giver stress and not with the other two variables.

Vermeer and her co-workers also assessed whether the children’s temperament affected their interaction with their care-givers and their response to stress. Childcare is a very social environment, so the researchers chose to assess the children using the sub-scale of “social fearfulness” from the eleven in the questionnaire used. This assesses the extent to which children seem timid or uncomfortable in novel social situations. Adding this into the analysis showed that children who were assessed by their parents as more fearful were more susceptible to their care-givers’ stress than those who showed less social fear. More fearful children whose care-givers had higher levels of stress (at least as suggested by positive RDC values) had lower reported well-being than their less fearful peers. More interestingly, however, the effect was reversed with care-givers who had negative RDC values indicating low stress: with these care-givers, fearful children had higher reported levels of well-being. This suggests that the difference between the fearful and non-fearful children may be one of susceptibility to care-giver stress: these children react more negatively to a stressful care environment but also benefit more from one that is calm and happy.

Vermeer and her co-workers concluded their study by pointing out that it could not distinguish between cause and effect: the fact that childcare workers may find it more stressful to care for more fearful children may complicate these findings. Also, a significant correlation between fearfulness and differential response to stress was only observed with one of the three measures of child well-being, and not with observed well-being or cortisol levels. They recommended that similar, larger studies would be needed to confirm these results. Their main conclusion, however, was that although all children will undoubtedly benefit from any reduction in their care-givers’ stress levels, it is likely to be the most socially fearful children who will benefit the most.

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