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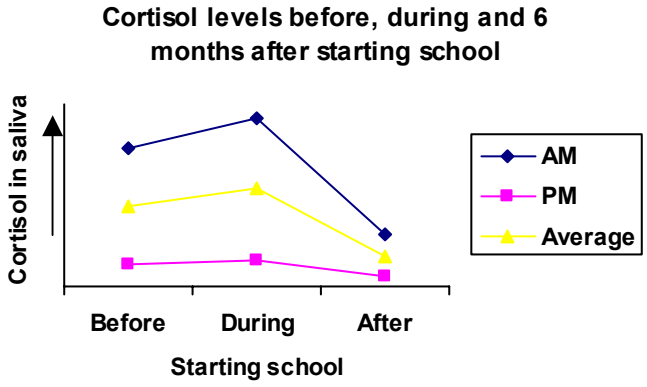
Children's Transition to School: Learning and Health Outcomes

Research Study Summary Report

The aim of the study was to look at how children responded to the experience of starting school and how they had adapted after six months of the start of their first term. In total, one hundred and five children (53 boys and 52 girls) and one of their parents signed up for the study. In addition, 76 teachers agreed to take part and provide information relating to adjustment to school. The first issue that we explored was that of physical stress responses of children before, during and after starting school, which we measured by collecting saliva samples in the morning and evening at specific time points throughout the study. Secondly, we set out to look at the relationship between these responses and children's behaviour, on their ability to learning and on their physical health (common cold and flu).

Stress Responses to starting school

Interestingly, the levels of the stress hormone, cortisol, measured in saliva, were much higher than we had expected when we measured levels before the children started school. Yet, as predicted, cortisol levels increased significantly when the children started school, compared to several months beforehand and then reduced significantly at follow up, 6 months later. When we separated out the morning and evening cortisol measures, we found a similar pattern, although the effect was slightly stronger for the morning measures. This indicates that starting school reliably produced a stress response in the children and that six months after starting school the children had adapted well. What surprised us was the relatively high level of cortisol several months prior to starting school. We had expected this level to be similar to the level we found once they had settled at school 6 months later. The reason for this is not known but could be linked to the anticipation of starting school. This could have implications for the amount of preparation that children are given before starting school. The graph below shows what the cortisol levels looked like at each of the three testing points.



Temperament, behaviour and stress in response to starting school

We then examined the links between temperament in the children, their behaviour as observed at school and their stress levels. As might be expected, children who felt more fearful when starting school had a higher morning cortisol level, indicating that their expectation of the day activated a stress response but this had reduced by the evening. In line with other research we found that children who were more extraverted (active, impulsive and eager to approach others) also had higher morning and evening cortisol levels in response to starting school. Interestingly, whilst other studies have assumed that this effect is short lived, we found that at six months after starting school the high cortisol responses were present in the more extraverted children both in the morning and the evening. We also found that those children who were more socially isolated when they started school had a lower evening cortisol level. This is important as past research has found that whether feelings of being more socially isolated are negative or not depends on the meaning of the situation for the individual. In this case, as we found cortisol levels being lower in the evening, this seems to indicate that the children who showed more socially isolated behaviour at school were not necessarily more anxious but removed themselves from social situations as a way of coping. As a result, they showed less stress activation in the evening. Those children who were more able to focus their attention and inhibit impulsive behaviour whilst at school had lower cortisol levels in the morning when starting school, a sign that they were experiencing less stress.

The stress response, physical health and learning outcomes when starting school

Overall our study suggests that there is a strong link between stress and symptoms of the common cold and flu. Intriguingly the results were in a different direction to what we had expected. Most of the work in this area has been based on more serious, chronic illnesses, rather than everyday common colds in healthy individuals. With chronic illness it has been found that high cortisol levels, particularly levels which remain high across the day, indicate poorer health. In our study, children who had higher cortisol levels when starting school were less likely to become ill and if they did, the cold lasted for fewer days. Children's levels of stress in the evening appeared to be especially important in respect to cold symptoms. Those who had higher evening levels of cortisol when starting school were less likely to suffer from cold symptoms during the next six months and had fewer days off sick once they got ill.

We also found that children whose stress cortisol levels stayed high throughout the day at school transition, were more likely to get ill during school holidays than at term time. Whilst people often refer to this idea of getting ill *after* the stress is over, there is very little scientific data that has shown this so far, so this study provides scientific evidence of this idea. Another important result of our study shows that children who tended to be more shy and who found it difficult to mix with other children at the beginning of school, were also more likely to get ill during the following 6 months.

One of the behaviour factors that we looked at was 'academic competence,' which included responses to questions such as 'stays on task' and 'learns well'. We did not find a significant link between this academic competence and cortisol levels either at school transition or 6 months later. We wanted to see if an association was there as several studies have found cortisol to be linked to performance on school related tasks. It is likely that we did not find a link because of the short time period over which we were looking.

What do the results mean and how can they be used to help children adapt to starting school and staying well?

When considered together, the results suggest that the experience of starting school undoubtedly creates a stress response in children. However, this response is a normal and natural reaction and after six months we found the stress levels to be significantly lower, indicating that children had adapted well to the school environment. What was surprising to us were the relatively high cortisol levels prior to starting school. There could be a number of reasons for this but it does suggest that stress levels in anticipation of starting school begin to rise much earlier than we anticipated. As we were not collecting data on school preparation, it would not be appropriate for us to speculate further on this from our findings. Yet we do plan to follow up on this in a future study.

This study is the first to look at cortisol in children starting school in the UK. Some other studies have looked at cortisol and temperament when starting school but this has been in the United States where school starting age is higher and there are many cultural differences. There is no evidence from this study that stress responses to starting school are more or less than those found in the States and the findings from our study are similar in regard to temperament. What has not been done before in this type of study is to follow children up at 6 months after transition to school and in addition to look at when they become ill with the common cold. It appears from our study that those children who had more exuberant temperaments felt better able to deal with the start of school as they became less anxious about the social situations they had to deal with. Those children with higher cortisol levels, even though this is associated with stress, in this study seemed to provide some protection against colds and flu. It was then during the holidays that these children were more likely to succumb to being ill. Whilst continued stress can have negative effects on health, there appeared to be some positive effects on health in the short term. A much longer study would have been needed to examine the effects of stress in the long term.

Results indicate that not only preparation for school but also the experience of school over the first year is important to monitor. It is especially important to provide environments that enable the more shy or quieter children to express themselves and find ways of coping which may have long term benefits for their health.

Future research

There is still much research to be done in this area. This study gave us a brief but valuable insight into the physical health and learning outcomes of young children. Results of the study have been presented at a number of academic conferences both in the UK and abroad. We plan to follow up this study as part of a programme of research, dependent upon obtaining further funding. Currently the results of the study are being written up for publication in journals relevant to psychology and health. We also have some further analyses left to run on the data. You can follow the progress of these and any other outcomes from this study on the Transition study web pages at **http://www.bath.ac.uk/schooltransition/home**. Findings from the additional two projects that were linked to the Transition study – the Digit project and the Polio Vaccine project – will also be available shortly on this website.

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