

Preterm birth affects ability to solve complex cognitive tasks, study shows

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Being born preterm goes hand in hand with an increased risk for neuro-cognitive deficits. Psychologists from the Ruhr-Universität Bochum and the University of Warwick, UK have investigated the relation between the duration of pregnancy and cognitive abilities under varying work load conditions. "Cognitive performance deficits of children dramatically increase as cognitive workload of tasks increases and pregnancy duration decreases," says Dr Julia Jäkel from the Ruhr-Universität. In the journal "PLOS ONE", the researchers report a new cognitive workload model describing the association between task complexity and incremental performance deficits of preterm children.

About 15 million, i.e., more than ten per cent of all babies worldwide are born preterm every year; that is before the 37th week of pregnancy – and the numbers are rising due to improvements in [neonatal medicine](#) and demographic changes. Recent studies suggest that delivery at any gestation other than full term (39 to 41 weeks gestational age) may impair [brain development](#), rendering survivors at risk for adverse neuro-[cognitive outcomes](#). Considering that 50 per cent of children are born before the 39th week of pregnancy, even small increases in cognitive impairments may have large effects on a [population level](#). "As the total number of children born preterm increases there will be parallel increases in special education needs placing new demands on the education system," Julia Jäkel and her colleagues say. To date, uncertainties remain regarding the nature and underlying causes of learning difficulties in [preterm children](#). The new cognitive workload model now reconciles previous inconsistent findings on the relationship

of gestational age and cognitive performance.

The research team tested 1326 children, born between weeks 23 and 41 of pregnancy, at an age of eight years. Data were collected as part of the prospective Bavarian Longitudinal Study. The children took part in a range of [cognitive tests](#) with varying workload. High workload tasks require the simultaneous integration of different sources of information, thereby placing high demands on the so called working memory. The results: The higher the workload and the shorter the pregnancy duration, the larger were the cognitive performance deficits. Deficits were disproportionately higher for children born before the 34th week of pregnancy compared with children born after week 33. Being born preterm specifically affected the ability to solve high workload tasks, whereas lower workload tasks were largely unaffected.

According to the researchers, these results should be taken into account for routine cognitive follow-ups of preterm children as well as for planning school lessons. "New studies suggest that computerized training can improve working memory capacity," Prof Dieter Wolke from Warwick says. "In addition, educational interventions could be developed in which information is not presented simultaneously to preterm children but more slowly and sequentially to promote academic attainment."

More information: J. Jäkel, N. Baumann, D. Wolke (2013): Effects of gestational age at birth on cognitive performance: a function of cognitive workload demands, *PLOS ONE*, [doi: 10.1371/journal.pone.0065219](https://doi.org/10.1371/journal.pone.0065219)

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