

Association Between Neonatal Neurobiological Risk at Discharge From Hospital and Behavioral Symptoms at the Age of Six in Very Preterm Infants with Very Low Birth Weight

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INTRODUCTION

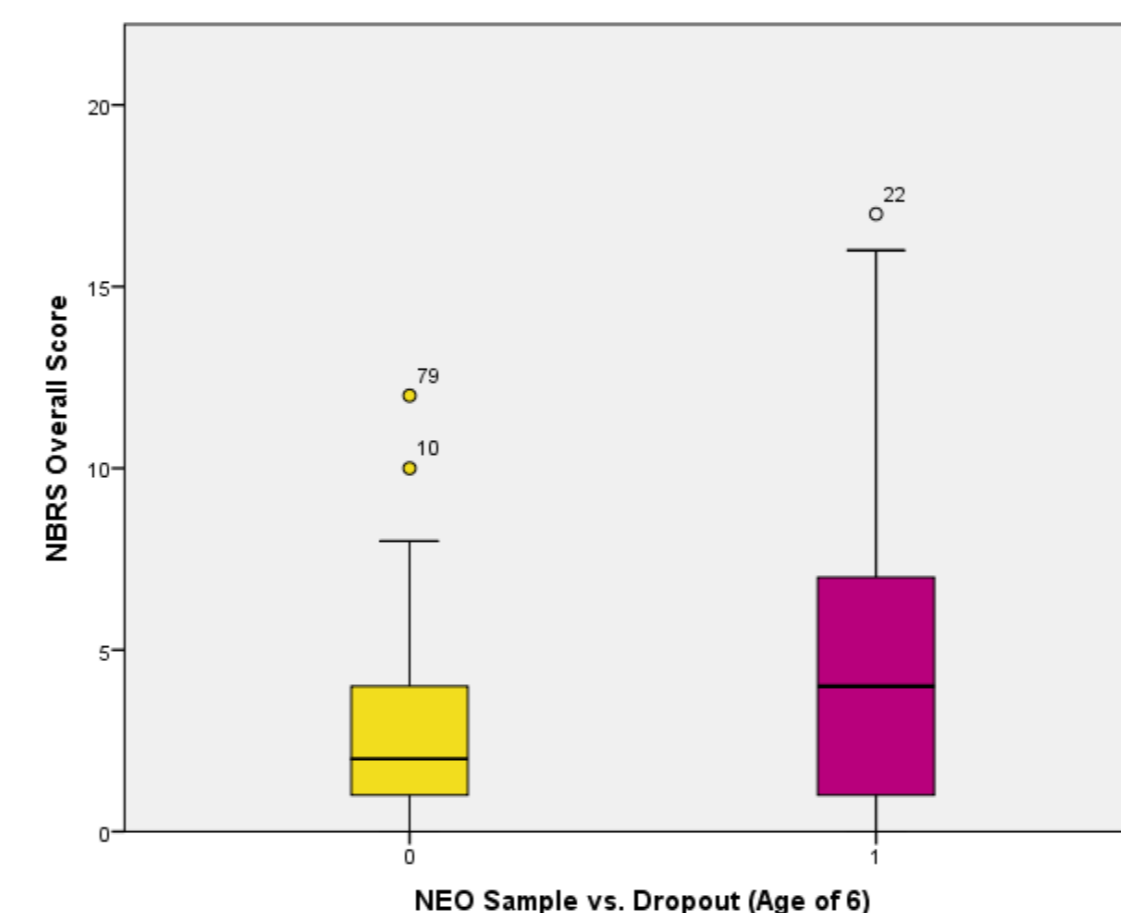
Children born preterm have been reported to be at greater risk of behavioral and emotional problems (Potijk et al., 2014), especially if they suffer from consequences of peri- and postnatal neurobiological injuries (Brazy et al., 1991; Elgen et al., 2012).

AIMS OF STUDY

The objective of this follow-up of a prospective longitudinal study was to investigate the association between the neonatal neurobiological risk of infants born preterm with very low birthweight (vlbw) at the time of discharge from hospital and their behavioral development at the mean age of 6.8 years postpartum (min= 6.1 years; max= 8.4 years; SD= 0.5).

NOTE:

Significantly **higher overall NBR score in drop-out group** 6 years postpartum
→ **Association between NBR score and behavior may in fact be even higher**



RESULTS

Subjects showed a significantly higher CBCL total score at six years postpartum than Achenbach's (1991) normative sample ($p < .01$).

Furthermore, the overall neonatal NBR score significantly predicted the CBCL subscales "social problems" ($\beta = .31, t(76) = 2.8, p < .01$) as well as "attention problems" ($\beta = .31, t(76) = 2.9, p < .01$) at the age of six. The NBR score explained 8.1 % of the variance in "social problems" and 10.5 % of variance in "attention problems".

MATERIALS & METHOD

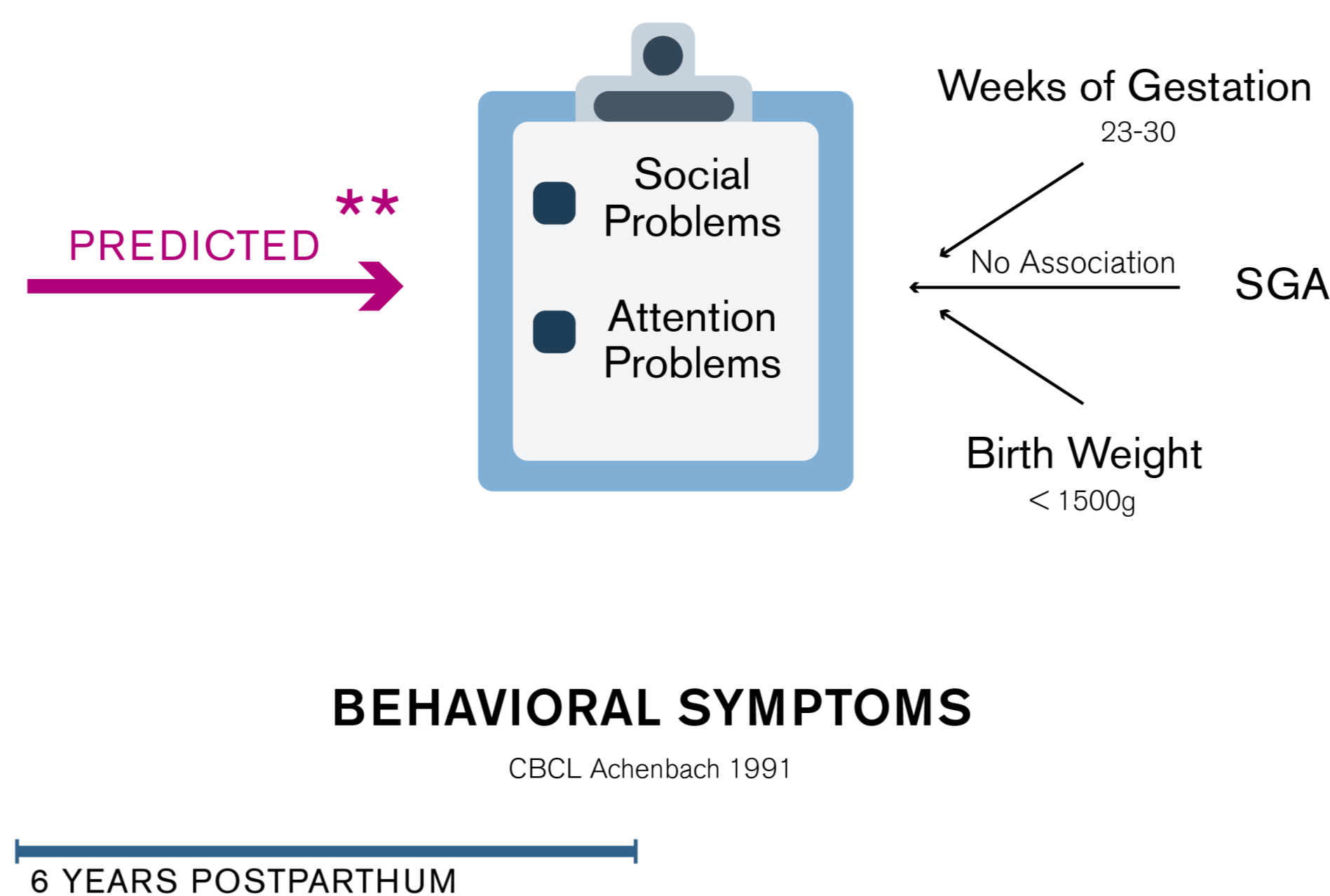
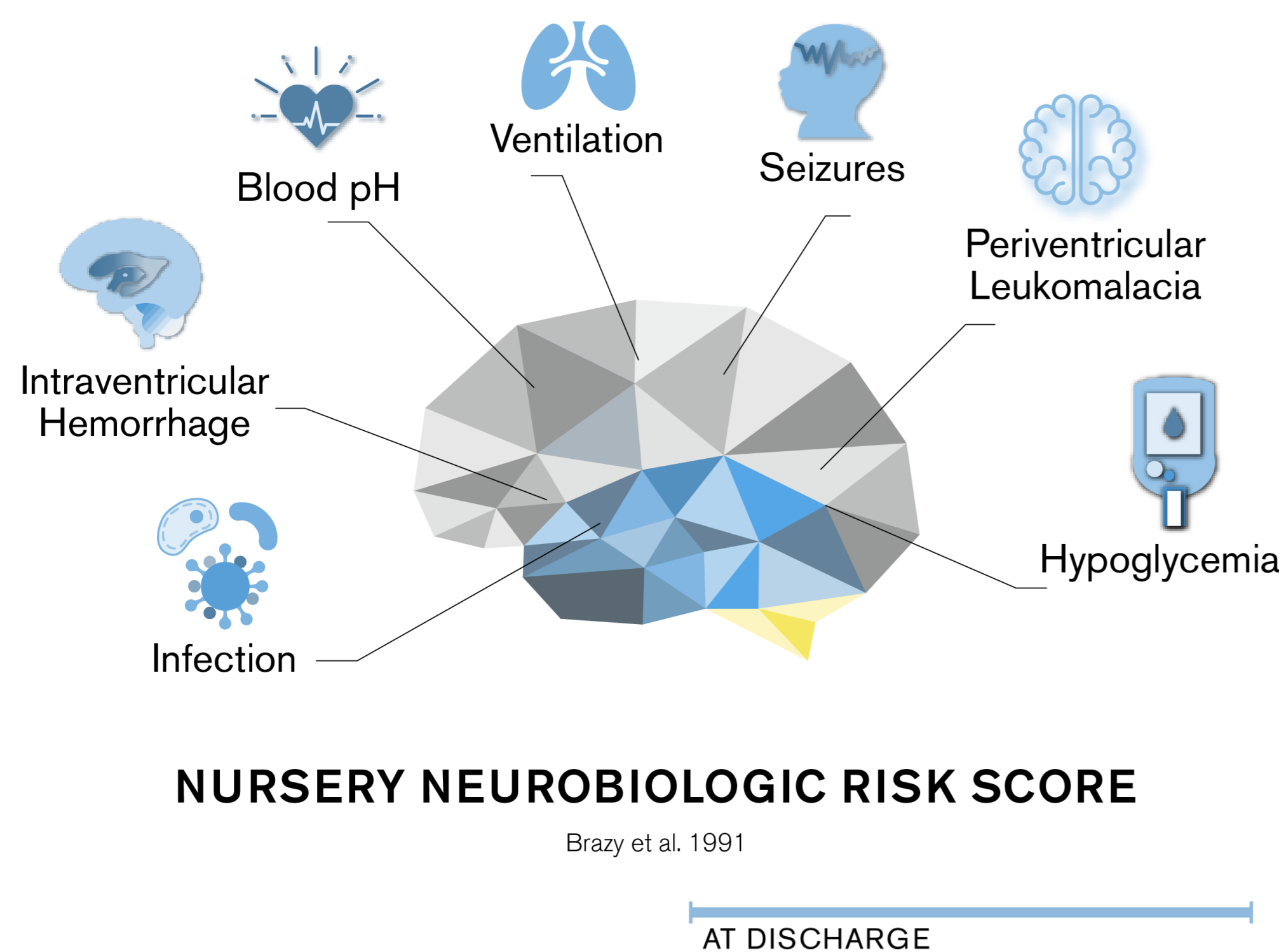
The sample consisted of a German cohort of $N = 79$ high-risk children born preterm (41 boys, 38 girls) with vlbw (min= 450g; max= 1490g; SD= 272.05g) to women without a history of psychopathology. Children's neonatal neurobiological health was measured using the Nursery Neurobiologic Risk Score (NBR; Brazy et al., 1991), – a questionnaire designed to assess physiological damage of brain cells/tissue rated by neonatologists. Premies' behavioral outcome was evaluated with the Child Behavior Checklist (CBCL; Achenbach, 1991) completed by parents.

| CBCL Total Score | 6 years postpartum | | |
|-------------------------------|--------------------|--------|------|
| | N | Mean | SD |
| Normative Sample ^o | 1065 | 18.9 | |
| NEO Sample | 79 | 24.9** | 16.3 |

| Subscale »Social Problems« | | | | |
|----------------------------|-------|----|--------|-----|
| Normative Sample | boys | | 1.3 | 1.8 |
| | girls | | 1.0 | 1.4 |
| NEO Sample | boys | 41 | 2.8*** | 2.2 |
| | girls | 38 | 2.1** | 2.3 |

** $p \leq .01$ *** $p \leq .001$

^oAchenbach 1991



DISCUSSION

In childhood, clinically relevant behavioral symptoms, particularly social and attention problems are more common among preemies who had a high NBR score after discharge. These findings stress the urgent need to examine predictivity of neonatal neurobiological morbidity on later behavioral outcome and to design remedial evidence-based, long-lasting follow-ups.

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Achenbach, T. H. (1991). Manual for the Child Behavior Checklist/4-18 and 1991 Profile. Burlington: University of Vermont Department of Psychiatry; Brazy, J. E., Goldstein, R. F., Oehler, J. M., Gustafson, K. E., & O'Rand, A. M. (1991). Nursery Neurobiologic Risk Score: Levels of Risk and Relationships with Nonmedical Factors. Journal of Developmental & Behavioral Pediatrics, 14(6), 375-380; Elgen, S. K., Leversen, K. T., Grundt, J. H., Hurum, J., Sundby, A. B., Elgen, I. B., & Markestad, T. (2012). Mental health at 5 years among children born extremely preterm: a national population-based study. European child & adolescent psychiatry, 21 (10), 583-589. doi: 10.1007/s00787-012-0298-1; Potijk, M. R., de Winter, A. F., Bos, A. F., Kerstjens, J. M., & Reijneveld, S. A. (2014). Behavioural and emotional problems in moderately preterm children with low socioeconomic status: a population-based study. European Child & Adolescent Psychiatry, 1-9. doi:10.1007/s00787-014-0623-y