

score of ToL ($R^2=.04$, $p<.001$). The regression model with HOME significantly predicted 66.7% of planning ability indicators, 16.7% of cognitive flexibility indicators, and 12.5% of inhibition ability indicators. Among the indicators mentioned above, HOME has been found the greatest predictive effect on rule-1 of ToL ($R^2=.027$, $p=.001$). The regression model with birthweight and HOME significantly predicted 50% of planning ability indicators. Among indicators mentioned above, the regression model has been found the greatest predictive effect on summation-of-score of ToL ($R^2=.061$, $p<.001$).

Conclusions: Both birthweight and home environment have been found significantly predicted different types of cognitive EFs at preschool-age of VLBW / ELBW preterm children with normal early development. Though the home environment doesn't have such a great predictive effect as birthweight is, both birthweight and home environment are significant predictors of planning ability.

Categories: Prenatal/Perinatal Factors/Prematurity

Keyword 1: prematurity

Keyword 2: executive functions

Keyword 3: cognitive functioning

9 The Correlation of IQ and Executive Function of VLBW and ELBW Preterm Children with Normal Early Development

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Objective: Previous studies had shown that even with normal early development, preterm children at age six still have executive function deficits, including planning, cognitive flexibility, and nonverbal working memory. The present study aims to discuss further the correlation between IQ and EF of preterm children with

different birthweight in order to clarify the potential influence of birthweight.

Participants and Methods: The preterm children were recruited from the Regional Cohort Network for premature infants who were admitted to neonatal intensive care units. Inclusion criteria were their scores of Bayley Scales of Infant and Toddler Development, second or third edition at 12 and 24 months, and Wechsler Preschool and Primary Scale of Intelligence, Revised Edition at 5 years old were higher than 70. Meanwhile, their FSIQ of Wechsler Intelligence Scale for Children, Fourth Edition were higher than 85 at age 6. Exclusion criteria were visual impairment, hearing impairment, and cerebral palsy. There was a total of 251 preterm children recruited in the present study. Preterm children were then divided into very low birthweight (VLBW) and extremely low birth weight (ELBW) groups. The VLBW group included 183 preterm children, whose birthweight is between 1000-1500g, and gestational age is less than 37 weeks. The ELBW group included 68 preterm children, whose birthweight is less than 1000g and gestational age is less than 37 weeks. Four types of executive function were assessed. Inhibition was assessed through Comprehensive Nonverbal Attention Test Battery (CNAT), cognitive flexibility was assessed through Wisconsin Card Sorting Test (WCST), verbal working memory was assessed through the Longest Digit Span Forward (LDSB) index of Digit Span Subtest of Wechsler Intelligence Scale for Children-IV (WISC-IV), and nonverbal working memory was assessed through Knox's Cube Test (KCT), and planning ability was assessed through Tower of London (ToL). Data were analyzed with independent T-test and Pearson Correlation.

Results: In VLBW preterm group, results showed that there were significant correlations ($p<.05$) between FSIQ and EF indexes in five out of six indexes of WCST, LDSB of Digit Span of WISC-IV, Backward score of Knox's Cube Test, and three out of six indexes of ToL. As to the CNAT, there was no index of CNAT that was significantly correlated with FSIQ in the VLBW preterm group. In ELBW preterm group, results showed that there were significant correlations ($p<.05$) between FSIQ and EF indexes in one out of five indexes of CNAT, one out of six indexes of WCST, Backward score of Knox's Cube Test, and two out of six indexes of ToL. And the LDSB of Digit Span of WISC-IV was not

significantly correlated with FSIQ in ELBW preterm group.

Conclusions: There were fewer EF indexes significantly correlated with FSIQ in ELBW preterm children with normal early development than VLBW preterm children with normal early development, suggesting that even with an IQ higher than 85, lower the birthweight, especially lower than 1000g, higher the EF performance should be concerned. Therefore, in the clinical setting, it is very important to assess the EF independently. And birthweight may be a crucial factor in preterm children's prefrontal cortex maturity.

Categories: Prenatal/Perinatal Factors/Prematurity

Keyword 1: executive functions

Keyword 2: intelligence

Keyword 3: low birth weight

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10 Meta-Attention Predict the Cognitive and Emotional Executive Function at School-aged Children.—Longitudinal Study of Very Low Birth Weight Preterm Children with Normal Early Development.

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Objective: Previous studies had shown that very low birth weight (VLBW) preterm children with normal early development had poorer cognitive executive functions (CEFs) and emotional executive functions (EEFs) at preschool-aged. There were still about 73% of children with deficits of CEFs and 74% of them with deficits of EEFs at school-aged. (Ni et al., 2011; Chiang et al., 2019; Lee et al., 2022). Besides, former studies less discuss the core neuropsychological ability related to the EFs development. In this study, meta-attention was

chosen as the core ability. This study applied longitudinal design aimed to discuss the predictive power of meta-attention at preschool-aged on the CEFs and EEFs at school-aged for VLBW preterm and typically developing children.

Participants and Methods: The VLBW group was referred by Premature Baby Foundation of Taiwan. These children have been followed up with Bayley Scales of Infant Development (BSID) II or III administered at the age of 12 months and 24 months and Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R) at the age of 5-year-old. Children with visual impairment, auditory impairment, cerebral palsy developmental indices of BSID-II or III less than 70, or full-scale IQ of WPPSI-R less than 70 were excluded.

The typical group was recruited from the community and included 30 children whose development was typical. Both preterm and typically developing children completed the CEFs and EEFs test at 6 and 8.

Four types of CEFs including 33 indicators were assessed: Meta-attention including 18 indicators through Comprehensive Nonverbal Attention Test Battery (CNAT), working memory including 2 indicators through Digit Span Subtest of Wechsler Intelligence Scale for Children-IV (WISC-IV) and Knox's Cube Test (KCT), planning ability including 6 indicators through Tower of London (ToL), and cognitive flexibility including 7 indicators through Wisconsin Card Sorting Test (WCST).

Two types of EEFs including 5 indicators were assessed. We designed Emotional EF Ecological Assessment Battery for Children in Taiwan to assess EEFs, including 3 indicators of theory of mind and 2 indicators of emotion regulation. Data were analyzed with correlation analysis and independent sample t-test.

Results: Meta-attention at 6 among the VLBW group significantly correlated with 73.3% of CEFs and 80% of EEFs indicators at 8 and had significant predictive power on working memory, planning ability, cognitive flexibility, emotion regulation, and theory of mind. ($p < .05$)

When the significance level was 0.01, meta-attention still correlated with 33% of CEFs and 80% of EEFs indicators and can predict those CEFs and EEFs among the VLBW group. Meta-attention at 6 among the typical group significantly correlated with 26.7% of CEFs and 80% of EEFs indicators at 8 and had significant predictive power on working memory, planning ability, emotion regulation, and theory of mind. ($p < .05$)