

all domains of EF) were used to examine associations between EF domains at both timepoints with math performance, as well as associations between EF at 7 years with change in math from 7 to 13 years.

Results: At 7 and 13 years, all EF domains were positively associated with concurrent math performance, with multivariable models finding information processing, cognitive flexibility and goal setting independently contributed to math performance at both ages. All EF domains were positively associated with improvement in math performance from 7 to 13 years, with multivariable models finding that goal setting contributed unique variance to improvement in math over this period.

Conclusions: This study provides evidence for a strong, consistent association between EF and math performance in children born VP and emphasizes the importance of goal setting capacity for later improvement in math performance.

Categories: Prenatal/Perinatal Factors/Prematurity

Keyword 1: mathematics ability

Keyword 2: executive functions

Keyword 3: prematurity

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8 Effects of Birthweight and Home Environment on Cognitive Executive Functions at Preschool-Age of VLBW / ELBW Preterm Children with Normal Early Development

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Objective: Preterm children with very low birthweight (VLBW) / extremely low birthweight (ELBW) with normal early development had been found poorer executive functions (EFs) at

preschool-age (Ni, Huang & Guo, 2011). The previous study found that the risks of deficits in EFs at preschool-age of preterm children can be attenuated by more supportive home environment (Taylor & Clark, 2016). However, former studies didn't investigate the effect of birthweight and home environment on cognitive EFs of preterm children simultaneously, especially those with normal early development. The present study aims to investigate the predictive effect of birthweight and home environment on the cognitive EFs of VLBW / ELBW preterm children.

Participants and Methods: The preterm children were recruited from the Premature Baby Foundation of Taiwan. 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. Exclusion criteria were visual impairment, hearing impairment, and cerebral palsy. There was a total of 287 preterm children with age 6 recruited in the present study. Preterm children were then divided into VLBW group (n=202, birthweight between 1001-1500g) and ELBW group (n=85, birthweight less than 1000g). The typical children included 89 term-born healthy and typically developing children with age 6, who were recruited from comparable social status families in the community.

Four types of cognitive EFs including 22 indicators were assessed. Inhibition ability including 8 indicators was assessed through Comprehensive Nonverbal Attention Test Battery (CNAT), cognitive flexibility including 6 indicators was assessed through Wisconsin Card Sorting Test (WCST), working memory including 2 indicators was assessed through Digit Span Subtest of Wechsler Intelligence Scale for Children-IV (WISC-IV) and Knox's Cube Test (KCT), planning ability including 6 indicators was assessed through Tower of London (ToL). The home environment was assessed through Home Observation for Measurement of the Environment (HOME), Revised edition. Data were analyzed with Stepwise Regression.

Results: Results showed that the regression model with birthweight significantly predicted 83.3% of planning ability indicators, 83.3% of cognitive flexibility indicators, and 50% of working memory indicators. Among indicators mentioned above, birthweight has been found the greatest predictive effect on summation-of-

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