Parental Stress Correlate Children's Cognitive Ability

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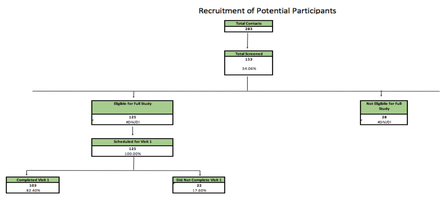
Abstract

Early childhood is a critical time period for cognitive development, and children exposed to adverse familial stress may impair child cognitive development. Therefore, my hypothesis is parents with a greater stress index will be correlated to higher levels of oxidative stress biomarker-F2 Isoprostane, and lower levels of executive function and language development in their biological children. The tests administered to assess children's cognitive ability mainly focus on the domains of executive function and language development. We also collected parent-child urine samples to assess parent-child oxidative stress biomarker (F2 Isoprostane) levels, and administered psychological stress questionnaires to the parent. For this research, parent stress will be analyzed from responses on the Parent Stress Index-IV questionnaire. All scores will be compared between the child participants aged three to six on executive function and language measures (N=103).

Methods

Participants: The experience has recruited 100 caregiver-child dyads with children between 36-84 months to participate.



Measures:

1.The parent stress will be analyzed from responses on the Parent Stress Index-IV questionnaire.

(1) Language development test is mainly used a process call 'QUILS', which includes Vocabulary, Syntax, and Language Learning parts. QUILS can test children in dynamic event stimuli - on the assessment of verb comprehension and verb learning - is critical to the development of children's language ability.

(2)The QUILS may take 15-20 mins for testing. The overall score of QUILS the cumulation score of the three task parts, the higher QUILS score the child get, the greater the child's Language development and learning ability they have.

2.The tests administered to assess children's cognitive ability mainly focus on the domains of executive function (EF touch) and language development (QUILS).

(1) Executive function (EF) refers to test the wide range of cognitive abilities involved in the control and coordination of information in the service of goal-directed actions(Fuster, 1997; Miller & Cohen, 2001)

(2) In this experiment, we measured three aspect by test child's inhibitory control, working memory and attention shifting abilities.

(3) The overall score of Executive Function is the cumulation score of the three task parts, the higher EF Touch score the child get, the greater the child's executive function ability have (R=0 ~ 3).

3. The parent stress level/score using the Parent Stress Index-Short Form (PSI-SF) to test.

(1) The Parent Stress Index-Short Form (PSI-SF) is used to identify parent-child problems. This form is used for parents and children ages birth-12 years old.

(2) The Parent Stress Index-Short Form (PSI-SF) is a 36-item questionnaire, with the range of each question from 1 to 5(1= Strong agree, and 5=Strong disagree).

(3) The score of this from is the cumulation score of all items.

Results

1. Analysis of variables and correlative data

This experiment adopts the method the of regression analysis of the test to show the correlation between the independent variables and dependent variables. (The influence of extreme values was excluded during the calculation progress.)

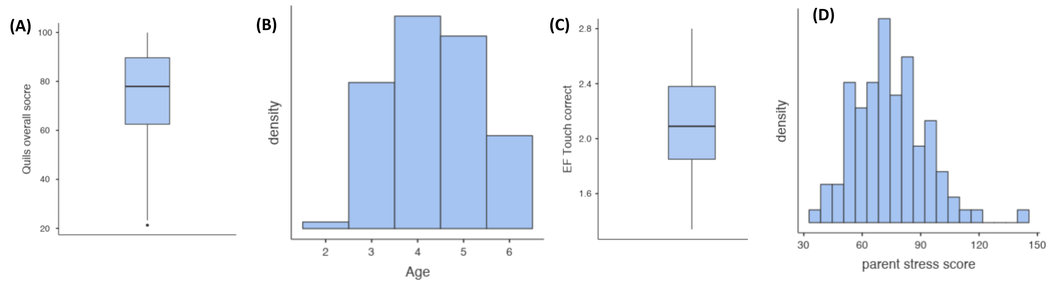


Figure 1. The analysis of correlative variables: (A) The box plot of Language development score; (B) The density of children's age; (C) The box plot of EF Touch correct score; and (D) The density of parent stress score.

As indicated in Figure 1, the sample number of the experiment is N=103. The average age of children is M=4.34 (SD=1.0, SE=0.1). The average score of parent stress score is M=74.25. The average score of EF Touch score M=2.12. The average score of child Language development M= 73.3.

2. Comparing the correlation between Parents Stress Score with Child EF Touch Score and Child QUILS Score.

Parent Stress and Child Language Development Correlation Matrix

	1	2	3	4	5	6	7	8	9
1.parent stress score	–	0.85 ***	0.85 ***	0.06	0.07	0.06	-0.00	0.21 *	0.08
2.parent-child dysfunction interaction		–	0.64 ***	-0.06	-0.08	-0.05	0.02	0.11	0.16
3.difficult child			–	0.07	0.07	0.05	0.05	0.08	0.07
4.Quils overall socre				–	0.87 ***	0.81 ***	0.82 ***	0.20	0.18
5.Vocab					–	0.63 ***	0.63 ***	0.17	0.33 **
6.syntax						–	0.60 ***	0.19	0.40 ***
7.process							–	0.13	0.14
8.Gender				0.203				–	-0.02
9.Age				0.184					–

Note. * p < .05, ** p < .01, *** p < .001

Table 1. Parent stress and child Language Development Correlation

Parent Stress and Child Executive Function Correlation Matrix

	1	2	3	4	5	6
1.EF Touch correct	–	0.04	0.07	0.01	0.04	0.57 ***
2.parent stress score		–	0.85 ***	0.85 ***	0.21 *	0.08
3.parent-child dysfunction interaction			–	0.64 ***	0.11	0.17
4.difficult child				–	0.08	0.07
5.Gender					–	-0.02
6.Age						–

Note. * p < .05, ** p < .01, *** p < .001

Figure 3. Parent Stress and Child Executive Function

EF Touch correct score * Language Development Correlation Matrix

	1	2	3	4	5	6	7
1.EF Touch correct	–	0.369 **	0.356 **	0.507 ***	0.337 **	0.566 ***	0.043
2.Quils overall score		–	0.869 ***	0.813 ***	0.821 ***	0.184	0.203
3.Vocab			–	0.633 ***	0.633 ***	0.330 **	0.165
4.syntax				–	0.597 ***	0.397 ***	0.185
5.process					–	0.144	0.129
6.Age						–	-0.017
7.Gender							–

Note. * p < .05, ** p < .01, *** p < .001

Figure 4. EF Touch Correct score and Language Development Correlation

The Figure 2. shows:

(1)The parent stress level is not show significant correlated with the child Executive Function;

(2) The child Executive Function is only significant with child's age(p<.001).

The Figure 3. shows:

(1) (1) The parent stress level is not show significant correlated with the child language development;

(2) the parent stress level show significant correlated with child's gender (p<.05)

The Figure 4. shows:

The EF Touch Score is significantly correlated with QUILS score(p<.01).

Discussion

Effective reasons

The result does not support our hypothesis, all the data shows there are no significantly correlation between parent stress score and child EF Touch Score and QUILS.

(1). It may because of the third variable effected our result. For example, the participants' emotions or understanding ability may affect the accuracy of the questionnaire survey results.

(2). The insufficient sample size (excluding the extreme data and invalid data) may also lead to the deviation of experimental results

(3) The failure to strictly control the environmental variables and time variables resulted in the deviation of the test results (the children's emotion in the new environment was affected; The time for the children to answer the questions is not strictly controlled, etc.)

Conclusion

1.Parent stress with EF Touch and QUILS

(1)Parent stress is not significant correlated with child EF Touch score and QUILS score.

(2).This result does not support the original hypothesis, for which we can not tell whether the high parent stress level id related with low executive function and language development.

2.EF Touch and Age

(1) The child EF Touch score is significant correlated with child's age (p<.001), and the parent stress level is significant correlated with child's gender (p<.05).

(2) This result index us that children with different gender will get different effect on parents' stress affect; child Executive function ability is affected by child's age.

3.EF Touch with QUILS

(1) Child executive function score is significantly correlated with child QUILS score.

(2) This result mean child's executive function ability s significantly correlated with child's language development progress.

Acknowledgements

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