

## 주의력결핍/과잉운동장애 아동의 신경심리학적 평가

NEUROPSYCHOLOGICAL ASSESSMENT OF CHILDREN WITH  
ATTENTION DEFICIT/HYPERACTIVITY DISORDER

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요 약 : ADHD , ADHD  
가 , ADHD  
ADHD 가 가  
ADHD ADHD  
ADHD , ADHD  
ADHD 가  
중심 단어 : / 가.

(Minimal Brain Dysfunction)

## 서 론

(Attention Deficit/Hyperactivity Disorder : ADHD ) 1991). ADHD  
(self - control) “(hyperkinetic syndrome), “(hyperkinetic re - action of childhood : DSM - 1968) 가  
(Barkley 1983 ; , 70  
Friedman Christophersen 1983).  
ADHD Strauss Lechtinen(1947) Attention Deficit/Hyperactivity Disorder  
“(Brain Injured Child Combined Type, Predominantly Inattentive  
Syndrome) , “ Type, Predominantly Hyperactive - Impulsive Type

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(Bryan Bryan 1975), Kahn Cohen (1934) , , , , Strauss  
 Lechtinen(1947)  
 (fundamental sign)

. Shaywitz (1978)  
 , , ,  
 가 , 가 “ ”

가 가 가 가  
 (Satz Fletcher  
 1980). ADHD ADHD

ADHD , ADHD 5% 가  
 가 (Rutter 1977). ADHD  
 ADHD ADHD (Ana-

stopoulos Barkley 1988), ADHD  
 ADHD (Rutter 1970).

2. 각성-억제 체계(Arousal-Inhibitory System)의 장애로 보는 견해  
 ADHD “  
 ” . Satterfield  
 (1972) ADHD

, Ferguson Pappas(1979) ADHD  
 ADHD “ - ”  
 ADHD  
 (underre-

(optimal stimulation)  
 (Anasto-

poulos Barkley 1988 ; Whalen 1989 ; Zemetkin Rapaport 1987).

3. 전두엽의 기능장애와 관련된 것으로 보는 견해  
 ADHD  
 -  
 , ADHD가 “ (prefrontal lobe)  
 ” 가 MRI, SPECT, PET

, (vigilance)

Mattes(1980) ADHD가  
 (prefrontal area) (caudate  
 nucleus) 가

가  
 ADHD , EEG  
 , ADHD

ADHD  
 MRI, SPECT, PET  
 가 ADHD  
 (Anastopoulos Barkley  
 1988 ; Zemetkin Rapaport 1987 ; Diamond Ma-  
 tteson 1997 ; Lou 1989). SPECT  
 ADHD

(Sieg 1995), SPECT  
 ADHD  
 ( 1997). MRI , ADHD

, PET  
 (Diamond Matteson 1997). Hynd (1991)

MRI , ADHD

( > )

Ross (1994) , (attentional set) 4가  
 , (working visuospa -  
 tial memory) 가 “  
 ” ADHD  
 , ADHD “ ”  
 , (locus coeruleus)  
 가 (encoding) (hippocampus)  
 ADHD 1  
 “ ”  
 (Barkley 1983).

#### 4. ADHD의 신경-인지적 그리고 해부학적 모델

Posner(1987) ADHD - 가 가  
 (network)

(modality) 가 (distinct  
 attentional systems)가

(alert & oriented) “  
 ”(general command system)

가  
 가 .  
 (striatum)  
 ( ) -  
 (orbital - frontal cortex)  
 가

ADHD가

. ADHD

(Lou 1989).

Posner Mirsky(1987)

#### 5. ADHD를 생화학적 장애로 설명하려는 이론들 dopamine

가 (Wender 1978)

ADHD  
 methylphenidate, amphetamine, pemoline do -  
 pamine transporter ADHD

dopamine tra -  
 nsporter ADHD (gene) 가  
 (Cook 1995).

(NE)  
 , Zametkin Rapaport(1987)

가  
 ADHD

ADHD

, NE

, ADHD

ADHD가

(Anastopoulos

Barkley 1988). ADHD

(1992) CPT , CPT ADHD가 가

6. 유전적 요인 가 ADHD 가

가 , ADHD (Ackerman (Faraone Biederman 1994). ADHD 1986 ; Felton 1987 ; Frost 1988), Fisher (20 30%가 ADHD (1990) ADHD (Barkley 1989 ; Biederman 1986), Deutsch(1990) ADHD . Douglas(1983) ADHD 20% ADHD가 , ADHD 4% ADHD 가 가 (executive function) ADHD (concordance rate) (Goodman Stevenson 1989 ; Heffron 1984), ADHD가 , Pennington Welsh(1993) AD HD 가 ADHD (working memory) 가 Go- , ADHD 가 No-Go , (Wisconsin Card Sorting Test : WCST), (Tower of Hanoi), ( : MFFT) (Raven's Progressive Matrices), (BGT, Porteus Maze, Rey-Osterrieth Complex Figure) , (paired associate memory), (story recall), (digit span)

ADHD 아동의 신경심리학적 평가방법

1. ADHD 아동의 신경심리 반응특성에 대한 국외 연구 ADHD . Grodzinsky (1990) (Stroop test) ADHD (vigilance) 가 가 (Continous Performance Test : CPT) ADHD 가 , Chelune (1986) ADHD (commission error) , (mental set) (omission error) (Dykman 1979 ; Klorman 1979 ; O'Dougherty 1984), ADHD Meere



2) 실행기능 검사(Executive Function Test)

, ADHD

가 (Lezak 1995). 가 (MFFT), (Verbal Fluency and Category Fluency Test), B (Trail Making Test B),

(1) (Matching Familiar Figure Test : MFFT) MFFT ADHD 가 (Kagan 1965). 6 , 12 , MFFT 가 (RT) , ADHD , MFFT ADHD 가 (1992) 5 13 ADHD ( =8.6 ) 10.5, RT (1996) 17.6 MFFT RT ADHD LD 가 (ADHD) =11.6, =14.9 ; LD = 12.3, =12.4). ( =6.20 ) (1981) ADHD (1992), (1996) ADHD

(2) (Verbal Fluency and Category Fluency Test) ( ' ' ' ' ' ' ' ' ' ' ) ( 1997). ' ' ' ' ' ' ' ' ' ' 1 가 " " "(intrusion error)가 가 . " 가 (1997) ADHD 가 ADHD 12.8 17.6 ADHD (22.6 ) ADHD (16.8 )

(3) B (Trail Making Test B) B 가 (1997)가 ADHD B ADHD 175.1 116.7 , ADHD 가 ADHD

(4) (Wisconsin Card Sorting Test : WCST) WCST(Grant Berg 1948) 가

(“ , ”) 가 가  
 ( , ) . CPT  
 , 가 , ( : vigilance) (distractibility)  
 . WCST 가 ,  
 “ , , , ”가 가 . Sostek  
 , “ ” (1980) (signal detection analysis)  
 , “ ” 5 CPT “ ”(error), “ ”  
 , “ ” (sensitivity : d’), “ ”(criterion bias : )  
 , “ ” 가 가 .  
 , ADHD  
 가 . (omission error)  
 , 가  
 , (mental set) (commission error)  
 가 (Osmon 1996). (1991)가 ( , 흥), ( , )  
 WCST ADHD LD ), CPT ADHD  
 (1996) , , AD HD  
 가  
 . ADHD  
 , (1997) ADHD (d’)  
 ADHD WCST ADHD  
 , ADHD (1996) 5 13  
 ADHD 가 , ADHD  
 ADHD ADHD CPT  
 . ADHD 가 ,  
 , 가 ADHD  
 가  
 . (1995) CPT  
 , 6 13 ADHD  
 , ADHD  
 , 가 , 가  
 ADHD , ADHD  
 가

3) 지속적 주의력 검사

- (1) (Continuous Performance Test ; ADHD CPT)
- CPT ADHD 가 (d’) ADHD

ADHD ( )

CPT ADHD

(3) TOVA(Test of Variables of Attention)  
TOVA ADHD  
가  
(Dupey Greenberg 1993). TOVA  
4 ( , , ) T -  
(2) 가 , 65  
가 ADHD  
TOVA  
ADHD 가  
( 1997). “ (Vigilance Task) (1994)  
가 TOVA , ADHD  
, CPT  
가 가  
, 가  
가  
가  
, ADHD  
가 (1997)  
가 , ADHD  
가  
가 , ADHD  
“ ”  
(monitoring test) T - , ADHD, LD, ,  
(1996)  
, ADHD ADHD RT VAR  
, ADHD  
(1996)  
가 ADHD RT, VAR  
가 “ ” ADHD  
, ADHD  
TOVA가 ADHD  
, TOVA ADHD  
ADHD  
37가

4) 루리아-네브라스카 신경심리검사 배터리

(LNNB - C :  
Golden 1987) 8 12  
가  
. LNNB - C 11 1  
, ,  
가 (1994)  
(K - LNNB - C)  
K - LNNB - C가 ADHD ,  
( )  
LNNB - C가 ADHD 가  
Schaughency (1989) LNNB - C  
ADHD  
가 , 102  
ADHD ( =123.3 , WISC FSIQ =96.7)  
156 ( =117.5 )

**Table 1.** Raw score means & standard deviations of K-LNNB-C subscales for ADHD and normal groups

Subscale	Normal	ADHD	F(age controlled)
	(n = 156)	(n = 102)	
Motor	4.61(4.26)	12.40(8.80)	84.15***
Rhythm	2.10(1.95)	5.00(3.26)	72.25***
Tactile	2.39(2.24)	5.88(5.26)	43.87***
Visual	1.94(1.40)	3.19(2.45)	23.67***
Receptive language	3.23(2.36)	6.58(4.51)	53.67***
Expressive language	5.21(3.22)	8.91(5.83)	38.21***
Writing	.86(1.11)	2.42(2.62)	44.99***
Reading	1.17(1.52)	4.46(3.01)	124.53***
Arithmetic	.69(1.60)	3.64(3.85)	64.42***
Memory	3.49(2.42)	6.43(3.36)	58.86***
Intellectual	4.62(2.84)	8.90(4.97)	68.39***
Pathognomonic	4.09(3.26)	10.32(5.79)	111.56***
Left hemisphere	1.14(1.23)	3.47(3.15)	60.92***
Right hemisphere	.99(1.10)	3.07(2.72)	64.98***

\*\*\*p < .0001

, , ADHD  
(Table 1). ADHD  
ADHD  
(Ackerman  
1986 ; Felton 1987)가  
(Fisher 1990), ADHD  
가  
(Pennington Welsh 1995),  
ADHD  
ADHD  
, K - LNNB - C  
가 Go - No - Go ( )  
, ),  
, ADHD

ADHD  
ADHD  
가 가  
가  
K - LNNB - C ADHD LD  
( 1996),  
LD  
ADHD  
LD ADHD  
가 가

맺 는 말

ADHD

가 ,

ADHD

ADHD

( ) ,

, ADHD

( )

가

References

ADHD

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가

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1 : 1

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가

가

ADHD

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, ADHD

가

신민섭 · 오경자 · 홍강의(1990) : 주의력결핍과잉활동장애 아동의 인지적 특성. 소아 · 청소년정신의학 1(1) : 55-64

, ADHD 가

신민섭 · 오경자 · 홍강의(1995) : 주의력결핍 과잉활동장애 아동에서 약물단독 치료와 부모훈련 병합 치료의 효과 비교. 소아 · 청소년정신의학 6(1) : 65-73

ADHD 가 가

가

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가

가 ADHD

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**NEUROPSYCHOLOGICAL ASSESSMENT OF CHILDREN WITH  
ATTENTION DEFICIT/HYPERACTIVITY DISORDER****Min-Sup Shin, Ph.D., Suzanne Park, M.A.***Division of Child-Adolescent Psychiatry, College of Medicine Seoul National University, Seoul*

This paper first reviewed the current neurological theories concerning the etiology of ADHD and secondly, examined results of studies that applied neuropsychological assessment methods in the examination of ADHD children both here in Korea and abroad. ADHD children were found to exhibit characteristic responses indicating deficits in vigilance, sustained attention, distractibility, allocation and regulation of attention in many assessments of attention, in addition to deficits in executive functioning, working and associative memory. Such neuropsychological assessment results suggest that in addition to dysfunction in the frontal lobe and the reticular activation system, dysfunction may exist in other neural pathways involving many areas of the brain. However, because a substantial number of neuropsychological assessment tools being employed in Korea for ADHD children had been developed abroad, a Korean standardization project involving ADHD and normal control children, in addition to other child psychiatric population pools must be conducted in order to obtain appropriate age norms and test validity, and in order to make possible a more accurate and precise comparison and interpretation in the assessment of ADHD children.

**KEY WORDS** : ADHD · Neuropsychological assessment.