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Regular Article

Measuring adjustment in Japanese juvenile delinquents with learning disabilities using Japanese version of Kaufman Assessment Battery for Children II

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Aim: The aim of this study was to create a profile of the cognitive and academic abilities of juvenile delinquents (JD) in Japan using the newly validated Japanese version of the Kaufman Assessment Battery for Children, Second Edition (KABC-II-J).

Methods: We administered the KABC-II-J to 22 JD (M_{age} = 15.9 years, standard deviation [SD] = 1.4), 28 typically developing high school students (M_{age} = 16.0 years, SD = 0.08), and (as controls) 12 special education students (M_{age} = 16.9, SD = 0.83) with mild intellectual disabilities.

Results: We observed significant differences between JD and typically developing students on learning index of the Mental Process Index, and the vocabulary, reading, writing, and mathematics indices on the Achievement Index. JD had lower scores than did typically developing high school students. Fourteen JD had a 1 SD discrepancy (43%) in scores on these indices. These cases were suspected of having learning disabilities.

Conclusion: The KABC-II-J is a suitable means of assessing academic and cognitive problems in JD; professionals working in the field of juvenile delinquency should recognize that offenders might have severe academic delays and learning disabilities.

Key words: academic achievement, forensic assessment, juvenile delinquency, Japanese version of Kaufman Assessment Battery for Children II, learning disabilities.

LEARNING DISABILITIES (LD) may be a risk factor for juvenile delinquency;[1–7] specifically, juvenile delinquents (JD) often experience academic failure and fail to adapt to their school life during adolescence. This has been related to the onset of criminal behavior.[8]

Researchers in the USA have conducted numerous studies about the correlation between LD and JD. A series of studies called the 'LD–JD link' were undertaken starting in the 1970s. The LD–JD link was a theory that children with LD would become JD in adolescence. LD were defined by Kirk[9] in 1962; he determined that LD were not intellectual disorders and that LD had discrepancy between cognitive abilities and academic achievement (e.g. handwriting, mathematics, reading, and spelling skills). Broder[10] described that 36% of JD had LD, according to data from the Association for Children with Learning Disabilities and the National Center of States Courts.

In another study, Meltzer *et al.*[3] surveyed the academic failures of JD. They administered the Wide Range Achievement Test (WRAT) to 53 JD and 51 typically developing students as controls, and found that JD tended to show poorer academic achievement than did controls. Specifically at the second-grade level, 45% of JD and 14% of controls had delays in reading, 36% of JD and 14% of controls had delays in handwriting, and 25% JD and 4% controls had delays in arithmetic.

Similarly, Famularo *et al.*[11] administered the Wechsler Intelligence Scale for Children-Revised (WISC-R) and WRAT to JD aged 13–15 years in

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Boston. The mean standard scores on the WRAT of JD were 87.6 (reading), 82.4 (spelling), and 74.5 (arithmetic), indicating that JD had lower scores than did typically developing students. In addition, JD showed a decline of around 1 SD in academic performance. In a similar study, Grigorenko[12] surveyed 812 boys and girls, aged 13 at the baseline assessment, for 7 years in six sites in the USA, and found that those classified as JD showed delays in academic achievement. Their results showed that 84% of JD had delays in mathematics and 93% in reading. In another study, Rucklidge *et al*.[13] administered the Wechsler Individual Achievement Test (WIAT) to 60 juvenile prisoners aged 16–19, and found that 91.6% of those youth had LD. In particular, they had difficulties in reading, mathematics, and oral language. Additionally, the authors found that reading comprehension predicted recidivism 4 years later.

More specifically in Japan, Matsuura *et al*.[14] administered the WISC-III on 54 students at a juvenile correctional school who were sent by the family court. The authors found that 18.5% had a discrepancy of over 15 points, and 51.9% had a discrepancy of over 10 points between verbal and performance IQ. Therefore, it appears that Japanese JD also have poorer cognitive abilities than do non-JD. This has been confirmed by other Japanese researchers: Kumagai *et al*.[15] administered the Wechsler Objective Numerical Domains (WOND) and the WISC-III to 20 students aged 14–15 years who had been committed to a juvenile correctional school by the family court. The results showed that the participants had a 2 SD delay in mathematical and numerical abilities as assessed by the WISC-III, indicating that delinquents had specific difficulties in mathematical skills.

To understand JD, we need to investigate the influence of LD. Therefore, it is appropriate to administer a survey about LD in relation to JD, and to create support and educational programs for JD to prevent recidivism.

For example, Bachara *et al*.[16] examined the outcomes of academic therapy for JD by conducting a 24-month academic program for 79 youth offenders. The recidivism rate was 6.5%, which was much lower than that of the controls who had not taken the academic program (41.6%). Moreover, Brier *et al*.[17] conducted a 24-month comprehensive diversion program that included psychological and vocational skills in addition to academic remediation for 192 delinquents. The rate of recidivism for those who had gone through the program was 12%, while that for controls was 40%. Thus, evidence has shown that diversion programs are effective for youth offenders.

However, no comprehensive studies have been conducted on the academic achievements of JD via standardized tests like the WRAT and WIAT in Japan; this is because there have been no such standardized tests of academic achievement that include reading, handwriting, calculation, and mathematical reasoning in Japan, until recently. Fortunately, in 2009, Fujita *et al*. designed and validated the Kaufman Assessment Battery for Children, Second Edition, Japanese version (KABC-II-J).[18] An appropriate assessment using this standardized test could lead to the development of an individualized program tailored for JD. Therefore, we administered the KABC-II-J to JD in family court cases as part of their rehabilitation.

In the present study, we administered the KABC-II-J to JD involved in family court cases in order to assess their abilities and difficulties – both cognitive and academic – to aid the development of an individualized education plan for this population. In other words, our primary aim was to clarify the cognitive and academic characteristics of JD using the KABC-II-J.

METHODS

Participants

Juvenile delinquents

We recruited 32 JD who were convicted of committing crimes by a family court between July 2009 and April 2011. In Japan, all JD are sent to family courts under juvenile law. In these family courts, a court investigator meets with young offenders and surveys their backgrounds, including their criminal behavior, life history, and family environment. The investigators then conduct a psychological assessment. In this study, the court investigator was the first author who conducted the KABC-II at a juvenile classification home. The JD participants included 28 boys and four girls. Their mean age was 15.9 (SD = 1.4), with an age range of 14–18 years.

Regarding the number of convictions, 14 JD had been sent to family court once and 18 had been sent more than twice. Eight participants had offended twice, five participants thrice, one participant seven times, and one participant 12 times.

Regarding the educational level, 20 JD were enrolled in junior high school or had not yet gone to

high school. There were five high school dropouts, three enrolled in high school, and one who had graduated from high school.

Finally, regarding the type of crime, 14 participants had committed property crimes, 13 had committed violent crimes, two were sexual offenders, and three were status offenders.

Controls

Twenty-eight public high school students from Saitama prefecture participated in the survey as controls. The authors had regular interaction and cooperation with the high school and students who had average academic performance were recruited. This included 13 boys and 15 girls, with a mean age of 16.0 (SD = 0.08), and mean IQ of 102.0 (SD = 8.1). We also included 12 students with mild intellectual disabilities who attended a public high school in Chiba prefecture for those with intellectual disorders. They consisted of six boys and six girls and their mean age was 16.9 (SD = 0.83). The authors had regular interaction and cooperation with this school. We included controls with mild intellectual disabilities to clearly identify and account for differences in cognitive abilities and academic achievements among JD, and to demonstrate that JD have unique profiles that differ from both typically developing high school students and students with mild intellectual disabilities.

Procedures

Measures

KABC-II-J

In 2009, Fujita *et al.* developed and validated the Japanese version of the KABC-II-J.[18] Kaufman and Kaufman[19] had originally designed the KABC-II in the USA, and several psychologists had used it for the assessment and support of students with behavioral and academic problems. The original KABC[20] assessed children between 2 and 11 years, while the KABC-II assessed those between 2 and 18 years and 11 months. Therefore, this makes it a suitable measure for professionals in the field of juvenile delinquency to assess the cognitive ability and academic achievement of JD, which can then be used to further develop strategies to support JD.

The KABC-II-J has 18 subtests, which include 10 cognitive process tests and nine academic achievement tests. The names of subtests are shown in Table 1. Each subtest includes approximately 20–80 questions, which cover material up to the ninth grade level. The KABC-II-J yields two major indices: the Mental Process Index (MPI) and the Achievement Index (AcI). The MPI reflects various cognitive abilities, such as IQ, and includes a further four indices: sequential, simultaneous, planning, and learning. The AcI shows academic achievement ability and includes four indices: vocabulary, reading, writing, and mathematics.

Informed consent

Informed consent was obtained from all participants, who were made aware of their right to decline cooperation without being awarded penalties. We also assured the family court that confidentiality for all cases would be maintained and that the administration of KABC-II-J was for the welfare of JD.

The study design was approved by the ethics review board of the University of Tsukuba.

Statistical analysis

We conducted a one-way ANOVA on results of JD, typically developing high school students, and high school students with mild intellectual disabilities. Each index and subtest score of the KABC-II were set as independent variables. Data were analyzed using SPSS 17.0 for Windows (IBM, Armonk, NY, USA). The significance levels were set at $P < 0.05$.

RESULTS

Demographics

The demographic data are presented in Table 1. The mean IQ for JD, according to the Shin–Tanaka B Test, a Japanese limited IQ test, was 94.0 (SD = 12.8), and the IQ range was 73–121. Specifically, the IQ were 73–84 for nine participants, 85–99 for nine, 100–114 for twelve, and higher than 115 for two. As for controls of typically developing high school students, their mean IQ was 102 (SD = 8.1), according to the WAIS-III.

KABC-II-J profile of JD

Table 2 shows the standard score of each index of the KABC-II-J of the JD, typically developing high school

Table 1. KABC-II-J scores on subtests (M = 10, SD = 3)

	Subtest	Juvenile delinquents (JD) $n = 32$	Typically developing high school students, $n = 28$	High school students with mild intellectual disabilities, $n = 12$	F	P	Post-hoc JD–Typically developing high school students
Cognitive ability	Atlantis	8.4	10.3	4.7	20.75	**	*
	Story completion	8.6	10.3	5.7	12.07	**	*
	Number recall	9.0	10.1	5.8	11.4	**	NS
	Gestalt closure	8.4	10.3	5.8	10.96	**	*
	Atlantis delayed	8.7	10.1	6.0	9.56	**	NS
	Rover	10.0	9.8	5.4	9.53	**	NS
	Triangles	8.5	9.9	5.5	10.53	**	NS
	Word order	8.0	10.1	4.8	15.49	**	*
	Pattern reasoning	8.8	9.3	5.1	10.31	**	NS
	Hand movements	9.8	9.5	5.0	14.92	**	NS
Academic achievement	Expressive vocabulary	7.3	10.6	3.9	30.38	**	**
	Math reasoning	6.8	9.4	2.5	28.05	**	**
	Riddles	8.1	10.1	2.9	37.31	**	**
	Calculation	5.2	10.3	2.8	53.06	**	**
	Reading	7.0	9.6	3.5	17.29	**	**
	Handwriting	6.7	10.3	6.0	17.02	**	**
	Passage comprehension	9.4	10.1	3.7	46.96	**	NS
	Writing fluency	9.3	11.5	4.3	32.78	**	NS
	Picture vocabulary	7.2	10.0	2.8	41.26	**	**

$^{**}P < 0.01$, $^{*}P < 0.05$.
NS, not significant.

students, and students with mild intellectual disability. There were significant differences between the three groups on each index ($P < 0.01$); post-hoc analyses by Tukey's method revealed that JD showed significantly lower scores than did typically developing high school students on the MPI and the learning index of cognitive processing. Regarding academic achievement, JD had significantly lower scores than did typically developing high school students on all five indices (AcI, vocabulary, reading, writing, and mathematics).

Table 3 shows the standard scores of each subtest of the KABC-II-J of the three groups. There were significant differences between the three groups on each subtest ($P < 0.01$), and post-hoc analyses indicated that the JD had lower scores than did typically developing high school students on four subtests: Atlantis, story completion, gestalt closure, and word order. As for academic achievement, which included nine subtests, the JD had significantly lower scores than did typically developing high school students on seven subtests, except for passage comprehension

Table 2. Demographic data

	Juvenile delinquents $n = 32$	Typically developing high school students $n = 28$	High school students with mild intellectual disability $n = 12$
Age (SD)	15.9 (1.4)	16.0 (.08)	16.9 (.83)
IQ (SD)	94.0 (12.8)	102 (8.1)	Range: 50–70
Sex (M/F)	28/4	13/15	6/6

Table 3. KABC-II-J score of each index (M = 100, SD = 15)

		Juvenile delinquents, $n = 32$	Typically developing high school students, $n = 28$	High school students with mild intellectual disability, $n = 12$	F	P	Post-hoc JD–Typically developing high school students
Cognitive ability	Mental Process Index	90.1	99.6	68.3	31.54	**	**
	Sequential Index	93.5	99.4	70.2	19.96	**	NS
	Simultaneous Index	92.9	99.9	71.5	18.23	**	NS
	Planning Index	91.7	99.4	72.8	15.1	**	NS
	Learning Index	92.4	101.3	74.7	18.96	**	*
Academic achievement	Achievement Index	82.9	100.9	65.4	54.93	**	**
	Vocabulary Index	84.9	100.8	63.5	46.39	**	**
	Reading Index	89.4	98.3	67.3	29.16	**	*
	Writing Index	87.8	104.8	72.9	30.49	**	**
	Mathematics Index	78.8	98.7	67.4	50.67	**	**
	Math reasoning standard score	83.9	96.7	62.0	27.46	**	**
	Calculation standard score	75.0	100.4	62.8	50.03	**	**

** $P < 0.01$, * $P < 0.05$.
KABC-II-J, Japanese version of the Kaufman Assessment Battery for Children, Second Edition; NS, not significant.

and word fluency. Particularly in the handwriting subtest, there was no significant difference between JD and high school students with mild intellectual disabilities.

Prevalence of learning disabilities in JD

The differences between the MPI and AcI, and the MPI and each index of academic achievement, are presented in Table 4. Six JD (19%) and two (7%) typically developing high school students had a discrepancy of over 15 points (1 SD) between the MPI and AcI (MPI > AcI). Five (16%) JD had a discrepancy of over 15 points (1 SD) between the MPI and the vocabulary index; three (9%) between the MPI and the reading index; four (13%) between the MPI and the writing index; and 12 (38%) between the MPI and the mathematics index. Finally, 14 JD had a discrepancy of over 15 points (1 SD) between the MPI and each index of academic achievement (43%). For JD, the MPI was higher than each academic achievement index.

DISCUSSION

This is the first study to describe JD's cognitive processing and academic achievement using the KABC-II-J.

We examined KABC-II-J with 32 JD who had been sent to family courts in Japan. The KABC-II-J is a standardized test that includes cognitive processes and academic achievements and can be used with Japanese samples. We compared the JD with the control group and attempted to characterize the participants' cognitive processes and academic styles. Our results indicated that JD showed a discrepancy between MPI and AcI, wherein they showed much lower academic abilities than cognitive performance. Furthermore, 43% of JD had a discrepancy between MPI and each index of academic achievement. Previous researchers have defined LD as having a discrepancy of over 1 SD between indexes of cognitive and academic ability.[13,21] Thus, the JD in our study may have had LD.

The results of this study were consistent with Meltzer's study, which identified LD in 45% of JD.[3] Rucklidge[13] found that 91.6% of juvenile prisoners had LD, but we assumed that juvenile prisoners would also demonstrate severe psychological and social problems concomitant with LD, which may have exaggerated the actual rate.

On the other hand, the results showed that 28% of typically developing high school students had LD. Previous studies about LD and JD defined that those with LD had a 1 SD discrepancy between cognitive

Table 4. Discrepancies between MPI and AcI between participant groups

	Juvenile delinquents		Typically developing controls		Controls with mild intellectual disorders	
	n	%	*n*	%	*n*	%
MPI > AcI	26	81%	13	46%	6	50%
1 SD discrepancy between MPI and AcI (MPI > AcI)	6	19%	2	7%	1	8%
MPI < AcI	6	19%	15	54%	5	42%
1 SD discrepancy between MPI and AcI (MPI < AcI)	0	0%	3	11%	0	0%
MPI > vocabulary (1 SD discrepancy)	5	16%	5	18%	3	25%
MPI > reading (1 SD discrepancy)	3	9%	4	14%	2	17%
MPI > writing (1 SD discrepancy)	4	13%	2	7%	2	17%
MPI > mathematics (1 SD discrepancy)	12	38%	3	11%	1	8%
MPI > one index of achievement (1 SD discrepancy)†	14	43%	8	28%		

Note: 1 SD = approx. 15 points.
†LD suspected.
MPI, Mental Processing Index; AcI, Achievement Index.

ability and academic achievement scores obtained from individual academic achievement tests (e.g., WRAT, WIAT, and KABC-II-J). We used the 1 SD discrepancy between cognitive abilities and academic achievement for the reading, writing, and mathematics subtests. We found that the definition of LD was effective, as the use of this definition allowed teachers or school psychologists to detect the weaknesses and strengths of students in relation to the discrepancy between cognitive abilities and academic achievement. Furthermore, the students themselves were made aware of their own abilities, allowing for early intervention. It is therefore important to understand the prevalence of LD in typically developing students as well.

When examining the subtests of academic achievement, JD showed significantly poorer performance than did typically developing high school students on all subtests except for passage comprehension and writing fluency. These subtests measure daily communication skills in terms of verbal and reading abilities. Indeed, when we contacted the JD in their correctional home, many had fluent conversational skills and could use abstract and polite language. This suggests that their verbal skills and daily conversation abilities are relatively unimpaired, and their deficits are solely academic. Thus, the lack of difference between the JD and typically developing high school students concerning passage comprehension and writing fluency can be explained by the fact that the two subtests were related to daily conversational abilities. This is further supported by research from the USA, where researchers interested in JD have tended to focus on language skills (e.g., handwriting, spelling, and reading).[12] The reason for this approach is that the minorities who commit crimes in the USA tend to have poor skills in reading and writing in English. Moreover, the results of these studies have revealed that an important rehabilitation policy for minority youth offenders is to provide them with skills training in English as a way of preventing recidivism.

Furthermore, the fact that these JD were not diagnosed as having LD in childhood or adolescence may have been because their LD was concealed by their fluent conversation and relatively unimpaired cognitive abilities. Similarly, many teachers and psychologists may not have noticed their academic disabilities. Additionally, in the aftermath of adverse family events or conflict for the youth, teachers, psychologists, and family members may have become more involved in addressing their behavioral problems. Therefore, teachers or psychologists in schools may have overlooked academic delays or failed to recognize the problems of these JD. Meltzer *et al*.[3] developed individual educational plans (IEP) for 70% of the JD, of which 61% were designed to help with remediation in reading, 62% to help with mathematics, and 34% were the introduction of resource rooms, which are separate rooms for special educa-

tion in the USA. Thus, several JD were provided with special education using IEP, which would be helpful in addressing the individual characteristics of their learning styles.

Recent studies have shown that LD is not directly related to criminal behavior but rather to minor, inconsequential misbehaviors or economic problems. In the USA, McNamara *et al*.[22] studied youth with LD aged 13–21, and compared them with typically developing students. They reported no significant difference in terms of major delinquency (e.g., involvement in gangs, possession of weapons), but found a significant difference in acts of minor delinquency (e.g., smoking, use of marijuana, aggressive behavior) between youth with LD and controls. Therefore, McNamara *et al*. characterized youth with LD as tending to have mild behavioral problems, but not serious criminal issues.[22] This was supported by Seo *et al*.,[23] who observed participants with LD aged 10–21 or 24 years in the USA. The authors examined participants' criminal records, occupations, and economic problems (having meal coupons), and found no significant difference in the criminal behavior between the LD and non-LD, but a significant difference in their need for public assistance.

Thus, in the aforementioned study, the LD–JD link was not substantiated and a direct relationship between LD and JD was refuted. However, our study found that 43% of JD had a diagnosable LD; considering that it is possible to detect LD, awareness of LD could be extremely helpful for professionals in understanding JD. Therefore, as professionals, we should offer not only psychological interventions but also educational programs for LD to prevent recidivism.

Additionally, we should not miss the learning disabilities in typically developing students. In our study, we detected 28% of LD among typically developing high school students. According to the DSM-IV, prevalence of learning disorder was 2–10%. The study could not diagnose LD, however we assume that many typically developing students had LD tendency.

To prevent their dropout, we reported learning disabilities not only among JD but also among typically developing students.

Also, to develop support programs for JD, researchers and policy-makers require a comprehensive assessment of cognitive ability and academic achievement.

The KABC-II-J is a useful tool to assess the strengths and weaknesses of JD, which can then be used to design IEP. Of course, we must also consider the influence of environmental factors, such as familial or neighborhood problems, in addition to education programs.

Despite the strength of the study, the sample size was too small for comprehensive statistical analyses. Therefore, larger prospective studies are needed to confirm and validate the findings.

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