表1 性別×学年ごとのADHD-RS得点

	教師評定						保護者評定					
	男子			女子			男子			女子		
	M	SD	Cutoff	M	SD	Cutoff	M	SD	Cutoff	M	SD	Cutoff
不注意												
小1	1.79	3.63	10	0.71	2.26	4	4.99	4.38	14	3.74	3.73	11
小2	3.05	5.02	14	0.91	2.65	7	6.84	5.62	18	4.45	4.47	15
小3	2.95	5.54	18	1.00	2.57	7	6.36	5.12	16	4.37	4.39	12
小4	2.93	5.15	16	0.94	2.53	6	6.17	5.21	16	4.09	3.87	12
小5	1.76	3.91	10	0.56	2.08	4	5.86	5.33	18	3.68	4.00	12
小6	2.40	5.04	13	0.49	1.54	4	5.35	5.40	17	3.58	4.16	11
中1	2.14	3.95	12	1.23	3.17	9	5.44	5.03	16	3.69	4.11	13
中2	1.65	3.59	9	0.67	2.53	6	4.71	4.77	16	3.63	4.07	12
中3	1.31	2.41	8	0.47	1.28	3	4.70	4.92	16	3.55	4.19	13
多動性・衝動性												
小1	1.13	2.95	6	0.29	1.27	2	3.40	3.78	11	2.21	2.96	8
小2	1.96	3.89	10	0.29	1.14	2	4.08	4.46	15	2.10	2.91	8
小3	1.81	4.47	14	0.22	1.01	1	3.77	4.32	13	2.13	3.38	9
小4	1.56	3.79	12	0.18	0.91	1	3.25	4.22	12	1.67	2.39	7
小5	1.47	3.52	10	0.12	0.72	1	2.97	4.03	11	1.53	2.71	7
小6	1.12	3.01	8	0.12	0.55	1	2.70	3.79	10	1.41	2.57	6
中1	1.16	2.87	6	0.28	1.05	2	2.27	3.30	9	1.33	2.82	7
中2	0.50	1.74	4	0.34	1.42	2	1.50	2.52	7	1.15	1.97	5
中3	0.42	1.27	3	0.14	0.58	1	1.46	2.61	7	1.13	2.46	6
ADHD傾向全体												
小1	2.92	5.95	17	1.00	3.26	5	8.39	7.66	24	5.95	6.25	18
小2	5.01	8.39	24	1.20	3.52	8	10.92	9.54	30	6.55	6.87	21
小3	4.76	9.59	30	1.22	3.31	9	10.14	8.87	29	6.51	7.22	21
小4	4.48	8.34	24	1.13	3.08	7	9.42	8.92	29	5.76	5.74	16
小5	3.23	6.94	18	0.68	2.56	4	8.84	8.84	29	5.21	6.28	17
小6	3.52	7.55	22	0.61	1.87	5	8.05	8.72	24	4.99	6.27	16
中1	3.30	6.09	19	1.51	3.90	10	7.71	7.73	23	5.02	6.48	18
中2	2.15	4.81	13	1.01	3.84	8	6.21	6.82	20	4.78	5.61	16
中3	1.73	3.13	10	0.61	1.71	4	6.16	6.98	19	4.68	6.27	20

***$p<0.001$
M；平均，SD；標準偏差

は，ADHD傾向に関する教師評定と親評定の相関係数はr＝0.3程度であった。しかし，日本において教師と保護者という評定者間の一致度を検討した研究はみられない。また，このような不一致が生じるのであれば，評定者ごとにアセスメントの基準となるデータを提示しておくことが必要である。

本研究では，大規模サンプルを用いて，日本の小中学生におけるADHD傾向の教師評定と保護者評定の基礎データを提供することを目的とする。また，教師評定と保護者評定との一致度および評定値の差について検討する。さらに，アメリカにおけるADHD傾向の得点と比較することで，日本の小中学生におけるADHD傾向の特徴を明らかにする。

教師評定と保護者評定との差			
男子		女子	
d	t	d	t
0.79	14.96***	0.97	14.13***
0.71	12.35***	0.94	14.69***
0.64	10.62***	0.92	13.73***
0.63	10.04***	0.96	13.08***
0.87	13.49***	0.93	15.33***
0.56	10.58***	0.97	12.20***
0.73	9.99***	0.67	8.94***
0.72	8.68***	0.86	11.01***
0.84	10.25***	0.98	11.20***
0.66	12.39***	0.56	11.64***
0.50	8.43***	0.79	11.51***
0.45	7.08***	0.74	10.63***
0.42	6.74***	0.80	10.86***
0.40	5.81***	0.63	10.14***
0.46	7.90***	0.69	8.30***
0.36	4.79***	0.46	6.26***
0.46	5.07***	0.47	5.71***
0.49	6.07***	0.55	6.17***
0.79	15.15***	0.68	14.06***
0.66	11.41***	0.95	14.53***
0.58	9.58***	0.92	13.54***
0.57	9.26***	0.99	13.60***
0.70	10.72***	0.86	14.41***
0.55	10.40***	0.93	11.58***
0.63	8.65***	0.64	8.78***
0.68	8.04***	0.78	9.87***
0.77	9.74***	0.88	9.90***

方法

1. 調査協力者

調査協力市の公立小中学校に通うすべての児童・生徒を調査対象とし，その担任教師と保護者に回答を依頼した。教師評定と保護者評定の両方がそろった児童・生徒5,478名(男子2,745名，女子2,733名)のデータを分析対象とした。なお，特別支援学級に所属する児童・生徒のデータは除外した。児童・生徒の内訳は，小学1年生757名(男子414名，女子343名)，小学2年生666名(男子325名，女子341名)，小学3年生723名(男子369名，女子354名)，小学4年生621名(男子307名，女子314名)，小学5年生656名(男子316名，女子340名)，小学6年生585名(男子300名，女子285名)，中学1年生538名(男子281名，女子257名)，中学2年生474名(男子220名，女子254名)，中学3年生458名(男子213名，女子245名)であった。保護者については，約94%が母親であり，約5%が父親，その他が祖父母であった。

2. 質問紙

DuPaulらが作成したADHD rating scale (ADHD-RS)の日本語版[5]を用いてADHD傾向を測定した。この尺度はDSM-Ⅳの診断基準をもとに作成され，ADHDの主な特徴である「不注意(9項目)」と「多動性・衝動性(9項目)」の2下位尺度から構成されている。妥当性と信頼性については先行研究で確認されている[6]。教師は担当クラスのすべての児童・生徒について，保護者は自分の子どもについて，各項目の特徴がどの程度あてはまるかを，「ない，もしくはほとんどない(0点)」「ときどきある(1点)」「しばしばある(2点)」「非常にしばしばある(3点)」の4件法で回答した。

3. 手続き

調査者がアンケート施行の1〜2か月前に，各学校を訪問して担任教諭に調査の依頼および調査用紙の配布を行った。保護者に対しては，担任教諭を通じて調査協力の依頼および質問紙の配布を行った。本研究は，浜松医科大学と調査協力市との間で交わされた研究と支援に関する協定に基づいて行われ，個人情報の保護についても市のセキュリティポリシーを遵守することで十分な倫理的配慮を行った。

4. 分析方法

子どものADHD傾向に対する教師評定と保護者評定との一致度を検討するために，まず評定者間での相関係数を算出した。次に，評定者間の得

表2 ADHD-RSの日米比較

	日本						アメリカ					
	男子			女子			男子			女子		
	N	M	SD	N	M	SD	N	M	SD	N	M	SD
教師評定												
不注意												
8～10歳(小2～小4)	1,001	2.98	5.25	1,009	0.95	2.58	307	10.33	8.49	258	6.04	7.29
11～13歳(小5～中1)	897	2.09	4.33	882	0.73	2.33	221	9.33	8.11	222	5.97	6.76
多動性・衝動性												
8～10歳(小2～小4)	1,001	1.78	4.09	1,009	0.23	1.03	307	8.43	8.05	258	3.81	6.15
11～13歳(小5～中1)	897	1.26	3.16	882	0.17	0.79	221	5.96	6.72	222	3.62	5.61
ADHD傾向全体												
8～10歳(小2～小4)	1,001	4.76	8.83	1,009	1.19	3.31	307	18.76	15.51	258	9.86	12.63
11～13歳(小5～中1)	897	3.35	6.89	882	0.90	2.87	221	15.28	13.55	222	9.59	11.42
保護者評定												
不注意												
8～10歳(小2～小4)	1,001	6.46	5.32	1,009	4.31	4.26	289	6.65	5.33	327	4.17	4.36
11～13歳(小5～中1)	897	5.56	5.26	882	3.65	4.08	149	6.70	6.27	173	4.61	5.12
多動性・衝動性												
8～10歳(小2～小4)	1,001	3.71	4.35	1,009	1.98	2.94	289	5.53	5.25	327	3.39	3.79
11～13歳(小5～中1)	897	2.66	3.74	882	1.43	2.69	149	4.79	5.54	173	2.88	3.48
ADHD傾向全体												
8～10歳(小2～小4)	1,001	10.17	9.12	1,009	6.29	6.67	289	12.18	9.81	327	7.56	7.51
11～13歳(小5～中1)	897	8.22	8.47	882	5.08	6.33	149	11.50	11.32	173	7.49	7.84

$^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$

注) アメリカのデータは，DuPaulら[3,4]で報告されているものを用いた。

N；人数，M；平均，SD；標準偏差

点差について，性別×学年ごとにt検定を用いて検討した。また，日米間の得点差についても，性別×年齢群ごとにt検定を用いて検討した。

結果

1. 尺度構成

ADHD-RSについて，評定者ごとに2因子を仮定した確認的因子分析を行った。教師評定(CFI (comparative fit index)＝0.90，RMSEA (root mean square error of approximation)＝0.08)，保護者評定(CFI＝0.91，RMSEA＝0.08)のいずれについても十分な適合度が示された。下位尺度ごとのα係数を算出したところ，教師評定では，不注意が0.90，多動性・衝動性が0.87，保護者評定では，不注意が0.90，多動性・衝動性が0.86と高い信頼性を有することが示されたため，評定者ごとの各項目の合計を下位尺度得点とした。また，全項目の合計をADHD傾向全体得点とした(教師評定，保護者評定ともα＝0.93)。

2. 評定者間の関連性

教師評定と保護者評定について，Pearsonの積率相関係数を算出した。その結果，不注意がr＝0.36，多動性・衝動性がr＝0.33，全体得点がr＝0.38であった(すべて$p<0.001$)。

3. 評定者間の比較

児童・生徒の性別×学年ごとにADHD傾向の平均とSDを算出した(表1)。本研究では，ADHD傾向に関する評定者間の差を検討することを目的としていたため，性別×学年ごとに評定者間の平均値差に関する効果量dを算出した。効果量dは，平均値差をSD単位に換算したもの

日本とアメリカの差			
男子		女子	
d	t	d	t
1.19	14.33***	1.27	11.02***
1.37	12.80***	1.42	11.35***
1.26	13.91***	1.22	9.29***
1.14	10.11***	1.32	9.13***
1.30	15.06***	1.35	10.92***
1.38	12.66***	1.52	11.23***
0.04	0.54	0.03	0.51
0.21	2.10	0.22	2.31*
0.40	5.37***	0.45	6.16***
0.53	4.50***	0.51	5.17***
0.22	3.11**	0.18	2.73*
0.37	3.37**	0.36	3.79***

である。不注意，多動性・衝動性のいずれも，すべての性別×学年で教師評定よりも保護者評定のほうが有意に高かった。効果量に注目すると，不注意の得点について，また女子において，より評定者間の差が大きかった。ADHD傾向全体得点についても，すべての性別×学年で教師評定よりも保護者評定のほうが有意に高く，特に女子において評定者間の差が大きい傾向がみられた。

4. Cutoff値の設定

Polanczyk ら[8]は，ADHDの有病率を5.29%としている。それをもとに，本研究では，性別×学年ごとに95パーセンタイル値を算出し，暫定的なCutoff値として設定した(表1)。

5. ADHD傾向に関する日米間比較

DuPaul ら[3,4]によって報告されているデータを用いて，ADHD傾向の日米間比較を行った。DuPaul ら[3,4]は，5～7歳，8～10歳，11～13歳，14～18歳の4グループごとの得点を報告している。そのため，本研究では8～10歳と11～13歳にあたる学年区分(小学年2年生～4年生と小学5年生～中学1年生)の2グループを構成して平均値を算出した(表2)。その結果，不注意の保護者評定を除いて，すべてアメリカに比して日本の得点が低くなっていた。効果量に注目すると，特に教師評定で差が大きく，効果量が1を超えていた。

考察

本研究では，小中学生のADHD傾向に対する教師評定と保護者評定の基礎データを提供し，評定者間の一致度とその差について検討した。評定者間の一致度について，両者の相関係数はr＝0.3～0.4程度であった。この値は，Power ら[9]の研究で報告されている値よりもやや高いものの，一致度という点からは小さい値といえる。ADHD傾向に関する教師の評定と保護者の評定の一致度は限定的であると考えたほうがよいだろう。評定者間の差については，教師よりも保護者のほうが高く評定していた。特に不注意の側面に対する評定と女子児童・生徒に対する評定に関して，評定者間の差が大きかった。

このような評定の不一致や差が生じる原因として，2つの可能性が考えられる。1つは，教室場面と家庭場面で児童・生徒が異なる行動特徴を示している可能性である。保護者評定のほうが全般的に高いことを考えると，家庭でのみ不注意や多動などを示す児童・生徒が相当数存在していることが考えられる。もう1つは，教師と保護者が異なる評価基準を持っている可能性である。教師は教室場面で多くの児童・生徒とかかわっている。不注意や多動など気になる行動を示す児童・生徒は目につきやすいものの，それらの行動が比較的目立たない児童・生徒には注目しにくい。特に日本の集団教育では，学級経営に支障を来すか否かが重視されやすく，学級を乱す児童・生徒の行動は高く評定されるが，学級を乱さなければ不

注意や多動を示してもあまり高く評定されないと考えられる。一方で，通常保護者がかかわるのは自分の子どもだけであり，自分の子どもの行動のみに基づいて評定を行う。ADHDの子どもがいる家庭では家族がかなり疲弊するとされており[7]，子どもがADHD傾向を示す程度に応じて家庭内でも問題が生じやすくなる。保護者は，家庭生活に問題が生じる程度に応じて，子どものADHD傾向を評定しているものと考えられる。このような評価基準の違いが，評定の不一致や差に表れている可能性もある。

ADHD傾向に関して，日米間で差がみられた。ADHDの有病率については，文化や国によって若干の差が報告されている[8]。しかし，本研究でみられた差が，必ずしも実際の子どもの行動の違いを反映しているとは限らない。本研究では，教師評定においても保護者評定においても全般的に日本よりもアメリカで得点が高く，特に教師評定に関して日米間の差が顕著であった。これは日本における教師評定の得点が低いことに起因するものである。前節で考察したように，日本では学級経営という点から集団を乱す可能性のある子どもに特化して注目しやすいが，アメリカの教育場面ではより個々の子どもに注目しやすいのかもしれない。この点については，文化心理学的な観点からさらなる検討が必要である。

本研究の限界として，次の3点が挙げられる。1つ目は，医学的診断を基にcutoff値を定めていないことである。今回は，先行研究をもとに，95パーセンタイル値を暫定的なcutoff値とした。今後，医学的診断を用いることで，より厳密なcutoff値を設定することが必要である。2つ目は，教師評定と保護者評定の不一致の原因が明らかにされていないことである。先に，両者の評定の不一致の理由として，教室場面と家庭場面での子どもの行動の違いと，教師と保護者の評価基準の違いという2つを述べた。しかし，本研究ではこの解釈を裏付ける変数を測定していない。子どもの行動観察や教師と保護者に対する面接調査を通して，評定者間の不一致の原因を明らかにすることが必要である。3つ目は，本研究の調査が単一市内にとどまっていることである。結果の一般化のためには，他の地域においても同様の知見を追認することが必要である。

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Summary

Tendency toward ADHD in Japanese Elementary and Junior High School Students : Differences between teacher and parent rating

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The purposes of this study were to obtain standard data on the tendency toward ADHD in Japanese elementary and junior high school students and to examine the differences between teacher and parent ratings. The teachers and parents of 5,478 children rated the tendency toward ADHD for their children. The correlations between the teacher and parent ratings ranged from 0.4 to 0.3, and the parent ratings were higher than the teachers ratings. These results thus prove that some discrepancies exist between the teacher and parent ratings. In addition, as per both teacher and parent ratings, scores of Japanese children were lower than scores of American children.

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Japanese version of school form of the ADHD-RS: An evaluation of its reliability and validity

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ABSTRACT

Using the Japanese version of school form of the ADHD-RS, this survey attempted to compare the scores between the US and Japan and examined the correlates of ADHD-RS. The classroom teachers of 7414 children (3842 males and 3572 females) evaluated all the children's behaviors. A confirmed factor analysis of ADHD-RS confirmed the two-factor solution (Inattentive and Hyperactive-Impulsive) same as previous studies. ADHD-RS scores were not related to IQ, but were associated with standardized achievement test scores. Males showed stronger ADHD tendencies than did the females, and the males tended to score lower as they grew older. Our comparison of the scores between the US and Japan found the Japanese children scored lower than did their US children. Japanese version of school form of the ADHD-RS with good reliability and validity was developed. More researches of ADHD in Japanese children are required.

1. Introduction

The concept and definition of attention deficit-hyperactivity disorder (ADHD) have been debated. Currently, the debates are narrowing down to a definition set forth by the American Psychiatric Association (1994): (a) some signs of inattention or hyperactivity-impulsivity have been present for at least six months to a point that is disruptive and inappropriate for developmental level; (b) some signs that cause impairment were present before age 7 years; (c) some impairment form the signs is present in two or more settings; (d) there must be clear evidence of significant impairment in social, school, or work functioning; (e) the signs do not happen only during the course of a pervasive developmental disorder, schizophrenia, or other psychiatric disorder.

An epidemiological survey has found that around 3 to 7% of all the school children in the US can be diagnosed as ADHD (Barkley, 1998). In addition, according to this survey, about 80% of those children diagnosed as ADHD patients carry their symptoms into their adolescence, and about 30–65% into their adulthood. Furthermore, a significant difference in the prevalence rate is also confirmed between the two sexes, with the male–female ratio in the general population reported to be 2.5:1 to 5.1:1. The US and some other nations of Europe and North America have been accumulating basic data on the disorder.

In Japan, we have epidemiological data from a survey conducted by a research team of the Ministry of Education, Culture, Sports, Science and Technology in 2002 of 41,579 school children in five regions of the nation. This survey, named "a nationwide survey of children and students going to regular classes in need of individual educational support," was conducted on the basis of the Developmental Disabilities Support Act enforced in 2005. The survey interviewed the school teachers about the following: students' learning, which covered learning disorders; students' interpersonal relationships,

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which covered pervasive developmental disorders; and students' behavior and attention, which covered ADHD. As a result, the survey found out that 6.3% of the students surveyed had some developmental disorders and were in need of special educational help (Ministry of Education, Culture, Sports, Science and Technology, 2003). This result was a sensational one, which accelerated the shift of the emphasis in the Japanese special educational system, which traditionally focused on special education to the children with mental retardation (1.4% of the nation's whole school children), towards education with special support education. The survey also found that 2.5% of the children surveyed showed obvious characteristics of ADHD, although this figure was smaller than that of the US at that time. This may be partly because the concept of developmental disorders had yet to recognize in Japanese school education, so teachers and parents did not have a good viewpoint or a framework for evaluating problematic behaviors. However, over the last several years, Japanese society has made remarkable progress improving its understanding of and support for developmental disorders. This would yield a major new trend radically different from the one found in 2002. Therefore, we have conducted another teacher-evaluated survey using a survey format, ADHD-RS, similar to the one employed in 2002 but more sophisticated.

An ADHD-RS survey conducted by classroom teachers of their own children can be helpful to the teachers themselves, as they can identify the children with ADHD who need support. Three types of rating scales of ADHD tendencies are currently available: those rated by parents, teachers, and children themselves. In general, in case an ADHD child works on a structured task one-on-one with an adult he/she meets for the first time, individual inspections are not essential in evaluating the child's ADHD tendency. They are only supplementary and provide some data on his/her intelligence and education. In assessing ADHD tendencies, it is necessary to collect data from multiple providers of information with different viewpoints. Many preschool and school education are using a multiple-gating procedure (Feil, Walker, & Severson, 1995). DuPaul (1992) proposed a five-stage assessment model. In the first stage, a child's teacher makes rough assessment of his/her ADHD symptoms. In the second stage, the teacher interviews the child's parents and watches his/her behaviors more closely. One common rating scale for teachers is Conners' Teacher Rating Scales-Revised (CTRS-R), developed by Conners, Sitarenois, Parker, and Epstein (1998). This scale consists of 59 evaluation items corresponding to six factors (28 items in the shorter version), and therefore is believed to suit the careful observation held in this second stage. Another rating scale, the ADHD-Rating Scale-IV (ADHD-RS) developed by DuPaul, Power, Anastopoulos, and Reid (1998) complies with the diagnostic criteria of DSM-IV and is standardized based on abundance of data. ADHD-RS is relatively easy to use and is believed to be helpful in the first stage of rating (DuPaul, Power, Anastopoulos, et al., 1998; DuPaul, Power, McGoey, Ikeda, & Anastopoulos, 1998).

Building upon those existing scales, our research has attempted to standardize the Japanese version of ADHD-RS, a scale of rating a child's ADHD tendencies from a teacher's perspective. In addition, we have examined reliability and validity of this scale. For the validation, we confirmed the factor structure and examined the relationships with a children's intelligence quotient (IQ), standardized achievement scores, and teacher ratings of needs for special care.

2. Method

2.1. Participants

Our survey covered all pupils and students of the public elementary and lower-secondary schools in a city X, Aichi Prefecture, located in central Japan. This city is a residential area adjacent to the central city of the region, accommodating some 80,000 residents. The city's residents consist of many different types of households, with some commuting to the adjacent central city and others working for local offices and plants within the residential city. This city, therefore, provides appropriate data that represent the demography of Japan. We conducted a questionnaire survey of the classroom teachers of all the children going to public elementary and lower-secondary schools of this city. Final sample consisted of 7414 of these children (3842 males and 3572 females). Our data did not include children going to special education classes. Table 1 shows a breakdown of the children by their sex and school grade. There was no significant difference in the male–female ratio across the school grades covered (χ^2 (8) = 8.11, *n.s.*). Note that the number of participants differs from one variable to another.

2.2. Measures

2.2.1. ADHD-RS

We employed the Japanese version of the ADHD-Rating Scale translated by DuPaul, Power, Anastopoulos, and Reid (2008). On the basis of the ADHD criteria of DSM-IV, this scale consists of two subscales to measure the two major characteristics of ADHD, Inattentive (9 items) and Hyperactive-Impulsive (9 items). There are two forms of teacher rating (school form) and rearers' ratings (home form). The reliability and validity of the scale have been confirmed (DuPaul, Power, McGoey, et al., 1998). Our survey employed the school form, and the classroom teachers were asked to evaluate their children. As in the prior surveys, teachers rated each item on a 4-point Likert Scale ranging from "Not at all, rarely (0)" to "Sometimes (1)" to "Often (2)" and "Very often (3)." Therefore, the higher a child's score is, the more ADHD tendency he/she has.

2.2.2. New Kyoken support to intelligence tests for each school grade

We measured intelligence of the elementary and lower-secondary school children using New Kyoken support to intelligence tests for each school grade, developed by Okamoto, Shibuya, Ishida, and Sakano (1993). This is a collective intelligence test conducted at the beginning of a school year to obtain each child's intelligence quotient.

Table 1
Details of grade and sex of participants of this survey.

Grade (age)	Male	Female	Total
1 (6–7)	490	403	893
2 (7–8)	450	428	878
3 (8–9)	478	441	919
4 (9–10)	419	392	811
5 (10–11)	421	431	852
6 (11–12)	417	361	778
7 (12–13)	416	374	790
8 (13–14)	387	377	764
9 (14–15)	364	365	729
Total	3842	3572	7414

2.2.3. Kyoken norm referenced test of academic performance

This is a standardized achievement test frequently used in Japan developed by Tatsuno, Ishida, Hattori, and Teachers at Tsukuba University's Elementary and Junior High Schools (2002). It evaluates children's performance on a scale of 100 points in each participant. Our survey employed the children's scores in Japanese and math. The test was conducted at the beginning of the school year.

2.2.4. Teacher ratings of needs for special care

For the first and second graders, we asked their classroom teachers to evaluate whether or not each student needs special care in a daily class.

2.3. Procedure

We prepared the questionnaire, containing the four types of scales above, and visited the schools covered to hand out the questionnaire to each teacher in early August, when the schools were in the middle of a summer off. The survey took almost a month to complete, till the end of the August. This survey was conducted in accordance with an agreement signed by and between the city of X and Hamamatsu University School of Medicine. For protection of personal data, we adhered to the city's information security policies. Thus, we paid due attention to the ethical issues related to the survey.

3. Results

3.1. Confirmatory factor analysis and reliability of ADHD-RS

We performed confirmatory factor analysis to examine the factor structure of Japanese version of ADHD-RS. Two models were compared: One presumed two factors, Inattentive and Hyperactive-Impulsive, following the prior studies (DuPaul, Power, Anastopoulos, et al., 1998; DuPaul, Power, McGoey, et al., 1998). The other model supposed only a single factor of ADHD. We found the fit indices of the two-factor model as GFI = .90, AGFI = .87 and RMSEA = .08, all sufficient values. Although the correlation between the factors was rather high at $r = .78$, it was consistent with the

Table 2
The result of confirmatory factor analysis of Japanese version of school form of the ADHD-RS and mean (*SD*) of items.

Item	Fl	F2	*M* (*SD*)
Inattentive ($\alpha = 91$)			
Fails to give close attention to details or makes careless mistakes in schoolwork	.73		0.34 (0.70)
Has difficulty sustaining attention in tasks or play activities	.84		0.24 (0.65)
Does not seem to listen when spoken to directly	.58		0.13 (0.47)
Does not follow through on instructions and fails to finish work	.73		0.13 (0.48)
Has difficulty organizing tasks and activities	.71		0.20 (0.59)
Avoids tasks (e.g., schoolwork, homework) that require sustained mental effort	.75		0.22 (0.65)
Loses things necessary for tasks or activities	.72		0.18 (0.58)
Is easily distracted	.81		0.27 (0.69)
Is forgetful in daily activities	.68		0.18(0.56)
Hyperactive-Impulsive ($\alpha = .88$)			
Fidgets with hands or feet or squirms in seat		.70	0.22 (0.64)
Leaves seat in classroom or in other situations in which remaining seated is expected		.70	0.09 (0.41)
Runs about or climbs excessively in situations in which it is inappropriate		.66	0.04 (0.25)
Has difficulty playing or engaging in leisure activities quietly		.75	0.10 (0.41)
Is "on the go" or acts as if "driven by a motor"		.73	0.05 (0.32)
Talks excessively		.65	0.14 (0.51)
Blurts out answers before questions have been completed		.63	0.10 (0.43)
Has difficulty awaiting turn		.71	0.06 (0.33)
Interrupts or intrudes on others		.71	0.09 (0.41)

Note: Factor correlation is .78.

value of the prior studies. Next, the single-factor model had the fit indices of GFI = .77, AGFI = .70, and RMSEA = .11, indicating poor fitness of the model. We can decide, therefore, that the two-factor structure is more appropriate. Table 2 shows the factor analysis results with the two-factor model as well as the mean and *SD* of the items. With all of the items, we recognized some floor effect.

We obtained Cronbach's alphas for the two subscales of ADHD-RS and found them sufficient, .91 for Inattentive and .88 for Hyperactive-Impulsive. These values show sufficient reliability of the scales.

3.2. The sex and grade differences of ADHD-RS

We conducted sex × grade analyses of variance (ANOVA) with the two subscale scores and the total score of ADHD-RS as dependent variables (Table 3).

With Inattentive, the sex × grade interaction effect was significant ($F(8, 7396) = 3.93$, $p < .001$). We had a simple main effect test and found that the sex had significant simple main effects in all the grades. In every grade, the males scored higher than the females. Another simple main effect was found with the grades in the males. For the second graders and above, the older they were, the lower their scores were. Among the females, the simple main effects of grade were nonsignificant.

With Hyperactive-Impulsive, the sex × grade interaction effect was significant ($F(8, 7396) = 8.87$, $p < .001$). Simple main effects of the sex were significant on the second through seventh graders, with the males scoring higher than the females

Table 3
Two-factor analyses of variance (ANOVA) of scale scores of ADHD-RS by sex and grade with Bonferroni multiple comparison ($p < .05$).

Grade (Age)	Male	Female	Sex × grade		Sex	Grade
	M (*SD*)	*M* (*SD*)	*F*		*F*	*F*
Inattentive			3.93***		378.69***	8.22***
1 (6–7)	2.26 (4.57)	0.83 (2.42)	28.13***		M > F	2 > 1, 5, 6, 8, 9
2 (7–8)	3.78 (5.67)	1.17 (2.97)	92.81***	M > F		3 > 1, 5, 6, 9
3 (8–9)	3.49 (5.97)	1.10 (2.69)	81.26***	M > F		4 > 5, 9
4 (9–10)	3.30 (5.46)	0.98 (2.53)	67.55***	M > F		7 > 9
5 (10–11)	2.27 (4.60)	0.67 (2.31)	34.03***	M > F		
6 (11–12)	2.77 (5.27)	0.56 (1.87)	58.36***	M > F		
7 (12–13)	2.61 (4.62)	1.36 (3.34)	19.01***	M > F		
8 (13–14)	2.42 (4.35)	0.99 (2.80)	24.37***	M > F		
9 (14–15)	1.90 (3.54)	0.74 (2.03)	15.03***	M > F		
			M: 10.80***	2 > 1, 5, 6, 7, 8, 9 3 > 1, 5, 7, 8, 9 4 > 1, 5, 9		
			F: 1.58			
Hyperactive-Impulsive			8.87***		367.54***	9.02***
1 (6–7)	1.36 (3.34)	0.35 (1.37)	32.55***	M > F	M > F	1 > 9
2 (7–8)	2.18 (4.21)	0.32 (1.25)	108.68***	M > F		2, 3 > 6, 7, 8, 9
3 (8–9)	2.12 (4.68)	0.23 (1.01)	117.71***	M > F		4, 5 > 9
4 (9–10)	1.74 (3.87)	0.23 (1.22)	66.36***	M > F		
5 (10–11)	1.57 (3.69)	0.14 (0.78)	62.24***	M > F		
6 (11–12)	1.29 (3.12)	0.13 (0.70)	37.81***	M > F		
7 (12–13)	1.24 (3.02)	0.29 (1.04)	25.54***	M > F		
8 (13–14)	0.87 (2.42)	0.39 (1.47)	6.39*	M > F		
9 (14–15)	0.50 (1.62)	0.18 (0.63)	2.69			
			M: 17.72***	1 > 9 2 > 1, 5, 6, 7, 8, 9 3 > 1, 6, 7, 8, 9 4, 5 > 8, 9 6, 7 > 9		
			F: 0.48			
ADHD-RS total			6.15***		440.29***	9.28***
1 (6–7)	3.62 (7.31)	1.18 (3.51)	35.11***	M > F	M > F	2 > 1, 5, 6, 7, 8, 9
2 (7–8)	5.96 (9.26)	1.50 (3.89)	116.40***	M > F		3 > 1, 5, 6, 8, 9
3 (8–9)	5.61 (10.12)	1.33 (3.42)	111.62***	M > F		4, 7 > 9
4 (9–10)	5.04 (8.71)	1.21 (3.31)	78.91***	M > F		
5 (10–11)	3.84 (7.68)	0.81 (2.79)	51.98***	M > F		
6 (11–12)	4.06 (7.70)	0.69 (2.40)	58.47***	M > F		
7 (12–13)	3.84 (6.94)	1.65 (4.07)	25.27***	M > F		
8 (13–14)	3.30 (6.19)	1.38 (3.91)	18.67***	M > F		
9 (14–15)	2.40 (4.63)	0.92 (2.47)	10.53**	M > F		
			M: 14.68***	2, 3 > 1, 5, 6, 7, 8, 9 4 > 1, 8, 9 5, 6, 7 > 9		
			F: 1.06			

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 4
Descriptive statistics of school form of the ADHD-RS.

Age (grade in Japan)	This study				DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998)				Comparison between country	
	Male		Female		Male		Female		Male	Female
	N	*M* (*SD*)	*N*	*M* (*SD*)	*N*	*M* (*SD*)	*N*	*M* (*SD*)	*t*	*t*
Inattentive										
5–7		–		–	243	8.75 (7.66)	211	6.59 (7.26)	–	–
8–10 (2–4)	1347	3.53 (5.71)	1261	1.09 (2.74)	307	10.33 (8.49)	258	6.04 (7.29)	13.34**	10.74**
11–13 (5–7)	1254	2.55 (4.84)	1166	0.86 (2.60)	221	9.33 (8.11)	222	5.97 (6.76)	12.03**	11.09**
14–18		–		–	223	8.25 (7.27)	223	4.09 (5.26)	–	–
Hyperactive-Impulsive										
5–7		–		–	243	8.12 (7.86)	211	5.66 (7.27)	–	–
8–10 (2–4)	1347	2.02 (4.29)	1261	0.26 (1.16)	307	8.43 (8.05)	258	3.81 (6.15)	13.50**	9.21**
11–13 (5–7)	1254	1.37 (3.29)	1166	0.19 (0.85)	221	5.96 (6.72)	222	3.62 (5.61)	9.93**	9.08**
14–18		–		–	223	4.37 (6.09)	223	1.97 (3.40)	–	–
ADHD total										
5–7		–		–	243	16.87 (14.61)	211	12.25 (13.61)	–	–
8–10 (2–4)	1347	5.55 (9.41)	1261	1.35 (3.55)	307	18.76 (15.51)	258	9.86 (12.63)	14.31**	10.71**
11–13 (5–7)	1254	3.91 (7.44)	1166	1.04 (3.18)	221	15.28 (13.55)	222	9.59 (11.42)	12.13**	11.05**
14–18		–		–	223	12.62 (12.16)	223	6.06 (7.94)	–	–

** $p < .01$.

across all those grades. Again, with the males, the grade had a significant simple main effect, with the higher-grade males scoring lower. The simple main effects of grade were nonsignificant among the females.

With the total score of ADHD-RS, the sex × grade interaction effect was significant ($F(8, 7396) = 6.15$, $p < .001$). A simple main effects of sex were significant with all the grades, with the males scoring higher than the females. In addition, among the males the grade has a significant simple main effect, with the score tending to decline as the grade went up. The grade had no significant effect among the females.

3.3. Comparison between Japanese data and USA data of ADHD-RS

We compared the Japanese ADHD-RS scores obtained in our survey to those of the US collected by DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998). The scores are presented in Table 4. Note that we compared only two age groups, 8–10 years of age and 11–13 years of age, since our participants were limited in age. Also, it is a very common that children are grouped not by their physical age but by their school grades when examining the developmental differences in Japan. For this reason, our survey grouped the participants according to their school grades to match the age classifications of DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998) for this comparison. This comparison showed that the Japanese children scored lower than did their US equivalents in the two subscale scores and the total score.

3.4. Correlations of ADHD-RS-IV with study variables

Table 5 shows the correlations between ADHD-RS and the study variables. The correlations with IQ were nearly zero, while the standardized achievement test scores showed significant negative correlations in all cases. Totally, Inattentive showed relatively high correlation.

3.5. Comparison between students with and without needs for special care

We compared the ADHD-RS scores between children with needs for special care and those without the needs (Table 6). Students who need special care scored significantly higher in two subscale scores and total score. This suggests that intensity

Table 5
Correlations of ADHD-RS with study variables.

	Inattentive	Hyperactive-Impulsive	ADHD total
IQ ($N = 6115$)	−.03*	.01	−.01
Standardized achievement test			
Japanese ($N = 6376$)	−.29***	−.13***	−.25***
Math ($N = 6376$)	−.30***	−.12***	−.25***

* $p < .05$.
*** $p < .001$.

Table 6
The comparison between students who need special care and who do not need special care in ADHD-RS scores.

	Children without needs for special care	Children with needs for special care	t
	M (SD)	M (SD)	
Inattentive	1.37 (3.21)	9.60 (6.95)	−14.27***
Hyperactive-Impulsive	0.66 (2.03)	5.79 (6.16)	−10.08***
ADHD total	2.03 (4.84)	15.39 (11.68)	−13.81***

*** $p < .001$.

of the ADHD tendency was a factor considered by the teachers as they decided whether or not a child was in need of such special care.

4. Discussion

4.1. Factor structure, reliability, and validity of ADHD-RS in Japan

We examined the factor structure of ADHD-RS using a confirmatory factor analysis and found that a two-factor structure of Inattentive and Hyperactive-Impulsive fit the data, consistent with prior studies (DuPaul, Power, Anastopoulos, et al., 1998; DuPaul, Power, McGoey, et al., 1998). With the reliability of the scale, we obtained sufficient alpha coefficients, indicating good reliability. Future studies should examine the reliability with the test–retest method.

4.2. The relationships between ADHD-RS and IQ and academic performance

We examined correlations between the ADHD-RS scores and the children's IQ and their standardized achievement tests scores of Japanese and math. The ADHD-RS scores showed no relationships with IQ. There are several hypotheses concerning complications of ADHD and mental retardation indicated by IQ. Our survey result agrees with another research reporting no significant difference in IQ between an ADHD group and a normal one (Kaplan, Crawford, Dewey, & Fisher, 2000). Some other researches indicate that while ADHD children with learning disorders are lower in IQ than normal children, ADHD children without learning disorders are no inferior in IQ (August & Garfinkel, 1989; Dykman & Ackerman, 1991). Future studies should examine the case of complications of learning disorders and ADHD in Japan. Meanwhile, we observed significant negative correlations between the ADHD-RS scores and the standardized achievement test scores. The correlation was especially high with inattentive. This finding agrees with the common understanding that many ADHD children also have chronic, poor academic performance inadequate to their intelligence (McConaughy, Achenbach, & Gent, 1988), which is a major problem with the disorder (Barkley, 1998). There are some hypotheses about the links between ADHD and poor academic performance. DuPaul and Stoner (2003), following Silver's (1990) hypothesis, pointed out that while ADHD children have no problem with their intelligence itself, they lose their opportunities of learning since they lose their attention and concentration easily, which results in their poor performance. McGee and Share (1988) argued that some disorders with academic skills eventually result in behavioral problems such as inattention and impulsiveness. Our survey finding supported the links between poor academic performance and ADHD tendencies, especially inattention.

4.3. Sex and grade differences of ADHD-RS scores in Japan

Our analyses of variance yield some significant sex × grade interaction effects for two subscale scores and total scores of ADHD-RS. Among the males, we saw a simple main effect of the grade. For the second graders and older, the higher the grade was, the lower were the scores. This means males of the second grade or above, as they grew older, they became more able to control their behaviors and impulse and maintain their attention. This agrees with a report that the symptoms of ADHD reach their peak in childhood, diminish in degrees during later childhood, and the symptoms disappear during the period in 50% of the children who satisfied the criteria of ADHD (Campbell, 2002). As for the remaining 50% in whom some problems remain after they enter elementary school, 59–67% of them can continue with their destructive behavioral disorder into the later childhood or even early adolescence (Raggio & Pierce, 1999). Thus, we cannot disregard the importance of identifying ADHD children among third or fourth graders or older.

In our survey, the first graders scored lower than did the second graders. We ascribe this to two factors. First, the teachers of the first graders evaluated their children on criteria slacker than those used by the teachers of the other grades. First grade is a transitional period from the preschool years into school years. Then, at least in Japan, many first graders tend to feel nervous since they have yet to get accustomed to life in school, which quite different from what they experienced in their preschool years. Thus, we can expect teachers of first graders to evaluate their children on a slacker standard. The other factor is a possibility that the first graders covered by our survey, as a whole, were of a generation with less ADHD tendency. This issue requires more researches, taking into consideration evaluations by their parents or third parties.

We found the significant main effects of sex, with the males showing stronger ADHD tendency than did the females. This is consistent with DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998). Also, the grade had no

significant simple main effect among the females. It is because the females, across all the grades, scored quite low. These results are in agreement with international epidemiological reports, which also suggest that the Japanese version of school form of the ADHD-RS has constructive validity.

4.4. Difference between Japanese data and USA data of ADHD-RS scores

We compared the scores between the US and Japan and found that the Japanese children scored lower than did their US children on the subscale scores and total score of ADHD-RS, irrespective of sex and age group. This result suggests that the Japanese children have less ADHD tendency than did the children in the US. However, we have another interpretation of the result. Many of the Japanese teachers might be less strict with their children than are many US teachers. One cross-cultural difference in child rearing and classrooms between the West and Japan is that between individualism and collectivism (Triandis, 1995). In the US, where the culture tends to nurture individuality and uniqueness, we can expect many classroom teachers to be generally sensitive to individuality of each pupil. Thus, many US teachers can recognize individual differences of their pupils, in a test such as ADHD-RS, in which a teacher evaluates each child. On the contrary, in the Japanese culture, which prioritizes collective standards above individuality, many teachers can evaluate individual children in terms of deviation from the group's norm. Therefore, many teachers may tend to focus on those children who stand out in their evaluation, leaving many other children unaccounted for. In the US, more teachers consider each and every child, we can expect. We recognized some floor effect with all of the items (Table 2). Also, we asked the teachers to separate those children in need of special care and those who had no such need. We compared the scores the teachers gave for those two types of children and found that the scores given to children with needs for special care were drastically higher than those given to the children without needs for special care (Table 6). These findings reflect the point of view many Japanese teachers have of their children.

4.5. Limitation and perspectives

Employing Japanese version of school form of the ADHD-RS, our survey compared the scores between the US and Japan and examined correlations with several variables. It showed that ADHD-RS has sufficient reliability and validity, and provides a basic data of ADHD in Japanese children. With respect to reliability, however, we further need to examine agreement rates with evaluations by people other than teachers and test–retest reliability. Also, some parts of our results did not agree with some prior studies and what we know from our experiences. For instance, the first graders scored lower than did any other graders. We think this is ascribable to the evaluation criteria. As this example suggests, we need further consideration and examinations in measurements used for collective screening of children with ADHD in Japan. Attempts for improvement include, among others, having more items that are hard to evaluate relatively, adjusting the number of alternatives, and having less items to reduce the teachers' work. At the same time, however, each school has a considerably different culture and we suppose many things should be ascribed to different viewpoints held by different school cultures. In addition, though we consider that this survey's epidemiological significance lies in that it was a complete survey in the target city, not a sample survey, we still need compare the results to those of surveys conducted in other cities, for the sake of further generalization of the findings. In addition, although this survey included only elementary and lower-secondary schools, a future survey including a broader range of schools might reveal some more developmental differences. Thus, further surveys and analyses are necessary in the future.

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Japanese version of home form of the ADHD-RS: An evaluation of its reliability and validity

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ABSTRACT

Using the Japanese version of home form of the ADHD-RS, this survey attempted to compare the scores between the US and Japan and examined the correlates of ADHD-RS. We collected responses from parents or rearers of 5977 children (3119 males and 2858 females) in nursery, elementary, and lower-secondary schools. A confirmed factor analysis of ADHD-RS confirmed the two-factor solution (Inattentive and Hyperactive-Impulsive) same as previous studies. ADHD-RS scores were not related to IQ, but were negatively associated with standardized achievement test scores. Males showed stronger ADHD tendencies than did the females, and the scores ended to decline as the children grew older. Japanese children scored lower than did their US children in Hyperactive-Impulsive among all of the sex-age groups. Japanese version of home form of the ADHD-RS was developed with good reliability and validity. More researches of ADHD in Japanese children are required.

1. Introduction

The Developmental Disabilities Support Act, which was enforced in 2005, marked the start of individual supports to children with developmental disabilities in the Japanese educational system. Prior to it, in 2002, a research team of the Ministry of Education, Culture, Sports, Science and Technology conducted a survey of 41,579 school children in five regions of Japan. This survey, named "a nationwide survey of children and students going to regular classes in need of individual educational support," interviewed classroom teachers about the following: students' learning, which covered learning disorders; students' interpersonal relationships, which covered pervasive developmental disorders; and behavior and attention, which covered ADHD. As a result, the survey found out that 6.3% of the children and students surveyed had some developmental disorders and were in need of educational help (The Ministry of Education, Culture, Sports, Science and Technology, 2003). This finding proved to be very persuasive and accelerated the shift of the emphasis in the Japanese educational system for the children with developmental disabilities towards education with special support education. The survey also found that 2.5% of the children surveyed showed obvious characteristics of ADHD, although this figure was smaller than that of the US. At that time, the concept of developmental disorders was yet to spread enough in Japan, thus this figure was surprising one.

Currently, Attention Deficit-Hyperactivity Disorder (ADHD) is defined as follows: (a) some signs of inattention or hyperactivity-impulsivity have been present for at least 6 months to a point that is disruptive and inappropriate for

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developmental level; (b) some signs that cause impairment were present before age 7 years; (c) some impairment form the signs is present in two or more settings; (d) there must be clear evidence of significant impairment in social, school, or work functioning; (e) the signs do not happen only during the course of a pervasive developmental disorder, schizophrenia, or other psychiatric disorder (American Psychiatric Association, 1994). In particular, the evaluation of children' behaviors with ADHD at school has come to be more important, especially after early childhood. After entering the elementary school, more children become to express maladaptive behaviors in their classroom, and educational supports for the behaviors are required. In addition, children with ADHD often have some academic problems. They tend to show problems of continuing poor academic performance inadequate to their intelligence compared to other mental disorders (McConaughy, Achenbach, & Gent, 1988). This is a major problem with the ADHD (Barkley, 1998).

In another study, we paid attention to school settings where ADHD syndromes tend to emerge and attempted to standardize the Japanese version of home form of the ADHD-Rating Scale-IV (ADHD-RS: DuPaul, Power, Anastopoulos, & Reid, 1998). The effectiveness of ADHD-RS as a tool of initial screening was confirmed (DuPaul, Power, McGoey, Ikeda, & Anastopoulos, 1998).

There are some hypotheses about the links between ADHD and poor academic performance. Silver (1990) pointed out that while ADHD children have no problem with their intelligence itself, they lose their opportunities of learning because of the major ADHD behaviors (inattention, impulsiveness, and hyperactivity) they have, which results in their poor performance. On the other hand, McGee and Share (1988) claimed that children with ADHD have some academic skill problems and their lowered academic self-concept causes the behavior problems such as inattention and impulsiveness. Because there are different groups of children with ADHD and learning disorders, it is possible that different causes related to the problematic behaviors in each group, rather than just one hypothesis is generally true (Hinshaw, 1992).

Children with ADHD have the propensity to be easily affected by environmental factors. Thus, their behaviors need to be evaluated from different viewpoints in different situations, and, it is very important to assess children's ADHD tendencies at home as well as school setting. As known, any intervention with children with ADHD should begin with appropriate assessment. For a child to be diagnosed with ADHD, symptoms must be observable in him/her at least in two different situations, as stated in the definition above. In addition, for diagnosis by a child psychiatrist, he/she needs some other providers of relevant information (DuPaul & Stoner, 2003). If children show different ADHD-like symptoms in different situations, for instance at school and at home, some specific environmental factors might affect their problematic behaviors. One of a good measuring scales for evaluation by parents is Conners' Parent Rating Scales – Revised developed by Conners, Sitarenios, Parker, and Epstein (1998). It contains 80 items of seven factors (27 items in the shorter version), and is thus believed to be good for detailed evaluation of children's behaviors. Still, it has too many items to be used for screening of children. Another scale of this type, the ADHD-Rating Scale-IV (ADHD-RS) developed by DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998), complies with the diagnostic criteria of DSM-IV and is standardized based on abundance of data. This ADHD-RS is relatively easy to use, and is suitable for screening (DuPaul, Power, Anastopoulos, et al., 1998; DuPaul, Power, McGoey, et al., 1998).

In this study, we attempted to standardize the Japanese version of home form of the ADHD-RS. We have examined reliability and validity of this scale. For the validation, we confirmed the factor structure and examined the relationships with a children's intelligence quotient (IQ), standardized achievement scores, and school teacher ratings of needs for special care. In addition we examined the relationships with child-rearing style of the parents.

2. Method

2.1. Participants

Our survey was conducted in a city X, Aichi Prefecture, located in central Japan. This city is a residential area adjacent to the central city of the region, accommodating some 80,000 residents. The city's residents consist of many different types of households, with some commuting to the adjacent central city and others working for local offices and plants within the residential city. This city, therefore, provides appropriate data that represent the demography of Japan. We conducted a questionnaire survey with the parents or rearers of all the children going to the public nursery schools (middle [4–5] and senior [5–6] ages), elementary, and lower-secondary schools. Final data set comprised of 5977 children (3119 males and 2858 females). Our data included no children going to special education classes. Table 1 shows a breakdown of the children by their sex and school grade. There was no significant difference in the male–female ratio across the school grades covered (χ^2 (8) = 14.22, *n.s.*). Note that the number of participants differs from one variable to another.

2.2. Measures

2.2.1. ADHD-RS

We employed the Japanese version of the ADHD-Rating Scale translated by DuPaul, Power, Anastopoulos, and Reid (2008). On the basis of the ADHD criteria of DSM-IV, this scale consists of two subscales to measure the two major characteristics of ADHD, Inattentive (9 items) and Hyperactive-Impulsive (9 items). Both school and home form of the ADHD-RS have been confirmed to have sufficient reliability and validity (DuPaul, Power, Anastopoulos, et al., 1998). Our survey employed ADHD-RS and asked the parents or rearers to respond to all the items for their children, as DuPaul, Power, Anastopoulos, et al. (1998) and

Table 1
Detail of grade and sex of participants of this survey.

Grade (age)	Male	Female	Total
Nursery school			
Middle (4–5)	142	137	279
Senior (5–6)	134	137	271
Elementary school			
1 (6–7)	398	315	713
2 (7–8)	358	363	721
3 (8–9)	388	336	724
4 (9–10)	336	300	636
5 (10–11)	343	315	658
6 (11–12)	301	252	553
Lower-secondary school			
7 (12–13)	294	250	544
8 (13–14)	220	236	456
9 (14–15)	205	217	422
Total	3119	2858	5977

DuPaul, Power, McGoey, et al. (1998) did. As in the prior surveys, parents or rearer rated each item on a 4-point Likert scale ranging from "Not at all, rarely (0)" to "Sometimes (1)" to "Often (2)" and "Very often (3)." Therefore, the higher a child's score is, the more ADHD tendency he/she has.

2.2.2. Parental rearing styles scale for parent training (PSPT)

We employed the scale to measure a parents' or rearers' style of rearing a child developed by Tsujii (2009). This scale consists of five subscales, Praising, Scolding, Easiness in bringing up, Social support, and Difficulty in bringing up. The reliability and validity of this scale was verified (Tsujii, 2009). Parents or rearer rated each item on a 4-point Likert scale ranging from "Does not apply at all (1)" to "Does not (usually) apply (2)" to "Hard to judge (3)," "Applies (4)," and "Applies very well (5)."

2.2.3. New Kyoken support to intelligence tests for each school grade

For elementary school children and lower-secondary school children, we measured their intelligence using New Kyoken Support to Intelligence Tests for Each School Grade, developed by Okamoto, Shibuya, Ishida, and Sakano (1993). This is a collective intelligence test conducted at the beginning of a school year to obtain each child's intelligence quotient.

2.2.4. Kyoken norm referenced test of academic performance

For elementary school children and lower-secondary school children, we measured their academic performance. This scale is a standardized achievement test frequently used in Japan developed by Tatsuno, Ishida, Hattori, and Teachers of at Tsukuba University's Elementary and Junior High Schools (2002). It evaluates children's performance on a scale of 100 points in each subject. Our survey employed the children's scores in Japanese and math. The test was conducted at the beginning of the school year.

2.2.5. Teacher ratings of needs for special care

For the first and second graders in elementary school, we asked their classroom teachers to evaluate whether or not each student needs special care in a daily class.

2.3. Procedure

For the parents or rearers, we prepared a questionnaire consisting of ADHD-RS and the PSPT, and distributed to the parents or rearers through the children's classroom teachers in September. The survey required almost a month to complete, from September to October 2009. For the IQ and scores of the standardized achievement tests of the children as well as the ratings of children's needs for special care, we used the teachers' evaluations. This survey was conducted in accordance with an agreement signed by and between the city and Hamamatsu University School of Medicine. For protection of personal data, we adhered to the city's information security policies. Thus, we paid due attention to the ethical issues related to the survey.

3. Results

3.1. Confirmatory factor analysis and reliability of ADHD-RS

We performed confirmatory factor analysis to examine the factor structure of Japanese version of ADHD-RS. Two models were compared: One presumed two factors, Inattentive and Hyperactive-Impulsive, following the prior studies (DuPaul,

Table 2
The result of confirmatory factor analysis of ADHD-RS and mean (SD) of items.

Item	F1	F2	M (SD)
Inattentive (α = .88)			
Fails to give close attention to details or makes careless mistakes in schoolwork.	.55		1.06 (.69)
Has difficulty sustaining attention in tasks or play activities.	.74		.56 (.72)
Does not seem to listen when spoken to directly.	.60		.48 (.68)
Does not follow through on instructions and fails to finish work.	.71		.32 (.58)
Has difficulty organizing tasks and activities.	.72		.61 (.75)
Avoids tasks (e.g., schoolwork, homework) that require sustained mental effort.	.69		.64 (.80)
Loses things necessary for tasks or activities.	.64		.63 (.73)
Is easily distracted.	.74		.79 (.79)
Is forgetful in daily activities.	.66		.62 (.76)
Hyperactive-Impulsive (α = 85)			
Fidgets with hands or feet or squirms in seat.		.62	.59 (.77)
Leaves seat in classroom or in other situations in which remaining seated is expected.		.64	.16 (.46)
Runs about or climbs excessively in situations in which it is inappropriate.		.67	.16 (.48)
Has difficulty playing or engaging in leisure activities quietly.		.72	.25 (.55)
Is "on the go" or acts as if "driven by a motor."		.70	.27 (.61)
Talks excessively.		.55	.59 (.80)
Blurts out answers before questions have been completed.		.60	.43 (.64)
Has difficulty awaiting turn.		.65	.22 (.51)
Interrupts or intrudes on others.		.64	.24 (.54)

Note. Factor correlation is .82.

Power, Anastopoulos, et al., 1998; DuPaul, Power, McGoey, et al., 1998). The other model supposed only a single factor of ADHD. We found the fit indices of the two-factor model as GFI = .91, AGFI = .89 and RMSEA = .08, all sufficient values. Although the correlation between the factors was rather high at r = .82, it was consistent with the value of the prior studies. Next, the single-factor model had the fit indices of GFI = .86, AGFI = .82, and RMSEA = .09, indicating poor fitness of the model. We can decide, therefore, that the two-factor structure is more appropriate. Table 2 shows the factor analysis results with the two-factor model as well as the mean and SD of the items. With all of the items, we recognized some floor effect.

We obtained Cronbach's alphas for the two subscales of ADHD-RS and found them sufficient, .88 for Inattentive and .85 for Hyperactive-Impulsive. These values show sufficient reliability of the scales.

3.2. The sex and grade differences of ADHD-RS

We conducted sex × grade analyses of variance (ANOVA) with the two subscale scores and the total score of ADHD-RS as dependent variables (Table 3).

With Inattentive, the sex × grade interaction effect was nonsignificant ($F(10, 5955) = 1.13$, *n.s.*). The main effect of sex was significant ($F(1, 5955) = 176.46$, $p < .001$), suggesting that males scored higher than did females. The main effect of grade was significant ($F(10, 5955) = 4.56$, $p < .001$). Second grader scored higher than first, sixth, and ninth graders did. Third graders scored higher than first and ninth graders did. And, fourth graders scored higher than did first graders.

With Hyperactive-Impulsive, the sex × grade interaction effect was significant ($F(10, 5955) = 3.08$, $p < .01$). Simple main effects of the sex were significant on the middle nursery through seventh grade children, with the males scoring higher than the females across all those grades. The simple main effects of grade was significant both in males and females, suggesting that higher their grade is, lower they scored.

With the total score of ADHD-RS, the sex × grade interaction effect was nonsignificant ($F(10, 5955) = 1.82$, *n.s.*). The main effect of sex was significant ($F(1, 5955) = 210.32$, $p < .001$), suggesting that males scored higher than did females. The main effect of grade was significant ($F(10, 5955) = 10.40$, $p < .001$). Middle nursery and second graders scored higher than first graders and fifth through ninth graders did. Senior nursery and fourth graders scored higher than eighth and ninth graders did. First graders scored higher than did ninth graders. And, fourth graders scored higher than sixth through ninth graders did.

3.3. Comparison between Japanese data and USA data of ADHD-RS

We compared the Japanese ADHD-RS scores obtained in our survey to those of the US collected by DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998). The scores are presented in Table 4. Note that we compared only three age groups, 5–7 years of age, 8–10 years of age, and 11–13 years of age, since our participants were limited in age. Also, it is a very common that children are grouped not by their physical age but by their school grades when examining the developmental differences in Japan. For this reason, our survey grouped the participants according to their school grades to match the age classifications of DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998) for this comparison.

Our analysis found no significant difference in the Inattentive in any of the boy groups between the two nations. Among the females, a significant difference was found only in the group aged 8 through 10 (second through fourth graders), with the

Table 3
Two-factor analyses of variance (ANOVA) of scale sores of ADHD-RS by sex and grade with Bonferroni multiple comparison ($p < .05$).

Grade (age)	Male	Female	Sex × Grade		Sex	Grade
	M (SD)	*M* (SD)	*F*		*F*	*F*
Inattention			1.13		176.46***	4.56***
Middle (4–5)[1]	6.51 (5.07)	4.94 (4.32)			M > F	4 > 3, 8, 11
Senior (5–6)[2]	5.96 (3.88)	4.78 (3.99)				5 > 3, 11
1 (6–7)[3]	5.71 (4.30)	4.53 (3.64)				6 > 3
2 (7–8)[4]	7.41 (5.48)	5.17 (4.41)				
3 (8–9)[5]	7.10 (5.20)	5.25 (4.42)				
4 (9–10)[6]	7.01 (5.09)	5.01 (3.93)				
5 (10–11)[7]	6.50 (5.21)	4.70 (3.99)				
6 (11–12)[8]	6.58 (5.30)	4.27 (3.98)				
7 (12–13)[9]	6.40 (4.86)	4.63 (4.16)				
8 (13–14)[10]	6.08 (4.94)	4.68 (3.95)				
9 (14–15)[11]	5.75 (4.77)	4.64 (4.11)				
Hyperactive-Impulsivity			3.08**		188.60***	27.38***
Middle (4–5)[1]	5.43 (4.87)	3.68 (3.54)	16.95***	M > F	M > F	1 > 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
Senior (5–6)[2]	4.93 (4.71)	3.23 (3.60)	15.37***	M > F		2 > 6, 7, 8, 9, 10, 11
1 (6–7)[3]	3.90 (3.82)	2.67 (3.02)	20.89***	M > F		3, 4, 5 > 7, 8, 9, 10, 11
2 (7–8)[4]	4.55 (4.52)	2.41 (2.86)	65.61***	M > F		6 > 9, 10, 11
3 (8–9)[5]	4.24 (4.42)	2.61 (3.71)	37.80***	M > F		7, 8 > 10, 11
4 (9–10)[6]	3.65 (4.25)	2.09 (2.70)	30.64***	M > F		
5 (10–11)[7]	3.16 (4.06)	1.99 (2.87)	17.64***	M > F		
6 (11–12)[8]	3.33 (4.07)	1.62 (2.41)	31.68***	M > F		
7 (12–13)[9]	2.70 (3.50)	1.62 (2.91)	12.34***	M > F		
8 (13–14)[10]	1.95 (2.71)	1.47 (2.02)	2.12			
9 (14–15)[11]	1.80 (2.71)	1.49 (2.71)	.79			
			M: 22.32***	1 > 3, 5, 6, 7, 8, 9, 10, 11 2 > 6, 7, 8, 9, 10, 11 3 > 9, 10, 11 4 > 6, 7, 8, 9, 10, 11 5 > 7, 8, 9, 10, 11 6 > 9, 10, 11 7, 8 > 10, 11		
			F: 7.99***	1 > 3, 5, 6, 7, 8, 9, 10, 11 2 > 7, 8, 9, 10, 11 3, 5 > 8, 9, 10, 11		
ADHD-RS total			1.82		210.32***	10.40***
Middle (4–5)[1]	11.94 (9.41)	8.62 (7.31)			M > F	1, 4 > 3, 7, 8, 9, 10, 11
Senior (5–6)[2]	10.88 (8.02)	8.01 (7.14)				2, 6 > 10, 11
1 (6–7)[3]	9.61 (7.57)	7.20 (6.15)				3 > 11
2 (7–8)[4]	11.96 (9.46)	7.58 (6.66)				5 > 7, 8, 9, 10, 11
3 (8–9)[5]	11.34 (9.00)	7.86 (7.60)				
4 (9–10)[6]	10.66 (8.79)	7.11 (6.01)				
5 (10–11)[7]	9.66 (8.70)	6.70 (6.38)				
6 (11–12)[8]	9.91 (8.79)	5.88 (5.92)				
7 (12–13)[9]	9.10 (7.68)	6.25 (6.58)				
8 (13–14)[10]	8.03 (7.17)	6.15 (5.46)				
9 (14–15)[11]	7.55 (6.88)	6.13 (6.36)				

** $p < .01$.
*** $p < .001$.

Japanese females scoring higher than their US counterparts. In Hyperactive-Impulsive, in all of the groups, both males and females, the Japanese children scored lower than did the children in the US. In total score, a significant difference was found in the males and females aged second through seventh (senior nursery through first graders) and the males of aged 11 through 13 (fifth through seventh graders). In any of these groups, the Japanese children scored below their US counterparts.

3.4. Correlations of ADHD-RS with study variables

Table 5 shows the correlations between ADHD-RS and the study variables. The correlations between ADHD-RS and IQ were nearly zero, while the correlations between ADHD-RS and standardized achievement test scores were significant and negative in all cases although the values were small. Totally, ADHD-RS shows significant relationships with PSRT. ADHD-RS was negatively related to Praising, Easiness in bringing up, and Social support, and positively related to Scolding and Difficulty in Bringing up.

Table 4
Descriptive statistics of home form of the ADHD-RS.

Age (grade in Japan)	This study				DuPaul, Power, Anastopoulos, et al. (1998) and DuPaul, Power, McGoey, et al. (1998)				Comparison between country	
	Male		Female		Male		Female		Male	Female
	N	*M* (SD)	*N*	*M* (SD)	*N*	*M* (SD)	*N*	*M* (SD)	*t*	*t*
Inattention										
5–7	532	5.77 (4.20)	452	4.60 (3.75)	353	5.94 (5.08)	314	4.51 (4.45)	.51	.31
8–10 (2–4)	1082	7.17 (5.26)	999	5.15 (4.28)	289	6.65 (5.33)	327	4.17 (4.36)	1.49	3.54**
11–13 (5–7)	938	6.49 (5.13)	817	4.54 (4.04)	149	6.70 (6.27)	173	4.61 (5.12)	.38	.16
14–18		–		–	133	5.70 (5.36)	225	4.07 (4.57)		
Hyperactive-Impulsive										
5–7	532	4.16 (4.09)	452	2.84 (3.22)	353	6.59 (5.56)	314	5.00 (4.53)	7.05**	7.25**
8–10 (2–4)	1082	4.16 (4.41)	999	2.38 (3.13)	289	5.53 (5.25)	327	3.39 (3.79)	4.06**	4.34**
11–13 (5–7)	938	3.07 (3.90)	817	1.76 (2.75)	149	4.79 (5.54)	173	2.88 (3.48)	3.64**	3.95**
14–18		–		–	133	3.68 (4.32)	225	3.29 (3.82)		
ADHD total										
5–7	532	9.93 (7.70)	452	7.45 (6.47)	353	12.54 (9.97)	314	9.51 (8.17)	4.16**	3.73**
8–10 (2–4)	1082	11.33 (9.09)	999	7.53 (6.81)	289	12.18 (9.81)	327	7.56 (7.51)	1.32	.06
11–13 (5–7)	938	9.56 (8.42)	817	6.31 (6.31)	149	11.50 (11.32)	173	7.49 (7.84)	2.00*	1.85
14–18		–		–	133	9.38 (8.96)	225	7.36 (7.74)		

* $p < .05$.
** $p < .01$.

Table 5
Correlations of ADHD-RS with study variables.

	Inattention	Hyperactive-Impulsive	ADHD total
IQ ($N = 4141$)	−.09*	−.08	−.09
Standard achievement test			
Japanese ($N = 4390$)	−.17**	−.13**	−.16***
Math ($N = 4390$)	−.16***	−11***	−.15**
Parental rearing styles			
Praising ($N = 5354$)	−.36***	− 25***	−.34***
Scolding ($N = 5409$)	.42***	.38***	.43***
Easiness to bring up ($N = 5380$)	−.32***	−.28***	−.33***
Social support ($N = 5356$)	−.17***	−.12***	−.16***
Difficulty in bring up ($N = 5374$)	.32***	.24***	.31***

* $p < .05$.
*** $p < .001$.

3.5. Comparison between students with and without needs for special care

We compared the ADHD-RS scores between children with needs for special care and those without the needs rated by their school teachers (Table 6). Students who need special care scored significantly higher in two subscale scores and total score. This suggests that intensity of the ADHD tendency evaluated by their parents or rearers was consistent with teachers' evaluation of needs for special care.

4. Discussion

4.1. Factor structure, reliability, and validity of ADHD-RS in Japan

We examined the factor structure of ADHD-RS by using a confirmatory factor analysis and found that a two-factor structure of Inattentive and Hyperactive-Impulsive fit the data, consistent with prior studies (DuPaul, Power, Anastopoulos,

Table 6
The comparison between students who need special care and who do not need special care in ADHD-RS scores.

	Children without needs for special care		Children with needs for special care		*t*
	N	*M* (SD)	*N*	*M* (SD)	
Inattention	1388	4.88 (4.57)	49	10.20 (6.66)	−5.55***
Hyperactive-Impulsive	1410	2.92 (3.62)	50	6.22 (5.75)	−4.03***
ADHD total	1386	7.75 (7.64)	48	16.46 (11.63)	−5.15***

*** $p < .001$.