A developmental study of scores of the Boston Qualitative Scoring System

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Abstract

To elucidate developmental changes of the Summary Scores of the Boston Qualitative Scoring System (BQSS) for the Rey–Osterrieth Complex Figure (ROCF). One hundred healthy children aged 6–16 (average 9.7 ± 2.4; 60 boys, 40 girls). The ROCF was administered and graded based on the BQSS. The subjects were classified in four age-groups: 6- and 7-year-olds; 8- and 9-year-olds; 10- and 11-year-olds; and 12- and 16-year-olds. The differences in Summary Scores were examined among age-groups. All BQSS Summary Scores except Delayed Retention showed clear developmental changes. The Copy Presence Accuracy, the Immediate Presence Accuracy, the Delayed Presence Accuracy, and the Immediate Retention showed continuous development throughout childhood, though some differences were noted in the age ranges during which each score showed the most rapid development. The Organization score showed a somewhat peculiar pattern, with rapid development during the age ranges of 8–9 and 10–11 and with no distinctive development before and after these ranges. Five of the six BQSS Summary Scores showed clear developmental changes with a different developmental pattern in each score. Especially, the Organization score was unique and was supposed to reflect a different underlying process than the other Summary Scores, which might relate to the local and global processing style. BQSS is a promising tool for the evaluation of higher brain functions in childhood.

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1. Introduction

Developmental disorders, such as pervasive developmental disorders, attention deficit/hyperactivity disorder, and learning disorders, are frequently encountered in childhood. Children with these disabilities or other neurological diseases such as epilepsy often show higher brain dysfunctions, including disabilities of visual memory, visuoconstructual ability, and executive functions. For this reason, in the daily clinical practice of developmental disabilities and other related neurological diseases in childhood, analyses of higher brain dysfunctions can give us important information, and we should evaluate the data, taking a patient’s age into consideration.

Andre Rey devised a complex geometric figure in 1941 to assess the visuoconstructual ability and visual memory performance in patients with brain injuries [1]. Three years later, Paul Osterrieth standardized Rey’s original method [2]. Since then this procedure has been

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called the Rey–Osterrieth Complex Figure (ROCF) and has been used for the assessment of visuoconstructual ability and visual memory. The scoring method most commonly used is Osterrieth’s method. This 36-point scoring system is based on an evaluation of the presence and accuracy of the 18 elements of the ROCF. Different investigators have developed several different systems that provided various criteria for scoring the ROCF quantitatively [3,4]. Because of the complexity of the figure, the ROCF also reflects cognitive processes regarding strategies and organizational approach at the time the figure was drawn. Several scoring methods were developed to evaluate the qualitative nature of ROCF [5,6]. The Boston Qualitative Scoring System (BQSS) for the ROCF is the scoring method developed by Stern et al. [7]. After one revision, it was put on the market in 1999 (Psychological Assessment Resources, Inc.). The BQSS provides numerous comprehensive qualitative scores and quantitative summary scores not only by assessing visual memory and visuoconstructual ability, but also by drawing strategies. BQSS was developed mainly for adults, and until recently clinical applications have been limited mostly to adult patients. However, we believe that as an ROCF scoring method, BQSS might also be useful for children because it enables us to evaluate ROCF multidimensionally, and its scoring criteria are very clear. In our previous study of children with various neurological disorders, we showed that BQSS scores reflect executive functions even in children [8]. In this study, we tried to elucidate the developmental changes of the BQSS Summary Scores and their characteristics.

2. Methods

The subjects of this study were 100 healthy children, all Japanese, aged 6–16 years (average age 9.7 ± 2.4; 60 boys and 40 girls; 86 right-handers and 14 left-handers) who agreed to participate in this investigation in response to a request made through our hospital employees group and the local parents’ associations of elementary schools and junior high schools. All subjects attended normal classes in elementary and junior high schools. Children with definite developmental retardation or a medical history of neurological disorders were excluded from this study. We received written consents from all parents of the participants and presented small gifts to the subjects after the test.

The ROCF was administered to each subject according to the BQSS manual. The administration of ROCF involved a copy condition, an immediate recall condition, and a 20–30 min delayed recall condition, using dedicated stimulus cards and response sheets (21.6 cm × 27.9 cm) attached to the BQSS test kit. During the delay time between the immediate recall condition and the delayed recall condition, verbal tasks or a Shiritori game (Japanese last and first) was conducted instead of visual tasks. The ROCF was drawn with six color felt pens, which were changed in a fixed order to enable the examiner to track the drawing sequence [9]. The scoring was strictly based on the criteria described in the BQSS manual (Comprehensive Scoring Method). In principle, only one rater (K.N. or K.W.) conducted the scoring. To evaluate interrater reliability, 40 of the 100 cases were graded by K.N. and K.W. In the BQSS, 21 figure elements of ROCF are classified in three element groups. Six Configural Elements are considered to be fundamental to the structure of the ROCF and include the large rectangle, the vertical and horizontal bisectors, the main diagonals, and the large triangle. The clusters are nine important secondary elements comprised of one or more shapes or line segments that appear to form a coherent whole. The details are six final-level elements consisting of single-line segments. These groups are hierarchically arranged in terms of structural importance. For each of the three ROCF conditions, 17 kinds of Qualitative Scores are calculated: Configural/Cluster/Detail Presence, Configural/Cluster Accuracy, Cluster/Detail Placement, Fragmentation, Planning, Neatness, Vertical/Horizontal Expansion, Reduction, Rotation, Perseveration, Confabulation, and Asymmetry. There are six Summary Scores, which are calculated by combining the Qualitative Scores mentioned above. A Copy Presence Accuracy (CPA) is a composite score of Configural Presence and Accuracy, Cluster Presence and Accuracy, and Detail Presence for Copy Condition. An Immediate Presence Accuracy (IPA) is a composite score of those for Immediate Recall Condition, and a Delayed Presence Accuracy (DPA) is a composite score of those for Delayed Recall Condition. The CPA is expected to represent a global measure of visuoperceptual accuracy and overall visuoconstructual ability for the copy condition, the IPA the amount and accuracy of information recalled for the immediate recall condition, and the DPA the amount and accuracy of information recalled for the delayed recall condition. Immediate Retention (IR), which is the difference between IPA and CPA, measures the amount of information lost or gained from copy to immediate recall. Delayed Retention (DR), which is the difference between DPA and IPA, measures the amount of information lost or gained from immediate recall to delayed recall. Organization (ORG), which is a composite score of Fragmentation and Planning for the Copy Condition, represents a comprehensive measure of organizational skills. In this manner, six kinds of Summary Scores were calculated as indexes for total quantitative assessment. Besides the ROCF, we performed an Information and Block Design of WISC-III in all subjects.

The subjects were classified in four age-groups. Group A: 6- and 7-year-olds (17 boys and 10 girls, total...
Group B: 8- and 9-year-olds (21 boys and 12 girls, total 33); Group C: 10- and 11-year-olds (15 boys and 10 girls, total 25); and Group D: 12- and 16-year-olds (7 boys and 8 girls, total 15). The differences among age-groups were examined in terms of Summary Scores. The Kruskal–Wallis test was used for intergroup comparison. We inferred a level $p < 0.05$ as significant. For multiple comparison, we used the Mann–Whitney test with Bonferroni correction. Since six combinations of age-groups were compared in each Summary Score, the significance level for each comparison pair was set at $p < 0.05/6 = 0.0083$. The interrater reliability was examined with a Spearman’s rank correlation. SPSS 12.0 J for Windows (SPSS Inc., Chicago, IL) was used for statistical calculations.

3. Results

Fig. 1 shows examples of ROCF products. Fig. 2 and Table 1 show the distributions of respective Summary Scores, and Table 2 shows the results of comparisons among age-groups.

3.1. Information and Block Design (WISC-III)

The average scaled score (SS) of Information was $10.7 \pm 2.62$, and the average SS of Block Design was $11.1 \pm 2.74$.

3.2. Interrater reliability of BQSS Summary Scores

Spearman’s rank correlation between two raters for each Summary Score was calculated. The correlation coefficient was 0.927 ($p < 0.001$) for CPA, 0.949 ($p < 0.001$) for IPA, 0.959 ($p < 0.001$) for DPA, 0.910 ($p < 0.001$) for IR, 0.594 ($p < 0.001$) for DR, and 0.857 ($p < 0.001$) for ORG.

3.3. Gender differences of the BQSS Summary Scores

Using the Mann–Whitney test to compare the BQSS Summary Scores between males and females in each age-group, we found no significant gender differences of the Summary Scores among any age-group. For this reason, subsequent analyses were conducted without regard to gender.

Fig. 1. Examples of ROCF products on copy condition. (A) Product of a 6-year-old boy; (B) product of an 8-year-old girl; (C) product of an 11-year-old boy; (D) product of a 15-year-old boy.
3.4. Comparisons of the BQSS Summary Scores among the age groups

3.4.1. CPA

The median of the CPA was 14 points in Group A, 17 points in Group B, 18 points in Group C, and 18 points in Group D. The Kruskal–Wallis test detected significant differences ($\chi^2 = 30.048$, df = 3, $p < 0.001$) across the four age-groups.

The results of multiple comparisons by the Mann–Whitney test indicated significant differences between Groups A and B ($p < 0.001$), between Groups A and C ($p < 0.001$), between Groups A and D ($p < 0.001$), and between Groups B and C ($p = 0.004$). In every comparison, higher scores were observed in the older age-group.

3.4.2. IPA

The medians of the IPA in each group were as follows: 7 points in Group A, 11 points in Group B, 12 points in Group C, and 15 points in Group D. Significant differences across the groups were found by the use of the Kruskal–Wallis test ($\chi^2 = 37.693$, df = 3, $p < 0.001$).

Fig. 2. Distribution of each Summary Score. CPA, Copy Presence Accuracy; IPA, Immediate Presence Accuracy; DPA, Delayed Presence Accuracy; IR, Immediate Retention; DR, Delayed Retention; ORG, Organization (abscissa axis). (A) 6- to 7-year-old children; (B) 8- to 9-year-old children; (C) 10- to 11-year-old children; (D) 12- to 16-year-old children.
### Table 1
Means and medians of Summary Scores in each age group

<table>
<thead>
<tr>
<th>Summary Score</th>
<th>Age group</th>
<th>6–7 years (n = 27)</th>
<th>8–9 years (n = 33)</th>
<th>10–11 years (n = 25)</th>
<th>12–16 years (n = 15)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPA</td>
<td>Mean (SD)</td>
<td>14.30 (3.31)</td>
<td>16.85 (1.62)</td>
<td>18.00 (1.36)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>14</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>IPA</td>
<td>Mean (SD)</td>
<td>7.85 (3.12)</td>
<td>10.85 (3.16)</td>
<td>12.12 (2.45)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>7</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>DPA</td>
<td>Mean (SD)</td>
<td>7.93 (3.34)</td>
<td>10.33 (3.06)</td>
<td>11.32 (2.96)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>9</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>IR</td>
<td>Mean (SD)</td>
<td>−45.88 (20.03)</td>
<td>−35.85 (16.94)</td>
<td>−32.32 (14.49)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>−44.44</td>
<td>−35.29</td>
<td>−33.33</td>
</tr>
<tr>
<td></td>
<td>DR</td>
<td>Mean (SD)</td>
<td>−0.45 (32.04)</td>
<td>−3.55 (15.12)</td>
<td>−7.03 (15.54)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>0.00</td>
<td>−5.88</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>ORG</td>
<td>Mean (SD)</td>
<td>3.89 (0.83)</td>
<td>4.21 (1.12)</td>
<td>5.16 (1.19)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

CPA, Copy Presence Accuracy; IPA, Immediate Presence Accuracy; DPA, Delayed Presence Accuracy; IR, Immediate Retention; DR, Delayed Retention; ORG, Organization.

### Table 2
Comparison of Summary Scores between age groups

<table>
<thead>
<tr>
<th>Score (Kruskal–Wallis test)</th>
<th>Age group</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) CPA (χ² = 30.048, df = 3, p &lt; 0.001)</td>
<td>A</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>−</td>
</tr>
<tr>
<td>(2) IPA (χ² = 37.693, df = 3, p &lt; 0.001)</td>
<td>A</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>−</td>
</tr>
<tr>
<td>(3) DPA (χ² = 37.693, df = 3, p &lt; 0.001)</td>
<td>A</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>−</td>
</tr>
<tr>
<td>(4) IR (χ² = 19.261, df = 3, p &lt; 0.001)</td>
<td>A</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>−</td>
</tr>
<tr>
<td>(5) DR (n.s.) (χ² = 2.410, df = 3, p = 0.492)</td>
<td>A</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>−</td>
</tr>
<tr>
<td>(6) ORG (χ² = 18.906, df = 3, p &lt; 0.001)</td>
<td>A</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>−</td>
</tr>
</tbody>
</table>

CPA, Copy Presence Accuracy; IPA, Immediate Presence Accuracy; DPA, Delayed Presence Accuracy; IR, Immediate Retention; DR, Delayed Retention; ORG, Organization.

n.s., not significant.

* p < 0.05/6 = 0.0083 (Mann–Whitney test with Bonferroni correction).
Multiple comparisons using the Mann–Whitney test revealed significant differences between Groups A and B \( (p < 0.001) \), Groups A and C \( (p < 0.001) \), Groups A and D \( (p < 0.001) \), Groups B and D \( (p < 0.001) \), and Groups C and D \( (p = 0.007) \). In every comparison, higher scores were observed in the older age-group.

### 3.4.3. DPA

The medians of the DPA for each group were 9 points in Group A, 11 points in Groups B and C, and 15 points in Group D. The Kruskal–Wallis test revealed significant differences across the groups \( (\chi^2 = 32.957, df = 3, p < 0.001) \).

Multiple comparisons using the Mann–Whitney tests revealed significant differences between Groups A and C \( (p = 0.001) \), between Groups A and D \( (p < 0.001) \), between Groups B and D \( (p < 0.001) \), and between Groups C and D \( (p = 0.001) \). The older age-groups showed higher scores.

### 3.4.4. IR

The medians of IR for each group were −44.44 points in Group A, −35.29 in Group B, −33.33 in Group C, and −20.00 in Group D. The Kruskal–Wallis test indicated significant differences across the groups \( (\chi^2 = 19.261, df = 3, p < 0.001) \).

According to multiple comparisons using the Mann–Whitney test, significant differences were found between Groups A and D \( (p < 0.001) \) and between Groups B and D \( (p = 0.002) \). For each comparison, the older age-group showed higher scores.

### 3.4.5. DR

The median of DR was 0.00 in Group A, −5.88 in Group B, and 0.00 in Groups C and D. The Kruskal–Wallis test showed no significant differences across the groups \( (\chi^2 = 2.410, df = 3, p = 0.492) \).

### 3.4.6. ORG

The medians of ORG were 4 in Group A, 4 in Group B, 5 in Group C, and 6 in Group D. The Kruskal–Wallis test detected significant differences across groups \( (\chi^2 = 18.906, df = 3, p < 0.001) \).

The multiple comparison by the Mann–Whitney test indicated significant differences between Groups A and C \( (p < 0.001) \), Groups A and D \( (p < 0.001) \), and Groups B and C \( (p = 0.003) \). For each comparison, the older age-group showed higher scores.

### 4. Discussion

The ROCF is expected to provide information regarding qualitative aspects in drawing performance. The scoring system developed by Osterrieth [2], which is commonly used today, depends on the presence of each element and the accuracy of the drawing. For this reason, little information is provided regarding the aspects of drawing sequence or strategy. Since Osterrieth, several methods assessing the strategy or organizational aspects in drawing ROCF have been devised [10–14]. The BQSS is the latest method and was developed to assess organization ability in drawing as well as visuoconstructional ability and visual memory.

The salient features of BQSS are that it provides abundant qualitative scales, and by using the qualitative scale scores we can calculate quantitative summary scores. Furthermore, the criteria for scoring the Qualitative Scores are so detailed and concrete that a very high interrater reliability has been reported. Considering that BQSS can provide multifaceted evaluations of patients with high interrater reliability, we assumed that it would be useful in the clinical practice of child neurology or child psychiatry. Akshoomoff and Stiles [15,16] reported on the BQSS Qualitative Scores of children in 1995, stating that the accuracy of drawing and the appropriateness of placement improved as the subject’s age increased. Furthermore, they indicated that the 6- to 8-year-old children tended to break up the figure into simple components, but thereafter improvements in their abilities to integrate the figure were observed with increasing age. However, they did not mention Summary Scores, and they used an old version of BQSS. To the best of our knowledge, this study is the first to elucidate a developmental change of BQSS Summary Scores of the current version.

The Developmental Scoring System (DSS) for the Rey–Osterrieth Complex Figure (Psychological Assessment Resources, Inc., 1994) developed by Bernstein and Waber [10,11] is another method for assessing the organizational aspects in drawing ROCF and was standardized among children. DSS is already on the market and has been used widely. Harris et al. [17] compared BQSS and DSS scores by assessing the same ROCF products, using both methods. They found that the Planning Score among BQSS Qualitative Scores correlated with DSS Organization, BQSS Fragmentation Score with DSS Style, and BQSS Presence Score with DSS Accuracy. However, those correlations were moderate. The Organization and the Style Scores of DSS are based on the alignment, intersection, and continuity of each line segment. Accordingly, those scores do not explicitly reflect drawing order or each entire element, which is comprised of several shapes and/or line segments that appear to form a coherent whole, although scorers should consider those factors in the background. On the contrary, the Planning and the Fragmentation among the BQSS Qualitative Scores, from which the ORG score is calculated, are based on the assessment of each entire element and drawing order. These differences might make it possible for BQSS scores to reflect other aspects of Organization ability than DSS. If so,
with the introduction of BQSS into the clinical practice of children, a more multifaceted assessment of ROCF should become possible.

The subjects participating in our study were not randomly sampled from a general population. Nevertheless, all of them attended normal classes; the average SS of WISC-III Information was 10.7 ± 2.62, and the average SS of Block Design was 11.1 ± 2.74. Consequently, they can be considered a group that does represent a general population of children.

In this study, all BQSS Summary Scores except Delayed Retention showed clear developmental change as a function of age. Moreover, the developmental patterns varied according to the kinds of Summary Scores. A continuous development throughout childhood was shown by CPA, IPA, DPA, and IR. The CPA showed progressive development during the age ranges of 6–7, 8–9, and 10–11, but further developmental change from late childhood to puberty was slight, maybe because of a ceiling effect. In contrast, the DPA showed noticeable development between the age ranges of 10–11 and 12–16. Moreover, the IPA showed marked development at two periods, namely, between the age ranges of 6–7 and 8–9 and between the ranges of 10–11 and 12–16, with sluggish development during the ranges of 8–9 and 10–11. The ORG score showed a slightly different pattern from those of other scores, with rapid development during the ranges of 8–9 and 10–11 and with no distinctive development before or after those ranges. As described above, because developmental curves differ from one Summary Score to another, it is suggested that the psychological processes reflected by each score might differ from score to score, even if they might partly overlap.

It is quite likely that the copy trial reflects perceptual, visuospatial, and organizational skills; the immediate trial reflects the amount of encoded information; and the delayed trial reflects the amount of information stored and retrieved from memory [5,18].

As for the BQSS Summary Score, it is presumed that visuospatial abilities in copy condition can be reflected by CPA, the organizational ability by ORG, the amount of coded information by IPA, and the amount of information stored and retrieved from memory by DPA. The developmental patterns of Summary Scores disclosed by our present study might correspond to the development of these abilities.

It is one of the characteristics of BQSS that among Summary Scores, ORG is provided as a specific Summary Score reflecting organizational ability. In our other research of BQSS on children with neurological disorders, we confirmed that the BQSS scores correlated to scores of conventional executive function tests, such as the Wisconsin Card Sorting Test and the Maze of WISC-III, suggesting that most BQSS Summary Scores can reflect executive functions, especially planning [8].

Contrary to expectations, however, ORG did not show a higher correlation to the Wisconsin Card Sorting Test or to the Maze of WISC-III compared to other BQSS Summary Scores. Therefore in that study we concluded that ORG was not a specific index of executive functions reflected in other conventional executive function tests. In our present study, the developmental curve of ORG differed from that of any other Summary Score. The main psychological process reflected by ORG might differ from those reflected by other Summary Scores. By definition, ORG is assessed largely by the continuity of line segments making up individual elements, recognition of a large rectangle or the outline of the whole figure, and configuration of the figure in the whole response sheet. Thus, whether subjects tend to grasp the figure as a whole or to recognize it by perceiving each part might greatly affect their ORG scores. Recent researches have shown that even preschoolers could perceive both part and whole aspects of the same objects [19]. However, these global and local processing abilities change as a function of age. First, those abilities of young children around 5 years of age are dependent on the density of local elements. That is, the more numerous and denser the local elements are, the easier it becomes to recognize the global whole. On the contrary, the fewer and sparser the local elements are, the easier it becomes to recognize the local elements. Such differences, however, were not found among children over 8–10 years of age and adults [20,21]. The constituent elements of ROCF are inhomogeneous and sparse, and even the smallest one is about 1 cm long. These facts might make younger children perceive local elements easier. Second, children’s part/whole perceptions are affected by object complexity. It was indicated that the ambiguous shape of a global whole disturbed the integrated perception of objects from both part and whole aspects in preschool young children [19]. Needless to say, ROCF is an ambiguous figure. This factor also might make it difficult for younger children to perceive a global whole. ORG might reflect the developmental change of global and local processing styles determined by several factors, including those mentioned above. If this is so, in clinical practice it would be useful for the assessment of patients with weak central coherence [22], such as those with pervasive developmental disorders. Nevertheless, the design of this study is incapable of elucidating the basic psychological process that ORG most reflects. Future studies are necessary to examine the correlation between ORG and other psychological assessment tests for global and local processing abilities or central coherence.

In this study, each of six Summary Scores revealed the specific developmental pattern. With the exception of Delayed Retention, the remaining scores showed obvious developmental changes. Moreover, it turned out that the respective stage in each of these five scores in which
the developmental change is accelerated differs from the others. Thus many different scores presumably reflecting different psychological processes are calculated in BQSS. Therefore, the BQSS has the possibility to disclose a wide-range profile of an individual patient’s higher brain dysfunction and to help differentiate several different developmental disorders. It is expected that BQSS is especially useful in the clinical practice of developmental disabilities in which those of visuoconstructional, visual memory, and organizational ability often coexist. Furthermore, the interrater reliabilities of the Summary Scores were found to be high in our present study. Even in DR, with the lowest reliability, the correlation coefficient between raters was 0.594, whereas interrater reliabilities of the other Summary Scores were excellent; namely, they showed correlation coefficients ranging from 0.857 to 0.959. These facts suggest that stable assessment is possible even in childhood. Future critical topics will be to elucidate BQSS profiles of specific disabilities, such as AD/HD and Asperger syndrome.

References