Brief Note

Co-Occurring Disorders in Children Who Stutter: Analysis of Using the Japanese Checklist for Possible Cluttering

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This study aimed to investigate the rate and type of co-occurring disorders in children receiving special support for stuttering in speech and language classrooms (resource rooms and special classes for children with speech and language disorders) and compare the results of the Japanese Checklist for Possible Cluttering (JCPC) ver. 2 between the high-score and not-high-score groups. Results indicated that 27 (11.4%) of 237 children who had fluency disorder and were trained as children who stutter (CWS) were either medically diagnosed or suspected by their teachers as having co-occurring disorders. The co-occurrence of disorders was observed significantly more frequently in the high-score than not-high-score groups. The most frequent co-occurring disorders in the high-score group were "AD/HD (N=4)," followed by "Asperger syndrome (N=3)," "intellectual disability (N=3)," and "LD (N=3)," which were consist with previous studies aside from "intellectual disability."

Key Words: stuttering, cluttering, co-occurring disorders, children who stutter, AD/HD

Introduction

Interest in the study of stuttering with comorbid disorders has recently been increasing (Arndt & Healey, 2001; Blood & Seider, 1981; Briley & Ellis, 2018; Donaher, Healey, & Zobell, 2009; Donaher & Richels, 2012; Druker, Hennessey, Mazzucchelli, & Beilby, 2019; Graham, 2006; Homzie, Lindsay, Simpson, Hasenstab, 1988; Nippold, 1990; Nippold & Schwarz, 1990). In particular, in addition to articulation/phonological and/or language disorders (e.g., Arndt & Healey, 2001; Blood & Seider, 1981; Nippold, 1990), developmental disorders also have been frequently reported (e.g., Briley & Ellis, 2018; Blood, Ridenhour, Qualls, & Hammer, 2003) as comorbid disorders with stuttering. Studying the disorders that co-occur with stuttering have some advantages. First, determining the frequencies of concomitant disorders in children who stutter (CWS) is crucial because a subgroup of children who require a different type of assessment, and treatment procedures than the general CWS group may emerge (Arndt & Healey, 2001). Second, the coexistence of disorders may further indicate that stuttering is not caused by a disturbance of a distinct area of the brain (Briley & Ellis, 2018). In other words, because stuttering, in some instances, may develop from disturbances along extensive neural pathways used for speech production, and overlaps with skills that are disturbed in other coexisting conditions (Smith & Weber, 2016), determining what other disorders co-occur with stuttering is essential. Third, as with stuttering, cluttering is easily linked to other disorders (e.g., van Zaalen & Reichel, 2015). In particular, whether stuttering with learning disabilities (LD) or attention deficit, and hyperactivity disorders (AD/HD) is equivalent to or independent of cluttering is unknown. If a case of a CWS who does not meet the criteria for cluttering while showing these concomitant conditions arises, even if LD and AD/HD are coexisting with stuttering, it will prove that it does not necessarily fall under cluttering. This finding has important implications for the identification and assessment of cluttering.

Disorders Co-Occurring with Stuttering

In a mail survey that invited responses from 1,184...
speech-language pathologists (SLPs), 62.8% of 2,628 children who stuttered had other co-occurring speech, language, or non-speech–language disorders (Blood et al., 2003). The most frequently reported co-occurring speech disorders were articulation (33.5%) and phonology (12.7%), and the non-speech-language disorders (34.3% of the children) were LD (15.2%), literacy disorders (8.2%), and attention deficit disorders (ADD) (5.9%). The prevalence of AD/HD among CWS ranges from 4% (Arndt & Healey, 2001) to 26% (Riley & Riley, 2000). Using their revised component model, Riley and Riley (2000) found that 26% of the 50 school-age CWS were diagnosed with AD/HD. Interestingly, their previous work suggested that the presence of AD/HD prior to therapy significantly decreased the likelihood of successful therapy outcomes (Riley & Riley, 1979). They confirmed that therapeutic outcomes could be enhanced by addressing the attention issues prior to the initiation of speech modification therapy. Their study results also suggested that treating neurological factors that disrupt fluency improves maintenance and carry-over. Donaher and Richels (2012) asked the parents of 36 CWS aged between 3.9 and 17.2 years for their responses on the AD/HD Rating Scale (Power, Costigan, Leff, Eiraldi, & Landau, 2001). In this cohort, 58% (n=21) of the participants met the criteria for needing referral for an additional evaluation for symptoms related to AD/HD. The authors concluded that their study results demonstrated the need for further training and education in AD/HD for SLPs working with CWS. Sisskin and Wasilus (2014) described the speech fluency and associated communication characteristics of a young boy diagnosed with Asperger syndrome (AS) who was between 7; 2 and 8; 0 when evaluated and treated. This case study demonstrates that traditional stuttering modification treatment can be successful in reducing atypical and typical disfluencies in a child with concomitant social language impairment that is consistent with autism spectrum disorder (ASD). This finding is supported by Brundage, Whelan, and Burgess (2013), who reported that visual inspection methods revealed a reduction in the percentage of stuttered words (%SW) in people who stutter (PWS), and with ASD. Only few studies have examined the differences between PWS and PWS with AS. These studies have corroborated that children with AS produced a greater number of pauses compared with stutterers (Beltrame, Viera, Tamanaha, Arcuri, Osborn, Perissinoto, & Schiefer, 2011) and that statistically significant differences exist in the percentage of words containing stuttering-like disfluencies between children with AS and CWS and between children with AS and those with no diagnosis (Scott, Tetnowski, Flaitz, & Yaruss, 2014). In the latter finding, four of 11 (36%) children with AS met the common diagnostic criteria for a fluency disorder. Disfluencies in the AS group differed qualitatively and quantitatively in CWS and included a larger distribution of word-final disfluencies (Scott et al., 2014). In Japan, Tomisato, Ooishi, Asano, Watanabe, and Ogawa (2016) reported 15% of the 39 subjects who sought consultation in the hospital, for which they are working had developmental disorder. Because few studies have investigated the rate of comorbid disorders with stuttering in Japan, its actual conditions are unclear.

**Cluttering**

Cluttering is a fluency disorder wherein the segments of conversation in the native language of the speaker are perceived typically as too fast overall, too irregular, or both. The segments of a rapid and/or irregular speech rate must be accompanied further by one or more of the following: (a) excessive normal disfluencies; (b) excessive collapsing or deletion of syllables; and/or (c) abnormal pauses, syllable stress, or speech rhythm (St. Louis & Schulte, 2011). Most disfluencies of people with cluttering (PWC) are normal disfluencies (Myers & Bradley, 1992; St. Louis, 1996). First, normal disfluencies, such as interjection, revision, and word and phrase repetitions, are produced with mild tension and a normal speech rhythm, and they often appear in fluent speakers. Normal disfluencies are also distinguished from stuttering-like disfluencies, such as block, sound repetition, and prolongation with tension. Second, the excessive collapsing, or deletion of syllables are also expressed as the phenomenon of overcoarticulation, which is called telescoping (when syllables are omitted) or coalescence (when syllables are collapsed). This overcoarticulation causes the unintelligibility of speech in PWC and makes their speech frequently misunderstood. Third, abnormal pauses, syllable stresses, or speech rhythms also appear in the speech of PWC. They are found to be the results of the lack of resources because PWC must focus on the word
and sentence formulation during their speech (van Zaalen & Reichel, 2015).

**Disorders Co-Occurring with Cluttering**

Cluttering usually co-occurs with other disorders, such as stuttering, articulation disorders, AD/HD, and LD (van Zaalen & Reichel, 2015). van Zaalen and Reichel (2015) explained that although ADD and AD/HD symptoms are often considered indicative of cluttering, individuals diagnosed with AD/HD do not necessarily clutter. Since the first English publication of a book on cluttering (Weiss, 1964), cluttering has been known to occur concomitantly with various symptoms, such as poor concentration, short attention span, restlessness, hyperactivity, and reading, and writing disorders. Daly (1993) explained that these varied symptoms are typical of cluttering. He listed eight quantitative (e.g., short attention span and poor concentration), and seven qualitative features of cluttering. Daly added that although such reports are based on clinical observation, the traits reported by different researchers are remarkably similar. Moreover, individuals diagnosed with ADD and AD/HD may present many of the same symptoms as PWC (Daly & Burnett, 1999).

St. Louis and Myers (1997) suggested that even a casual inspection of LD and AD/HD symptoms clearly indicates that individuals with these disorders frequently have many of the same symptoms associated with PWC. They further hypothesized that important differences can be inferred between cluttering and LD or AD/HD in the areas of disfluency and speech rate. When the definition of cluttering is narrowed (St. Louis & Schulte, 2011), differences, and similarities between cluttering and LD become clear. To this end, van Zaalen, Wijnen, and Dejonckere (2011) set objective norms to differentiate the speech and language characteristics of cluttering from those of LD. They summarized that although cluttering and LD have been hypothesized to be genetically-based disorders, the problems in cluttering are possibly related to language production, and those in LD are due to neurologically-based processing difficulties. They compared the results of the three types of language tasks between cluttering, LD, and control groups. Then they concluded that defective language automation formed the basis of cluttering, whereas problems in conceptualizing, and formulating stages in language planning resulted in the disturbed language production of children with LD. Meanwhile, Scott, Grossman, Abendroth, Tetnowski, and Damico (2007) identified differences in their study of individuals with autistic features and those with AS. In their study, 33% of individuals with AS met the diagnostic criteria for a speech fluency disorder (i.e., stuttering and/or cluttering), suggesting that cluttering is a potential disorder that speech-language therapists must consider when evaluating the communication patterns of individuals with ASDs. Scott (2011) reviewed the studies on disfluencies in ASD and concluded that a higher incidence of cluttering symptoms is expected in an ASD-diagnosed population than in an undiagnosed one. When the conversation samples of previous studies in ASD were divided into stuttering- and non-stuttering-like disfluencies, the latter group presented with more of the disfluency type consistent with the working definition of cluttering proposed by St. Louis, Raphael, Myers, and Bakker (2007). However, the reasons for this difference could not be concluded based on current evidence. Scott (2011) demonstrated that speech disfluency and other developmental problems could co-occur in cluttering and stuttering. This finding is consistent with the definition of Weiss (1964), stating that cluttering is a speech disorder characterized by the unawareness of the clutterer of his/her disorder; by a short attention span; and by disturbances in the perception, articulation, and formulation of speech processes preparatory to speech, and based on hereditary disposition. Cluttering is the verbal manifestation of Central Language Imbalance, which affects all the channels of communication (e.g., reading, writing, rhythm, and musicality) and behavior in general.” Hence, cluttering may originally be a constellation of symptoms. Following this definition, cluttering is suspected to co-occur frequently with other disorders. However, few studies have examined the prevalence of co-occurring disorders in cluttering.

Miyamoto (2018) reported the distribution for the scores on the Japanese checklist for possible cluttering (JCPC) ver. 2 and suggested the norm scores for distinguish stuttering and cluttering. This study utilized the JCPC ver. 2 to investigate the prevalence of co-occurring disorders in CWS and to compare the results between the high-score group of the JCPC ver. 2 and the not-high-score group based on their total score in the checklist. Requests for responses to the JCPC ver. 2 were sent to teachers in 300 resource
rooms and special classes for elementary schoolchildren with speech/language disability who had been selected randomly by mail (Miyamoto, 2018), and they were also requested to describe the co-occurring disorders of the children. As theorized by Daly (1993), varied symptoms are typical of cluttering; thus, the group with a high-score should be associated with a higher prevalence of the co-occurrence of disorders other than fluency ones. Then, it is doubtful whether there are CWS who have also medical diagnosis for AD/HD or LD actually in the high-score group than not-high-score group.

This study aimed to investigate the rate and type of co-occurring disorders in children receiving special support for stuttering in speech and language classrooms and to compare the results between the high-score group of the JCPC ver. 2 and the not-high-score group.

Method

Participants
The subjects included 237 students who were trained as CWS and participants in Miyamoto (2018). One hundred seventy-eight (75.1%) were boys, and 57 (24.1%) were girls, and two students (0.8%) were unanswered. Of the 300 speech and language classrooms (resource rooms and special classes for children with speech and language disorders) in the Kanto region that received requests for responses, only teachers in 80 classrooms agreed to participate in this study.

Co-Occurring Disorders
The survey required the teachers to describe the co-occurring disorders other than the stuttering of children who were the subjects of the JCPC ver. 2 in Miyamoto (2018). They were asked to provide information on the children based on the documentation of the case histories, files, and information of the latter shared by parents, teachers, and members of collaborative teams. They were also requested to distinguish between a suspected and a medically diagnosed concomitant disorder. For the identification of CWS as a suspected case having concomitant disorder, the criterion was that there was teachers’ description about suspected features or the terms of medical diagnosis in the case document. The content should include the behaviors actually observed and what was reported by family members.

Data Analysis
First, the rates of students who were described as presenting with co-occurring disorders were calculated. Thereafter, the rates were categorized into disorders that were suspected by the teachers or medically diagnosed. Second, their rates were divided further into the high-score and not-high-score groups using the JCPC ver. 2 (see Appendix). In Miyamoto (2018), although the criterion for PC was determined as a total score of above 18 in the JCPC ver. 2, the procedure for determining the cutoff value has some problems and does not go beyond the provisional standard. Then, the score of 18 cannot be used as criteria for classifying stuttering and cluttering but can be used as a criterion for whether the total score of the JCPC ver. 2 is high or not. The chi-square test or the Fisher exact test was conducted to compare the results between the high-score and not-high-score groups of the JCPC ver. 2. The IBM SPSS Statistics 22 was used for all the statistical analyses.

Results

Co-Occurring Disorders
The total number of the medical diagnoses of co-occurring disorders and suspicion of concomitant disorders among the 237 children was 27 (11.4%)

Table 1 Number of Children with the Descriptions of Having Co-Occurring Disorders Other than Stuttering and the Frequency of Descriptions in 237 Children

| Children with the descriptions of co-occurring disorders |  |
|----------------------------------------------------------|---|
| With medical diagnosis                                   | 16/237 (6.8%) |
| With indicated suspicion of concomitant disorders        | 11/237 (4.6%) |
| **Total**                                                | **27/237 (11.4%)** |

| Frequency of descriptions                                 | 1 |
|----------------------------------------------------------|---|
| With provided medical diagnosis                          | 16 |
| With the indicated suspicion of concomitant disorders    | 15 |
| **Total**                                                | **31** |

Note. The teachers provided the descriptions about their children receiving special support for stuttering and multiple answers for each child were allowed. The teachers were employed in 80 public resource rooms or special classes for elementary schoolchildren with speech/language disability.
Co-Occurring Disorders in Children Who Stutter

The number of the medical diagnoses of co-occurring disorders was 16 of 237 children (6.8%), while 11 of the 237 (4.6%) were suspected of having concomitant disorders (see Table 1). For four children, teachers described two types of disorders as suspicious concomitant disorders, owing to which, the frequency of descriptions for the suspicion of concomitant disorders was 15 (see Table 1).

The most frequent co-occurring disorders based on medical diagnoses were borderline intellectual functioning \( (N=3) \), intellectual disability \( (N=3) \), and “PDD (pervasive developmental disorders) \( (N=3) \)” (see Table 2).

**Rate and Type of Co-Occurring between the High-score and Not-high-score Groups of the JCPC ver. 2**

The children were classified into the high-score (total score \( \geq 18 \)) and not-high-score (total score \( < 18 \)) groups based on the tentative JCPC ver. 2 norm score. Of the total children in the high-score \( (N=46) \) and not-high-score \( (N=191) \) groups, 17 (37.0%) and 10 (5.2%), respectively, were described as presenting with co-occurring disorders on the basis of medical diagnosis or the suspicions of a concomitant disorder (see Fig. 1). Children with a description of co-occurring disorder based on medical diagnosis or the suspicions of a concomitant disorder were significantly more frequently observed in the high-score than in the not-high-score group \( (\chi^2=36.953, df=1, p=.000 < .001, \phi=.395) \) (see Fig. 1). Of the total children in the high-score \( (N=46) \) and not-high-score \( (N=191) \) groups, 9 (19.6%) and 7 (3.7%), respectively, were described as presenting with co-occurring disorders on the basis of medical diagnosis (see Table 3).

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**Table 2** Number of Children with the Descriptions of Having Co-Occurring Disorders in 237 Children

| Co-occurring disorders (Medical diagnosis) | Number of children with medical diagnosis | Number of children with descriptions of suspected co-occurring disorders | Total |
|-------------------------------------------|-----------------------------------------|-------------------------------------------------|-------|
| Borderline intellectual functioning        | 3                                       | 1                                               | 4     |
| Intellectual disability                    | 3                                       | 2                                               | 5     |
| PDD                                       | 3                                       | 0                                               | 3     |
| AS                                        | 2                                       | 1                                               | 3     |
| LD                                        | 2                                       | 1                                               | 3     |
| AD/HD                                     | 1                                       | 4                                               | 5     |
| DCD                                       | 1                                       | 0                                               | 1     |
| Epilepsy                                  | 1                                       | 0                                               | 1     |
| Others                                    | 0                                       | 6                                               | 6     |
| **Total**                                 | **16**                                  | **15**                                          | **31**|

**Note.** AS: Asperger syndrome; DCD: Developmental coordination disorder. The teachers provided the descriptions and multiple answers for each child were allowed. The teachers were employed in 80 public resource rooms or special classes for elementary schoolchildren with speech/language disability.
and Fig. 2). Children with descriptions as having co-occurring disorders based on medical diagnosis only were significantly more frequently observed in the high-score than in the not-high-score group ($p=.001 < .01$, $\phi=.251$, Fisher’s exact test).

In the high-score group, the most frequent co-

| Descriptions of co-occurring disorders in the high-score group ($n=17$) | Medical diagnosis ($n=9$) | Descriptions of suspected co-occurring disorders ($n=8$) | Total |
|---|---|---|---|
| AD/HD | 0 | 4 | 4 |
| AS | 2 | 1 | 3 |
| Intellectual disability | 2 | 1 | 3 |
| LD | 2 | 1 | 3 |
| Borderline intellectual functioning | 1 | 1 | 2 |
| DCD | 1 | 0 | 1 |
| PDD | 1 | 0 | 1 |
| Paralysis of a sinistral limb by a high fever | 0 | 1 | 1 |
| Weakness in perioral muscles | 0 | 1 | 1 |
| Speech and language delay | 0 | 1 | 1 |
| Total | 9 | 11 | 20 |

| Descriptions of co-occurring disorders in the not-high-score group ($n=10$) | Medical diagnosis ($n=7$) | Descriptions of suspected co-occurring disorders ($n=3$) | Total |
|---|---|---|---|
| PDD | 2 | 0 | 2 |
| Borderline intellectual functioning | 2 | 0 | 2 |
| Intellectual disability | 1 | 1 | 2 |
| AD/HD | 1 | 0 | 1 |
| Epilepsy | 1 | 0 | 1 |
| Articulation disorder | 0 | 1 | 1 |
| Speech and language delay | 0 | 1 | 1 |
| Appears restless and fidgety | 0 | 1 | 1 |
| Total | 7 | 4 | 11 |

*Note. AS: Asperger syndrome; DCD: Developmental coordination disorder; The teachers provided the descriptions and multiple answers for each child were allowed. The teachers were employed in 80 public resource rooms or special classes for elementary schoolchildren with speech/language disability.*

Fig. 2 Comparison on the Number of Children with the Descriptions of Co-Occurring Disorders Based on Medical Diagnosis between the High-score and Not-high-score Groups as Provided by Their Teachers; **$p<.01$. 
occurring disorders based on medical diagnosis or suspected were “AD/HD (N=4),” followed by “AS (N=3),” “intellectual disability (N=3),” and “LD (N=3).” In the not-high-score group, “PDD (N=2),” “borderline intellectual functioning (N=2),” and “intellectual disability (N=2).” The high-score group included 10 kinds of disorders based on medical diagnosis, whereas the not-high-score group involved eight. The kinds of disorders observed in both groups were similar, that is, “borderline intellectual functioning,” “intellectual disability,” and “PDD.” Meanwhile, “AD/HD” and “epilepsy” were not included in the high-score group as medical diagnosis-based descriptions (see Table 3). Of 11 descriptions of suspected co-occurring disorders in the high-score group, six were described as presenting with “AD/HD (N=4),” “AS (N=1),” and “LD (N=1)” (see Table 3). According to the results of medical diagnosis in the high-score group, “AD/HD (N=0),” “AS (N=2),” and “LD (N=2)” were showed. Careful interpretation is crucial for these different results.

Discussion

Co-Occurring Disorder with Children Who Have Fluency Disorder

Previous studies have indicated that CWS have co-occurring speech, language, or non-speech-language disorders. The results of this study indicated that of the 237 students who were trained as CWS in 80 speech and language classrooms in public elementary schools, 27 (11.4%) children had co-occurring disorders other than stuttering, which were either diagnosed medically or suspected by their teachers. These results were less than the 34.3% found in Blood et al. (2003) and the 18% in Tomisato et al. (2016).

Co-Occurring Disorder with the High-score and Not-high-score Groups of the JCPC ver. 2

Although only few studies have examined the co-occurrence of cluttering with other disorders aside from stuttering, van Zaalen and Reichel (2015) hypothesized that the possible presence of other coexisting problems with cluttering were AD/HD and LD. In this study, for the high-score group, the most frequent co-occurring disorders based on medical diagnosis or suspected were “AD/HD (N=4),” followed by “AS (N=3),” “intellectual disability (N=3),” and “LD (N=3).” These results are consistent with the preliminary report by van Zaalen and Reichel (2015) aside from “intellectual disability” and “AS.”

Although it is not targeted as education or training for “intellectual disability (N=3)” in speech and language classes, the responses about co-occurring with intellectual disability were included in this study. Therefore, some CWS with intellectual disability were receiving support in speech, and language classes. Regarding speech disfluency for intellectual disability, several studies revealed several disfluencies in people who are intellectual disabilities (van Zaalen & Reichel, 2015). Further research is crucial for classifying stuttering or cluttering. Moreover, interestingly, the all response of “AD/HD (N = 4)” in the high-score group was not a medical diagnosis but a descriptive decision judged by the standpoint of the teacher. This result may be influenced by the fact that the children with stuttering tend to exhibit AD/HD like problems in prominent appearance and are easy to be found by teachers in speech and language classrooms. CWS with AD/HD may speak a highly impulsive way of speaking and may be felt fast in the speed of their speech. However, easily identifying their problem as cluttering as soon after teachers discover CWS with AD/HD is dangerous. Paying attention to the difference whether their speech represented is a stuttering-like symptom or normal disfluency is essential, and differential diagnosis between stuttering and cluttering is indispensable.

Additionally, in the present study, 37.0% of children in the high-score group (JCPC ver. 2 score ≥18) were described as having co-occurring disorders by their teachers on the basis of medical diagnosis or suspicion, and 19.6% of them were diagnosed medically as having co-occurring disorders. The rate of co-occurring disorders was significantly higher in children in the high-score than in not-high-score groups, which is consistent with the findings of Daly (1993).

The disorders described by the teachers were similar between the high-score and not-high-score groups. In both groups, the most frequently described common disorders were “intellectual disability,” and “borderline intellectual functioning.” According to van Zaalen and Reichel (2015), people with intellectual disability use ‘uhm’-interjections mainly to gain time for lexical retrieval, and building “the idea” or “the message” appears to be troublesome for this group. They also suggested that in addition to their normal disfluencies, people with intellectual
disabilities produce disfluencies that are not typical and cannot be categorized as stuttering-like or cluttering-like disfluencies. Therefore, future studies are necessary to clarify how the characteristics of disfluency of intellectual disabilities to differentiate from stuttering or cluttering.

Although objectivity can be assured when analysis is based only on medical diagnosis, non-evidence-based descriptions, such as the observations of “hyper-active tendency” or “possible learning disabilities,” are considered equally important. For the latter case, a direct observation, or an alternate series of tests could be employed for further examination. For instance, “A survey on students who need special educational support with possible developmental disabilities who are enrolled in regular classes” can be useful (Ministry of Education, Culture, Sports, Science, and Technology, 2012).

Finally, the results of this study support that the JCPC ver. 2 can pick up the children who have not only AD/HD and LD but also AS and intellectual disability, and the higher the total score of the JCPC ver. 2 is, the more children who have concomitant disorder with stuttering are included.

Relationship among Stuttering, Cluttering, AD/HD, LD, and ASD

The symptoms of AD/HD are often considered indicative of cluttering as the AD/HD factor has been found by a factor analysis in a Japanese checklist for possible cluttering (Miyamoto, 2011, 2018). Among the JCPC ver. 2 items that represent the features of AD/HD are items 14, 18, and 20; (see Appendix). van Zaalen and Reichel (2015) also listed the characteristics of similarity and difference among stuttering, cluttering, AD/HD, and LD (p. 97), and they insisted on the importance of differential diagnosis among those disorders. For instance, for mean articulation rate, although cluttering shows as rapid and/or irregular, stuttering, LD, and AD/HD show a normal range. Regarding sentence structures, people with cluttering cannot make a sentence correctly in time (they can if given enough time), while the sentences of people who stutter are often disrupted because of their avoidance behaviors. The sentences of the formulation of those with LD are underdeveloped, and people with AD/HD usually have no problems with sentence production. Many other differences in language and speech emerge among those disorders. Hence, clustering is not a state in which AD/HD and LD overlap in stuttering, so why does the JCPC ver. 2 contain the same symptoms as AD/HD and LD? When approaching the triggers of cluttering, understanding which developmental problems cause cluttering speech symptoms to occur is necessary. For instance, though impulsivity or the lack of attention span may cause a rapid rate of speaking or disorganized speech in cluttering, not all people with AD/HD indicate a symptom of cluttering, such as rapid, or unintelligible speech. Therefore, these AD/HD like symptoms may not be considered as comorbid symptoms of cluttering but as causal symptoms. In short, items included in the JCPC ver. 2 are a set of problems that are likely to occur simultaneously with cluttering and may also be considered candidates for triggers that cause each other’s problems (Daly & Burnett, 1999).

The argument is complicated, but stuttering and cluttering also happen frequently with other disorders as mentioned in the Introduction section. In order to sort out these problems, the speech and language features found in LD and AD/HD without stuttering and cluttering must be clarified. This study suggested that ASD in addition to AD/HD and LD may coexist with the high- and not-high-score groups. In future research, the characteristics of speech, and language in people with ASD should be included to address the relationship among stuttering, cluttering, AD/HD, LD, and ASD.

Limitations

Two limitations must be noted. First, two criteria (i.e., medical diagnosis and suspicion of a concomitant disorder by teachers in speech and language classrooms) were used to estimate the rate of the co-occurring disorder of stuttering in high-score, and not-high-score groups of the JCPC ver. 2. Although medical diagnosis was adequate, teachers’ suspicion of a concomitant disorder was subjective and lacking evidence. Therefore, that a questionnaire on the children’s behaviors during regular classes asks for the teachers’ responses is reasonable. Second, the small sample size (N=237) of this study precludes generalizability. Thus, to obtain an accurate rate of co-occurring disorders with stuttering and cluttering, future studies must use a greater sample size (e.g., over 1,000 students) as the previous study indicated (Blood et al., 2003).
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### Appendix

**Japanese Checklist of Possible Cluttering (JCPC) ver. 2**

1. Appears younger than his/her age; small and/or immature
2. Other family members have the same/similar problem; heredity
3. Started talking late; delayed onset of words and sentences
4. Fluency disruptions started early; no remissions; never fluent
5. Silent gaps and hesitations are common; interjections; many “filler” words
6. Stops before saying a vowel, no tension; drawn-out vowels
7. Slurred articulation (omits sounds or unstressed syllables)
8. Storytelling difficulty; (trouble sequencing event)
9. Inappropriate reference by pronounce is common
10. Improper language structure; poor grammar and syntax
11. Writing includes the omission or transposition of letters and words
12. Rapid speaking (speaks too fast); tachylalia; speaks in spurts
13. Respiratory dysrhythmia; jerky breathing pattern
14. Clumsy and uncoordinated; accelerated motor activities, impulsive
15. Disintegrated and fractionated writing; poor motor control
16. Left-right confusion; delayed hard preference
17. Improper stress patterns of speech; poor melodic accenting of syllables
18. Extrovert; high verbal output; compulsive talker
19. Difficulty following directions; impatient/uninterested listener
20. Distractible; attention-span-related problems; poor concentration
21. Seems to think faster than he can talk or write
22. Untidy, careless, hasty, impulsive, or forgetful
23. Speech is better under pressure; e.g., during short periods of heightened attention
24. Lack of self-awareness; unconcerned attitude over the inappropriateness of many behaviors and responses