Speech-Language Pathologists' Self-Reported Definition of Cluttering and Confidence in

Assessment of Cluttering

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Abstract

Speech-Language Pathologists' Self-Reported Definition of Cluttering and Confidence in Assessment of Cluttering

This study investigated speech-language pathologists' (SLPs') definition of cluttering based on the individual features of cluttering, and their confidence in assessment of those individual features as well as their overall confidence in assessment, diagnosis and treatment of cluttering. Within the field of speech-language pathology there is not an agreed upon definition of cluttering or a standard method of evaluation and treatment of the disorder. Relative to other speech and language disorders, cluttering has a very low prevalence, and is not found on the caseload of many SLPs'. Eight-eight SLPs completed a survey comprised of open-ended questions, questions on a modified 7-point Likert scale and demographic questions. These questions were used to determine their definition of cluttering based on the features of cluttering (as determined by the published literature on cluttering) and their self-reported confidence in assessment of the individual features of cluttering and their overall confidence in assessment, diagnosis and treatment of cluttering. There was a positive relationship between SLPs' definition of cluttering and the current cluttering literature as well as a significant difference between SLPs' self-reported confidence in assessment of the individual features of cluttering and cluttering overall. Self-reported years experience was correlated with overall confidence in assessment, diagnosis and treatment of cluttering, however the correlations were weak. These results support the need for continuing education on cluttering, and the need for a standard method of evaluation of cluttering.

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Introduction

Organization of Introduction

Cluttering is a complex, multifaceted fluency disorder. This literature review will first discuss speech-language pathologists' scope of practice and the frequency of the disorders that are treated. It will then analyze aspects of fluency disorders, reviewing definitions, prevalence of fluency disorders, and research that has been done on cluttering. Next, it will analyze the ways in which definitions assist in assessment, diagnosis and treatment planning. Finally, it will explain other factors that can influence a speech-language pathologist's decision making, including one's level of confidence. This study will address speech-language pathologists' definition of cluttering (e.g., how well the features in their definition correlate with existing literature), and their confidence in assessment. It also aims to document speech-language pathologists' self-reported confidence in decision-making regarding cluttering diagnosis and treatment planning.

Scope of Practice

Speech-language pathologists (SLPs) are required to be educated and knowledgeable on a great number of communication disorders as well as disorders of swallowing. The master's degree is the required degree for entry into practice. Further, SLPs are required to have a certificate of clinical competence (CCC). Continuing

education is required to maintain the certification. SLPs are responsible for assessment, diagnosis and treatment in the general areas of speech, language, and swallowing. Within their scope of practice, SLPs assess, diagnose, and treat disorders of speech sound production, resonance, voice, fluency, language (comprehension and expression), swallowing and feeding (American Speech-Language-Hearing Association, 2007). A person's place of employment greatly impacts both caseload and client-base, which in turn determines the types of disorders that are more frequently seen, diagnosed and treated by individual SLPs. For example, "94% of school-based SLPs regularly serve clients with articulation/phonological disorders" (ASHA, 2008, p.7). Additionally, some disorders of speech, language and swallowing occur with greater prevalence than others, also influencing caseload and client-base.

Frequency of Disorders

The frequency that a speech-language pathologist treats a specific disorder is a result of both their place of employment and the overall prevalence of the disorder. With regard to disorders of voice, roughly 7.5 million people have difficulty using their voice in the United States (National Institute on Deafness and Other Communication Disorders, 2008). The National Institute on Deafness and Other Communication Disorders (2008) estimates that more than 3 million adults stutter which is less than 1% of adults in the United States. Further, it is estimated that between 6 and 8 million people have a form of a language disorder in the United States (National Institute on Deafness and Other Communication Disorders, 2008). Within schools, the majority of SLPs treat students with articulation/phonological disorders and language disorders on their caseload (94%

and 92% respectively). Mental retardation/developmental disability and childhood apraxia of speech occur less frequently than other disorders for a school based SLP (66% and 58% respectively) (American Speech-Language-Hearing Association, 2008). It is clear that prevalence of a disorder and the SLPs' place of employment influence the amount of experience they have with various disorders of speech, language and swallowing.

Overall prevalence of a disorder and place of employment greatly impact a SLP's exposure to various speech, language and swallowing disorders, the same factors contribute to the relative exposure that occurs with fluency disorders. With regard to prevalence of fluency disorders, stuttering and cluttering occur relatively less than other speech-language disorders. The prevalence of stuttering is 1% of the general population. While the exact prevalence of cluttering is unknown, it is thought to be less than stuttering (Brady, 1993). Within the schools, only 67% of SLPs have at least one child with a fluency disorder on their caseload (American Speech-Language-Hearing Association, 2008). Although formally educated and trained to diagnose and treat many disorders, it is not possible for SLPs to have an expert level of knowledge with all disorders. This is particularly the case with the relatively rarer fluency disorders, for which SLPs rated themselves as, "less competent, or even incompetent to work with fluency" (Kelly, Martin, Baker, Rivera, Bishop, Krizizke, Stettler, Stealy, 1997, p. 205) than they do in treating articulation/phonology and language disorders. Understandably, SLPs may be knowledgeable on more frequently seen disorders and relatively less knowledgeable in assessing and treating disorders seen less frequently particularly fluency disorders.

Fluency Disorders

"Fluency disorders" include stuttering and cluttering. As defined by the American Speech-Language Hearing Association (1999), "A fluency disorder is a "speech disorder" characterized by deviations in continuity, smoothness, rhythm, and/or effort with which phonologic, lexical, morphologic, and/or syntactic language units are spoken," (p. 3). This literature review will primarily focus on cluttering; however, it is important for the reader to have a definition of stuttering to reference when discussing similarities and differences between cluttering and stuttering. As defined by Guitar (1998), "stuttering is characterized by an abnormally high frequency or duration of stoppages in the forward flow of speech. These stoppages usually take the form of (*a*) repetitions of sounds, syllables, or one-syllable words, (*b*) prolongations of sounds or (*c*) "blocks" of airflow or voicing in speech" (pp. 10-11). Speech-language pathologists are the clinicians who identify, assess and treat fluency disorders. Although cluttering and stuttering manifest with some traits that are not directly speech-language related, they are fluency disorders and thereby properly within the scope of practice of a SLP.

Cluttering Characteristics in the Literature

In the research literature reviewed for features of cluttering, some features occurred with a relatively greater frequency than others did (see Table I for a frequency of occurrence summary and see the METHOD section for a description of how the literature search was completed). Fifty-two different features were identified in the 29 publications reviewed. Of the 52 features, 48 features were mentioned by fewer than 50%

of the publications. High frequency of occurrence (defined as present in 70% or greater of the publications) was evident for features of cluttering including *imprecise articulation*, and *excessively rapid rate*. Imprecise articulation and rapid rate are features of speech that experts in the field identify with cluttering (ASHA, 2009). Moderate frequency of occurrence (defined as present in 50% to 70% of the publications) was found for features of *excessive number of whole-word, or phrase repetitions in speech*, and *familial factors*. A speaker's *lack of awareness* of their errors was only identified by 48.3% of the publications (14 out of the total 29 publications reviewed). Notably, many of the features with greater frequency of occurrence for example, features of rate, disfluencies in speech and articulation difficulties have been included in the current working definition of cluttering by St. Louis, Myers, Bakker & Raphael (2007), which is discussed in greater detail below. Before presenting a definition of cluttering, it is necessary to discuss general challenges to defining fluency disorders.

Issues with Defining Fluency Disorders

There remains little consensus within the field as to what constitutes cluttering, the best method to diagnose cluttering, and further, how to treat cluttering. The challenge of defining a disorder is not new to the field, as similar problems have also surrounded stuttering (Bakker, 1996; Brundage, Bothe, Lengeling & Evans, 2006; Ward, 2006). Problems in obtaining a solidified definition of cluttering can be attributed to the use of vague terms that are not operationally defined, difficulty in specifying necessary and non-necessary characteristics of cluttering and/or the presence of concomitant disorders.

Lack of a uniform, empirically-based definition compromises assessment, diagnosis and treatment of cluttering. As evidenced by the working definitions proposed, definitions of cluttering have both vague and definable characteristics, which challenge the capability of a SLP to fully understand the disorder. First proposed by Weiss (1964), she defined cluttering as, "…the verbal manifestation of central language imbalance, which affects all channels of communication (e.g., reading, writing, rhythm, and musicality) and behaviour in general." More recently, Myers and St. Louis, (1992) defined cluttering as " …a speech-language disorder, and its chief characteristics are (1) abnormal fluency which is not stuttering and (2) a rapid and/or irregular speech rate," (p. 49). These definitions provide definable characteristics of speech and language, but remain vague without emphasis of specific, measurable parameters (e.g., the amount of syllables or words per minute to quantify 'rapid rate') necessary features or characteristics of the disorder that can aid in assessment, diagnosis and treatment. The terms used in these definitions are not operationally defined and the vagueness is not helpful for SLPs in assessment of cluttering.

An operational definition of the necessary features of cluttering does not currently exist. It is possible that one could operationally define 'necessary' as those characteristics mentioned by over 70% of the publications on cluttering. Given this proposed criteria for a 'necessary' characteristic, our tally indicates that a person would only have to exhibit *imprecise articulation* and *excessively rapid rate* in order to receive a cluttering diagnosis (see Table 1). Further, if 'necessary' was operationally defined as those characteristics mentioned in 55% of the publications or greater the previously mentioned characteristics would have to be present as well as *excessive number of whole-word, or phrase*

repetitions in speech and *familial factors*. However, it is not clear from the literature if these features are the essence of what differentiates cluttering from other disorders that co-occur with cluttering or disorders that simply have similar features. The use of a set of operationally defined necessary criteria for cluttering might be a logical first step in providing SLPs with the ability to more accurately determine what is truly cluttering when assessing, diagnosing and then planning treatment for a person who clutters.

Further hindering the ability to obtain an agreed upon definition is the coexistence of other disorders with cluttering. Cluttering rarely occurs independently as a pure speech disorder; other disorders and their associated features accompany this disorder (St. Louis, et al., 2007). Cluttering can coexist with other communication disorders, learning or attention deficits, pragmatic problems and motor planning difficulties (St. Louis et al., 2003; St. Louis, et al., 2007), some of which share similar speech and language characteristics with cluttering. It is uncommon to find a clutterer who exhibits features only associated with a diagnosis of cluttering (Daly & Burnett, 1996). This coexistence with other disorders further challenges the ability of a speech-language pathologist to make an accurate, precise identification of cluttering.

Relationships between cluttering and stuttering (Preus, 1996; Ward, 2006), attention deficit hyperactivity disorders (St. Louis, et al., 2007; Ward, 2006), language disorders (St. Louis & Myers, 1995; St. Louis, et al., 2007; Ward, 2006), and learning disabilities (St. Louis & Myers, 1995; St. Louis, et al., 2007; Preus, 1996; Ward, 2006) have been discussed in the literature. Articulation difficulties (St. Louis & Myers, 1995; St. Louis, et al., 2007; Ward, 2006) and rate deviations also coexist with cluttering (St. Louis & Myers, 1995; St. Louis, et al., 2007). In addition to these concomitant disorders,

Preus (1996) identified relationships between cluttering and psycholinguistic disorders, minimal brain dysfunction (MBD), language learning disorders (LLD), and central auditory processing disorders (CAPD). The possibility of any of these disorders coexisting with cluttering complicates the application of a uniform set of criteria and the ability for a SLP to accurately, consistently diagnose a person who clutters. The presence of other disorders with similar characteristics makes for a possible overlap between disorders, and further challenges a SLP to establish which disorder is contributing to the specific symptom, and if the cluttering characteristics can be accounted for by the other disorders.

A "Working Definition" of Cluttering

Fluency disorders are notoriously difficult to define and identify (Bakker, 1996; Brundage, Bothe, Lengeling & Evans, 2006; Ward, 2006). With respect to cluttering, St. Louis, et al., (2007) provide the elements of a *good* definition: "It requires the identification of those critical features of the condition or symptoms without which a person would not be regarded as a clutterer. Moreover, it must also not include symptoms that may – but do not necessarily accompany the essential symptoms" (St. Louis, et al., 2007, p. 300). For assessment and diagnosis (and ideally treatment) to be valid and accurate, it is essential that SLPs adhere to conditions set forth by such definition. St. Louis et al.'s criteria for a *good* definition reiterates the need for specificity in a working definition of cluttering. Absent a *good* definition, SLPs cannot be expected to follow a uniform, agreed upon specific criteria for assessment, diagnosis and treatment planning.

While there is not currently a single, agreed-upon definition of cluttering within the field, for the purposes of this paper St. Louis, et al.'s (2007) definition will be used. This definition attempts to incorporate aspects from previous [proposed] definitions as well as including additional, new information. St. Louis and colleagues (2007) propose the following definition:

> Cluttering is a fluency disorder characterized by a rate that is perceived to be abnormally rapid, irregular or both for the speaker (although measured syllable rates may not exceed normal limit). These rate abnormalities further are manifest in one or more of the following symptoms: (a) an excessive number of disfluencies, the majority of which are not typical of people who stutter; (b) the frequent placement of pauses and use of prosodic patterns that do not conform to syntactic and semantic constrains; and (c) inappropriate (usually excessive) degrees of coarticulation among sounds, especially in multisyllabic words (St. Louis et al., 2007, pp. 300-301).

This definition serves to create a framework for the necessary elements that distinguish cluttered speech from other types of nonfluent speech, such as stuttered speech. It also begins to confront the challenges of previously used vague characteristics. Given that this is a working definition, not a uniform, agreed upon definition within the field of speech language pathology it still presents some challenges for application. Uniform application of agreed-upon, common characteristics will lead to determination of appropriate treatment measures for this fluency disorder. When confronted with the current state of affairs (vague, ill-defined definitions), clinicians often rely on rubrics or heuristics to guide decision-making. These are discussed in following sections.

Use of Rubrics, Scales and Checklists in Evaluation

When faced with a less frequently diagnosed disorder or a less prevalent disorder, a SLP must determine the appropriate method for accurate assessment. Rubrics, scales and checklists provide methods for SLPs to more objectively evaluate the possibility of a disorder, particularly one that they are less familiar with. SLPs rely on rubrics to increase their confidence and their accuracy in decision-making. These evaluation measures are used for a variety of speech-language disorders including disorders of voice, language and fluency (Bzoch, League & Brown, 2003; Cooper, 1973; Gilliam & Miller, 2008; Special Interest Division 3, 2002). After completion of a rubric, scale or checklist, SLPs may refer back to definitions of disorders to solidify the diagnosis. By referring back to the definition of the disorder, the SLP is ensuring that their diagnosis, based on the objective measure, is consistent with the conditions set forth in a definition that is accepted within the field of speech-language pathology (Perkins, 1983). Further, the information from the more objective evaluation measure considered in conjunction with the definition will determine the appropriate course of treatment.

Currently, the Predictive Cluttering Inventory *(PCI)* (Daly, 2006) is used for evaluation of possible cluttering or cluttering-stuttering. The *PCI* is a list of 33 descriptive statements in the categories of pragmatics, speech-motor, language-cognition and motor coordination-writing problems. Each statement on the *PCI* is rated on a 7-point scale with 0 indicating "never," 3 indicating "sometimes," and 6 indicating "always." A total score is obtained to determine whether the speaker being evaluated is a pure clutterer, a clutter-stutterer or neither. The *PCI* does not evaluate the possibility of a pure

stuttering. Previous versions of the *PCI* were modified to create the updated, 2006

version. A total of 60 fluency experts from around the world were asked to rate, and then

rank a set of features based on their accuracy in indicating a person who clutters. These

features were then used to update the *PCI* (Daly, 2006). The *PCI* is based on expert

opinion, which is a relatively less rigorous method for determining the validity of such an

instrument. Moreover, a significant intra-rater agreement (p=<.05) between the experts

who were consulted was only present for 3 of the 33 characteristics of the rubric (Ward,

2006). To date no research has been published that assesses the validity, reliability or

specificity with which the *PCI* identifies people who clutter. If the *PCI* contains

characteristics not mentioned frequently in the cluttering literature, then there is the

possibility that some of the *PCI* ratings are not necessary or valid for cluttering diagnosis.

Use of rubrics such as the PCI can have positive and negative impacts on the

decision making process used by a clinician. If valid and reliable, rubrics can guide

clinicians to an accurate diagnosis based on information retrieved using the rubric.

However, rubrics can lead to incorrect diagnoses if they are followed without knowledge

of the disorder or confidence in clinical decision-making. Other factors, aside from lack

of knowledge, can influence a SLP's decision-making.

Factors Influencing Decision-Making

Decision-making can be influenced by a professional's knowledge, expertise and

confidence relative to a specific topic or disorder (Berliner, 1994). In addition,

availability and intuitive bias can impact decision-making.

Knowledge of the Disorder

Having a specific basis of knowledge of one disorder, and greater knowledge of other disorders clearly impacts a professional's decision-making abilities. Importantly, in the case of cluttering, we do not know the amount of knowledge that SLPs have about the disorder as we do for stuttering (Kelly, et al, 1997). Often referred to as *the orphan of speech pathology* (Daly, 1986; St. Louis, et al., 2007; Weiss, 1964), cluttering poses many challenges to speech-language pathologists (SLPs) in assessment, diagnosis and treatment. These challenges could be attributed to minimal professional exposure to cluttering, the absence of an agreed upon definition of cluttering, or lack of information about cluttering within the field of speech-language pathology. There is currently no research detailing SLPs' scope of knowledge and understanding of cluttering; this type of research has been conducted for stuttering (Kelly, et al, 1997). In a survey of 157 school-based SLPs, Kelly and colleagues (1997) determined that the majority of respondents perceived their confidence treating students who stutter to be reduced when compared to treating students with articulation/phonological or language difficulties (Kelly, et al., 1997).

With regard to fluency disorders in general, Yaruss and Quesal (2002) surveyed 159 graduate programs, and determined that between 1997 and 2002 there was an increase in graduate programs that allowed students to graduate without any academic or clinical training in fluency disorders. Thus, newly educated SLPs may not have been exposed to guided clinical practica with persons who clutter, making it difficult for these SLPs to make knowledgeable and confident treatment decisions with this population. As previously discussed, when compared to other speech-language disorders, cluttering and

stuttering and low prevalence disorders (Brady, 1993). A SLP's place of employment

may further contribute to their lack of exposure to cluttering, which could lead to

inaccuracies in diagnosis and treatment.

The relative rarity of fluency disorders may contribute to a lack of SLP

confidence in assessing, diagnosing, and treating cluttering. This potential impact has

been researched on treatment of stuttering; Brisk, Healey and Hux (1997) found that only

60% of SLPs who responded to their survey were confident in their self-perceived ability

to create appropriate treatment goals for students of all ages who stutter.

Influence of Expertise

Professional expertise influences confidence and decision-making. Expertise is

the concept that one has the skill of an expert; that they have special skills and knowledge

in a particular area that is representative of mastery of a specific subject (Merriam-

Webster, 2003). Professionals who consider themselves experts on a given topic or in a

given field are often sought after for advice, or for information from those who do not

have the same level of expertise or knowledge in a given situation. As explained by

Kennedy and Barnes (1994), "Expert practitioners are engaged in a continual process of

reinventing their practices – of using their experiences both to devise their practices and

to revise their theories of practice" (p. 196). Professionals with expertise have a caliber of

knowledge and skill due to education and experience thus making them the source for

other professionals to consult for assistance (Hagbaghery, Salsali, Fazlolah, 2004). The

skills and abilities of an expert are founded on experience, training and professional

insight. As professionals gain increased training and experiences with like situations,

they develop familiarity and confidence with features that constitute a particular diagnosis.

As seen in research of teachers, experts are more accurate and adept in recognizing patterns when compared to novices (Berliner, 1994). A novice is lacking in experience and professional insight and thereby [properly] reliant, in part, on those with greater experience, again suggesting that there are many factors influencing a clinician's decision making.

Impact of Availability

The concept of availability suggests that events are judged based on examples that easily come to mind due to similarities of the specific event that has occurred to events that have occurred previously (Tversky & Kahneman, 1974). Applying the availability concept to speech language pathology, given the relative lack of exposure to cluttering when compared to stuttering, it is likely that speech-language pathologists are more inclined to diagnose a person with a fluency disorder as a stutterer rather than a clutterer. Tversky & Kahneman (1974) discuss bias due to retrievability of instances whereby decisions are based on the number of occurrences, or the frequency with which they recall the same (or very similar) event taking place. This may lead to more diagnoses of stuttering than cluttering simply based on the bias of retrievability of instances where clinicians have been exposed to stuttering and cluttering.

Intuitive Bias Hypothesis

The role of confidence is essential when making decisions. As explained by Simmons & Nelson (2006), the *intuitive bias hypothesis* suggests that, "because intuitions are often held with high confidence, people will choose intuitive options more frequently than equally valid nonintuitive options," (p. 411). The concept of *intuitive bias* suggests that given a scenario in which a decision must be made, it is more likely that a person will decide based upon intuition due to greater confidence and comfort even if there is equal support for the non-intuitive choice. For example, we might reasonably assume that the majority of speech-language pathologists have some basis of knowledge about stuttering and [relatively] less knowledge on cluttering. Given that the two disorders have similar characteristics, it logical that speech-language pathologists would be intuitively confident to misdiagnose cluttering as stuttering or a language formulation disorder. This possible misdiagnosis could be due to the similar features that the two disorders share and the relatively less amount of knowledge that SLPs have about cluttering when compared to stuttering. This [comparatively] larger knowledge base in stuttering, and exposure to more stuttering than cluttering, reinforces a possible intuitive confidence that all clients with possible fluency disorders must be stutterers as opposed to clutterers.

Self-Rated Confidence

Self-rated confidence also impacts decision-making. Confidence is the amount of certainty, or the belief that a decision or statement is correct. Relative to decision-making, confidence is the degree of certainty that a person has in his or her own decision, or the degree of certainty that someone else may have in the decision being made. While

researching extreme confidence, Fischoff, Slovic and Lichtenstein (1977) determined that people are wrong quite often, even when they are very confident that their answer is correct. This high level of confidence, or certainty in their response allowed participants to "risk money… in both hypothetical and real gambles," (p. 561). Fischoff and colleagues (1977) provide a possible reason for this over confidence in participants' responses; they suggest that people must use prior knowledge or information to infer the answer. While inferring the answer based on prior knowledge, people do not critique or criticize their response as carefully or cautiously as necessary to ensure an accurate answer. With regard to speech-language pathology, 'gambles' and use of prior knowledge might be considered in a diagnosis of a disorder with extreme confidence that is based on little prior knowledge of the disorder, and not obtaining further pertinent information to substantiate the decision.

In a study of nurse's clinical decision making, participants identified self-confidence as their belief in their own capabilities (Hagbaghery, Salsali, Fazlolah, 2004). Further, lack of self-confidence can result in self-doubt leading to lack of participation in decision-making, or constant questioning of the decisions they have made. Moreover, nurse's reduced self-confidence can cause them to "relinquish the authority to those perceived as being better," (Hagbaghery, Salsali, Fazlolah, 2004, p. 7). Given their broad scope of practice, and education in many areas, SLPs' lacking self-confidence may look to experts in a given domain of speech language pathology to assist in more accurate decision-making. Alternatively, SLPs might have high levels of self-reported confidence and not seek out experts prior to decision-making. Both of these possibilities have the potential to result in an inaccurate decision with varying degrees of confidence.

Essentially, one could be highly confident but make incorrect decisions; conversely one might be less confident, but be able to make the correct decision if one had enough knowledge of the disorder. As discussed by Siegel (1982) it is nearly impossible to be successful in any profession without self-confidence in assessment and treatment, however extreme confidence in conjunction with very high expectations of client success may yield a lack of trust in the clinician.

Summary

Speech-language pathologists are Master's educated clinicians with a certificate of clinical competence (CCC), which requires continuing education for maintenance. Within their general scope of practice, SLPs assess, diagnose and treat disorders of speech language and swallowing. Their place of employment impacts their caseload and client base in turn impacting the frequency with which they assess and treat specific disorders. Cluttering is fluency disorder that is low in prevalence and has been very challenging for SLPs to uniformly define. This impacts the ability of a SLP to accurately and consistently assess, diagnose and plan treatment for the disorder. Due to difficulties in defining cluttering, and the relatively low prevalence of cluttering, SLPs have relatively less training on cluttering than other disorders of speech, language and swallowing.

Knowledge of a disorder will influence confidence in decision-making, and perhaps the accuracy of the decision. Confidence can lead to biases in decision-making as well. Over confidence or a lack of confidence in one's knowledge or skills can greatly impact decision-making. Inaccurate perceptions of knowledge therefore should be the

first step of a continuing education effort in cluttering, if it turns out that SLPs' have

inaccurate knowledge of cluttering. This study aims to document the knowledge SLPs of

cluttering, e.g., how well SLPs knowledge correlates with existing literature. This study

also addresses SLP confidence in decision-making regarding cluttering diagnosis and

treatment; it could be that SLPs are knowledgeable but not confident or vice-versa. Our

findings will assist professional organizations such as ASHA to develop appropriate

continuing education efforts concerning cluttering assessment and treatment.

Research Questions

The current study answers the following questions:

1. How well do the features in SLPs' definition of cluttering correlate with existing

     literature on cluttering?

2. Is there a difference between SLPs' self-rated confidence in assessment of the

     individual features of cluttering, and assessment of cluttering as a whole?

3. Is there a correlation between years of experience and overall confidence in

     assessment, diagnosis and treatment of cluttering?

4. Is there a correlation between years of experience and SLPs' definition of

     cluttering (based on the individual features)?

5. Is there a correlation between overall confidence in assessment, diagnosis and

     treatment of cluttering?

Method

Survey Development

Overview of Survey

A survey was created to assess Speech-Language Pathologists' definition of cluttering based on the individual features of cluttering and confidence their in assessment of cluttering. The survey included five sections: *general knowledge about cluttering*, *definition of cluttering*, *confidence with assessing of individual features associated with cluttering* and *overall confidence in assessing, diagnosing and treating cluttering* and *demographic/background information*. See Appendix A for the complete survey.

The first section of the survey, assessing SLPs *general knowledge about cluttering* contained three open-ended questions asking how SLPs would define cluttering, the criteria they would use to diagnose cluttering and resources they would use to assess possible cluttering.

The second section of the survey contained 34 questions assessing SLPs' *definition of cluttering*. Participants were provided with the carrier phrase "A person who exhibits cluttering has" followed by a list of 34 speech features to complete the statement. Participants were asked to rate each feature on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). Features provided for SLPs to rate were

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obtained through a comprehensive review of the cluttering literature from 1964 to June 2008.

The third section of the survey contained 37 questions. The first 34 questions assessed SLPs' *confidence in assessment* of the individual features of cluttering, mirroring the 34 features in the participants' *definition of cluttering section*. The fourth section was comprised of 3 questions assessing SLP's *overall* confidence in assessing, diagnosing and treating cluttering. For all questions assessing confidence with assessment, SLPs rated themselves on a 7-point Likert-type scale from 1 (not confident at all) to 7 (highly confident). To account for the possibility of an order effect, the features of cluttering (in both the *definition of cluttering* and *confidence in assessment of specific features* sections) were presented in a computer generated random order for each participant in each section.

The final section of the survey, *demographic/background information*, was designed to obtain information regarding participants' professional and educational experiences. Participants were asked multiple choice, yes/no and free-response questions. These questions obtained information regarding the participant's highest level of education, continuing education units, licensure and caseload.

Selection of Survey Items

To identify characteristics in the research literature pertinent to cluttering, we created a tally of features based on frequency of occurrence of various characteristics mentioned in the peer-reviewed, published literature from June 1964 to June 2008. Peer reviewed articles, chapters in books and whole books were obtained by searches in the

electronic databases Linguistics and Language Behavior Abstracts, Ovid PsycINFO, and

Ovid Medline by searching for "clutter" and the appropriate truncation symbol for each

database in the title/keyword of the publications. These search results were reviewed to

include only results pertaining to cluttered speech (as opposed to cluttering/hoarding

which is common in the psychology literature), and to only include articles published in

English. Books and whole chapters from books were included in the literature review

such that only most recent editions of books were used. Only chapters directly pertaining

to cluttering were included; short summaries of cluttering such as that found in Boone

(1987) were not included. Further, data from the same subjects used multiple times were

only included once (for example, the two subjects used by St. Louis, Myers, et al., 1996

and by Myers & St. Louis, 1996). Publications that did not discuss pure, organic

cluttering were not included as part of the feature frequency count, for example, articles

discussing clutterer-stutterers (Craig, 1996), or neurogenic clutterers (Thacker & De Nil,

1996). Published research on cluttering is primarily case-based, and descriptive rather

than experimental. Given the relatively minimal amount of research on pure cluttering,

features presented in single case studies were included in the tally of cluttering features.

This resulted in 29 articles for review to obtain a ranking of the most-to-least frequently

mentioned characteristics of cluttering.

The first author read all of the articles and books, and made a frequency count of

all the features associated with cluttered speech based on the aforementioned literature

review. This tally revealed a variety of features, some identified in nearly all of the

publications, ranging to features that were identified in only one publication (see Table I

for feature tally). As this list was quite lengthy, the features selected for inclusion in the

survey were selected to represent the frequency distribution of features on the larger list. Features chosen for use in the survey are marked in **bold** in Table I.

Features of speech were also added to the survey that were indicative of stuttering, but not cluttering, as well as features not representative of stuttering or cluttering. Features indicative of stuttering were included to determine if SLPs were able to differentiate between stuttering and cluttering. Features neither indicative of stuttering nor cluttering were included to verify that SLPs were able to distinguish between other disorders (not related to fluency) and cluttering. Five of the features representative of cluttering only were selected, and re-worded slightly to be included in the survey as an assessment of intra-rater reliability, these five features were the same for the *definition of cluttering* section and the *confidence in assessment* section.

In the first section of the survey, open-ended questions were developed to obtain SLPs' general knowledge about cluttering. SLPs were asked to define cluttering, explain what criteria they would use to diagnose someone with cluttering, and what resources they would use to assess possible cluttering. The open-ended nature of these questions allowed for a sense of knowledge prior to questions with specific features listed. These data were not analyzed for this study.

For the second section of the survey, to generate questions assessing participants' definition of cluttering and their confidence in assessment, features were selected to sample across frequency of occurrence within the literature. Questions assessing SLPs' definition of cluttering were answered with regard to agreement of the feature being present in a person who clutters using a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree). This same sample of features was used to create questions

regarding participants' definition of cluttering and their confidence in assessing features of cluttering. Questions were also created to determine SLPs' overall confidence in assessing, diagnosing and treating cluttering. All questions regarding confidence were answered using a 7-point Likert-type scale from 1 (not confident at all) to 7 (highly confident).

Survey Item Reliability

After completion of the literature review, and tally of features present in the literature, reliability of the presence of features was assessed. Once the features of cluttering present in the literature were reliably identified, survey questions were generated. To determine the first author's reliability in identifying cluttering characteristics in the publications she reviewed, 25% of the publications reviewed by the first author that were selected for reliability measures. Publications were chosen to account for the relative occurrence of features within the literature (features that were present in the first author's tally more were representatively distributed in the selection of publications given to judge), the range of publication dates and the type of publications. A graduate student in the Speech and Hearing Sciences Department at the George Washington University served as the judge for reliability. The student had completed one graduate level course on fluency disorders and had clinical experience with two clients who stuttered. This judge independently read 25% of the publications from the literature review. Inter-judge reliability was calculated for identification of features from approximately 25% of the sample (7 of 26 publications). The reliability judge was provided with 7 publications (2 chapters from books, and 5 peer reviewed journal

articles) as well as a spreadsheet, which contained the publication and a list of 52 possible features present in each of the publications. For each publication reviewed, the reliability judge was asked to read the portions of each article or chapter that discussed features associated with cluttering. These sections were highlighted before the publications were provided to the reliability judge. After reading the highlighted sections, the reliability judge was instructed to tally the features that she felt were present in the publication on the spreadsheet containing the 52 possible features in each article or chapter. The reliability judge was asked to count a feature only once per publication even if it was discussed more than once within the article or chapter. For example, if the authors listed features, then explained each individual feature the reliability judge counted that feature only once, not twice. Inter-judge reliability of feature selection was .88 (326 of 371 features identified). Total number of feature agreements was 326. Total number of feature disagreements was 45. Of the disagreements, 18 of the 45 were a result of differences in interpretation of descriptions (of features) between the first author and the reliability judge, 25 of the 45 errors were a result of the reliability judge not adhering to all directions for feature selection, and 2 of the 25 errors were due to incorrect tallying by the first author. The first author and reliability judge discussed the disagreements and came to consensus about each one Once disagreements between the first author and reliability judge were resolved inter-judge reliability for the selection was 1.0.

The survey was placed online to make it accessible to SLPs in broad geographic locations, therefore facilitating a larger number of participants. The online survey, and data collected while participants completed the survey were secured through Secured Socket Layer (SSL) on www.surveymonkey.com. Participants were given the option of

completing the survey through paper and pen if they desired. The final survey contained 87 questions and took 10 to 15 minutes to complete. See appendix A for survey.

Survey Testing

Following completion of survey question development, 3 people completed the survey [using paper and pen] and provided feedback on ease of use, and the amount of time necessary to answer all questions. Based on feedback, wording of some demographic questions was revised. For example, question 8b in the demographic section was changed from "If yes, approximately how many activities related to fluency disorders in the last three years?" to read "If yes, approximately how many CEUs related to fluency disorders in the last three years?" After all changes were made to the survey, it was placed online at www.surveymonkey.com.

Procedure

Participants were recruited through email and flyers at university speech-language clinics, school systems, private schools, private speech-language practices within the Washington, DC metropolitian area, and via professional contacts of the George Washington Uuniversity Speech and Hearing faculty as well as the following professional listservs: American Speech-Language Hearing Association (ASHA) Special interest Division 4 (Fluency and Fluency Disorders Division), Special Interest Division 3 (Voice and Voice Disorders), Special Interest Division 16 (School Based Issues), Special Interest Division 2 (Neurophysiology and Neurogenic Speech and Language Disorders).

Given the nature of an openly accessible online survey, researchers could not control which of the recruited participants completed the survey. However, researchers were able to use demographic information provided by participants to make certain that data was only used for participants who met the defined criteria. Participants were licensed speech-language pathologists who had completed their clinical fellowship year (CFY).

Through recruitment materials, participants were provided with the link to www.surveymonkey.com/cluttering to access the survey online. The survey was accessible from October 1, 2008 through December 31, 2008. Once participants accessed the survey at www.surveymonkey.com/cluttering they were presented with an Institutional Review Board (IRB) approved information sheet about the purpose of the research and questions they would be asked; consent for participation was not required because the study was approved as "exempt" by the IRB at the George Washington University. After reading the information sheet, participants had the option to continue with the survey by selecting "next" on the bottom of the webpage. Consent was inferred by their entering the survey. Following the information sheet participants first answered 3 open-ended questions about their definition of cluttering, criteria they would use to diagnose cluttering and resources they would use to assess possible cluttering. Next, to assess SLPs' *definition of cluttering*, participants answered 34 questions on a 7 point Likert-type scale regarding features of cluttering followed by 34 similar questions regarding their self-perceived *confidence in assessment* of individual features associated with cluttering and then 3 questions pertaining to *overall confidence* with assessing, diagnosing and treating cluttering. The final section of the survey was the demographic

information, which contained questions pertaining to professional and educational experiences and general demographic data. The survey was developed such that as participants completed one section of the survey and proceeded to the following section they were not permitted to return to a previous section. Participants completed the survey sections regarding *definition of cluttering,* and *confidence with assessing of individual features associated with cluttering* in a random order determined by www.surveymonkey.com that was different for each survey completed.

Survey Response

A total of 99 speech-language pathologists began the survey, with 93 using the online method and 6 using paper and pen. Eleven surveys were incomplete and these were eliminated from further analyses. The 11 incomplete surveys were characterized by participants who did not answer all of the questions, for example did not complete entire sections of the survey. The remaining 88 completed surveys were used for all analyses.

Participants

Participants were 88 speech-language pathologists who have been practicing for an average of 16.71 years (range: 1 year to 45 years). With regard to specialty certification, 17% ($n = 15$) of the participants held a specialty certification in fluency (BRS-FD) and 28.4% ($n = 25$) were members of Special Interest Division 4 (Fluency and Fluency disorder), however only 5.7% ($n = 5$) were members of the International Cluttering association. Further, 63.6% ($n = 56$) of the participants had engaged in formal continuing education activities relevant to fluency disorders (e.g. workshops,

conferences, in service training, etc.). The majority of participants did not consider themselves people who stutter (97.7%; $n = 86$) and did not consider themselves people who clutter (98.9%; $n = 87$).

Data Entry and Data Cleaning

Data collected online at www.surveymonkey.com as participants completed the survey online. Data for the participants who completed the survey using paper and pen was entered into www.surveymonkey.com by the first author. After all data were collected, and entered into www.surveymonkey.com a filter was applied to the data such that only participants who had answered all questions (fully completed all portions of the survey) would be compiled. After this filter was applied to the surveys, the remaining data were downloaded directly to an excel spreadsheet. These data were then sorted in the excel spreadsheet in the prescribed order in which the questions were originally entered to create the survey.

Results

The means, modes, and medians, and standard deviations for definition of

cluttering based on individual features of cluttering are reported in Table II. The means,

modes, medians, and standard deviations for self-rated confidence in assessment of

individual cluttering features, and overall confidence in assessment, diagnosis, and

treatment of cluttering are also reported in Table II. For definition based on individual

features of cluttering, there was not a significant difference between the mean and median

scores (t = -1.97, df = 28, p = .06); this finding led us to perform the remainder of our

statistical analyses using the means for definition based on individual features and for

self-rated confidence, in order to keep the comparisons the same between definition and

confidence. Visual inspection of Table II suggests that the means and medians for self-

rated confidence are not that different. Further, we interpreted the relative strength of the

correlations calculated to answer the research questions, rather than significance. As

explained by Sheskin (2003), correlations between $0 \leq r < .3$ were considered weak, $.3 \leq$

$r < .7$ were considered moderate and $.7 \leq r \leq 1.0$ were deemed strong.

Intra-Judge Reliability

Intra-judge reliability was calculated for features used to assess SLPs' definition

of cluttering and confidence in assessment with features of cluttering by having

participants re-rate five features with slightly modified wording. For example, "excessively rapid rate" and "a very fast rate" [of speech]. The same five features, with the same modification in wording were used for both definition and confidence sections. To calculate intra-rater reliability, we defined a 'disagreement' as a difference greater than two Likert-scale points (on a 7-point scale) between the two ratings.

Point-to-point intra-judge agreement was calculated as the number of agreements divided by the number of agreements plus disagreements. We calculated point-to-point agreement for each of the five features (see Table III). Intra-rater agreement for knowledge ratings ranged from 94-100% agreement. Intra-rater agreement for confidence ratings ranged from 95-100%.

Additionally, we visually inspected each participant's data set, and verified that the overall intra-judge rating across all five re-rated features for each participant was 80% or greater. This was true for all definition and confidence ratings, therefore all participants were included in data analysis as the intra-rater reliability was 80% across the five features for both sections. None of the participants had more than one instance where their difference in rating was 3 or greater throughout both sections. Point-to-point intra-rater reliability for self-reported definition and confidence is reported in Table III.

Speech-Language Pathologists Definition of Cluttering

Research question 1: How well do the features in SLPs' definition of cluttering correlate with existing literature?

We calculated a Spearman Rank-Order Correlation Coefficient to determine if SLPs' average self-reported definition of cluttering based on the individual features

correlated with the rank ordered frequency of features in the existing cluttering literature. Mean scores for self-reported definition were strongly correlated with rank of features in the cluttering literature (r = .716, p = .000, 2-tailed) (see Table IV for r and r^2 values). This indicates that SLPs' definition of cluttering is strongly correlated with the true state of the literature.

Speech-Language Pathologists Confidence

Research Question 2: Is there a difference between SLPs' self-rated confidence in assessment of the individual features of cluttering, and assessment of cluttering as a whole?

A paired samples t-test was used to determine if there was a difference in SLPs' self-rated confidence in assessment of the *individual* features of cluttering versus their self-rated confidence in *overall* assessment of cluttering. A significant difference was found (t = -7.80, df = 87, p = .000) between individual SLP's average confidence in assessment of all of the individual features related to cluttering (mean = 5.45) and their confidence in overall assessment of cluttering (mean = 4.01). SLPs are significantly more confident in assessment of the individual features of cluttering than of cluttering overall.

We calculated another Spearman Rank-Order Correlation Coefficient to determine if SLPs' self-rated *confidence* correlated with the existing features in the cluttering literature. Mean scores for self-rated confidence were moderately correlated with rank of features in the literature (r = 0.318, p = .093, 2-tailed).

Relationships Between Definition, Confidence and Demographics

Research question 3: Is there a correlation between years of experience and overall confidence in assessment, diagnosis and treatment of cluttering?

We calculated a Pearson Product-Moment Correlation to determine if there was a relationship between SLPs' self-reported years of experience and self-reported confidence in overall assessment, diagnosis and treatment of cluttering. Self-reported years experience was moderately correlated with overall confidence in assessment (r= 0.32, p = .003, 2-tailed), weakly correlated with overall confidence in diagnosis (r= 0.29, p= .007, 2-tailed) and moderately correlated with overall confidence in treatment (r= 0.343, p= .001, 2-tailed) of cluttering (see Table V for r and r^2 values). Overall confidence in assessment, diagnosis and treatment only accounted for a small amount of the variance (a large amount of the variance was not accounted for by SLPs' years experience).

Research question 4: Is there a correlation between years of experience and SLPs' definition of cluttering (based on the individual features)?

We calculated a Pearson Product-Moment Correlation to determine if there was a relationship between SLPs' self-reported years of experience and definition of cluttering based on the individual features of cluttering. This was determined by the relative frequency of the features within the current cluttering literature, and SLPs' self-reported strength of agreement with features that a person who clutterers would exhibit. Pearson Product-Moment correlations indicated a weak negative correlation between years experience and excessively rapid rate (r= -0.268, p= 0.012, 2-tailed). These correlations also indicated weak positive correlations between years of experience and hesitations (r=

0.229, p= 0.033, 2-tailed), lack of awareness (r= 0.266, p= 0.013, 2-tailed), delays in speech and/or language (r= 0.257, p= 0.016, 2-tailed), and improved speech with attention (r= 0.279, p= 0.009, 2-tailed) (see Table VI for r and r^2 values). With the aforementioned five exceptions, years of experience did not correlate significantly with participants' definitions of cluttering based on the individual features of cluttering.

Research question 5: Is there a correlation between overall confidence in assessment, diagnosis and treatment of cluttering?

We calculated a Pearson Product-Moment Correlation to determine if there was a relationship between SLPs' self-reported confidence in overall assessment, diagnosis and treatment of cluttering. There was a strong correlation between overall confidence in assessment and overall confidence in diagnosis (r= 0.967, p= .00, 2-tailed) as well as a strong correlation between overall confidence in assessment and overall confidence in treatment (r= 0.856, p= .000, 2-tailed). Overall confidence in diagnosis was strongly correlated with overall confidence in treatment (r= 0.875, p= .000, 2-tailed) (see Table VII for r and r^2 values).

Discussion

Study Overview

     This study aimed to determine SLPs' self-reported knowledge of the features of cluttering and their self-reported confidence in assessment of the individual features of cluttering as well as their overall confidence in assessment, diagnosis and treatment of cluttering. Spearman Rank-Order Correlation Coefficients and Pearson Product-Moment Correlation Coefficients were used to determine if there were significant correlations between variables. To determine if there were significant differences between variables, a paired samples t-test was used. Siegel (1982) suggests that knowledge, skills, and confidence are three variables that are necessary for treatment success. Our study evaluated two of these variables [knowledge and confidence] in the assessment of cluttering.

Definition

     Our findings indicate that SLPs' self-reported definition of cluttering is related to the cluttering literature. Significant correlations between SLPs' self-reported definition of cluttering, and the current cluttering literature suggests that SLPs are aware of what features comprise cluttered speech. SLPs' mean scores for features of cluttered speech

were significantly correlated with the current literature on cluttering. Moreover, examination of the means table (Table II) suggests that SLPs can differentiate cluttering characteristics from stuttering characteristics. Even given vague definitions of cluttering, without operationally defined terms and with the coexistence of other disorders SLPs are able to differentiate the features of cluttering that are in the current literature. Based on our findings, it does not appear that when identifying features of cluttering SLPs are using an intuitive bias as was observed by Simmons & Nelson (2006). For example, SLPs are not intuitively deciding that speech features of stuttering are also speech features for cluttering. Further, this finding suggests a lack of systematic bias that has been found in other decision-making literature (Alba & Hutchinson, 2000). We did not set out to evaluate assessment skills in cluttering, therefore we cannot say that our findings suggest that SLPs use their self-reported knowledge of cluttering during actual assessments (see Future Directions).

Confidence

A second critical variable in successful treatment is clinician confidence (Siegel, 1982; Wampold, 2001). A significant difference was found between SLPs' self-reported confidence in assessment of the *individual features* of cluttering versus their self-reported confidence in *overall* assessment of cluttering. SLPs report more confidence in their ability to assess the individual features of cluttering than they do in assessing cluttering as a whole. This discrepancy in self-reported confidence in assessment could be attributed to a lack of confidence in their knowledge of cluttering as a disorder. If SLPs' do not believe that they have a foundation of knowledge of cluttering then it would be logical

that they would lack confidence in assessment of the disorder as a whole. This lack of

confidence could lead to poorer assessment, diagnosis, and treatment of persons who

clutter. This finding also suggests the need for continuing education opportunities in

cluttering that focus on increasing confidence as well as disorder-specific knowledge; it

appears that SLPs are knowledgeable but not confident in their decision-making.

Confidence and Expertise

One measure of expertise is the number of years of experience in a profession.

We found weak, but significant positive relationships between SLPs' self-reported years

of experience and their self-reported confidence in overall assessment, diagnosis and

treatment of cluttering. However, expertise is not the sole contributing influence to

SLPs' confidence, because these correlations were not strong. Other variables are

influencing their confidence as well. Some possible variables include caseload, location

of employment, level of education, continuing education in fluency disorders and interest

in fluency disorders (as indicated by membership in SID-4).

As evident in research conducted by Hagbaghery, Salsali, Fazlolah, (2004) when

nurses lack confidence they give their decision making power to those who they consider

experts. The SLPs who participated in this study are different from the nurses because

they have confidence in their assessment of the individual aspects of cluttering (more on

this in Future Directions).

Theoretical and Clinical Implications

Many of the publications in the speech-language pathology literature allude to, or clearly state that the field is lacking in evidence-based practice, and that more research is needed within the field (ASHA, 2004). In the cluttering literature, there is a repeated theme of lack of knowledge and understanding of the disorder. This deficit in published research could result in the decreased confidence of SLPs in their knowledge and/or confidence in assessment of fluency disorders. As discussed by Siegel (1982), skills, knowledge and confidence are all essential elements in successful speech therapy. The current study suggests that SLPs' definition of cluttering is consistent with the current cluttering literature, however they are not confident in assessment of cluttering as a whole. It also suggests that SLPs are confident in assessing the individual features of cluttering.

The discrepancy between SLPs' definition of cluttering and their confidence in assessment, diagnosis and treatment creates a valid argument for continuing education on cluttering, focusing on making SLPs aware that they have accurate definitions, which in turn should increase their overall confidence in assessment, diagnosis and treatment of cluttering. When discussing training for specialists in the area of fluency disorder, Brisk and colleagues (1997) explain that providing training to specialists will not remove the need for well-trained non-specialists. Effective continuing education courses on cluttering for current SLPs would primarily focus on improving their awareness and confidence in their definition of cluttering. Once SLPs are confident in their own definition of the disorder, they will be more confident in their ability to assess the disorder. This assumption is supported by data indicating that SLPs are confident in assessing the individual features that the literature identifies with cluttering. In a study of general

practitioners confidence in management of mental health disorders, Browne, Lee and Prabhu (2007) determined that prior education/training and an interest in the area of mental health had a significant impact on the participants' self-reported confidence. Similarly, if SLPs are confident in assessment of the individual features and they do not know that those individual features are 'cluttering' it is logical that if they know that their knowledge of cluttering matches that of the current state of affairs in the cluttering literature they should feel confident in their ability to assess the overall disorder.

Within undergraduate, graduate and doctoral level courses, students need to be educated on the features of cluttering. As more research is conducted in the speech features of cluttering, and assessment, diagnosis and treatment of cluttering, students need to be made aware of the current state of the field so that they are fully informed. While research on SLPs' education in cluttering has not been conducted, Kelly, et al. (1997) did conduct research regarding SLPs educational preparation in stuttering, another fluency disorder. They determined that within the schools, 19% of SLPs had no education at the undergraduate or graduate level in stuttering (Kelly, et al., 1997, p. 202). If SLPs are not completing course work to become educated about stuttering, it can be assumed that they are also not completing course work about cluttering due to its relatively lower prevalence than stuttering. Without this knowledge, they will not feel confident in their abilities as clinicians when working with a person who clutters. Further, lack of confidence in assessment can lead to SLPs relying on rubrics or heuristics, which do not always lead to an accurate diagnosis. They may also rely on experts in the field rather than using their own clinical judgment, skill and knowledge to accurately diagnose a

person who clutters. Findings from this study support a need for development and/or exploration of assessment procedures used when assessing a possible person who clutters.

Currently, the *PCI* (2006) is one of the tools used in assessing and diagnosing a person who clutters; however research has not been conducted to determine if it is a valid and reliable assessment instrument. Given the current status of cluttering within the field, the *PCI* (2006) would have to contain the essential features of cluttering as documented in the cluttering literature, and place greater emphasis on certain speech features (based on their relative frequency in the cluttering literature) to fully encompass the disorder. Determining the validity and reliability of a diagnostic instrument is not an easy or quick task, thus something must be done in the interim to ensure accurate diagnosis of cluttering. This task becomes even more challenging given the lack of a solidified definition to refer to when assessing the diagnostic instrument. Perhaps there should be an agreed upon set of necessary features to obtain a diagnosis of "a person who clutters". There should also be an agreed upon method for evaluation (e.g. a specific length of a speech sample in specifically identified speaking situations).

Further, there is a need for more research to empirically determine what features truly constitute a diagnosis of cluttering. Based on the literature review conducted by the first author, there are only a two features (imprecise articulation, and excessively rapid rate) that 70% or greater of the current publications on cluttering agree upon as 'cluttering'. Before an accurate diagnostic instrument can be devised, or a definition can be agreed upon within the field of speech-language pathology a set of speech features that form cluttering must be created. Also, research must be conducted to determine how the many concomitant disorders affect a diagnosis of cluttering. Once the effect of the

concomitant disorders is established it will have implications for appropriate treatment protocols.

Limitations

Survey Completion

Due to the on-line nature of the survey, some participants began the survey, but did not complete it. This could be attributed to participants' believing that they were answering the same questions in the *confidence* section as they had previously answered in the *definition* section. In future studies we will be sure to highlight more clearly the differences between sections of the survey.

Participants' Definition of Cluttering Section

With regard to questions about *definition* of cluttering, no questions were asked about participants' overall knowledge in assessment, diagnosis and treatment of cluttering. These questions were only asked regarding their overall confidence in assessment, diagnosis and treatment of cluttering. This limited our ability to analyze data to determine if there were correlations between SLPs' self-reported *knowledge* in overall assessment, diagnosis and treatment of cluttering and their self-reported *confidence* in overall assessment, diagnosis and treatment of cluttering.

Demographic Questions

In the demographic section of the survey, we did not account for the possibility of participants outside of the United States of America completing the survey. Given this

oversight, we did not ask questions about the country in which the participants received the majority of their education in speech-language pathology or the country in which they practice and are licensed.

Reliability

To account for the possibility of an order effect, the features of cluttering (in both the knowledge and confidence sections) were presented in a computer generated random order for each participant in each section. Given this computer-generated randomization, there was not a way to determine which ratings of the reliability questions were truly the participants' first or second ratings.

Future Directions

The current study aimed to determine speech-language pathologists' self-reported definition of cluttering based on the individual features of cluttering, their self-reported confidence in assessment of the individual features of cluttering as well as their self-reported confidence in overall assessment, diagnosis and treatment of cluttering. As mentioned above in the limitations section, there were no questions regarding overall knowledge of assessment, diagnosis and treatment of cluttering. Including these additional questions could further support the need for continuing education courses on the speech features of cluttering, and the methods to assess, diagnose and treat cluttering.

To determine if expertise in fluency disorders (based on the BRS-FD) is correlated with participants' definition of cluttering knowledge and/or self-reported confidence in assessment of cluttering it would be beneficial to recruit more BRS-FD to

complete the survey, so that their data could be analyzed. The same recruitment and data analyses could be conducted for members of the International Cluttering Association, and members of ASHA's Special Interest Division 4 (Fluency Disorders). This would allow researchers to determine if a strong interest in a disorder or domain could increase self-reported knowledge and self-reported confidence.

Finally, it would be valuable to code the open-ended response that participants provided as their definition of cluttering to determine if their definitions incorporated features found in the existing cluttering literature. Coding these responses for specific words, namely the features of cluttering, could help determine if there are common misconceptions about cluttering, or features that might be considered common knowledge among SLPs. The analysis of the open-ended responses could help to determine particular information to be used when creating an effective continuing education program and when determining what specific areas of cluttering need to be researched further.

Conclusion

This study researched SLPs' definition of cluttering based on the speech features of cluttering, their self-reported confidence in assessment of the individual features of cluttering, and their overall confidence in assessment, diagnosis, and treatment of cluttering through an on-line survey. Our findings suggest that the features in SLPs' definitions of cluttering are positively related to the current cluttering literature. We also determined that SLPs are significantly more confident in their assessment of the individual features of cluttering, than of cluttering as a whole. Further, we found

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expertise to have a [weak] significant correlation with overall confidence in assessment, diagnosis and treatment of cluttering. These findings have implications for the need for continuing education on cluttering, with an emphasis on increasing SLPs' confidence. SLPs' definition of cluttering based on the individual features of cluttering is related to the current state of the literature, and they are confident in their abilities to assess the individual features of cluttering therefore, SLPs' should not lack confidence in their overall ability to assess cluttering.

Appendix A

Survey completed by participants

SLPs' knowledge of cluttering characteristics and confidence in

Please review the following information sheet.

Information about the Research Study

Speech-Language Pathologists' Knowledge of Cluttering Characteristics and Their Confidence in Assessing Cluttering
IRB# 070819

You are invited to participate in a research study under the direction of Dr. Shelley Brundage of the Department of Speech and Hearing Sciences, George Washington University (GWU). Taking part in this research is entirely voluntary. The status of your employment will not, in any way, be affected should you choose not to participate or if you decide to withdraw from the study at any time.

The purpose of this study is to determine speech-language pathologists' knowledge about cluttering, as well as the features of cluttering and their confidence in assessing cluttering.

If you choose to take part in this study, you will complete a survey, either on-line or on paper, consisting of four sections. You will complete a survey consisting of questions about your knowledge of cluttering, your confidence in assessment of cluttering and general demographic information. The total amount of time you will spend in connection with this study is approximately 15 minutes. You may refuse to answer any of the questions and you may stop your participation in this study at any time.

Possible risks or discomforts you could experience during this study include: possible loss of confidentiality; however, your on-line responses will be anonymous and if you complete the survey using paper and pen, those responses will be coded without your name attached to them. Participating in this study poses no risks that are not ordinarily encountered in daily life.

You will not benefit directly from your participation in the study. The benefits to science and humankind that might result from this study are: a better knowledge of what speech-language pathologists know about cluttering, and the potential for improved continuing education and evaluation procedures for cluttering.

Every effort will be made to keep your information confidential, however, this can not be guaranteed. You will not be asked to provide your name, only demographic information about yourself and professional, educational experiences. If results of this research study are reported in journals or at scientific meetings, the people who participated in this study will not be named or identified. Your place of employment will not be identified by name, but may be identified by type of facility (e.g., school, hospital, private practice).

The Office of Human Research of George Washington University, at telephone number (202) 994-2715, can provide further information about your rights as a research participant. Further information regarding this study may be obtained by contacting Robin Goldberg, graduate student investigator, or Dr. Shelley Brundage at telephone number (202) 994-2205.

To ensure anonymity, your signature is not required in this document. Your willingness to participate in this research study is implied if you proceed with completing the survey/interview.

*You may "print screen" now if you want to retain a copy of this document

SLPs' knowledge of cluttering characteristics and confidence in

Based on your current professional knowledge, please answer the following:

How would you define cluttering?

What criteria would you use to diagnose someone with cluttering?

What resources would you use to assess possible cluttering?

SLPs' knowledge of cluttering characteristics and confidence in

Features of Cluttering

A person who exhibits cluttering has:

	1 (Strongly Disagree)	2	3	4 (No Opinion)	5	6	7 (Strongly Agree)
Robotic speech characterized by monotone speech quality	○	○	○	○	○	○	○
Sensory integration disorder	○	○	○	○	○	○	○
Weakness in musical ability and rhythm	○	○	○	○	○	○	○
Spelling difficulties	○	○	○	○	○	○	○
Poorly organized thinking	○	○	○	○	○	○	○
Familial factors	○	○	○	○	○	○	○
Poor breath support	○	○	○	○	○	○	○
Below average intelligence	○	○	○	○	○	○	○
Heredity influence	○	○	○	○	○	○	○
Delayed speech and/or language development	○	○	○	○	○	○	○
Hyperactivity	○	○	○	○	○	○	○
An unawareness of speech disorder	○	○	○	○	○	○	○
Lack of awareness	○	○	○	○	○	○	○
Better speech with attention	○	○	○	○	○	○	○
Excessively rapid rate	○	○	○	○	○	○	○
Movement of other parts of the body with speech (secondary behaviors)	○	○	○	○	○	○	○
Difficulties with reading	○	○	○	○	○	○	○
Imprecise articulation (e.g. distorts sounds)	○	○	○	○	○	○	○
Speech anxiety due to awareness of errors	○	○	○	○	○	○	○
Atypical pauses in speech	○	○	○	○	○	○	○
Poor readers	○	○	○	○	○	○	○
Poor syntax/poor spoken grammar	○	○	○	○	○	○	○
Tension and struggle when speaking	○	○	○	○	○	○	○
A very fast rate of speech	○	○	○	○	○	○	○
A fear of speaking	○	○	○	○	○	○	○
Poor receptive language (adults)	○	○	○	○	○	○	○
Irregular speech rate; speaks in spurts	○	○	○	○	○	○	○
Disorganized thinking	○	○	○	○	○	○	○
Excessive number of whole-word, or phrase repetitions in speech	○	○	○	○	○	○	○
Hesitations	○	○	○	○	○	○	○
Short attention span/poor concentration	○	○	○	○	○	○	○
Sound prolongations	○	○	○	○	○	○	○
Fluent in multiple languages	○	○	○	○	○	○	○
Interjections, revisions, filler words	○	○	○	○	○	○	○

SLPs' knowledge of cluttering characteristics and confidence in

Confidence in Assessment

Rate your confidence in assessment of the following:

	1 (Not Confident at All)	2	3	4 (Somewhat Confident)	5	6	7 (Highly Confident)
Familial factors	○	○	○	○	○	○	○
Heredity influence	○	○	○	○	○	○	○
Spelling difficulties	○	○	○	○	○	○	○
Excessive number of whole-word, or phrase repetitions in speech	○	○	○	○	○	○	○
Poor readers	○	○	○	○	○	○	○
Tension and struggle when speaking	○	○	○	○	○	○	○
Excessively rapid rate	○	○	○	○	○	○	○
Below average intelligence	○	○	○	○	○	○	○
Imprecise articulation (e.g. distorts sounds)	○	○	○	○	○	○	○
Disorganized thinking	○	○	○	○	○	○	○
Lack of awareness	○	○	○	○	○	○	○
A very fast rate of speech	○	○	○	○	○	○	○
Irregular speech rate; speaks in spurts	○	○	○	○	○	○	○
Poorly organized thinking	○	○	○	○	○	○	○
Atypical pauses in speech	○	○	○	○	○	○	○
Better speech with attention	○	○	○	○	○	○	○
Delayed speech and/or language development	○	○	○	○	○	○	○
Movement of other parts of the body with speech (secondary behaviors)	○	○	○	○	○	○	○
An unawareness of speech disorder	○	○	○	○	○	○	○
Sound prolongations	○	○	○	○	○	○	○
Poor receptive language (adults)	○	○	○	○	○	○	○
Weakness in musical ability and rhythm	○	○	○	○	○	○	○
Short attention span/poor concentration	○	○	○	○	○	○	○
Poor syntax/poor spoken grammar	○	○	○	○	○	○	○
Speech anxiety due to awareness of errors	○	○	○	○	○	○	○
Difficulties with reading	○	○	○	○	○	○	○
Interjections, revisions, filler words	○	○	○	○	○	○	○
Robotic speech characterized by monotone speech quality	○	○	○	○	○	○	○
Poor breath support	○	○	○	○	○	○	○
A fear of speaking	○	○	○	○	○	○	○
Hyperactivity	○	○	○	○	○	○	○
Hesitations	○	○	○	○	○	○	○
Sensory integration disorder	○	○	○	○	○	○	○
Fluent in multiple languages	○	○	○	○	○	○	○

SLPs' knowledge of cluttering characteristics and confidence in

Overall Confidence

Rate your overall confidence in the following

	1 (Not Confident at All)	2	3	4 (Somewhat Confident)	5	6	7 (Highly Confident)
Assessing cluttering	○	○	○	○	○	○	○
Diagnosing cluttering	○	○	○	○	○	○	○
Treating cluttering	○	○	○	○	○	○	○

SLPs' knowledge of cluttering characteristics and confidence in

Demographic Information

1. Do you hold a:

○ CCC-SLP   ○ Dual certification   ○ State license   ○ CFY in progress

2. How many years post-CFY have you been a practicing speech-language pathologist?

[   ]

3. Do you hold a specialty certification in fluency (BRS-FD)?

○ Yes   ○ No

4. Are you a member of Special Interest Division 4 (Fluency and Fluency Disorders Division)?

○ Yes   ○ No

5. Are you a member of the International Cluttering Association (ICA)?

○ Yes   ○ No

6. What is the highest level of education you have completed?

○ Master's   ○ Doctoral

7. Indicate the number of entire courses in fluency disorders that you took at a college/university (if none please indicate "0"):

at the bachelor's level   [   ]
at the master's level   [   ]
at the doctorate level   [   ]

8. Have you engaged in formal continuing education activities relevant to fluency disorders (e.g., workshops, conferences, in service training, etc.)?

○ Yes   ○ No

If yes, approximately how many CEUs related to fluency disorders in the last three years?

[   ]

9. Where do you work?

☐ Private practice   ☐ University/college   ☐ Other
☐ School system   ☐ Hospital

10. Is the majority of your caseload:

○ Preschool   ○ Adolescent (9th -12th grade)
○ School age (kindergarten - 8th grade)   ○ Adult

11. Indicate the total clients on your current caseload

[   ]

12. How many clients on your current caseload have a fluency disorder?

[   ]

13. Do you consider yourself a person who stutters?

○ Yes   ○ No

14. Do you consider yourself a person who clutters?

○ Yes   ○ No

15. Is there anything else that you think we should know about your previous experience with fluency disorders?

[   ]

16. Where have you learned the majority of your knowledge on cluttering?

○ ASHA convention   ○ Internet   ○ Other
○ CEUs   ○ Other professional conferences
○ Colleagues   ○ Textbooks

If other (please explain)

[   ]

SLPs' knowledge of cluttering characteristics and confidence in

Thank You

Thank you for taking the time to participate. This survey is about SLPs' knowledge of the characteristics of cluttering, and their confidence in assessing cluttering. Group results of this survey will be posted on The George Washington University Speech and Hearing Department Website (www.gwu.edu/~sphr/brundage) when the study is completed.

Table I

Frequency of features based on review of the cluttering literature used in survey

*development. Features in **bold** were included in the survey.*

Feature	# Articles Mentioned	% Articles Mentioned	Citations
Imprecise articulation (e.g. distorts sounds)	23	79.3%	Becker, K. P. & Grundmann, K. (1970); Bradford, D. (1970); Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Dalton, P. & Hardcastle, W. J. (1989); Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Grewel, F. (1970); Hartinger, M. & Mooshammer, C. (2008); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Mussafia, M. (1970); Myers, F. L. & St. Louis, K. O. (1996); Pearson, L. (1962); Rieber, R. W., Breskin, S., & Jaffe, J. (1972); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, Hinzman & Hull (1985); St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Tiger, Irvine & Reis (1996); Ward, D. (2006); Weiss, D. (1964); Wolk, L. (1986)
Excessively Rapid Rate	21	72.4%	Becker, K. P. & Grundmann, K. (1970); Bradford, D. (1970); Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Dalton, P. & Hardcastle, W. J. (1989); Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Grewel, F. (1970); Hartinger, M. & Mooshammer, C. (2008); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Mussafia, M. (1970). Myers, F. L. & St. Louis, K. O. (1996); Pearson, L. (1962); Rieber, R. W., Breskin, S., & Jaffe, J. (1972); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Teigland, A. (1996); Ward, D. (2006); Weiss, D. (1964)

Excessive number of whole-word, or phrase repetitions in speech	17	58.6%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Dalton, P. & Hardcastle, W. J. (1989); Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Molt, L. M. (1996); Mussafia, M. (1970); Myers, F. L. & St. Louis, K. O. (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Hinzman, A. R., & Hull, F. M. (1985); Teigland, A. (1996); Ward, D. (2006) Weiss, D. (1964); Wolk, L. (1986)
Familial Factors	16	55.2%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Dalton, P. & Hardcastle, W. J. (1989); Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Molt, L. M. (1996); Mussafia, M. (1970); Myers, F. L. & St. Louis, K. O. (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Hinzman, A. R., & Hull, F. M. (1985); Teigland, A. (1996); Ward, D. (2006); Weiss, D. (1964); Wolk, L. (1986)
Irregular speech rate; speaks in spurts	14	48.3%	Bradford, D. (1970); Daly, D. A., & Burnett, M. L., (1996); Hartinger, M. & Mooshammer, C. (2008); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Molt, L. M. (1996); Myers, F. L. & St. Louis, K. O. (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); Seeman, M. (1970); St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997); .St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Teigland, A. (1996); Ward, D. (2006)
Lack of awareness	14	48.3%	Dalton, P. & Hardcastle, W. J. (1989); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Molt, L. M. (1996); Mussafia, M. (1970); Myers, F. L. & St. Louis, K. O. (1996); Pearson, L. (1962); Rustin, L. & St.

			Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); Seeman, M. (1970); St. Louis, K. O. & Myers, F. L. (1997); Tiger, R. J., Irvine, T. L., & Reis, R. P. (1980); Ward, D. (2006); Weiss, D. (1964); Wolk, L. (1986)
Interjections, revisions, filler words	13	44.8%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Dalton, P. & Hardcastle, W. J. (1989), Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Molt, L. M. (1996); Myers, F. L. & St. Louis, K. O. (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997); Teigland, A. (1996); Ward, D. (2006); Weiss, D. (1964); Wolk, L. (1986)
Repetition of single-syllables	13	44.8%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Dalton, P. & Hardcastle, W. J. (1989); Grewel, F. (1970); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Molt, L. M. (1996); Mussafia, M. (1970); Pearson, L. (1962); Rieber, R. W., Breskin, S., & Jaffe, J. (1972); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); Teigland, A. (1996); Weiss, D. (1964); Wolk, L. (1986)
Auditory processing difficulties	11	37.9%	Blood, G. W., Blood, I. M. & Tellis, G. (2000); Daly, D. A., & Burnett, M. L., (1996); Grewel, F. (1970); Mitrinowicz-Modzejewska, A. (1970); Molt, L. M. (1996); Myers, F. L. & St. Louis, K. O. (1996); Pearson, L. (1962); Teigland, A. (1996); Tiger, R. J., Irvine, T. L., & Reis, R. P. (1980); Weiss, D. (1964); Wolk, L. (1986)
Short attention span and poor concentration	11	37.9%	Arnold, G. E. (1970); Becker, K. P. & Grundmann, K. (1970); Daly, D. A., & Burnett, M. L., (1996); Grewel, F. (1970); Molt, L. M. (1996); Pearson, L. (1962); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); Weiss, D. (1964); Wolk, L. (1986)

Weaknesses in musical ability and rhythm	11	37.9%	Arnold, G. E. (1970); Becker, K. P. & Grundmann, K. (1970); Daly, D. A., & Burnett, M. L., (1996); Grewel, F. (1970); Molt, L. M. (1996); Pearson, L. (1962); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); Weiss, D. (1964); Wolk, L. (1986)
Poor motor performance in general – suggesting dyspraxia	9	31.0%	Arnold, G. E. (1970); Becker, K. P. & Grundmann, K. (1970); Daly, D. A., & Burnett, M. L., (1996); Grewel, F. (1970); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); Seeman, M. (1970); Weiss, D. (1964)
Poor readers	9	31.0%	Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Grewel, F. (1970); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Tiger, R. J., Irvine, T. L., & Reis, R. P. (1980); Weiss, D. (1964); Wolk, L. (1986)
Poor syntax/poor spoken grammar	9	31.0%	Becker, K. P. & Grundmann, K. (1970); Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Molt, L. M. (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007)
Writing difficulties – handwriting is characteristic of generally reduced motor skill	9	31.0%	Bradford, D. (1970); Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Grewel, F. (1970); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Myers, F. L. & St. Louis, K. O. (1996); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Weiss, D. (1964)
Atypical pauses	7	24.1%	Dalton, P. & Hardcastle, W. J. (1989); Pearson, L. (1962); Rieber, R. W., Breskin, S., & Jaffe, J.

			(1972); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Ward, D. (2006); Weiss, D. (1964)
Language disorganized, confused wording	7	24.1%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Daly, D. A., & Burnett, M. L., (1996); Molt, L. M. (1996); Myers, F. L. & St. Louis, K. O. (1996); St. Louis, K. O. & Myers, F. L. (1997); Teigland, A. (1996); Ward, D. (2006)
Robotic speech characterized by monotone festination (i.e., taking faster and faster)	7	24.1%	Dalton, P. & Hardcastle, W. J. (1989); Grewel, F. (1970); Pearson, L. (1962); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); Weiss, D. (1964); Wolk, L. (1986)
Telescopes or condenses words (e.g. omits syllables)	7	24.1%	Dalton, P. & Hardcastle, W. J. (1989); Grewel, F. (1970); Pearson, L. (1962); Rustin, L. & St. Louis, K. O. (1992); Ward, D. (2006); Weiss, D. (1964); Wolk, L. (1986)
Hyperactivity	6	20.7%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Grewel, F. (1970); Pearson, L. (1962); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Tiger, R. J., Irvine, T. L., & Reis, R. P. (1980); Ward, D. (2006)
Poor body coordination	6	20.7%	Daly, D. A., & Burnett, M. L., (1996); Georgieva & Miliev (1996); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996); Pearson, L. (1962); St. Louis, K. O. & Myers, F. L. (1997); Weiss (1964)
Delayed speech and/or language development	5	17.2%	Grewel, F. (1970); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); Ward, D. (2006); Weiss, D. (1964)
Discoordination between pauses and breath groups	5	17.2%	Pearson, L. (1962); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); Weiss, D. (1964)
EEG abnormalities	5	17.2%	Dalton, P. & Hardcastle, W. J. (1989); Grewel, F. (1970); St. Louis,

			K. O. & Myers, F. L. (1997); Weiss, D. (1964); Wolk, L. (1986)
Lack of pauses between words; run-on sentences	5	17.2%	Bradford, D. (1970); Dalton, P. & Hardcastle, W. J. (1989); Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); Ward, D. (2006)
Word retrieval difficulties	5	17.2%	Becker, K. P. & Grundmann, K. (1970); Grewel, F. (1970); Myers, F. L. & St. Louis, K. O. (1996); St. Louis, K. O. & Myers, F. L. (1997); St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007).
Poorly organized thinking	4	13.8%	Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992); Weiss, D. (1964); Wolk, L. (1986).
Better speech with attention	3	10.3%	Grewel, F. (1970); Pearson, L. (1962); Ward, D. (2006)
Circumlocutions common	3	10.3%	Rustin, L. & St. Louis, K. O. (1992); St. Louis, K. O. & Myers, F. L. (1997); Ward, D. (2006)
Language disorder	3	10.3%	Arnold, G. E. (1970); Molt, L. M. (1996); St. Louis, K. O. & Myers, F. L. (1995)
Learning disability	3	10.3%	Daly, D. A., & Burnett, M. L., (1996); Rustin, L. & St. Louis, K. O. (1992); Rustin, L. & St. Louis, K. O. (1992).
Poor intelligibility	3	10.3%	Bradford, D. (1970); Myers, F. L. & St. Louis, K. O. (1996); St. Louis, K. O. & Myers, F. L. (1997)
Pragmatic language disorder	3	10.3%	St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007); Daly, D. A., & Burnett, M. L., (1996); Lees, R. M., Boyle, B. E., & Woolfson, L. (1996)
Articulatory variability	2	6.9%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985); Hartinger, M. & Mooshammer, C. (2008)
Do not think faster than they can speak but speak quickly	2	6.9%	Grewel, F. (1970); Weiss, D. (1964)

Hesitations	2	6.9%	Molt, L. M. (1996); Wolk, L. (1986)
Little physiologic tension or struggle	2	6.9%	St. Louis, K. O. & Myers, F. L. (1995); St. Louis, K. O. & Myers, F. L. (1997)
Poor listeners	2	6.9%	Molt, L. M. (1996); Weiss, D. (1964)
Amusia	1	3.4%	Grewel, F. (1970)
Difficulty dividing a polysyllabic word into its proper components	1	3.4%	Pearson, L. (1962)
Difficulty with appropriate syllable stress	1	3.4%	Pearson, L. (1962)
Dysrhythmia more apparent in expressive than receptive area	1	3.4%	Pearson, L. (1962)
Excessive typical disfluencies	1	3.4%	St. Louis, K. O., Myers, F. O., Bakker, K., & Raphael, L. J. (2007)
General language disability	1	3.4%	Bradford, D. (1970)
Impatient	1	3.4%	Weiss, D. (1964)
Lack of motivation to correct oneself	1	3.4%	Mussafia, M. (1970)
Nasal resonance	1	3.4%	Wolk, L. (1986)
Paragrammatism	1	3.4%	Grewel, F. (1970)
Reduced vocabulary	1	3.4%	Cohn, B., Girson, J. & Wahlhaus, M. M. (1985)
Short-tempered	1	3.4%	Weiss, D. (1964)
Speak too fast for articulatory capabilities	1	3.4%	Grewel, F. (1970)
Spelling difficulties	1	3.4%	Grewel, F. (1970)
Symptom variability (based on communication context, concentration, tiredness of speaker)	1	3.4%	Hartinger, M. & Mooshammer, C. (2008)

Table II

Means, medians, standard deviations and modes of each feature for definition of cluttering and confidence in assessment of individual features of cluttering, organized by frequency of occurrence in the cluttering literature.

Features	Definition				Confidence			
	Mean	Standard Deviation	Median	Mode	Mean	Standard Deviation	Median	Mode
Imprecise articulation (e.g. distorts sounds)	4.74	1.69	5	5	6.26	1.11	7	7
Excessively Rapid Rate	6.07	1.05	6	7	6.26	0.99	7	7
Excessive number of whole-word, or phrase repetitions in speech	4.83	1.76	5	6	6.13	1.17	6	7
Familial Factors	4.67	1.07	5	4	4.68	1.64	5	5
Irregular speech rate; speaks in spurts	5.99	1.22	6	7	6.08	1.21	6	7
Lack of awareness	5.33	1.58	6	7	5.66	1.49	6	7
Interjections, revisions, filler words	5.24	1.68	6	6	6.10	1.20	6.5	7
Short attention span and poor concentration	4.40	1.47	5	5	4.67	1.71	5	5
Weaknesses in musical ability and rhythm	3.81	1.32	4	4	3.67	1.86	4	4
Poor readers	3.81	1.40	4	4	4.70	1.75	5	5
Poor syntax/poor spoken grammar	4.30	1.58	4	4	6.11	1.09	6	7
Atypical pauses	5.27	1.19	5	5	5.95	1.29	6	7
Robotic speech characterized by monotone festination (i.e., taking faster and faster)	3.15	1.66	3	4	5.67	1.42	6	7
Hyperactivity	3.94	1.43	4	4	4.19	1.79	4	5
Delayed speech and/or language development	4.13	1.35	4	4	5.82	1.50	6	7

Poorly organized thinking	4.89	1.47	5	5	5.03	1.59	5	5
Better speech with attention	5.17	1.32	5	5	5.43	1.49	6	7
Hesitations	4.42	1.64	5	5	5.89	1.25	6	7
Spelling difficulties	4.00	1.30	4	4	5.23	1.63	6	6
Movement of other parts of the body with speech (secondary behaviors)	3.24	1.51	3	4	5.85	1.40	6	7
Tension and struggle when speaking	3.11	1.56	3	2	5.72	1.39	6	7
A fear of speaking	3.20	1.50	3	2	5.24	1.47	6	6
Speech anxiety due to awareness of errors	3.02	1.65	3	2	5.43	1.46	6	6
Sound Prolongations	3.22	1.47	3	4	5.97	1.36	6	7
Poor receptive language (adults)	3.26	1.56	4	4	5.63	1.50	6	7
Poor breath support	4.19	1.39	4	4	5.42	1.54	6	7
Below average intelligence	2.24	1.24	2	1	3.81	1.87	4	4
Sensory Integration Disorder	3.41	1.17	4	4	2.85	1.64	3	1
Fluent in multiple languages	3.09	1.31	4	4	3.83	1.94	4	4
Overall Assessment	--	--	--	--	4.01	1.94	4	5
Overall Diagnosis	--	--	--	--	3.86	1.93	4	5
Overall Treatment	--	--	--	--	3.61	1.91	3	1

Table III

Point-to-point intra-rater reliability for participants' definition and self-reported

confidence

Section	Feature				
	Excessively Rapid Rate	Familial Factors	Lack of Awareness	Poor Readers	Poorly Organized Thinking
Definition of Cluttering	98%	100%	97%	98%	94%
Confidence in Assessing Features	100%	95%	98%	99%	99%

Table IV

r and r² values for research question 1 (How well do the features in SLPs' definition of

cluttering correlate with existing literature on cluttering?)

Correlation	r	r^2
Self-reported definition and rank of features	.716[C]	.51

[A] Weak Correlation
[B] Moderate Correlation
[C] Strong correlation

Table V

r and r² values for research question 3 (Is there a correlation between years of

experience and overall confidence in assessment, diagnosis and treatment of cluttering?)

Correlation	r	r^2
Years experience and overall confidence in assessment	0.32^B	.10
Years experience and overall confidence in diagnosis	0.29^A	.08
Years experience and overall confidence in treatment	0.34^B	.12

[A] Weak Correlation
[B] Moderate Correlation
[C] Strong correlation

Table VI

r and r² values for research question 4 (Is there a correlation between years of

experience and SLPs' definition of cluttering (based on the individual features)?)

Correlation	r	r^2
Years experience and excessively rapid rate in definition	-0.268[A]	0.072
Years experience and hesitations in definition	0.229[A]	0.052
Years experience and lack of awareness in definition	0.266[A]	0.071
Years experience and delays in speech and/or language in definition	0.275[A]	0.066
Years experience and improved speech with attention in definition	0.279[A]	0.078

[A] Weak Correlation
[B] Moderate Correlation
[C] Strong correlation

Table VII

r and r² values for research question 5 (Is there a correlation between overall confidence in assessment, diagnosis and treatment of cluttering?)

Correlation	r	r^2
Overall confidence in assessment and overall confidence in diagnosis	0.967^C	0.94
Overall confidence in assessment and overall confidence in treatment	0.856^C	0.73
Overall confidence in diagnosis and overall confidence in treatment	0.875^C	0.77

[A] Weak Correlation
[B] Moderate Correlation
[C] Strong correlation

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