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audiologistes*

- ▶ *Swallowing After Right Hemisphere Stroke: Oral versus Pharyngeal Deficits*
Julie Theurer, Jennifer L. Johnston, Donald H. Taves, Vladimir Hachinski and Ruth E. Martin
- ▶ *Critical Review of Evidence for Residual Long-Term Speech Deficits Following Transient Cerebellar Mutism in Childhood*
Rebecca Hisson and Scott G. Adams
- ▶ *Teachers' Attitudes Towards People Who Stutter: Results of a Mail Survey*
Farzan Irani and Rodney Gabel

Purpose and Scope

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) is the recognized national professional association of speech-language pathologists and audiologists in Canada. The association was founded in 1964, incorporated under federal charter in 1975 and is committed to fostering the highest quality of service to communicatively impaired individuals and members of their families. It began its periodical publications program in 1973.

The purpose of the *Canadian Journal of Speech-Language Pathology and Audiology* (CJSLPA) is to disseminate contemporary knowledge pertaining to normal human communication and related disorders of communication that influence speech, language, and hearing processes. The scope of the Journal is broadly defined so as to provide the most inclusive venue for work in human communication and its disorders. CJSLPA publishes both applied and basic research, reports of clinical and laboratory inquiry, as well as educational articles related to normal and disordered speech, language, and hearing in all age groups. Classes of manuscripts suitable for publication consideration in CJSLPA include tutorials, traditional research or review articles, clinical, field, and brief reports, research notes, and letters to the editor (see Information to Contributors). CJSLPA seeks to publish articles that reflect the broad range of interests in speech-language pathology and audiology, speech sciences, hearing science, and that of related professions. The Journal also publishes book reviews, as well as independent reviews of commercially available clinical materials and resources.

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Objet et Portée

L'Association canadienne des orthophonistes et audiologistes (ACOA) est l'association professionnelle nationale reconnue des orthophonistes et des audiologistes du Canada. L'Association a été fondée en 1964 et incorporée en vertu de la charte fédérale en 1975. L'Association s'engage à favoriser la meilleure qualité de services aux personnes atteintes de troubles de la communication et à leurs familles. Dans ce but, l'Association entend, entre autres, contribuer au corpus de connaissances dans le domaine des communications humaines et des troubles qui s'y rapportent. L'Association a mis sur pied son programme de publications en 1973.

L'objet de la *Revue canadienne d'orthophonie et d'audiologie* (RCOA) est de diffuser des connaissances relatives à la communication humaine et aux troubles de la communication qui influencent la parole, le langage et l'audition. La portée de la Revue est plutôt générale de manière à offrir un véhicule des plus compréhensifs pour la recherche effectuée sur la communication humaine et les troubles qui s'y rapportent. La RCOA publie à la fois les ouvrages de recherche appliquée et fondamentale, les comptes rendus de recherche clinique et en laboratoire, ainsi que des articles éducatifs portant sur la parole, le langage et l'audition normaux ou désordonnés pour tous les groupes d'âge. Les catégories de manuscrits susceptibles d'être publiés dans la RCOA comprennent les tutoriels, les articles de recherche conventionnelle ou de synthèse, les comptes rendus cliniques, pratiques et sommaires, les notes de recherche, et les courriers des lecteurs (voir Renseignements à l'intention des collaborateurs). La RCOA cherche à publier des articles qui reflètent une vaste gamme d'intérêts en orthophonie et en audiologie, en sciences de la parole, en science de l'audition et en diverses professions connexes. La Revue publie également des critiques de livres ainsi que des critiques indépendantes de matériel et de ressources cliniques offerts commercialement.

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From the Editor

Fall Issue



Your manuscript is both good and original, but the part that is good is not original and the part that is original is not good. (Attributed to Samuel Johnson, 1709 - 1784)

These editorial remarks are concerned with the under-appreciated art of the peer review. Obviously, a reviewer comment such as the one above would never fly in the *Canadian Journal of Speech-Language Pathology and Audiology*. The writer H. G. Wells (1866 - 1946) observed cynically that “no passion in the world is equal to the passion to alter someone else’s draft.” However, peer review is task of great responsibility. A peer review of a manuscript requires insight, good judgment, and a sense of tact in conveying constructive criticism. The *Canadian Journal of Speech-Language Pathology and Audiology* appreciates the important contribution that our scientific peer reviewers are making to the quality of the papers published in the journal. Peer review serves as a system of checks and balances, intentioned to improve the scientific quality of published research. Feedback from scientific peers about a draft manuscript will often enable the authors to ameliorate the structure, content and writing of the manuscript. While authors may sometimes feel that the incorporation of reviewer suggestions into their manuscript is a chore, they understand that the critical discussion of their research will strengthen and improve a paper. An amazing aspect about the peer review system is that the peer reviewers will work without remuneration, on their own time, and without receiving much formal recognition for their contribution. After all, the peer reviewers themselves are usually also authors who will appreciate a constructive discussion of their own writings. All of us here at the journal would like to thank our peer reviewers for their time, effort, and the dedication to their work.

In related news, the *Canadian Journal of Speech-Language Pathology and Audiology* is proud to introduce a new online submission and review system. The start page for this system can be found at <http://cjslpa.coverpage.ca>

We encourage our authors and reviewers to give the new submission system a try. We would like to thank Gordon Rowland for creating the new system and Angie D’Aoust, Judith Gallant, and Phyllis Schneider during her tenure as the editor of the journal, for overseeing its development.

All three papers in this issue of the *Canadian Journal of Speech-Language Pathology and Audiology* have been authored jointly by students and their research supervisors.

The first paper in the current issue is entitled “Swallowing after right hemisphere stroke: Oral versus pharyngeal deficits”, by Julie Theurer, Jennifer Johnston, Donald Taves, David Bach, Vladimir Hachinski, and Ruth Martin. The authors analyzed videofluoroscopic swallowing exams with regards to a set of oral and pharyngeal phase parameters.

The second paper by Rebecca Hisson and Scott Adams is entitled “Critical review of the evidence for residual long-term speech deficits following transient cerebellar mutism in childhood”. This review provides insights into the specific clinical characteristics of a rare population of paediatric patients with brain tumours.

The final paper by Farzan Irani and Rodney Gabel has the title “Teachers’ attitudes towards people who stutter : results of a mail survey” and documents the results of a mail survey to 178 school teachers.

Also included is a book review of “Cognitive communication disorders of dementia” by Bayles and Tomoeda (2007). The book was reviewed by Regina Jokel.

Tim Bressmann
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Mot du rédacteur en chef

Numéro de l'automne



Votre manuscrit est à la fois bon et original, mais la section qui est bonne n'est pas originale et la section qui est originale n'est pas bonne. (trad. d'une citation attribuée à Samuel Johnson, 1709–1784)

Le présent éditorial porte sur l'art sous-estimé de la révision par les pairs. Évidemment, une remarque d'un réviseur comme celle ci-dessus ne passerait jamais dans la *Revue canadienne d'orthophonie et d'audiologie*. L'écrivain britannique H. G. Wells (1866–1946) a observé cyniquement qu'il n'y a aucune passion dans le monde qui vaille la passion de modifier l'ébauche d'un autre. Toutefois, la révision par les pairs est une grande responsabilité. Il faut de la perspicacité, un jugement solide et un sens du tact pour formuler des critiques constructives. La *Revue canadienne d'orthophonie et d'audiologie* apprécie la contribution importante apportée par nos pairs-réviseurs scientifiques à la qualité des articles publiés. La révision par les pairs sert de système de freins et contrepoids en vue d'améliorer la qualité scientifique des articles publiés. Les remarques des pairs-réviseurs scientifiques permettent souvent aux auteurs d'améliorer la structure, le contenu et le style de leur manuscrit. Bien que les auteurs aient parfois l'impression que l'intégration des remarques d'un réviseur dans leur manuscrit soit une corvée, ils comprennent que l'échange critique sur leur recherche permet d'améliorer et de renforcer l'article. Par ailleurs, il est incroyable de voir que la révision par les pairs fonctionne grâce au travail bénévole des réviseurs qui acceptent de donner de leur temps sans grande reconnaissance officielle. Après tout, ces réviseurs sont souvent eux-mêmes des auteurs qui apprécieront un échange constructif sur ce qu'ils écrivent. Toutes les personnes de la Revue tiennent à remercier les pairs-réviseurs de leur temps, de leurs efforts et de leur dévouement.

Dans un même ordre d'idée, la *Revue canadienne d'orthophonie et d'audiologie* a le plaisir de lancer son nouveau système de soumission et de révision de manuscrits et de révision par les pairs en ligne. La page d'accueil de ce système se trouve à l'adresse : <http://cjslpa.coverpage.ca>

Nous invitons les auteurs et les réviseurs à faire l'essai de ce système. Nous tenons à remercier Gordon Rowland de l'avoir créé et Angie D'Aoust, Judith Gallant, et Phyllis Schneider durant son mandat comme rédactrice en chef de la Revue d'en avoir supervisé l'élaboration.

Les trois articles contenus dans le présent numéro ont été rédigés conjointement par des étudiants et leur directeur de recherche.

Le premier article s'intitule « La déglutition après un accident vasculaire cérébral à l'hémisphère droit : déficiences orales et pharyngées » et provient de Julie Theurer, Jennifer Johnston, Donald Taves, David Bach, Vladimir Hachinski et Ruth Martin. Les auteurs ont examiné des images vidéo fluoroscopiques de la déglutition pour en analyser des paramètres relatifs aux phases orale et pharyngée.

Le second article, de Rebecca Hisson et Scott Adams, est intitulé « Revue critique des données probantes sur les troubles résiduels à long terme de la parole à la suite d'un mutisme ischémique transitoire durant l'enfance ». Cette revue traite des caractéristiques cliniques précises d'une population rare de patients pédiatriques ayant une tumeur cérébrale.

Le dernier article, signé par Farzan Irani et Rodney Gabel, s'intitule « Attitudes des enseignants et des enseignantes envers les bègues : résultats d'une enquête menée par la poste » et présente les résultats d'une enquête menée par la poste auprès de 178 enseignants et enseignantes.

Ce numéro de la Revue comprend aussi un compte rendu du livre « *Cognitive communication disorders of dementia* » de Bayles et Tomoeda (2007). Regina Jokel a rédigé le compte rendu.

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■ Swallowing after Right Hemisphere Stroke: Oral versus Pharyngeal Deficits

■ La déglutition après un accident vasculaire cérébral à l'hémisphère droit : déficiences et pharyngées

Julie A. Theurer
 Jennifer L. Johnston
 Donald H. Taves
 David Bach
 Vladimir Hachinski
 Ruth E. Martin

Abstract

Although previous studies have attempted to identify distinct patterns of dysphagia following unilateral hemispheric stroke, the relationships between lesion sites and swallowing dysfunction remain unclear. In particular, swallowing deficits resulting from right hemisphere stroke remain poorly understood. The present study employed a case report design to examine the oral and pharyngeal phase deficits in swallowing following right hemisphere stroke. Lateral-view videofluoroscopic images were obtained from six subjects following right hemisphere stroke as they performed swallowing trials with various bolus consistencies (i.e., thin liquid, thick liquid, and paste). Each swallow was evaluated on 17 oral phase, and 17 pharyngeal phase physiologic swallowing parameters. Results indicated that, whereas all patients exhibited both oral and pharyngeal phase swallowing deficits, the majority of patients showed relatively greater oral phase than pharyngeal phase impairment. In addition, patterns of swallowing deficits were highly variable across individuals, particularly for the pharyngeal phase. These findings suggest that oral phase swallowing impairment can be a prominent feature of right hemisphere stroke. Thus, swallowing assessment in patients with right hemisphere stroke should emphasize both oral and pharyngeal phases. Instrumental techniques can provide valuable insights into swallow pathophysiology in this population.

Abrégé

Bien que des études aient déjà tenté d'identifier des profils particuliers de dysphagie survenue à la suite d'un accident vasculaire cérébral (AVC) unilatéral, les liens entre l'emplacement des lésions et les troubles de déglutition restent flous. On comprend notamment encore mal les troubles de déglutition causés par un AVC à l'hémisphère droit. La présente recherche se fonde sur un devis de cas uniques et examine les déficiences orales et pharyngées de la déglutition après un AVC à l'hémisphère droit. On a obtenu des images vidéofluoroscopiques latérales de six personnes ayant subi un AVC à l'hémisphère droit. Ces images les montrent pendant qu'elles essaient d'avaler des aliments de consistance différente (p. ex. : liquide clair, liquide épais et purée). On a évalué chaque tentative de déglutition en fonction de 17 paramètres physiologiques de la phase orale et de 17 paramètres physiologies de la phase pharyngée. Les résultats indiquent que, bien que tous les patients aient montré des troubles de déglutition à la phase orale autant que pharyngée, la majorité d'entre eux avaient une déficience relativement plus prononcée dans la phase orale. De plus, les déficiences de la déglutition tendent à être très variables d'une personne à l'autre, surtout dans la phase pharyngée. Ces résultats suggèrent qu'une déficience de la phase orale de la déglutition dans la phase orale serait une caractéristique dominante d'un AVC à l'hémisphère droit. Par conséquent, l'évaluation de la déglutition chez les patients ayant subi un AVC de ce type doit mettre l'accent sur les phases orale autant que pharyngée. Les méthodes techniques peuvent fournir de l'information valable sur la pathophysiologie de la déglutition chez cette population.

Key Words: deglutition, deglutition disorders, cerebrovascular accident, fluoroscopy

Introduction

Swallowing is a complex behaviour that is thought to be controlled primarily through a central network located in the brainstem (Jean, 1990). Afferent inputs trigger the activity of this medullary swallowing centre, with the neuronal network then enacting a coordinated, stereotyped sequence of motor events (Jean, 1990; Miller, 1982, 1999). However, mounting evidence from both electrophysiological and clinical studies has pointed toward the importance of the cerebral cortex in swallowing regulation (for review, see Martin & Sessle, 1993 and Miller, 1999). Of particular interest, human clinical studies have revealed that significant swallowing impairments can result subsequent to hemispheric stroke, either unilateral or bilateral, without concomitant involvement of the brainstem (Barer, 1989; Gordon, Hower, & Wade, 1987; Horner & Massey, 1988; Horner, Massey, Riski, Lathrop, & Chase, 1988; Veis & Logemann, 1985).

Numerous studies have been aimed at elucidating the relationship between unilateral stroke location and patterns of swallowing impairments. Robbins and Levine (1988) reported an association between lesions of the left cerebral cortex and oral stage deficits, while right cerebral cortical lesions were found to be associated with pharyngeal deficits. In a subsequent study, Robbins, Levine, Maser, Rosenbek and Kempster (1993) identified several durational and descriptive swallowing measures that differed significantly between individuals following left and right hemispheric stroke. These two studies have fostered the belief that left hemispheric stroke is associated with greater oral stage deficits, while right hemispheric stroke is associated more closely with pharyngeal stage deficits. However, several other studies have failed to fully substantiate this relationship (Alberts, Horner, Gray, & Brazer, 1992; Chen, Ott, Peele, & Gelfand, 1990; Daniels & Foundas, 1999; Irie & Lu, 1995; Johnson, McKenzie, Rosenquist, Lieberman, & Sievers, 1992; Veis & Logemann, 1985). For example, Veis and Logemann (1985) reported that hemispheric stroke location did not predict particular types of swallowing abnormalities. Rather, reduced lingual control (i.e., oral stage), and delayed swallowing reflex and reduced pharyngeal peristalsis (i.e., pharyngeal stage), were common outcomes of stroke, regardless of lesion lateralization. Additionally, in a small group of subjects with left subcortical strokes, mild deficits were present in both the oral and pharyngeal stage of swallowing (Logemann et al., 1993). Oral dysmotility (i.e., delayed initiation of oral transfer, and groping, effortful lingual movements) has been reported to be of equal frequency in patients with left and right hemisphere stroke (Daniels, Foundas, Iglesia, & Sullivan, 1996), and lingual discoordination has been shown to occur following both left and right hemisphere stroke (Daniels, Brailey, & Foundas, 1999). Furthermore, other studies have failed to find a clear relationship between the prevalence of aspiration, or other pharyngeal abnormalities, and the side of stroke (Alberts et al., 1992; Chen et al., 1990; Daniels & Foundas, 1999; Irie & Lu, 1995; Johnson et al., 1992). Although Irie and Lu (1995) also failed to find a

distinct correlation between site of the stroke (left vs. right) and the prevalence of oral and pharyngeal dysfunction, their results did indicate that left stroke was more prone to affect the oral stage of swallowing, while right stroke was more likely to impair both stages of the swallow.

The notion that right hemisphere stroke may impact both the oral and pharyngeal stages of swallowing is an interesting finding that warrants further exploration. The various oral and pharyngeal deficits that are exhibited following right hemisphere stroke remain relatively unexplored. While some data exist regarding lingual coordination, oral and pharyngeal dysmotility, and aspiration, there is little understanding of the breadth of physiological swallowing parameters in the oral and pharyngeal stages that are impacted by right hemisphere stroke.

Additionally, the research in this area has been dominated by group comparison studies. Certainly, large sample studies have the power necessary to identify relationships between stroke lateralization and swallowing deficit patterns, if they exist. However, as noted above, this type of research has not yielded a clear picture of the relationship between dysphagia profile and stroke location. One reason for this lack of clarity may relate to intersubject variation in swallowing performance following stroke, and, perhaps among healthy elderly. Although high intersubject variability is likely in this population, few case reports have appeared in the literature. Thus, the variability of swallowing patterns within this population remains poorly understood.

The aim of this preliminary study was to further elucidate the specific swallowing deficits associated with unilateral right hemispheric stroke in an attempt to ascertain whether the swallowing difficulties associated with such infarcts result in pharyngeal stage abnormalities primarily, or whether a pattern of both oral and pharyngeal deficits is more common. A case report design was employed in order to address swallowing variation across individuals following stroke in the right hemisphere.

Methods

Subjects

Six individuals (age, 69.3 ± 13.1 years) who exhibited dysphagia within the first week following a right hemisphere stroke participated in this investigation. Subjects were recruited through purposive sampling. Lesion information and demographic data are summarized in Table 1. Stroke location was determined with computed tomography (CT) on the day of hospital admission. Swallowing impairment in these subjects was determined with a clinical swallowing assessment and/or a standard videofluoroscopic swallow study (VFSS; Logemann, 1998). All patients were studied within 5 to 40 days (mean: 15 days) following the onset of the stroke. Four subjects were right handed (S1, S2, S4, S6); handedness for the remaining two subjects was unknown. Subjects gave written informed consent before participating in the study. The study was approved by the

Table 1
Stroke Subject Demographics

Subject	Age	Gender	Stroke location	Modified barium swallow: days post stroke	Dysphagia profile
S1	68	F	R Middle cerebral artery territory; R lacunar involving corona radiata	11	Oral deficits > pharyngeal deficits; Decreased tongue strength, coordination, and range of motion; Good awareness of post-swallow residue.
S2	67	M	R Middle cerebral artery involving mid/high frontal and parietal lobes; angular gyrus and supramarginal gyrus in inferior parietal lobe	6	Pharyngeal deficits > oral deficits; Decreased tongue strength, coordination and range of motion; Difficulty initiating and coordinating pharyngeal phase; Poor awareness of post-swallow residue.
S3	71	F	R lacunar	6	Oral deficits > pharyngeal deficits; Decreased control of bolus; Decreases tongue strength and range of motion with increased viscosity
S4	91	F	R lacunar including posterior internal capsula, into corona radiata	5	Oral deficits > pharyngeal deficits; Decreased tongue strength and range of motion; Decreased coordination of pharyngeal phase
S5	50	M	R Middle cerebral artery territory including posterior 2/3 of insular cortex	22	Pharyngeal deficits > oral deficits; Decreased lingual strength and range of motion; Decreased pharyngeal strength and coordination; Poor awareness of post-swallow residue; Several episodes of aspiration

with a Siemens's high-scan camera and recorded on S-VHS videotape at a rate of 30 frames per second using a Panasonic model 7300 videocassette recorder. The VFSSs were analyzed by two trained judges (a speech-language pathologist and a graduate student in speech-language pathology) who did not have knowledge of the patient's stroke localization. Videotapes were replayed on a Panasonic model AG-7350 videocassette recorder and viewed on a Trinitron RGB monitor, model PVM-1351Q. Fluoroscopic data were analyzed in real-time and slow motion. Each swallow was evaluated on 34 physiologic swallow abnormalities (17 in the oral and 17 in the pharyngeal stage) that reflect the major physiological events and bolus flow characteristics of impaired swallowing (adapted from Dodds, Logemann, & Stewart, 1990; Dodds, Stewart, & Logemann, 1990; Logemann, 1998). A binary rating system was used to evaluate whether each oral stage and pharyngeal stage abnormality was either present or absent, based on an operational definition for each (see Appendix A). For the purpose of this study, severity of the swallowing deficits was not rated.

University of Western Ontario Review Board for Health Sciences research involving human subjects.

Data Collection and Analysis

A VFSS was performed with each patient in the erect lateral position. The fluoroscopic tube was focused on the oral cavity from the lips anteriorly to the pharyngeal wall posteriorly, and from the nasopharynx superiorly to below the larynx inferiorly. Each subject was administered 2- and 5-ml aliquots of thin liquid barium (i.e., Unibar-100 barium, concentration 35% weight/volume), thickened liquid barium, and barium of a paste consistency (i.e., pudding) from a plastic teaspoon, and was instructed to swallow upon verbal command. Two repetitions of each volume and consistency combination were obtained, as tolerated by the subject, beginning with 2ml thin liquid. Fluoroscopic data were obtained

Results

Deglutition was evaluated by VFSS in 6 patients with lesions of the right hemisphere, with a total of 69 swallows collected for analysis (Figure 1). All patients exhibited deficits in both the oral and pharyngeal phases of swallowing. The most frequently occurring oral stage swallowing abnormalities were oral residue (66/69), impaired tongue to palate/posterior pharyngeal wall (PPW) contact (46/69), impaired tongue stripping wave (45/69), and impaired tongue propulsive action (44/69). The most frequently occurring pharyngeal stage swallowing abnormalities were vallecular residue (60/69), reduced closure of the laryngeal vestibule (35/69), PPW residue (33/69), and pyriform sinus residue (29/69).

Although all patients presented with right hemisphere stroke, the patterns of oral and pharyngeal swallowing deficits varied considerably across individuals (Figure 2).

Subject 1

Subject 1 (S1) completed 12 swallows (4 thin liquid, 4 thick liquid, 4 paste). The most frequently occurring oral stage deficits were repetitive tongue pumping (11/12), impaired tongue stripping wave (11/12), oral residue (11/12), and decreased tongue to palate/PPW contact (9/12). The most frequently occurring pharyngeal stage deficits identified were vallecular residue (12/12) and delayed pharyngeal phase (6/12). Overall, S1 presented with a swallowing pattern of more frequent oral stage abnormalities than pharyngeal stage deficits, characterized by decreased lingual coordination and range of motion, and difficulty initiating the pharyngeal phase. These deficits resulted in residue in the oral cavity and pharynx, which was more pronounced with increasing viscosity.

Subject 2

Subject 2 (S2) completed 11 swallows (4 thin liquid, 4 thick liquid, 3 paste). The most frequently occurring oral stage deficits were oral residue (11/11), premature spillage (7/11), impaired tongue propulsion (7/11), and decreased tongue to palate/PPW contact (7/11). The most frequently occurring pharyngeal stage deficits were increased pharyngeal transit time (11/11), reduced pharyngeal peristalsis (11/11), pyriform sinus residue (11/11), impaired upper esophageal sphincter (UES) opening (11/11), and delayed triggering of the pharyngeal swallow (9/11). S2 presented with a pattern of more frequent pharyngeal phase deficits than oral phase deficits, although the oral stage was also impaired significantly. This subject's swallow can be characterized by decreased lingual coordination and range of motion, with difficulty initiating and coordinating the pharyngeal phase of the swallow, leading to generalized oral and pharyngeal stasis and increased transit times.

Subject 3

Subject 3 (S3) completed 11 swallows (4 thin liquid, 3 thick liquid, 4 paste). The most frequently occurring

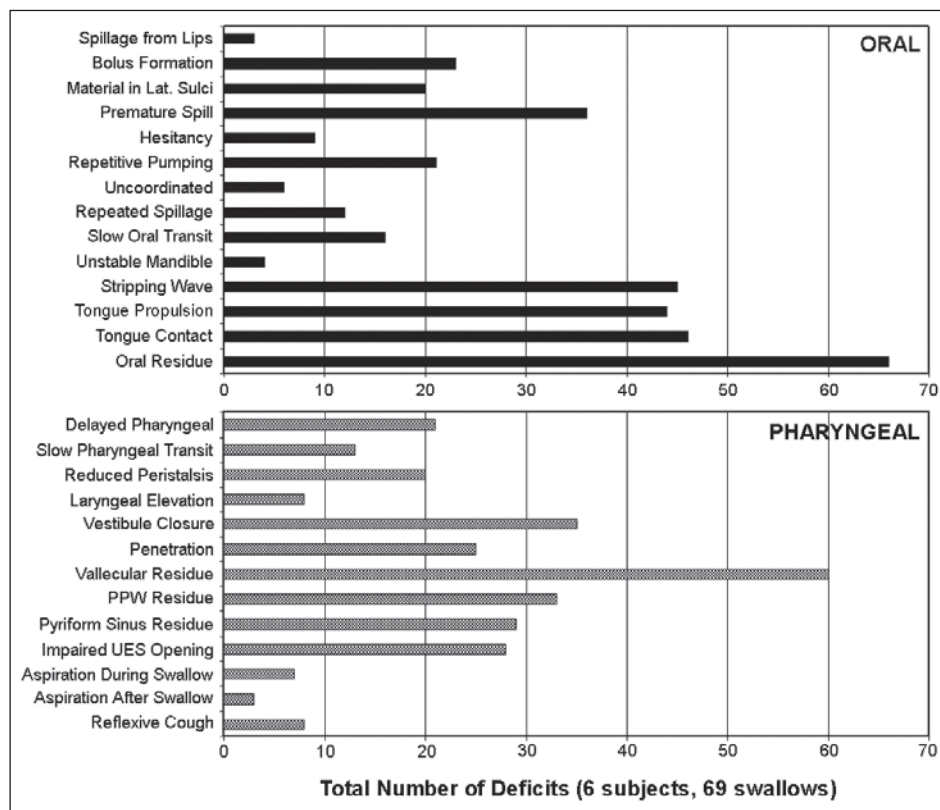


Figure 1. Number of oral phase (upper graph) and pharyngeal phase deficits (lower graph) summed over repetitions of thin liquid, thick liquid and pudding swallows for 6 subjects (69 swallows).

oral abnormalities were oral residue (11/11), premature spill (7/11), and difficulty with bolus formation (6/11). The most frequently occurring pharyngeal abnormality was vallecular residue (9/11). Overall, S3 presented with a swallowing profile that was characterized by more difficulty in the oral phase, with particular problems controlling the bolus during oral preparation. Decreased lingual strength and range of motion became more apparent with increases in viscosity.

Subject 4

Subject 4 (S4) completed 12 swallows (4 thin liquid, 4 thick liquid, 4 paste). The most frequently occurring oral deficits were reduced tongue to palate/PPW contact (12/12), impaired tongue propulsive action (11/12), premature spillage (10/12), oral residue (10/12), and impaired tongue stripping wave (6/12). The most frequently occurring pharyngeal deficits were decreased laryngeal vestibule closure (11/12) and vallecular residue (11/12). S4 presented with a pattern of more frequent difficulties in the oral phase versus the pharyngeal phase of swallowing with decreased lingual strength and range of motion, as well as decreased coordination of the pharyngeal phase.

Subject 5

Subject 5 (S5) completed 11 swallows (3 thin liquid,

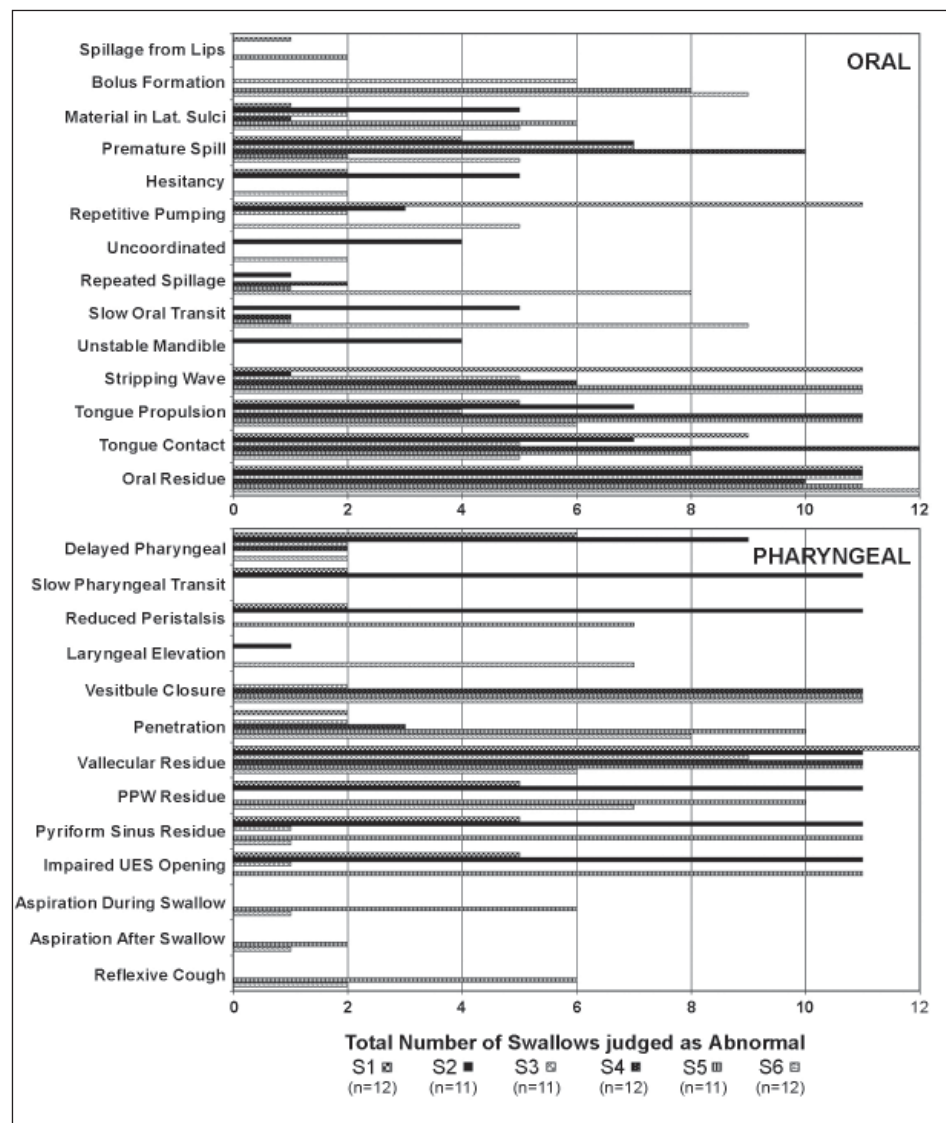


Figure 2. Number of Oral and Pharyngeal Phase Parameters judged as Abnormal, Individual data.

4 thick liquid, 4 paste). The most frequently occurring oral phase deficits were impaired stripping wave (11/11), impaired tongue propulsive action (11/11), oral residue (11/11), reduced tongue to palate/PPW contact (8/11), difficulty forming a bolus (8/11), and material in the lateral sulci (6/11). The most frequent pharyngeal phase abnormalities were decreased laryngeal vestibule closure (11/11), vallecular residue (11/11), pyriform sinus residue (11/11), impaired UES opening (11/11), laryngeal penetration (10/11), PPW residue (10/11), reduced pharyngeal peristalsis (7/11), aspiration during the swallow (6/11), and impaired/absent reflexive cough following aspiration (6/11). While this subject did demonstrate oral phase deficits, more pharyngeal stage swallowing abnormalities were noted. Lack of response to penetration, aspiration, and accumulating residue suggested reduced oral and pharyngeal sensation. S5 experienced several episodes of

aspiration across all consistencies.

Subject 6

Subject 6 (S6) completed 12 swallows (4 thin liquid, 4 thick liquid, 4 paste). The most frequently occurring oral deficits were oral residue (12/12), impaired tongue stripping wave (11/12), difficulty forming a bolus (9/12), slow oral transit time (9/12), and impaired tongue propulsive action (6/12). The most frequent pharyngeal deficits were decreased closure of the laryngeal vestibule (11/12), laryngeal penetration (8/12), PPW residue (7/12), decreased laryngeal elevation (7/12), and vallecular residue (6/12). Although oral phase deficits were more numerous than pharyngeal phase problems, the pharyngeal phase impairment was significant as it included reduced airway protection. Spontaneous repeat swallows occurred in response to oral and vallecular residue. S6 experienced two episodes of trace aspiration.

Discussion

In this small patient sample, swallowing following right hemisphere stroke was characterized by patterns of both oral phase and pharyngeal phase deficits. While some subjects (2/6) exhibited more frequent deficits in the pharyngeal stage compared to the oral stage of swallowing, the majority (4/6) showed more frequent oral stage swallowing impairments. Although these findings differ from previous reports that right hemisphere damage results in greater pharyngeal than oral swallowing impairments (Robbins & Levine, 1988; Robbins et al., 1993), they are consistent with other studies that have failed to identify a clear association between oral versus pharyngeal stage deficits and stroke lateralization (Alberts et al., 1992; Chen et al., 1990; Johnson et al., 1992; Veis & Logemann, 1985). These findings also support two studies that identified the co-occurrence of oral and pharyngeal deficits following right hemisphere stroke (Daniels & Foundas, 1999; Irie & Lu, 1995).

This study is the first to report on a diverse range of swallowing deficits following unilateral hemispheric stroke. Oral stage deficits seen in all subjects included material in the lateral sulci, premature spill, impaired tongue stripping wave, impaired tongue propulsive action, impaired tongue to palate/PPW contact, and oral residue.

An unexpected finding was the frequency of deficits related to bolus preparation and manipulation. Typically, the preparation of the bolus for swallowing is considered to be under volitional control, and thus, associated with the left hemisphere (Robbins & Levine, 1988; Veis & Logemann, 1985). However, in this group of subjects with right hemisphere lesions, difficulty with bolus preparation was quite common. This finding supports the results of a study by Daniels and colleagues, who reported that hemisphere lateralization did not predict the occurrence of lingual discoordination (Daniels et al., 1999).

In the pharyngeal phase, only the presence of vallecular residue was universal in this population. Aside from this commonality, the patterns of pharyngeal deficits were highly individual despite the fact that all subjects had a lesion lateralized to the right hemisphere.

Although the sample is small, it is interesting to note that 3/3 patients with lacunar infarcts demonstrated oral impairment with greater frequency than pharyngeal impairment, whereas 2/3 patients with cortical stroke showed more frequent pharyngeal swallowing abnormalities. Thus, in addition to hemispheric differences, the cortical versus subcortical distinction may be a useful way of interpreting swallowing patterns post-stroke.

Electrophysiologic and functional imaging studies have implicated a distributed network of cortical and subcortical brain regions in the initiation and regulation of swallowing (Martin & Sessle, 1993; Hamdy, Mikulis et al., 1999; Hamdy, Rothwell et al., 1999; Martin, Goodyear, Gati, & Menon, 2001). These sites include the primary sensorimotor cortical orofacial representation, as well as orofacial association areas (Hamdy, Mikulis et al., 1999; Hamdy, Rothwell et al., 1999; Martin et al., 2001; Martin et al., 2004). Indeed, swallowing and voluntary tongue movement have been shown to activate overlapping, though distinct, regions of sensorimotor cortex in both hemispheres (Martin et al., 2004). Imaging studies have also suggested that the right and left hemispheres make differential contributions to swallowing control. The sensorimotor cortical swallowing representation appears to be significantly lateralized within individual subjects (Hamdy, Mikulis et al., 1999; Hamdy, Rothwell et al., 1999; Martin et al., 2001; Martin et al., 2004; Mosier et al., 1999), with 60% of right-handed, healthy subjects showing lateralization of the postcentral gyrus toward the left hemisphere (Martin et al., 2004). Given this neurophysiologic evidence, it might be anticipated that some individuals would exhibit oral stage swallowing deficits following right hemisphere stroke. Additionally, the variability in hemispheric lateralization for swallowing, as well as the distributed nature of the cortical swallowing network, fit with the current finding of substantial intersubject variability in swallowing profiles following right hemisphere stroke.

The present study employed a case report research design. This is in contrast with the vast majority of the literature on swallowing deficits following stroke, where large *N* studies have predominated. Indeed, only one other study has provided detailed description of individual

swallowing data while examining the relationship between lesion localization and swallowing impairments (Daniels & Foundas, 1997). The utility of implementing a case-by-case analysis stems from the fact that much variability exists in swallowing performance across individuals, in both health and disease. The use of group designs, while providing the power necessary to detect significant differences or relationships between variables, does not provide information regarding the extent to which variation in swallowing patterns may be related to site of brain lesion. The sequencing of oropharyngeal swallowing events has been reported to be significantly variable in healthy adults (Kendall, 2002), and yet, this variability has been the subject of relatively few studies. Given that the swallowing performance of healthy adults is highly variable, it is likely that the variability in swallowing among stroke subjects would be even greater. In fact, human stroke can be described as heterogeneous, with much variability existing in the types of stroke, recovery patterns, and related clinical factors (Gladstone, Black, & Hakim, 2002). Daniels et al. (2006) have postulated that perhaps the lack of clarity in the research examining the lateralization of the phases of swallowing is due to the great intersubject variability following stroke, and "this lack of consistent findings in the stroke literature may indicate that in some people different components of swallowing may lateralize differently..." (p.26). The present study demonstrates that individuals suffering infarcts of the same hemisphere can present with highly individualized patterns of swallowing. Continued use of case series reports may begin to reveal specific lesion sites within each hemisphere that result in similar swallowing outcomes across subjects.

Limitations of the Present Study

Because the present study examined a small number of patients, the findings should not be generalized to the population level. Rather, the results of this study are offered as descriptive "proof of principle" that both oral and pharyngeal phase swallowing deficits can occur following right hemisphere stroke. It is possible that distinct dysphagia profiles following right hemisphere stroke might begin to emerge if larger numbers of subjects were examined. In addition, it would be of great interest to use the same methodology to examine the swallowing patterns present in subjects following left hemisphere stroke and healthy age-matched controls. Most group studies have compared the swallowing performance of individuals with left versus right hemisphere stroke, but there is little information regarding the individual swallowing patterns associated with a unilateral left infarct. It is likely that a variety of swallowing patterns following left hemisphere stroke also would emerge.

Other aspects of the methodology also may have influenced the observed patterns in swallowing. For example, length of time between stroke and the modified barium swallow was variable across patients. Some of the variability in swallowing patterns may be related to the trajectory of swallowing recovery post-stroke, with

neuroplastic changes secondary to brain damage and compensatory alterations as the patient adapts to his/her new swallowing function. Nevertheless, the fact that all subjects presented with both oral and pharyngeal deficits regardless of time post-stroke provides valuable insight into the types of swallowing deficits that can be anticipated following right hemisphere stroke.

Conclusions

The results of this study suggest that both oral and pharyngeal phase swallowing deficits can occur following right hemispheric stroke. Some patients may present with a dysphagia profile characterized predominantly by impairment of the oral phase, compared to the pharyngeal phase of swallowing. Interestingly, the greatest diversity in dysphagia profiles was observed in the pharyngeal phase, with only a single parameter being common across subjects. The finding that oral phase swallowing abnormalities can be a prominent feature of right hemisphere stroke highlights the need for clinicians to remain vigilant in assessment in order to identify the breadth of deficits that may impact swallowing safety and efficiency in this patient population.

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Appendix A

Table A1: Videofluoroscopic Swallow Study Rating Parameters: Oral Stage Abnormalities

Swallow Parameter	Definition
Spillage from lips	Material exits between lips during bolus preparation
Impaired bolus formation	Material not gathered into one cohesive mass
Material in lateral sulci	Material spills into lateral sulci during bolus preparation
Premature spill	Premature loss of ingested material past the anterior faucial pillars prior to onset of oral stage of swallow
Hesitancy	Delayed initiation of posterior movement of bolus following bolus preparation
Anterior tongue thrust	Anterior movement of tongue tip at onset of oral stage of swallow
Repetitive tongue pumping	Repetitive pattern in which tongue squeezes bolus posteriorly, but only to mid-palatal region, then it is rolled forward to its initial position
Uncoordinated tongue movement	Disorganized, searching tongue movements; good range of motion, but inability to organize anterior-to-posterior lingual and bolus movement
Piecemeal deglutition	After collection on superior tongue surface, bolus is divided and transported to pharynx in more than one portion
Repeated spillage	Repeated spillage of material into lateral and/or anterior sulci from superior tongue surface during oral stage of swallow
Slow oral transit	Interval from beginning of posterior movement of bolus to passage of the head of the bolus past intersection of tongue base and mandibular ramus is > 1 sec
Tongue tremor	Tongue tremor present at rest and/or on movement
Instability of mandible	Movement of mandible occurs during tongue loading/tongue propulsive stages of the oral phase
Impaired tongue stripping wave	Inefficient pattern of tongue movement along the palate resulting in incomplete and slow anterior-posterior bolus transit through oral cavity
Impaired tongue propulsive action	Reduced force, range, and/or velocity of tongue base movement to posterior pharyngeal wall during propulsion into the pharynx
Reduced tongue contact	Tongue fails to make complete contact with palatal contour or posterior pharyngeal wall (tip, dorsum, base)
Oral residue	Bolus material remains in oral cavity at termination of oral phase

Appendix A

Table A2: Videofluoroscopic Swallow Study Rating Parameters: Pharyngeal Stage Abnormalities

Swallow Parameter	Operational Definition
Absent pharyngeal phase	Rapid, coordinated movement pattern of velar elevation, hyolaryngeal elevation, UES opening, and anterior movement of posterior pharyngeal wall (PPW) does not occur
Delayed pharyngeal phase	Time (in sec) between passage of the head of the bolus past the intersection of tongue base and mandibular ramus and the onset of pharyngeal phase is > 1 sec
Reduced palatal closure	Incomplete approximation of velum and PPW at maximum velar excursion
Increased pharyngeal transit time	Time (in sec) from movement of the head of the bolus past the intersection of the tongue base and mandibular ramus to passage of the tail of the bolus through the UES is > 1 sec
Reduced pharyngeal peristalsis	Reduced anterior movement of PPW
Impaired epiglottic deflection	Epiglottis exhibits no/minimal downward deflection
Reduced laryngeal elevation	Upper outline of hyoid does not approximate the lateral contour of the mandible at maximum excursion
Impaired laryngeal vestibule closure	Incomplete closure of laryngeal vestibule during pharyngeal swallow
Laryngeal penetration	Material enters the laryngeal vestibule during pharyngeal swallow
Vallecular residue	Residual material in vallecular space following pharyngeal swallow
PPW residue	Material coats the PPW following pharyngeal swallow
Pyriform sinus residue	Residual material in pyriform sinuses following pharyngeal swallow
Impaired UES opening	Bolus transit through the UES is impaired; material pools immediately superior to the UES
Aspiration before swallow	Material penetrates past vocal folds before the onset of the swallow
Aspiration during swallow	Material penetrates past vocal folds in the period during which the hyolaryngeal complex is elevating and descending back to rest position
Aspiration after swallow	Material penetrates past vocal folds any time after return of larynx to rest. Includes aspiration of residue associated with repeat swallow attempts
Impaired reflexive cough	Absent or delayed cough in response to laryngeal penetration and/or aspiration

■ Critical Review of the Evidence for Residual Long-Term Speech Deficits Following Transient Cerebellar Mutism in Childhood

■ Revue critique des données probantes sur les troubles résiduels à long terme de la parole à la suite d'un mutisme ischémique transitoire durant l'enfance

Rebecca Hisson

Scott G. Adams

Abstract

This brief report critically examines the available evidence for residual long-term speech deficits following transient cerebellar mutism in childhood. Study designs include: parental surveys and retrospective chart reviews, between group comparison designs, and case studies (3). Overall, the research supports the presence of residual speech deficits (articulation, fluency, phonology, rate of speech, and dysarthria) in many individuals who underwent surgery and recovered from mutism. The results of the present report should be interpreted with consideration of the inherent limitations of the methodology used in the reviewed studies.

Abrégé

Le présent rapport sommaire examine de façon critique les données probantes disponibles sur les troubles résiduels à long terme de la parole suivant un mutisme ischémique transitoire durant l'enfance. Cette étude se fonde sur des enquêtes auprès des parents, l'examen rétrospectif de dossiers, des comparaisons entre groupes et des études de cas (3). Dans l'ensemble, la recherche corrobore la présence de troubles résiduels de la parole (articulation, fluidité, phonologie, débit de la parole et dysarthrie) chez bon nombre de personnes ayant subi une chirurgie et surmonté leur mutisme. Il faut interpréter les résultats contenus dans le présent rapport en tenant compte des limites inhérentes de la méthode employée par les études examinées.

Key words: cerebellar mutism, speech, cerebellar tumors

The primary function of the cerebellum is to coordinate the timing and force of muscular contractions so that skilled, voluntary movements are appropriate for an intended task. The cerebellum processes sensory information from all over the body and integrates that information into the execution of a movement. There are three major neural pathways that are involved in cerebellar function and connect the cerebellum to other regions of the nervous system. These include the inferior, middle and superior peduncles. The inferior peduncle transmits sensory information (i.e. joint position, muscle contraction, tendon stretch, vestibular information, etc.) from the entire body to the cerebellum, helps to monitor the timing and force of movements, and determines if muscle contractions are achieving the intended results. The middle peduncle transmits preliminary information regarding the plan of the intended movement from the cerebral cortex to the cerebellum where it can be integrated with incoming sensory information to modify and refine the intended plan of movement. The superior peduncle transmits the processed and refined information about the intended motor plan from the cerebellum to the motor areas of the cortex. This information from the superior cerebellar peduncle is then used to modify the

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final motor outflow from the motor cortex.

Cerebellar damage may be caused by stroke, tumour resection, alcohol abuse, head injury, or exposure to chemicals such as toluene and phenytoin. Cerebellar lesions may result in a dysarthria affecting the ability to coordinate the movements of the tongue, lips, and palate, as well as the synchronization of respiration and phonation (Gordon, 1996). The most typical speech pattern resulting from cerebellar lesions is that of ataxic dysarthria which is characterized by imprecise consonants, excess and equal stress (scanning speech), irregular articulation breakdown, vowel distortions, harsh voice, phoneme and interval prolongation, monopitch and monoloudness, and slow speech rate (Darley, Aronson & Brown, 1969). Clinicoanatomic studies of ataxic dysarthria have produced quite variable results. A recent review of focal cerebellar lesions found that ataxic dysarthria was associated with lesions of the vermal, paravermal, and lateral aspects of the cerebellum (Kent, Duffy, Slama, Kent & Clift, 2001). In a subsequent review, it was concluded that clinical data do not yet provide a coherent picture on the topographic correlates of cerebellar dysarthria (Ackermann, Mathiak, & Riecker, 2007).

In addition to the characteristics of ataxic dysarthria stated above, some individuals develop transient cerebellar mutism (TCM), also known as posterior fossa syndrome or cerebellar syndrome, following surgery to remove cerebellar tumours. This transient mutism, which is a state of speechlessness in a conscious patient, occurs in 7.5% to 29% of patients following tumour resection and is more common in children than adults (Huber, Bradley, Speigler & Dennis, 2006; Pollack, Polinko, Albright, Towbin, Fitz, Hoffman, & Schut, 1995; Dailey, McKhann, & Berger, 1995; Van Mourik, Catsman-Berrevoets, Yousef-Bak, Paquier & Van Dongen, 1998; Catsman-Berrevoets, Van Dongen, Mulder, Paz y Geuze, Paquier & Lequin, 1999). The posterior fossa is the most common site for brain tumours in children, accounting for about a half of all childhood central nervous system tumours (Breen, Kehagioglou, Usher, & Plowman, 2004). Cerebellar astrocytoma and medulloblastoma tumours together account for approximately one third of all childhood brain tumours (Huber et al., 2006) with medulloblastoma being the most common malignant childhood brain tumour (Ray et al. (2004). Five and 10-year survival rates for children diagnosed with medulloblastoma are reported to be 59% and 49% respectively (Ray et al., 2004).

The mechanism and structures involved in the development of cerebellar mutism are poorly understood (Duffy, 2005) but it has been suggested that mutism may result from an interruption of the pathway that connects the cerebellum to the supplementary motor cortex (Germano et al., 1998). A modified version of this hypothesis has been recently presented by Ackermann and colleagues (Ackermann et al., 2007). In their 'cerebello-cerebral diaschisis' hypothesis, Ackermann et al., (2007) suggest that posterior fossa cerebellar lesions, due to tumor surgery, cause a disruption in the normal cerebellar-

to-cortical interactions and give rise to a 'functional suppression' of mesofrontal cortical structures that are believed to be required for the initiation of speech. This hypothesis suggests that mutism is caused by remote effects (diaschisis) on the frontal cortex rather than local effects on the cerebellum. In this hypothesis, local effects on the cerebellum would be linked to ataxic dysarthria but not mutism (Ackermann, et al., 2007). Thus, this hypothesis suggests that there is an anatomical and a functional dissociation between cerebellar mutism and ataxic dysarthria.

In children who develop transient cerebellar mutism following tumour resection, well-preserved speech is observed for 24 hours up to 6 days, after which time mutism begins and lasts anywhere from several days to several months, or even years (Huber et al., 2006; van Dongen, Catsman-Berrevoets, & van Mourik, 1994; Steinbok, Cochrane, Perrin, & Price, 2003; Doxey, Bruce, Sklar, Swift, & Shapiro, 1999). As speech begins to re-emerge following the period of mutism, children often present with the characteristics of ataxic dysarthria discussed above. Therefore, the term 'mutism with subsequent dysarthria' has been used in the literature to refer to the process of the recovering cerebellar mechanism (van Dongen et al., 1994). The nature of cerebellar recovery following tumour resection is not fully understood. Some researchers describe the mutism as resolving completely into normal speech (van Dongen et al., 1994; Reigate, Grubb, Aram, Hahn, & Ratcheson, 1985; Riva & Giorgi, 2000; Pollack, 1997). Other researchers suggest that speech never fully recovers (Hudson, Murdoch & Ozanne, 1989; Huber et al., 2006; Huber-Okraïne, Dennis, Bradley, & Spiegler, 2001; Steinbok et al., 2003). This discrepancy in the literature has been noted by researchers and some have gone so far as to suggest that "One might reasonably conclude from a review of the literature that 'cerebellar mutism' is a distressing, but transient and ultimately benign problem" (Steinbok et al., 2003, p. 180).

Objectives

The primary objective of this paper is to critically evaluate the existing literature regarding the evidence for residual long-term speech deficits following transient cerebellar mutism in childhood. The second objective is to provide evidence-based recommendations for future research.

Method

Search Strategy

Computerized databases, including Commdis Dome, CINAHL, Pubmed and Medline, were searched using the following search strategy:

((transient cerebellar mutism) OR (posterior fossa syndrome) OR (cerebellar syndrome) OR (mutism)) AND (dysarthria) AND ((tumour resection) OR (tumor resection)).

The reference lists of the articles found were also searched for relevant papers and the search was limited to articles written in English.

Search Criteria

Studies selected for inclusion in this review were required to investigate speech characteristics, involve individuals who had cerebellar tumours resected in childhood, and who developed a transient period of mutism as a result of the cerebellar lesion. In order to fulfill the requirement of 'long-term' deficits, studies were also required to have participants who had received surgery at least 2 years prior.

Data Collection

Results of the literature search yielded the following study types: parental surveys and retrospective chart reviews, between group comparison designs, and case studies (3).

Results

In their 2006 study, Huber, Bradley, Speigler and Dennis investigated the presence of residual motor speech deficits in six survivors (mean survival years was 10.78) of childhood cerebellar tumour resection who develop transient cerebellar mutism (TCM) as a result. These individuals were then compared to six individuals with cerebellar tumours who did not develop postoperative TCM and six healthy individuals in order to determine whether deficits were greater in those individuals who developed TCM than in the other two groups. Subjects were videotaped while providing a narrative in response to a picture book. Two speech-language pathologists (S-LPs) independently analyzed the videotaped narratives to determine percent dysfluencies (types of dysfluencies included in the count were blocks, prolongations, part-word repetitions, word and phrase repetitions, interjections, and phrase revisions), rate of speech and the presence of ataxic dysarthria using the Dysarthria Rating Scale. Results showed that individuals who developed TCM postoperatively were significantly more dysarthric and had slower rates of speech than either the healthy controls or the individuals who did not develop TCM postoperatively. The results also showed that patients who developed TCM following tumour resection were significantly more dysfluent than healthy controls, but were not significantly different from patients who did not develop TCM following tumour resection.

The 2003 study by Steinbok, Cochrane, Perrin, and Price used parental reports and retrospective chart reviews to determine the long-term neurological and speech outcomes of seven patients who developed TCM following cerebellar tumour resection in childhood. Subjects were identified through a search of a hospital's database and medical records were reviewed and parents were contacted to determine their child's most recent speech and neurological status. Reports from parents and chart reviews indicated that at time of follow-up (between 2.5

and 13.1 years post-surgery) one child remained mute, one child's speech returned to normal, three children had speech that was reported to be slower than normal, and two children were reported to slur their speech.

In 1989, Hudson, Murdoch, and Ozanne looked at the presence of articulation, phonological, phonetic, and motor speech deficits in two individuals who had undergone surgery in childhood for the removal of a cerebellar tumour and developed TCM postoperatively. Subjects completed the Fisher-Logemann Test of Articulation Competence, and the Khan and Lewis procedure was used to analyze the results phonetically. Participants also completed the Frenchay Dysarthria Assessment and provided an audio recorded connected speech sample which two independent S-LPs used to determine the presence or absence of the ten most prominent features of ataxic dysarthria as defined by Darley, Aronson, and Brown (1969). The first individual, who was 6 years post-operative, was described as presenting with a number of inconsistent phoneme productions, the retention of phonological processes, a mixed ataxic-flaccid dysarthria, left facial palsy, lack of volume control and 5 of the 10 ataxic dysarthria characteristics, including imprecise consonants, excess and equal stress, irregular articulatory breakdowns, prolonged phonemes and slow rate. This individual was reported to be largely unintelligible. At 4 years and 9 months post-surgery, the second individual was described as presenting with some phoneme prolongations, pitch breaks, variable pitch, lack of volume control, explosive onsets and 6 of the 10 ataxic dysarthria features including imprecise consonants, excess and equal stress, harsh voice, prolonged phonemes, prolonged intervals and slow rate.

Di Cataldo et al. (2001) presented a case study of an individual who at 25 months after surgery for the removal of a cerebellar tumour was reported to have normal speech following TCM. No formal assessment was completed.

In 1996, Jones, Kirollos, and Van Hille described a case study of an individual who underwent cerebellar tumour resection and developed TCM postoperatively. At a 2-year follow-up the individual was reported to demonstrate slurring and stuttering of speech, although no formal assessment was completed.

Discussion

When reviewing the results of these studies, it is important to consider issues related to subject selection, sample size, statistics, and methodology, as these factors may impact the strength of the evidence.

Subject Selection and Sample Size

Most of the studies involved very small sample sizes, ranging from one to seven subjects. This is likely due to the limited number of cases of TCM and the limited number of individuals who survive medulloblastoma brain tumours. As a result, the power and generalizability of the findings are compromised.

Another issue is the lack of random sampling in

the selection of the participants. The participants in the study by Huber et al. (2006) were the same individuals that participated in a previous study and the methods of participant selection were not described in either paper. Therefore it is unknown whether the methods of selection were valid and thus to what extent the results can be generalized. Steinbok et al. (2003) and Hudson et al. (1989) used hospital databases in order to identify potential subjects for their studies. This process may have had inherent biases as individuals who seek services at a particular hospital may be of a certain ethnic background or have a certain socioeconomic status. However, this background information was not provided by the authors.

Information regarding participant inclusion and exclusion criteria was not included in a number of studies (Huber et al., 2006; Steinbok et al., 2003; Di Cataldo et al., 2001). Therefore, it is unclear if factors such as medical history or the presence of premorbid speech impairments could have played a role in the outcome of these studies. Many papers also failed to report whether the subjects had received speech therapy and therefore it is unclear what role speech therapy may play in the prevention of long-term residual speech deficits in TCM. Reporting and controlling for these variables would assist in ensuring that the results obtained were due to the effects of cerebellar tumour resection and TCM and not to premorbid medical issues, premorbid speech impairments, or speech treatment.

A number of researchers failed to control for, or provide information regarding, tumour type, location or size, surgical resection technique and amount of tumour resected, or whether post-surgery treatment (e.g. radiotherapy, chemotherapy) was provided. Huber et al. (2006) matched the TCM group with the tumour resection group who did not develop TCM for tumour type and location. They also stated that there were equal numbers of radiated and nonradiated patients in each group. Steinbok et al. (2003) controlled for tumour type and location as well as the location of the surgical incision, however some individuals were reported to have received radiation while others did not. Hudson et al. (1989) provided information regarding tumour type, location and size, as well as whether radiation therapy was received, and, if so, the dosage and location of delivery. Di Cataldo et al. (2001) and Jones et al. (1996) reported tumour type and location as well as a description of the surgical procedure. In addition, Di Cataldo et al. (2001) included information regarding post-operative treatment including radiation and chemotherapy. These variables could impact the potential outcome of TCM and, therefore, controlling for them would increase the generalizability of the results obtained.

Methodological Issues

When interpreting the results of studies, it is important to consider limitations of the methodology, in particular prominent information that was not included in the research descriptions, statistics provided, and the

type of study conducted (e.g. case study, chart review, experimental).

Huber et al. (2006) and Hudson et al. (1989) failed to provide important information related to test administration and listening procedures (i.e. how many times the S-LPs were able to listen to speech samples; who administered the standardized tests, etc.). Several studies failed to provide information related to the methods and criteria that were used to determine the subjects' neurological deficits and diagnosis. This lack of information reduces the reproducibility and validity of the findings.

A number of researchers relied on subjective observations made by themselves in their case studies (Di Cataldo et al., 2001; Jones et al., 1996), or by parents through parental reports (Steinbok et al., 2003), to determine the presence of speech deficits. These studies do not provide empirical findings and, therefore, the results are less valid and reliable than experimental approaches. There are also concerns that the researchers reporting the observations were not qualified S-LPs and may have missed subtle speech deficits. Definitions or descriptions of the observations were not included and, therefore, what constitutes 'slurring of speech', for example, is unknown. Likewise, Huber et al. (2006) reported that individuals who developed TCM post-operatively were significantly more dysfluent than healthy controls, however, the type and frequency of dysfluencies observed were not provided. Therefore, whether these individuals presented with typical stuttering, consisting of more blocks and prolongations than word and phrase repetitions, remains unknown. Steinbok et al. (2003) obtained information from parents by asking whether their child's speech had returned to normal and used this information along with information from medical records to make a determination as to whether speech had returned to normal. How this determination was made and by whom was not reported. The method of how the information was obtained, and by whom, will influence the validity as well as the scope of the results. According to Steinbok et al. (2003) "...it is reasonable to assume that if a speech abnormality was noted by the parents, it is highly probable that a speech abnormality would have been identified in a formal speech assessment" (p.182). This may be true, however, the converse is not. Parents will most likely not be aware of all the aspects of speech that a trained professional would be able to detect (e.g. excess and equal stress, irregular articulatory breakdowns, prolonged phonemes and intervals, voice quality, fluency of speech) and a seemingly minor speech abnormality might not be detected or reported by a parent.

Another important aspect to discuss when appraising these articles is the manner in which speech samples were obtained. Huber et al. (2006) obtained connected speech samples using picture-prompted narrative speech task in which individuals were asked to tell a story using a children's picture storybook. The age of subjects in this study ranged from 8.75 to 31.5 years and, therefore, the use of a children's picture book may not have been appropriate for the older

children and adults in the study. Similarly, Hudson et al. (1989) used a picture stimulus and asked each child (age 8 and 16) 'what will happen next?'. Obtaining a speech sample through these means may have resulted in shorter samples that are not as comprehensive or representative of daily speech as would have been a more open discussion with the subjects. Assessing speech in a more natural environment (e.g. conversations with family members in the individual's home) and through more natural means would aid in increasing the validity of the speech samples obtained. This would result in samples that were more representative of daily speech and, therefore, more representative of the speech difficulties that the subjects face in their daily lives.

Finally, it is important to consider how speech outcomes were measured. It may not be appropriate to apply diagnostic and assessment criteria derived from the acquired dysarthrias of adulthood to those of children. The difficulties are similar to those seen when classifying the acquired aphasias in children, in that the clinical picture in childhood is different from that in adults (Catsman-Berrevoets, van Dongen & Zwetsloot., 1992, p.1108). However, Huber et al. (2006) used the Dysarthria Rating Scale in order to determine the presence of ataxic dysarthria and Hudson et al. (1989) used the Frenchay Dysarthria Assessment and the method of Darley et al. (1969) to describe the speech characteristics of their subjects. Therefore, the results obtained from these studies may have reduced validity and reliability.

Statistics

Inter-rater reliability was not reported by Huber et al. (2006) and therefore there is no way of knowing how many inconsistencies occurred and how often a consensus had to be reached. Inter-rater reliability scores would allow for the determination of the reliability of the results obtained. The researchers used an appropriate between-group ANOVA for each speech characteristic. However, with only six subjects in each group it is unlikely that the study had sufficient power to obtain a statistical difference between groups. Therefore, it is almost impossible to reject the null hypothesis and a descriptive approach might have been more appropriate for this study. The sample sizes in the remaining empirical research papers were too small to allow for statistical analyses.

Recommendations

Based on the critical review of the available literature there is evidence to suggest that some individuals continue to have speech deficits as measured by articulation, phonology, fluency of speech, rate of speech, or the presence of dysarthria characteristics years after surgery and TCM. However, several concerns regarding the research exist including; concerns regarding recruitment of participants, small sample sizes, lack of inclusion and exclusion criteria, lack of experimental designs and control groups and concerns regarding the use of adult criteria to classify the acquired dysarthrias of childhood. It is

therefore recommended that clinicians be cautious when generalizing the findings of these studies to clients in their practice, such as when providing parents with information regarding the expected speech outcomes for their child following surgery.

It is also recommended that further research be conducted to confirm the research that has been completed and to clarify this research question. Researchers working in this area are encouraged to:

1. Use experimental study designs and include control groups.
2. Develop longitudinal studies.
3. Use objective measurements for articulation, fluency, dysarthria, and rate of speech instead of relying on subjective and descriptive approaches.
4. Include relevant and important information such as inclusion and exclusion criteria, participant histories and recruitment procedures.
5. Include more participants in their studies and use random sampling.
6. Control for the use of radiation in the treatment paradigm, including whether it was delivered focally or to the whole brain, and the dose.
7. Control for the involvement of speech therapy post-surgery.
8. Obtain speech samples in more natural communication settings where interactions are more spontaneous and representative of daily conversational speech.
9. Use diagnostic tools which were developed for assessing the acquired dysarthrias of childhood.
10. Examine the relationship between the extent and location of cerebellar damage due to tumour resection and the extent of residual speech deficits.
11. Examine the relationship between the length of the period of mutism and characteristics of the subsequent recovery and the long term speech deficits.
12. Examine whether the residual deficits are so minimal as not to be perceived by the average person, and only by trained professionals through the use of diagnostic procedures.

Conclusion

The present literature review suggests that some individuals who have cerebellar tumours resected in childhood experience residual speech deficits following transient cerebellar mutism. These deficits may impact articulation, phonology, fluency, or rate of speech, or they may manifest as a complex dysarthria. They may persist beyond 2 years following surgery. This information is important for clinicians to consider when providing parents with the expected long-term speech outcomes of their child following surgery and mutism. Although the research is largely descriptive in nature and contains few subjects, there were long term speech deficits in all but

two participants in the previous studies. Until further experimental research can be completed, the findings from these studies can be used cautiously to show that there is the potential for residual long-term speech deficits following transient cerebellar mutism in childhood.

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■ Schoolteachers' Attitudes Towards People Who Stutter: Results of a Mail Survey

■ Attitudes des enseignants et des enseignantes envers les bégues : résultats d'une enquête menée par la poste

Farzan Irani
Rodney Gabel

Abstract

This study assessed schoolteachers' attitudes toward people who stutter (PWS) and also explored the effect of familiarity and educational factors on teachers' attitudes toward PWS. A 14-item semantic differential scale was used to measure teachers' attitudes towards PWS as compared to fluent speakers. The responses from 178 teachers were analyzed with regards to the teachers' level of experience with PWS and their previous coursework on stuttering. The results indicated that the teachers reported positive attitudes towards both PWS and fluent speakers. The scores on the semantic differential scale indicated that the PWS were judged more positively for three items. Educational and experiential factors were found to have no systematic effect on the teachers' attitudes toward PWS. Future research is needed to further investigate societal stereotypes and biases related to fluency disorders.

Abrégé

La présente étude a évalué l'attitude d'enseignants et d'enseignantes envers les bégues ainsi que l'effet des facteurs de familiarité et de sensibilisation aux troubles de la fluence sur leur attitude envers les bégues. On a utilisé une échelle de différenciation sémantique en 14 points pour mesurer les attitudes des enseignants et enseignantes envers les bégues par opposition aux enfants qui ne béguaient pas. On a analysé les réponses de 178 enseignants pour voir leur niveau d'expérience auprès des bégues et leur formation sur le bégaiement. Les résultats indiquent que les enseignants disent avoir une attitude positive autant envers les enfants bégues que les autres enfants. Les pointages obtenus à l'échelle de différenciation sémantique montrent que les bégues étaient jugés plus favorablement pour trois éléments. On a remarqué que l'éducation et l'expérience n'avaient pas d'effet systématique sur les attitudes des enseignants et des enseignantes envers les bégues. Il faut approfondir la recherche pour examiner les stéréotypes et les biais de la société relatifs aux troubles de fluidité.

Key words: semantic differential scale, teachers, attitudes, people who stutter

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Introduction

It has been argued that stuttering cannot be defined solely as a speech fluency problem. Doing so would ignore the person's feelings about him- or herself and the effect that stuttering has on his or her life. It could also lead to wrong decisions in therapy because the speech fluency may not be the principal problem that the clinician has to address (Guitar, 2006, Manning 2001; Van Riper, 1982; Sheehan, 1975). Yaruss and Quesal (2004) stress that stuttering can severely limit a person's social, occupational, and educational opportunities. All of these issues may have a detrimental impact on the self-concept of people who stutter (PWS). They can also affect how PWS are viewed by others. Okun (1997) defines self-concept as, "the perception we have of ourselves based on information from significant others and from our experiences" (p. 291). For PWS, the listeners' perceptions of their speech will play an important role in shaping their self-concept.

Central to the societal perception of stuttering is the concept of stereotyping. Stereotyping is defined as an "exaggerated belief associated with a category and functions to justify (rationalize) one's conduct in relation to that category" (Allport, 1986, p. 191). Stereotypes are detrimental to the individual because (1) they portray the individual as a member of a category, (2) they polarize by clearly demarcating between those inside and outside of a category, and (3) they may lead to behaviours and actions that reduce options and freedoms for individuals in a category (Smart, 2001).

A review of the literature indicates that the speech of PWS is often subject to negative stereotyping. Such negative stereotyping has been demonstrated for various groups of listeners, including educators (Dorsey & Guenter, 2000; Yeakle & Cooper, 1986; Crowe & Walton, 1981), healthcare professionals (Silverman & Bongey, 1997; Yairi & Carrico, 1992), employers (Hurst & Cooper, 1983a), vocational counselors (Hurst & Cooper, 1983b), speech-language pathologists (Cooper & Cooper, 1996; Turnbaugh, Guitar, & Hoffman, 1979; Woods & Williams, 1976; Yairi & Williams, 1970), lay people (Ham, 1990; Crowe & Cooper, 1977), and college students (Dorsey & Guenter, 2000; Silverman & Paynter, 1990; Ruscello, Lass, & Brown, 1988). Findings from these studies indicate that PWS are characterized using descriptors such as 'shy', 'anxious', 'withdrawn', 'nervous', 'tense', 'hesitant', 'self-conscious', 'less competent', 'introverted', and 'insecure'. Perceptions such as these, based simply on the fact that a person stutters, may contribute to a negative stereotype of PWS. This negative stereotype can lead to behaviours and actions that can discriminate against the individual (Smart, 2001). This in turn can contribute to a negative self-concept among PWS (Manning, 2001; Silverman, 1996).

People with disabilities, including PWS, often internalize negative stereotypes and accept them as the truth about themselves (Smart, 2001). This internalization may be exacerbated if such stereotypes are repeated often and from authority figures. For children in school, teachers are authority figures who can have a significant impact on their lives. Previous studies (Lass et al., 1994; 1992; Yeakle & Cooper, 1986) found that teachers and school administrators held largely negative stereotypes about PWS. Yeakle and Cooper (1986) also explored the effect of experience with PWS or course work in speech disorders in teachers' perceptions of PWS. The study found that teachers who reported having experience with PWS or course work in speech disorders expressed more realistic attitudes toward PWS, thus indicating that familiarity and/or education can help improve teachers' perceptions of PWS.

Obviously, it is of concern if such an influential professional group admits to negative stereotypes. However, no further research on this topic was undertaken after the study by Lass et al. (1994). Additionally, no study has explored the effect of familiarity and educational factors on teachers' perceptions of PWS after the study by Yeakle and Cooper (1986). The purpose of the present study was

twofold: (1) to reassess schoolteachers' attitudes; and (2) to explore the effect of familiarity and educational factors on their perception of PWS.

Methods

Participants and Survey Distribution

The participants for this study were schoolteachers of the levels Kindergarten (K) to grade 12. The teachers were recruited from all 50 states of the United States of America. The participants were identified via an internet search of K-12 schools in each state. Based on this convenience sample, 1,100 potential participants were selected quasi-randomly. This list included teachers of all disciplines and grade levels. Each participant was mailed a copy of the survey packet and asked to complete and return it. The survey packets contained a demographic questionnaire, a 14-item semantic differential scale (Burley & Rinaldi, 1986; Collins & Blood, 1990), a cover letter, an informed consent form, and a postage paid return envelope.

Of the 1,100 survey packets that were mailed, 44 questionnaires were returned because the address was incorrect. A total of 212 participants returned the survey, which corresponds to a response rate of 19.27%. Of the 212 returned questionnaires, 178 (16.2% of all mail-outs) were complete and usable. Of the 34 questionnaires that were not usable, 30 questionnaires could not be used because the participants did not complete the entire questionnaire. Four questionnaires were excluded from the analysis because the participants reported that they themselves stuttered. It was assumed that these four teachers might have had a positive bias toward PWS, thus potentially distorting the survey results.

Semantic differential questionnaire

A semantic differential scale was utilized to measure the attitudes that the teachers reported towards PWS. The semantic differential scale utilized in this study was a 14-item instrument consisting of 14 adjectives paired with their antonyms (Collins & Blood, 1990; Burley & Rinaldi, 1986; see Table 1). Semantic differential scales, like the one used in this study have been used previously to measure attitudes toward PWS (Gabel, 2006; Silverman & Bongey, 1997; Collins & Blood, 1990; Horsley & FitzGibbon, 1987; Burley & Rinaldi, 1986; Woods & Williams, 1976). The antonyms (e.g. 'sincere - insincere') were randomly assigned to the left and right columns in an equal number of items. The random assignment was used to reduce the likelihood of stereotypical response patterns (Silverman & Bongey, 1997). The ratings were made on a 7-point scale, which was placed between the antonyms. The participants were asked to circle the number on the scale they felt best described the individual. Positive and negative items were randomly distributed to either the left (1) or the right (7) ends of the scale. In order to quantify the rating results, the negative extreme of each antonym was scored with a 7 and the positive extreme was scored with a 1. Therefore, a higher score indicated a more negative attitude and a lower score indicated a more positive attitude.

Each of the 1,100 participants was randomly assigned to complete the semantic differential scale in reaction to one of two descriptions of a person. The two descriptions were: (1) a person who stutters and has no other communication disorder (PWS) and; (2) a person who does not stutter and has no other communication disorder (normal speaker). No specific definitions of stuttering were provided to the participants in order to ensure that all responses and ratings were based on the participant's internal standards. Of the 178 usable questionnaires, 88 teachers responded to the first description and 90 teachers responded to the second description.

Demographic questionnaire

The demographic questionnaire required the participants to report their age, sex, and years of teaching. It also asked about the teachers' knowledge about stuttering, based on their readings or participation in courses. Finally, the teachers were asked if they had taught students who stutter in one of their present or past classes. Table 2 summarizes the response data, sorted according to the version of the semantic differential questionnaire that was filled in.

Data Analysis

Means and standard deviations were obtained for each item on the semantic differential scale. According to

the scoring system applied, a higher mean score for a particular group was indicative of negative attitudes toward that group and, conversely, a lower mean score was indicative of positive attitudes toward that group.

A Multivariate Analysis of Variance (MANOVA) was used to compare the differences of reports made by the two groups of participants for the 14 items on the semantic differential scale as well as the overall mean scores. The MANOVA was used to explore which traits (positive or negative) were more or less likely to be associated with PWS compared to fluent speakers. The initial target alpha level was set to $p < 0.05$. Due to the large number of two-way comparisons conducted, the alpha level was adjusted to reduce the risk of a statistical Type I error (false positive). According to the Bonferroni procedure, the target alpha of $p < 0.05$ was divided by the total number of analyses conducted (14 individual items and the overall mean score), resulting in a more rigorous alpha value of $p \leq 0.003$.

For the participants responding to the description of the PWS ($n=88$), an additional MANOVA

Table 1

*Comparison of participants' responses for PWS ($N = 88$) and fluent speakers ($N = 90$) on the semantic differential scale, together with the results of the MANOVAs. Statistically significant differences ($p \leq 0.003$) between the two groups are indicated with *.*

Adjective	Mean (SD)- Judgments of PWS	Mean (SD)- Judgments of fluent speakers	F-value	p-value
Sincere-insincere	2.19 (1.28)	2.81 (1.35)	9.72	0.002*
Likable-notlikeable	2.23 (1.32)	2.73 (1.31)	6.31	0.013
Trustworthy-not trustworthy	2.17 (1.36)	2.68 (1.27)	6.84	0.010
Decisive-indecisive	2.81 (1.58)	2.96 (1.42)	0.432	0.512
Physically normal-physically abnormal	2.05 (1.37)	2.96 (2.53)	8.78	0.003*
Reliable-unreliable	2.20 (1.35)	2.67 (1.30)	5.62	0.019
Good sense of humor-poor sense of humor	2.77 (4.63)	2.91 (1.30)	0.04	0.785
Mentally stable-mentally unstable	2.18 (1.49)	2.64 (1.36)	4.65	0.032
Sociable-unsociable	2.90 (1.57)	2.87 (1.47)	0.01	0.891
Friendly-hostile	2.37 (1.28)	2.64 (1.30)	1.91	0.168
Strong character-weak character	2.42 (1.34)	2.72 (1.27)	2.44	0.120
Intelligent-unintelligent	2.26 (1.49)	3.15 (1.62)	14.60	0.000*
Employable-unemployable	1.89 (1.19)	2.45 (1.45)	7.80	0.006
Emotionally adjusted-emotionally maladjusted	2.47 (1.39)	2.87 (1.65)	3.03	0.083
Overall mean score	2.35 (1.21)	2.79 (1.08)	6.53	0.011

Table 2
Summary of responses to the demographic questionnaire

	Group responding about fluent speakers (N=90)	Group responding about PWS (N=88)
1. Age of participants	Mean = 43.52 Range = 23-72 Standard Deviation = 11.34	Mean = 45.02 Range = 25-67 Standard Deviation = 9.67
2. Gender	Male = 18 Female = 71	Male = 24 Female = 64
3. Ethnicity	Caucasian = 76 NA = 7 Asian = 4 African-American = 3 Latino = 0	Caucasian = 73 NA = 9 African-American = 3 Asian = 2 Latino = 1
4. Do you stutter?	Yes = 0 No = 90	Yes = 0 No = 88
5. Do you know someone who stutters?	Yes = 0 No = 90	Yes = 0 No = 88
6. Number of years in education	Mean = 14.69 Range = 1-39 Standard Deviation = 9.46	Mean = 17.13 Range = 2-46 Standard Deviation = 9.87
7. Grade level presently teaching	Preschool = 0 K-2 = 7 3-6 = 24 7-9 = 30 10-12 = 28 Adults = 1	Preschool = 1 K-2 = 15 3-6 = 13 7-9 = 29 10-12 = 29 Adults = 1
8. Did you take any college courses dealing with disorders of speech?	Yes = 21 No = 68 No Response = 1	Yes = 23 No = 65
9. Have you ever done any professional reading about stuttering?	Yes = 24 No = 65 No Response = 1	Yes = 25 No = 63
10. How many people who stutter have you taught?	0 = 18 1-3 = 51 4-6 = 13 More than 6 = 8	0 = 19 1-3 = 55 4-6 = 9 More than 6 = 5
11. Do you presently have a student in your class who stutters?	Yes = 21 No = 69	Yes = 11 No = 77

was completed to explore in how far the participants' responses were influenced by their personal experience and/or additional training about PWS. These analyses were based on the participants' responses to four questions of the demographic questionnaire. The four questions in the demographic questionnaire used as independent variables for this analysis were:

- 1) Have you ever had a college course in disorders of speech?
- 2) Have you ever done any professional reading about stuttering?
- 3) How many people who stutter have you taught?
- 4) Do you presently have a student in your class who stutters?

The first, second and fourth questions required yes/no answers with two levels of the independent variable. The third question had four levels to the independent variable. The alpha level for this analysis was set to $p < 0.05$. The initial target alpha level was set to $p < 0.05$. To reduce the risk of a statistical error, the target alpha of $p < 0.05$ was divided by the total number of analyses conducted (14 individual items and the overall mean score), resulting in an alpha value of $p \leq 0.003$.

The decision to use a parametric test for an analysis of equal-appearing interval data was based on a review of past literature. Collins and Blood (1990), Horsley and FitzGibbon (1987), Yeakle and Cooper (1986), Burley and Rinaldi (1986), and Woods and Williams (1971) all

used parametric tests to analyze the results from semantic differentials with equal-appearing interval scales. In the present study, all pair-wise comparisons were recalculated using the more conservative non-parametric Mann-Whitney U-test to corroborate the findings from the MANOVAs. In terms of instances of statistical significance (or non-significance), the results from the non-parametric comparisons were identical to the parametric statistics. Only the results of the parametric procedures are reported and discussed in the following sections.

Results

The mean score and standard deviations for each of the 14 items and the overall mean score on the semantic differential scale are reported in Table 1. The mean scores for the items rated by the first group (who rated PWS) ranged from 1.89 to 2.91. For group 2 (who rated fluent speakers), the results ranged from 2.46 to 3.16. The overall mean score for the semantic differential scale for PWS was 2.35 and 2.79 for fluent speakers.

MANOVAs were used to explore the difference between the two groups' perceptions of PWS and fluent speakers for each item on the semantic differential scale, as well as the overall mean score. The results are displayed in Table 1 and indicate significant differences for three of the items ($p \leq 0.003$). These three items include the antonyms 'sincere – insincere', 'physically normal – physically abnormal', and 'intelligent – unintelligent'. For these three items, the participants reported more positive attitudes towards PWS than towards fluent speakers.

A second set of MANOVAs was calculated for the data from the 88 participants who completed the scale in response to the PWS in order to determine the influence of their experiences and previous training on their judgments. Four MANOVAs were conducted to explore the possible effects for each of the 14 items and the overall mean score. No significant effects were found for any of these analyses.

Discussion

This study reassessed K-12 schoolteachers' attitudes toward PWS and fluent speakers. Of 1,100 survey packages mailed, only 178 (16.18%) were returned completed and usable. This response rate was reasonable given the fact that the teachers received the questionnaire unannounced and with no particular incentive to participate in the study. Nevertheless, the sample may not have been representative of the general population of teachers. This limits the ability to generalize the results of the study and should be considered when interpreting the results.

Based on the teachers' responses on the semantic differential scale, it was found that the K-12 schoolteachers did not report overtly negative attitudes toward PWS. Both PWS and fluent speakers were described positively for each item on the semantic differential scale, which also yielded a positive result for the overall mean score. While both groups were judged positively, the PWS received significantly more positive scores than the fluent speakers for three items on

the semantic differential scale. Educational and experiential factors were not found to have an effect on the teachers' overall positive attitudes toward PWS.

In this study, a Bonferroni adjustment was used to reduce the risk of a Type I error (false positives) in light of the relatively large number (15) of two-way analyses conducted. However, the use of a more rigorous alpha level for the analyses reduced the number of significant differences found between groups. Without the Bonferroni adjustment, there would have been significant differences between the groups for eight items on the semantic differential scale and for the overall mean score. As a result of the Bonferroni adjustment, significant differences between the groups were found for only three items on the semantic differential scale. The use of the Bonferroni adjustment may therefore have contributed to the increase in a Type II error (false negatives; Perneger, 1998).

The findings of this study differ from previous research, which consistently found that teachers (Lass, et al. 1992; Yeakle & Cooper, 1986) and school administrators (Lass et al., 1994) reported negative attitudes toward PWS. Instead, the results of the present study could be cautiously interpreted to indicate a positive shift in teachers' attitudes toward PWS. However, it should be noted that the methodology used by this study differs from the methodology used by Lass et al., (1992) and Yeakle and Cooper (1986) studies. Therefore, the results are not directly comparable and the findings need to be further corroborated.

A positive shift in teachers' attitudes toward PWS was also noted by Cooper and Cooper (1996) with regard to causality, early intervention, and character judgment. This conclusion was based on an analysis of studies published between 1973 and 1983. Two more recent studies by Healey, Gabel, Daniels and Kawai (2007) and Gabel (2006) found that members of the general population reported more positive attitudes towards PWS than in the past. Finally, Irani, Gabel, Hughes, Swartz and Palasik (in press) explored occupational stereotyping of PWS by K-12 schoolteachers but did not find evidence of such stereotyping. The findings of this study and of these other recent studies may suggest a general positive shift in attitudes towards PWS.

It could be argued that the results from the different studies should not be compared directly because of methodological differences. For example, Lass et al., (1992, 1994) asked teachers and administrators to list adjectives to describe a typical 8 year-old female and male PWS, compared to a typical adult female and male PWS. The majority of the adjectives listed were deemed to be indicative of negative attitudes toward PWS. The semantic differential used in the present study did not allow the participants to generate their own descriptors. However, the scale between the antonyms would still have allowed the participants to express negative attitudes and feelings towards PWS.

It should also be noted that the respondents were not provided with a definition of stuttering. This approach was chosen based on previous studies (e.g., Woods &

Williams, 1971; Lass et al., 1992; 1994), which used a similar methodology, but this may not be the best research design. Future research exploring teachers' attitudes towards stuttering might incorporate a verbal definition of stuttering or audiovisual samples, to either support or refute the present findings.

Finally, in every questionnaire study, the respondents might give socially acceptable responses rather than admit to their genuine beliefs. The teachers may have felt that reporting negative attitudes towards PWS would be unacceptable for their profession. Considering society's predisposition to political correctness, people might hesitate to overtly express negative attitudes or feelings on a semantic differential scale. There is no easy way to assess such a positive answer bias, however, some researchers have used psychophysiological measures to address this issue. Guntupalli, Kalinowski, Nanjudeswaran, Saltuklaroglu and Everhart (2006) found skin conductance and heart rate changes in fluent adults who were watching 1-minute video clips of PWS reading aloud. However, even a participant with a strong aversive physiological response may still make a cognitive decision to behave in a tolerant and inclusive manner. The teachers in the present study had no specific incentive to participate. It is therefore reasonable to assume that they also did not have any strong motivation to provide insincere answers.

The findings from the present study suggest that American K-12 teachers have become more tolerant and accepting of people who stutter. This is a positive finding that should be documented and corroborated by more research, using further semantic differential studies as well as alternative methodologies.

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Book Review/ Évaluation de livre

Cognitive Communication Disorders of Dementia
Kathryn A. Bayles & Cheryl K. Tomoeda (2007)

Publisher: Plural Publishing Inc., San Diego, California

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Bayles and Tomoeda's book represents a long overdue textbook for speech-language pathologists addressing communication issues in dementia. With its comprehensive content, logical organization, and wealth of clinically-relevant basic facts, it has the potential to provide context for language impairments in cognitive-communication disorders. It includes information on the fundamentals of language assessment and basic intervention strategies in dementia necessary for every new clinician and welcomed by those in need for a refresher.

The authors have divided the book into four sections, organized by conceptual themes that include (1) general cognition and communication (2) the effects of dementia on cognition and communication, (3) assessment of cognitive-communication disorders, and (4) treatment approaches. Each section contains multiple chapters.

The first section defines the features of normal aging and provides a concise description of the neural bases of cognition and language. It also includes a general introduction to dementia as a syndrome couched in memory disorders. While it may be useful to present some dementias within the context of memory disorders, especially those for which memory is one of the defining features (e.g., dementia of the Alzheimer's type) it does not necessarily provide a sufficient framework for understanding the fronto-temporal group of dementias (FTD), where either executive function (e.g., frontal variant of FTD) or language-based deficits (e.g., temporal variant) play a more important role than memory. The first section also contains a brief summary of neuroimaging techniques relevant to studies in dementia.

In the second section, the authors present important clinical information regarding a number of dementias other than dementia of the Alzheimer's type, including vascular and fronto-temporal dementia, dementia in Down's syndrome and dementia associated with neurodegenerative diseases such as Parkinson's disease, Huntington's disease and Lewy Body dementia. This section provides easily accessible basic facts relevant to clinical S-LP practice and represents a nice compilation of language profiles associated with different dementias.

The third section of the book provides a comprehensive description of various assessment tools, including historically important (but outdated) as well as current and up-to-date tools. Emphasis was placed on the Arizona Battery for Communication in Dementia, developed by the book's authors in 1993. Overall, the book is heavily focused on language impairments resulting from dementia of the Alzheimer's type and falls short on outlining both the assessment procedure and interventions for its FTD counterpart. In addition, the portion covering the diagnosis of semantic dementia (SD) is somewhat confusing. In the current literature, SD is commonly described as the fluent variant of primary progressive aphasia. Bayles and Tomoeda assigned the term "fluent" to a variant of primary progressive aphasia that seems to be different from SD. The basis for this classification is not clear and may appear confusing to a new clinician who is unfamiliar with this particular patient population and/or nosology. However, there are many publications that may easily remediate this shortcoming (e.g., Hodges & Patterson, 1996; Snowden, Neary & Mann, 1996). For more information regarding differences related to typology of language profiles in fronto-temporal dementia, one could refer to the literature on the topic (e.g., Kertesz, Davidson, McCabe, Takagi, & Munoz, 2003; Gorno-Tempini, Dronkers, Rankin, Ogar, Phengrasamy, Rosen, et al., 2004).

The fourth and final conceptual section of the book consists of information related to intervention strategies in dementia. Again, most of the information pertains to dementias characterized by a progressive loss of memory, rather than dementias characterized primarily by a language deficit (i.e., FTD). To the authors' credit, the subsection relating to care planning focuses on issues that are not generally addressed in other dementia-focused publications, but that are important to the successful management of dementia and its progression.

Each chapter ends with a helpful summary section highlighting important points followed by a list of references. Readers will also be happy with the glossaries of terms and clear visual aids to the text in the form of tables and figures/drawings.

With the exception of the previously mentioned shortcomings related to fronto-temporal dementia, this book is an excellent dementia resource and could become easily the starting point for both students and new clinicians working with clients affected by Alzheimer's dementia. I intend to use sections of the book as a resource when teaching a graduate course on cognitive communication disorders. It is a showcase of many years of successful research into communication issues in Alzheimer's disease. Next to Mendez and Cummings' 'Dementia: A Clinical Approach' (2003), and Dan Kempler's 'Neurocognitive Disorders in Aging' (2005), the 'Cognitive-Communication Disorders of Dementia' by Bayles and Tomoeda is a sound addition to the library of every speech-language pathologist with a special interest in communication and aging.

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ERRATUM

CJSLPA, Volume 32, No. 2

Material and Resource Review

Educating Children with Velo-Cardio-Facial Syndrome

In the material and resource review on the book "Educating Children with Velo-Cardio-Facial Syndrome", the name of the author of the review was given as Christie Mellies. The correct name of the author is Christina Mellies. The publisher regrets and apologizes for this error.

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Along with copies of the manuscript, a cover letter indicating that the manuscript is being submitted for publication consideration should be included. The cover letter must explicitly state that the manuscript is original work, that has not been published previously, and that it is not currently under review elsewhere. Manuscripts are received and peer-reviewed contingent upon this understanding. The author(s) must also provide appropriate confirmation that work conducted with humans or animals has received ethical review and approval.

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All submissions should conform to the publication guidelines of the *Publication Manual of the American Psychological Association* (APA), 5th Edition. A confirmation of receipt for all manuscripts will be provided to the contact author prior to distribution for peer review. CJSLPA seeks to conduct the review process and respond to authors regarding the outcome of the review within 90 days of receipt. If a manuscript is judged as suitable for publication in CJSLPA, authors will have 30 days to make necessary revisions prior to a secondary review.

The author is responsible for all statements made in his or her manuscript, including changes made by the editorial and/or production staff. Upon final acceptance of a manuscript and immediately prior to publication, the contact author will be permitted to review galley proofs and verify its content to the publication office within 72 hours of receipt of galley proofs.

Organization of the Manuscript

All copies should be typed, double-spaced, with a standard typeface (12 point, noncompressed font) on high quality 8 ½ X 11 paper. All margins should be at least one (1) inch. An original and four (copies) of the manuscript should be submitted directly to the Editor. Author identification for the review process is optional; if blind-review is desired, three (3) of the copies should be prepared accordingly (cover page and acknowledgments blinded). Responsibility for removing all potential identifying information rests solely with the author(s). All manuscripts should be prepared according to APA guidelines. This manual is available from most university bookstores or is accessible via commercial bookstores. Generally, the following sections should be submitted in the order specified.

Title Page: This page should include the full title of the manuscript, the full names of the author(s) with academic degrees, each author's affiliation, and a complete mailing address for the contact author. An electronic mail address also is recommended.

Abstract: On a separate sheet of paper, a brief yet informative abstract that does not exceed one page is required. The abstract should include the purpose of the work along with pertinent information relative to the specific manuscript category for which it was submitted.

Key Words: Following the abstract and on the same page, the author(s) should supply a list of key words for indexing purposes.

Tables: Each table included in the manuscript must be typewritten and double-spaced on a separate sheet of paper. Tables should be numbered consecutively beginning with Table 1. Each table must have a descriptive caption. Tables should serve to expand the information provided in the text of the manuscript, not to duplicate information.

Potential Conflicts of Interest and Dual Commitment

As part of the submission process, the author(s) must explicitly identify if any potential conflict of interest, or dual commitment, exists relative to the manuscript and its author(s). Such disclosure is requested so as to inform C JSLPA that the author or authors have the potential to benefit from publication of the manuscript. Such benefits may be either direct or indirect and may involve financial and/or other nonfinancial benefit(s) to the author(s). Disclosure of potential conflicts of interest or dual commitment may be provided to editorial consultants if it is believed that such a conflict of interest or dual commitment may have had the potential to influence the information provided in the submission or compromise the design, conduct, data collection or analysis, and/or interpretation of the data obtained and reported in the manuscript submitted for review. If the manuscript is accepted for publication, editorial acknowledgement of such potential conflict of interest or dual commitment may occur when publication occurs.

Illustrations: All illustrations included as part of the manuscript must be included with each copy of the manuscript. All manuscripts must have clear copies of all illustrations for the review process. High resolution (at least 300 dpi) files in any of the following formats must be submitted for each graphic and image: JPEG, TIFF, AI, PSD, GIF, EPS or PDF. For other types of computerized illustrations, it is recommended that CJSPLA production staff be consulted prior to preparation and submission of the manuscript and associated figures/illustrations.

Legends for Illustrations: Legends for all figures and illustrations should be typewritten (double-spaced) on a separate sheet of paper with numbers corresponding to the order in which figures/illustrations appear in the manuscript.

Page Numbering and Running Head: The text of the manuscript should be prepared with each page numbered, including tables, figures/illustrations, references, and if appropriate, appendices. A short (30 characters or less) descriptive running title should appear at the top right hand margin of each page of the manuscript.

Acknowledgments: Acknowledgments should be typewritten (double-spaced) on a separate sheet of paper. Appropriate acknowledgment for any type of sponsorship, donations, grants, technical assistance, and to professional colleagues who contributed to the work, but are not listed as authors, should be noted.

References: References are to be listed consecutively in alphabetical order, then chronologically for each author. Authors should consult the APA publication manual (4th Edition) for methods of citing varied sources of information. Journal names and appropriate volume number should be spelled out and italicized. All literature, tests and assessment tools, and standards (ANSI and ISO) must be listed in the references. All references should be double-spaced.

Participants in Research Humans and Animals

Each manuscript submitted to CJSPLA for peer-review that is based on work conducted with humans or animals must acknowledge appropriate ethical approval. In instances where humans or animals have been used for research, a statement indicating that the research was approved by an institutional review board or other appropriate ethical evaluation body or agency must clearly appear along with the name and affiliation of the research ethics and the ethical approval number. The review process will not begin until this information is formally provided to the Editor.

Similar to research involving human participants, CJSPLA requires that work conducted with animals state that such work has met with ethical evaluation and approval. This includes identification of the name and affiliation of the research ethics evaluation body or agency and the ethical approval number. A statement that all research animals were used and cared for in an established and ethically approved manner is also required. The review process will not begin until this information is formally provided to the Editor.

Renseignements à l'intention des collaborateurs

La Revue canadienne d'orthophonie et d'audiologie (RCOA) est heureuse de se voir soumettre des manuscrits de recherche portant sur la communication humaine et sur les troubles qui s'y rapportent, dans leur sens large. Cela comprend les manuscrits portant sur les processus normaux et désordonnés de la parole, du langage et de l'audition. Nous recherchons des manuscrits qui n'ont jamais été publiés, en français ou en anglais. Les manuscrits peuvent être tutoriels, théoriques, synthétiques, pratiques, pédagogiques ou empiriques. Tous les manuscrits seront évalués en fonction de leur signification, de leur opportunité et de leur applicabilité aux intérêts de l'orthophonie et de l'audiologie comme professions, et aux sciences et aux troubles de la communication en tant que disciplines. Par conséquent, tous les manuscrits sont évalués en fonction de leur incidence possible sur l'amélioration de notre compréhension de la communication humaine et des troubles qui s'y rapportent. Peu importe la catégorie, tous les manuscrits présentés seront soumis à une révision par des collègues afin de déterminer s'ils peuvent être publiés dans la RCOA. La Revue a récemment établi plusieurs catégories de manuscrits afin de permettre la meilleure diffusion possible de l'information portant sur la communication humaine et les troubles s'y rapportant. Les nouvelles catégories de manuscrits comprennent :

Tutoriels : Rapports de synthèse, traités ou exposés de position portant sur un sujet particulier dans un cadre théorique ou clinique.

Articles : Manuscrits conventionnels traitant de recherche appliquée ou expérimentale de bases sur les questions se rapportant à la parole, au langage ou à l'audition et faisant intervenir des participants humains ou animaux.

Comptes rendus cliniques : Comptes rendus de nouvelles

procédures ou méthodes ou de nouveaux protocoles cliniques portant particulièrement sur une application directe par rapport aux questions d'identification, d'évaluation et de traitement relativement à la parole, au langage et à l'audition.

Comptes rendus sommaires : Semblables aux notes de recherche, brèves communications portant sur des conclusions préliminaires, soit cliniques soit expérimentales (appliquées ou fondamentales), pouvant mener à une étude plus poussée dans l'avenir. Ces comptes rendus se fondent typiquement sur des études à petit « n » ou pilotes et doivent traiter de populations désordonnées.

Notes de recherche : Brèves communications traitant spécifiquement de travaux expérimentaux menés en laboratoire. Ces comptes rendus portent typiquement sur des questions de méthodologie ou des modifications apportées à des outils existants utilisés auprès de populations normales ou désordonnées.

Comptes rendus d'expérience : Comptes rendus décrivant sommairement la prestation de services offerts en situations uniques, atypiques ou particulières; les manuscrits de cette catégorie peuvent comprendre des comptes rendus de dépistage, d'évaluation ou de traitement.

Courrier des lecteurs : Forum de présentation de divergences de vues scientifiques ou cliniques concernant des ouvrages déjà publiés dans la Revue. Le courrier des lecteurs peut avoir un effet sur notre façon de penser par rapport aux facteurs de conception, aux confusions méthodologiques, à l'analyse ou à l'interprétation des données, etc. Comme c'est le cas pour d'autres catégories de présentation, ce forum de communication est soumis à une révision par des collègues. Cependant, contrairement aux autres catégories, on recherchera la réaction des auteurs sur acceptation d'une lettre.

Présentation de manuscrits

On demande aux collaborateurs de faire parvenir par voie électronique un fichier électronique incluant leurs manuscrits, y compris tous les tableaux, figures ou illustrations et références, en format MS Word ou WordPerfect à : tim.bressmann@utoronto.ca. L'envoi des manuscrits par voie électronique est la méthode préférée pour la soumission, pourtant les manuscrits peuvent toujours être soumis en envoyant 5 copies imprimées à :

Tim Bressmann, PhD
Rédacteur en chef, Revue canadienne d'orthophonie et d'audiologie
Department of Speech-Language Pathology
University of Toronto
160 - 500 University Avenue
Toronto, Ontario M5G 1V7

On doit joindre aux exemplaires du manuscrit une lettre d'envoi qui indiquera que le manuscrit est présenté en vue de sa publication. La lettre d'envoi doit préciser que le manuscrit est une œuvre originale, qu'il n'a pas déjà été publié et qu'il ne fait pas actuellement l'objet d'un autre examen en vue d'être publié. Les manuscrits sont reçus et examinés sur acceptation de ces conditions. L'auteur (les auteurs) doit (doivent) aussi fournir une attestation en bonne et due forme que toute recherche impliquant des êtres humains ou des animaux a fait

l'objet de l'agrément d'un comité de révision déontologique. L'absence d'un tel agrément retardera le processus de révision. Enfin, la lettre d'envoi doit également préciser la catégorie de la présentation (i.e. tutoriel, rapport clinique, etc.). Si l'équipe d'examen juge que le manuscrit devrait passer sous une autre catégorie, l'auteur-contact en sera avisé.

Toutes les présentations doivent se conformer aux lignes de conduite présentées dans la publication *Manual of the American Psychological Association* (APA), 5^e Édition. Un accusé de réception de chaque manuscrit sera envoyé à l'auteur-contact avant la distribution des exemplaires en vue de la révision. La RCOA cherche à effectuer cette révision et à informer les auteurs des résultats de cette révision dans les 90 jours de la réception. Lorsqu'on juge que le manuscrit convient à la RCOA, on donnera 30 jours aux auteurs pour effectuer les changements nécessaires avant l'examen secondaire.

L'auteur est responsable de toutes les affirmations formulées dans son manuscrit, y compris toutes les modifications effectuées par les rédacteurs et réviseurs. Sur acceptation définitive du manuscrit et immédiatement avant sa publication, on donnera l'occasion à l'auteur-contact de revoir les épreuves et il devra signifier la vérification du contenu dans les 72 heures suivant réception de ces épreuves.

Organisation du manuscrit

Tous les textes doivent être dactylographiés à double interligne, en caractère standard (police de caractères 12 points, non comprimée) et sur papier 8 1/2" X 11" de qualité. Toutes les marges doivent être d'au moins un (1) pouce. L'original et quatre (4) copies du manuscrit doivent être présentés directement au rédacteur en chef. L'identification de l'auteur est facultative pour le processus d'examen : si l'auteur souhaite ne pas être identifié à ce stade, il devra préparer trois (3) copies d'un manuscrit dont la page couverture et les remerciements seront voilés. Seuls les auteurs sont responsables de retirer toute information identificatrice éventuelle. Tous les manuscrits doivent être rédigés en conformité aux lignes de conduite de l'APA. Ce manuel est disponible dans la plupart des librairies universitaires et peut être commandé chez les libraires commerciaux. En général, les sections qui suivent doivent être présentées dans l'ordre chronologique précisé.

Page titre : Cette page doit contenir le titre complet du manuscrit, les noms complets des auteurs, y compris les diplômes et affiliations, et l'adresse complète de l'auteur-contact. Une adresse de courriel est également recommandée.

Abrégé : Sur une page distincte, produire un abrégé bref mais informateur ne dépassant pas une page. L'abrégé doit indiquer l'objet du travail ainsi que toute information pertinente portant sur la catégorie du manuscrit.

Mots clés : Immédiatement suivant l'abrégé et sur la même page, les auteurs doivent présenter une liste de mots clés aux fins de constitution d'un index.

Tableaux : Tous les tableaux compris dans un même manuscrit doivent être dactylographiés à double interligne sur une page distincte. Les tableaux doivent être numérotés consécutivement, en commençant par le Tableau 1. Chaque tableau doit être accompagné d'une légende et doit servir à compléter les renseignements fournis dans le texte du manuscrit plutôt qu'à reprendre l'information contenue dans le texte ou dans les tableaux.

Illustrations : Toutes les illustrations faisant partie du manuscrit doivent être incluses avec chaque exemplaire du manuscrit. Chaque manuscrit doit contenir des copies claires de toutes les illustrations pour le processus de révision. Il faut envoyer un fichier électronique pour chaque image et graphique en format JPEG, TIFF, AI, PSD, GIF, EPS ou PDF, compression minimale 300 ppp. Pour les autres types d'illustrations informatisées, il est recommandé de consulter le personnel de production de la RCOA avant la préparation et la présentation du manuscrit et des figures et illustrations s'y rattachant.

Légendes des illustrations : Les légendes accompagnant chaque figure et illustration doivent être dactylographiées à double interligne sur une feuille distincte et identifiées à l'aide d'un numéro qui correspond à la séquence de parution des figures et illustrations dans le manuscrit.

Numérotation des pages et titre courant : Chaque page du manuscrit doit être numérotée, y compris les tableaux, figures, illustrations, références et, le cas échéant, les annexes. Un bref (30 caractères ou moins) titre courant descriptif doit apparaître dans la marge supérieure droite de chaque page du manuscrit.

Remerciements : Les remerciements doivent être dactylographiés à double interligne sur une feuille distincte. L'auteur doit reconnaître toute forme de parrainage, don, bourse ou d'aide technique, ainsi que tout collègue professionnel qui ont contribué à l'ouvrage mais qui n'est pas cité à titre d'auteur.

Références : Les références sont énumérées les unes après les autres, en ordre alphabétique, suivi de l'ordre chronologique sous le nom de chaque auteur. Les auteurs doivent consulter le manuel de l'APA (5^e Édition) pour obtenir la façon exacte de rédiger une citation. Les noms de revues scientifiques et autres doivent être rédigés au long et imprimés en italiques. Tous les ouvrages, outils d'essais et d'évaluation ainsi que les normes (ANSI et ISO) doivent figurer dans la liste de références. Les références doivent être dactylographiées à double interligne.

Conflits d'intérêts possibles et engagement double

Dans le processus de présentation, les auteurs doivent déclarer clairement l'existence de tout conflit d'intérêts possibles ou engagement double relativement au manuscrit et des auteurs. Cette déclaration est nécessaire afin d'informer la RCOA que l'auteur ou les auteurs peuvent tirer avantage de la publication du manuscrit. Ces avantages pour les auteurs, directs ou indirects, peuvent être de nature financière ou non financière. La déclaration de conflit d'intérêts possibles ou d'engagement double peut être transmise à des conseillers en matière de publication lorsqu'on estime qu'un tel conflit d'intérêts ou engagement double aurait pu influencer l'information fournie dans la présentation ou compromettre la conception, la conduite, la collecte ou l'analyse des données, ou l'interprétation des données recueillies et présentées dans le manuscrit soumis à l'examen. Si le manuscrit est accepté en vue de sa publication, la rédaction se réserve le droit de reconnaître l'existence possible d'un tel conflit d'intérêts ou engagement double.

Participants à la recherche – êtres humains et animaux

Chaque manuscrit présenté à la RCOA en vue d'un examen par des pairs et qui se fonde sur une recherche effectuée avec la

participation d'êtres humains ou d'animaux doit faire état d'un agrément déontologique approprié. Dans les cas où des êtres humains ou des animaux ont servi à des fins de recherche, on doit joindre une attestation indiquant que la recherche a été approuvée par un comité d'examen reconnu ou par tout autre organisme d'évaluation déontologique, comportant le nom et l'affiliation de l'éthique de recherche ainsi que le numéro de l'approbation. Le processus d'examen ne sera pas amorcé avant que cette information ne soit formellement fournie au rédacteur en chef.

Tout comme pour la recherche effectuée avec la participation d'êtres humains, la RCOA exige que toute recherche effectuée avec des animaux soit accompagnée d'une attestation à l'effet que cette recherche a été évaluée et approuvée par les autorités déontologiques compétentes. Cela comporte le nom et l'affiliation de l'organisme d'évaluation de l'éthique en recherche ainsi que le numéro de l'approbation correspondante. On exige également une attestation à l'effet que tous les animaux de recherche ont été utilisés et soignés d'une manière reconnue et éthique. Le processus d'examen ne sera pas amorcé avant que cette information ne soit formellement fournie au rédacteur en chef.



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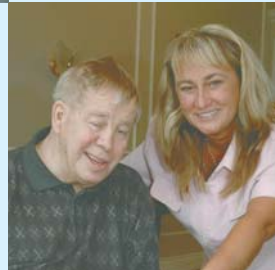




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