1. Abstract.

Developmental stuttering is a chronic speech disorder that affects about 1% of the world's population. Conventional perspectives on the stuttering disorder have yet to provide an empirically falsifiable theory accounting for the etiology of stuttering or fluency enhancement in those who stutter; furthermore, conventional stuttering treatments have failed to significantly alter the incidence or prevalence of stuttering, despite having over 70 years to implement change. Consequently, my primary goal as a researcher is to offer new (truly efficacious) treatment alternatives to the stuttering population via the creation of an empirically falsifiable neurphysiological model of the stuttering disorder and enhanced fluency in those who stutter. This proposal details the foundation of these research objectives through the combination of basic and applied research integrated into a series of short- and long-term research objectives. Immediate short term objectives include one basic research study measuring *The Effects of Differential Delays in Visual Feedback on Stuttering Frequency: A Pilot Study*, as well as two small-scale applied research studies measuring *The Effects of Long-Term Exposure to Voiced Sonorants on Stuttering Frequency*, and *The Effects of Tactile Speech Feedback on Stuttering Frequency*. The latter two of the three research projects will test new treatments to the stuttering population, while the first will serve to further (behaviorally) test an emerging multi-disciplinary neurophysiological model of the stuttering disorder and enhanced fluency in those who stutter. The research described herein represents the continuation of data acquisition, testing the basic theory and applied research of an emerging neurophysiological model of the stuttering disorder. As a broad foundation of basic and applied research data of the neurophysiological stuttering perspective continues to accumulate, a long term research objective can be met—which is receiving external funding to instrumentally test this theory, potentially through functional Magnetic Resonance Imaging and Magnetoencephalography.

2. Narrative.

A. Subject or nature of the problem to be studied: Developmental stuttering is a chronic speech disorder that affects about 1% of the world's (adult) population (Bloodstein, 1995; Starkweather, 1987). This disorder usually surfaces between two and four years of age (Bloodstein, 1995; Starkweather, 1987), and is typically characterized by ephemeral part- and whole-word repetitions, prolongations, and inaudible postural fixations (Bloodstein, 1995; Wingate, 1964). Conventional perspectives on stuttering have suggested that the disorder stems from either a psychological (Bloodstsein, 1995) or speech-motor incoordination (Starkweather, 1987) etiology. Subsequently, stuttering treatments have focused on altering the psychology (Bloodstsein, 1995) or speech-motor-behaviors (Starkweather, 1987) of people who stutter. Paradoxically, despite the fact that these two perspectives have been clearly refuted (Stuart, 1999; Armson & Kalinowski, 1995), they remain the predominant perspectives of stuttering etiology and treatment. And while these two treatment perspectives have been administered for decades (Bloodstein, 1995; Starkweather, 1987), there is a paucity of evidence suggesting significant long term treatment efficacy (Bloodstein, 1995). Specifically, the increased prevalence of pediatric stuttering therapy has not changed the incidence of developmental stuttering found in adults (Kalinowski, Saltuklaroglu, Dayalu, & Guntupalli, 2005); therapeutic relapse is often the rule, rather than the exception (Snyder, 2002); fluent listeners often prefer stuttered speech to the "therapeutic speech" taught in speech therapy (Kalinowski, Noble, Armson, & Stuart, 1994; Franken, Boves, Peters, & Webster, 1992); and while existing therapies may provide an ephemeral reduction of stuttering frequency, they do not result in "true fluency"—which has been operationally defined as speech that is: natural sounding, requiring little cognitive attention, and stable across time and environments (Dayalu & Kalinowski, 2001).

B. Background: Despite the limited success of prevalent stuttering treatments, it has been widely known that fluency is significantly enhanced when a person who stutters speaks while being exposed to various forms of (auditory) speech feedback (Choral Speech, Delayed Auditory Feedback, Frequency Altered Feedback) (Andrews, Howie, Dozsa & Guitar, 1982); reductions in stuttering frequency secondary to speech feedback have been documented to be as dramatic as 85% to 100% (ibid). It is my belief that this phenomenon was never fully understood (and subsequently ignored) primarily because it was interpreted through the psychological or speech-motor paradigms. Specifically, it was believed that auditory feedback provided the person who stutters with an auditory distraction (i.e. psychological perspective) or a slowed rate of speech (i.e. speech-motor coordination perspective), which resulted in fluency enhancement (Starkweather, 1987); the thinking of the time recognized that these skills could be learned clinically, and thus speech feedback was largely ignored (Starkweather, 1987). However, the discovery of *Visual Choral Speech* (Kalinowski, Stuart, Rastatter, Snyder & Dayalu, 2000) forced new interpretations of the Enhanced Fluency Phenomenon, as it became a multi-sensory feedback phenomenon providing fluency regardless of auditory distractions or changes in speech-rate (ibid; Snyder & Hough, 2003).

Concurrently, advances in neurophysiological imaging have suggested that stuttering is associated with deviant neurolingustic processing (Salmelin et al., 1998, 2000); research has also documented that exposure to (auditory) speech feedback is associated with a functional correction to the deviant stuttered neurolingustic

processing (Fox et al., 1996, 2000; Wu et al., 1995, 1997). These changes (i.e. functional corrections) in the neurolingustic processing in those who stutter is associated with significantly enhanced fluency. In short, it could be hypothesized that stuttering is best considered a neurological disorder with symptoms manifested in the production of expressive communication (Conture, 1991; Garber & Siegel, 1982; Snyder, 2005a); moreover, it is hypothesized that exposure to speech feedback modifies the deviant neurolinguistic processing in stutterers, which results in fluent speech (Snyder & Hough, 2003; Snyder & Hough, 2004; Snyder, 2005a, 2005b).

In short, my research objectives are to provide the stuttering population with new treatment alternatives via the creation of an empirically falsifiable neurophysiological model of stuttering and fluency enhancement. I believe these objectives can be met with well planned short and long term objectives, coupled with a combination of basic and applied research. My short term research objective is to continue to use multidiscipline neurophysiological models to predict and document behavioral outcomes relative to the enhanced fluency phenomenon; once a critical mass of behavioral data supporting the developing neurophysiological stuttering model has been acquired, this research foundation will be used to seek external funding for neurophysiological testing (functional magnetic resonance imaging; magnetoencephalography). Subsequently, I have begun (behavioral) data collection by measuring the effects of synchronous and asynchronous visual feedback on stuttering frequency (Snyder & Hough, 2003), as well as measuring the effects of (speech) gestural feedback (via a puppet) on stuttering frequency (Snyder & Hough, 2004). Both were remarkably effective, and enhanced fluency on par with other forms of speech feedback. These results lead me to begin researching the specific components of speech feedback, in attempts to find the "active components" that were necessary and sufficient to enhance fluency in people stutter. Results from my dissertation suggest that effective fluency enhancement requires: (1) exogenous or external speech initiation, via (2) (speech) gestural information (Snyder, 2005a, 2005b). This data lead me to hypothesize that enhanced fluency works by basically bypassing the neural circuitry associated with internally initiated speech production, and utilizing an alternate neural network that is associated with externally initiated speech and motor gestures (Snyder & Hough, 2003, 2004; Snyder 2005a, 2005b). In short, stuttering behaviors are the body's natural attempt to force self-generated (speech) gestural initiation; stuttering represents an inefficient (albeit effective) solution to the problem—which is a failure to initiate the speech gesture itself.

C. Project Design and Methods: If awarded, opportunities provided by the Faculty Research Program will result in the continuation of this research agenda via the support of one basic research pilot study, and two small-scale applied research studies.

The effects of differential delays in visual feedback on stuttering frequency: A pilot study. The discovery of Visual Choral Speech (Kalinowski et al., 2000) (externally generated synchronous visual speech feedback) led me to research and document the fluency enhancing effects of Delayed Visual Feedback (internally generated synchronous and asynchrouns visual speech feedback) (Snyder & Hough, 2003). The next step in this research progression is to research and document the fluency enhancing effects of (self-generated) visual feedback at differential delays. An IRB application will be submitted the semester before this research is scheduled to occur.

Specialized visual delay equipment (Prime Image, D1 Pipeline) will be integrated with a capture device (video camera) and display device (monitor), and field tested. Then, I will initially test the equipment and differential visual delays on myself, to gauge the extreme boundaries of visual delay feedback efficacy. (The fact that I stutter has been incredibly useful in past research, as I often serve as my own walking laboratory.) I project this process of lab assembly, integration, field testing, and pre-pilot data collection and analysis to take about 1 week. Since visual feedback requires eye contact, specialized methodologies must be employed, as simple reading tasks cannot be used (Kalinowski et al., 2000; Snyder & Hough 2003). Consequently, this study will employ a similar methodology used in previous peer-reviewed research (Kalinowski et al., 2000; Snyder & Hough 2003). Participants will read short phrases and commit them to memory; participants will then look up into the display device and recite these phrases while focusing on their own visual feedback. Participants will repeat this process until a 300 syllable speech sample is acquired. Based on existing speech feedback research (Snyder & Hough 2003), I project that optimal fluency enhancing visual delays will lie between 0 and .50 second delay; subsequently, this pilot study is projected to measure the effects of visual delay from 0 to .50 seconds, by .10 second intervals. This will result in 7 distinct speaking conditions: control, 0-second delay, .10-second delay, .20-second delay, .30-second delay, .40-second delay, .50-second delay. This procedure is projected to take between 1 to 3.5 hours per participant, depending on their severity. It is projected that three stuttering participants will be sufficient to achieve a range of optimized visual delays for future study; if more study participants are needed to identify a range of experimental efficacy, more participants will be recruited. Subsequently, the process of data collection is projected to occur over the span of 4 days. It has been my experience that data analysis (tallying stuttered syllables) takes a similar length of time as data collection; for this pilot study, it is projected to occur over 4 days. This study will then be written up and submitted to a journal specializing in fluency disorders as a pilot study; it is projected that the

writing and proofing of this article will take about 1 week. In sum, this pilot study is projected to occur over a three week timeline.

The effects of long-term exposure to voiced sonorants on stuttering frequency. Research has documented that producing a voiced sonorant (such as a vowel sound) for 3 seconds prior to speech production significantly enhances fluency (Dayalu, Saltuklaroglu, Kalinowski, Stuart, Rastatter, 2001). My own research has suggested that there is no functional difference between producing and perceiving a speech gesture, relative to fluency enhancement (Snyder, 2005a, 2005b). Moreover, a number of people who stutter have discovered that long-term production of speech sounds (5+ hours a day, 6 days a week, 3 to 4 consecutive weeks) results in enhanced fluency (Harkness, 2005). Subsequently, I hypothesized that long-term perception of a voiced sonorant (such as listening to vowel sounds on a device such as an iPod) would affect stuttering severity. And being a person who stutters myself, I have already pilot tested this methodology on myself and feel confident that it provides either a reduction or stabilization in stuttering severity; two other people who stutter have tried this, and reported similar results. Subsequently, these results suggest that this methodology could result in a new treatment alternative for the stuttering population. (Furthermore, this represents a passive treatment alternative that does not require significant amounts of cognitive effort or result in unnatural changes in speech production.) Specifically, 12 people who stutter will be recruited for this basic pre-test post-test study design. The methodology will follow a common protocol found in many peer-reviewed articles (Kalinowski et al., 2000; Snyder & Hough 2003); this methodology will ask participants to produce a 300 syllable baseline speech sample in both reading and conversation. Participants will then be given an iPod Shuffle, preloaded with an audio track consisting of vowel sounds. (The iPod Shuffles are associated with a single 'host' computer; this will inhibit personal use of the device while participating in this study.) Participants will be asked to listen to the voiced sonorant music file for at least 4 hours a day, 6 days a week, for 3 weeks; study participants will keep a journal of iPod usage, which will give the researcher specific data of voiced sonorant exposure. After this three week trial is completed, study participants will return to the lab for post-test data collection, which will include another 300 syllable samples in both reading and conversational speech. It is projected that speech sample acquisition will (conservatively) take between 6 and 12 hours, depending on participant stuttering severity; this equates to about 4 days of pre- and post-test data collection. Data analysis is projected to take about 2 days. As this is a relatively simple small-scale applied research study, it is projected that this data can be converted into manuscript form in about 1 week. Subsequently, this study is projected to occur within a 2 week timeframe.

The effects of tactile speech feedback on stuttering frequency. As the fluency enhancing effects of speech feedback is now known to be a multi-sensory phenomenon (Kalinowski et al., 2000; Snyder & Hough 2003), I predict that tactile speech feedback will result in fluency enhancement. This tactile speech feedback can easily be achieved by instructing people who stutter to feel the vibration of their thyroid cartilage (i.e., "voice box") with their index finger and thumb during speech production. As usual, I have pilot tested this study on myself, and have found that it is remarkably effective. I have also demonstrated this "trick" to other people who stutter, who have likewise reported significant fluency enhancement while employing this methodology. This represents another new (quasi-prosthetic) treatment alternative to those who stutter; this methodology has particularly high applicability to people who stutter while talking on the telephone, which has been repeatedly documented as one of the most challenging speaking situations for the stuttering population (Bloodstein, 1995; Startweather, 1987; Van Riper, 1982). What's more, data for this study can be functionally included into the study *The effects of long-term exposure to voiced sonorants on stuttering frequency* listed above. (Give them iPods, and they will come.) Participant baseline measurements of stuttering frequency will apply to both studies, which includes 300 syllable speech samples in both reading and conversational speech. An additional treatment condition (tactile speech feedback) can be implemented during the initial participant interview, which is projected to add an additional 30 minutes per participant. Additional data analysis will be minimal—as it only represents 2 (enhanced fluency) samples per-participant. Subsequently, it is projected that this additional study will take an additional 2 days for data collection and analysis, with another week for manuscript preparation and proofing.

The three studies detailed above represent my objectives for the 2006/2007 research year. All told, I estimate that these three studies can occur within a conservative 3-month timeline. Much of this research can occur in parallel; and apart from *The effects of long-term exposure to voiced sonorants on stuttering frequency*, this completion of this research is not time sensitive. Further, this research can benefit by trained graduate research assistants. Given the restrictions of the FRP grant, the length of these studies will exceed the salary awarded. This is an acknowledged reality; and while this is an aggressive plan of research, I believe these are achievable objectives, given my: 9 month contract and past successes in research, departmental support, as well as my intimate knowledge of stuttering and stuttering research.

D. Significance: First, this research agenda includes one basic research project, which will document and support an alternative interpretation of the enhanced fluency phenomenon. Over time, this (and similar) research will force a Kuhnian crisis (Kuhn, 1996), where the psychological and speech-motor stuttering perspectives will no longer serve as legitimate explanations of stuttering and enhanced fluency. This will result in a functional paradigm shift; I predict the field will adopt the emerging neurphysiological model of stuttering, which will result in a new category of (prosthetic) stuttering managements. This new perspective on stuttering and enhanced fluency will directly affect the stuttering community, which is predicted to reach 3 million people within the decade. Second, this research agenda includes 2 small-scale applied research studies that have the potential of immediately providing the stuttering population with two previously undocumented therapeutic options. So for those people who stutter that are resistant to, unaffected by, or unsatisfied with existing treatments, these new treatment alternatives may provide an alternate methodology of speech control, which may in turn create new life opportunities via an increase in socially accepted oral communication.

E. Benefits to your career: The systemic failure of existing stuttering perspectives and treatment suggests that this current stuttering paradigm will die as soon as another legitimate perspective is offered. This places me and my research agenda in fortunate and unique time to provide an empirically falsifiable alternate (neurophysiological) theoretical perspective of the stuttering disorder and stuttering management. Subsequently, this opportunity granted by the FRP, will provide the opportunity to submit pioneering basic and applied research (along with an alternate neurophysiological perspective) that not only establishes a foundation for my long-term research objective of instrumental neurphysiological measurements, but also immediate alternative treatments to the stuttering population.

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Snyder, G., Strauss-Hough, M. (2004). Induced Fluency in People who Stutter via Syllabic Priming and Visual Feedback. Manuscript prepared for submission to refereed journal.

Snyder, G. (2005a). Induced Fluency in People who Stutter via a Single Initiating Gestural Prime. Manuscript prepared for submission to refereed journal.

Snyder, G. (2005b) Induced Fluency in People who Stutter via Single Self- and Externally-Generated Oral Primes. Manuscript prepared for submission to refereed journal.

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4. Other Support for This Project.

Internal. This research agenda detailed above is not associated with additional direct contributions or other pending applications to the department or school of Applied Sciences.

External. As detailed above, this research will provide a foundation of behavioral data collected under the perspective of the previously described neurophysiological perspective. While no external funding is associated with the studies detailed above, the continued collection of this type of data will establish the creation of a new paradigmatic view of stuttering and enhanced fluency. The establishment of this body of research is a fundamental step toward future success with external grant support.

5. Budget and Justification.

Salaries: $1,333.33 a week, based on my current 9-month salary. I am requesting 4 weeks salary, which will provide partial compensation for the time required to complete these research studies. This equates to $5,333.33 in salary.

Stipends/Wages: No stipends or wages are associated with these research studies.

Fringe Benefits: Additional fringe benefits (28.03% of $5,333.33, effective September 28, 2005) for the salary detailed above represents an additional $1,494.93.

Travel: No travel expenses are associated with these research studies.

Supplies and Materials: The study *The effects of long-term exposure to voiced sonorants on stuttering frequency* requires the use of a portable media player. While there are many such devices, it is suggested that this study use the iPod Shuffle—as it is inexpensive, small, convenient, and (most importantly) is natively configured to associate with only 1 host computer. (The latter point will make it difficult for participants to utilize the MP3 player for personal use during the study.) Refurbished iPod Shuffles (512k) can be purchased directly from Apple.com at the cost of $79.00 each. Purchasing 12 of these units (7% sales tax included) costs $1019.10. (If it is interpreted that this expenditure exceeds the $1,000 FRP grant maximum, the purchase of 11 iPod Shuffles will suffice, costing $929.83.)

Contractual Services. No contractual services are associated with these research studies.

Other (specify). No additional items are requested.

Total FRP Funds Requested. $5,333.33 (salary) + $1,494.93 (fringe benefits) + $1019.10 (Supplies and Materials) = $7842.63. (If FRP Funds will only provide 11 iPod Shuffles for *Supplies and Materials*, the total funds requested is $7758.09)

6. Past Faculty Research Program Projects.

As this is my only my second year after completing a Ph.D. in Communication Sciences and Disorders, and my first year at the University of Mississippi, I have no history with Faculty Research Program Projects. However, I would like to point the reviewers to my Curriculum Vitae, which details my past research. I was awarded authorship for my work on *Visual Choral Speech* (Kalinowski et al., 2000). The findings from this study led me to research *The Effects of Synchronous and Asynchronous Visual Feedback on Stuttering Frequency* (Snyder & Hough, 2003). Results from this study resulted in a line of research searching for the specific components of speech feedback that were both necessary and sufficient to enhance fluency in those who stutter (Snyder & Hough, 2004; Snyder 2005a, 2005b). These five studies—along with a few other projects, including another sole author refereed journal article, an invited article for an international online stuttering conference, and serving as a contributing editor for *The Stuttering Activity Book* (Reitzes, in press)—were completed while earning a doctorate and serving as Assistant Professor of in the Department of Hearing, Speech and Language Sciences at Gallaudet University. Thus, while I

have no previous experience with FRP Grant support, I feel that my reputation as a developing researcher and independent scholar is self evident.

Note: Given that Gallaudet University is an institution primarily for the deaf population, this impacted the submission of my research articles. Before being considered for tenure, Gallaudet University requires that (hearing) faculty pass rigorous proficiency standards in American Sign Language. Only then, can faculty (and their research) be considered for tenure. Subsequently, I did not submit prepared manuscripts for peer-review, as the system would not have recognized this work toward tenure. Now that I am an assistant professor at the University of Mississippi, it can be expected that I will submit 1 article for peer-review per-semester.

7. Vita.

Educational History

2000 – 2004	Doctorate of Philosophy	East Carolina University	Communication Sciences & Disorders
1997 – 2000	Master of Science	East Carolina University	Communication Sciences & Disorders
1992 – 1995	Bachelor of Arts	Wheaton College	Psychology

Employment History

2003 – 2005	Gallaudet University	Assistant Professor
2005 – Present	University of Mississippi	Assistant Professor

Recent Scholarly Activity

PUBLISHED REFEREED JOURNAL ARTICLES

Kalinowski, J., Stuart, A., Rastatter, M., Snyder, G., & Dayalu, V. (2000). Inducement of fluent speech in persons who stutter via visual choral speech. Neuroscience Letters, 281, 198-200.

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ARTICLES PREPARED FOR SUBMITTION TO REFEREED JOURNALS

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Snyder, G., Strauss-Hough, M. (2003). The Effects of Self-Generated Synchronous and Asynchronous Visual Feedback on Stuttering Frequency. Manuscript in revision for Fall 2004 submission.

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Snyder, G. (2005a). Induced Fluency in People who Stutter via a Single Initiating Gestural Prime. Manuscript prepared for submission to refereed journal.

Snyder, G. (2005b) Induced Fluency in People who Stutter via Single Self- and Externally-Generated Oral Primes. Manuscript prepared for submission to refereed journal.

PUBLISHED REFEREED ABSTRACTS

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Kalinowski, J., Stuart, A., Rastatter, M.P, Dayalu, V. & Snyder, G. (2001). Fluency Enhancement in Persons Who Stutter Via Visual Choral Speech. Asha Leader.

Snyder, G., Strauss-Hough, M. (2001) Theoretical Implications of an Initiatory Speech Gesture within a Neurological Stuttering Model. In B. Maassen, W. Hulstijn, R. D. Kent & P. H. H. M. Van Lieshout (Eds.), Speech Motor Control in Normal and Disordered Speech. Proceedings 4th International Speech Motor Conference. Nijmegen, The Netherlands: Uitgeverij Vantilt.

Snyder, G, Kalinowski, J., & Dayalu, V. (2000). Discussion Needed on Stuttering Treatment. ASHA Leader, 5 (4), p 18, July 18, 2000.

PUBLISHED BOOK CHAPTERS

Contributing Editor & Researcher. The Stuttering Activity Book. Pro-Ed Publishers. (Reitzes, in press)

NON-PEER-REVIEWED PUBLICATIONS

Snyder, G. (2002). The Use of Altered Speech Feedback in Stuttering Management. Invited Manuscript, International Stuttering Awareness Day Online Conference: [http://www.mnsu.edu/comdis/isad5/isadcon5.html].

INVITED PRESENTATIONS

Snyder, G. (November, 2005). Describing and Operationally Defining Stuttered Sign Language: A Hypothesis. Paper presented at the American Speech-Language-Hearing Association's National Convention, San Diego, C.A.

Snyder, G. (November, 2005). Stuttering Behaviors in Speech, Simultaneous Communication, & Sign Language. Paper presented at the American Speech-Language-Hearing Association's National Convention, San Diego, C.A.

Snyder, G. (February, 2005). Therapeutic Considerations for the Pediatric Stuttering Population. District of Columbia Speech and Hearing Association. Washington, DC.

Snyder, G. (November, 2004). Exploratory Research of Cognitive Initiation in the Enhanced Fluency Phenomenon. Paper presented at the American Speech-Language-Hearing Association's National Convention, Philadelphia, P.A.

Snyder, G. (November, 2004). Contributions of Speech Feedback and the Speech Gesture in Stuttering. Paper presented at the American Speech-Language-Hearing Association's National Convention, Philadelphia, PA.

Snyder, G. (February, 2004). Developments in the Neurophysiological Stuttering Model: Implications for the Present and Future of Stuttering Theory and Management. Paper presented at the District of Columbia Speech and Hearing Association. Washington, DC.

Snyder, G. (June, 2003). Confronting Relapse: The Science, The Treatment, and The Emotions. Paper presented at the National Stuttering Association's Annual Convention, Nashville, TN.

Snyder, G. (June, 2003). Accepting and Understanding the Dynamic Nature of Stuttering. Paper presented at the National Stuttering Association's Annual Convention, Nashville, TN.

Snyder, G., Strauss-Hough, M. (April, 2003). An Analysis of Adaptation and Relapse in Stuttering Management. Paper presented at the North Carolina Speech, Hearing, and Language Association's Annual Convention, Research Triangle Park, NC.

Snyder, G., Strauss-Hough, M. (November, 2002) A Neurotheoretical Explanation of Evoked Fluency and Stuttering Relapse. Paper presented at the American Speech, Hearing, and Language Association's Annual National Conference, Atlanta, Ga.

Snyder, G., Strauss-Hough, M. (April, 2002). Reconciling the Motor and Linguistic Components within Stuttering Theory. Paper presented at the North Carolina Speech, Hearing, and Language Association's Annual Convention, Winston Salem, NC.

Teaching

CD 613 (3hr) Research Design, Department of Communicative Disorders, University of Mississippi (Fall, 2005)

HSL 760.01 (3hr) Organic & Swallowing Disorders, Department of Hearing, Speech & Language Sciences, Gallaudet University (Fall, 2004)

A&S 750.01 (3 hr) Voice Disorders, Department of Hearing, Speech & Language Sciences, Gallaudet University (Spring, 2004)

A&S 751.01 (2 hr) Stuttering, Department of Hearing, Speech & Language Sciences, Gallaudet University (Spring, 2004)

A&S 760.01 (3hr) Organic & Swallowing Disorders, Department of Hearing, Speech & Language Sciences, Gallaudet University (Fall, 2003)

CSDI 4000 (5hr) Introduction to Speech Disorders, Department of Communication Sciences and Disorders, East Carolina University (Fall, 2001 & 2002)

CSDI 2100 (3hr) Introduction to Communication Sciences and Disorders, East Carolina University (Fall & Spring: 2000, 2001)

A complete account of teaching proficiency is available upon request…