

## An Exploration of Anticipation of Stuttering in Adults

Patrick M. Briley\*

Department of Communication Sciences & Disorders, East Carolina University, Greenville, NC, USA

\*Corresponding author: Patrick M. Briley, Communication Equity and Outcomes Laboratory, Department of Communication Sciences and Disorders, East Carolina University, Health Sciences Building, Greenville, USA, Tel: 252-744-6111; E-mail: [brileypa@ecu.edu](mailto:brileypa@ecu.edu)

Received date: October 10, 2016, Accepted date: December 24, 2016, Published date: January 02, 2017

Copyright: © 2016 Briley P. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

**Objective:** The experience of stuttering is more complex than its observable behaviors, and in order for a person who stutters (PWS) to truly experience fluent speech the complete experience of stuttering must be removed. This study investigates the effects of various speaking conditions on one aspect of the experience of stuttering-anticipation of stuttering.

**Methods:** Ten adult stutterers were asked to read three passages under three reading conditions: normal reading, choral speech, and extremely prolonged speech. Participants made pre anticipatory evaluations assuming normal reading and post anticipatory evaluations assuming reading under a recently performed condition. A Friedman test was utilized to determine the presence of a difference between reading conditions for both dependent variables—stuttering occurrences and changes in anticipation of stuttering. These differences were then examined using a non-parametric Wilcoxon Signed Rank Test.

**Results:** Results from the Friedman tests indicated significant differences between stuttering occurrences and differences in pre and post anticipated events of stuttering at all common significant levels. The non-parametric Wilcoxon Signed Rank Tests revealed significant differences in stuttering occurrences between choral speech and normal reading ( $p=0.008$ ) and extremely prolonged speech and normal reading ( $p=0.008$ ). The Wilcoxon also revealed significant differences in anticipation of stuttering between choral speech and normal reading ( $p=0.005$ ) and extremely prolonged speech and normal reading ( $p=0.005$ ).

**Conclusion:** This study informs us that for some PWS, anticipation of stuttering events are eliminated while speaking with extremely prolonged speech and/or choral speech. The importance of this finding is the beginning of understanding the difference between perceivably fluent speech (remaining under the control of stuttering) and fluent speech that more closely approximates that of a typical speaker.

**Keywords:** Stuttering; Anticipation of stuttering; Choral speech; Prolongations; Overt behaviors; Experience of stuttering; Carry-over fluency

### Introduction

Stuttering is defined as an involuntary disorder characterized by overt behaviors, which include part-word repetitions, sound prolongations, and audible and inaudible postural fixations [1-4]. In addition to the aforementioned overt behaviors, covert behaviors occur that include substitutions, circumlocutions and avoidance of sounds, words, people, places, and situations [3,5]. Furthermore, a person who stutters (PWS) may also experience subperceptual stuttering, which is only perceived by the PWS and not the listener [6]. Subperceptual stuttering may go overlooked at times, however it is imperative that it be considered in the understanding of this disorder as doing so provides a more complete account of the stuttering experience.

An additional key issue in the experience of stuttering is the occurrence of stuttering anticipation [7-9]. PWS can often anticipate stuttering events prior to their occurrence. Jackson et al. [7] described anticipation of stuttering as: “the sense that stuttering will occur before it is physically and overtly realized” (p. 38). Such anticipation can elicit

covert behaviors such as substitutions, circumlocutions, and avoidances of sounds, words, people, places and situations which is subsequently physically and cognitively taxing on the PWS [3,7,10]. The significance of anticipation is that PWS can anticipate stuttering events days, months, or years ahead (e.g., wedding toast and job interviews), or just prior to initiating speech. As a whole, this projected fear of future events due to the expectancy of stuttering can result in situational fears [4].

Understanding issues related to stuttering anticipation is important because one key goal in stuttering treatment is to eliminate maladaptive communication behaviors such as anticipation [11]. Understanding behaviors such as anticipation of stuttering is key to obtaining a comprehensive view of stuttering and understanding the multiple factors that influence the stuttering experience. In the absence of understanding all aspects of stuttering, PWS are left with utilizing management approaches that may eliminate or reduce one component (i.e. overt behaviors) yet allow another to linger without management (i.e. anticipation).

Despite an extensive literature related to overt symptoms, less is known about how these observable symptoms are intertwined with anticipation of stuttering or whether one or both are eliminated during the use of therapeutic techniques such as choral speech and prolonged speech. Prolonged speech and choral speech have been shown to

successfully improve fluency via the reduction of overt stuttering symptoms [12-16]. Yet it is unclear if this approach concurrently reduces anticipation of stuttering. Therefore, the object of this study was to examine the impact of prolonged and choral speech on anticipation of stuttering events.

## Methods

### Participants

Participants consisted of adult PWS who were at least 18 years of age. All participants were identified through the East Carolina University speech clinic and through existing relationships with PWS. To be included in the study, participants were required to exhibit at least a 3% stuttering rate during the reading of a 300 syllable passage. Ten adult stutterers (six males and four females) were identified and agreed to participate in the study. This study was reviewed and approved by the East Carolina University Institutional Review Board (IRB).

### Materials

The study was completed in a quiet research laboratory. A database of thirteen, 300-syllable passages was used as the reading stimuli. Each reading passage was composed of junior-high reading level material. A Sony HDR-SR12 camera was used to produce audio and video recordings of the passage readings for each participant in order to later analyze overt stuttering occurrences. The camera was set up 10 feet from the participant.

### Reading task

Each participant read a randomly selected 300-syllable passage (see example in Appendix). Passages were read under three conditions: normal reading rate, choral speech, and extremely prolonged speech. The three conditions were defined as follows:

**Normal reading rate:** Oral reading without any fluency enhancing technique being utilized.

**Choral speech:** Coordinated speech production whereby the participant read orally in unison with another speaker (researcher). The participant was instructed to “join in” with the second speaker after their initiation of reading the passage but not attempt to begin reading without the researcher first initiating reading.

**Extremely prolonged speech:** Speech produced at duration of 2-seconds per syllable.

For each experimental condition, a demonstration was first provided before conducting the experiment. In addition to a demonstration being provided by the researcher, the participant was asked to replicate what the researcher demonstrated while using a substitute passage.

### Measuring anticipation

Each participant was instructed to report anticipated events of stuttering via marking of syllables with pen/pencil before reading aloud began and before being informed of the condition under which they were asked to read. Therefore, participants first marked the passages for anticipated events of stuttering with the assumption they would be reading the passage normally. Similar procedures have been utilized in previous research for PWS to indicate where they

anticipated occurrences of stuttering in reading passages [17,18]. With the anticipated instances of stuttering documented, the participant then read a clean version of one of the passages (no anticipated markings viewable) under one of the conditions. Each participant was assigned three reading conditions (normal reading, choral speech, and extremely prolonged speech) to read with three passages. The passages and the conditions under which each passage was read were randomly selected and paired, accounting for all three conditions but not allowing for duplicates of either the passage or the condition for each participant. Upon completion of each reading, the participant was asked to mark again the anticipated instances of stuttering, assuming they would be reading under the same condition that had just been completed. The experimental tasks were completed in one session and took approximately 1 hour to complete.

### Reliability

Stuttering occurrences were documented by the researcher and calculated from the participants’ recorded readings. An occurrence of stuttering was deemed to be present with the observance of one of the following: a part-word repetition, a sound prolongation, or an audible or inaudible postural fixation. The total number of stuttering occurrences was divided by the number of syllables in each passage. A trained graduate research assistant in speech-language pathology used the video recordings to review the first fifteen percent of each passage. The graduate research assistant was given a clean copy of the passage and used this passage to document the occurrences of overt stuttering. Interjudge and intrajudge syllable-by-syllable reliability measurements, as indexed by Cohen’s kappa, were 0.86 and 0.90, respectively. Excellent agreement beyond chance is recognized with a kappa value above 0.75 [19].

### Data analysis

Basic descriptive statistics were used to describe the sample. A non-parametric analysis approach was utilized due to the small sample size and non-normal distribution. A Friedman Test was utilized to compare the outcomes across the three conditions. The independent variable was reading condition (normal reading, choral reading, extremely prolonged reading). The primary dependent or outcome variables were presence of stuttering occurrences (percent stuttered syllables) and average change (reduction) in anticipation of stuttering (percent change). Average change in anticipation of stuttering was the difference in anticipated events of stuttering from the initial marking of the passages compared to each experimental condition. A Wilcoxon Signed Rank Test was utilized to explore statistically significant differences between the conditions.

## Results

The demographic characteristics of the sample are reported in Table 1.

The mean age of the sample was 26.2 years. The mean years of education were 18.3 years. Nine of the 10 participants were White and six of the 10 participants were male.

Participant	Age	Gender	Race	Years of Ed	Occupation
1	27.3 years	Male	Non-Hispanic White	16	Media Specialist

2	29.5 years	Male	Non-Hispanic White	16	Wireless Comm. Representative
3	23.7 years	Female	Other	16	Parole Officer
4	25.4 years	Female	Non-Hispanic White	12	Nursing Aid
5	22.3 years	Male	Non-Hispanic White	14	Student
6	31.1 years	Male	Non-Hispanic White	23	Speech Scientist
7	20.9 years	Female	Non-Hispanic White	16	Student
8	24.9 years	Female	Non-Hispanic White	12	Early Childhood Worker
9	36.0 years	Male	Non-Hispanic White	16	Financial Advisor
10	20.6 years	Male	Non-Hispanic White	14	Student

**Table 1:** Demographic data for each participant

**Stuttering occurrences across conditions**

The means and standard deviations for stuttering occurrences are reported in Table 2.

Participant	Normal Reading (NR)	Choral Speech (CS)	Speech	Extremely Prolonged Speech (EP)
1	3.13%	0.00%		0.00%
2	6.17%	0.00%		0.00%
3	6.67%	0.0031		0.0479
4	NA*	0.00%		0.00%
5	3.77%	0.00%		0.0032%
6	3.23%	0.00%		0.00%
7	3.31%	0.0030%		0.00%
8	5.81%	0.00%		0.00%
9	4.01%	0.00%		0.00%
10	3.86%	0.00%		0.00%
Mean	4.44%	.035%		.48%
Standard Deviation	1.38	.10		1.51
p-value (Compared to NR)		.008		.008

\*Participant 4 was unable to complete reading under "normal reading" condition as she became visibly upset after experiencing significant struggles due to stuttering when reading the first sentence and requested that she not be made to proceed.

**Table 2:** Summary of stuttering occurrences for each participant under each condition

The range of stuttering occurrences for each condition were as follows: normal reading 3.13%–6.67%, choral speech 0%–0.31%, and extremely prolonged speech 0%–4.79%. The Friedman test showed differences across the three conditions  $X^2=16.27$ ;  $p<0.001$ . Post-hoc testing using the Wilcoxon Signed Rank Test indicated condition differences between normal reading and choral speech ( $Z=-2.67$ ;  $p=0.008$ ) and normal and extremely prolonged speech ( $Z=-2.67$ ;  $p=0.008$ ) but no significant differences were noted between choral speech and extremely prolonged speech ( $Z=-1.07$ ;  $p=0.285$ ).

**Change in anticipated events of stuttering across conditions**

The means and standard deviations for change in anticipated events of stuttering are reported in Table 3.

Participant	Pre Anticipation	Post Anticipation Events		
	Normal Reading (NR)	Normal Reading (NR)	Choral Speech (CS)	Extremely Prolonged Speech (EP)
1	2.45%	0.0125%	0.00%	0.00%
2	12.8%	0.19%	0.00%	0.00%
3	7.57%	7.94%	0.31%	3.10%
4	7.18%	11.8%	0.00%	0.00%
5	2.74%	2.52%	0.00%	0.0032%
6	15.6%	1.94%	0.00%	0.00%
7	1.87%	3.31%	0.59%	0.00%
8	2.93%	2.90%	0.00%	0.00%
9	4.01%	1.54%	1.29%	0.60%
10	2.06%	2.81%	1.13%	0.00%
<b>Change in Anticipation</b>				
Mean		-2.43	-5.59	-5.55
Standard Deviation		5.99	5.07	4.85
p-value (compared to NR)			.005	.005

**Table 3:** Summary of pre anticipation events when averaged for all three passages, post anticipation events for each condition, and the mean change in anticipation of stuttering for each condition.

Using the same analysis approach, comparisons of anticipated events of stuttering using the Friedman test showed differences across the three conditions  $X^2=17.20$ ;  $p<0.001$ . Post-hoc testing using the Wilcoxon Signed Rank Test indicated condition differences between

normal reading and choral speech ( $Z=-2.80$ ;  $p=0.005$ ) and normal speech and extremely prolonged speech ( $Z=-2.80$ ;  $p=0.005$ ) but no significant differences were noted between choral speech and extremely prolonged speech ( $Z=-0.405$ ;  $p=0.686$ ).

## Discussion

There are two key findings in this study. First, stuttering occurrences differed significantly between the three conditions with the primary differences observed between choral speech and normal reading as well as extremely prolonged speech and normal reading. The findings are important because they highlight the value of such techniques in stuttering management. Traditionally, these two techniques have been utilized to increase fluency among PWS. Studies have shown on a consistent basis that these techniques offer a valuable strategy to improve fluency, and thus these results support the claim of choral speech and prolonged speech as being powerful inhibitors of overt stuttering [12-14,20,21]. It is notable that in this study eight of the ten participants experienced speech with no observable behaviors of stuttering when speaking under choral speech. Similarly, eight of the ten participants exhibited no observable behaviors of stuttering when speaking with extremely prolonged speech. These observations suggest that the majority of the overt symptoms of stuttering were eliminated through usage of these techniques, which is a necessary requirement when exploring a technique's usefulness in eliminating multiple components of the experience of stuttering. These results offered justification to further explore the effectiveness of choral speech and extremely prolonged speech in reducing other aspects of the experience of stuttering – namely, anticipation of stuttering.

The second key finding is that reports of anticipation of stuttering declined when utilizing choral speech and extremely prolonged speech. Similar to their effect on occurrences of stuttering, these conditions were able to significantly reduce anticipation of stuttering when comparing normal reading and choral speech and normal reading and extremely prolonged speech. These findings suggest that techniques designed to elicit reduced overt behaviors of stuttering, among PWS, may also offer reductions in anticipation issues that have the potential of indirectly impacting communication in a negative manner. In addition, it is possible that in order for the total experience of stuttering to be eliminated, the focus cannot be solely on the removal of the observable behaviors of stuttering, but also on the elimination of the unobservable behaviors, which include anticipation of stuttering. The findings reported here support the hypothesis that anticipation of stuttering could be greatly reduced when reading with strategies traditionally used to reduce occurrences of disfluency. It is also interesting that six of the 10 participants reported 0% anticipated events when preparing to use choral speech and eight of 10 participants reported 0% anticipated events when preparing to use extremely prolonged speech.

The findings reported here offer evidence that these approaches can be effective in addressing the complex nature of the stuttering experience. For example, in stuttering treatment clinicians frequently attempt to eliminate one aspect of stuttering yet this singular approach may not eliminate or reduce all other stuttering symptoms and behaviors [11]. More specifically, these findings suggest that optimal treatment effectiveness may be garnered via approaches that eliminate a complex array of stuttering behaviors and symptoms. In addition, such treatments are more likely to elicit much needed and desired long-term carry-over fluency [22-24]. More specifically, a rationale for reducing both the overt behaviors of stuttering and anticipation is that

it may be the necessary “active ingredient”, when utilized with the appropriate “treatment dose” (or treatment duration), required to elicit carry-over fluency in all speaking environments [25]. It should be noted that carry-over fluency can occur following fluency interventions [2,22-24]. Unfortunately, even in the presence of carry-over fluency, so too is relapse [26-31]. What is not known is which aspects of stuttering interventions are most critical to optimal outcomes. It is clear that despite the provision of stuttering interventions, many individuals who stutter continue to experience stuttering events in conjunction with moments of perceivably fluent, yet experientially disfluent speech. Therefore, when overt symptoms of stuttering are eliminated, along with anticipation of stuttering, not only will the PWS experience perceptually fluent speech but likely too, speech that is experientially fluent. Future studies should explore the capabilities of choral speech and extremely prolonged speech in creating carry-over fluency and improving overall stuttering outcomes.

## Limitations

While we believe these findings are interesting, there are some limitations to this study. This is a pilot study with a small sample. The findings here should be considered with caution and interpreted only as a critical first step in examining the key variables of interest. Second, the accuracy of measuring anticipation of stuttering leaves the author with some concern, as the measurement is not as concrete as an event that is actually observed. Third, only adult PWS were included in the study and their complex history of stuttering offers a range of unmeasured characteristics related to acceptance, hidden anxiety and other issues that create significant heterogeneity in their experiences of stuttering. It is unclear how these issues come into play in this type of study. Fourth, the sample was one of convenience and may not reflect the general population of individuals who stutter. Fifth, this study does not differentiate between specific anticipation of stuttering (examined in the current study) and a more general anticipation of stuttering (not examined in the current study) [32]. While elimination of specific anticipation of stuttering does represent progress in eliminating more of the experience of stuttering, it does not necessarily mean the elimination of the total experience of stuttering. Therefore, examination of these and other techniques' potential in eliminating both specific and general anticipation of stuttering would be a beneficial endeavor. Lastly, reading is only one form of communication and not the primary method used for conversation. While the impact of choral speech and extremely prolonged speech on anticipation of stuttering was only measured in reading tasks, this study suggests additional study utilizing spontaneous speech is feasible.

## Acknowledgements

I wish to thank Dr. Charles Ellis for his comments/suggestions related to this work.

## References

1. Perkins WH (1990) What is stuttering? *J Speech Hear Disord* 55: 370-382.
2. Guitar B (2014) *Stuttering: An integrated approach to its nature and treatment*. (4th edn), Lippincott Williams & Wilkins, Baltimore, MD.
3. Murphy B, Quesal RW, Gulker H (2007) Covert stuttering. *Persp Flu Disord* 17: 4-9.
4. Van Riper C (1982) *The nature of stuttering*. Prentice Hall, Englewood Cliffs, NJ, USA.
5. Starkweather CW (1987) *Fluency and Stuttering*. Prentice-Hall, Englewood Cliffs, New Jersey, USA.

6. Freeman FJ (1984) Laryngeal muscle activity of stutterers. In: RF Curlee and WH Perkins (edn) *Nature and Treatment of Stuttering*. New Directions, 104-116. College-Hill Press, San Diego, USA.
7. Jackson ES, Yaruss JS, Quesal RW, Terranova V, Whalen DH (2015) Responses of adults who stutter to the anticipation of stuttering. *J Fluency Disord* 45: 38-51.
8. Cholin J, Heiler S, Whillier A, Sommer, M (2016) Premonitory awareness in stuttering scale (PAiS). *J Fluency Disord* 49: 40-50.
9. Garcia-Barrera MA, Davidow JH (2015) Anticipation in stuttering: A theoretical model of the nature of stutter prediction. *J Fluency Disord* 44: 1-15.
10. Petrunik M, Shearing CD (1983) Fragile facades: stuttering and the strategic manipulation of awareness. *Socia Prob* 31: 125-138.
11. Starkweather CW (1998) *Relapse: A misnomer?* University of Minnesota Duluth.
12. Ingham RJ, Ingham JC, Bothe AK, Wang Y, Kilgo M (2015) Efficacy of the modifying phonation intervals (MPI) stuttering treatment program with adults who stutter. *ASHA* 24: 256-271.
13. O'Brian S, Onslow M, Cream A, Packman A (2003) The Camperdown Program: outcomes of a new prolonged-speech treatment model. *JSLHR* 46: 933-946.
14. Hearne A, Packman A, Onslow M, O'Brian S (2008) Developing treatment for adolescents who stutter: A Phase I trial of the Camperdown Program. *Lang Speech Hear Serv Sch* 39: 487-497.
15. Wingate ME (1969) Sound and pattern in "artificial" fluency. *JSLHR* 12: 677-686.
16. Ritto AP, Costa JB, Juste FS, Andrade CR (2016) Comparison of different speech tasks among adults who stutter and adults who do not stutter. *Clinics* 71: 152-155.
17. Peins M (1961) Consistency Effect in Stuttering Expectancy. *JSLHR* 4: 397-398.
18. Brutton GJ, Janssen P (1979) An eye-marking investigation of anticipated and observed stuttering. *JSLHR* 22: 20-28.
19. Fleiss J (1981) *Statistical methods for rates and proportions*. (2nd edn) Wiley, New York, USA.
20. Bloodstein O, Bernstein Ratner N (2008) *A handbook on stuttering*. (6th edn), Thomas Delmar Learning, New York, USA.
21. Goldiamond I (1965) Stuttering and fluency as manipulable operant response classes. In L Krasner and L Ullman (eds), *Research in behavior modification*, 106-156. Holt, Rinehart and Winston, New York, USA.
22. Hanna R, Wilfling F, McNeill B (1975) A biofeedback treatment for stuttering. *J Speech Hear Disord* 40: 270-273.
23. Gallop RF, Runyan CM (2012) Long-term effectiveness of the SpeechEasy fluency-enhancement device. *J Fluency Disord* 37: 334-343.
24. Perkins WH (1983) Learning from negative outcomes in stuttering therapy: II. An epiphany of failures. *J Fluency Disord* 8: 155-160.
25. Baker E (2012) Optimal intervention intensity. *Int J Speech Lang Pathol* 14: 401-409.
26. Craig A (1998) Relapse following treatment for stuttering: A critical review and correlative data. *J Fluency Disord* 23: 1-30.
27. Craig AR, Calver P (1991) Following up on treated stutterers: Studies of perceptions of fluency and job status. *JSLHR* 34: 279-284.
28. Craig AR, Hancock K (1995) Self-reported factors related to relapse following treatment for stuttering. *Aus J Human Comm Disord* 23: 48-60.
29. DiLollo A, Neimeyer RA, Manning WH (2002) A personal construct psychology view of relapse: Indications for a narrative therapy component to stuttering treatment. *J Fluency Disord* 27: 19-42.
30. Kamhi AG (1982) The problem of relapse in stuttering: Some thoughts on what might cause it and how to deal with it. *J Fluency Disord* 7: 459-467.
31. Prins D (1970) Improvement and regression in stutterers following short-term intensive therapy. *J Speech Hear Disord* 35: 123-135.
32. Van Riper C (1937) Effect of devices of minimizing stuttering on the creation of symptoms. *J Abnormal Soc Psychol* 32: 185.