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Fluency in Bilingual Preschool Children

Jenna DeChristopher

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Jenna DeChristopher is a graduating senior majoring in Special Education with a concentration in Communication Disorders. Her project was completed in the summer of 2012 under the mentorship of Dr. Suzanne Miller (Communication Disorders) and made possible through the funding of an Adrian Tinsley Program summer research grant. This project was presented at the Bridgewater State University's Summer Research Symposium in 2012. This project was also presented at the National Conference on Undergraduate Research in La Crosse, Wisconsin in April of 2013.

Purpose: 1)To examine the spontaneous speech fluency of typically developing bilingual children obtained during an oral narrative task involving a conversational interview. 2) To determine what type of disfluencies may be present and 3) To investigate if there is a difference between fluency data obtained live and fluency data obtained from audio recordings during fluency sampling.

Method: Two examiners were used for this study. A corpus of one hundred words was obtained from eight participants by both examiners, audio taped, and transcribed. Live data was also obtained during the time of speech sampling. The participants were preschoolers between ages three and five who spoke Brazilian Portuguese or Spanish in the home. The Teacher Questionnaire (Guiterrez-Clellen & Kreiter, 2003) was used to determine if the participants were proficient enough speaking and understanding English to appropriately interact with the examiners.

Results/Findings: 1) Results showed a low frequency of occurrence of developmental disfluencies for both live data and audio recording data. 2) There were no observed non-developmental disfluencies during the sampling. 3) There was a significant difference between the data recorded live and data obtained from audio recording.

Conclusion: The participants were acquiring and using two languages simultaneously, yet demonstrated the same types of normal disfluencies as children who are in the process of acquiring one language. The difference between the data obtained live and the data obtained from the audio recording support similar findings of Rousseau, Onslow, Packman, & Jones (2008) that suggest that one means of collecting data may be more efficient than another.

Preschool is a period of growth and development. Children are beginning to expand their communicative interactions beyond their family members. They are forced out of their linguistic comfort zone and must learn how to form new bonds with their peers. Children's early social experience contributes to the development of their capacity to build relationships with family or peers, and it is also an important foundation for learning (Shankoff & Philips, 2000 as cited in Yow & Markman, 2001). It is during this time that the onset of normal developmental speech disfluencies typically takes place.

For bilingual children, this time of transition can be especially stressful. Bilingual children have the added stress of monitoring which language is being communicated to them and how to appropriately respond in that language (Yow & Markman, 2011). According to the National Center for Education Statistics, approximately 21% of children ages five to seventeen speak a language other than English at home (http://nces.ed.gov/fastfacts/display.asp?id=96).

Bilingual children can be described as: Simultaneous Bilingual Children, Sequential Bilingual Children and English Language Learners. Simultaneous Bilingual Children are children who learn two or more languages from birth or begin learning both languages sometime before the age of 3. In effect, children who are simultaneous bilinguals have two first languages. Simultaneous bilinguals can be exposed to languages in different ways, i.e., from their parents or siblings in the home, from child care workers in the home or child care centers, or from grandparents or relatives. Sequential bilingual children are children who begin learning an additional language after three years of age; that is, after the first language is established. Second language learners are often exposed to their additional language through schooling. English language learners are language minority students in the US who are learning English, the majority language, for social interaction and educational purposes. There is no definitive demarcation at three years of age, but this is the most widely used cut off point between children who are simultaneous bilinguals and children who are second language learners. (Paradis, Genesee, & Crago, 2011)

Disfluency (Stuttering) in Young Children

The onset of disfluency (stuttering) typically occurs around the preschool age of 20 to 48 months (Yairi & Ambrose, 2005). Children at this age often demonstrate developmental disfluencies such as: part word repetition, single syllable repetition, multisyllabic repetition, phrase repetitions, interjections, revision-incomplete phrase, prolongation, and tense pauses (Guitar, 1998). "There are no secondary behaviors (eye blinks, head nods, or interjections of extra sounds) associated with normal disfluency" (Guitar, 1998). Children who begin to demonstrate non-developmental disfluencies develop tension during speech attempts, phonatory arrests, and significant frustration during speaking (Guitar, 1998). Natural recovery is extremely common for young children who stutter. Natural recovery is described as "when stuttering ends of its own accord without any formal treatment" (Yairi & Ambrose 1999, as cited in Yairi & Ambrose 2005). It is estimated that 75% of children who stutter will stop spontaneously (http://www.asha.org/public/speech/disorders/StutteringCauses.htm).

Much of the available research on stuttering is derived from monolingual speakers. Therefore, the outcomes of these studies should be applied to bilingual children with caution. Research on identification and intervention with bilingual preschool children is lacking (van Borsel, 2001). Identifications of stuttering are extensive. "Individual prognosis for each child regarding the risk for chronic stuttering and choosing between a waiting period or immediate treatment can be scientifically based" (Yairi, 1999). However, these outcomes should only be applied to monolingual children. Research aiding identification and intervention with bilingual preschool children is lacking (van Borsel, 2001). Van Borsel concludes that although there are many theories about stuttering in bilingual children, there is a general belief that bilingual children are at a higher risk of developing disfluency; however, this remains unsupported by the research. There is some evidence to support the notion that the number of bilingual and monolingual stutterers is similar (Au-Young, 2000), but investigations of bilingual preschool children who stutter are sparse.

The implications of early identification are substantial for successful intervention of preschooler's speech fluency disorders. Early intervention in the field of speech-language pathology has shown that the earlier the disfluency is treated, the greater the chances of developing normal communication skills (Guralnick, 2001). If a child remains undiagnosed, he or she may stutter into adulthood. Adults who stutter are more likely to demonstrate anxiety, mood disorders, social phobia, and substance abuse (Lverach, 2010). Data in this topic area are needed in order to more fully understand the nature of bilingual preschool children's speech fluency to ensure that they are provided the appropriate services.

Data Collection Methods

The use of video and audio recording is well established in literature. There are many fluency studies that involve the use of audio and audio visual recordings. "Audio recordings of stuttered speech can be used for clinical and research purposes" (Howell, Davis & Bartrip, 2009).

There are data that suggest that the mode of data collection influences the results of the study, although "there is evidence that mode of assessment does not influence the measure of stuttering severity" (Rousseau, et al., 2008). This information, however, was obtained from adult studies and therefore should not be applied to children.

This study addressed the following questions:

1) Do bilingual preschool children demonstrate typical developmental speech disfluencies during their production of a narrative?

2) What is the frequency of occurrence of typical developmental speech disfluencies during the production of a narrative?

3) Do bilingual preschool children demonstrate non-developmental speech disfluencies during their production of a narrative?

4) What is the frequency of occurrence of non-developmental speech disfluencies bilingual preschool children?

5) Does a difference exist between the frequency of occurrence of normal developmental speech disfluencies obtained from live data and audio recorded data?

Method

Setting Two Head Start locations in Southeastern Massachusetts.

Research Design This study was designed as a cross-sectional, prospective, nonrandomized investigation. Institutional Review Board approval was sought and obtained from Bridgewater State University.

Inclusionary/Exclusionary Criteria Inclusionary criteria included: children who spoke either Spanish or Brazilian Portuguese in the home, children who were competent in English in both use and proficiency, and children who were three to five years of age. Our exclusionary criteria included: children who were receiving speech or language intervention services, children with cognitive disabilities, and children with genetic disorders.

Recruitment Our original plan was to recruit twenty to thirty bilingual preschoolers from area Head Start programs. However, many of these children return to their home country during the summer months when the data were collected. Therefore, we recruited ten participants from two Head Start programs. Consent forms (see Appendix A & A1), translated into the home language, were distributed to the caregivers by the Head Start faculty when the participant was brought to the facility for their normally scheduled school day.

Participants The participants (Table 1) consisted of ten children ages three to five years. Five of the participants were male and five were female. Eight of the participants spoke Brazilian Portuguese and two participants spoke Spanish. Seven of the participants were five years of age, two were four years of age, and one participant was three years of age. However, two children, Participant 9 and Participant 10 failed to complete the study. Participant 9 was suspected to demonstrate selective mutism though this was an unconfirmed diagnosis. Participant 10 was new to the program and was in the process of acclimating to her new environment. This participant retained her right of refusal and did not speak to the examiners.

Participants1-8 completed the study. Four of the remaining participants were male and four were female; two spoke Spanish and six spoke Brazilian Portuguese. Six of the children were five years of age; two were four years of age.

Materials The SSI-4 Stuttering Severity Instrument (Riley, 1994) was used for this study. The SSI-4 is a norm-referenced stuttering assessment that can be used for both clinical and research purposes. It measures stuttering severity in children and adults in multiple areas such as: frequency, duration, physical concomitants, and naturalness of speech (Riley, 1994).

The Teacher Questionnaire (Guiterrez-Clellen & Kreiter, 2003) (see Appendix B and B1) was also used and chosen for the purpose of documenting the children's level of receptive and expressive English without formal testing. The participants' teachers completed the questionnaire which was a subjective assessment of the participants' use and proficiency with English.

Speech Fluency Sample A corpus of one hundred words was obtained by both examiners. The participants were interviewed by the examiners in a room separate from their classroom and their classmates. A Head Start teacher was present during the time of interviewing. The speech sample was audio taped and transcribed. Live data also was also obtained during speech sampling by investigators using a system of dots and slashes.

Table 1. Demographics Information for Ten Participants

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Age	5	4	5	5	5	5	4	5	3	5
Gender	Female	Male	Female	Female	Male	Male	Female	Male	Male	Female
Home Language	BP	BP	BP	SP	BP	SP	BP	BP	BP	BP

Note. BP-Brazilian Portuguese; SP- Spanish

Dots represented spoken words and slashes represented a stuttered event (Riley, 1994). Utterances were not restricted to true sentences; sentence fragments, sentence revisions, rephrasing of previous utterance, lexical and non-lexical fillers were considered as separate utterances if occurring initially or at the end of the utterances in accordance with SSI procedures (Riley, 1994). Unintelligible or partially unintelligible utterances were excluded from the sample.

Speech Fluency Sample Analysis Each participant's speech sample was coded subjectively by Examiner 1 and Examiner 2 as either fluent or disfluent using the aforementioned system of dots (for fluent utterances) and slashes (disfluent utterance).

Inter-rater Reliability Inter-rater reliability was established in the following manner: two speech samples from five participants were chosen, one from each examiner (n=10). The coded data from selected participants collected by each examiner were analyzed using non-parametric Related Samples Wilcoxon Signed Ranks Test. No significant differences between examiners were found (p =.121) meaning that between examiners, no speech sampling bias was found.

Results

This investigation focused on the occurrence of developmental disfluencies and whether there was a significant difference between data obtained live and that obtained via audio recording.

Typical Developmental Speech Disfluencies Developmental speech disfluencies were observed by examiners for all participants regardless of language spoken.

Frequency of Typical Developmental Speech Disfluencies The frequency of occurrence of typical developmental speech disfluencies for live data (Table 2 & Table 3) obtained from both investigators never exceeded three and never occurred more than three times. The frequency of occurrence of typical developmental speech disfluencies obtained from audio data (Table 4 & Table 5) never exceeded five and never occurred more than five times.

Non-developmental Speech Disfluencies None of the participants produced any non-developmental speech disfluencies during their narratives

Comparison between Live Data and Audio Transcribed As can be seen in Table 6, Related Samples Wilcoxon Signed Ranks Test shows the median of differences between live data and audio data obtained by Examiner 1 (p=.017). Therefore, the findings show that there is a significant difference between the data obtained live and the data obtained from the audio recording.

Table 2. Examiner 1 Live Data of SSI-4 Frequency

Number of Stuttered Events	Frequency	Percent
0	1	12.5
1	1	12.5
7	1	12.5
8	1	12.5
10	1	12.5
11	1	12.5
17	1	12.5
25	1	12.5

Note. SSI-4= Stuttering Severity Instrument for Children and Adults (4th ed)

Table 3. Examiner 2 Live Data of SSI-4 Frequency

Number of Stuttered Events	Frequency	Percent
0	3	37.5
2	1	12.5
6	1	12.5
7	1	12.5
13	1	12.5
24	1	12.6

Note. SSI-4= Stuttering Severity Instrument for Children and Adults (4th ed)

Discussion

We endeavored to determine if bilingual children demonstrate developmental and non-developmental speech disfluencies. Additionally we sought to determine the frequency of occurrence of developmental and non-developmental disfluencies in a sample of eight bilingual children. And, to investigate if there is a significant difference between fluency data obtained during live speech sampling and from audio transcription.

The participants were acquiring and using two languages at the same time, yet they demonstrated the same types of disfluencies as children who are in the process of acquiring one language. Developmental disfluencies present included: part-word repetition, single-syllable word repetition, multisyllabic word repetition, phrase repetition, interjection, revision-incomplete phrase, prolongations, and tense pauses (Guitar, 1998). These children can be considered English Language Learners and were still using their first language daily, yet they developed the

Table 6. Comparison Between Live and Audio Transcribed Data from Examiner 1

Null Hypothesis	Test	Sig.	Decision
The mean difference between Examiner 1 Live and Examiner 1 Audio Data equals 0.	Related- Samples Wilcoxon Signed Ranks Test	.017	Reject the null hypothesis.

Note. Asymptotic significances are displayed. The significance level is .05.

Table 4. Examiner 1 Audio Recorded Data of SSI-4 Frequency

Number of Stuttered Events	Frequency	Percent
0	2	25
4	2	25
6	1	12.5
10	1	12.5
16	1	12.5
23	1	12.5

Note. SSI-4= Stuttering Severity Instrument for Children and Adults (4th ed)

Table 5. Examiner 2 Audio Recorded Data of SSI-4 Frequency

Number of Stuttered Events	Frequency	Percent
0	5	62.5
4	1	12.5
6	1	12.5
22	1	12.5

Note. SSI-4= Stuttering Severity Instrument for Children and Adults (4th ed)

same normal speech disfluencies as children their age who were monolingual speakers (see Appendix C).

All of the disfluencies can be characterized as normal developmental disfluencies. Non-developmental disfluencies were not observed, nor were any physical behaviors observed by the examiners. The frequency of occurrence for non- developmental disfluencies was zero. The frequency of occurrence for developmental disfluencies for both live and audio data never exceeded five.

The significant difference obtained between the live and audio data support findings from Rousseau et al., (2008) (who reported that their results when using audio only and audio visual methods) were significantly different. Similar to the results in this study, their results differed depending on the method in which the data was collected.

This study, however, differed in several ways from Rousseau, et al., (2008). First, the investigators listened to the audio samples multiple times. This was decided because the participants maintained the articulatory, phonatory, and intonation patterns of their home language while speaking English. This made it very difficult for the investigators to understand what the child was saying and, as a result, it was difficult to document their fluency. Secondly, in some cases, the participant spoke in their home language when they did not know the intended word in English. Third, the participants in this study were normally developing children with no factors that would affect speech or language acquisition.

Though these studies differed in multiple ways, their results supported the hypothesis of Rousseau et al., (2008) that one method of data collection appears to be more efficient than another. Our results suggest that audio recording is a more efficient method of data collection than data collected live.

Clinical Implications The implications for early identification are substantial for successful intervention of preschooler's speech fluency disorders. Early intervention in the field of speech-language pathology has shown that the earlier the disfluency is treated, the chances of developing normal communication skills increases (Guralnick (2001) as cited in Paul & Roth, 2011). If disfluency is undiagnosed in early childhood, the child may stutter into adulthood (Iverach, Jones, O'Brien, Block, et al., 2010).

The implications of this study can be applied to not only bilingualism and fluency but also to data collection. This study provides further support that audio recorded data is more reliable than live data.

This study adds evidence to a topic area that is lacking empirical data. The fluency of bilingual preschool children is an area that is significantly under-researched, yet the importance of this area is great. Bilingual children deserve an equal opportunity at early intervention, but in order for clinicians to choose appropriate interventions, normative data are needed for accurate identification and diagnosis. Furthermore, evidence in this topic area is needed in order to more fully understand the nature of bilingual preschool children's speech development to ensure that they are provided appropriate fluency intervention services when needed.

Limitations of the Study: The author acknowledges that the small sample size restricts generalization of the results of this investigation. Also, inclusion of children from a wider range of socio-economic families would allow a broader understanding of bilingual preschooler's speech fluency development. However, this study has taken the first step toward that end.

Acknowledgements

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www.asha.org/public/speech/disorders/StutteringCauses.htm

Appendix A

Parental Consentimento Bridgewater State University

Título da pesquisa: O discurso bilíngüe fluência em crianças pré-escolares.

Pesquisadores:
Jenna DeChristopher: Distúrbios Educação Estudante, Especial e Comunicação, Bridgewater State College, Bridgewater MA
Suzanne M. Miller, PhD CCC / SLP Professor Assistente, Educação Especial e Distúrbios da Comunicação, Bridgewater State College, Bridgewater MA

Ele pediu permissão para o seu filho para participar de pesquisas. Para você ser capaz de tomar uma decisão informada sobre se você quer que seu filho a participar deste projeto, você deve entender que o projeto é de cerca de, e os possíveis riscos e benefícios. Este processo é conhecido como consentimento informado. Esta forma descreve a finalidade, os procedimentos, os potenciais benefícios e riscos. Ele também explica como as informações pessoais do seu filho vai ser usado e protegido. Depois de ler este formulário e suas perguntas são respondidas no estudo serão convidados a assinar. Isso vai permitir a participação do seu filho neste estudo. Você deverá receber uma cópia deste documento para levar com você.

Explicação de Estudo
Este estudo foi realizado para examinar o desenvolvimento bilingue da oralidade de crianças pré-escolares.
Se você concorda em permitir que seu filho participe, o seu filho terá que falar com investigadores cerca de 10-15 minutos. A interação da criança com os pesquisadores registrados através de gravador de áudio digital para garantir que os dados obtidos durante a sessão estão corretas.
A criança não deve participar deste estudo se ele ou ela está recebendo serviços de necessidades especiais, fala ou linguagem, ou ter um atraso cognitivo diagnosticado.

Riscos e desconfortos
Sem riscos ou desconfortos são antecipados.

Benefícios
Seu filho não se beneficiarão pessoalmente da participação neste estudo. Este estudo é importante para a sociedade porque fonoaudiólogo ajudar a identificar as crianças bilíngües que estão começando a gaguejar.

Appendix A1

Confidencialidade e Registros
Os dados do estudo do seu filho serão mantidas em sigilo pela atribuição de números aos dados de cada criança. Nenhum nome será usado.
Além disso, embora todos os esforços serão feitos para manter as informações confidenciais estudo do seu filho, pode haver circunstâncias em que essas informações serão compartilhadas com: Representantes da Bridgewater State University, incluindo o Conselho de Revisão da Instituição, uma comissão supervisiona a pesquisa em BSU.

Compensação
Nenhuma compensação será dada.

Informações para contato
Se você tem alguma dúvida sobre este estudo, por favor entre em contato com Dr. Suzanne M. Miller, 508-531-2972.
Se você tiver qualquer dúvida sobre os direitos do seu filho como participante da pesquisa, por favor entre em contato com o Conselho de Revisão Institucional, Bridgewater State University, 508-531-1242.

Ao assinar abaixo, você concorda que:
• Você leu este formulário de consentimento (ou leram para você) e ter sido dada a oportunidade de fazer perguntas e receber uma resposta.
• Você foi informado dos riscos potenciais para a criança e ter sido explicado a sua satisfação.
• Você entende Bridgewater State University não tem recursos alocados para os ferimentos de seu filho pode receber como resultado de sua participação neste estudo.
• Você tem 18 anos de idade ou mais.
• A participação do seu filho nesta pesquisa é totalmente voluntária.
• A criança pode retirar a qualquer momento. Se seu filho decidir parar de participar no estudo, não há nenhuma sanção para o seu filho e ele / ela não vai perder todos os benefícios a que ele / ela tem direito.

Assinatura do Pai _____ Date _____

Nome impresso _____

Nome da Criança _____

Appendix B

TEACHERS' QUESTIONNAIRE*
Questionnaire for teachers about the child's language at school

Child's Initials: _____ School: _____
Age of Child: _____ Teacher: _____

Use refers to how much the child uses each language. Circle appropriate rank for each language (Spanish and English) for all the questions.

0 Never uses the indicated language. Never hears it
1 Never uses the indicated language. Hears it very little.
2 Uses the indicated language. Hears it sometimes.
3 Uses the indicated language sometimes. Hears it most of the time.
4 Uses the indicate language all of the time. Hears it all of the time.
DK Don't know

Use

Questions	Spanish	English
Speaks with you in class	DK 0 1 2 3 4	DK 0 1 2 3 4
Speaks with aides or other teachers	DK 0 1 2 3 4	DK 0 1 2 3 4
Speaks with classmates	DK 0 1 2 3 4	DK 0 1 2 3 4

Proficiency refers to how well the child speaks each language. Circle the appropriate rank for each language.
0 Cannot speak the indicated language, has a few words or phrases, cannot produce sentences. Only understands a few words.
1 Cannot speak the indicated language, has a few words or phrases, understands the general idea of what is being said.
2 Limited proficiency with grammatical errors, limited vocabulary, understands the general idea of what is being said.
3 Good proficiency with some grammatical errors, some social and academic vocabulary, understands most of what is being said.
4 Native-like proficiency with few grammatical errors, good vocabulary, understands most of what is said.
DK Don't know

Proficiency

Questions	Spanish	English
Speaks with you in class	DK 0 1 2 3 4	DK 0 1 2 3 4

Applied Psycholinguistics 24:2
Gutierrez-Clellan & Kreiter (2003): Understanding child bilingual acquisition using parental and teacher reports

Do you think the child has language problems?	YES	NO
Do you think the child has academic or learning problems?	YES	NO
Do you think the child has behavioral or social problems?	YES	NO
Do you think the child has physical problems?	YES	NO

On the continuum circle the percentage of time that the child is exposed to each language at school:

English	0%	20%	40%	50%	60%	80%	100%
Spanish	0%	20%	40%	50%	60%	80%	100%

Appendix B1

Applied Psycholinguistics 24:2
Gutierrez-Clellan & Kreiter (2003): Understanding child bilingual acquisition using parental and teacher reports

TEACHERS' QUESTIONNAIRE*
Questionnaire for teachers about the child's language at school

Child's Initials: _____ School: _____
Age of Child: _____ Teacher: _____

Use refers to how much the child uses each language. Circle appropriate rank for each language (Brazilian Portuguese and English) for all the questions.

0 Never uses the indicated language. Never hears it
1 Never uses the indicated language. Hears it very little.
2 Uses the indicated language. Hears it sometimes.
3 Uses the indicated language sometimes. Hears it most of the time.
4 Uses the indicate language all of the time. Hears it all of the time.
DK Don't know

Use

Questions	Brazilian Portuguese	English
Speaks with you in class	DK 0 1 2 3 4	DK 0 1 2 3 4
Speaks with aides or other teachers	DK 0 1 2 3 4	DK 0 1 2 3 4
Speaks with classmates	DK 0 1 2 3 4	DK 0 1 2 3 4

Proficiency refers to how well the child speaks each language. Circle the appropriate rank for each language.
0 Cannot speak the indicated language, has a few words or phrases, cannot produce sentences. Only understands a few words.
1 Cannot speak the indicated language, has a few words or phrases, understands the general idea of what is being said.
2 Limited proficiency with grammatical errors, limited vocabulary, understands the general idea of what is being said.
3 Good proficiency with some grammatical errors, some social and academic vocabulary, understands most of what is being said.
4 Native-like proficiency with few grammatical errors, good vocabulary, understands most of what is said.
DK Don't know

Proficiency

Questions	Brazilian Portuguese	English
Speaks with you in class	DK 0 1 2 3 4	DK 0 1 2 3 4

Applied Psycholinguistics 24:2
Gutierrez-Clellan & Kreiter (2003): Understanding child bilingual acquisition using parental and teacher reports

Do you think the child has language problems?	YES	NO
Do you think the child has academic or learning problems?	YES	NO
Do you think the child has behavioral or social problems?	YES	NO
Do you think the child has physical problems?	YES	NO

On the continuum circle the percentage of time that the child is exposed to each language at school:

English	0%	20%	40%	50%	60%	80%	100%
Brazilian Portuguese	0%	20%	40%	50%	60%	80%	100%

Appendix C

Type of Developmental Disfluency	Example
Interjections	"um coloring"
Phrase repetition	"and then and then an elephant came to say hi"
Single syllable repetition	"if if somebody going to the parade"