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APPLICATION OF THE PICO PROCESS TO PLAN
TREATMENT FOR A CHILD WITH A CO-OCCURRING
STUTTERING AND PHONOLOGICAL DISORDER

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Application of the PICO Process to Plan Treatment for a Child With a Co-occurring Stuttering and Phonological Disorder

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Structured Abstract

Clinical Question: What treatment approaches are available to reduce the frequency of phonological processes and disfluencies (moments of stuttering or stuttered words or syllables) in a school-aged child with a phonological disorder (PD) and an additional stuttering disorder (SD)? Additionally, what is the treatment efficacy of available approaches?

Method: Systematic Review

Study Sources: ERIC, ASHA, Cochrane Library, PsycINFO, PubMed, Google Scholar, and speechBITE

Search Terms: phonology, stuttering, and intervention approaches

Number of Studies Included: 6

Primary Results:

- (1) Therapy should be conducted in a concurrent or blended fashion.
- (2) The portion of intervention that addresses PD should be indirect in nature.
- (3) The portion of intervention that addresses SD should be direct in nature.
- (4) A phonological process approach should be used in conjunction with fluency modification techniques.

Conclusions: There is a desperate need to further examine treatment efficacy for children with PD and SD. To date, there is one empirical research study that established whether children improved with a blended, simultaneous approach (Conture, Louko, & Edwards, 1993). Furthermore, there is a documented uneasiness in treating children with both PD and SD due to the lack of available treatment information (Unicomb, Hewat, Spencer, & Harrison, 2013).

Clinical Scenario

As a graduate student, part of the educational program requires completion of outplacements in clinical speech-language therapy settings. During one of these outplacements, Elizabeth worked with a child named R. K. who was 5 years old and in kindergarten. R. K. presented with a severe phonological disorder and had been seen by Elizabeth's supervisor for approximately one year when she met him. At the time that Elizabeth began working with R. K., he had been stuttering for approximately 6 months. His stuttering, which was of concern to his parents, primarily consisted of sound repetitions and was pervasive in his speech. He did not present with any associated behaviors but exhibited more than three within-word disfluencies in a 100-word sample. Despite meeting the diagnostic criteria for a fluency disorder (Conture, 1990; Zebrowski & Conture, 1989), R. K.'s stuttering appeared to be secondary to his phonological disorder in that the phonological disorder arose prior to the onset of his disfluency. In intervention, 30% of the session time was spent on fluency-related therapy including identification of disfluencies, use of purposeful stuttering, and production of easy/smooth speech. The other 70% of the session was focused on the correct production of speech sounds.

When working on fluency, R. K. was easily able to make his speech fluent. Disfluencies dropped significantly while discussing easy/smooth speech, but this progress did not carry over to conversation. The same was true for his work on speech sound production. R. K. needed minimal to moderate prompting during direct sound practice but needed maximal cueing and models during less structured activities. During speech sound practice, a cycles (Hodson & Paden, 1983, 1991) approach was taken in therapy with R. K. Each week a new sound was targeted and the previous week's sound was reinforced but not targeted directly.

The Clinical Question

As a student, Elizabeth was aware that children who stutter are more likely to have phonological disorders as compared to peers without fluency disorders (Riley & Riley, 1979; St. Louis, Murray, & Ashworth, 1991; Wolk, Conture, & Edwards, 1990). She was unaware, however, of the best approach for working on both disorders concurrently. Elizabeth was taking a more direct approach

to treating stuttering and a cycles approach to treating R. K.'s phonological disorder, but in general she was taking a "treat each disorder individually" approach. Was this best approach to take?

With her questions in mind, Elizabeth modified the PICO format (Sackett, Richardson, Rosenberg, & Haynes, 1997) to create a question that could be used successfully in an evidence-based treatment approach. Specifically, Elizabeth needed to determine the PICO elements: population or patient problem (P), intervention (I), comparison (C), and outcome (O). She used the following format to create her question:

- P: A 5-year-old school-aged child
- I: Treatment for a child who presents with phonological AND fluency disorders
- C: N/A (A comparison between established approaches was not a part of the search.)
- O: Reduction of phonological processes and instances of disfluencies

Elizabeth posed her question as, "What is the best available treatment approach to reduce the frequency of phonological processes and disfluencies in a school-aged child with a phonological disorder and a co-occurring fluency disorder?" She purposefully excluded the comparison portion of the PICO format because the goal of her search was to establish the available treatment approaches and their effectiveness.

Background

Stuttering as a solitary disorder has a reported incidence of 8.5% by 3 years of age (Reilly et al., 2009). The exact etiology of stuttering is unknown but is likely caused by a variety of factors, including the child's temperament and genetics. Intervention strategies for stuttering treatment have long been researched and include treatments that are direct and indirect in nature, or a combination of the two (Trajkovski et al., 2009).

Speech sound disorders, which include phonological and/or articulation disorders, have been reported to affect approximately 10–15% of preschool-aged children and approximately 6% of school-aged (grades 1–12) children (Williams, McLeod, & McCauley, 2010). Like stuttering therapy approaches, there are a wide variety of approaches a clinician can choose from. Many of these have been supported by randomized control trials (Almost &

Rosenbaum, 1998; Pamplona, Ysunza, & Espinosa, 1999; Ruscello, Cartwright, Haines, & Schuster, 1993; Rvachew, 1994).

Blood and Seider (1981) determined, through a questionnaire mailed to service providers in schools, that 68% of children who stutter also have some other type of speech-language disorder. It is widely believed that children who stutter are more likely to have co-occurring phonological disorders than peers who do not stutter (Arndt & Healey, 2001; Louko, 1995; Louko, Conture, & Edwards, 1999; Louko, Edwards, & Conture, 1990; Wolk, Edwards, & Conture, 1993; Yaruss & Conture, 1996), although the frequency of this co-occurrence varies amongst studies (Nippold, 2001). Unlike intervention types for SD and PD alone, there is little empirical research available on treatment approaches for children who exhibit both disorders (Nippold, 2002). There are, however, several research articles and book chapters that outline best practices for service delivery for children with both stuttering and phonological disorders (Ratner, 1995; Louko et al., 1999; Thompson Byrd, Wolk, & Lockett Davis, 2007; Wolk, 1998). There is also research that describes differences in stuttering between children with both a phonological disorder and stuttering versus children with a stuttering disorder alone (Wolk et al., 1993), as well as research that describes the frequency of stuttering and phonological errors (Wolk, Blomgren, & Smith, 2000).

Search for the Evidence

Information Retrieval Strategy

After a brief review of the background information, Elizabeth discovered that many of the studies focused primarily on younger children; Elizabeth presumed that this was due to the nature of phonological disorders. Typically, younger children with phonological disorders are observed because that is the time when their phonological systems or rules are developing. As a result, she did not stipulate a specific age in her search criteria. To find studies that addressed phonological disorders, Elizabeth used the term phonology in her search. Elizabeth also included the term speech sound disorders, but too many non-relevant hits were retrieved and phonology was retained as the search term for PD. It became clear that she would also need to specify stuttering

in the search criteria so as to retrieve articles that were specific to her question and not related to phonology alone. Finally, Elizabeth chose to add the term intervention approaches (without quotes so the search would not be restricted to the exact term) to retrieve papers that directly addressed interventions for the population of interest.

Inclusion Criteria

To keep the focus targeted on her question, Elizabeth chose the following inclusion criteria for the selection of her papers. First and foremost, children in the studies had to have SD and PD as co-occurring disorders. Second, studies had to provide some form of treatment-efficacy evidence for a given intervention. Finally, articles or book chapters had to be primary research articles. Book chapters or articles that did not present original findings were not included.

With these criteria in mind, Elizabeth began to search electronic databases. She initiated the search with the ERIC database and, using the keywords/title and peer-reviewed limiters, entered the three search terms phonology, stuttering, and intervention approaches. She then reviewed titles and abstracts to determine whether a given paper could be used to answer the clinical question, given the established inclusion criteria. The database yielded one hit, which she selected. Elizabeth repeated this process for the following databases: ASHA, Cochrane Library, PsycINFO, PubMed, Google Scholar, and speechBITE.

During her search, Elizabeth quickly discovered that there was little empirical evidence for different intervention types and that many of the research articles contained surveys or were descriptive in nature. Elizabeth realized that she would need to alter the inclusion criteria. As a result, she allowed for articles that were narrative reviews and surveys despite the lack of discussion of treatment efficacy. Furthermore, in order for a survey to be included for review, data regarding intervention (types and/or frequency) had to be documented specifically for children with both disorders. If a survey presented information on children with a fluency disorder and an additional nondescript speech-language disorder, it was not included. Another change that was made during the inclusion process was in the PsycINFO database search. In that particular search, the intervention approach search term was removed. When this term was included, the database retrieved zero articles. When the term was

removed, results increased to 15. The same approach was taken when searching the speechBITE database. This approach was not applied for other databases, however, because enough hits were received with its inclusion.

Evaluating the Evidence

Once articles were selected for review, Elizabeth geared her search toward finding information on treatment efficacy. Only one paper directly examined the effectiveness of an intervention type on children with co-occurring stuttering and phonological disorders. Conture, Louko, and Edwards (1993) assessed whether children with both disorders would respond to an indirect blended/simultaneous method where activities incorporated goals from both disorders. This method included a modified cycles approach for the phonological disorder. The modified cycles approach included the following intervention components: 1) modeling, 2) auditory discrimination, 3) increasing linguistic complexity, 4) minimal pairs, 5) facilitating contexts, 6) modified paired stimuli, and 7) overtraining. After or concurrently with the discrimination phase, the clinician modified any indirect productions of the child in an indirect manner (e.g., Child: “I thee the dog,” Clinician: “I see the dog too”). This blended approach also focused on the reduction of tension and rate of speech in addressing fluency. Results indicated that two out of four children in the stuttering/phonology group decreased stuttering frequency by 15% or more and the mean percent of change for targeted phonological processes decreased by at least 25% for all four children. In this study, children appeared to have the ability to improve in both areas if phonology and fluency were treated concurrently, albeit via individual approaches.

In addition to this singular empirical study, there were two studies that used a survey approach to determine what intervention strategies clinicians were using with their clients with stuttering and phonological disorders (Arndt & Healey, 2001; Unicom et al., 2013). Arndt and Healey received completed surveys from 241 clinicians. The clinicians returned information on 133 children who exhibited the co-occurring disorders of interest. Figure 1 reports on the use of different treatment approaches for this population. A blended approach, described by the authors as treating fluency and phonological disorders simultaneously, was the approach

used most frequently (by 45% of respondents). Just over 20% of clinicians used a concurrent approach that included equal amounts of time spent on PD and SD. This concurrent approach did not include direct attention to speech sound errors. In treatment, a clinician would address fluency while modeling the correct production of sounds but would not make direct reference to correct sound production by the child. The cycles approach was the third most common approach taken by clinicians.

In Unicom et al.’s (2013) survey study, thirteen service providers submitted information regarding the types of assessment and intervention that they used with children with PD and SD. Ten of the thirteen providers reported using a serial approach, while two reported using a concurrent or serial approach and one provider reported using only a concurrent approach. Of the ten providers that always provided service in a serial fashion, nine reported using the Lidcombe program (Onslow, Packman, & Harrison, 2003) for fluency intervention and did not address the PD until stage 2 of the Lidcombe program. In general, service providers used a direct treatment approach and used interventions that were shown to be successful for PD and SD independently. (See figures 2 and 3 for a breakdown of interventions used.) Despite reporting the use of efficacious intervention approaches, many of the service providers also voiced their hesitancy in providing treatment for children with both disorders. Many felt uncomfortable or unsure about whether they were making the correct clinical decision because there is a lack of empirical evidence in this area of the field.

Louko (1995) made arguments for simultaneous therapy that addresses both disorders at the same time, although Bernstein Ratner (1995) supports simultaneous treatment if it is the best option for a given client. In other words, Bernstein Ratner articulated the importance of being flexible in treatment planning; what works for one child may not work for another. Some children may perform well with a blended/simultaneous approach whereas others benefit from a serial therapy plan. It is important to note that even though Bernstein Ratner stresses the importance of flexibility, she also indicates that “it is efficient to practice [fluency skills] while working on other areas of communication development.” In light of the lack of empirical evidence, Bernstein Ratner further states that monitoring progress is even more important in order to make sure that clients are benefitting from whatever therapeutic intervention/approach is being used.

Wolk (1998) defined six guiding principles for the management of children with PD and SD. Her principles for phonology-fluency therapy included these strategies: “1) The use of an indirect phonological approach, in which there is not overt correction of the child’s speech, 2) Employing a phonological process approach, 3) The use of direct fluency modification techniques, 4) The concurrent application of phonological and fluency principles, 5) Parental involvement, and 6) The use of a group setting.” Wolk also makes an argument for providing treatment in a concurrent fashion. She argues that providing therapy serially results in an ethical dilemma in that a service provider is not providing treatment for a diagnosed problem. Similar to Bernstein Ratner (1995) and Louko (1995), Wolk makes the argument that “it is efficient and natural to use phonological and language targets in any speech therapy.”

Making an Evidence-Based Decision

Although Elizabeth’s search yielded only one empirical research study and she was unable to directly answer her question of treatment efficacy, there were a handful of themes that emerged across all papers that should be considered in developing a therapeutic plan:

Therapy should be conducted in a blended or concurrent fashion (Arndt & Healey, 2001; Bernstein Ratner, 1995; Conture et al., 1993; Louko, 1995; Wolk, 1998).

Fluency modification techniques should be direct in nature (Conture et al., 1993; Wolk, 1998).

The portion of intervention that addresses PD should be indirect in nature (Conture et al., 1993; Louko, 1995; Wolk, 1998).

Although an indirect approach (versus a direct one) may slow progress (Wolk, 1998), “phonological changes have to be targeted in a manner that does not exacerbate the stuttering issues for the child” (Conture & Curlee, 2007).

A phonological process approach as opposed to a sound-by-sound approach should be used (Conture et al., 1993; Unicomb et al., 2013; Wolk, 1998).

Without a doubt, the most important finding in this review is that PD and SD should be treated simultaneously. Treatment providers have a responsibility to address all diagnosed disorders for any particular child. Based on the available research, a specific approach for treating co-occurring PD and SD has not yet been established. For the time being, providers will need to select approaches such as the cycles approach (Hodson & Paden, 1983) and speech-rate reduction (Bloodstein, 1995; Conture, 2001), which have been shown to be efficacious within the PD and SD literature, while also closely monitoring their clients’ progress. In conclusion, Elizabeth was unable to directly answer what treatment is most efficacious for children with PD and SD; however, she was able to find and document some guidelines for treatment. Based on her findings, when working with a child with PD and SD, the professional should plan a blended approach to therapy that addresses PD in an indirect manner and SD in a direct manner.

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Table 1. Keyword Search and Selected Studies

Database	Limiters	Terms	Hits	Number of Articles Selected	Articles Selected After Title/Abstract Review and Duplicate Removal
ERIC	Title/keywords/peer-reviewed	Phonology Stuttering Intervention Approaches	1	1	Arndt & Healey (2001) Bernstein Ratner (1995) Conture et al. (1993) Louko (1995) Unicomb et al. (2013) Wolk (1998)
ASHA	Text/abstract/title	Phonology Stuttering Intervention Approaches	10	2	
Cochrane Library	Title/abstract/keywords	Phonology Stuttering Intervention Approaches	1	0	
PsycINFO	None—All Fields	Phonology Stuttering Intervention Approaches	1	1	
PubMed	None—All Fields	Phonology Stuttering	15	1	
Google Scholar	Title/keywords	Phonology Stuttering Intervention Approaches	2,000+ (first 7 pages reviewed)	6	
speechBITE	Keywords	Phonology Stuttering	1	1	

Table 2. Selected Studies and Findings

Reported Study	Design	Mean Age	Sample Size	Measures	Findings
Arndt & Healey (2001)	Qualitative survey	Not provided	<i>N</i> = 133*	Survey sent to providers	Out of all reported approaches, a blended approach was used 45% of the time, while a concurrent approach was used approximately 20% of the time.
Bernstein Ratner (1995)	Narrative review/ Expert opinion	N/A	N/A	N/A	Fluency tx should be placed within appropriate linguistic and phonological contexts (i.e., not to exceed a child's phonological abilities). Tx should also depend on child's needs.
Conture et al. (1993)	Non-randomized controlled trial	69.7 months	<i>N</i> = 4**	Overall percentage change of errors	Children appear to have the ability to improve in both areas if phonology and fluency are treated concurrently.
Louko (1995)	Narrative review/ Expert opinion	N/A	N/A	N/A	Simultaneous "indirect" tx.
Unicomb et al. (2013)	Qualitative survey	N/A	<i>N</i> = 13 (service providers)	Survey sent to providers	SLPs surveyed reported that they use evidence-based direct approaches for each disorder (i.e., tx shown to be effective for each disorder individually).
Wolk (1998)	Expert opinion	N/A	N/A	N/A	Description of six guiding principles to follow in tx.

Note: * Number of children with phonological disorders and fluency in addition to number of children with phonological in addition to language disorders and fluency; ** number of children in the stuttering-phonology treatment group; N= number of participants included; N/A= not available or not a part of the study; tx= treatment.

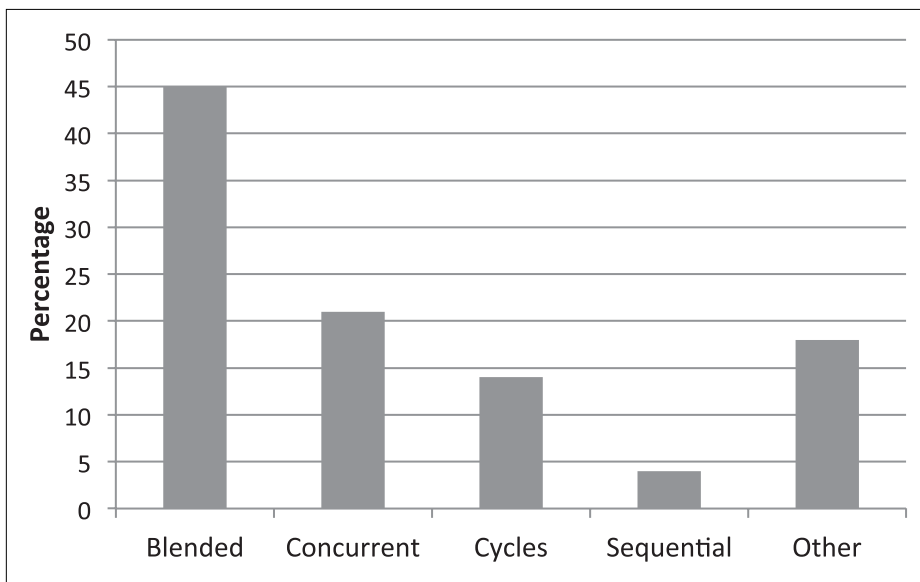


Figure 1. Percentage of intervention type use.

Adapted from Arndt, J., & Healey, E. C. (2001). Concomitant disorders in school-age children who stutter. *Language, Speech and Hearing Services in Schools, 32*, 68–78.

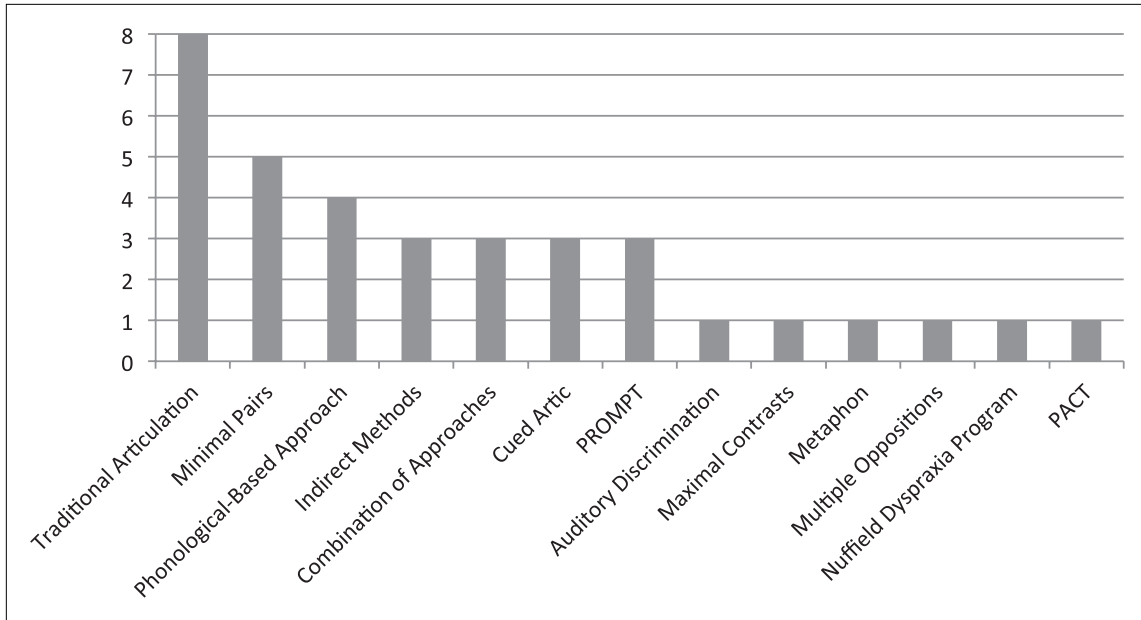


Figure 2. Phonological processes intervention types.

Adapted from Unicomb et al. (2013).

Note: Number of service providers (out of 13) reporting use of a given intervention type.

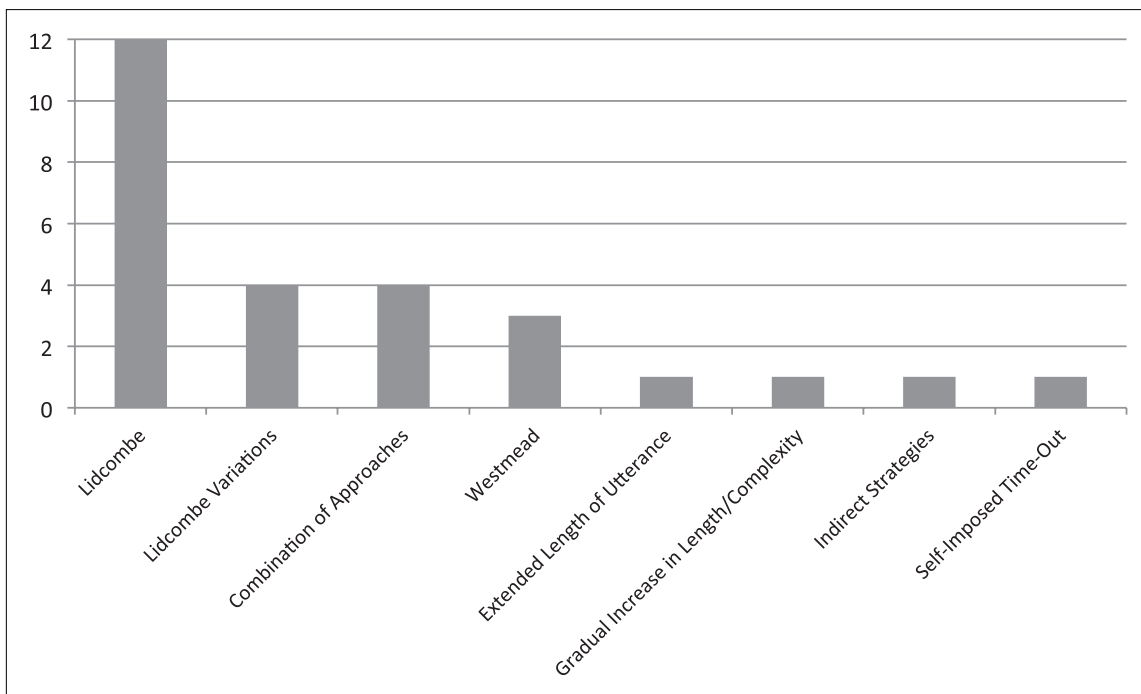


Figure 3. Stuttering intervention types.

Adapted from Unicomb et al. (2013).

Note: Number of service providers (out of 13) reporting use of a given intervention type.