

**Critical Review:
Does changing parent verbal interaction styles increase fluency in children who stutter?**

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The current paper is a critical review of six studies that examine the fluency facilitating effects of changing parent verbal interaction style when speaking with their children who stutter. Study designs include: nonrandomized clinical trials, within groups, pre-posttest studies, and a single subject 'n-of-1' design. Overall, evidence gathered from this review is inconclusive. Recommendations for further research and clinical practice are provided.

Introduction

Stuttering is a speech and language disorder that affects the forward flow of speech. It can often begin in the preschool years (ASHA, 2011). Early intervention is vital, and once a child is seen by a professional, several recommendations are often made to the parents to modify their speech in order to create a more fluency-facilitating model for their child (Bernstein Ratner, 2004). Parents are often involved in their child's stuttering treatment, as they can be very influential in determining the course of very early stuttering patterns (Bernstein Ratner, 2004). As Cooper and Cooper (1996) stated, "parent counselling is the critical factor in helping the preschool stutterer."

In 1973, Van Riper concluded that disfluent speech in a child who stutters often follows speech from a parent or sibling that is "too difficult" for the child to follow. Therefore, recommendations are often made for parents to decrease their rate of speech and to simplify their language. However, research has been inconsistent on the use and effectiveness of recommendations made to parents to modify their speech in order to create stutter-free speech in their children. Also, a child's language development can be hindered if their parents are consistently using less complex syntactic and semantic language structures (Miles & Bernstein Ratner, 2001). In addition, focusing treatment on parental input variables can increase a parent's feeling of guilt over their child's disorder (Bernstein Ratner, 2004). For these reasons, it is important that the clinical effectiveness of modifications to parental input is firmly established. This paper examined whether or not changing parental verbal interaction styles is associated with an increase in fluency in children who stutter.

Objectives

The primary objective of this review was to provide a critical evaluation of the existing research regarding the outcomes that will result from changing parent verbal

interaction style with their children who stutter. The secondary objective of this review was to provide clinicians with evidence-based information to help guide the recommendations they give to families in order to create a home environment that encourages fluent speech.

Methods

Search Strategy: Computerized databases, including PubMed, Proquest and Medline, were searched using the following search strategy:

[(stuttering) OR (disfluency) OR (fluency disorders)] AND [(parents) OR (mothers) OR (fathers) OR (interaction)]

The search was limited to articles written in English.

Selection Criteria: Studies selected for review were required to investigate the outcome of manipulating any parental verbal or nonverbal behaviour when interacting with their children who stutter in order to improve their fluency. The search was limited to children with no observable speech or language impairments, other than stuttering, and their parents.

Data Collection: Results of the literature search yielded 6 articles that met the selection criteria. These included the following study designs: nonrandomized clinical trial (3), within groups, pre-posttest study (2), and single subject 'n-of-1' design (1).

Results

A common weakness in each of the studies included in this critical review is the issue of a small sample size of research participants. This is an inherent problem in the field of speech-language pathology, as stuttering disorders are uncommonly found in the general population. Therefore, statistical power is reduced, generalizability is limited, and conclusions must be interpreted with caution due to the limited number of participants on which the results are based.

Nonrandomized Clinical Trials

Miles and Bernstein Ratner (2001) compared language use of 12 mothers with preschool children who stuttered and a matched control group. Mother-child interactions were recorded while two observers made on-line tallies of number of utterances. Written transcripts were made for each conversation.

An appropriate Mann-Whitney U test, corrected for tied ranks to yield a Z score, revealed no significant differences between the two groups of parents on any of the measures of language complexity when parental language scores were examined independently from the child language scores. The discrepancies in scores between mothers and their children were equivalent in both the stuttering and nonstuttering groups.

Small sample size was a significant limitation in the present study. In addition, the groups may not have been well matched on language skills. Despite average language skills as revealed by appropriate standardized tests, the mean scores of the CWS fell below those of the CWDNS on every standardized measure (and significantly below on two measures). Nevertheless, this difference may not have been problematic given that the null effect in the mother-child discrepancies in scores across groups.

One of the limitations of this study is that it focused on the initial stage of stuttering onset only. Also, the authors did not consider the level of stuttering severity in each of the stuttering participants in the study.

The study provides suggestive evidence that parents of CWS do not differ from parents of CWDNS in their presentation of semantically and syntactically complex linguistic input at the onset of stuttering.

Savelkoul, Zebrowski, Feldstein, and Cole-Harding (2007) examined the degree of congruence between the conversations of parents and children who stutter and the conversations of parents and children who do not stutter.

The subjects in this study consisted of 10 school-aged CWS and 10 age- and gender-matched control CWDNS with age appropriate language and cognitive skills and normal hearing. However, these children were included to increase sample size. Each child was accompanied by a mother and a father.

The children were video and audio recorded interacting with their parent in a semi-structured play activity. All interactions were audio recorded for automatic vocal transaction analysis (AVTA), a specialized computer

system for analyzing child-parent interactions as they unfold over time.

The influence of the parent's (or child's) vocal behaviour on the child's (or parent's) vocal behaviour five seconds later was appropriately examined using cross correlations and Chi-square analysis where applicable. Appropriate ANOVAs compared measures of congruence across groups (stuttering children, nonstuttering children, and parents). Results revealed that CWS and their parents were more likely than nonstuttering children and their parents to show conversational attunement while engaging in a conversational exchange. Therefore, CWS were significantly influenced by the subtle differences in their parents change in conversational style (i.e., interruptions). Moreover, CWS were more likely to be influenced by the temporal characteristics of their father's, as opposed to their mother's, speech during a conversational interaction.

One major limitation in this study is the potential source of error in using the electronic AVTA system for processing conversational exchanges. The computer system may have interpreted nonspeech signals, such as laughter or coughing, as speech signals. The sampling rate may have over or underestimated the duration of either a vocalization or a pause. Also, a child who stutters may experience a period of voicelessness due to an inaudible sound prolongation or a block, which may have been interpreted as a pause by the AVTA system.

In addition, the data analyzed in this study was collected at one point in time in a quiet room in the child's home, free from distractions. Therefore, this study does not consider various environmental stimuli that can affect the child's fluency.

Overall, the study provided suggestive evidence that CWS are sensitive to subtle changes in their parent's speech during conversation. This study also included the fathers of stuttering children, and found that they can provide a significant amount of influence over their children's speech. However, the above-mentioned limitations in the use of the AVTA system for conversational analysis need to be considered when implementing the results in clinical practice.

Kasprisin-Birrelli, Egolf, and Shames (1972) hypothesized that there should be observable differences in the verbal interaction patterns of parents talking to their stuttering children and parents talking to their CWDNS. They also hypothesized that these changes should parallel or come about as a result of changes in the parent's verbal behaviour. The study participants included 14 parents (10 mothers, 4 fathers) of 14

school-aged stutterers and 14 parents of nonstuttering children. The control parents were matched for sex. The control children were matched for age and sex.

Data was collected by recording 15 minutes of parent-child conversation. Each parental utterance was analyzed and divided into positive (encourages mutual respect between the parent and the child, encourages verbal output on the part of the child, and indicates acceptance of the child's feelings and ideas) and negative (fosters hostility, distrust, aggression, or silence) statements.

Appropriate t-tests revealed significantly more negative statements by the parents of CWS at baseline, and significantly fewer positive statements. In addition, parents receiving therapy showed significantly more positive statements post therapy.

Binominal tests were run to determine whether or not group differences were truly representative of the group, as opposed to a reflection of extreme deviations by a few subjects. All but two comparisons showed significant differences between the distribution of positive and negative statements at the 0.01 level of confidence. The two comparisons that were not significant belonged to two subjects who withdrew voluntarily from treatment.

The authors noted some limitations to this study. The study only considered the verbal interaction pattern of one parent speaking with their child. Also, the verbal interaction style of the parent speaking with a nonstuttering sibling was not observed.

There are also several strengths that can be acknowledged. Acceptable intra and inter-judge reliability for rating the positive and negative utterances were reported.

The study provides suggestive evidence regarding parental verbal behaviour as a factor considered for the maintenance and reduction of stuttering behaviour in school-aged children. The evidence that suggests that treatment effects can generalize from clinician to parent makes these findings clinically important.

Within Groups, Pre-posttest Study

This type of design is beneficial because it reduces variability between participants and allows for an examination of performance over time. However, this type of design lacks the use of control subjects and randomization of participants into treatment groups.

Stephenson-Opstal and Bernstein Ratner (1988) examined the effects of a slowed maternal speech rate

on 2 young children who stutter. Two male subjects (3;3 and 6;2 years of age) and their mothers served as the subjects of this study. Audio recordings were made of each mother-child dyad in the home environment for 10 minutes on 5 occasions. After baseline, a slower speech rate was explained and modeled by the clinician and post-instruction recordings were made. For each recoding, maternal and child speech rate was measured in fluent syllable per second (sps) with pause time and disfluencies removed.

For one mother-child dyad, the mother did substantially slow her articulatory style. However, her child's average speech rate did not show a proportionate decline, and increased during the post-instruction phase. For the other mother-child dyad, a similar but less consistent pattern was observed. Despite the rapid articulatory rates of their mothers, both children were more fluent during the post-instruction phase compared to baseline. It was noted that both mothers spoke at a rate considerably faster than that observed when mothers spoke with normally fluent children (according to data obtained in previous studies).

The authors have noted several limitations in the current study in addition to the small sample size. Articulatory rate was the only variable examined in the study. The authors did not consider other variables that could affect the child's increased fluency, such as a slower rate of conversational turn taking or a change in the demand structure of the child-directed speech. Also, instructions to "slow your rate" may have secondary fluency facilitating effects, including reducing length and complexity of parental utterances, increasing the amount of parental paraphrase and redundancy, and changing the number and types of parental questions and directives.

The study provides suggestive evidence regarding the effects of instructions to mothers to decrease their conversational speech rate in order to produce fluent speech in their children.

Zebrowski, Weiss, Savelkoul, and Hammer (1996) also examined the effects of slowed maternal speech rate on young children who stutter. Participants in this study included 5 children, ranging from 2;10 to 7;5 years of age and their mothers.

Each mother-child dyad was audio-video-recorded, seated opposite from one another at a table. Researchers examined their speech on a split screen. During the pre- and post-training stages, 3 tasks that varied in their degree of structural constraint were used to elicit speech samples (spontaneous conversation; structured conversation; sentence repetition). During

the pre-training sessions, mothers were instructed to talk to their child “the way they normally do.” Training included modeling a slow speech rate and directing mothers to insert pauses at phrase and sentence boundaries, and between groups of 2-4 words. They were also instructed to increase their turn-switching pause duration in conversational exchanges. Visual prompts were provided if needed as a cue to slow down speech rate.

For the mothers, analysis of group data using appropriate paired t-tests revealed significant ($p \leq 0.01$) pre- versus post-training differences for overall articulatory speaking rate and turn-switching pause duration. For the children, analysis of group data using paired t-tests did not reveal any significant differences for the pre- versus post-training conditions. However, a review of individual data demonstrates trends in similar directions to those demonstrated by the mothers. The differences between rates in each dyadic pair were smaller in the post-training conversational samples compared to pre-training conversational samples.

Limitations in the present study include: In order for a statistically significant result to be obtained, the children who stutter would have to speak at an abnormally slow articulatory rate. This would be impossible to achieve and maintain, especially given that the children who stutter have articulatory rates within normal limits to begin with. Also, data was only collected at one or two isolated points in time. Therefore it is impossible to determine an accurate reflection of the nature of the complex relationship between parent-child speech from such a small sample of data.

The results indicate that maternal rate reduction can be fluency-facilitating for some, but not all, children who stutter. The study provides suggestive evidence for the efficacy of reducing maternal speech rate in order to improve fluency outcomes in preschool children who stutter. The clinical importance is limited due to the weaknesses in methodology.

Single Subject ‘n-of-1’ Design

Guitar, Schaefer, Donahue-Killburg, and Bond (1992) examined the relative changes made in a 5 year old female’s stuttering in response to changes in both parent’s speech variables. The child had been stuttering for 15 months prior to diagnostic evaluation and was rated as a moderate-to-severe stuturer. The clinicians developed a treatment plan that focused on the parents’ verbal interactions with their child. The child’s stuttering was assessed in percentage of syllables stuttered (%SS).

A Mann-Whitney U test was conducted to examine the child’s stuttering at the beginning and end of treatment. Results indicated that the child’s percentage of syllables stuttered decreased significantly in interactions with her mother ($U = 0$; $p < .01$), but did not change in interactions with her father ($U = 11$; $p > .01$). One-tailed tests indicated that both parents significantly decreased their speech rates and the father decreased nonaccepting questions ($p < .01$).

There are several limitations to this study. Because this was a correlational study, there is no indication that slowing the mother’s rate of speech caused a decrease in the child’s stuttering. The verbal interaction samples collected were small and only considered the child’s stuttering at one point in time. The variables included for analysis in this study may have only been responsible for a part of the variance in the child’s stuttering. Findings cannot be generalized to the wider population of children who stutter as this study was only conducted with a single child and her parents.

Despite the limitations, the study also had several strengths. The design and statistical analysis of the data were appropriate for this study. Long-term outcomes were also determined, at 2 and 12 months post-treatment. A random sample of each of the videotapes was re-assessed for inter- and intra-observer reliability. Videotaping the parents’ interactions also allowed them to see themselves and their behaviours more objectively and more accurately compared to relying on memory alone during discussions with the clinician.

The study provides suggestive preliminary evidence that decreasing parental speaking rate is effective in reducing stuttering in children.

Discussion

Overall, the critical appraisal of the evidence included in this review suggests that changing parental verbal interaction styles may have a small effect on improving fluency in children who stutter. Three out of six studies have suggested that changes to parental speech, such as using more positive statements and changing their style of conversational interaction (i.e., using less interruptions) have positive effects on increasing fluency in children who stutter. According to Stephenson-Opal and Bernstein Ratner (1988), decreasing parental speech rate is significantly related to an increase in fluent speech. The two other studies that examined parental speech rate found that this change in parental verbal interaction style may influence fluency in some, but not all young children who stutter. However, these two studies were weak in their design and methodology. Also, according to Miles and

Bernstein Ratner (2001), parental language complexity is unrelated to developmental stuttering.

The lack of evidence in support of advice that parents of CWS simplify their speech is useful for language development. Research has shown that growth in language development is stimulated when parents use language that is at a slightly higher level than their children's language.

There are several complications in studying the fluency-enhancing effects of changing parental verbal interaction styles in the parents of children who stutter. Compared to other speech and language disorder populations, the population of children who stutter is relatively small. Furthermore, clinicians should be cognizant of the heterogeneity of this population. Not all children experience the same types of stutters (i.e., mild word repetitions, to tense blocks accompanied with facial tension) or stutter to the same severity as other children. Therefore, modifications to parent's speech may be beneficial for some children, but not others. Also, the nature of the treatment designs included in this review did not allow for random allocation of participants into treatment groups or for the use of blinding in either the researchers, participants or both. In addition, there is an inherent difficulty in comparing data within and between the studies included in this review, as all studies did not measure fluency in a standardized manner (i.e., using percent syllables stuttered as a measure of fluency). Based on the Oxford Centre for Evidence-based Medicine Levels of Evidence, the study designs included in this review fall into level two and level three categories.

Overall, the field of evidence in this area is limited by small sample sizes and lack of large-scale comparisons to either matched controls or groups receiving no treatment. Therefore, it cannot be stated with confidence that parent's speech behaviours influence their children's stuttering or that changing parental verbal interaction style will increase a child's fluency.

Recommendations

Further research would be necessary to clarify and confirm the relationship between changing parental verbal interaction styles and an increase in fluency in children who stutter. It is recommended that further research should take the following into consideration:

1. Larger sample of children and their parents should be studied in order to create more confident conclusions on the impact of changing verbal interaction patterns on the fluency of children who stutter.

2. Treatment designs should incorporate comparisons to age- and stuttering severity-matched control children and groups receiving no treatment.
3. The long-term effects of changing parental verbal interaction style in the maintenance of fluent speech.
4. Further investigation into the secondary effects inherent in the instructions to "slow your rate of speech," and determination of which of these variables is truly impacting fluency outcomes in children.

Clinical Implications

Many clinicians provide parents with a list of suggestions that they can implement at home in order to help facilitate fluent speech in their child who stutters. Due to the limited strength of evidence provided by the articles reviewed, clinicians should proceed with caution when sharing these recommendations with parents. Parents should be advised that rate and turn-taking modification may have a small impact on their children's fluency, but may not be significant enough to resolve stuttering problems. Furthermore, clinicians should exercise caution when making recommendations that have the possibility of negatively influencing language growth in young children (i.e., parents simplifying their speech).

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