



# Evidence-based treatment of stuttering: II. Clinical significance of behavioral stuttering treatments

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## Abstract

An evidence-based framework can be described as an empirically-driven, measurement-based, client-sensitive approach for selecting treatments. It is believed that using such a framework is more likely to result in a clinically significant outcome. For this paper, a clinically significant outcome was defined as a meaningful treatment change. It was suggested that there are at least three groups for whom a treatment's outcome is meaningful. These groups include clinicians/clinical researchers, the clients, and relevant others who have some interest in the outcome (e.g., parents of a child who stutters). The meaning and measurement of clinical significance was discussed for each of these three groups, based on research from the behavioral stuttering treatment literature.

**Educational objectives:** The reader will learn about and be able to (1) broadly define a clinically significant outcome and identify some of the groups who are interested in such an outcome and (2) describe how clinical significance has been evaluated in stuttering treatment within an evidence-based framework.

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**Keywords:** Clinical significance; Evidence-based; Treatment; Evaluation; Outcome

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## 1. Introduction

An evidence-based framework for selecting and applying treatment is steered by three guidelines (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2001). First, treatment selection is based on the best available, most recent, and clinically applicable research evidence. Second, the clinician is a self-directed learner with an appropriately critical attitude and a healthy level of skepticism about knowledge claims. Third, the client's personal values, concerns, and perspective are considered and evaluated throughout the selection and treatment management process. The successful integration of these guidelines is believed to more likely result in a client-clinician relationship that will assure a clinically significant outcome. The purpose of this paper is to briefly look at the parameters of a clinically significant outcome for behavioral treatments for stuttering within an evidence-based framework and to examine how such a framework might lead towards outcomes that are meaningful for the clinician or clinical researcher, the client, and relevant others such as parents of a child who stutters.

### *1.1. What is clinical significance within an evidence-based framework?*

Perhaps the best starting point for understanding the concept of clinical significance is to begin with a definition that has been couched within a behaviorally oriented, evidence-based framework. Kazdin and Kendall (1998, p. 223) have proposed that clinical significance as a basis for selecting effective treatments is based on "the extent to which changes on various outcome measures translate to palpable benefits or meaningful change."

Two important characteristics of clinical significance are depicted in this definition. The first is "palpable benefits" which means that treatment change is easily perceived. This, however, raises an obvious question: easily perceived by whom? The second characteristic is "meaningful change" which means that treatment change is important, but again this raises the question: important to whom? In considering these questions, Hayes and Haas (1988) have argued that something is meaningful because somebody thinks it is meaningful and, ultimately, what is meaningful will be a matter of value and how much of a change is meaningful will also be a matter of value (also see Hollon & Flick, 1988). In other words, defining what is a meaningful change and how much change is meaningful really depends on who the stakeholders are in the treatment's outcome. In terms of clinical significance, there are at least three consisting of the (1) clinicians and clinical researchers who are trying to administer and develop the most effective treatment approach, (2) clients who are seeking help for their problem, and (3) relevant others who have some interest in the treatment's outcome, such as parents, significant others, teachers, third-party payers, and employers (e.g., Craig & Calver, 1991). The following sections will examine each of these groups in order to better understand the meaning and measurement of clinical significance within an evidence-based framework.

## 1.2. What is a clinically significant change for clinicians and clinical researchers?

Kazdin (1999) has suggested that amount or degree of change in symptoms is the most relevant characteristic of a clinically significant difference for clinicians and clinical researchers. The methods for evaluating amount of change within an evidence-based framework are typically based on two well-known concepts. The first is statistical significance, which is used for evaluating differences in the context of group designs and the second is non-statistical criteria, which are used for evaluating differences in the context of single subject designs.

These two concepts are important within an evidence-based framework because they provide an objective set of criteria for identifying possible treatment changes; but they are not sufficient for identifying clinically significant changes. The reason is simply that noticeable changes in symptoms do not always result in meaningful changes. A significance test, for example, only indicates if the quantifiable changes found as the result of treatment are greater than would be observed by chance. This means that the difference is statistically meaningful, but it says little about whether or not it is clinically meaningful. Similarly for single subject design, graphic-based criteria that are used for identifying change — such as conspicuously visible departures from baseline trends — are judged as experimentally meaningful, but they do not insure that the change is clinically meaningful.

The stuttering treatment literature, however, has illustrated that clinical researchers — and probably clinicians as well — sometimes recognize that amount of change in symptoms does not necessarily mean clinically significant change. For several decades, research has demonstrated that some treatments for stuttering, especially prolonged speech treatments have resulted in noticeable, large, and quantifiable differences in the dependent variable of stuttering frequency (Cordes, 1998). However, based on laboratory evidence (e.g., Ingham & Packman, 1978), as well as clinical anecdotes, it became apparent that treatment changes that led to essentially stutter-free speech might be judged as unacceptable, especially in terms of speech quality (Onslow & Ingham, 1987). In other words, treatment lead to noticeable changes in stuttering but the resulting speech quality was sometimes no more acceptable than the pretreatment speech behavior (e.g., Kalinowski, Noble, Armson, & Stuart, 1994).

Clinical researchers responded to the growing evidence of unacceptable outcomes by developing measurement tools for evaluating speech quality. One of the most reliable and valid measures that emerged in the behavioral treatment literature (Schivavetti & Metz, 1997) consisted of a 9-point speech naturalness scale, where 1 represents highly natural sounding and 9 represents highly unnatural-sounding (Martin, Haroldson, & Triden, 1984). Furthermore, Ingham, Martin, Haroldson, Onslow, and Leney (1985) demonstrated the clinical utility of this measure by showing that it could be used in treatment to help normalize unnatural-sounding, stutter-free speech. Speech naturalness ratings have since been incorporated into an evidence-based framework for modifying stuttering and evaluating stuttering

treatment (Ingham & Riley, 1998). Recently, several efficacy studies (see Ingham et al., 2001; Onslow, Costa, Andrews, Harrison, & Packman, 1996) have shown that prolonged speech treatment not only resulted in noticeable differences in stuttering frequency, but it was also shown that the resulting speech behavior in most cases received naturalness ratings that were in the same range as those typically assigned to people who have never had a stuttering problem.

In sum, this case example illustrates that sometimes clinicians and clinical researchers value both amount *and* meaningfulness of treatment change. But equally important, it reveals the scientific underpinnings of an evidence-based framework. In this example, the research evidence showed that changes in stuttering treatment based on prolonged speech were needed and, as a result, corrective action was taken and self-correction is the sine qua non of a scientific approach.

### *1.3. What is a clinically significant change for clients who stutter?*

Baer (1988, 1990) has argued that a meaningful change for people seeking professional help is changing the behavior that prompted them to seek treatment in the first place. Furthermore, Erwin (1997) has suggested that satisfying the client's needs is a logical and theory-neutral criterion for determining the success of a treatment outcome. From the perspective of an evidence-based framework, this means that it is necessary to measure the behavior that represents the client's complaint. Building on this premise, Ingham and Cordes (1997) proposed a three-factor model of stuttering treatment outcome evaluation based on speech performance, speaking situations, and time that incorporates clients' self-judged acceptability of treatment changes in combination with observer-based measures. Thus, self-measurement serves as the basis for determining the clinical significance of a treatment change from the client's perspective. An important feature of self-measurement is that it allows access to behaviors that are the primary complaint of the client including those behaviors that are sometimes only accessible to the client who stutters (e.g., loss of control).

Ingham (1982) experimentally demonstrated the potential clinical value of self-measurement in a study that evaluated the effects of self-evaluation training combined with a self-managed maintenance program during stuttering treatment. In this study, two adult subjects were trained to self-evaluate their speech for stuttering and speaking rate after receiving prolonged speech treatment. As shown in Fig. 1, the findings revealed that as self-evaluation training was systematically introduced across different speaking situations outside the clinic, a noticeable reduction in stuttering frequency occurred relative to the non-self-evaluation phase that preceded the training. This finding was replicated across both subjects.

This research has led to the development of treatments that include client self-evaluation throughout all stages of the program. Ingham (1999), for example, recently described a treatment protocol that was driven in large part by clients' self-evaluations of their speech behavior in terms of stuttering frequency and speech naturalness, where the treatment goals were stutter-free, natural-sounding

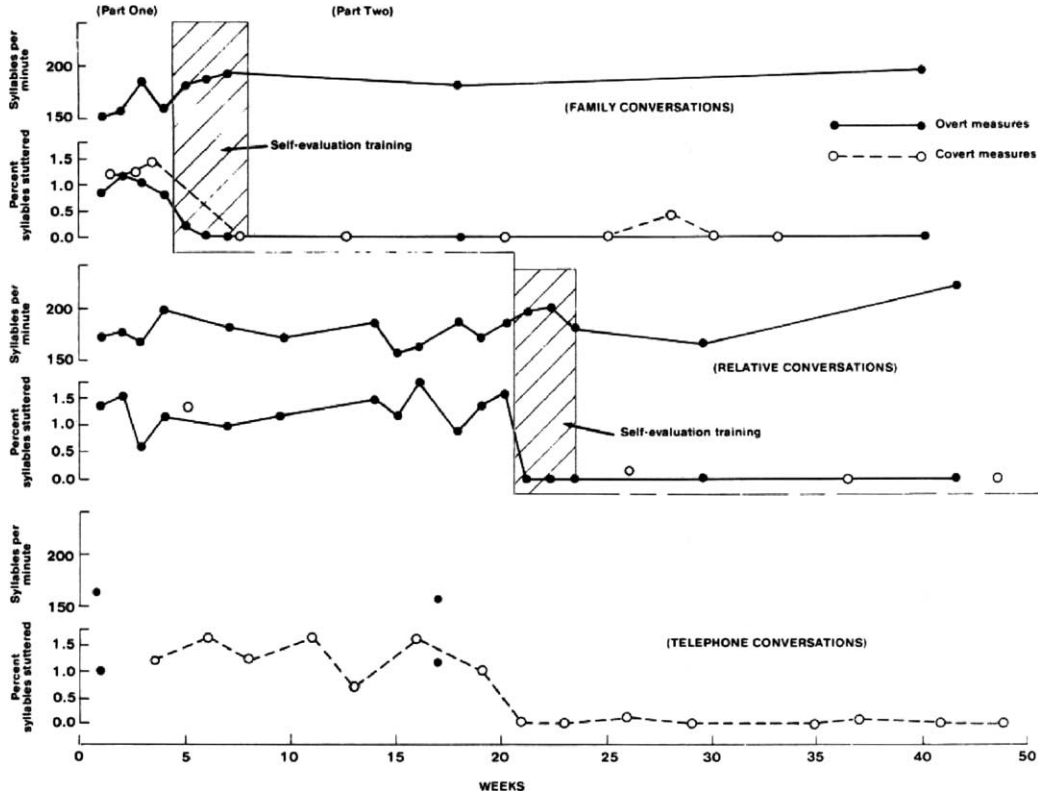


Fig. 1. Trend of frequency of stuttering in percent syllables stuttered (%SS) and speaking rate in syllables per minute (SPM) across self-evaluation training and beyond clinic assessment conditions for a 20-year-old male who stuttered. [Figure reprinted from Ingham, 1982. Copyright by the American Speech-Language-Hearing Association. Reprinted with permission from ASHA and the author.]

speech. Clients self-judge their own stuttering and speech naturalness during the three primary phases of the treatment: establishment, transfer, and maintenance. Self-judgments are based on within-clinic speech performance and, eventually, in beyond clinic speaking situations as well. A recent treatment efficacy study based on this treatment protocol experimentally demonstrated that all participants ( $n = 5$ ) achieved and maintained essentially stutter-free, natural-sounding speech up to a year after the formal treatment was completed (Ingham et al., 2001). This study was not designed to directly evaluate clinical significance; nonetheless the self-evaluation process provided a basis for subjects to judge for themselves the effect of the treatment on a primary symptom of their stuttering problem. Indeed, subjects reported in this study that one of the important benefits of the treatment was they had the responsibility for judging their stutters and speech naturalness and that they were able to select the speech situations where it was important for them to change their speech behavior.

#### *1.4. What is a clinically significant change for relevant others?*

Besides the clinician and the client, there are other parties who have some interest or investment in a treatment's outcome. In the context of clinical significance, the most relevant others are those individuals who place the most value on a treatment change in the client. For clients who stutter, there are several possible candidates that will probably vary depending on client-related characteristics such as age, sex, socioeconomic position, and marital status. However for the young child who stutters, there seems little doubt that in most cases the child's parents will be the most relevant others. In fact, for preschool children who stutter it is very likely the parents' concern rather than the child's complaint that resulted in seeking professional help. Thus within an evidence-based framework, it would be important to measure the behavior that represents the parents' primary concern, which is probably their child's stuttered speech behavior. Furthermore, it would be reasonable to consider evaluating parent-judged acceptability of treatment changes in the child's stuttering (e.g., Lincoln, Onslow, & Reed, 1997).

The Lidcombe program for early stuttering intervention developed by Onslow and his colleagues is an illustration of an evidence-based treatment program that includes parent evaluation of the child's stuttering as a primary component. This is a clinician-directed, parent-managed approach where parents are trained to administer verbal contingencies for stuttering and fluency and the treatment goal is stutter-free speech (Onslow, Packman, & Harrison, 2003). Before treatment commences, parents are trained to rate their child's stuttering on a daily basis for stuttering severity using a 10-point rating scale, where 1 = no stuttering, 2 = very mild stuttering, and 10 = extremely severe stuttering. Parents make their ratings of the child's stuttering severity in beyond clinic speaking situations where the child does most of his/her talking. The parent's ratings in combination with the clinician's speech measures become a basis for making decisions about the treatment's progress and outcome. Several studies evaluating the Lidcombe

program have demonstrated improvement in the children's stuttering that appears to be related to the treatment (e.g., Onslow, Andrews, & Lincoln, 1994; Onslow, Costa, & Rue, 1990).

Parental ratings of the child's stuttering severity do not necessarily mean that the treatment change was clinically significant. Nonetheless, they still provide a basis for the parents to measure and evaluate for themselves the changes in their child's problem behavior. More importantly, in an evidence-based framework, this process of measurement and evaluation especially by relevant others serves as a potential mechanism for assuring a clinically significant outcome.

## **2. Summary and closing remarks**

An evidence-based framework can be broadly characterized as an empirically-driven, measurement-based, client-sensitive approach for selecting and applying treatment. Within this framework, the concept of clinical significance can be defined as a recognizable treatment change that is valued by the clinician, client, and relevant others. For clinicians and clinical researchers, the amount of change in the symptoms is important because it can be evaluated on the basis of objective criteria, but these criteria do not assure a clinically significant change. The stuttering treatment literature, however, illustrated that meaningful change is also valued and that an evidence-based framework can provide a basis for assuring that changes are clinically significant as well. Evidence-based guidelines also require that client's values and concerns are evaluated and the concept of clinical significance provides a basis for conceptualizing how to measure a client's complaint. Such a perspective has been incorporated into models for evaluating stuttering treatment outcome and this may yet prove to be one of the more important developments in treatment evaluation in the last several years. Relevant others are not explicitly mentioned in an evidence-based framework but clearly when children are involved, their parents or caretakers must become an important consideration. As suggested in this review, management approaches for young children who stutter that are housed within an evidence-based framework have included parent evaluation as part of the process and this has the potential to provide a basis for evaluating a clinically significant change.

In closing, the literature on behavioral treatment of stuttering provides an illustration of the meaning and measurement of clinical significance within an evidence-based framework. At the same time, clinical researchers have not yet fully established the clinical significance of stuttering treatment outcome because none of the studies described in this review were a direct empirical test of a clinically significant change. But then none of them were explicitly designed with that purpose in mind. Such a research direction is worth pursuing further because the foundations have been established for evaluating such a change. Finally, this paper is by no means an exhaustive review of the concept of clinical significance. For example, change in quality of life is another aspect of clinical significance that has

been discussed in other fields (Gladis, Gosch, Dishuk, & Crits-Christoph, 1999) as well as in the area of stuttering (Crowe, Davidow, & Bothe, in press; Yaruss, 2001). But for now, the notion of clinically significant change as described in this paper has the strongest empirical support especially when viewed from within an evidence-based framework.

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## CONTINUING EDUCATION

### Evidence-based treatment of stuttering: II. Clinical significance of behavioral stuttering treatments

#### QUESTIONS

1. Clinical significance refers to:
  - a. Small and minor changes
  - b. Large and insignificant changes
  - c. Noticeable and meaningful changes
  - d. Noticeable and meaningless changes
  - e. None of the above

2. Clinical significance of an outcome is valued by:
  - a. Clinicians
  - b. Clinical researchers
  - c. Clients
  - d. Parents
  - e. All of the above
3. Client-judged acceptability of treatment changes:
  - a. Is included in Ingham and Cordes' three-factor model of outcome evaluation
  - b. Can be included in self-measurement procedures
  - c. Can be used to evaluate the client's complaint
  - d. All of the above
  - e. None of the above
4. Relevant others who have an interest in stuttering treatment outcome:
  - a. May vary depending on client's age, sex, and marital status
  - b. Will likely be the parents when the client is of preschool age
  - c. May provide information on the acceptability of the treatment outcome
  - d. All of the above
  - e. None of the above