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The effectiveness of stuttering treatments in Germany

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ABSTRACT

Purpose: Persons who stutter (PWS) should be referred to the most effective treatments available, locally or regionally. A prospective comparison of the effects of the most common stuttering treatments in Germany is not available. Therefore, a retrospective evaluation by clients of stuttering treatments was carried out.

Method: The five most common German stuttering treatments (231 single treatment cases) were rated as to their perceived effectiveness, using a structured questionnaire, by 88 PWS recruited through various sources. The participants had received between 1 and 7 treatments for stuttering.

Results: Two stuttering treatments (stuttering modification, fluency shaping) showed favorable and three treatments (breathing therapy, hypnosis, unspecified logopedic treatment) showed unsatisfactory effectiveness ratings. The effectiveness ratings of stuttering modification and fluency shaping did not differ significantly. The three other treatments were equally ineffective. The differences between the effective and ineffective treatments were of large effect sizes. The typical therapy biography begins in childhood with an unspecified logopedic treatment administered extensively in single and individual sessions. Available comparisons showed intensive or interval treatments to be superior to extensive treatments, and group treatments to be superior to single client treatments.

Conclusion: The stuttering treatment most often prescribed in Germany, namely a weekly session of individual treatment by a speech-language pathologist, usually with an assorted package of mostly unknown components, is of limited effectiveness. Better effectiveness can be expected from fluency shaping or stuttering modification approaches, preferably with an intensive time schedule and with group sessions.

Educational objectives: Readers will be able to: (a) discuss the five most prevalent stuttering treatments in Germany; (b) summarize the effectiveness of these treatments; and (c) describe structural treatment components that seem to be preferable across different kinds of treatments.

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1. Introduction

Stuttering treatments are shown to have a lasting effect, both for speech outcomes and for social, emotional, and cognitive outcomes, if they contain variants of slowed speech, soft voice onset, continuous phonation, self-management, response contingencies, exercises in group sessions, and transfer into non-clinical settings (Bothe, Davidow, Bramlett, & Ingham, 2006; Herder, Howard, Nye, & Vanryckeghem, 2006). For preschool children, parental reinforcement for fluent speech has also shown effectiveness (Lattermann, Euler, & Neumann, 2008; Nye et al., 2013). Pharmacological treatments have had unsatisfactory outcomes thus far (Bothe, Davidow, Bramlett, Franic, & Ingham, 2006).

One of the most important findings regarding stuttering treatment effects, particularly in the study of Bothe, Davidow, Bramlett, Franic, et al. (2006) and Bothe, Davidow, Bramlett, and Ingham (2006) and most saliently in Nye et al. (2013), is that only a minority of studies fulfill methodological quality criteria of modern evidence-based research. Bothe, Davidow, Bramlett, Franic, et al. (2006) and Bothe, Davidow, Bramlett, and Ingham (2006) required as inclusion criterion that four out of five quality criteria (random assignment to groups or qualified single-subject design; blind or independent observers; both pre-treatment and post-treatment data; beyond-clinic data; controls for speech rate and naturalness) had to be fulfilled. The authors identified 39 out of 162 studies published between 1970 and 2005 that fulfilled their relatively lenient inclusion criterion. Nye et al. (2013) meta-analyzed the reports about treatment effectiveness in children and adolescents between the ages of 2 and 18 years, first excluding single-subject studies, pharmacological studies, and studies which did not report fluency measures, with a stricter methodological inclusion criterion provided by the Downs & Black, 1998 Downs and Black Checklist (1998). This checklist assesses five categories of methodological quality (reporting, external validity, internal validity bias, internal validity confounding, and power) and yields an overall methodological quality rating by expert raters. With a relatively moderate and compliable cut-off (14 out of a possible 26 points) the authors could include only nine studies, from 312 citations that fulfilled the first inclusion criteria.

Studies reported in German journals were not included in the above-mentioned reviews. To our knowledge there is at least one German study (Euler & Wolff von Gudenberg, 2000) which probably would have otherwise been included in the Bothe, Davidow, Bramlett, Franic, et al. (2006) and Bothe, Davidow, Bramlett, and Ingham (2006) review. An effectiveness comparison of German treatments in order to inform German prescribers is needed, but is not available. However, it is not given that the effectiveness and efficiency of treatments performed by experts under selected and often ideal circumstances, such as reported in the above-mentioned systematic reviews, compares to the effectiveness and efficiency of the same kind of treatments delivered in everyday domestic contexts (Langevin et al., 2006).

Persons who stutter (PWS) or whose parents search for stuttering treatment have the right to get the most effective and evidence-based treatments recommended by professionals (Yaruss, 2001) which are locally or regionally available. Therefore, a Germany-wide retrospective questionnaire-based study on the rated effectiveness of stuttering treatment is reported in this paper. It can be expected that some of the results are generalizable to countries other than Germany, depending on how access to stuttering treatments differs between Germany and other countries where stuttering treatments are provided. Therefore, the treatment situation in Germany is described first, followed by the situation in a few selected countries. We omit the North American countries, assuming that most readers are relatively well informed about stuttering treatment in the United States and Canada.

1.1. Access to stuttering treatments in Germany, Australia, and Eastern Europe

In Germany, parents who are concerned that their child might stutter most often consult a physician (pediatrician, phoniatrician/pediatric audiologist, otorhinolaryngologist) who prescribes a treatment and refers the child to a logopedist (the most common Continental European occupational title for a speech-language pathologist) in a private practice or, less frequently, to a stuttering treatment center. Adult PWS who seek treatment also consult a physician in order to obtain a medical referral. The latter is required for health insurance coverage. Health insurance, which is obligatory in Germany (either public or private), covers the costs for unspecified logopedic treatments in private practices and, in most cases, partly for selected specific treatments, such as fluency shaping treatments or stuttering modification treatments (Peters & Guitar, 1991), provided in centers. Other therapies, such as breathing regulation or hypnosis-based treatments, have to be covered by the patients or parents themselves.

In Australia, as an example of an English-speaking country, speech pathology services for stuttering are provided in hospitals, schools, health centers, and private practices. A medical referral is not required. Services in the public sector are free of charge and optional health insurance covers part of the costs in the private sector. Financial support is also provided by the government for a limited number of sessions with a private practitioner. As stuttering has quite a high profile in Australia, parents of preschoolers who start to stutter will often contact a speech pathologist directly for a consultation (A. Packman, personal communication, May 15, 2013).

In most Eastern European countries (Fibiger, Peters, Euler, & Neumann, 2008), stuttering treatment for children is offered in kindergartens, schools, or health services and is usually free of charge. Coverage of treatment is provided by educational systems, health services, or social/health insurance. In many Eastern European countries, but not in Bulgaria and Russia, adults receive free treatment through the public health system or get full or partial reimbursement from their health insurance. Many different kinds of therapeutic approaches are reported, but fluency shaping treatment is dominant,

followed by stuttering modification and a host of other treatments which are unusual elsewhere, such as “logorhythmic” therapy, phonographorhythmic therapy, “complex method,” and medication such as bronchodilatation.

1.2. The comparability of stuttering prevalence and treatment effects across languages

It might be assumed that prevalence of stuttering and treatment successes differs between languages (e.g. Dworzynski & Howell, 2004). However, earlier studies about prevalence differences – as, for example, reported in Bloodstein and Bernstein Ratner (2008) – are of questionable validity and generally cannot be replicated (e.g. Proctor, Yairi, Duff, & Zhang, 2008). Despite substantial differences in phonetic complexity between languages (Dworzynski & Howell, 2004), the literature so far seems to report comparable treatment success across languages (Langevin et al., 2006; Shenker, 2004). The conclusion of comparability across languages might turn out to be premature considering that only a few of the many existing languages have been compared. However, in the absence of contradicting data this assumption seems warranted, which justifies tentative generalizations from German to other languages.

1.3. Studies of effectiveness of stuttering treatments in Germany

Reports concerning the effectiveness of stuttering treatments in Germany which fulfill a reasonable number of the methodological criteria specified in the Downs and Black Checklist (1998) are rare. A study by Lattermann et al. (2008) reports the Lidcombe treatment to produce significantly higher reduction of disfluencies in preschoolers than those seen in the wait-control group. In a relatively large sample of adolescent and adult PWS ($N=238$), Euler and Wolff von Gudenberg (2000) and Euler, Wolff von Gudenberg, Jung, and Neumann (2009) documented the longer-term effects of the Kassel Stuttering Therapy, a two- to three-week intensive fluency shaping approach with special biofeedback software to train smooth voice onsets and continuous phonation, as well as a one-year maintenance program which entails client monitoring of practice on the computer and two to three weekend refresher courses during a period of 12 months after the intensive course. The longer-term effects (12 months after the last refresher course, or later) were favorable both with respect to objectively assessed disfluencies – measured in four different speech tasks – and to subjective evaluations of various speech aspects, as they amounted to effects sizes of about 1.0, depending on the speech task. If relapses occurred, they did so most often within the first six months after the intensive course. Natke, Alpermann, Heil, Kuckenberg, and Zückner (2010) reported the long-term effects of the treatment of 18 clients with a stuttering modification procedure, administered as an interval treatment in group sessions with a structured treatment protocol, an explicit prescription of the speech techniques to be trained, and semiannual refreshers during the two-year period after intensive treatment. Disfluencies were measured with the use of a modified time-interval analysis (Cordes, Ingham, Frank, & Ingham, 1992), with 3-second slices of speech categorized as “stuttered,” “fluent,” or “trained speaking pattern,” with the latter category constituting the modification. Fluency assessments, also one and two years after intensive treatment, were carried out through surprise telephone calls by an unknown person from outside the treatment context. The treatment effects sizes from before treatment to two years after intensive treatment were moderate to large, both for objective disfluency measures and for subjective measures such as attitudes toward communication and speech avoidance. A study by Kellner (1993) described the effects of a treatment according to Van Riper, but reports only subjective measures and no objective disfluency measures. Finally, Baumeister, Caspar, and Herziger (2008) published, for 40 Austrian children and adolescents, the results of a summer-camp treatment combination of fluency shaping and stuttering modification. Follow-up data, however, were reported for only two months after treatment and for only subjective measures, with a relatively large loss-to-follow-up.

The German language studies with encouraging effectiveness demonstrations are not directly comparable, but three points might be worth considering: (1) the treatments were those which are reported to be the most effective in the international community, that is, the Lidcombe treatment for preschoolers and fluency shaping or stuttering modification for adults (Natke & Alpermann, 2010); (2) the treatments were intensive; and (3) the treatments were not carried out on a one-to-one basis, but were group treatments, or therapist–parent–child treatments in the case of the Lidcombe treatment. As reported above, however, the most commonly prescribed treatment for stuttering is extensive treatment in which one therapist, usually a logopedist, treats a single client, usually in a private practice and with a single session per week, and the kind of treatment is assumedly more often an eclectic composition of various treatment methods rather than an acknowledged evidence-based method executed with proper manual fidelity.

1.4. Aim of the study

A retrospective evaluation of treatment by the clients themselves is currently the only available method to compare the effectiveness of stuttering treatments in Germany. Such a method is admittedly susceptible to biases – some of which, however, can be alleviated by statistical detail analyses and careful interpretation (see Sections 3 and 4). A retrospective treatment evaluation by PWS, on the other hand, has the advantage that many PWS can look back on a series of successive treatments in their biographies (Yaruss, Quesal, & Murphy, 2002) and thus are able to make within-subjects comparisons. Additionally, these persons are able to evaluate the long-term effectiveness of treatments (except for those treatments received recently).

A retrospective evaluation of stuttering treatments has previously been reported by Yaruss, Quesal, Reeves, et al. (2002), who obtained respective information from 67 respondents attending a National Stuttering Association conference. A

major finding was that participants who had received fluency shaping approaches were more likely to report relapse or unsatisfactory results than those who had tried other approaches, mainly stuttering modification or avoidance reduction approaches. Most data from these authors are reported descriptively (percentages of participants), usually with answer formats in grouped variable intervals. Therefore, a more detailed description is provided in Section 4 of this paper for those results which are comparable to our own ones presented below.

Analysis of the order of the various treatments in the individual treatment biographies may provide an objective measure of treatment effectiveness, albeit of unknown validity, as is true for subjective evaluations. Such an ethological measure concerning what the individual *does* (deciding for and undergoing a particular treatment) can add validity to a purely psychological measure derived from what the individual *says* (evaluating a treatment in a questionnaire). An effective treatment can be expected to be more likely the last or only treatment, whereas an ineffective treatment is more likely to be followed by a further treatment, either the same or a different kind of treatment.

The aims of the present study are thus the following: (1) To compare effectiveness and satisfaction ratings as well as treatment durations from PWS who have undergone stuttering treatments in the past, for those kinds of stuttering treatments that have been used mostly in Germany; (2) to investigate which aspects of the therapy, irrespective of kind of treatment (treatment schedule; individual vs. group treatment), are associated with more favorable ratings; and (3) to explore which insights into treatment effectiveness can be gained from a detailed analysis of the within-participant order of stuttering treatments, as explained in the previous paragraph.

2. Method

2.1. Participants

2.1.1. Recruitment strategies

The participants were recruited through various sources. The German Association of Stuttering Self-Help (Bundesvereinigung Stottern & Selbsthilfe e.V.) called attention to the study through their mailing lists. Information regarding participation was also placed in various German stuttering newsgroups (www.stotterer-training.de/forum/; www.stop-stottern.de/forum/stottern/). Persons who identified themselves as PWS were sought out on social networks (Facebook, studiVZ, meinVZ). Known PWS were asked for the addresses of other PWS. Professionals involved in stuttering research or treatment were asked for addresses of PWS. All subjects gave their written informed consent according to the Code of Ethics of the World Medical Association (Helsinki Declaration).

2.1.2. Description of participants

Completed questionnaires were received from 88 PWS who had received stuttering therapy (61 males, 27 females; 17–66 years old, median 32.5 years), 23 of them through online recruitment. The participants had received between one and seven treatments for stuttering – not infrequently the same kind of treatment more than once. The mean number of treatments per participant was 2.95. Thus, data for about 260 single treatments were available, but because of the exclusion of one kind of treatment due to small case number (see Section 2.3) and missing data, 231 treatment cases finally entered the analysis.

2.2. Questionnaire

A questionnaire (see Attachment) was developed which asked, in addition to participant's age and gender, for the following information:

- Age at treatment onset for each treatment.
- Duration of each treatment.
- Time regimen of each treatment (extensive treatment: for example, weekly session; interval treatment: for example, several weekends; intensive treatment: for example, treatments lasting for several subsequent days or weeks).
- Social format of each treatment (single or group sessions).
- Name or kind of each treatment. The following categories of the most popular German stuttering treatments, according to the knowledge of the authors, were provided: (a) stuttering modification; (b) fluency shaping; (c) combination of stuttering modification and fluency shaping; (d) breathing regulation; (e) hypnosis; (f) unspecified logopedic treatment (for example, treatment mix, breathing, relaxation, voice or articulation exercises, loud reading). All treatments, except for “unspecified logopedic treatment,” were additionally labeled with the most popular treatment name or therapist name in order to aid the participants in the identification of their type of treatments. Obviously, the so-called “unspecified logopedic treatment” was unspecified from the viewpoint of the PWS and assumedly not from the viewpoint of the logopedist.
- For the treatments “combination of stuttering modification and fluency shaping,” “hypnosis,” and “unspecified logopedic treatment,” the essential treatment constituents were requested, with 11 response categories. The answers to these questions, however, were too sporadic to lead to additional identification of kinds of therapies.
- Effectiveness of each treatment (1 – none at all; 2 – a little; 3 – so-so; 4 – quite good; 5 – very good).
- Satisfaction with each treatment (1 – completely unsatisfied, 2 – rather unsatisfied; 3 – so-so; 4 – quite satisfied; 5 – completely satisfied).

2.3. Data analysis

Only 11 participants indicated a “combination of stuttering modification and fluency shaping” treatment; they were therefore excluded from the main analysis because of the small sample size. A total of 18 participants did not respond to the question regarding kind of treatment. Thus, 231 cases of treatment from 83 different persons entered the data analysis. An additional 15 participants reported their treatment biography but did not provide effectiveness ratings.

Chi-square tests were used for comparisons of categorical variables, here the frequencies of kinds of treatments and the order of treatments. Two-sample *t*-tests were conducted to compare the means of two independent samples and analysis of variance (ANOVA) for the comparison of three or more groups (see Fields, 2009, for further descriptions of these methods). In this paper, this applied to the effectiveness ratings.

All tests were two-sided and used an alpha level of .05. Effects sizes (eta square [η^2] and Cohen's *d*) were reported where appropriate. All analyses were conducted with standard procedures as implemented in PASW 18.

The various treatments are nested in persons – that is, a participant could contribute more than one treatment case. Thus, the therapy cases are not independent of each other, which could violate the requirements of the General Linear Model (Fields, 2009). Dependency between the single treatment cases within persons can be quantified by the intra-class correlation coefficient (ICC) which, in this case, indicates the proportion of variance attributable to persons. For both target-dependent variables the ICCs were extremely low, namely 0.0% for treatment effectiveness and 2.3% for satisfaction with treatment. Therefore, hierarchical modeling is not required (Raudenbush & Bryck, 2002). The single treatments can be considered as independent cases.

3. Results

3.1. Treatment frequencies

The 231 therapy cases were distributed over the various treatments with the following frequencies: 50 cases of stuttering modification, 36 cases of fluency shaping, 13 cases of breathing regulation, 25 cases of hypnosis, and 107 cases of unspecified logopedic treatment. A χ^2 -test rejected the null hypothesis that all treatments occurred with the same frequency ($\chi^2(5)_{N=231} = 116.16, p < .001$). Most participants contributed only one ($n = 19$) or two ($n = 21$) treatment cases. Three or four treatment cases per participant occurred relatively often ($n = 17$ each), whereas more treatments per participant rarely occurred (5 therapies: 5 participants; 6: 2 participants; 7: 2 participants).

3.2. Correlation between effectiveness of and satisfaction with treatment

Several distributions of satisfaction ratings were not normally distributed. Therefore, the correlations between the ratings of treatment effectiveness and satisfaction with treatment were calculated non-parametrically. The Spearman rank correlations (ρ) were as follows for the different kinds of treatments: stuttering modification .75, fluency shaping .65, breathing regulation .58, hypnosis .86, unspecified logopedic treatment .79. A separate statistical analysis of satisfaction with treatment has been omitted for most of the current report, because the results were highly similar to the results regarding rated effectiveness of treatment due to the generally high correlations between both target-dependent variables.

3.3. Effectiveness evaluations of treatments

Fig. 1 shows the effectiveness evaluations of the stuttering treatments. The top bar depicts the ratings for all treatments pooled. The overall picture is sobering, as the frequencies for no or little effects (light gray bars) dominate the frequencies for rather or very good effects (dark gray and black bars).

An ANOVA showed the five types of treatment to be significantly different as to their subjectively rated effectiveness ($F(4, 217) = 29.81, p < .001, \eta^2 = .35$). Bonferroni-corrected paired comparisons documented that both fluency shaping and stuttering modification were significantly more effective than breathing treatment, hypnosis, or unspecified logopedic treatment (all p 's < .03). The differences between stuttering modification and fluency shaping were not significant, nor were any differences between the other three treatment approaches (all p 's > .50). Table 1 shows the statistical values for all paired

Table 1

Paired comparisons of stuttering treatments, with *t* values, *p* values, and effect sizes *d* ($t/p/d$); significant differences indicated by asterisk.

	Kind of treatment			
	Fluency shaping	Breathing regulation	Hypnosis	Unspecified logopedic treatment
Stuttering modification	1.46/.99/0.20	3.16/.03*/0.51	6.76/.01*/0.94	7.56/.01*/1.07
Fluency shaping		4.03/.01*/0.60	7.59/.01*/1.02	8.38/.01*/1.27
Breathing regulation			1.97/.56/0.27	1.06/.99/0.22
Hypnosis				1.62/.99/0.27

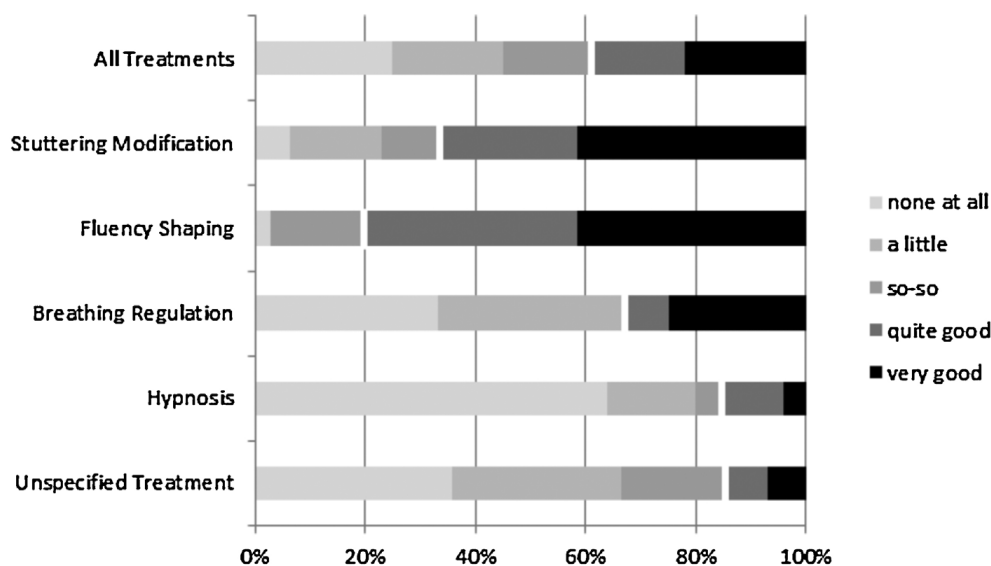


Fig. 1. Percentages of respondents with particular treatment effectiveness ratings. (The darker the more effective; white vertical stripes within each stacked bar indicate the borderline between the percentages of respondents who rated the treatment as effective and the percentages who rated it as less effective.)

comparisons and Table 2 the descriptive values for each treatment approach, including the values for satisfaction with each treatment. The treatment combination of stuttering modification and fluency shaping, which had been excluded from the main analysis due to small sample size, had comparable values to both pure treatment forms (means: effectiveness 4.18, satisfaction 4.27).

The difference between the two effective and satisfactory treatment approaches and the three less effective and satisfactory ones is not only statistically significant but also of considerable effect size, represented as Cohen's *d* (Cohen, 1988). The effectiveness gap (Table 1) for the significant differences ranges between effect size of *d* = 0.51 (stuttering modification vs. breathing treatment) and *d* = 1.27 (fluency shaping vs. unspecified treatment). Unlike the statistical significance of a difference between groups, the effect size indicates the practical significance. By convention, a *d* > 0.50 is considered a moderate effect, a *d* > 0.80 a large effect (Cohen, 1988).

3.4. Treatment order

Each treatment was classified into two complementary categories, namely whether it was the last or only treatment or whether it was followed by another treatment, which could be a different or the same kind of treatment. Altogether, the data for 98 participants entered the analysis. The number of participants here is higher than that for the effectiveness ratings, because some subjects described their treatment biography but did not provide treatment effectiveness ratings. Of the 53 stuttering modification treatments, 36 were the only or last treatment (68%). Of the 37 fluency shaping treatments, 30 (81%) were the only or last treatment. The respective percentages for the other three kinds of treatment were as follows: breathing treatment 44%, hypnosis 12%, and unspecified logopedic treatment 8%. The frequency difference between stuttering modification and fluency shaping was significant ($\chi^2(1) = 6.74, p < .01$).

3.5. Age and stuttering treatment

Fig. 2 shows the ages at which the participants had received the various stuttering treatments. Unspecified logopedic treatment was received mainly at early ages. The first stuttering treatment was an unspecified logopedic treatment in 72% of the cases. Of the children up to the age of 8 years, 84% had received an unspecified logopedic treatment for their stuttering. The most effective treatments, however – fluency shaping and stuttering modification – were typically not received before young adulthood.

Table 2

Effectiveness and satisfaction with each kind of stuttering treatment; *M*: mean; *SD*: standard deviation; and *CI*: 95% confidence interval.

Kind of stuttering treatment	Effectiveness			Satisfaction		
	<i>M</i>	<i>SD</i>	<i>CI</i>	<i>M</i>	<i>SD</i>	<i>CI</i>
Stuttering modification	3.78	1.31	3.40–4.60	3.88	1.09	3.57–4.19
Fluency shaping	4.17	0.90	3.86–4.47	3.89	1.02	3.53–4.24
Breathing treatment	2.58	1.68	1.52–3.65	1.75	1.22	0.98–2.52
Hypnosis	1.76	1.23	1.25–2.27	2.12	1.33	1.57–2.67
Unspecified logopedic treatment	2.20	1.21	1.96–2.44	2.46	1.28	2.21–2.71

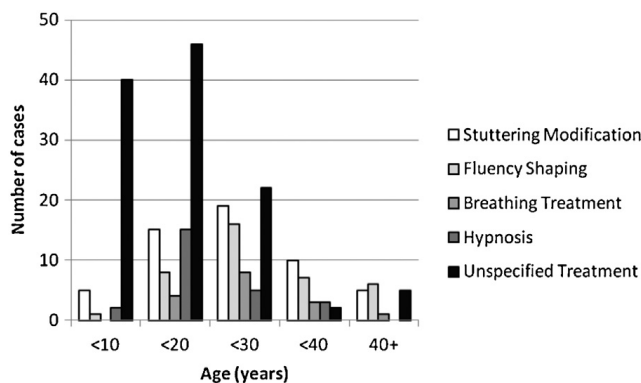


Fig. 2. Absolute number of treatment cases in five different age ranges ($N = 246$, cases without treatment effectiveness ratings included).

Table 3
Median duration, temporal regimen, and social form of the stuttering treatments.

	Median duration (months)	Temporal regimen (%)			Social form (%)	
		Extensive	Interval	Intensive	Single	Group
Stuttering modification	9.5	38	40	16	38	62
Fluency shaping	1.0	3	9	89	5	95
Breathing treatment	0.5	11	11	78	0	100
Hypnosis	6.0	56	0	44	40	60
Unspecified logopedic treatment	10.0	84	2	14	76	24

3.6. Duration and structure of stuttering treatments

The average duration of each kind of stuttering treatment, the temporal regimen (intensive, interval, extensive), and the social form (individual or group sessions) are shown in Table 3. Limitations of the evaluation of treatment durations are addressed in Section 4.

Due to small sample sizes, the relationship between the temporal regimen (extensive, interval, intensive) and the effectiveness of the treatment could be examined only partially. With respect to unspecified logopedic treatment, the difference between extensive ($n = 76$) and intensive treatment ($n = 13$) could be tested; likewise for hypnosis ($n = 14$ vs. $n = 11$), with no significant difference for either treatment form. However, the sample sizes were small and the treatment effects were low. Both the sample size and the floor effect do not allow for a powerful test of potential true differences. In the case of stuttering modification, interval treatment ($n = 19$) was very significantly superior to extensive treatment ($n = 18$; $p < .01$; $d = 1.02$).

The difference between individual and group session treatment could be tested for stuttering modification, hypnosis, and unspecified logopedic treatment, due to sufficiently large subsample sizes (Fig. 3). As for stuttering modification, group therapy ($n = 19$) was very significantly superior to individual therapy ($n = 34$, $p < .01$; $d = 0.84$) and significantly superior to unspecified treatment ($n = 25$ vs. $n = 76$, $p < .05$, $d = 0.49$). With respect to hypnosis ($n = 16$ vs. $n = 9$) there was no significant difference, but again, small samples and floor effect prevent detection of minor true differences. All in all, the data point to an advantage of group treatments over individual treatments, and of intensive treatments over extensive treatments.

3.7. Earlier vs. more recent treatments

The unspecified logopedic treatments had been received most often at earlier ages, with stuttering modification and fluency shaping at later ages (Fig. 2). This age difference might constitute a bias against the unspecified treatments which

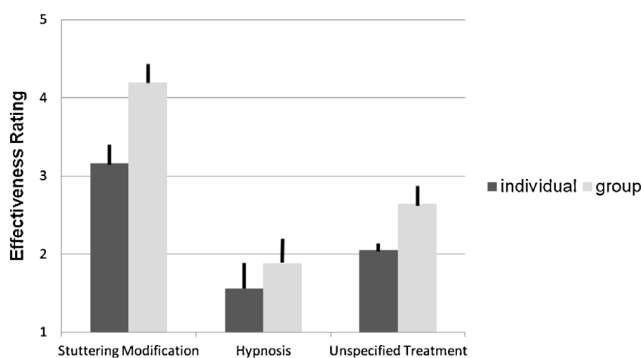


Fig. 3. Mean effectiveness ratings for individual session (dark gray bars) vs. group session treatments (light gray bars); whiskers: standard error.

could have gained in quality over the years. To control for this possible bias, earlier treatments were compared with more recent treatments for those treatments with sufficient sample sizes. For stuttering modification and fluency shaping, the median treatment onset was five years previously. For both treatment forms, there was no significant effectiveness difference between the earlier and the more recent treatments. Half of the unspecified logopedic treatments had been received 21 years previously or earlier. These past treatments, however, were not less effective than the unspecified treatments received less than 21 years previously. In fact, they were numerically *more* effective, although not significantly so ($p = .065$), than the more recent ones. This finding cannot be explained by a glorification of the past, because the satisfaction with the earlier nonspecific treatments was numerically lower (albeit not to a statistically significant level) than the more recent nonspecific treatments. The effectiveness comparison between stuttering modification and fluency shaping on the one hand, and unspecified logopedic treatments on the other, is thus not biased against unspecified logopedic treatments due to different amounts of time having elapsed since treatment onset.

Another possible bias could be due to the fact that the typical stuttering treatment biography starts with an unspecified logopedic treatment. Persons for whom this first unspecified treatment was effective might be less likely to participate in the current study. A non-assisted recovery from stuttering is also not unlikely during childhood (Johannsen, 2001; Månsson, 2000; Yairi & Ambrose, 2005) and can be confounded with true treatment effects. Thus, those persons with assisted childhood recovery from stuttering might be underrepresented in the current study, whereas those with persistent stuttering might be overrepresented. To control for this possible bias, only those treatments that were not an initial treatment were selected. From these second or later treatments, the pooled cases of stuttering modification and fluency shaping ($n = 66$) were compared, concerning their effectiveness, with the second or later cases of unspecified treatment ($n = 47$). The difference remained highly significant ($M = 5.06$ vs. $M = 2.55$) with a very large effect size ($d = 1.26$), which was comparable to the difference between stuttering modification and unspecified logopedic treatment ($d = 1.27$) or the difference between fluency shaping and unspecified logopedic treatment ($d = 1.99$) when first treatments were included. A bias against unspecified logopedic treatment due to early selection is thus unlikely.

4. Discussion

A retrospective evaluation by clients of the effectiveness and satisfaction with stuttering treatments implemented most often in Germany has clearly differentiated between two effective and three relatively ineffective treatments. Effective treatments were stuttering modification and fluency shaping, whereas treatments with little effect were breathing treatment, hypnosis, and unspecified logopedic treatment. Stuttering modification and fluency shaping were perceived as equally effective. This result agrees with international reports in which fluency shaping techniques and stutter modification approaches have been shown to be effective in reducing either speech disfluencies or the burden of stuttering (Prasse & Kinkano, 2008), or both. The size of the difference between effective and hardly effective treatments is similar to the difference between treatment groups and non-treatment control groups as reported by Nye et al. (2013), namely a difference of about one standard deviation, which is equivalent to an effect size of $d = 1$. The participants in the study by Yaruss, Quesal, and Murphy, (2002) and Yaruss, Quesal, Reeves, et al. (2002) reported the same size of difference between the “best” and “worst” treatments they had received.

Fluency shaping and stuttering modification have somewhat different treatment goals, the former aiming primarily at reducing disfluencies and the latter at reducing the negative impact of disfluencies (Natke & Alpermann, 2010), but when PWS are asked for the effectiveness of a treatment, it is assumed that they are able to rate the effectiveness criterion adequately according to the particular treatment aims. In our study, fluency shaping was rated with regard to comparable effectiveness, as was stuttering modification, unlike the retrospective client report by Yaruss, Quesal, and Murphy (2002) and Yaruss, Quesal, Reeves, et al. (2002) in which fluency shaping was judged as inferior to stuttering modification.

Group treatment format was generally superior to individual treatment format within the three kinds of treatments where comparison was possible because of a sufficient number of cases (stuttering modification, hypnosis, unspecified logopedic treatment; see Fig. 3). Group treatment was the usual format in fluency shaping approaches (95%; see Table 3), whereas in stuttering modification use of the group format was less frequent (62%). The question arises as to whether there might be differences in effectiveness or satisfaction ratings between stuttering modification in group format and fluency shaping in group format. There was a sufficient number of cases to allow such a comparison, namely $N = 29$ vs. $N = 34$ for effectiveness ratings and $N = 30$ vs. $N = 33$ for satisfaction ratings. However, t -tests showed no significant differences either for ratings of treatment effectiveness or for ratings of satisfaction with treatment.

In contrast to the subjective effectiveness ratings, treatment order as a potential behavioral indicator of treatment effectiveness showed a significant advantage of fluency shaping over stuttering modification, because the former, rather than the latter, was more often the last (or only) treatment received. The reason for this discrepancy between effectiveness ratings and treatment order may be due to a sampling bias, or to the different psychological costs for both forms of treatment: the restructuring of the speech pattern in fluency shaping approaches usually involves a strict program with tedious practice and is prone to fear of failure (that is, relapse), whereas stuttering modification may be more accepting of and congenial to the client. However, this statement is tentative, particularly in light of missing significant differences in the satisfaction ratings between both kinds of treatment.

The data concerning treatment duration is probably not sufficiently valid to calculate efficiency differences, for example, between fluency shaping and stuttering modification. In case of extensive treatment with weekly sessions, the data

regarding treatment duration may most likely mean the time elapsed between the first and the last treatment session. The database remains unclear as to whether these data are comparable to duration reports concerning a fade-out treatment which begins with an in-patient intensive phase followed by a phase of interval treatment, for example, during weekend refresher courses and short daily home practices to automatize the newly acquired speech pattern, as is the case in the Kassel Stuttering Therapy (Euler et al., 2009).

The average number of treatments in our sample was 2.9 treatments per participant, whereas Yaruss, Quesal, and Murphy (2002) and Yaruss, Quesal, Reeves, et al. (2002) reported an average of about 3.8 treatments in a US sample. However, the comparability of both samples is only moderate. The average age of the American participants was 45 years, and that of the current sample 35 years. Moreover, the American sample probably contained a different self-selection bias than the German sample, because the former consisted of voluntary participants from attendees of a National Stuttering Association conference. It is thus premature to conclude that US PWS undergo more stuttering treatments in their lifetime than do German PWS. The age difference might also account for the fact that Yaruss, Quesal, and Murphy (2002) and Yaruss, Quesal, Reeves, et al. (2002) reported 44.4% of their respondents as having spent more than five years in treatment for stuttering, whereas in our sample only 20.5% had spent that much time in treatment.

Another striking difference between US and German results is hardly explainable by sample differences. Yaruss, Quesal, and Murphy (2002) and Yaruss, Quesal, Reeves, et al., 2002 reported that only 13.4% of the participants remembered having received treatment before the age of six years. In our sample, the percentage is equally low (15.9%), and the few percentages of difference might simply be due to the fact that the German data have been collected more recently than the US data. However, from the age of six years on, the percentages of American respondents having received treatment declined steadily, from a high of 61.2% in the age group of 6–12 years to a low of 20.0% in the age group of over 50 years. In contrast, the percentages in the German sample were over 50% in all these age groups. This difference is most likely due to differences in health care systems.

The results of the current study suggest two structural components for the optimization of stuttering therapy. A treatment that contains, at least, phases of intensive treatment and group sessions seems to be superior to exclusively individual treatment in distributed single sessions. The recommendation of group treatment for PWS is not new but needs recurrent emphasis (Liddle, James, & Hardman, 2011). Outpatient treatment of one 45-min session per week, the common duration of a single logopedic treatment session in Germany, helps at best only a minority of PWS. Such a treatment plan contains only nominally – not in reality – one session per week, bearing in mind vacation and illness on the part of either the therapist or client. The current medical prescription practice for stuttering therapy in Germany typically consists of initial treatment by a resident logopedist or – considering the substantial spontaneous remission of childhood stuttering – of a wait-and-see style of treatment abstinence. The training of German logopedists does cover treatment of disfluencies, but generally only theoretically and in a cursory manner. Comparable deficits have been reported for the training of US speech-language pathologists (Yaruss, 1999; Yaruss & Quesal, 2002). The treatment administered frequently in Germany consists of an assemblage of opinion-based or eminence-based treatment components. Such an approach cannot be recommended unless the evidence for long-term treatment effects has been delivered (Ingham & Cordes, 1999). Without such evidence, the practicing speech-language pathologist falls prey to the Lake Wobegon effect (Brown, 1986; Kruger, 1999), the illusory superiority according to which almost everybody considers him or herself as above average in all kinds of skills.

The prevailing argument that each PWS is a unique individual who requires a unique and individually tailored treatment (Starkweather, 1999) does not speak against evidence-based treatments which are administered according to a treatment protocol, because the treatments which have proven effective – that is, stuttering modification and fluency shaping for adolescents and adults and the Lidcombe treatment for children – generally allow for individual client demands. Moreover, several treatment components which have been shown to be effective (Bothe, Davidow, Bramlett, & Ingham, 2006; Bothe, Davidow, Bramlett, Franic, et al., 2006; Herder et al., 2006; Lattermann et al., 2008; Nye et al., 2013) can be combined and thus enable selection options which serve individual demands. These components address the speech pattern directly and require drill, rather than addressing secondary problems of stuttering or supposedly underlying psychological causes. Currently, progress in universal treatment effectiveness seems to be better achieved by piecemeal engineering – that is, by improving combinations of treatment components which have been shown to be effective, rather than ever new creative treatment packages without long-term evidence of effectiveness.

The presented study has several, mostly unavoidable, limitations. The sample of participants cannot claim representativeness and several subsamples were small, which further limits representativeness. The data is retrospective and thus is susceptible to memory-induced bias, and the treatment succession within each participant was not balanced. Furthermore, our data do not reveal which kinds of treatment components actually constitute what we call “unspecified treatment.” Finally, the data provide information only with regard to generic treatment effects, not clinician effects (Plexico, Manning, & DiLollo, 2010). Attempts to reduce several potential biases, however, did not mitigate the main finding that there is a large gap between effective stuttering treatments available in Germany and prevailing treatments which cannot be recommended any longer.

Conflict of interest

None declared.

Disclosure statement

Harald Euler has advised the Institute of the Kassel Stuttering Therapy in Bad Emstal, Germany, with respect to data management and analysis.

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CONTINUING EDUCATION**The effectiveness of stuttering treatments in Germany****QUESTIONS**

1. Which is the most frequently applied stuttering treatment in Germany?
 - (a) Stuttering modification.
 - (b) Fluency shaping.
 - (c) Lidcombe program.
 - (d) Unspecified logopedic treatment.
 - (e) Hypnosis.
2. Which is the typically the first type of treatment in the lifetime of a German person who stutters?
 - (a) Lidcombe program.
 - (b) Hypnosis.
 - (c) Unspecified logopedic treatment.
 - (d) Breathing treatment.
 - (e) Fluency shaping.
3. Which two types of stuttering treatment received the highest effectiveness ratings in a retrospective client evaluation?
 - (a) Unspecified logopedic treatment and Lidcombe program.
 - (b) Breathing treatment and Lidcombe program.
 - (c) Fluency shaping and Stuttering modification.
 - (d) Stuttering modification and Unspecified logopedic treatment.
 - (e) Lidcombe program and Fluency shaping.
4. Which treatment characteristics seem most effective in the current study, irrespective of type of treatment?
 - (a) Extensive individual treatment, that is, one or two sessions per week over a longer time.
 - (b) Intensive individual treatment, that is, treatment lasting for several subsequent days or weeks.
 - (c) Extensive group treatment.
 - (d) Intensive group treatment.
 - (e) Individual treatment, irrespective of whether it is given intensively or extensively.
5. In what respect does stuttering treatment in Germany differ from treatment in the United States?
 - (a) In Germany relatively more adults are treated for stuttering than in the US.
 - (b) Treatment in Germany is less effective than treatment in the US.
 - (c) Treatment in Germany is more effective than treatment in the US.
 - (d) In Germany, more children who stutter receive treatment before the age of six years than in the US.
 - (e) In Germany more treatment options are available than in the US.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.jfludis.2014.01.002>.

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