

6. Models of Aphasia Treatment in *Clinical Aphasiology* 1972–1988

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In clinical aphasiology, research methodology stands at one corner, theory at another, and clinical relevance at the third. The players in this triangular relationship—methodology, theory, and clinical relevance—have received critical attention but rarely critical acclaim in the major reviews of our research over the years.

In 1972, Darley—in the methodology corner—critiqued the early efficacy studies and outlined the essential components of aphasia treatment group designs in efficacy research. A few years later, Martin (1975)—in the theory corner—lamented the lack of explicit theory in aphasiology. “Even though a rationale can sometimes be inferred,” Martin said, the lack of an explicit rationale of therapy is problematic for two reasons: first, because it “interferes with the full evaluation of proposed techniques,” and second, because it hinders “the emergence of new techniques from the old” (p. 67). In 1979, Rosenbek gave clinical aphasiology research mixed reviews on the question of theoretical principles, saying, “It is not that we lack principles but that most of them have escaped rigorous testing” (1979b, p. 164). He urged us to stand firmly “in the stream of change” long enough to test our treatment principles. He hoped that the Clinical Aphasiology Conference would reward this steadfastness by admitting only those with “wrinkled feet” (p. 172).

This tug of war between methodology and theory was complicated further by Brookshire’s critique in 1985 (Brookshire, 1985b). He found that peer-reviewed published literature by aphasiologists, albeit sparse, showed evidence for “scholarly and theoretical questions”; that was the good news. The bad news was that the published aphasia research had, to quote, “marginal clinical relevance” (p. 13). Then, in 1989, Kearns and

We appreciate the work of Leslie Gonzalez Rothi, PhD, who provided important ideas on models of aphasia in the American Speech-Language-Hearing Association short course entitled “Aphasia Recovery: Theory and Treatment” (Rothi & Horner, 1979).

Thompson presented a special session on analytical and technical directions in applied aphasia research (Thompson & Kearns, 1991). They reviewed *Clinical Aphasiology* from 1978 to 1987 and analyzed four general categories: types of research designs, research styles, technical aspects of single-subject designs, and generalization (Kearns & Thompson, 1991). One of their conclusions was that authors in *Clinical Aphasiology* were guilty of a phenomenon called "technical drift." They defined "technical drift" as "the tendency for applied research to become a purely technical, cure oriented effort with limited or declining interest in conceptual issues" (p. 39). They concluded: "Programmatic treatment research that examines and makes explicit its relationship to basic behavioral, cognitive, and linguistic principles and theories is needed to reverse our technical drift and facilitate the development and maturity of clinical aphasiology" (p. 40).

Apparently, clinical aphasiologists have not stood long enough in the stream of change to get "wrinkled feet" (Rosenbek, 1979b) on the substantive question of theoretical models.

PURPOSE

In response to Kearns and Thompson's companion papers, we decided to conduct our own review of *Clinical Aphasiology* to address the following question: Is aphasia treatment research in *Clinical Aphasiology* motivated by theoretical models?

The immediate response to this question might be: If our research is methodologically sound *and* clinically relevant, is it necessary for clinical aphasiologists to worry about the third point in the triangle—theoretical models? Muma, Hamre, and McNeil (1986) offered the opinion that an atheoretical orientation to clinical management of aphasia is "scientifically repugnant" (p. 279). Nevertheless, they recognized a potential problem in the pursuit of models, namely, that "models (or their proponents) tend to be insensitive to data" (p. 279).

Despite this potential "Catch 22," we suggest that thinking in terms of models has several advantages for us, from both clinical and scholarly perspectives. The advantages of adopting theory- or model-driven approaches in clinical aphasiology, we suggest, are at least fourfold. First, framing our clinical questions in terms of models helps us to translate the psycholinguistic and neurolinguistic literature into treatment techniques. Second, recognizing an underlying theory helps us to articulate the rationale of a specific treatment approach or technique. Third, knowing the underlying theory helps us to critique the specific technique when it works (or does not work). Finally, and most important, we suggest that an accumu-

lation of model-driven scientific investigations of therapy efficacy may help us to validate (or invalidate) the theoretical model in question.

The specific purpose of our study was to review all data-based aphasia treatment articles in *Clinical Aphasiology* from 1972 to 1988 (Brookshire, 1975–1987; Porch, 1974; Prescott, 1989, 1991; Wertz & Collins, 1972) to answer the following questions:

1. Was a theoretical model explicitly stated by the author, or was it implicit, necessitating an inference by the reader?
2. What was the prevalence of six different theoretical treatment models?
3. What types of aphasia were treated?
4. What was the reported frequency of acute versus chronic aphasia?
5. What was the distribution of mild, moderate, and severe aphasia?
6. What specific language functions were treated?

METHODS AND PROCEDURES

We previewed all articles in *Clinical Aphasiology* from 1972 to 1988 and selected only data-based aphasia treatment articles. A bibliography of articles was then established and provided to each reviewer. Any article not already in a reviewer's library was copied and provided to each reader. A total of 75 articles constituted our review. We operationally defined each category of interest (described below) and established a data base evaluation form for subsequent computer entry. Two independent readers (Horner and Loverso) reviewed all treatment articles and completed data base evaluation forms independently. The raters shared similar academic degrees, years of clinical experience, professional background (specialization in neurological communication disorders), and present clinical responsibilities. No rater training was provided, because our goal was to review each article independently to allow any theoretical, professional, religious, and/or astrological biases to emerge.

Operational Definitions

Explicit Versus Implicit. An "explicit" model was stated and appropriately referenced by the authors. In contrast, an "implicit" model was not stated in the article. This necessitated an inference by the reader about the underlying theory based on the background literature references and a

reliance on the substantive aspects of the treatment technique described in the article.

Models of Aphasia Treatment. For this study, we recognized six theoretical models, all of which have been alluded to in the clinical aphasiology literature: (a) the stimulation-facilitation model, (b) the modality model, (c) the linguistic model, (d) the processing model, (e) the minor-hemisphere mediation model, and (f) the functional communication model. We categorized some articles under the rubric "multitheoretical" when more than one model was used, either explicitly or implicitly, to define the rationale of a specific therapeutic intervention (see Figure 6.1).

We operationally defined an aphasia treatment model by articulating three points: a premise about normal language, a definition of aphasia, and a treatment implication. In Figure 6.1, we describe models in this three-point fashion. We identify selected proponents of each model, and we cite two selected articles from *Clinical Aphasiology* that we think are representative of the particular model.

Aphasia Type. The aphasia types considered in this review were global aphasia; transcortical motor, sensory, or mixed aphasia; generic non-fluent (or Broca's) aphasia; generic fluent (or Wernicke's) aphasia; conduction aphasia; and anomic aphasia. Patients with apraxia of speech and aphasia were considered within the category of nonfluent aphasia.

Aphasia Chronicity. We defined acute aphasia as less than 6 months post-onset and chronic aphasia as 6 months or longer post-onset.

Aphasia Severity. We defined severity of aphasia as mild, moderate, or severe. If the author did not rate patients by severity, we extrapolated scores from the *Porch Index of Communicative Ability (PICA)* (Porch, 1967), or the *Western Aphasia Battery (WAB)* (Kertesz, 1979). We operationally defined severe aphasia as ≤ 40 , moderate as 41-79, and mild as ≥ 80 , in accordance with *PICA* percentiles or *WAB* aphasia quotients, respectively.

Language Functions Treated

To characterize the focus of treatment, we selected one or more of the following language functions for each article: speech, comprehension, repetition, naming, reading, writing, gesturing, pragmatics, and/or "other."

Stimulation-Facilitation Model

Premise: "Language is an integrative activity that is linked to sensory and motor modalities but cannot be considered bound to them" (Duffy, 1986; Schuell, Jenkins, & Jimenez-Pabon, 1964).

Aphasia: "A multimodality disturbance which is unidimensional in nature . . . all modalities tend to be impaired in aphasia . . . in the same manner and to about the same degree. . . . Auditory processes are at the apex of these interacting systems which aid in the acquisition, processing, and control of language" (Duffy, 1986; Schuell et al., 1964).

Treatment: Intensive auditory stimulation; meaningful material; abundant and varied material; repetitive sensory stimulation; a response for each stimulus; elicited rather than forced responses; stimulation rather than correction; stimulus is made adequate (LaPointe, 1978; Schuell et al., 1964).

Proponents: Duffy (1986); Schuell et al. (1964); Wepman (1951, 1953).

Representative Clinical Aphasiology Research:

Cueing hierarchies and word retrieval: A therapy program (Linebaugh & Lehner, 1977).

Extended comprehension training reconsidered (Marshall & Neuburger, 1984).

Modality Model

Premise: Inner language is modality bound.

Aphasia: Aphasia can be modality specific and may be characterized as a uni- or multimodality performance deficit.

Treatment: Remediate input and output modalities, singly or in combination; reorganize modalities through selective intrasystemic or intersystemic stimulation; systematically pair weak with strong modalities to "deblock" impaired performances.

Proponents: Luria (1973); Rosenbek (1979a); Weigl and Bierwisch (1970).

Representative Clinical Aphasiology Research:

Gesture as a deblocking modality in a severe aphasic patient (Rao & Horner, 1978).

Gestural sign (Amer-Ind) as a facilitator of verbalization in patients with aphasia (Kearns, Simmons, & Sisterhen, 1982).

Linguistic Model

Premise: Language is a specialized, abstract, rule-governed cognitive activity.

Aphasia: Disrupted lexical-semantic, syntactic, and/or phonological performance.

Treatment: Restore language performance by organizing stimuli according to linguistic system and linguistic complexity.

Proponents: Goodglass and Blumstein (1973); Jakobson (1971); Lesser (1979).

Representative Clinical Aphasiology Research:

Application of verbing strategies to aphasia treatment (Loverso, Selinger, & Prescott, 1979).

Generative use of locatives in multiword utterances in agrammatism: A matrix training approach (Thompson, McReynolds, & Vance, 1982).

Figure 6.1. Operational definitions, proponents, and representative *Clinical Aphasiology* research for six aphasia treatment models.

Figure 6.1. (continued)

Processing Model

Premise: Language reflects the operation of semiautonomous “faculties” or “modules” that carry out complex processes. The modules are highly discrete, and the relational processes are highly specific. A “central executive” governs the interaction of modules, which are probably stimulus, modality, and/or task specific.

Aphasia: Modular and relational processing deficits.

Treatment: Restore or compensate for language-specific and language-related processing deficits.

Proponents: Chapey (1986); Fodor (1983); Gardner (1985); Martin (1975); Porch (1986).

Representative Clinical Aphasiology Research:

Model-driven remediation of dysgraphia (Hillis & Caramazza, 1987).

A short-term memory treatment approach to the repetition deficit in conduction aphasia (Peach, 1987).

Minor-Hemisphere Mediation Model

Premise: The minor hemisphere has rudimentary linguistic, visual-spatial-holistic, affective-prosodic, and paralinguistic cognitive (organizational, interpretive) abilities.

Aphasia: A manifestation of impaired dominant-hemisphere language and spared minor-hemisphere language.

Treatment: Use minor-hemisphere abilities to mediate (facilitate) communication through the use of imagery, drawing, melody, contextually rich stimuli, novel stimuli, and humor.

Proponents: Glass, Gazzaniga, and Premack (1973); Horner and Fedor (1983); Myers and Linebaugh (1984); Sparks, Helm, and Albert (1976).

Representative Clinical Aphasiology Research:

Effects of hypnosis and imagery training on naming in aphasia (Thompson, Hall, & Sison, 1985).

Back to the drawing board: A treatment program for nonverbal aphasic patients (Morgan & Helm-Estabrooks, 1987).

Functional Communication Model

Premise: Communication reflects the application of pragmatic rules, unconstrained by modality, linguistic, or neurolinguistic considerations.

Aphasia: Ineffective or inefficient language use in natural communication contexts.

Treatment: Facilitate more normal communication by emphasizing pragmatic function over linguistic form and enhancing intermodality flexibility; establish strategies for circumventing and/or repairing communication breakdowns.

Proponents: Aten (1986); Davis and Wilcox (1981); Holland (1980); Marshall (1983).

Representative Clinical Aphasiology Research:

Communicative use of signs in aphasia: Is acquisition enough? (Coehlo & Duffy, 1985).

Treatment of aphasia through family member training (Simmons, Kearns, & Potechin, 1978).

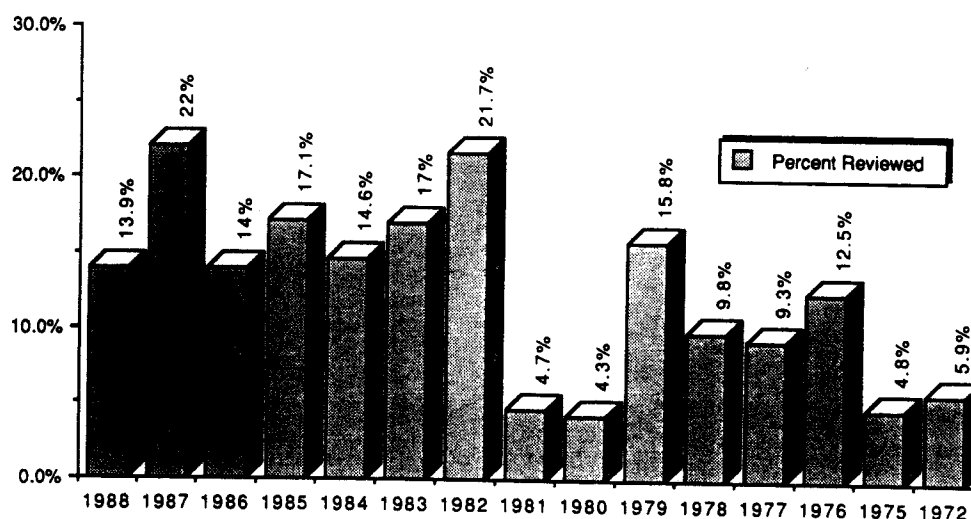


Figure 6.2. Percentage of *Clinical Aphasiology* articles reporting the efficacy of aphasia treatment by year.

RESULTS

From 1972 to 1988, *Clinical Aphasiology* contained 593 entries from which our preview yielded 75 (12.6%) data-based aphasia treatment articles. We depict the percentage of aphasia treatment articles by year in Figure 6.2. *Clinical Aphasiology* yielded only 1 aphasia treatment article in 1972 and 1 in 1975—5.9% and 4.8%, respectively. No treatment articles appeared in 1974, and the *Proceedings* were not published in 1973. In 1976 and 1977, only 4 articles for each year were reviewed—12.5% and 9.3%, respectively. The *Proceedings* from 1978 yielded 4 of 41 articles (9.8%), whereas in 1979, 6 of 38 (15.8%) articles addressed aphasia treatment. In 1980 and 1981, *Clinical Aphasiology* yielded only 2 articles each (4.3% and 4.7%, respectively), whereas in 1982, it yielded 10 of 46 articles (21.7%). For 1983, we reviewed 8 of 47 (17.0%); in 1984, 6 of 41 (14.6%); in 1985, 7 of 41 (17.1%); and in 1986, 6 of 43 (14.0%). In 1987, *Clinical Aphasiology*'s best year with respect to the percentage of treatment articles, 9 of 41 (22.0%) were specific to treatment of aphasic adults. In 1988, only 5 treatment articles were identified from a total of 36 articles (13.9%).

The explicit versus implicit usage of theoretical models was based on these 75 selected articles (Figure 6.3). Rater #1 (Horner) described 37 of 75 (45.3%) as explicit with respect to the model articulated by the author. Rater #2 (Loverso) determined that 31 of 75 (41.3%) articles stated the treatment model explicitly. The two raters agreed on the explicit or implicit characterization of theory for 54 of 75 articles, for an inter-rater reliability of 72.0%.

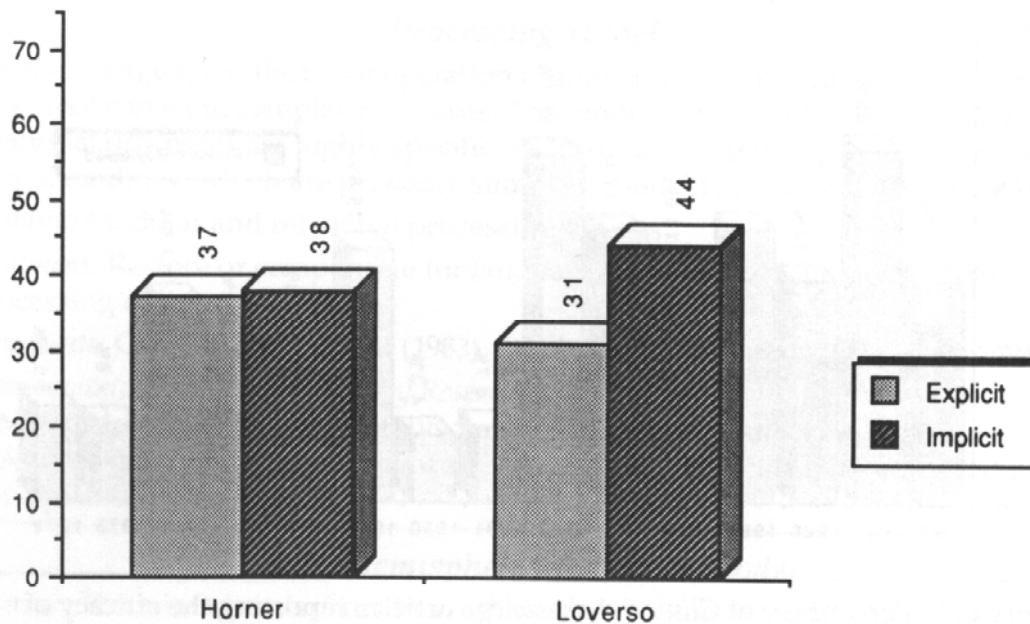


Figure 6.3. Of 75 data-based aphasia treatment articles in *Clinical Aphasiology* from 1972 to 1988, the number of articles motivated by explicit or implicit theoretical models, as judged by two readers.

Of 75 articles, 34 involved the treatment of a single patient. Of these 34, Rater #1 found 18 single-case studies to be explicit (53%), and Rater #2 found 13 (38.5%) to be explicit. In contrast, 41 articles involved the treatment of groups of patients. Of these 41 group studies, Rater #1 found 19 (46.0%) to be explicit, and Rater #2 found 18 (44.0%) to be explicit. These data show that single-case designs were no more explicit with respect to the model of treatment than treatment studies using groups of patients.

The next major question of our study was to determine which models are used by contributors to *Clinical Aphasiology*. Figure 6.4 shows the number of articles using specific models, as determined by the two readers. Because more than half of all articles did not clearly address the theoretical underpinnings of a treatment (i.e., over 50% used an "implicit" model), the determination of *which model was used* was problematic and resulted in low inter-rater agreement. Reliability between raters for the specific models used was only 53.3% when *both* explicit and implicit models were considered. Agreement between raters increased to 88.0% when only those articles with explicitly stated models were analyzed.

Figure 6.3 depicts the number of articles reviewed by model (by two readers) regardless of the explicit versus implicit nature of the theoretical models provided. Rater #1 classified 6 of 75 within the stimulation-facilitation framework, while Rater #2 determined 16 of 75 to be of this type.

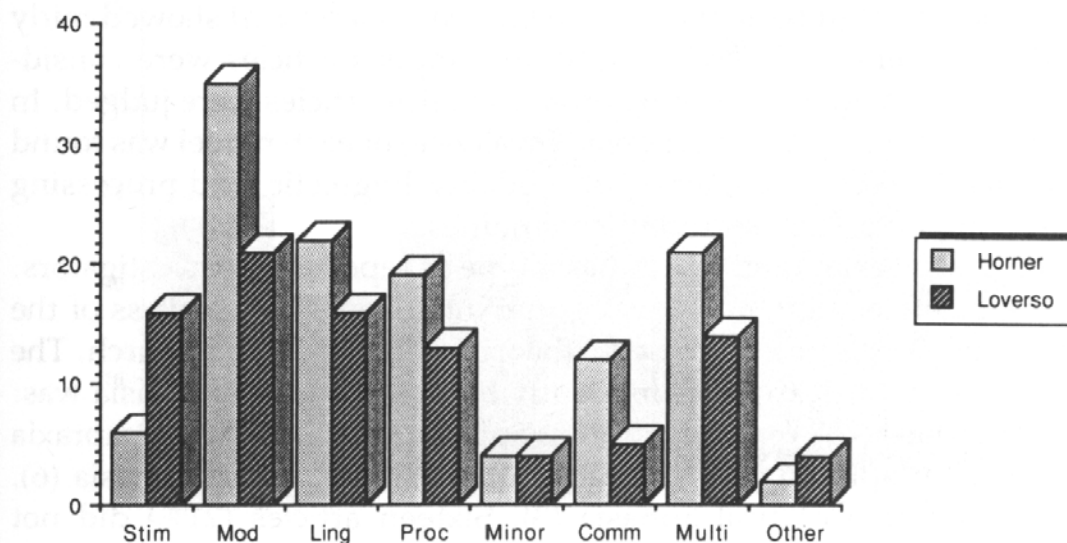


Figure 6.4. The number of articles of both explicit and implicit types judged by two readers to be representative of these theoretical models: Stimulation-Facilitation (Stim), Modality (Mod), Linguistic (Ling), Processing (Proc), Minor-Hemisphere Mediation (Minor), Functional Communication (Comm), Multi-theoretical (Multi), and Other.

When “explicit” articles only were considered, inter-rater agreement for this model improved to 100%, with each reviewer classifying 4 articles as representative of the stimulation-facilitation model. For modality-based treatments, Rater #1 classified 35 of 75 and Rater #2 classified 21 of 75 articles within this model. Agreement again increased to 100% for explicitly stated modality model articles (5 for each rater).

Rater #1 determined 22 of 75, and Rater #2, 16 of 75, to be based on the linguistic model of aphasia treatment. For only explicitly stated linguistic models (5 articles), agreement again improved to 100%. The processing model was at the origin of 19 articles as established by Rater #1, and 13 by Rater #2. For explicitly stated articles (6 articles), agreement was a low 58.3%. In contrast, Rater #1 and Rater #2 classified the same 4 articles as representative of the minor-hemisphere mediation theoretical model, with 100% agreement. Rater #1 categorized 12 and Rater #2 categorized 5 articles within the framework of a functional communication model, improving to 100% agreement for explicitly stated models (2 articles). Rater #1 judged 21 articles and Rater #2 judged 14 as “multitheoretical.” The lowest agreement for explicitly stated articles was obtained for the multitheoretical model at 37.5%. However, 100% agreement was estab-

lished for this category (only 1 article) when the multiple theories were stated explicitly.

Thus, the raters' judgments about *which models were used* showed fairly diverse agreement when *both* explicit and implicit articles were considered, but agreement improved when *only* explicit articles were judged. In addition, the rank order (the relative prevalence) of each model was found to be similar between the raters. The modality, linguistic, and processing models, it appears, fuel our treatment engines.

The next issue examined was aphasia type as reported by investigators. Agreement between the raters was approximately 90% regardless of the explicit/implicit determination of the theoretical bases of the research. The rank order from most to least frequently reported types of aphasia was: nonfluent aphasia (38 reported), fluent aphasia (21), anomia (12), apraxia of speech with aphasia (11), conduction aphasia (8), global aphasia (6), other (4), and transcortical aphasia (3). Sixteen articles (21%) did not report aphasia type in their patient descriptions.

The issue of chronicity was then analyzed. Treatment papers directed at chronic aphasia predominated, with 56 of 75 articles (74%) focusing on this population. Twenty-nine papers focused treatment on acute aphasia, and 11 papers studied individuals with both acute and chronic aphasia. The total number of patients studied in *Clinical Aphasiology* articles reviewed was 212. Of the 212 patients examined, 207 were described in terms of chronicity: 161 out of 207 (77.8%) were classified as chronic while 46 out of 207 patients (22.2%) were described as acute.

The next issue addressed in our review was patient severity. Agreement between the raters was 62 of 75 papers, or 82.7%. Treatment articles for moderate levels of aphasia appeared most often (51 papers), followed by severe aphasia (29 papers) and then mild aphasia (14 papers). (The sum is greater than 75 because some studies included more than one severity level.)

The final issue we examined was language functions treated. Agreement between the raters for the treatment content area was approximately 70%. This lower agreement for treatment content areas was caused by three factors: (a) articles often did not specify the criterion performance, (b) methods used to establish criterion performance were sometimes ambiguous and difficult for either rater to interpret, and (c) treatments directed at one language function as reported by the authors were in reality addressing other language functions as well. However, of the nine language function areas specified in our data base, the first five had the highest reliability between reviewers and are probably safe to report aggressively. In rank order from most to least frequently reported, language functions specified in treatment were: speech only (32 papers), comprehension (18), naming (16), writing (13), gesturing (10), pragmatics (4), other (4), and repetition (3).

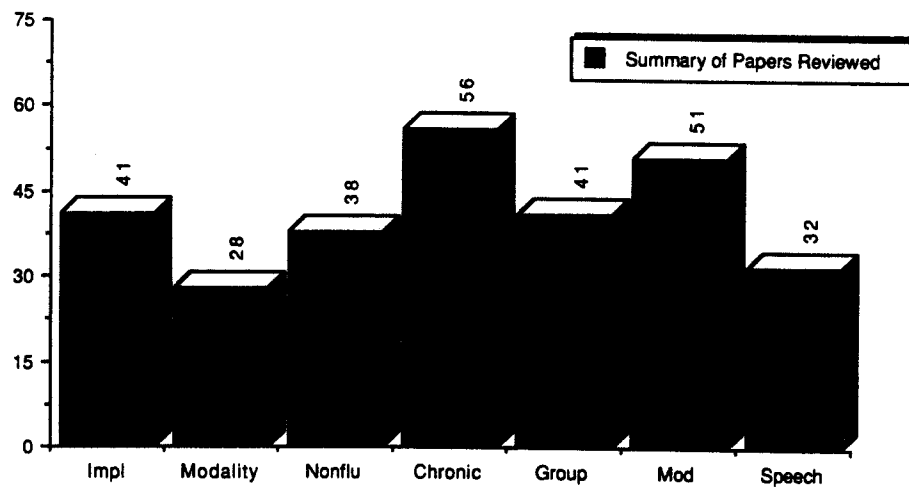


Figure 6.5. In *Clinical Aphasiology* from 1972 to 1988, most papers used an implicit (Impl) model; based treatment on the Modality model; studied nonfluent (Nonflu), chronic patients of moderate (Mod) severity in group designs; and focused treatment on spontaneous speech.

DISCUSSION

In summary (Figure 6.5), we found that only 75 of 593 papers in *Clinical Aphasiology* from 1972 to 1988 were data-based aphasia treatment articles, and response to treatment has been examined in only 212 patients in the past 18 years of the Clinical Aphasiology Conference. *Clinical Aphasiology* treatment studies stated theoretical models explicitly only about half the time. The modality model received most attention, with the linguistic and processing approaches ranking second and third, respectively. The treatment of moderately impaired, chronic, nonfluent aphasic individuals was studied more often than the treatment of individuals with other aphasic profiles, and most studies used group designs. The efficacy of treatment of spontaneous speech was evaluated more often than other language functions.

We embarked on this project in response to our interest in model-driven aphasia treatment; in response to critical reviews highlighting the importance of balancing methodology, theory, and clinical relevance; and (most recently) in response to Kearns and Thompson's (1991) call for "a closer look at the substances underneath" our increasingly sophisticated—but technically drifting—research designs.

We agree with Muma, Hamre, and McNeil (1986) that a clinician or clinical researcher must not seek to "choose the best model," but may find

it more productive to weigh the merits of various models, probably on a patient-by-patient basis. We suggest that the appropriate question for clinical aphasiologists is not which model of aphasia is "best," but rather which model of aphasia is the most efficacious foundation for the intervention, given the individual aphasic person's idiosyncratic profile of aphasia type, severity, chronicity, functional communication abilities, and learning characteristics.

We close with the suggestion that clinical relevance is essential and methodological sophistication is healthy, but to have both in the absence of theory is scientifically undesirable. We hope that future studies will address all three points in the triangle—relevance, design, and theory—in hopes that an accumulation of theory-driven studies, if shown to be efficacious, will lead to the validation of treatment models of aphasia.

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