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#### Benchmarks of significant change after aphasia rehabilitation

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27	ABBREVIATIONS
28	ASHA: American Speech-Language Hearing Association
29	BNT: Boston Naming Test
30	CI: Confidence interval
31	CETI: Communicative Effectiveness Index
32	COS: Core Outcome Set
33	ES: effect size
34	PRISMA: Preferred Reporting Items for Systematic Review and Meta-analyses
35	QOL: Quality of Life
36	SEM: Standard Error of Measurement
37	TPO: time post onset
38	WAB-AQ: Western Aphasia Battery-Aphasia Quotient
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47	ABSTRACT

48 **Objective:** To establish benchmarks of significant change for aphasia rehabilitation outcome 49 measures (i.e., Western Aphasia Battery-Aphasia Quotient [WAB-AQ], Communicative 50 Effectiveness Index [CETI], Boston Naming Test [BNT]) and assess if those benchmarks significantly differed across subgroups (i.e., time post onset, dose frequency, treatment type). 51 Data Sources: A comprehensive literature search of 12 databases, reference lists of previous 52 reviews, and evidence-based practice materials was conducted. 53 54 Study Selection: Randomized-controlled trials, quasi-experimental studies, single-subject 55 design, and case studies that used a standardized outcome measure to assess change were 56 included. Titles and full-text articles were screened using a dual review process. 78 studies met 57 criteria for inclusion. Data Extraction: Data were extracted independently and 25% of extractions were checked for 58 59 reliability. All included studies were assigned quality indicator ratings and an evidence level. 60 Data Synthesis: Random-effects meta-analyses were conducted separately for each study design group (i.e., within/between group comparisons). For within group designs, the summary effect 61 62 size after aphasia rehabilitation was 5.03 points (95% confidence interval: 3.95-6.10, p < .001) on the WAB-AQ, 10.37 points (6.08-14.66, *p* < .001) on the CETI and 3.30 points (2.43-4.18, *p* 63 <.001) on the BNT. For between group designs, the summary effect size was 5.05 points (1.64-64 8.46, p = .004) on the WAB-AQ, and .55 points (-1.33, 2.43, p = .564) on the BNT, the latter of 65 which was not significant. Subgroup analyses for the within group designs showed no significant 66 differences in the summary effect size as a function of dose frequency, or treatment type. 67 Conclusions: This study established benchmarks of significant change on three standardized 68 69 outcome measures used in aphasia rehabilitation.

70 Key Words: stroke; rehabilitation; outcome; speech therapy; aphasia

Thirty to forty percent of stroke survivors experience aphasia.<sup>1</sup> While numerous 71 systematic reviews and meta-analyses have demonstrated aphasia rehabilitation efficacy,<sup>2,3</sup> none 72 have provided the average significant change, or summary effect size (ES) by outcome measure, 73 a valuable metric for practitioners and researchers. Robey's hallmark meta-analyses<sup>2,4,5</sup> showed a 74 positive aphasia treatment effect, but were segregated by study design and focused on identifying 75 the effect size for different conditions (e.g., treated vs untreated recovery). Similarly, the most 76 recent Cochrane review<sup>3</sup> demonstrating speech therapy efficacy, synthesized data from 77 78 randomized controlled trials only, excluding a wealth of aphasia treatment data. Furthermore, effect sizes were represented as standardized mean differences for specific behaviors (e.g., verbal 79 expression), not for specific outcome measures (e.g., Western Aphasia Battery-Aphasia 80 Quotient<sup>6</sup> [WAB-AQ]). 81

Another option is to synthesize results by outcome measure to obtain a summary ES (i.e., raw unstandardized mean difference),<sup>7</sup> which can be used to interpret meaningful change on a specific assessment post-treatment. Clinicians and researchers frequently utilize standard error of measurement (SEM) to interpret a test score's meaningfulness after intervention. However, summary ES is a more appropriate metric. It reflects the treatment effect's size<sup>7</sup> and can be used to interpret group data, as opposed to SEM, which is more relevant for interpreting individual scores.<sup>8</sup>

Numerous aphasia assessment instruments exist<sup>9</sup> for assessing impairment (i.e., Body
Structure/Function), functional communication (i.e., Activity/Participation), psychosocial
functioning (i.e., Contextual Factors) and well-being (i.e., Quality of Life [QOL]). It is not
surprising then that practicing speech-language pathologists<sup>10–12</sup> and researchers<sup>13,14</sup> use
measures inconsistently making synthesis and comparison across trials challenging.

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94	Wallace and colleagues proposed a core outcome set (COS) <sup>13,15–18</sup> for aphasia, specifying
95	a minimum set of outcomes that should be administered to persons with aphasia as standard
96	practice (i.e., WAB, The Scenario Test, General Health Questionnaire-12, SAQOL-39g) to
97	increase consistency. Yet, the summary ES for these measures remains unknown. Given the
98	potential benefits to clinical and research practice, a systematic review of behavioral aphasia
99	intervention studies with meta-analyses was conducted with two aims: 1) To calculate the
100	summary ES reported on the most frequently-used and relevant outcome measures; and 2) To
101	determine if the summary ES significantly differed across subgroups for each outcome measure
102	(i.e., time post onset, dose frequency, treatment type).
103	METHODS
104	This study followed the Preferred Reporting Items for Systematic Review and Meta-
105	analyses: the PRISMA Statement <sup>19</sup> guidelines and was registered at the International prospective
106	register of systematic reviews, PROSPERO, under the identification number CRD42016039393.
107	Inclusionary Criteria
108	Randomized-controlled, quasi-experimental, single-subject design, and case studies with
109	an $n \ge 3$ were included if they (1) assessed the effect of a behavioral aphasia intervention and (2)
110	used a standardized outcome measure to evaluate change post-treatment as compared to pre-
111	treatment (i.e., data from two time points).
112	Literature search
113	The following databases: PubMed, EMBASE, CINAHL, PsycINFO, SpeechBite, LLBA,
114	PLoS, Worldcat, Web of Science, Ageline, Scopus, and Google Scholar were searched (see
115	Supplementary Material 1 for sample search strategy) from 5/24/2016-08/26/2016. Reference
116	lists of relevant systematic reviews, meta-analyses and professional organization materials were

reviewed. Search terms were modified to meet each database's requirements. Grey literature was
removed during screening. All citations were managed using Zotero<sup>20</sup> and exported to Excel for
screening and data extraction.

120 Study Selection and Data Extraction

Two reviewers (first two authors) independently screened 9,285 titles and abstracts 121 against inclusionary criteria (96% inter-reviewer reliability). Full-text articles were obtained for 122 records that met all criteria. Both reviewers screened 858 full-text articles against the 123 124 inclusionary criteria (90% inter-reviewer reliability). Disagreements were resolved through discussion and searching the full-text. Study exclusion rationale was documented (Figure 1). 125 126 When results from the same dataset were included in multiple publications, only the publication with the greatest sample size was included. Both reviewers extracted the following data from the 127 full-text: the standardized outcome measure used to measure intervention-related change, 128 presence/absence of data from two time points, study design, sample size, testing time points, 129 130 and population treated (i.e., stroke survivors and/or caregivers). The number of studies using each standardized outcome measure was calculated. Based 131 on the measure's use frequency (Supplementary Material 2), field relevance (i.e., part of aphasia 132 COS), and disability domain<sup>21,22</sup> measured (i.e., Body Structure/Function, Activity/Participation, 133 Contextual Factors and/or QOL), the WAB-AQ, the Communicative Effectiveness Index<sup>23</sup> 134 (CETI) and the Boston Naming Test<sup>24</sup> (BNT) were chosen for meta-analysis. To have a power 135 of .80 to detect an effect size of  $\geq$ .50 using a random-effects model, outcome measures with 136 137 cumulative sample sizes across within group studies < than 100 were excluded and/or if the measure was used in less than < 10 studies.<sup>25</sup> The contextual factor and QOL COS measures 138 were excluded from meta-analysis because 1) the 12-item General Health Questionnaire was 139

140	only used in 1 study and 2) sensitivity to change had already been established <sup>26,27</sup> for the Stroke
141	and Aphasia Quality of Life Scale-39. 78 studies met eligibility for meta-analysis. Both
142	reviewers extracted the following data from these studies: age, sex, aphasia type and severity,
143	time post onset, treatment type and description, session length, weekly session frequency, testing
144	time points, treatment length, pre- and post-treatment test score correlation, and pre- and post-
145	treatment mean (SD) on the WAB-AQ, CETI and/or BNT.
146	Studies were classified as including an acute (i.e., < 6 months post stroke onset) or
147	chronic sample; providing a lower dose frequency (i.e., $\leq 4$ hours/week) or a higher dose
148	frequency; and utilizing an impairment-based (i.e., treated discrete deficits),
149	activity/participation-based (i.e., targeted everyday communication) and/or integrated (i.e.
150	combined impairment and activity/participation level approaches) treatment. According to
151	Warren, Fey and Yoder, 2007, <sup>28</sup> dose frequency is the number of times an intervention was
152	provided daily and weekly.
153	The same two reviewers responsible for screening divided the data extraction. Each
154	reviewer extracted data for 25% of the others' studies (98% inter-reviewer reliability). Reviewers
155	contacted original authors for additional data needed to calculate effect sizes as needed.
156	Quality Assessment
157	The same two reviewers independently appraised included studies' quality using
158	indicators identified by the American Speech-Language Hearing Association (ASHA) level of
159	evidence scheme. <sup>29,30</sup> See Supplementary Material 3 for quality indicator details. Quality
160	indicator summative scores $\leq 1$ for within group studies [Post-treatment Mean vs. Pre-treatment
161	mean for the same group] and $\leq 2$ for between group studies [Experimental group Post-treatment
162	Change vs. Control group Post-treatment Change] were excluded for poor quality. Reviewers

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assigned each study's evidence level using ASHA<sup>31</sup> guidelines originally proposed by the
Scottish Intercollegiate Guidelines Network<sup>32</sup> (i.e., IB: randomized controlled study; IIA: non-

165 randomized controlled study; IIB: quasi-experimental study; III: non-experimental studies).

166 Data Analysis

Individual patient results from studies with sample sizes  $\geq$  three were averaged to 167 calculate a group mean and SD. Pre-post treatment correlation scores were calculated for studies 168 providing individual subject data as follows: Pre-treatment SD + Post-treatment SD - Change 169 SD/2 \* Pre-treatment SD \* Post-treatment SD.<sup>33</sup> When it could not be computed, the average of 170 the observed pre-post treatment correlation coefficients was used.<sup>34</sup> For crossover designs, data 171 were extracted after both treatment phases, as long as both involved the same treatment type (i.e., 172 impairment, activity/participation and/or integrated). For the WAB-AQ within group analysis, a 173 weighted mean and SD was calculated for the Cherney, 2010 study as the published results were 174 split by severity and for the Mozeiko et al., 2016 study, data for the higher dose frequency and 175 176 lower dose frequency groups were entered separately.

177 Meta-analyses were conducted independently for within and between group study designs 178 to avoid methodological concerns involved in transforming to a common metric.<sup>35</sup> After group 179 averages were calculated for both time points, single-subject design and case study data were 180 included in the within group meta-analyses.

181 Meta-analyses for each outcome measure for both study designs were performed using 182 Comprehensive Meta-Analysis software.<sup>36</sup> As heterogeneity between studies was anticipated, a 183 random-effects model was used to combine individual study results into a summary ES (i.e., raw 184 unstandardized mean difference). Raw unstandardized mean difference was calculated because 185 clinicians and researchers interpret raw change on these outcome measures post-intervention,

making this effect size inherently meaningful to the field.<sup>7</sup> Q and I<sup>2</sup> statistics were examined to
determine the extent of any remaining heterogeneity across studies. Even if the heterogeneity
was low (i.e., non-significant and < 75%), subgroup analyses were conducted to assess summary</li>
ES differences depending on recovery stage, treatment type, and dose frequency. Sub-group
analyses were corrected for multiple comparisons using the Bonferroni correction method.

191 Subgroup Analyses

Although no significant heterogeneity was present in the overall summary ESs, subgroup 192 193 analyses were performed to investigate for summary ES differences due to these variables. As > 5 studies per subgroup are required to conduct a valid subgroup analysis,<sup>7</sup> the same subgroup 194 195 analyses were not feasible for all outcome measures and study design groups. Subgroup analyses 196 were conducted with the following variables, outcome measures, and study designs: 1) dose frequency for within group studies using the WAB-AQ, CETI, and BNT and 2) treatment type 197 198 for within group studies using the WAB-AQ and BNT. No subgroup analyses were conducted to 199 assess for differences in summary ES related to TPO as the nearly all of the within group studies included participants in the chronic phase. No subgroup analysis was conducted to assess for a 200 difference in summary ES according to treatment type for within group studies using the CETI, 201 202 or any of the between group study designs as there were < 5 studies in each subgroup. 203 Funnel plots for meta-analyses including > 10 studies were examined for asymmetry (i.e.,

Funnel plots for meta-analyses including > 10 studies were examined for asymmetry (i.e.,
 within group meta-analyses only). Publication bias was objectively assessed using Begg and
 Mazumdar rank correlation, Egger's regression intercept and Duval and Tweedie's Trim and
 Fill.<sup>7</sup>

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#### RESULTS

# Aim 1: What is the summary ES post-therapy on three commonly-used outcome measures in aphasia rehabilitation? Study Identification/Description. 78 studies met criteria for inclusion in the metaanalyses (i.e., within group: 70; between group: 8). Descriptive information and references for

these studies can be found in Supplementary Materials 4 through 9.

213 Within group study designs. Combining individual studies' findings resulted in a 214 significant summary ES indicating a positive treatment effect across all three outcome measures. 215 On the WAB-AQ (53 studies, n = 522), the summary ES on the raw unstandardized mean difference was 5.03 points, (95% confidence interval [CI]: 3.95-6.10, p < .001). No significant 216 heterogeneity was found (Q = 50.79, df = 52, p = .52;  $I^2 = 0$ ). The CETI summary ES (17) 217 studies, n = 208), was 10.37 points (6.08-14.66, p < .001). No significant heterogeneity was 218 found (Q = 16.47, df = 16, p = .42; I<sup>2</sup> = 2.86). The summary ES for the BNT (36 studies, n =219 347), was 3.30 points (2.43-4.18, p < .001). No significant heterogeneity was found (Q = 42.17; 220 df = 35; p = .19;  $I^2 = 17.01$ ). See Figures 2 and 3 for forest plots depicting the variability across 221 studies. 222

Publication bias for within group meta-analyses. No marked asymmetry was noted in 223 224 funnel plots for any of these meta-analyses (Supplementary Materials 10). For the WAB-AO, 225 both the Egger's regression intercept ( $\beta = 1.31$ , CI = (-.11, 2.72), t (51) = 1.86, p = .04) and the Duval and Tweedie's Trim and Fill (Observed point estimate = 5.03(3.95, 6.10); Imputed point 226 227 estimate = 5.88 (4.74, 7.02) suggested the presence of publication bias for the WAB-AQ (i.e., 228 missing positive studies). There was no significant presence of publication bias for the CETI meta-analysis (1-tailed p > .05). For the BNT, the Duval and Tweedie's Trim and Fill revealed 229 230 the presence of publication bias (Observed point estimate = 3.30(2.43, 4.18); Imputed point

231 estimate = 2.97(2.02, 3.92)) (i.e., missing negative studies). In both cases where publication bias, 232 was indicated, the SES shifted only minimally (i.e., < 1 point, within the confidence interval), 233 verifying that the within group SESs reported for all three outcome measures are valid and can 234 be utilized with confidence. **Between group study designs.** On the WAB-AQ (6 studies, Experimental n = 119; 235 Control n = 99), the summary ES on the raw unstandardized mean difference between the 236 experimental and control groups was 5.05 (1.64-8.46, p < .01). No significant heterogeneity was 237 found (Q = 5.26, df = 5, p = .39; I<sup>2</sup> = 4.87). No between-group meta-analysis was conducted for 238 the CETI as only one publication using it to measure post-intervention change was identified. On 239 240 the BNT (5 studies, Experimental n = 66; Control n = 35), the raw unstandardized mean difference between the experimental and control groups at post-treatment was .55 (-1.33-2.43, p 241 = .56). There was no significant heterogeneity between included studies (Q = .86, df = 4, p = .93; 242  $I^2 = 0$ ). See Figure 4 for forest plots that illustrates the variability across studies. 243 244 Publication bias for between group meta-analyses. Due to the low sample size in the between group study design meta-analyses,<sup>37</sup> funnel plots could not be validly assessed for the 245 presence of publication bias. 246 Aim 2: Does the summary ES vary according to time post onset, dose frequency and/or 247 treatment type? 248 There were no statistically significant differences between summary ESs for any of the 249 250 within group study design subgroup analyses completed (i.e., dose frequency for WAB-AQ, CETI, and BNT; treatment type for WAB-AQ and BNT). See Table 1 for results and 251 252 Supplementary Materials 11 for forest plots.

253 Quality Appraisal

254	For within group study designs, 73% of studies included in the meta-analyses were level
255	III evidence, <sup>29,31</sup> 26% were IIB, and 1% were IIA. For between group study designs, 50% were
256	classified as IB, 38% as IIA, and 13% as IIB level evidence. None of the 78 studies selected for
257	meta-analysis were excluded from the analysis based on their quality, which is unsurprising as
258	studies of poorer quality were likely excluded during the two initial screening phases. See Table
259	2 for summative quality indicator scores for both study designs. For within group studies, most
260	studies had summative scores of 3, with higher scores indicating better quality. For between
261	groups comparisons, the majority of studies using the WAB or BNT had summative scores of 7
262	or 5, respectively. Individual study ratings are included in Supplementary Materials 4-8. The
263	percentage of studies meeting criterion for each specific quality indicator are available in
264	Supplementary Material 12.
265	DISCUSSION
266	This study established benchmarks for significant change on three outcome measures
267	used in aphasia rehabilitation to assess severity, functional communication, and naming ability.
268	Practitioners can use these metrics to objectively demonstrate improvement in their clients
269	following treatment, an essential element of clinical practice that directly influences
270	reimbursement and clients' duration of services. Likewise, researchers can reference the reported
271	summary ESs when quantifying change from experimental interventions, but also when
272	conducting a priori power analyses for future studies. The latter analyses require estimating the
273	effect size, <sup>38</sup> which is not consistently reported in published aphasia treatment studies, <sup>39</sup> further
274	emphasizing the utility of this study's benchmarks.
275	The relationship between the summary ESs established in this study and each outcome

276 measure's SEM must be discussed. WAB-AQ summary ESs (Within group: 5.03; Between

277	group: 5.05), were equivalent to its SEM of 5, which has been framed as a metric of clinically
278	meaningful improvement. <sup>40-42</sup> On initial inspection, the adjacency of these two values suggests a
279	diminished effect of aphasia rehabilitation as measured by the WAB-AQ. However, the seminal
280	work of Hula, Donovan, Kendall & Gonzalez-Rothi, 2010, <sup>42</sup> demonstrating that the WAB-AQ's
281	SEM was actually closer to 2 for AQs between 28-68, but much higher (i.e., up to 12) for scores
282	outside that range (i.e., AQs of 0-27, 69-100) serves to clearly distinguish the summary ES
283	established in this study from measurement error. Future research should examine how the
284	WAB-AQ summary ES varies for persons with more mild or severe aphasia and examine which
285	treatment approaches result in summary ESs well outside of the SEM for all severity groups. The
286	CETI's summary ES of 10.37 was well above its SEM of 5.87, <sup>23</sup> suggesting that those
287	improvements were not due to variations inherent to measurement alone. Lastly, the summary
288	ES for the BNT of 3.30 was also higher than its SEM of 2.04, <sup>43</sup> supporting its validity as a metric
289	of intervention-related improvement. Importantly, the summary ESs were consistent across
290	treatment approaches and dose frequencies as none of the meta-analyses demonstrated
291	significant heterogeneity, nor were any of the sub-group analyses significant.
292	This study provides a unique contribution to the literature on aphasia rehabilitation as it
293	included studies according to the outcome measure used to assess change as opposed to by study
294	design, as in previous systematic reviews and meta-analyses. <sup>2,3</sup> This methodological shift is
295	valuable as rather than conducting only meta-analyses with between group comparisons, separate
296	meta-analyses were also conducted using within group study comparisons, including single
297	subject design studies. This approach allowed for the inclusion and synthesis of a larger body of
298	the treatment literature in the field than previous reviews. In summary, this work adds to the
299	body of literature that confirms a positive effect of aphasia treatment and further, provides

300 benchmarks for significant change.

301	Nonetheless, some open questions remain. In order to maintain adequate power to conduct
302	meta-analyses, a number of studies employing less-frequently used outcome measures were
303	excluded (e.g., assessing contextual factors). Secondly, subgroup analyses could not be
304	conducted between acute and chronic participant studies. Third, as the summary ES for the
305	WAB-AQ was only notably higher than the SEM for a range of AQs (i.e., 28-68), it should be
306	tested whether a higher benchmark for improvement should be used for individuals who are
307	more mild or severe, or a different assessment measure altogether.
308	Study Limitations
309	All systematic reviews and meta-analyses are susceptible to publication bias. Although
310	funnel plots for the within group designs were largely symmetric, publication bias was detected
311	in the within-group WAB-AQ and BNT analyses. However, the point estimates varied
312	minimally and thus, the observed summary ESs for those measures should be considered valid.
313	CONCLUSIONS
314	By combining evidence from existing treatment studies, the present systematic review
315	and meta-analyses establishes valuable benchmarks of change for three frequently used outcome
316	measures. Furthermore, it confirms that aphasia rehabilitation is indeed effective.
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#### FIGURE TITLES & LEGENDS

Figure 1. The PRISMA flow diagram<sup>1</sup> of study inclusion. *Note:* 1. Moher D, Liberati A, 431 432 Tetzlaff J, Altman DG. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med. 2009;6(7):6. 433 Figure 2. Summary effect sizes for within group studies reporting the Western Aphasia Battery-434 Aphasia Ouotient (WAB-AQ). The difference in means column reflects the pre-treatment mean 435 436 subtracted from the post-treatment mean. The lower and upper limits columns show the 95% 437 confidence interval surrounding the difference in means. The p-value indicates the significance of the effect. The final row describes the summary effect size, 95% confidence interval, and p-438 439 value. The diamond represents the summary effect size. The squares reflect effect sizes of 440 individual studies. Figure 3. Summary effect sizes for within group studies reporting the Communicative 441

Effectiveness Index (CETI) and Boston Naming Test (BNT). Figure details are the same as forFigure 2.

Figure 4. Summary effect sizes for between group studies reporting the Western Aphasia 444 Battery-Aphasia Quotient (WAB-AQ) and Boston Naming Test (BNT). The diamond is the 445 summary effect size. The squares reflect effect sizes of individual studies. The difference in 446 means column reflects the post-treatment control group mean change subtracted from the post-447 treatment experimental group mean change. The lower and upper limits columns show the 95% 448 confidence interval surrounding the difference in mean change. The p-value indicates the 449 450 significance of the effect. The final row describes the summary effect size, 95% confidence 451 interval, and p-value. The diamond represents the summary effect size. The squares reflect effect sizes of individual studies. 452

Outcome Measure	LDF	HDF	IMP	A/P	INT
	<i>n</i> = 35	<i>n</i> = 11	n =33	<i>n</i> = 6	<i>n</i> = 14
WAB-AQ	4.50	5.17	4.42	5.10	6.48
	3.64-5.36	3.72-6.61	3.09-5.76	1.73-8.47	4.38-8.57
CETI	<i>n</i> = 10	<i>n</i> = 5			
CEII	10.05	11.02	n/a	n/a	n/a
	3.83-16.28	2.81-19.24			
DNT	<i>n</i> = 25	<i>n</i> = 9	<i>n</i> = 24	<i>n</i> = 5	<i>n</i> = 7
BNT	3.55	3.39	3.18	3.89	3.34
	2.33-4.76	1.75-5.02	2.09-4.27	1.65-6.14	1.18-5.49

Table 1. Results of subgroup analyses for within group study designs

Note: WAB-AQ=Western Aphasia Battery-Aphasia Quotient; CETI= Communicative Effectiveness Index; BNT= Boston Naming Test; LDF = lower dose frequency; HDF = higher dose frequency; IMP = impairment-based treatment; A/P = activity/participationbased treatment; INT= integrated treatment

Design	Test	Ν	7	6	5	4	3	2	1
XX7' (1 '	WAB	53	N/A	2	17	21	32	28	0
Within Group	CETI	17	N/A	12	24	35	67	18	0
Gloup	BNT	36	N/A	6	11	28	33	22	0
Between	WAB	6	50	33	17	0	0	0	0
Group	BNT	5	0	20	80	0	0	0	0

Table 2. Quality Indicator Summative Scores for Included Studies

*Note:* Value in cell represents percentage of studies with that summative score. Within group studies could not obtain a rating of 7 because intention to treat is not a relevant parameter for that study design. Higher scores = higher methodological quality.



bdel	Study name	Statistics for each study					Difference	in means and 95% CI	
		Difference in means	Lower limit	Upper limit	p-Value				
	Aftonomos et al. 1999	9.100	5.571	12.629	0.000	1	1	I —	1
	Archibald et al. 2009	6.350	-0.659	13.359	0.076			+-•-+	
	Babbit & Cherney 2015	7.300	4.866	9.734	0.000				_
	Bakheit et al. 2005	23.100	19.866	26.334	0.000				-
	Ball et al. 2011 Beeson et al. 2003	5.070 -0.840	0.344	9.796	0.036				
	Boles 1997	3,400	-2.363	7.488	0.280				
	Breier et al. 2006	3.400	-0.688	6.576	0.103				
	Brown & Chobor 1989	8.400	4.771	12.029	0.000				
	Chemev et al. 2008	3,700	-3.654	11.054	0.324				
	Cherney & Halper 2008	2,100	-2.547	6,747	0.376				
	Chemey 2010	2.390	-3.342	8.122	0.414				
	Dovie et al. 1987	3.600	2.353	4.847	0.000				
	Duncan et al. 2016	2.620	-1.708	6,948	0.235			+=	
	Edmonds & Kiran 2006	10.000		19.798	0.045				
	Edmonds et al. 2009	8.270	5.912	10.628	0.000			<b>-∎-</b>	
	Edmonds et al. 2014	6.170	3.098	9.242	0.000				
	Falconer & Antonucci 2012	2.850	0.650	5.050	0.011				
	Faroqi-Shah 2008	7.400	4.693	10.107	0.000				
	Faroqi-Shah 2013	17.600	6.160		0.003				>
	Ferguson et al. 2012	5.250	-0.659	11.159	0.082				
	R.K. Johnson et al. 2008	0.530	-12.161	13.221	0.935			-	
	ML. Johnson et al. 2014	13.050		22.750	0.008				·
	Kendall et al. 2008	5.650	3.333	7.967	0.000				
	Kendall et al. 2014	4.900	1.793	8.007	0.002				
	Kendall et al. 2015 Kiran & Thompson 2003	3.970 8.220	0.805	7.135	0.014				
	Kiran & Thompson 2003 Kiran 2005	-2.130	-8.985	4,725	0.001				
	Kiran & Johnson 2008	4.000	1.570	6.430	0.001				
	Kiran 2008	9,060	5,397	12.723	0.000				
	Kiran et al. 2009	2.830	0 187	5.473	0.036				
	Kiran et al. 2011	3,130	0.031	6.229	0.048				
	Lesser et al. 1986	6.510	2.278	10.742	0.003				
	Macauley 2006	1.030	-1.147	3.207	0.354				
	Marshall et al. 2015	2.300	-4.982	9.582	0.536			I	
	Milman et al. 2014a	5.600	3.442	7.758	0.000				
	Milman et al. 2014b	7.700	-1.088	16.488	0.086			+	
	Mozeiko et al. 2016_I	8.300	4.125	12.475	0.000			<b></b>	
	Mozeiko et al.2016_D	2.880	-0.981	6.741	0.144			+	
	Purdy & Wallace 2015	3.360	0.692	6.028	0.014				
	Raymer et al. 2006a	4.080	-2.875	11.035	0.250				
	Raymer et al. 2006b	4.790	1.735	7.845	0.002				
	Raymer et al. 2012	6.490	-0.421	13.401	0.066				
	Rider et al. 2008	1.130	-1.648	3.908	0.425				
	Rodriguez et al. 2006	3.050	-0.121	6.221	0.059				
	Rose et al. 2013 Sandberg et al. 2015	4.520 3.800	1.516 0.597	7.524	0.003				
	Sandberg et al. 2015 Schneider & Thompson 2003		0.597	6.840	0.020				
	Schneider & Thompson 200. Silkes 2015	1.200	-2.410	4.810	0.002				
	Steele et al. 2014	3 500	0.236	6.764	0.036				
	Thompson et al. 2003	2,180	-1.847	6.207	0.289				
	Waller et al. 1998	7.000	0.992	13.008	0.022				
	Wilson et al. 2012	6,180	2.022	10.338	0.004				
ndom		5.025	3.952	6.099	0.000			I ▲ I	
						-25.00	-12.50	0.00 12.50	25
							Negative Effect	Positive Effect	

						iveness Ir	
Model	Study name			tics for e		dy	Difference in means and 95% Cl
			ence	Lower	Upper limit	p-Value	
	Babbitt et al. 2015		11.400	7.785	15.015	0.000	
	Aftonomos et al. 1999		19.800	12.995	26.605	0.000	
	van der Gaag et al. 2005 Barthel et al. 2008		9.700 9.200	-0.794	20.194 21.073	0.070	
	Barthel et al. 2008 Rose et al. 2013		9,200	-2.6/3	13.969	0.129	
	Edmonds et al. 2014		32.670	25.828	39.512	0.000	
	Rodriguez et al. 2013		13,700	3.254	24.146	0.010	
	Steele et al. 2014		17.800	6.308	29.294	0.002	
	Wilson et al. 2012		11.625	5.700	17.550	0.000	
	Code et al. 2010 Raymer et al. 2012		12.500	-2.981 -14.893	27.981	0.114	
	Wambaugh et al. 2012		7.500	-1.144	16.144	0.089	
	Nickels & Osborne 2016		-0.750	-10.464	8.964	0.880	
	Archibald et al. 2009		10.000	-1.316	21.316	0.083	
	Johnson et al. 2008		12.656	-2.868	28,181	0.110	
	Miman et al. 2014a Sorin-peters & Behrmann 19		1.067	-5.993	8.126	0.767	
Random	Sorin-peters & Benrmann 18	990	10.371	6.079	14.663	0.000	
. Januard II			10.041	0.0.0	14.000	0.000	-25.00 -12.50 0.00 12.50 25
							Negative Effect Positive Effect
				Bostor	n Namin	q Test	
	01	01-11-1		each st		-	Difference in means and 95% CI
model	Study name	Difference			Jay		Dimerence in means and 95% CI
		in means			-Value		
	Aftonomos et al. 1997	11 100	5 461	16.739	0.000	1	
	Babbitt et al. 2015	4.100	1.841	6.359	0.000		-
	Breier et al. 2006			3.610	0.671		
	Edmonds & Kiran 2006	16.633	0.187	33.079	0.047		
	Edmonds et al. 2009			12.001	0.000		
	Falconer & Antonucci 2012 Ferguson et al. 2012			8.040	0.308		
			-0.488		0.096		
	Fridriksson et al. 2006 Kendall et al. 2008	0.667 3.600	-1.689	3.022 6.249	0.579		
	Fridriksson et al. 2006 Kendall et al. 2008 Kendall et al. 2014	0.667 3.600 0.125	-1.689 0.951 -2.825	3.022 6.249 3.075	0.579 0.008 0.934		
	Fridriksson et al. 2006 Kendall et al. 2008 Kendall et al. 2014 Kendall et al. 2015	0.667 3.600 0.125 3.270	-1.689 0.951 -2.825 -0.081	3.022 6.249 3.075 6.621	0.579 0.008 0.934 0.056		
	Fridriksson et al. 2006 Kendail et al. 2008 Kendail et al. 2014 Kendail et al. 2015 Kiran & Thompson 2003	0.667 3.600 0.125 3.270 7.305	-1.689 0.951 -2.825 -0.081 -0.076	3.022 6.249 3.075 6.621 14.686	0.579 0.008 0.934 0.056 0.052		
	Fridriksson et al. 2006 Kendali et al. 2008 Kendali et al. 2014 Kendali et al. 2015 Kiran & Thompson 2003 Kiran 2005	0.667 3.600 0.125 3.270 7.305 4.980	-1.689 0.951 -2.825 -0.081 -0.076 0.431	3.022 6.249 3.075 6.621 14.686 9.529	0.579 0.008 0.934 0.056 0.052 0.032		
	Fridriksson et al. 2006 Kendail et al. 2008 Kendail et al. 2014 Kendail et al. 2015 Kiran & Thompson 2003 Kiran & Johnson 2008	0.667 3.600 0.125 3.270 7.305 4.980 9.000	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540	3.022 6.249 3.075 6.621 14.686 9.529 19.540	0.579 0.008 0.934 0.056 0.052 0.032 0.032		
	Fridriksson et al. 2006 Kendall et al. 2008 Kendall et al. 2014 Kendall et al. 2015 Kiran & Thompson 2003 Kiran 2005 Kiran 4. Johnson 2008 Kiran 2008 Kiran 2008	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702		
	Fridřiksson et al. 2006 Kendall et al. 2018 Kendall et al. 2014 Kendall et al. 2015 Kiran & Thompson 2003 Kiran 2005 Kiran & Johnson 2008 Kiran 2008 Kiran et al. 2011 Kurland et al. 2014	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 -2.200	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457		
	Fridriksson et al. 2006 Kendali et al. 2008 Kendali et al. 2014 Kendali et al. 2015 Kiran & Johnson 2003 Kiran & Johnson 2008 Kiran 2005 Kiran et al. 2011 Kuralnoi et al. 2014 Lacey et al. 2010	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 0.660 7.333	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457 0.002		
	Fridriksson et al. 2006 Kendall et al. 2018 Kendall et al. 2014 Kendall et al. 2015 Kiran & Thompson 2003 Kiran & Johnson 2008 Kiran 2005 Kiran 2008 Kiran 2008 Kiran 2011 Kuran et al. 2011 Lacey et al. 2011 MecGregor et al. 2015	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 7.333 4.420	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045 5.743	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457 0.002 0.000		
	Fridriksson et al. 2006 Kendali et al. 2008 Kendali et al. 2008 Kendali et al. 2014 Kiran & Thompson 2003 Kiran 2005 Kiran 2008 Kiran 2008 Kiran et al. 2011 Kurland et al. 2011 Lacey et al. 2010 MecGregor et al. 2015	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 -2.200 7.333 4.420 6.333	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045 5.743 13.696	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457 0.002 0.092		
	Fridriksson et al. 2006 Kendali et al. 2008 Kendali et al. 2008 Kendali et al. 2015 Kiran & Thompson 2003 Kiran 2005 Kiran 2005 Kiran et al. 2011 Kuran et al. 2011 Kuran et al. 2011 MexGregor et al. 2015 Miman et al. 2014	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 -2.200 7.333 4.420 6.333 4.370	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029 0.577	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.595 5.743 13.696 8.163	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457 0.000 0.000 0.092 0.024		*** ** ** **
	Fridriksson et al. 2006 Kendali et al. 2008 Kendali et al. 2008 Kendali et al. 2014 Kiran & Thompson 2003 Kiran 2005 Kiran 2008 Kiran 2008 Kiran et al. 2011 Kurland et al. 2011 Lacey et al. 2010 MecGregor et al. 2015	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 7.333 4.420 6.333 4.370 2.300 2.300	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.027 0.0277 -1.0277 -1.485 -3.934	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045 5.743 13.696 8.163 6.085 7.934	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.000 0.702 0.002 0.002 0.002 0.002 0.022 0.024 0.234		*** *** ***
	Pröfisson et al. 2006 kendall et al. 2016 kendall et al. 2016 kendall et al. 2015 kran 2. 2015 kran 2. 2015 kran 2. 2016 kran 2. 2016 kran 2. 2016 kran 2. 2011 kran 2. 2011 kran 2. 2010 kran 2. 2010 kran 2. 2014 kehr et al. 2016 kettelon 2. 206a	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 0.660 0.660 0.620 7.333 4.420 6.333 4.420 6.333 4.370 2.300 2.000 1.000	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029 0.577 -1.485 -3.934 -1.702	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.5945 5.743 13.696 8.163 6.085 7.934 3.702	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.407 0.000 0.092 0.024 0.024 0.24 0.509 0.468		ŧ₄ŧ₄ +
	Pröfiksion et al. 2006 Kendall et al. 2008 Kendall et al. 2014 Krima b. Thompson 2009 Krima S. Johnson 2008 Krima S. Johnson 2008 Krima S. Johnson 2008 Krima S. Johnson 2008 Krima S. Johnson 2008 Miran et al. 2011 MacGregor et al. 2015 Mart et al. 2014 Mart et al. 2014 Mart et al. 2014 Mart et al. 2014 Mart et al. 2016 Mart et al. 2006b	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 13.000 0.660 7.333 4.420 6.333 4.420 6.333 4.420 2.300 2.300 2.300 1.220	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029 0.577 -1.029 0.577 -1.485 -3.485 -3.492 -1.702 -1.258	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045 5.743 13.696 8.163 6.085 7.934 3.702 3.698	0.579 0.008 0.934 0.052 0.052 0.032 0.094 0.002 0.457 0.002 0.002 0.002 0.024 0.234 0.234 0.234 0.335		**********
	Pridrisson et al. 2006 kendali et al. 2016 kendali et al. 2016 kendali et al. 2016 kran 2.015 kran 2.005 kran 2.005 kran 2.001 kran 2.001 kran 2.010 kran 2.006 kraymer et al. 2006 kraymer et al. 2012 kraymer et al. 2012	0.667 3.600 0.125 3.270 7.305 4.990 9.000 7.305 4.420 0.660 6.333 4.370 2.300 2.200 1.000 1.220 1.000	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029 0.577 -1.485 -3.934 -1.702 -1.258 -3.934 -1.702	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045 5.743 13.694 8.163 6.085 7.934 3.702 3.698 5.223	0.579 0.008 0.934 0.052 0.032 0.094 0.000 0.702 0.457 0.002 0.000 0.024 0.234 0.234 0.234 0.335 0.963		╪ <sub>╋</sub> ╪ ╪┿╵┤┤ ╪ <sub>┧</sub> ╵╼╎┤ ╪┽ ┿┿╎
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	Pridrisson et al. 2006 Kendal et al. 2008 Kendal et al. 2008 Kendal et al. 2014 Kiran 2008 Kiran	0.667 3.600 0.125 3.270 7.305 4.980 9.000 0.660 0.2200 7.333 4.420 6.333 4.370 2.300 1.220 1.220 1.220 3.667 3.267	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029 0.577 -1.485 -3.934 -1.702 -1.258 -5.473 0.210 -8.701	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.540 19.874 4.043 3.594 13.696 8.163 8.163 6.085 7.934 3.702 3.698 5.223 7.124 13.201	0.579 0.008 0.934 0.052 0.032 0.094 0.000 0.702 0.032 0.000 0.702 0.002 0.000 0.002 0.002 0.024 0.234 0.234 0.335 0.335 0.335 0.963 0.687		*** *+ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++
	Pröfisson et al. 2006 Kendall et al. 2008 Kendall et al. 2014 Krana 2015 Krana 2015 Krana 2015 Krana 2016 Krana 2006 Krana 2006 Krana 2016 Krana 2016 K	0.667 3.600 0.125 3.270 7.305 4.980 9.000 0.660 0.2200 7.333 4.420 6.333 4.370 2.300 1.220 1.220 1.220 3.667 3.267	-1.689 0.951 -2.825 -0.081 -1.540 6.1540 6.2.723 -7.994 2.622 3.097 -1.029 0.577 -1.485 -3.934 -1.029 0.577 -1.485 -3.934 -1.258 -3.9210 -8.7010 -8.7010 -8.7611 -3.661	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.540 19.874 4.043 3.594 13.696 8.163 8.163 6.085 7.934 3.702 3.698 5.223 7.124 13.201	0.579 0.008 0.934 0.052 0.032 0.094 0.002 0.702 0.457 0.002 0.092 0.092 0.024 0.235 0.509 0.468 0.335 0.963		╪ <sub>╋</sub> ╪ <sub>╋</sub> ╪ ┥╎╵╵ ┿ <sub>┥</sub> ┿ <mark>╋╪┿╵╎╵╵╵</mark>
	Fránsson et al. 2006 Kendal et al. 2008 Kendal et al. 2014 Kendal et al. 2014 Kenn S. Longense 2008 Kenn 2005 Kenn 2005 Kenn 2008 Kenn 2	0.667 3.600 0.125 3.270 7.305 4.980 9.000 13.000 13.000 13.000 0.660 0.2200 6.333 4.420 2.300 2.200 1.000 1.220 0.125 0.125 3.667 2.250 2.400 7.455 0.990	-1.689 0.951 -2.825 -0.081 -1.506 0.431 -1.506 -2.723 -7.994 2.622 3.097 -1.029 0.577 -1.029 0.577 -1.029 0.577 -1.029 0.577 -1.258 -3.934 -1.702 -3.934 -1.702 -3.641 3.661 3.6554	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.540 19.874 4.043 3.594 12.045 5.743 13.696 8.165 7.934 3.696 8.165 7.934 3.696 5.223 7.124 13.201 8.461	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457 0.002 0.457 0.002 0.092 0.234 0.509 0.468 0.335 0.363 0.3687 0.3687 0.438 0.0687 0.438 0.067		╪┿╪┿┽ ┥┥┙┙┙┙┥ ┥
	Printisson et al. 2006 Kendal et al. 2014 Kendal et al. 2014 Kendal et al. 2014 Kendal Della (2014) Kendal (2014) Kendal (2014) Kendal (2014) Kendal (2014) Kendal (2014) Mithan et al. 2014 Lacey et al. 2016 Mithan et al. 2016 Mithan et al. 2016 Regiment et al. 2006 Regiment et al.	0.667 3.600 0.125 3.270 7.305 4.990 9.000 0.660 0.660 0.2200 6.333 4.420 6.333 4.420 2.300 1.000 1.220 0.125 3.667 2.250 2.400 2.400 2.455 0.990	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -7.994 2.622 3.097 -1.029 0.577 -1.485 -3.934 -1.7029 0.577 -1.485 -3.934 -1.258 -5.473 0.210 -8.701 -3.661 3.552	3 022 6 249 3 075 6 621 14,686 9 529 19,540 19,874 4,043 3,594 12,045 5,743 3,594 12,045 5,743 3,594 13,696 8,163 6,085 5,743 3,696 8,163 6,085 5,733 4,3696 8,163 6,085 5,733 4,3696 8,523 7,124 13,207 13,696 8,523 7,124 13,207 13,696 8,523 7,124 13,696	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.457 0.002 0.024 0.2457 0.002 0.024 0.224 0.509 0.458 0.385 0.963 0.938 0.938 0.438 0.438 0.438 0.438 0.438		* <del>*</del> ** + + + + + + + + + + + + + + + + + +
	Pridriscor et al. 2006 Pridriscor et al. 2016 Nerndal et al. 2016 Nerndal et al. 2016 Nern J. Conton 2008 Nern J. Conton 2008 Nern A. 2010 Nern A. 2010 Nern A. 2011 Nern et al. 2014 Nern et al. 2016 Nerne et al. 2020 Nerd et al. 2020	0.667 3.600 0.125 3.270 7.305 4.980 9.000 0.660 -2.200 7.333 4.420 6.333 4.420 2.300 1.000 1.220 0.2300 1.220 2.200 1.220 2.200 1.220 2.200 1.220 2.306 7.35 3.667 7.2250 2.400 2.400 2.400 7.455 0.990 2.460 7.455 0.990 2.460 7.455 0.990 2.460 7.355 1.2200 1.2200 1.2200 1.2200 1.2200 1.2200 1.2200 1.2200 1.2200 1.2200 1.2200 1.2	-1.689 0.951 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 2.622 2.622 2.622 2.622 3.097 -1.485 -3.934 -1.702 -1.485 -3.934 -1.728 -3.934 -1.728 -3.934 -1.728 -3.934 -1.728 -3.934 -1.728 -3.9545 -3.9545 -3.954 -3.954 -3.954 -3.954 -3.954 -3.9545	3 022 6 249 3 075 6 6621 14 686 9 529 19 540 19 874 4 043 3 554 12 045 5 743 13 696 8 163 3 696 5 223 3 698 5 223 7 124 13 201 8 461 11 380 11 385 8 1534 4 388 13 151	0.579 0.008 0.934 0.056 0.052 0.094 0.002 0.702 0.457 0.002 0.702 0.024 0.234 0.335 0.963 0.335 0.963 0.335 0.963 0.335 0.963 0.335		ŧ₄ŧ₄   
	Pridriscon et al. 2006 Pridriscon et al. 2006 Kendal et al. 2006 Kendal et al. 2007 Kendal 2008 Kendal 2	0.667 3.600 0.125 3.270 7.305 4.980 9.000 -2.200 7.333 4.420 0.660 2.200 7.333 4.420 2.300 2.200 1.220 2.200 1.220 2.200 1.225 2.250 2.5000 2.500 2.5000 2.5000 2.5000 2.5000 2.5000 2.5000 2.5000 2.5000 2.50000 2.50000 2.50000000000	-1.689 0.9511 -2.825 -2.825 -0.081 -0.076 0.431 -1.540 6.126 -2.723 -1.540 6.126 -2.723 -2.3.097 -1.629 -2.622 3.097 -1.485 -3.934 -1.702 -1.258 -3.934 -1.702 -1.258 -3.934 -1.702 -1.258 -3.934 -1.702 -1.258 -3.934 -1.540 -3.5444 -3.	3.022 6.249 3.075 6.621 14.686 9.529 19.540 19.874 4.043 3.594 12.045 5.743 13.695 8.163 6.085 7.934 13.608 6.085 7.934 13.206 8.163 6.085 7.934 13.202 8.163 6.085 7.934 13.202 7.124 13.202 8.534 13.205 8.151 8.461 13.350 8.534 13.151 14.368	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.000 0.702 0.022 0.000 0.022 0.000 0.024 0.024 0.234 0.234 0.234 0.234 0.234 0.234 0.385 0.385 0.388 0.438 0.438 0.438 0.038 0.438 0.038		╪┿╧┿┥┤┥┥ ┿┥╵┥┥┥ ┿┥╵┥┥┥ ┿┥╵┥┥
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	Pridriscon et al. 2006 Pridriscon et al. 2006 Kendal et al. 2006 Kendal et al. 2007 Kendal 2008 Kendal 2	0.667 3.600 0.125 3.270 4.990 9.000 -2.200 7.305 4.420 6.333 4.370 2.200 1.220 0.660 2.200 1.220 0.125 3.667 2.250 0.900 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 1.255 0.2555 0.2555 0.2555 0.255	-1.689 0.951 -0.061 -0.076 -0.0431 -1.540 6.1262 -2.723 -7.994 2.622 -2.723 -7.994 2.622 -2.723 -7.994 2.622 -2.723 -1.029 0.577 -1.485 -3.904 -1.702 -1.258 -3.904 -1.702 -3.904 -1.702 -3.904 -1.702 -3.904 -1.702 -3.904 -1.702 -1.254 -1.029 -1.254 -1.454	3.022 6.249 3.075 6.621 14.686 9.529 19.874 4.043 3.594 12.045 5.743 13.696 8.163 6.085 7.934 3.606 5.223 7.124 13.201 8.524 3.606 5.223 7.124 13.201 8.524 3.606 5.223 7.124 13.201 8.534 4.368 13.201 8.534 4.4197 10.159 3.853	0.579 0.008 0.934 0.056 0.052 0.032 0.094 0.000 0.702 0.000 0.702 0.000 0.702 0.000 0.024 0.024 0.234 0.056 0.024 0.234 0.056 0.024 0.234 0.365 0.963 0.368 0.068 0.438 0.068 0.438 0.069 0.438 0.065 0.052 0.052 0.000 0.024 0.052 0.053 0.057 0.052 0.057 0.052 0.0570		╸
	Frénkson et al. 2006 Frénkson et al. 2006 Kendal et al. 2016 Kendal et al. 2016 Kendal et al. 2016 Kenn A. Thompsone 2000 Kenn A. Thompsone 2000 Kenn A. 2010 Kenn 2000 Kenn 2000	0.667 3.600 0.125 3.270 4.990 9.000 -2.200 7.305 4.420 6.333 4.370 2.200 1.220 0.660 2.200 1.220 0.125 3.667 2.250 0.900 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 2.400 7.455 0.990 0.455 0.990 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.400 0.455 0.990 0.405 0.990 0.455 0.990 0.455 0.990 0.405 0.990 0.455 0.990 0.455 0.990 0.405 0.455 0.990 0.405 0.455 0.990 0.405 0.455 0.990 0.405 0.455 0.990 0.405 0.455 0.990 0.405 0.455 0.990 0.455 0.900 0.455 0.900 0.455 0.900 0.455 0.900 0.455 0.900 0.455 0.900 0.455 0.000 0.455 0.900 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0.000 0.455 0	-1.689 0.951 -0.061 -0.076 -0.0431 -1.540 6.1262 -2.723 -7.994 2.622 -2.723 -7.994 2.622 -2.723 -7.994 2.622 -2.723 -1.029 0.577 -1.485 -3.904 -1.702 -1.258 -3.904 -1.702 -3.904 -1.702 -3.904 -1.702 -3.904 -1.702 -3.904 -1.702 -1.254 -1.029 -1.254 -1.454	3 022 6 249 3 075 6 6621 14 686 9 529 19 540 19 874 4 043 3 594 12 045 5 743 13 696 8 163 6 085 7 934 3 702 3 698 5 223 7 124 13 201 8 8461 11 1360 8 5223 7 124 13 201 8 461 11 1360 8 523 4 4 368 13 151 1 4 197 10 159	0.579 0.008 0.934 0.056 0.052 0.094 0.000 0.702 0.457 0.002 0.000 0.024 0.234 0.234 0.234 0.234 0.234 0.234 0.234 0.335 0.963 0.335 0.963 0.038 0.687 0.438 0.687 0.438 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.797 0.000 0.052 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.000000	-25.00	12.50 02.50 receive Effect

Nodel	Study name	Stati	stics for e	each stud	<u>/</u>	_	Difference	in means	and 95%	
		Difference in means	Lower limit	Upper limit	p-Value					
	Altmann et al. 2014	0.639	-2.692	3.969	0.707		1	-#	1	1
	Des Roches et al. 2015	2.800	-1.678	7.278	0.220			+∎-	-	
	Godecke et al. 2012	8.980	4.449	13.511	0.000				-8-	
	Godecke et al. 2014	12.270	7.394	17.146	0.000					
	Katz & Wertz, 1997	3.200	-0.538	6.938	0.093			⊢₽	-	
	Maher et al. 2006	3.565	-0.983	8.113	0.124			- +-∎	-	
Random		5.047	1.638	8.456	0.004					
						-25.00	-12.50	0.00	12.50	25.00
			Bosto	n Namin	a Test	N	egative Effe	ect P	ositive Eff	ect
Viodel	Study name	Stati	Bostor	n Namin each study	<u> </u>		egative Effe			
Model	Study name	_ <u>Stati</u> Difference in means			<u> </u>		•			
Model	Study name	Difference	stics for e Lower	ach study Upper	<u>v</u>		•			
Model		Difference in means	stics for e Lower limit	each study Upper limit	y p-Value		•			
<u>Model</u>	Altmann et al. 2013	Difference in means 0.860	stics for e Lower limit -3.156	each study Upper limit 4.876	y p-Value 0.675		•			
<u>Model</u>	Altmann et al. 2013 Des Roches et al. 2015	Difference in means 0.860 1.594	stics for e Lower limit -3.156 -1.750	each study Upper limit 4.876 4.938	<b>p-Value</b> 0.675 0.350		•			
<u>Model</u>	Altmann et al. 2013 Des Roches et al. 2015 Maher et al. 2006	Difference in means 0.860 1.594 -0.400	stics for e Lower limit -3.156 -1.750 -6.085	each study Upper limit 4.876 4.938 5.285	p-Value 0.675 0.350 0.890		•			
<u>Model</u> Random	Altmann et al. 2013 Des Roches et al. 2015 Maher et al. 2006 Raglio et al. 2016	Difference in means 0.860 1.594 -0.400 0.000	stics for e Lower limit -3.156 -1.750 -6.085 -3.568	each study Upper limit 4.876 4.938 5.285 3.568	<b>p-Value</b> 0.675 0.350 0.890 1.000		•			

#### Western Aphasia Battery Aphasia Quotient

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#### **Supplementary Material 1: Sample Search Strategy**

In PubMed:

Line 1: aphasia Line 2: AND treatment OR therapy OR intervention OR rehabilitation OR outcome OR training Line 3: AND adult Line 4: NOT primary progressive aphasia OR dementia OR dysphagia OR transcranial magnetic stimulation OR transcranial direct current stimulation Line 5: NOT pharmaceutical preparations.

Article type was limited to Case Reports, Clinical Study, Clinical Trial, Clinical Trial, Phase I, Clinical Trial, Phase II, Clinical Trial, Phase II, Clinical Trial, Phase IV, Comparative Study, Controlled Clinical Trial, Dataset, Meta-Analysis, Multicenter Study, Observational Study, Practice Guideline, Randomized Controlled Trial, Systematic Reviews, Validation Studies and Evaluation Studies. No other limits or filters were applied.

plied.

Outcome	Туре	n
WAB-AQ	Study	80
	Subject	1276
BNT	Study	53
	Subject	673
CETI	Study	27
	Subject	458
CADL-2	Study	11
	Subject	89
Scenario	Study	1
Test	Subject	34
ACOM	Study	1
	Subject	73
SAQOL	Study	2
	Subject	34

# Supplementary Material 2: Frequency of outcome measure use

	Study	6
SAQOL-39		
-	Subject	87
SAQOL-39g	Study	
	Subject	20
ALA	Study	2
	Subject	23
GHQ-12	Study	2
	Subject	14

*Note:* Indicates the outcome measure, the number of studies reporting the measure and the cumulative number of subjects reported for the measure. CADL-2= Communication Activities of Daily Living-Second Edition; ACOM= Aphasia Communication Outcome Measure; SAQOL= Stroke and Aphasia Quality of Life Scale; ALA= Assessment For Living With Aphasia; GHQ-12= 12-item General Health Questionnaire

Indicator	Description
1. Study protocol	Adequate detail about the study protocol was given for the study to be replicated.
2. Blinding	Participants were blinded to condition. Assessors were blinded to condition/treatment.
3. Sampling/allocation	For example: random sample, convenience sample, not described, etc.
4. Treatment fidelity	Administrators established that the treatment protocol was delivered as planned.
5. Significance for primary outcome measure of interest (e.g., trained verbs)	Statistical analyses were conducted and p-values were reported.
6. Significance for standardized outcome measure of interest (i.e., WAB, CETI, BNT)	Statistical analyses were conducted and p-values were reported.
7. Precision	Effect size was reported or calculable.
8. Intention to treat	Data was analyzed based on the group to which the participants were originally assigned.

Supplementary Material 3. Quality indicators for assessing included studies

*Note:* Indicators: 1, 2, and 4-8 were scored as either (+) for present, or (-) for absent. Indicator 3 consisted of qualitative information. (+) values were tallied to create quality indicator summative scores. This table was adapted from Table S3. 1 in Faroqi-Shah, Y, Frymark, T, Mullen, R, & Wang, B. Effect of treatment for bilingual individuals with aphasia: A systematic review of the evidence. *Journal of Neurolinguistics*. 2010;23(4):319-341.

CERTE

Appelbaum, & Steele, 1999 $M = 35;$ $F = 25$ $24-86$ Anomic = 13 Global = 11 Wemickes = 8 Conduction = 3 TCM = 2 TSM = 1 Isolation = 1 $24-144$ Lingraphica (icon-based language system) to provide thrapeutic exercises at the appropriate level for participants' severity. Also, focused on improving functional communication outside of the clinic as well as provided home exercises. Intensity: $2x/week$ , $60 \text{ min}$ , $21.5  Mereica of primeoutcome measure: -Significance of primeoutcome or in clinic with trained personnel.IIB/class IIIStudy protocol: +Significance of pri-outcome measure: -Significance of primeSignificance of set.Or ange, &F = 271.00(11.15)S5-87Anomic = 4Broca's = 2Conduction = 1Global = 1Mild = 3Nid -to-Mod. = 2Nod. = 1Sev. = 2Type: 1 Description: Computer-provided treatment viaomprehension, visual matching, reading comprehension,spelling, semantics, sentence processing). Patients usedcomputer at home or in clinic with trained personnel.Intensity: 1x/week, 60 \min, 15 weeks60.29(33.37)Study protocol: +Blinding: -Sampling/allocationTreatment fidelity:Significance of ret.Study protocol: +Blinding: -Sampling/allocationTreatment fidelity:Significance of ret.Study protocol: +Blinding: -Sampling/allocationTreatment fidelity:Significance of ret.Study protocol: +Blinding: -Sampling/allocationTreatment fidelity:Significance of ret.$	Study Name	Study N; N for outcome measure; Sex	Mean Age(SD) range	Aphasia Type	Aphasia Severity (WAB-AQ)	Mean MPO range	Treatment(Tx)	Pre-Tx M(SD) Post-Tx M(SD) Change Score	Methodological Rigor
Archibald, Orange, & Jamieson, 20098; 8; M = 6; F = 271.00(11.15) 55-87Anomic = 4 Broca's = 2 Conduction = 1 Global = 1Mild = 3 Mild-to-Mod. = 2 Mod. = 1Type: I Description: Computer-provided treatment via AphasiaMate across 8 modules (i.e., auditory comprehension, visual matching, reading comprehension, spelling, semantics, sentence processing). Patients used computer at home or in clinic with trained personnel.60.29(33.37) 66.64(27.50)Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation Treatment fidelity: Significance for st.	Aftonomos, Appelbaum, & Steele, 1999	M = 35;		Anomic = 13 Global = 11 Wernicke's = 8 Conduction = 3 TCM = 2 TSM = 1	Modto-sev.		Lingraphica (icon-based language system) to provide therapeutic exercises at the appropriate level for participants' severity. Also, focused on improving functional communication outside of the clinic as well as provided home exercises. <b>Intensity:</b> 2x/week, 60 min,	51.60(28.70)	IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: +
Precision: +	Orange, &	M = 6;		Broca's = 2 Conduction = 1	Mild-to-Mod. = 2 $Mod. = 1$		AphasiaMate across 8 modules (i.e., auditory comprehension, visual matching, reading comprehension, spelling, semantics, sentence processing). Patients used computer at home or in clinic with trained personnel.	66.64(27.50)	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: Ct Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: +

Babbitt, Worrall, & Cherney, 2015	74; 74; M = 52; F = 22	54.10(16.30) 18-86	Nonfluent = 49 Fluent = 25	Mod.	15.5 3-87	<b>Type:</b> INT <b>Description:</b> Intensive Comprehensive Aphasia Program (ICAP): two individual therapy sessions and one session each of constraint-induced language therapy (CILT), reading/writing, computers and conversation group for six hours of daily programming. <b>Intensity</b> : 5x/week, 360 min, 4 weeks	51.30(21.80) 58.60(21.30) 7.30	Level of Evidence: IIB/ class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Bakheit, Carrington, Griffiths, & Searle, 2005	67; 67; M = 31; F = 36	71.90(N/A) 38-92	Broca's = 21 Anomic = 18 Global = 15 Wernicke's = 9 Conduction = 3 TCM = 1	Modto-sev.	12.72 n/a	<b>Type:</b> n/a <b>Description:</b> Individual "conventional" SLP sessions targeting comprehension and expression to improve functional communication. Tasks included selecting pictures/objects, naming objects, describing/recognizing associations between items, facilitating the expression of feelings and improving conversational ability. SLPs encouraged the use of gesture and other non-verbal communication including aids and equipment. <b>Intensity:</b> 2-5x/week, 40-60 min, 12 weeks	44.30(28.10) 67.40(25.50) 23.10	Level of Evidence: IIB/ class III Study protocol: + Blinding: + Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Ball, de Riesthal, Breeding, & Mendoza, 2011	3; 3; M = 1; F = 2	70.67(3.21) 67-73	Global = 2 Conduction = 1	Mod. = 1 Sev. = 2	28.33 26-33	Type: I Description: Modified Anagram and Copy Treatment (ACT) and Copy and Recall Treatment (CART) (Beeson, Hirsch & Rewega, 2002 Beeson, Rising & Rolk, 2003) Intensity: 1x/week, 60 min, 12 weeks (daily home practice)	23.80(20.35) 28.87(17.83) 5.07	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Beeson, Rising, & Volk, 2003	8; 8; M = 5; F = 3	71.00(5.98) 64-79	Broca's = 7 Wernicke's = 1	Modto-sev. = 1 Sev. = 7	39.75 24-84	<b>Type:</b> I <b>Description:</b> Copy and Recall Treatment (CART): 1) Show a picture 2) Have PWA write the word and support them in writing the word, if needed 3) Remove the word and show picture again and have them write three more times again. Stimuli (i.e., 20 words) was developed with family support to make it functionally relevant. <b>Intensity</b> : 1x/week, 60 min, 17 to 30 weeks	20.59(5.31) 19.75(4.81) -0.84	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: -

						<u> </u>		Precision: + Intention to treat: N/A
Boles, 1997	4; 4; M = 1; F = 3	56.00(15.38) 47-79	N/A	Mild = 3 Mod. = 1	28.75 7-84	Type: INT Description: Conversation partner therapy: Family member was coached by SLP to facilitate communication with PWA. Intensity: 2x/week, 60 min, 7 weeks	70.70(9.85) 74.10(8.62) 3.40	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Breier, Maher, Novak, & Papanicolaou, 2006	6; 6; M = 4; F = 2	61.33(8.80) 53-77	Broca's = 5 Conduction = 1	Mild-to-Mod. = 2 Mod. = 2 Modto-sev. = 1 Sev. = 1	46.83 21-70	<b>Type:</b> A/P <b>Description:</b> Constraint Induced Language Therapy (CILT) = Only verbal expression was accepted and multi-modality communication was restricted, even self-cueing. Treatment was conducted in dyads and consisted of a dual card task with barrier present (i.e., PWA took turns requesting a card or responding another's request). Stimuli included four sets of cards of different semantic categories with two levels of difficulty (i.e., low- and high-frequency). Clinicians used shaping (i.e., increasing communicative demands of request/response from single words to lengthier sentences) and cueing for a successful production (i.e., semantic, phonemic, repetition). <b>Intensity</b> : 4x/week, 180 min, 3 weeks	52.22(21.99) 54.45(24.65) 2.23	Level of Evidence: IIB/ class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Brown & Chobor, 1989	10; 10; M = 7; F = 3	64.90(N/A) 55-76	Nonfluent = 9 Fluent = 1	Mild-to-Mod. = 1 Mod. = 2 Modto-sev. = 3 Sev. = 5	77.99 36-120	Type: I Description: Writing treatment with right arm using a prosthesis which included four stages 1) geometric shapes 2) block letter alphabet 3) low- and high-frequency words and 4) two- and three-word short phrases. PWA went through three training phases: tracing, copying and writing to command within each of these stages. Intensity: 2x/week, 60 min, 12 weeks	36.40(19.75) 44.80(23.00) 8.40	Level of Evidence: IIB/ class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Cherney, Halper, Holland, & Cole, 2008	3; 3; M = 1; F = 2	69.33(7.51) 65-78	Broca's = 1 Wernicke's = 1 Anomic = 1	Mild-to-Mod. = 1 Mod. = 2	28.33 18-48	<b>Type:</b> A/P <b>Description:</b> AphasiaScripts software program was used for script training. 1) PWA listened to script while it is visible on the screen. 2) PWA reads the sentence twice chorally with avatar. PWA practice any words with which they had difficulty. 3)PWA reads each sentence aloud on their own. The computer records their response. 4) PWA can listen to the recorded sentence and then, practice and record again, if they want. PWA were trained sequentially on three scripts (i.e., three weeks each script). They practiced at home for 30 minutes daily. Clinician observed participants practicing once per week. <b>Intensity:</b> 5x/week, 30 min, 9 weeks	62.13(11.41) 65.83(7.96) 3.70	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
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Cherney & Halper, 2008	3; 3; M = 2; F = 1	64.00(12.77) 50-75	Nonfluent = 2 Fluent = 1	Mild-to-Mod. = 1 Mod. = 2	36 12-48	<b>Type:</b> I <b>Description:</b> AphasiaScripts software program was used for script training. 1) PWA listened to script while it is visible on the screen. 2) PWA reads the sentence twice chorally with avatar. PWA practice any words with which they had difficulty. 3)PWA reads each sentence aloud on their own. The computer records their response. 4) PWA can listen to the recorded sentence and then, practice and record again, if they want. PWA were trained sequentially on three scripts (i.e., three weeks each script). They practiced at home for 30 minutes daily. Clinician observed participants practicing once per week. <b>Intensity:</b> 5x/week, 30 min, 8 weeks	61.43(16.95) 63.53(13.51) 2.10	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Cherney, 2010	25; 25; M = 16; F = 9	55.38(9.49) 35-82	Nonfluent	Mod.	52.47 12-253	<b>Type:</b> I <b>Description</b> : Oral Reading for Language in Aphasia (ORLA): 1) PWA listened to the sentence twice while reading it on a card or on the computer and pointing to each word in the sentence 2) PWA read the sentence aloud with the SLP twice 3) PWA identified two or three words randomly and read them aloud 4) PWA and SLP read the whole sentence again together. Thirty different stimulus items of a certain length (i.e., 3-5 words, 8-12 words and 15-30 words) according to their severity level were practiced within the session. <b>Intensity</b> : 2-3x/week, 60 min, 8-12 weeks	54.59(29.68) 56.98(29.37) 2.38	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Duncan, Schmah, & Small, 201619; 19; M = 15; F = 453.50(11.70) 31-72Broca's = 9 Anomic = 6 Conduction = 1 Wernicke's = 1 TSM = 1 TCM = 1Mild-to-Mod.chronic S-130Type: I Description: Initiation-based therapy wherein PWA listened to words and phrases produced by six different speakers and then, repeated them nonce or numerous times. Half of the PWA were also exposed to a video of the speaker. Intensity: $6x/week$ , 90 min, 6 weeks67.72(20.00) (70.34(18.33)Level of Evidence: III/ Study protocol: + Biampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance of primary outcome for st. outcome of netrest: + Precision: + Intensity: $2x/week$ ,67.72(20.00) (70.34(18.33)Level of Evidence: III/ Study protocol: + Biampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance of primary outcome reasure: + Significance of primary outcome content is Precision: + Intensity: $2x/week$ ,67.72(20.00) (70.34(18.33)Level of Evidence: III/ Study protocol: + Bianding: - Sev. = 1Edmonds & Kiran, 20063.3; F = 254.00(1.73) S 53-56Nonfluent = 3Mod. =2 Sev. = 18.67 Sev. = 1Type: I Description: Semantic feature analysis-based (SFA-based) treatment (Boyle & Coehlo, 1995 Kiran & Thompson, 2003) involving the following steps: 1) initial naming attempt 2) written feature verification 3) yes/no feature questions 4) second naming attempt 2. Written feature verification 3) yes/no feature questions 4) second naming attempt 2. Significance for st. outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/	Doyle, Goldstein, & Bourgeois, 1987	4; 4; M = 3; F = 1	55.75(9.32) 42-62	Broca's = 4	Mild-to-Mod. = 2 Mod. = 2	117.5 30-177	<b>Type:</b> I <b>Description</b> : Treatment incorporated Helm Elicited Language Program for Syntax Stimulation (HELPSS), which included sentence production training with Level A prompting (i.e., delayed repetition) and Level B prompting (i.e., verbal stimulus requiring response to a question). <b>Intensity</b> : 3x/week, 6 months max	65.68(4.93) 69.28(4.20) 3.60	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Kiran, 2006 $M = 1;$ $F = 2$ 53-56Sev. = 18-9(SFA-based) treatment (Boyle & Coehlo, 1995 Kiran & Thompson, 2003) involving the following steps: 1) initial naming attempt 2) written feature verification 3) yes/no feature questions 4) second naming attempt. Treatment was administered in both languages. Intensity: 2x/week, 120 min, 7-34 weeks58.33(16.07)class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance for st. outcome of interest: + Precision: +	Schmah, &	M = 15;		Anomic = 6 Conduction = 1 Wernicke's = 1 TSM = 1	Mild-to-Mod.		PWA listened to words and phrases produced by six different speakers and then, repeated them once or numerous times. Half of the PWA were also exposed to a	70.34(18.33)	class IV Study protocol: + Blinding: + Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: +
		M = 1;		Nonfluent = 3			(SFA-based) treatment (Boyle & Coehlo, 1995 Kiran & Thompson, 2003) involving the following steps: 1) initial naming attempt 2) written feature verification 3) yes/no feature questions 4) second naming attempt. Treatment was administered in both languages. <b>Intensity</b> : 2x/week,	58.33(16.07)	class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: +

Edmonds,	11;10;	63.30(13.07)	Anomic $= 5$	Mild = 1	57.5	Type: I Description: Verb Network Strengthening	75.91(10.36)	Level of Evidence: III/
Mammino, &	M = 6;	35-81	Conduction $= 2$	Mild-to-Mod. = 8	14-144	Treatment (VNeST): PWA were given a verb then, asked	82.08(8.54)	class IV
Ojeda, 2014	F = 4		TCM = 2	Mod. = 1		to retrieve related agents and patients. They are	6.17	Study protocol: +
- <b>J</b> · · · · ·			Wernicke's $= 1$			encouraged and supported to generate multiple pairs of		Blinding: -
						agents and patients for each verb. Intensity: 2x/week,		Sampling/allocation: CS
						120min, 10 weeks		Treatment fidelity: +
								Significance of primary
								outcome measure: +
								Significance for st.
								outcome of interest: +
								Precision: +
								Intention to treat: N/A
Edmonds,	4;4;	61.50(10.08)	TMA = 2	Mild-to-Mod. = 4	37.25	Type: I Description: Verb Network Strengthening	74.83(3.41)	Level of Evidence: III/
Nadeau, &	M = 1;	52-75	Conduction $= 2$		10-96	Treatment (VNeST): 1) PWA were given a verb. 2)	83.10(2.27)	class IV
Kiran, 2009	F = 3					Asked to produce 3-4 thematic role pairs. 3) Picked a	8.28	Study protocol: +
						thematic role pair and answered wh-questions about it		Blinding: -
						Intensity: 2x/week, 120 min, avg. 4.75 weeks (4-6		Sampling/allocation: CS
						weeks)		Treatment fidelity: +
								Significance of primary
								outcome measure: -
								Significance for st.
								outcome of interest: -
								Precision: +
Falconer &	4. 4.	45 75(15.00)	Candrastian 2	Mild-to-Mod. = 1	86.00	T	54 15(15 20)	Intention to treat: N/A Level of Evidence: III/
	4; 4; M = 3;	45.75(15.09) 31-62	Conduction $= 2$ Broca's $= 1$	Mild-to-Mod. = 1 Mod. = 2	86.99 24-156	<b>Type</b> : INT <b>Description</b> : Modified Promoting Aphasics' Communication Effectiveness (PACE) approach: Within	54.15(15.39) 57.00(16.22)	class IV
Antonucci, 2012	M = 3; F = 1	51-62	Brocas = 1 TCM = 1	Mod. = $2$ Modto-sev. = 1	24-156	a small group, PWA took turns describing stimuli hidden	· · · ·	
	$\Gamma = 1$		1  Civi = 1	NIOUto-sev. $= 1$		from others with enough detail for others to guess the	2.85	Study protocol: + Blinding: -
					7	item) When word-retrieval difficulty occurred, the activity		Sampling/allocation: CS
				Y		was briefly discontinued while PWA were led through the		Treatment fidelity: -
						SFA chart (Boyle,2004) until they accessed the target.		Significance of primary
						HW assignments included describing difficult-to-name		outcome measure: -
						pictured objects using SFA outside of treatment sessions.		Significance for st.
						Intensity: 2x/week, 90-120 min, 7 weeks		outcome of interest: -
								Precision: +
								Intention to treat: N/A
L	1	1	1		1		1	

Faroqi-Shah, 2013	6; 6; M = 5; F = 1	47.67(8.71) 37-56	Broca's = 6	Mild-to-Mod. = 3 Mod. = 2 Sev. = 1	33.17 16-84	<b>Type:</b> I Morphosemantic treatment: 1) name action in 3 pictures 2) grammaticality judgment 3) match spoken sentence to picture 4) PWA were given a sentence and asked to write the verb inflection to match the picture 5) PWA arranged words in the correct order to form the sentence matching the picture. Trained past, present and future tenses of 20 verbs. <b>Intensity</b> : 4x/week, 60-120 min, 3 weeks	59.97(22.20) 77.57(12.86) 17.60	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Faroqi-Shah, 2008	4; 4; M = 2; F = 2	64.50(3.87) 59-68	Broca's = 3 TCM = 1	Mild-to-Mod. = 1 Mod. = 3	56.99 12-108	<b>Type:</b> I Morphophonological treatment: 1) Naming the action from a picture 2) Auditory discrimination 3) Lexical decision 4) Morphology generation 5) Oral and written transformation 6) Repetition AND Morphosemantic treatment 1) Naming the action 2) Anomaly judgment (i.e., identifying mismatch between adverb & verb tense) 3) Auditory Comprehension (i.e., matching sentence to picture) 4) Sentence completion (i.e., fill in the blank with correct verb form) 5) Sentence construction (i.e., arranging words in the correct order) <b>Intensity</b> : 4-5x/week, 60-120 min, 3 weeks	64.65(2.83) 72.05(3.71) 7.40	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Ferguson, Evans, & Raymer, 2012	4; 4; M = 2; F = 2	57.75(14.20)	Broca's = 2 Conduction = 1 TCM = 1	Mild-to-Mod. = 2 Sev. = 2	34.75 22-41	<b>Type:</b> I Intention Gesture Treatment (IGT): 1) Participants generated L-hand gesture and pressed button to view target noun then, attempted to name. 2) If they were inaccurate, the SLP modeled the gesture and noun together and participant imitated 4-6 times. 3) SLP modeled again and PWA rehearsed gesture and verbal production 4-6 times. 4) PWA re-attempted to produce the target noun after producing gesture and pressing the red button. Pantomime Gesture treatment (PGT)) 1) PWA were trained to produce pantomime gestures. 2) SLP pushed button to change picture, then PWA attempted to name. 3) If they were inaccurate, SLP produced gesture and verbal model of target and PWA imitated 4-6x. 4) SLP modeled again and participant practiced the gesture and verbal target again. 5) They re-attempted production of the target after SLP pressed button. <b>Intensity</b> : 2- 3x/week, 45-60 min, 3-5 weeks, 1 week break then 2- 3x/week, 45-60 min, 3-5 weeks	50.45(30.39) 55.70(30.84) 5.25	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
R. K. Johnson, Hough, King, Vos, & Jeffs, 2008	3; 3; M = 1; F = 2	67.67(10.07) 57-77	Broca's =2 Mixed =1	Mod. = 1 Modto-sev. = 1 Sev. = 1	52.68 27- 93	Type: INT Description: Intensive therapy using computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in	32.87(14.62) 33.40(6.48) .53	Level of Evidence: III/ class IV Study protocol: + Blinding: -

						therapy and use of an AAC device to reduce the severity of the impairment and increase activities and participation. <b>Intensity</b> : 3-4x/week, 60 min, 12 weeks		Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
M. L. Johnson et al., 2014	4; 4; N/A	70.75(9.57) 60-83	Broca's = 4	Mild-to-Mod. = 2 Mod. = 2	46.79 16-96	<b>Type:</b> A/P Constraint-induced aphasia therapy (CIAT) (i.e., discouragement of gesture and nonverbal vocalizations). Daily tasks included 1) Completion of How Well scale of the Verbal Activity Log (VAL) 2) Speech Repetition Drills 3) Activities of Daily Living (ADL) phrase repetition drills 4) Language Card game 5) Picture description 6) Role play 7) Home skill assignment. Caregiver present for all therapy. <b>Intensity</b> : 7x/week, 195 min, 2 weeks	66.23(7.14) 79.28(11.29) 13.05	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Kendall et al., 2008	10; 10; M = 6; F = 4	52.40(11.40) 40-76	NS	Mild = 2 Mild-to-Mod. = 7 Mod. = 1	59.7 16-120	<b>Type:</b> I <b>Description</b> : Phonologically-based treatment: 1)Trains subjects on individual phonemes and 2) Trains phonological and orthographic sequence knowledge at the syllable level <b>Intensity</b> : 4x/week, 120 min, 12 weeks	77.12(14.47) 82.77(14.08) 5.65	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Kendall, Raymer, Rose, Gilbert, & Gonzalez Rothi, 2014	8; 8; M = 4; F = 4	62.00(9.65) 46-72	N/A	Mild = 3 Mild-to-Mod. = 3 Mod. = 1 Modto-sev. = 1	63.13 11-120	<b>Type:</b> I <b>Description</b> : Naming pictures with semantic, phonologic, repetition and orthographic cueing hierarchy including a delayed-recall step. <b>Intensity</b> : 3x/week, 60 min, 3.5 weeks	74.45(18.29) 79.35(20.03) 4.90	Level of Evidence: III/ class IV Study protocol: + Blinding: + Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Kendall, Oelke, Brookshire, & Nadeau, 2015	26; 26; M = 15; F = 11	56.04(14.53) 26-78	NS	Above cut-off = 5 Mild = 6 Mild-to-Mod. = 9 Mod. = 5 Modto-sev. = 1	47.5 8-211	<b>Type:</b> I <b>Description</b> : Multimodal, phonologically-based therapy using phonemes in isolation and one-, two-, and three-syllable sequences in real words and nonword combinations. More specifically, Stage 1) targeted sounds in isolation and Stage 2) targeted sounds in syllables. Each stage involves an overview, introduction of sounds and sound sequences, perception tasks and production tasks. <b>Intensity</b> : 5x/week, 120 min, 6 weeks	78.68(16.53) 82.65(12.58) - 0.08	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Kiran & Thompson, 2003	4; 4; M = 1; F = 3	68.50(5.92) 63-75	Fluent = 4	Mild-to-Mod. = 1 Mod. = 2 Modto-sev. = 1	33.75 9-99	<b>Type:</b> I <b>Description</b> : Typicality-based SFA treatment involving 1) Naming 2) Category Sorting 3) Feature Verification 4) Answering yes/no questions <b>Intensity</b> : 2x/week, 120 min, 17-35 weeks	52.68(11.95) 60.90(12.81) 8.23	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Kiran, 2005	3; 3; M = 3	63.67(4.16) 59-67	TCM =1 Broca's = 1 Anomic = 1	Mild-to-Mod. = 2 Mod. = 1	156 24-288	<b>Type:</b> I <b>Description</b> : Phoneme-to-grapheme conversion: 1) writing to dictation of the word 2) copying the word 3) oral reading of the word 4) selecting and writing the sounds of the target 5) writing phonemes of the target word presented aloud 6) writing to dictation of the word <b>Intensity</b> : 2x/week, 120 min, 5-10 weeks	73.10(12.25) 70.97(14.33) - 2.13	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

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Kiran & Johnson, 2008	3; 3; M = 2; F = 1	62.33(11.15) 54-75	Anomic = 3	Mild = 1 Mild-to-Mod. = 2	18 7-36	<b>Type:</b> I <b>Description</b> : Typicality-based SFA treatment 1) Naming the picture 2) sorting pictures of target category 3) selecting written features for the target 4) answering written yes/no questions 5) naming the picture <b>Intensity</b> : 2x/week, 120 min, avg. 14 weeks (8-18 weeks)	84.70(2.42) 88.70(0.36) 4.00	Level of Evidence: III/ class IV Study protocol: - Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Kiran, 2008	5; 5; M = 1; F = 4	58.40(12.03) 47-77	Conduction= 3 Broca's = 2	Mild-to-Mod. = 1 Mod. = 3 Modto-sev. = 1	8.2 7-10	<b>Type</b> : I <b>Description</b> : SFA-based treatment involved 1) naming the picture 2) sorting pictures by category 3) identify semantic features 4) answer yes/no feature questions <b>Intensity</b> : 2x/week, 60 min, 24 weeks	54.96(13.77) 64.02(12.91) 9.06	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Kiran, Sandberg, & Abbott, 2009	4; 4; M = 2; F = 2	56.75(15.63) 39-77	Anomic = 4	Mild = 4	25.5 8-43	<b>Type:</b> I <b>Description:</b> SFA-based treatment involving: 1) category sorting 2) feature selection 3) yes/no feature questions 4) word recall and 5) free generative naming. <b>Intensity:</b> 24 sessions	87.75(1.52) 90.58(1.63) 2.83	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

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Lesser, Bryan, Anderson, & Hilton, 198613; 9; A do-7660.00(10.83) Broca's = 5 Conduction = 4Broca's = 5 Mid-to-Mod. = 3 Mod. = 4 Modto-sev. = 2Mid-to-Mod. = 3 2-3315:56 2-33Type: INT Description: Language Enrichment Therapy lice of the pictured in line drawings in sets of eight within language tasks of increasing complexity. Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve complexity. Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve complexity. Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve complexity. Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve complexity. Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve complexity. Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve complexity. Each unit repeated the same exercise 20 times with addition and consending. Intensity: 1x/week, 60 min, 10-12 weeks74.37(10.65)Level of Evidence: III/ 6.51Macauley, 2006 M = 33; 3; M = 363.00(4.00) 59-77Nonfluent = 3Mild-to-Mod. = 3 Mod. = 172 48-84Type: INT Description: Traditional Therapy 1) PWA asked to name a picture 2) SLP aks for a phrase using the word Animal-assisted therapy: 1) Stimuli cards were arranged throughout the room with dog treats on them 2) PWA asks dog to "find treat" 3) SLP picks up card from dog who just ate the treat and asks client to name it. SLP asks PWA to tell dog brase containing the target word. 4) Dog shakes hand or barks to say "well done" when the PWA says it accurately. All PWA had both treatments. Intensity: 1x/week, 30 min	Kiran, Sandberg, & Sebastian, 2011	6; 6; M = 3; F = 3	68.00(15.76) 39-84	Anomic = 4 Conduction=3	Mild-to-Mod. = 6	55.83 9-108	<b>Type:</b> I <b>Description</b> : SFA-based treatment involving 1) category generation 2) category sorting 3) feature generation and/or selection and 4) answering yes/no feature questions <b>Intensity</b> : 2x/week, 120 min, 10 weeks	78.85(6.06) 81.98(8.77) 3.13	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
M = 359-77Mod. = 148-84asked to name a picture 2) SLP asks for a phrase using the word Animal-assisted therapy: 1) Stimuli cards were arranged throughout the room with dog treats on them 2) PWA asks dog to "find treat" 3) SLP picks up card from dog who just ate the treat and asks client to name it. SLP asks PWA to tell dog phrase containing the target word. 4) Dog shakes hand or barks to say "well done" when the PWA says it accurately. All PWA had both treatments. Intensity: 1x/week, 30 min, 24 weeks75.40(8.73)class IVMod. = 148-84asked to name a picture 2) SLP asks for a phrase using the word Animal-assisted therapy: 1) Stimuli cards were arranged throughout the room with dog treats on them 2) PWA asks dog to "find treat" 3) SLP picks up card from dog who just ate the treat and asks client to name it. SLP asks PWA to tell dog phrase containing the target word. 4) Dog shakes hand or barks to say "well done" when the PWA says it accurately. All PWA had both treatments. Intensity: 1x/week, 30 min, 24 weeks75.40(8.73)class IVOutcome of interest: - Precision: +Precision: +75.40(8.73)1.03Study protocol: + Blinding: - Sampling/allocation: CS Significance for st. outcome of interest: - Precision: +			60.00(10.83) 40-76	Broca's = 5 Conduction = 4		15.56 2-33	sets of eight within language tasks of increasing complexity from picture-matching to understanding a text (28 units of complexity). Each unit repeated the same exercise 20 times with different vocabulary. Exercises involve comprehension, repetition, naming, constructing sentences, reading and writing. Spouse/volunteer can use materials with PWA between therapy visits. LET was supplemented with conversation and counseling.		Study protocol: + Blinding: + Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: +
	Macauley, 2006			Nonfluent = 3			asked to name a picture 2) SLP asks for a phrase using the word Animal-assisted therapy: 1) Stimuli cards were arranged throughout the room with dog treats on them 2) PWA asks dog to "find treat" 3) SLP picks up card from dog who just ate the treat and asks client to name it. SLP asks PWA to tell dog phrase containing the target word. 4) Dog shakes hand or barks to say "well done" when the PWA says it accurately. All PWA had both treatments.	75.40(8.73)	class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: +

Marshall, Laures-Gore, DuBay, Williams, & Bryant, 2015	3; 3; M = 1; F = 2	58.00(13.89) 49-74	Broca's = 2 Global = 1	Mod. = 1 Modto-sev. = 2	18.33 12-22	<b>Type:</b> INT <b>Description</b> : PWA received conventional speech therapy while also practicing unilateral nostril breathing techniques (i.e., diaphragmatic breathing and close nostril on their affected side, inhale through the open nostril and exhale for twice as long than their inhalation). <b>Intensity</b> : 2x/week, 40 min, avg. 14 weeks (14-18 weeks)	38.33(12.52) 40.63(6.75) 2.30	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Milman, Clendenen, & Vega-Mendoza, 2014a	3; 3; M = 3	N/A(N/A) 56-68	Nonfluent = 3	Mod. =1 Modto-sev. = 2	n/a 12-84	<b>Type:</b> INT <b>Description</b> : Functional use of adjectives to describe people in four different tasks: 1) single-word adjective production 2) single-word pronoun production 3) sentence training and 4) discourse production. Semantic, orthographic and phonemic cues were given to facilitate single word use. <b>Intensity</b> : 4x/week, 60 min, avg. 9 weeks (5-12 weeks)	43.70(8.75) 51.40(16.41) 7.70	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Milman, Vega- Mendoza, & Clendenen, 2014b	3; 3; M = 1; F = 2	62.33(6.35) 55-66	Non-fluent = 3	Mild-to-Mod. = 1 Modto-sev. = 2	41 22-61	<b>Type:</b> INT <b>Description</b> : Each individual session targeted: 1) word retrieval 2) sentence production and 3) discourse-level communication to integrate training received in steps 1 and 2. Daily homework was assigned focusing on material from steps 1 and 2. Group session once weekly to transfer skills from individual therapy to conversational level. <b>Intensity</b> : 4x/week, 60 min, avg. 11 weeks (6-18)	47.07(27.67) 52.67(26.37) 5.60	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

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Mozeiko, Coelho, & Myers, 2016_Intensive	4; 4; M = 2; F = 2	54.50(20.63) 26-72	Broca's = 2 Not classifiable = 1 Global = 1	Mild-to-Mod. = 1 Modto-sev. = 2 Sev. = 1	65.4 18-134	<b>Type:</b> A/P <b>Description:</b> Intensive Constraint Induced Language Therapy (CILT) (i.e., 5x/week): PWA participated in a Go Fish game wherein they had to ask one another for a card that matches one of their own. SLP increases the difficulty level by accepting different responses: Level 1) single word response with high frequency cards and Level 2) introduces a carrier phrase to the single word 3) adds an adjective to the carrier phrase with a single word response 4) adds two adjectives to the carrier phrase with a single word response. <b>Intensity:</b> 5x/week, 180 min, 2 weeks	38.05(20.00) 46.35(20.97) 8.30	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Mozeiko, Coelho, & Myers, 2016_Distributed	4; 4; M = 3; F = 2	59.50(13.50) 47-77	Broca's = 1 Anomic = 1 Conduction = 1 Not classifiable = 1	Mild-to-Mod. = 1 Mod. = 1 Modto-Sev. = 2	36 13-96	<b>Type:</b> A/P <b>Description:</b> Distributed Constraint Induced Language Therapy (CILT) (i.e., 3x/week) PWA participated in a Go Fish game wherein they had to ask one another for a card that matches one of their own. SLP increases the difficulty level by accepting different response Level 1) single word response with high frequency cards and Level 2) introduces a carrier phrase to the single word 3) adds an adjective to the carrier phrase with a single word response 4) adds two adjectives to the carrier phrase with a single word response. <b>Intensity</b> : 3x/week, 60min, 10 weeks	59.20(24.72) 62.08(23.19) 2.88	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Purdy & Wallace, 2015	3; 3; M = 3	53.33(12.22) 40-64	Broca's = 3	Modto-sev. = 1 Sev. = 2	26.67 10-48	<b>Type:</b> I <b>Description:</b> 1) Multimodality training of nouns and 2) training communicative use of the targets (i.e., Promoting Aphasic's Communication Effectiveness (PACE) (Davis & Wilcox, 1985) <b>Intensity</b> : 5x/week, 120-180 min, 2 weeks	22.27(4.97) 25.63(2.83) 3.37	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

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Raymer, Kohen,	5; 5;	70.80(12.11)	Conduction $= 2$	Mild-to-Mod. = 2	18.4	Type: I Description: MossTalk Words (i.e., computer-	53.32(19.14)	Level of Evidence: III/
& Saffell, 2006a	M = 2;	51-82	Broca's = 2	Modto-sev. $= 3$	4-42	assisted treatment program). PWA completed multi-	57.40(17.26)	class IV
,	F = 3		Mixed = 1			modal matching exercises involving 1) spoken plus	4.08	Study protocol: +
						written word to picture matching 2) spoken word to		Blinding: -
						picture matching 3) written word to picture matching		Sampling/allocation: CS
						Intensity: 1-2x/week, 60 min, 6-12 weeks, then, 3-		Treatment fidelity: -
						4x/week, 60 min 3-4 weeks. 4 week break in between		Significance of primary
						each 12-hour tx. phase.		outcome measure: +
								Significance for st.
								outcome of interest: -
								Precision: +
								Intention to treat: N/A
Raymer,	9;9;	60.67(9.08) 49-	Broca's = 6	Mild-to-Mod. = 1	29	Type: I Description: Gesture-Verbal Treatment (GVT):	47.64(16.89)	Level of Evidence: III/
Singletary, et al.,	M = 6;	70	Wernicke's $= 2$	Mod. = 4	5-62	1) SLP showed the picture and modeled the target word	52.43(15.46)	class IV
2006b	F = 3		Conduction =1	Modto-sev. $= 3$		and a gesture. 2) PWA produced word and gesture three	4.79	Study protocol: +
				Sev. = 1		times 3) SLP showed gesture in isolation and participant		Blinding: -
						imitated three times 4) SLP presented the target and PWA		Sampling/allocation: CS
						repeated it three times 4) After a 5-second delay, SLP prompted participant to show and tell them what		Treatment fidelity: - Significance of primary
						happened in the picture. <b>Intensity</b> : 3-4x/week, 60 min, 10		outcome measure: +
						weeks		Significance for st.
						WEEKS		outcome of interest: +
								Precision: +
								Intention to treat: N/A
Raymer et al.,	8; 8;	58.13(14.30)	Broca's = 4	Mild-to-Mod. = 1	13.5	Type: I Description: Errorless Naming: 1) SLP modeled	56.91(5.43)	Level of Evidence: III/
2012	M = 4;	40-79	TMA = 2	Mod. $= 7$	5-30	the picture name and PWA repeated 2)SLP showed the	63.40(11.46)	class IV
	F = 4		TSA = 1		$\bigcirc$	written word and PWA read it aloud three times 3)Written	2.50	Study protocol: +
			Wernicke's $= 1$			word was removed and PWA was given 5 seconds to hold		Blinding: -
						onto it 4) SLP prompted PWA to name it again. Gestural		Sampling/allocation: CS
						Facilitation: 1) SLP modelled the name and a related		Treatment fidelity: +
						gesture 2) SLP modelled the gesture alone for SLP to		Significance of primary
						imitate three times 3) SLP modelled name and PWA		outcome measure: -
						repeated three times 4) Clinician modelled gesture while		Significance for st.
						showing the picture 5) After 5 second delay SLP		outcome of interest: -
						prompted PWA to provide name and gesture again.		Precision: +
						Intensity: 2-3x/week, 60 min, 10 weeks		Intention to treat: N/A
							•	
				1				

Rider, Wright, Marshall, & Page, 2008	3; 3; M = 2; F = 1	63.33(9.07) 55-73	Nonfluent =3	Mild-to-Mod. = 2 Mod. = 1	65.67 26-126	<b>Type:</b> I <b>Description</b> : Trained words related to 6-8 contexts (i.e., story retell and procedural narratives) using SFA (e.g., Boyle, 2004 Boyle & Coelho, 1995) <b>Intensity</b> : 2-3x/week, 60 min, 7-14 weeks	72.30(5.71) 73.43(8.00) 1.13	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Rodriguez, Raymer, & Rothi, 2006	4; 4; M = 3; F = 1	65.00(9.76) 52-73	Conduction = 2 Wernicke's =1 Broca's = 1	Mild-to-Mod. = 1 Mod. = 1 Modto-sev. = 2	34.25 8-96	<b>Type:</b> I <b>Description:</b> All PWA received both verb naming treatments. Gesture-Verbal Treatment (GVT): 1) SLP showed the picture and modeled the target word and a gesture. 2) PWA produced word and gesture three times 3) SLP showed gesture in isolation and PWA imitated three times 4) SLP presented the target and PWA repeated it three times 4) After a 5-second delay, SLP prompted participant to show and tell them what happened in the target picture. Semantic-Phonologic Treatment: 1) SLP showed PWA the picture and modeled the target word 2) PWA answered semantic and phonologic questions about the target 3) PWA produced the target three times 4) After a 5-second delay, PWA attempted to explain what was happening in the picture. <b>Intensity</b> : 2-3x/week, 60 min, 10-14 weeks	53.40(18.00) 56.45(20.18) 3.05	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Rose, Attard, Mok, Lanyon, & Foster, 2013	11; 11; M = 6; F = 5	58.09(10.63) 39-74	Broca's = 6 Anomic = 4, Conduction= 1	Mild = 2 Mild-to-Mod. = 2 Mod. = 6 Modto-sev. = 1	44 17-88	<b>Type:</b> A/P <b>Description:</b> PWA targeted word retrieval in small groups through treatment activities including(i.e,. Go Fish, Memory, Request Role plays, Board games, rapid naming while playing snap, Who am I) In CIAT Plus: Verbal production was the goal but cueing was provided as needed (i.e., phonemic cue, written cue). In multi-modal aphasia therapy (M-MAT): Verbal production was also the goal but, multi-modal cueing was provided (i.e., gesture, drawing, written model, verbal model). All PWA received both treatments. <b>Intensity</b> : 4x/week, 195 min, 2 weeks	66.26(18.29) 70.78(16.55) 4.52	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Sandberg, Bohland, & Kiran, 2015	10; 10; M = 3; F = 7	59.40(10.01) 47-75	Anomic = 6 Conduction = 2 Broca's = 1 TCM = 1	Above cut-off = 3 Mild = 1 Mild-to-Mod.= Modto-sev. =	55.7 7-134	<b>Type:</b> I <b>Description</b> : PWA were trained on ten abstract words in a particular context category (e.g., courthouse) and ten untrained concrete words from the same context- category were monitored to measure generalization. Treatment steps included 1) Feature selection 2) Abstract/concrete lexical decision 3) Synonym generation <b>Intensity</b> : 2x/week, 120 min, 10 weeks	80.52(17.41) 84.32(15.00) 3.80	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Schneider & Thompson, 2003	7; 6; N/A	N/A(N/A) N/A	Broca's	Mild-to-Mod. = 5 Mod. = 1	N/A 39-132	<b>Type:</b> I <b>Description:</b> Semantic verb retrieval treatment or argument structure verb retrieval treatment was applied to a category of verbs. Semantic treatment focused on the meaning of verb and argument structure focused on number of argument structures pertaining to the verb and its thematic role assignment. Treatment involved 3 steps: 1) Presentation of the item 2) Presentation of the meaning or thematic role information for the verb being trained 3) PWA names the item. <b>Intensity</b> : 24 sessions	72.43(6.44) 76.60(4.39) 4.17	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Silkes, 2015	4; 4; N/A	60.25(1.26) 49-60	Nonfluent = 1 Fluent = 3	Mild=1 Mild-to-Mod. = 3	58.5 24-96	<b>Type:</b> I <b>Description:</b> Masked repetition priming treatment: Each section PWA saw prime-picture pair 16 times and had four opportunities to name each picture. PWA were instructed to watch the screen and try to name the picture when they saw it for the 4th time. <b>Intensity</b> : $2x/day XX 12 days$	75.13(9.56) 76.33(6.98) 1.20.00	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Steele, Baird, McCall, & Haynes, 2014	9; 9; M = 7; F = 2	61.44(10.42) N/A	Broca's = 5 TCM = 1 Wernicke's = 1 Isolation = 1 Conduction = 1	Mod.	66.72 16-230	<b>Type</b> : INT <b>Description</b> : Individual therapy (i.e., improving conversational skills using script training, sentence patterning and response elaboration), group therapy (i.e., word retrieval, improve speech intelligibility, train social exchanges, train longer and more complex sentences, increase conversational turns, improve well-being, increase life participation)and online language exercises (i.e., Talk Path: listening, speaking, reading and writing activities) <b>Intensity</b> : 2x/week 60 min 20.6 weeks	53.90(9.40) 57.40(10.40) 3.50	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: +

						<u> </u>		Precision: + Intention to treat: N/A
Thompson, Shapiro, Kiran, & Sobecks, 2003	4;4; N/A	N/A(N/A) N/A	Broca's = 4	Mild-to-Mod. = 2 Mod. = 2	N/A 12-132	<b>Type</b> : I <b>Description</b> : Trained to comprehend & produce different sentence <b>Types</b> using Treatment of Underlying Forms (Thompson, 2001) <b>Intensity</b> : 2x/week 120 min 3-9 weeks	66.20(5.51) 68.38(7.04) 2.175.00	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Waller, Dennis, Brodie, & Cairns, 1998	4; 3; M = 2; F = 1	62.33(10.21) 55-74	Nonfluent = 3	Mod. = 2 Sev. = 1	31.56 15-78	<b>Type:</b> INT <b>Description:</b> PWA were trained to retrieve pre-programmed items in their TalkBac (i.e., word-based AAC device with personal sentences and stories) by SLP. Trained caregivers provided opportunities to elicit those phrases and SLP visited weekly to provide support. Three group sessions were organized to allow caregivers and subjects to meet and discuss pros and cons of the project. <b>Intensity:</b> 1x/week 90 min 52 weeks	38.77(28.34) 45.77(31.88) 7.00	Level of Evidence: III/ class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Wilson et al., 2012	9;9; M = 8; F = 1	52.22(9.73) 28-62	Anomic = 5 Nonfluent = 2 Global = 1 Mixed = 1	Above cut-off = 1 Mild = 3 Mild-to-Mod. = 2 Mod. = 1 Modto-sev. = 1 Sev.= 1	22.68 6-66	<b>Type:</b> INT <b>Description:</b> PWA participated in Intensive Residential Aphasia Communication Theraprogram (InteRACT Carey et al. 2006). Five hours of daily treatment included focus on speech and language skills, functional communication strategy usage, community re- integration and communication partner training. <b>Intensity:</b> 5x/week 300 min 4 weeks	69.91(28.85) 76.09(25.25) 6.18	Level of Evidence: IIA/ class II Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

Study Name	Study N; N for outcome measure; Sex	Mean Age(SD) range	Aphasia Type	Aphasia Severity (WAB-AQ)	Mean MPO range	onvenience sample Treatment(Tx)	Pre-Tx M(SD) Post-Tx M(SD) Change Score	Methodological Rigor
Aftonomos, Appelbaum, & Steele, 1999	60; 29; M=35; F=25	68.60(12.30) 24-86	Broca's= 21 Anomic = 13 Global = 11 Wernicke's = 8 Conduction = 3 TCM = 2 TSM = 1 Isolation=1	Modto-sev.	24.6 .24-144	<b>Type</b> : INT <b>Description</b> : Individual treatment using the Lingraphica (icon-based language system) to provide therapeutic exercises at the appropriate level for participants' severity. Also, focused on improving functional communication outside of the clinic as well as provided home exercises. <b>Intensity</b> : 2x/week, 60 min, 20.5 weeks	42.80(19.00) 62.60 (18.60) 19.80	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Archibald, Orange, & Jamieson, 2009	8; 3; M=2; F=1	77.67(9.02) 69-87	Broca's =1 Anomic =1 Global =1	Mod.=1 Mod to-sev. =2	44.66 10-105	<b>Type:</b> I <b>Description</b> : Computer-provided treatment via AphasiaMate across 8 modules (i.e., auditory comprehension, visual matching, reading comprehension, spelling, semantics, sentence processing). Patients used computer at home or in clinic with trained personnel. <b>Intensity</b> : 1x/week, 60 min, 15 weeks	41.67(3.79) 51.67(6.66) 10	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Babbitt,	74;74;	54.10(16.30)	Nonfluent $= 49$	Mod.	15.5	Type: INT Description: Intensive Comprehensive	46.80(15.70)	Level of Evidence: IIB/class
Worrall, &	M=52;	18-86	Fluent = 25		3-87	Aphasia Program (ICAP): two individual therapy	58.20(16.20)	Ш
Cherney, 2015	F=22					sessions and one session each of constraint-induced	11.4	Study protocol: +
3,						language therapy (CILT), reading/writing, computers		Blinding: -
						and conversation group for six hours of daily		Sampling/allocation: CS
						programming. Intensity: 5x/week, 240 min, 4 weeks		Treatment fidelity: +
								Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: +
								Precision: +
								Intention to treat: N/A
Barthel,	12; 12;	55.20(14.20)	Broca's=8	Modto-sev.	64	Type: INT Description: Model-oriented aphasia	42.60(21.30)	Level of Evidence: IIB/class
Meinzer,	M=5;	35-76	Anomic=1		13-156	therapy (MOAT) was provided on an individual basis. It	51.80(20.90)	Ш
Djundja, &	F=7		Global=1			combines model-oriented aphasia therapy (i.e., target	9.20	Study protocol: +
Rockstroh,			Non-standard=2			semantic system), linguistic approach (i.e., target		Blinding: -
2008						phonological errors), strategy approach (i.e.,		Sampling/allocation: CS
						paraphrasing), communicative approach (i.e., role		Treatment fidelity: -
						playing) and involvement of relatives. Intensity:		Significance of primary
						1x/day, 180 min, 10 days		outcome measure: +
								Significance for st. outcome
								of interest: +
						Y		Precision: +
								Intention to treat: N/A
Code, Torney,	8;7;	52.71(13.40)	Broca's= 3	Mod.	34.43	Type: INT Description: Individual and group therapy	45.00(10.10)	Level of Evidence: IIB/class
Gildea-	M=6;	36-73	Global= 2		9-70	was administered based on participants' pre-treatment	57.50(24.10)	III
Howardine, &	F=1		Wernicke= 1			testing results. Weekly counseling was offered to	12.50	Study protocol: -
Willmes, 2010			Amnesic= 1		7	caregivers & participants. Intensity: 5x/week, 4 weeks		Blinding: +
								Sampling/allocation: CS
								Treatment fidelity: -
								Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: +
								Precision: +
								Intention to treat: N/A

Hough, King, M=1; Vos, & Jeffs, F=2 2008	35-81 Conduction TCM=2 Wernicke's 67.67(10.07) 57-77 Broca's =2 Mixed =1	=1	14-144 52.68 27-93	Treatment (VNeST): PWA were given a verb then, asked to retrieve related agents and patients. They are encouraged and supported to generate multiple pairs of agents and patients for each verb. <b>Intensity</b> : 2x/week, 120 min, 10 weeks <b>Type</b> : INT <b>Description</b> : Intensive therapy using computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase activities and participation. <b>Intensity</b> : 3-4x/week, 60	65.28(11.20) 32.67 26.27(13.49) 38.93(3.09) 12.66	IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Johnson,   3; 3;   67     Hough, King,   M=1;   67     Vos, & Jeffs,   F=2   67     2008   Milman, Vega-   3;3;   6     Milman, Vega-   3;3;   6   6	Wernicke's 67.67(10.07) Broca's =2	Mod.=2		encouraged and supported to generate multiple pairs of agents and patients for each verb. <b>Intensity</b> : 2x/week, 120 min, 10 weeks <b>Type</b> : INT <b>Description</b> : Intensive therapy using computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	26.27(13.49) 38.93(3.09)	Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;	67.67(10.07) Broca's =2	Mod.=2		agents and patients for each verb. <b>Intensity</b> : 2x/week, 120 min, 10 weeks <b>Type</b> : INT <b>Description</b> : Intensive therapy using computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				120 min, 10 weeks <b>Type:</b> INT <b>Description:</b> Intensive therapy using computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				<b>Type</b> : INT <b>Description</b> : Intensive therapy using computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Significance for st. outcome of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	of interest: + Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Precision: + Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Intention to treat: N/A Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Hough, King, Vos, & Jeffs, 2008 Milman, Vega- Mendoza, & M=1;				computer-based augmentative alternative communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	38.93(3.09)	IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
Vos, & Jeffs, 2008   F=2     Milman, Vega- Mendoza, & M=1;   3;3; M=1;   6	57-77 Mixed =1	Sev. = 1	27-93	communication (AAC) (i.e., symbol identification, navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase		Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: -
2008 Milman, Vega- Mendoza, & M=1;				navigation, scenario role play, sentences). It involved training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase	12.66	Blinding: - Sampling/allocation: CS Treatment fidelity: -
Milman, Vega- Mendoza, & M=1;				training caregiver in therapy and use of an AAC device to reduce the severity of the impairment and increase		Sampling/allocation: CS Treatment fidelity: -
Mendoza, & M=1;				to reduce the severity of the impairment and increase		Treatment fidelity: -
Mendoza, & M=1;				to reduce the severity of the impairment and increase		
Mendoza, & M=1;				activities and participation Intensity: 3-4x/week 60		
Mendoza, & M=1;						Significance of primary
Mendoza, & M=1;				min, 12 weeks		outcome measure: -
Mendoza, & M=1;						Significance for st. outcome
Mendoza, & M=1;						of interest: -
Mendoza, & M=1;				Y		Precision: +
Mendoza, & M=1;						Intention to treat: N/A
	62.33(6.35) Nonfluent=	=3 Mod.=2	41	Type: INT Description: Each individual session	48.77(10.46)	Level of Evidence: III/class
Clendenen, F=2	55-66		40-66	targeted: 1) word retrieval 2) sentence production and	49.83(14.91)	IV
				3) discourse-level communication to integrate training	1.07	Study protocol: +
2014				received in steps 1 and 2. Daily homework was		Blinding: -
				assigned focusing on material from steps 1 and 2.		Sampling/allocation: CS
				Group session once weekly to transfer skills from		Treatment fidelity: +
				individual therapy to conversational level. Intensity:		Significance of primary
				4x/week, 60 min, avg. 9 weeks (5-12 weeks)		outcome measure: +
						Significance for st. outcome
						of interest: -
						Precision: +
						Intention to treat: N/A

				Modto-sev.= 2		expression through Go Fish. 1) Volunteer played the game with two PWA. 2) PWA chose a card and asked the other players for a card. 3) Co-player then responded. PWA could use multi-modal communication, as needed. Shaping was included to increase the complexity of their verbal responses. Intensity: 2x/week, 90 min, 4 weeks		Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
2012 N	8; 6; M=2; F=4	60.33(14.49) 47-79	Broca's= 3 TMA =1 TSA =1 Wernicke's= 1	Mild= 1 Mild-to-Mod.= 2 Mod.=2 Modto-sev.= 1	14 5-30	<b>Type:</b> I <b>Description:</b> Errorless Naming: 1) SLP modeled the picture name and PWA repeated 2)SLP showed the written word and PWA read it aloud three times 3)Written word was removed and PWA was given 5 seconds to hold onto it 4) SLP prompted PWA to name it again. Gestural Facilitation: 1) SLP modelled the name and a related gesture 2) SLP modelled the gesture alone for SLP to imitate three times 3) SLP modelled name and PWA repeated three times 4) Clinician modelled gesture while showing the picture 5) After 5 second delay SLP prompted PWA to provide name and gesture again. <b>Intensity</b> : 2-3x/week, 60 min, 10 weeks	64.37(19.91) 59.27(20.42) - 5.09	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
al., 2013 N	11;9; M=4; F=4	60.45(17.67) 18-79	N/A	Modto-sev.	25.81 8-56	<b>Type:</b> INT <b>Description:</b> Individual treatment involved both impairment-based and functional therapy. PWA and family members were involved in group treatment (i.e., share information about available local services, facilitate discussions about "living with aphasia", promoting social interaction and multi-modal communication) Computer-based therapy (i.e., Bungalow, REACT, Speech Sounds on Cue) Challenge Task: specific goal each PWA wanted to achieve by the end of the program. <b>Intensity</b> : 5x/week, 240 minutes, 2 weeks OR 5x/week, 300 minutes, 4 weeks	41.60(15.50) 55.30(16.60) 13.70	Level of Evidence: III/class IV Study protocol: + Blinding: + Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Rose, Attard,	11;10;	59.30(10.37)	Broca's = 5	Mild - 1	46.21	Type: A/P Description: PWA targeted word retrieval in	53.00(22.13)	Level of Evidence: III/class
Mok, Lanyon,	M=5;	39-74	Anomic $= 4$	Mild-to-Mod 2	7-88	small groups through treatment activities including (i.e,.	62.29(20.52)	IV
& Foster, 2013	F = 5		Conduction = 1	Mod. – 3		Go Fish, Memory, Request Role plays, Board games,	9.29	Study protocol: +
				Modto-sev 4		rapid naming while playing snap, Who am I) In CIAT		Blinding: -
						Plus: Verbal production was the goal but cueing was		Sampling/allocation: CS
						provided as needed (i.e,. phonemic cue, written cue). In		Treatment fidelity: +
						multi-modal aphasia therapy (M-MAT): Verbal		Significance of primary
						production was also the goal but, multi-modal cueing		outcome measure: -
						was provided (i.e., gesture, drawing, written model,		Significance for st. outcome
						verbal model). All PWA received both treatments.		of interest: +
						Intensity: 4x/week, 195 min, 4 weeks		Precision: +
								Intention to treat: N/A
Sorin-Peters &	3;3;	69.33(3.06)	Fluent =3	Mild=1	5	Type: INT Description: Individual Therapy goals:	72.00(13.45)	Level of Evidence: III/class
Behrmann,	M=2;	66-72		Mild-to-Mod.=1	3-7	Targeted the impaired process and taught PWA to	69.67(20.13)	IV
1995	F=1			Mod.=1		compensate using non-verbal techniques with the	-2.33	Study protocol: +
						overall goal of increasing PWAs' participation in the		Blinding: -
						community and their conversational skills. Group		Sampling/allocation: CS
						Therapy goals: Gave PWA the opportunity to use		Treatment fidelity: -
						compensatory strategies in a more a natural setting.		Significance of primary
						Individual goals were incorporated into group		outcome measure: -
						discussion. PWA also participated in groups at the Day		Significance for st. outcome
						Treatment Center, which were led by nursing,		of interest: -
						recreational therapy, occupational therapy and social		Precision: +
						work personnel that were trained to use compensatory		Intention to treat: N/A
						strategies with PWA. Intensity: 2x/week, 60 min, avg.		
						22.14 weeks (4-6.5 mos)		
Steele, Baird,	9; 8;	60.75(10.91)	Broca's = 4	Mod.	65.85	Type: INT Description: Individual therapy (i.e.,	49.90(18.60)	Level of Evidence: III/class
McCall, &	M=6;	43-77	Conduction = 1		16-230	improving conversational skills using script training,	67.70(13.60)	IV
Haynes, 2014	F = 2		TCM = 1			sentence patterning and response elaboration), group	17.80	Study protocol: +
-			Isolation = 1			therapy (i.e., word retrieval, improve speech		Blinding: -
			Wernicke's $= 1$			intelligibility, train social exchanges, train longer and		Sampling/allocation: CS
						more complex sentences, increase conversational turns,		Treatment fidelity: +
						improve well-being, increase life participation)and		Significance of primary
						online language exercises (i.e., Talk Path: listening,		outcome measure: +
						speaking, reading and writing activities) Intensity:		Significance for st. outcome
						2x/week, 60 min, 20.6 weeks		of interest: +
						. ,		Precision: +
								Intention to treat: N/A

22; 14;	58.00(13.40)	N/A	Mod.	Chronic	Type: INT Description: Group therapy (i.e.,	48.40(20.43)	Level of Evidence: IIB/class
M=6;	31-81			N/A	conversation, communication skills, art, discussion,	58.10(19.85)	III
F=16					self-advocacy, monitoring communication skills of	9.70	Study protocol: +
					conversation partners) Intensity: 1x/week, 120 min, 7		Blinding: +
					weeks		Sampling/allocation: CS
							Treatment fidelity: -
							Significance of primary
							outcome measure: +
							Significance for st. outcome
							of interest: +
							Precision: +
							Intention to treat: N/A
6; 6;	57.83(8.26)	Nonfluent $= 5$	Mild=1	44.5	Type: A/P Description: PWA received treatment in	40.83(8.13)	Level of Evidence: III/class
M=4;	46-70	Fluent =1	Mild-to-Mod. $= 3$	19-96	two picture Description contexts (i.e., "Tell me about	48.33(10.46)	IV
F=2			Mod. = 2		the picture") and one personal recount context (i.e., "Tell	7.50	Study protocol: +
					me something about anything you would like to talk		Blinding: -
					about.") Intensity: 2-3x/week, 6 weeks		Sampling/allocation: CS
							Treatment fidelity: +
							Significance of primary
							outcome measure: -
							Significance for st. outcome
							of interest: -
					Y		Precision: +
							Intention to treat: N/A
9;8;	51.38(10.04)	Anomic=5	Mild-to-Mod. = 2	17.16	Type: INT Description: PWA participated in Intensive	53.63(16.41)	Level of Evidence: IIA/class
M=7;	28-62	TCM=1	Mod. = 4	6-36	Residential Aphasia Communication Theraprogram	65.25(18.13)	II
F =1		Conduction=1	Modto-sev. =1	$\mathbf{N}$		11.63	Study protocol: +
		Broca's=1	Sev. = 1				Blinding: -
							Sampling/allocation: CS
							Treatment fidelity: -
							Significance of primary
					······································		outcome measure: -
							Significance for st. outcome
							of interest: -
							Precision: +
							Intention to treat: N/A
	M=6; F=16 6; 6; M=4; F=2 9;8; M=7;	M=6; 31-81 F=16 6; 6; 57.83(8.26) M=4; 46-70 F=2 9;8; 51.38(10.04) M=7; 28-62	M=6; F=16 $31-81$ 6; 6; M=4; F=2 $57.83(8.26)$ $46-70$ Nonfluent = 5 Fluent =1   9;8; M=7; F=1 $51.38(10.04)$ $28-62$ Anomic=5 TCM=1 Conduction=1	M=6; F=16 31-81 Mile   6; 6; M=4; F=2 57.83(8.26) Nonfluent = 5 Mild=1   Mile 46-70 Fluent =1 Mild-to-Mod. = 3   Mod. = 2 9;8; M=7; F=1 51.38(10.04) Anomic=5 TCM=1 Conduction=1 Mild-to-Mod. = 2 Mod. = 4	M=6; F=16 31-81 N/A   6; 6; M=4; F=2 57.83(8.26) 46-70 Nonfluent = 5 Fluent = 1 Mild=1 Mild-to-Mod. = 3 Mod. = 2 44.5 19-96   9;8; M=7; F=1 51.38(10.04) 28-62 Anomic=5 TCM=1 Conduction=1 Mild-to-Mod. = 2 Mod. = 4 17.16 6-36	M=6; F=1631-8131-81N/AN/Aconversation, communication skills, art, discussion, self-advocacy, monitoring communication skills of conversation partners) Intensity: 1x/week, 120 min, 7 weeks6; 6; M=4; F=257.83(8.26) 46-70Nonfluent = 5 Fluent =1Mild=1 Mild=to-Mod. = 3 Mod. = 244.5 19-96Type: A/P Description: PWA received treatment in two picture Description contexts (i.e., "Tell me about me something about anything you would like to talk about.") Intensity: 2-3x/week, 6 weeks9;8; H=7; F=151.38(10.04) 28-62Anomic=5 TCM=1 Conduction=1Mild-to-Mod. = 2 Mod. = 217.16 6-36Type: INT Description: PWA participated in Intensive Residential Aphasia Communication Theraprogram (InteRACT Carey et al. 2006). Five hours of daily	M=6; F=1631-8131-81N/AN/Aconversation, communication skills, art, discussion, self-advocacy, monitoring communication skills of vecks58.10(19.85)6; 6; F=257.83(8.26) 46-70Nonfluent = 5 Fluent =1Mild=1 

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Study Name	Study N; N for outcome measure; Sex	Mean Age(SD) range	Aphasia Type	standar Aphasia Severity (WAB-AQ)	Mean MPO range	Treatment(Tx)	Pre-Tx M(SD) Post-Tx M(SD) Change Score	Methodological Rigor
Aftonomos, Steele, & Wertz, 1997	23;10; M=7; F=3	62.20(10.62) 49-77	Anomic = 3 Wernicke's =2 Broca's=4 Conduction =1	Mild = 3 Mod. = 5 Sev. = 2	40.8 9-80	<b>Type:</b> INT: <b>Description</b> : Individual treatment to familiarize PWAs with their Lingraphica (LG) system and improve their performance in areas of weakness. Group treatment for 3 PWA involved PWAs using their LGs to respond to one another with a PACE treatment. PWA assigned exercises for home practice. <b>Intensity</b> : 1.96x/week, 60 min, avg. 14.1 weeks	23.00(12.03) 34.10(16.70) 11.10	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Babbitt, Worrall, & Cherney, 2015	74;74; M = 52; F = 22	54.10(16.30) 18-86	Nonfluent = 49 Fluent = 25	Mod.	15.5 3-87	<b>Type</b> : INT Intensive Comprehensive Aphasia Program (ICAP): two individual therapy sessions and one session each of constraint-induced language therapy (CILT), reading/writing, computers and conversation group for six hours of daily programming. <b>Intensity</b> : 5x/week, 360 min, 4 weeks	16.60(19.00) 20.70(20.50) 4.10	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Breier, Maher, Novak, & Papanicolao,20 06	6;6; M=4; F=2	61.33(8.80) 53-77	Broca's=5 Conduction =1	Above =2 Sev. =2 Mod. =1	47 21-70	<b>Type</b> : A/P <b>Description</b> : Constraint Induced Language Therapy (CILT) = Only verbal expression was accepted and multi-modality communication was restricted, even self-cueing. Treatment was conducted in dyads and consisted of a dual card task with barrier present (i.e., PWA took turns requesting a card or responding another's request). Stimuli included four sets of cards of different semantic categories with two levels of difficulty (i.e., low- and high-frequency). Clinicians used shaping (i.e., increasing communicative demands of request/response from single words to lengthier sentences) and cueing for a successful production (i.e., semantic, phonemic, repetition). <b>Intensity</b> : 4x/week, 180 min, 3 weeks	24.00(24.46) 23.00(24.54) - 1.00	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Edmonds & Kiran, 2006	3 ;3; M=1; F=2	54.00(1.73) 53-56	n/a	Mild =1 Mod. =1 Sev. =1	8.66 8-9	<b>Type: I Description</b> : Semantic feature analysis-based (SFA-based) treatment (Boyle & Coelho, 1995 Kiran & Thompson, 2003) involving the following steps: 1) initial naming attempt 2) written feature verification 3) yes/no feature questions 4) second naming attempt. Treatment was administered in both languages. <b>Intensity:</b> 2x/week, 120 min 7-34 weeks	22.23(20.02) 38.87(8.21) 16.63	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Edmonds, Nadeau, & Kiran, 2009	4; 4; M=1; F=3	61.50(10.08) 52-75	TMA=2 Conduction=2	Mild= 2 Mod.= 2	37.25 10-96	<b>Type:</b> I <b>Description</b> : Verb Network Strengthening Treatment (VNeST): 1) PWA were given a verb. 2) Asked to produce 3-4 thematic role pairs. 3) Picked a thematic role pair and answered wh-questions about it. <b>Intensity</b> : 2x/week, 120 min, avg. 4.75 weeks (4-6 weeks)	36.50(11.24) 44.50(9.40) 8.00	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

Falconer & Antonucci, 2012	4; 4; M=3; F=1	45.75(15.09) 31-62	Conduction=2 Broca's=1 TCM=1	Mod.=1 Sev.=3	86.99 24-156	<b>Type:</b> INT <b>Description</b> : Modified Promoting Aphasics' Communication Effectiveness (PACE) approach: Within a small group, PWA took turns describing stimuli hidden from others with enough detail for others to guess the item) When word-retrieval difficulty occurred, the activity was briefly discontinued while PWA were led through the SFA chart (Boyle,2004) until they accessed the target. HW assignments included describing difficult-to-name pictured objects using SFA outside of treatment sessions. <b>Intensity</b> : 2x/week, 90- 120 min, 7 weeks	9.00(8.29) 11.75(10.90) 2.75	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Ferguson, Evans, & Raymer, 2012	4;4; M=2; F=2	57.75(14.20) 40-74	Broca's=2 Conduction = 1 TCM=1	Above = 1 Mild = 1 Sev. = 2	34.75 22-41	<b>Type: I Description:</b> Intention Gesture Treatment (IGT): 1) Participants generated L-hand gesture and pressed button to view target noun then, attempted to name. 2) If they were inaccurate, the SLP modeled the gesture and noun together and participant imitated 4-6 times. 3) SLP modeled again and PWA rehearsed gesture and verbal production 4-6 times. 4) PWA reattempted to produce the target noun after producing gesture and pressing the red button. Pantomime Gesture treatment (PGT)) 1) PWA were trained to produced pantomime gestures. 2) SLP pushed button to change picture, then PWA attempted to name. 3) If they were inaccurate, SLP produced gesture and verbal model of target and PWA imitated 4-6x. 4) SLP modeled again and participant practiced the gesture and verbal target again. 5) They re-attempted production of the target after SLP pressed button. Intensity: 2-3x/week, 45-60 min, 9-11 weeks	26.75(25.18) 29.50(27.09) 2.75	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Fridriksson, Morrow-Odom, Moser, Fridriksson, & Baylis, 2006	3 ;3; M=3	59.00(10.82) 47-68	Broca's = 2 Anomic = 1	Mild = 1 Sev. = 2	60 24-144	<b>Type:</b> I <b>Description</b> : A combination of spaced retrieval, errorless learning and massed practice techniques were used to treat naming. Target items were selected by participants. Treatment was administered in a group setting. PWA and clinicians played board games and took turns working on naming in between turns in the game. <b>Intensity</b> : 7x/week, 240 min, 2 weeks	13.67(22.81) 14.33(21.39) .67	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

Kendall et al.,	10;10;	52.40(11.40)		Mild=6	59.7	Type: I Description: Phonologically-based treatment:	30.10(13.47)	Level of Evidence: III/class
2008	M=6;	40-76		Mod.=1	16-120	1)Trains subjects on individual phonemes and 2) Trains	33.70(12.61)	IV
	F=4			Sev.=3		phonological and orthographic sequence knowledge at	3.60	Study protocol: +
ł						the syllable level. Intensity: 4x/week, 120 min, 12		Blinding: -
						weeks		Sampling/allocation: CS
								Treatment fidelity: +
ł								Significance of primary
ł								outcome measure: -
ł								Significance for st. outcome
ł								of interest: +
								Precision: +
ł						C		Intention to treat: N/A
Kendall,	8;8;	62.00(9.65)	Mild = 6		63.13	Type I: Description: Naming pictures with semantic,	30.63(12.72)	Level of Evidence: III/class
Raymer, Rose,	M=4;	46-72	Mod. = 1 Severe =		11-120	phonologic, repetition and orthographic cueing	30.75(14.05)	IV
Gilbert, &	F=4		1			hierarchy including a delayed-recall step. Intensity:	.13	Study protocol: +
Gonzalez						5x/week, 120 min, 6 weeks		Blinding: +
Rothi, 2014								Sampling/allocation: CS
								Treatment fidelity: -
ł								Significance of primary
ł								outcome measure: -
ł								Significance for st. outcome
ł								of interest: +
ł						Y		Precision: +
ł								Intention to treat: N/A
Kendall, Oelke,	26;26;	56.04(14.53)	No aphasia=5		47.5	Type: I Description: Multimodal, phonologically-based	34.34(18.11)	Level of Evidence: III/class
Brookshire, &	M=15;	26-78	Mild=6		8-211	therapy using phonemes in isolation and one-, two-, and	37.61(16.17)	IV
Nadeau, 2015	F=11		Mild-to-Mod.=9		$\mathbf{N}$	three-syllable sequences in real words and nonword	3.27	Study protocol: +
,			Mod.=5			combinations. More specifically, Stage 1) targeted		Blinding: -
ł			Modto-severe=1			sounds in isolation and Stage 2) targeted sounds in		Sampling/allocation: CS
					· · · · · · · · · · · · · · · · · · ·	syllables. Each stage involves an overview, introduction		Treatment fidelity: +
						of sounds and sound sequences, perception tasks and		Significance of primary
ł						production tasks. <b>Intensity</b> : 5x/week, 120 min, 6 weeks		outcome measure: +
						· · · · · · · · · · · · · · · ·		Significance for st. outcome
								of interest: +
								Precision: +
	1	1	1		1			Intention to treat: N/A

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Kiran &	4;4	68.50(5.92)	Fluent =4	Sev. = 4	33.75	Type: I Description: Typicality-based SFA treatment	6.45(2.34)	Level of Evidence: III/class
Thompson,	F=3;	63-75			9-99	involving 1) Naming 2) Category Sorting 3) Feature	13.76(6.99)	IV
2003	M=1					Verification 4) Answering yes/no questions Intensity:	7.31	Study protocol: +
						2x/week, 120 min, 17-35 weeks		Blinding: -
								Sampling/allocation: CS
								Treatment fidelity: -
								Significance of primary
								outcome measure: -
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A
Kiran, 2005	3;3;	63.67(4.16)	TCM =1	Mild = 1	156	Type: I Description: Phoneme-to-grapheme	23.02(16.52)	Level of Evidence: III/class
	M=3	59-67	Broca's $= 1$ :	Mod. = 1	24-288	conversion: 1) writing to dictation of the word 2)	28.00(12.51)	IV
			Anomic $= 1$	Sev. = 1		copying the word 3) oral reading of the word 4)	4.98	Study protocol: +
						selecting and writing the sounds of the target 5) writing		Blinding: -
						phonemes of the target word presented aloud 6) writing		Sampling/allocation: CS
						to dictation of the word Intensity: 2x/week, 120 min, 5-		Treatment fidelity: +
						10 weeks		Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: -
						Y		Precision: +
								Intention to treat: N/A
Kiran &	3;3;	62.33(11.15)	Anomic=3	Mild =1	18	Type: I Description: Typicality-based SFA treatment 1)	32.54(16.29)	Level of Evidence: III/class
Johnson, 2008	M=2;	54-75		Mod. =1	7-36	Naming the picture 2) sorting pictures of target category	41.54(7.05)	IV
	F=1			Sev. =1	$\mathbf{N}$	3) selecting written features for the target 4) answering	9.00	Study protocol: -
						written yes/no questions 5) naming the picture		Blinding: -
						Intensity: 2x/week, 120 min, 8-15 weeks		Sampling/allocation: CS
								Treatment fidelity: +
								Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A

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Kiran, 2008	5;5;	58.40(12.03)	Conduction =3	Mod.=2	8.2	Type: I Description: SFA-based treatment involved 1)	14.00(9.06)	Level of Evidence: III/class
	M=1;	47-77	Broca's=2	Sev.=3	7-10	naming the picture 2) sorting pictures by category 3)	27.00(13.56)	IV
	F=4					identify semantic features 4) answer yes/no feature	13.00	Study protocol: +
						questions Intensity: 2x/week, 120 min, 24 weeks		Blinding: -
								Sampling/allocation: CS
								Treatment fidelity: +
								Significance of primary
								outcome measure: -
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A
Kiran,	4;4;	56.75(15.63)	Anomic =4	Mild=3	25.5	Type: I Description: SFA-based treatment involving: 1)	36.51(15.48)	Level of Evidence: III/class
Sandberg, &	M=2;	39-77		Sev. =1	8-43	category sorting 2) feature selection 3) yes/no feature	37.50(11.62)	IV
Abbott, 2009	F=2					questions 4) word recall and 5) free generative naming.	.99	Study protocol: +
						Intensity: 2x/week, 120 min, avg. 12 weeks (6-19)		Blinding: -
								Sampling/allocation: CS
								Treatment fidelity: +
								Significance of primary
								outcome measure: -
								Significance for st. outcome
								of interest: -
						Y		Precision: +
								Intention to treat: N/A
Kiran,	6 ;6;	68.00(15.76)	Anomic=4	Mild=2	43.16	Type: I Description: SFA-based treatment involving 1)	23.50(12.21)	Level of Evidence: III/class
Sandberg, &	M=3;	39-84	Conduction=2	Mod.=1	6-108	category generation 2) category sorting 3) feature	24.16(13.02)	IV
Sebastian, 2011	F=3			Sev.=3	$\mathbf{N}$	generation and/or selection and 4) answering yes/no	.66	Study protocol: +
						feature questions Intensity: 2x/week, 120 min, 10		Blinding: -
						weeks		Sampling/allocation: CS
								Treatment fidelity: +
								Significance of primary
								outcome measure: -
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A

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Wilkins, & Stokes, 2014	8;5; M=2; F=3	67.60(8.26) 58-80	Anomia = 3 Transcortical sensory =1 Wernicke =1	Mild = 4 Mod. = 1	44 17-84	<b>Type</b> : INT <b>Description</b> : Home practice implemented after two weeks of intensive language therapy (ILAT) or modified version of Promoting Aphasic Communicative Effectiveness (PACE). Each participant received two individualized iBook (i.e., objects and actions) to practice at home. Daily practice involved 20 words. Each word had a chapter with five interactive pages in the iBook targeting it. They also met with the SLP once weekly for informal conversation and trouble-shooting. <b>Intensity</b> : 5-6x/week, 20 min, 26 weeks	39.60(10.24) 37.40(11.72) -2.20	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Lacey, Lott, Snider, Sperling, & Friedman, 2010	6; 3; F=3	56.00(15.39) 39-69	Anomic = 3	Mild = 1 Mod. = 2	54.33 13-114	<b>Type:</b> I <b>Description:</b> Multiple Oral Re-reading Treatment: 1) Read text passages three times aloud 2) Re-read words on which they made mistakes. Clinician read the word aloud for them if they could not. PWA re- read the whole sentence if they made so many errors that the sentence flow was disrupted. They were instructed to call the SLP daily and read the passage aloud over the phone. They also read it 5 times at home daily without assistance. <b>Intensity</b> : 1x/week, 60 min, 8 weeks	26.33(7.51) 33.67(3.79) 7.33	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
MacGregor, Difrancesco, Pulvermüller, Shtyrov, & Mohr, 2015	12;12; M=9; F = 3	57.00(15.64) 26-76	Non-fluent	Mod.	81.58 17-234	<b>Type</b> : A/P <b>Description</b> : Intensive Language Action Therapy (ILAT): Treatment involved language games (i.e., making requests) to improve their language and communication. Treatment stimuli included cards depicting scenes/objects. Verbal expression was encouraged and non-verbal communication was discouraged. <b>Intensity</b> : 1x/day, 180-240 min, 10 days	28.58(4.86) 33.00(4.22) 4.42	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A

Milman,	3;3;	N/A(N/A)	Broca's = 3	Sev.	12-84	Type: INT Description: Functional use of adjectives to	16.33(11.37)	Level of Evidence: III/class
Clendenen, &	M=3	56-68				describe people in four different tasks: 1) single-word	22.67(8.50)	IV
Vega-Mendoza,						adjective production 2) single-word pronoun production	6.33	Study protocol: +
2014						3) sentence training and 4) discourse production.		Blinding: -
						Semantic, orthographic and phonemic cues were given		Sampling/allocation: CS
						to facilitate single word use. Intensity: 4x/week, 60		Treatment fidelity: +
						min, avg. 11 weeks (6-18)		Significance of primary
								outcome measure: -
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A
Mohr,	8; 8;	62.38(12.75)	Nonfluent	Mild = 3	87	Type: A/P Description: Intensive Language Action	25.38(16.69)	Level of Evidence: IIB/class
Difrancesco,	M=7;	41-76		Mod. = 1	17-234	Therapy (ILAT): Treatment involved language games	29.75(13.31)	III
Harrington,	F = 1			Sev. = 4		(i.e., making requests) to improve their language and	4.38	Study protocol: -
Evans, &						communication. Treatment stimuli included cards		Blinding: -
Pulvermüller,						depicting scenes/objects. Verbal expression was		Sampling/allocation: CS
2014						encouraged and non-verbal communication was		Treatment fidelity: -
						discouraged. Intensity: 1x/day, 180 min, 10 days		Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: +
						7		Precision: +
								Intention to treat: N/A
Nettleton &	6; 6;	64.83(7.83)	Fluent = 4	Mod. = 1	47	Type: I Description: Semantic therapy involved word-	12.20(6.84)	Level of Evidence: III/class
Lesser, 1991	F=4;	55-74	Anomic $= 1$	Sev. = 5	6-96	picture matching, yes/no feature judgments and category	14.50(6.26)	IV
	M=2		Non-fluent $= 1$			sorting. Phonological therapy involved repetition of	2.30	Study protocol: +
					Y	picture name, rhyme judgment and naming with		Blinding: -
						progressive phonemic cues. Intensity: 2x/week, 60 min,		Sampling/allocation: CS
						8 weeks		Treatment fidelity: -
								Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: +
								Precision: +
								Intention to treat: N/A
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Nickels &	4;4;	59.75(18.66)	Global= 2	Mod. = 3	25.8	Type: A/P Description: Constraint Induced Aphasia	23.25(6.99)	Level of Evidence: III/class
Osborne, 2016	M=3;	34-74	Anomic= 1	Sev. = 1	15-42	Therapy Plus (CIAT-plus): Therapy addressed verbal	25.25(8.18)	IV
	F= 1		TCS=1			expression through Go Fish. 1) Volunteer played the	2.00	Study protocol: +
						game with two PWA. 2) PWA chose a card and asked		Blinding: -
						the other players for a card. 3) Co-player then		Sampling/allocation: CS
						responded. PWA could use multi-modal		Treatment fidelity: +
						communication, as needed. Shaping was included to		Significance of primary
						increase the complexity of their verbal responses.		outcome measure: +
						Intensity: 2x/week, 90 min, 4 weeks		Significance for st. outcome
								of interest: +
								Precision: +
								Intention to treat: N/A
Raymer,	5;4;	70.80(12.11)	Broca's=2	Mod. = 1	18.4	Type: I Description: MossTalk Words (i.e., computer-	6.80(9.98)	Level of Evidence: III/class
Kohen, &	M=2;	51-82	Conduction $= 2$	Sev. = 4	4-42	assisted treatment program). PWA completed multi-	7.80(7.92)	IV
Saffell, 2006a	F=3		Mixed = 1			modal matching exercises involving 1) spoken plus	1.00	Study protocol: +
						written word to picture matching 2) spoken word to		Blinding: -
						picture matching 3) written word to picture matching		Sampling/allocation: CS
						Intensity: 1-2x/week, 60 min, 6-12 weeks, then, 3-		Treatment fidelity: -
						4x/week, 60 min 3-4 weeks. 4 week break in between		Significance of primary
						each 12-hour tx. phase.		outcome measure: +
								Significance for st. outcome
								of interest: -
						7		Precision: +
D	0.0	(0, (7, (0, 0, 0))			20		11.00(11.01)	Intention to treat: N/A
Raymer,	9; 9;	60.67(9.08)	Broca's $= 6$	Mod. = 3	29	<b>Type</b> : I <b>Description</b> : Gesture-Verbal Treatment (GVT):	11.33(11.31)	Level of Evidence: III/class
Singletary, et	M=6; F=3	49-70	Wernicke's $= 2$	Sev. = 6	5-62	1) SLP showed the picture and modeled the target word	12.55(14.11)	IV St. 1
al., 2006b	F=3		Conduction =1			and a gesture. 2) PWA produced word and gesture three times 3) SLP showed gesture in isolation and participant	1.22	Study protocol: +
						imitated three times 4) SLP presented the target and		Blinding: - Sampling/allocation: CS
						PWA repeated it three times 4) After a 5-second delay,		Treatment fidelity: -
						SLP prompted participant to show and tell them what		Significance of primary
						happened in the picture. <b>Intensity</b> : 3-4x/week, 60 min,		outcome measure: +
						10 weeks		Significance for st. outcome
						10 weeks		of interest: +
								Precision: +
								Intention to treat: N/A
	1	1	I		1			mendon to treat. WA
				Y				

Raymer et al., 2012	8;8; M=4; F=4	58.13(14.30) 40-79	Broca's = 4 TMA = 2 TSA = 1 Wernicke's = 1	Mod.= 4 Sev. = 4	13.5 5-30	<b>Type:</b> I <b>Description</b> : Errorless Naming: 1) SLP modelled the picture name and PWA repeated 2)SLP showed the written word and PWA read it aloud three times 3)Written word was removed and PWA was given 5 seconds to hold onto it 4) SLP prompted PWA to name it again. Gestural Facilitation: 1) SLP modelled the name and a related gesture 2) SLP modelled the gesture alone for SLP to imitate three times 3) SLP modelled name and PWA repeated three times 4) Clinician modelled gesture while showing the picture 5) After 5 second delay SLP prompted PWA to provide name and gesture again. <b>Intensity</b> : 2-3x/week, 60 min, 10 weeks	14.63(8.31) 14.50(6.78) 13	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
Rider, Wright, Marshall, & Page, 2008	3; 3; M=2; F=1	63.33(9.07) 55-73	Nonfluent =3	Mild = 1 Mod. = 2	65.67 26-126	<b>Type:</b> I <b>Description</b> : Trained words related to 6-8 contexts (i.e., story retell and procedural narratives) using SFA (e.g., Boyle, 2004 Boyle & Coelho, 1995) <b>Intensity</b> : 2-3x/week, 60 min, 7-14 weeks	30.33(11.06) 34.00(10.15) 3.67	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Rodriguez, Raymer, & Rothi, 2006	4 ;4; M=3; F=1	65.00(9.76) 52-73	Conduction = 2 Wernicke's = 1 Broca's =1	Mild =1 Sev. =3	34.25 8-96	<b>Type:</b> I <b>Description:</b> All PWA received both verb naming treatments. Gesture-Verbal Treatment (GVT): 1) SLP showed the picture and modeled the target word and a gesture. 2) PWA produced word and gesture three times 3) SLP showed gesture in isolation and PWA imitated three times 4) SLP presented the target and PWA repeated it three times 4) After a 5-second delay, SLP prompted participant to show and tell them what happened in the target picture. Semantic-Phonologic Treatment: 1) SLP showed PWA the picture and modeled the target word 2) PWA answered semantic and phonologic questions about the target 3) PWA produced the target three times 4) After a 5-second delay, PWA attempted to explain what was happening in the picture. <b>Intensity</b> : 2-3/week, 60 min, 10-14 weeks	12.50(19.00) 14.75(23.08) 2.25	Level of Evidence: III/class IV Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: N/A

Rodriguez et	11;11;	60.45(17.67)	N/A	Mod.	25.81	Type: INT Description: Individual treatment involved	20.10(19.10)	Level of Evidence: IIB/class
al., 2013	M=4;	18-79			8-56	both impairment-based and functional therapy. PWA	22.50(21.30)	III
	F=4					and family members were involved in group treatment	2.40	Study protocol: +
						(i.e., share information about available local services,		Blinding: +
						facilitate discussions about "living with aphasia"		Sampling/allocation: CS
						promoting social interaction and multi-modal		Treatment fidelity: +
						communication) Computer-based therapy (i.e.,		Significance of primary
						Bungalow, REACT, Speech Sounds on Cue) Challenge		outcome measure: +
						Task: specific goal each PWA wanted to achieve by the		Significance for st. outcome
						end of the program. Intensity: 5x/week, 240 min, 2		of interest: +
						weeks OR 5x/week, 300 min, 4 weeks		Precision: +
								Intention to treat: N/A
Rose, Attard,	11;11;	58.09(10.63)	Broca's = 6	Above =1	44	Type: A/P Description: PWA targeted word retrieval in	20.18(16.28)	Level of Evidence: III/class
Mok, Lanyon,	M= 6;	39-74	Anomic $= 4$ ,	Mild = 1	17-88	small groups through treatment activities including (i.e.,	27.64(18.92)	IV
& Foster, 2013	F = 5		Conduction = 1	Mod. = 4		Go Fish, Memory, Request Role plays, Board games,	7.45	Study protocol: +
				Sev. = 5		rapid naming while playing snap, Who am I) In CIAT		Blinding: -
						Plus: Verbal production was the goal but cueing was		Sampling/allocation: CS
						provided as needed (i.e., phonemic cue, written cue). In		Treatment fidelity: +
						multi-modal aphasia therapy (M-MAT): Verbal		Significance of primary
						production was also the goal but, multi-modal cueing		outcome measure: -
						was provided (i.e., gesture, drawing, written model,		Significance for st. outcome
						verbal model). All PWA received both treatments.		of interest: +
						Intensity: 4x/week, 195 min, 4 weeks		Precision: +
								Intention to treat: N/A
Sandberg,	10; 10;	59.40(10.01)	Anomic=6 2	Above =6	55.7	Type: I Description: PWA were trained on ten abstract	47.34(13.40)	Level of Evidence: III/class
Bohland, &	M=7;	47-75	Conduction=2	Mild= 3	7-134	words in a particular context category (e.g., courthouse)	49.80(13.57)	IV
Kiran, 2015	F=3		Broca's=1	Mod.=1		and ten untrained concrete words from the same	2.46	Study protocol: +
			TCM=1		7	context-category were monitored to measure		Blinding: -
						generalization. Treatment steps included 1) Feature		Sampling/allocation: CS
						selection 2) Abstract/concrete lexical decision 3)		Treatment fidelity: -
						Synonym generation Intensity: 2x/week, 120 min, 10		Significance of primary
						weeks		outcome measure: -
								Significance for st. outcome
					1			of interest: -
					1			Precision: +
					1			Intention to treat: N/A
		•	7		•			
				C '				
				7				

Schwartz,	8;6;	60.00(8.37)	Nonfluent = 5	Above = 1	4.91	Type: I Description: Mapping Therapy: 1) PWA read a	24.33(14.25)	Level of Evidence: III/class
Saffran, Fink,	M=4;	46-70		Mod. = 3	59-102	sentence aloud and then, was given assistance if needed	32.17(15.20)	IV
Myers, &	F=2			Sev. = 2		by the SLP. 2) They were asked to identify the verb, the	7.83	Study protocol: +
Martin, 1994						agent and the patient/theme. 3) PWA would underline		Blinding: -
						the verb and head noun in the noun phrases. Intensity:		Sampling/allocation: CS
						3x/week, 60-90 min, 17.38 weeks		Treatment fidelity: -
								Significance of primary
								outcome measure: +
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A
Silkes, 2015	4; 4;	60.25(1.26)	Fluent=3	Mild = 1	58.5	Type: I Description: Masked repetition priming	24.00(13.44)	Level of Evidence: III/class
	N/A	59-62	Nonfluent=1	Mod. = 1	24-96	treatment: Each section PWA saw prime-picture pair 16	26.50(14.55)	IV
				Sev. = 2		times and had four opportunities to name each picture.	2.50	Study protocol: +
						PWA were instructed to watch the screen and try to		Blinding: -
						name the picture when they saw it for the 4th time.		Sampling/allocation: CS
						Intensity: 2x/day, 12 days		Treatment fidelity: -
								Significance of primary
								outcome measure: -
								Significance for st. outcome
								of interest: -
						Y		Precision: +
								Intention to treat: N/A
van Hees,	8; 8;	56.38(9.15)	Anomic=6	Mild	52.25	Type: I Description: Semantic Feature Analysis (SFA):	38.50(15.44)	Level of Evidence: IIB/class
Angwin,	F=5;	41-69	Conduction=2		17-170	1) Name the item 2) produced semantic features (i.e.,	43.50(14.04)	III
McMahon, &	M=3					use, action, properties, location and association) 3)	5.00	Study protocol: +
Copland, 2013					Y	Name the item again Phonological Components		Blinding: -
						Analysis (PCA) 1) Name the item 2) Produced		Sampling/allocation: CS
						phonological features (i.e., first sound, syllables, last		Treatment fidelity: -
						sound, association and rhyme) Intensity: 3x/week, 60-		Significance of primary
						90 min, 4 weeks		outcome measure: +
								Significance for st. outcome
								of interest: -
								Precision: +
								Intention to treat: N/A
				7				

Votruba, Rapport, Whitman, Johnson, & Langenecker, 2013	50; 50; M=28; F=22	56.80(15.20) 20-85	N/A	Mod.	43.6 N/A	<b>Type</b> : INT <b>Description</b> : Outpatient speech language therapy (SLT): All PWA received mostly individual SLT and adjunct group SLT. Individual SLT addressed expressive language (100%), writing (92%), comprehension/reading/naming (83%), spelling (50%), repetition/prosody (8%). <b>Intensity</b> : Outpatient SLT university clinic schedule	25.70(18.60) 26.90(19.80) 1.20	Level of Evidence: IIB/class III Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: - Precision: + Intention to treat: N/A
				C C C C C C C C C C C C C C C C C C C				

Suppl Note: M=	ementar Male; F = Fer	<b>y Mate</b> male; TCM	rial 7: = transcor	tical motor; TSM = transcortical sensory; sev	. = severe; I =	Impairment-ba	ased treatment;	ing Western Aphasia Battery A/P = activity/participation-based treatment;	<b>– Apha</b> INT = integ	sia Quotient rated treatment; st. =
Study Name	N; Sex	Mean Age (SD) Range	Mean MPO range	stan Treatment (Tx)	dardized; CS = Pre-Tx M(SD) Post-Tx M(SD) Change Score	convenience s Mean Age(SD) Range	sample Mean MPO range	Treatment (Tx)	Pre-Tx M(SD) Post-Tx M(SD) Change Score	Methodological Rigor
Altmann et al., 2014	G=7; M=2; F=5 NG=7 M=6; F=1	72.14 (10.51) 62-92	6+ N/A	Type: I Description: Phase 1 and Phase 2: present pictures for naming Phase 3: PWA was presented with auditory/orthographic representations of category name and PWA generated a category member. Clinicians provided feedback and/or corrected them. Treatment started with L hand opening, reaching into a box to press a red button and making a non-meaningful circular gesture with Left hand during correction phase. Intensity: 5x/week, 120 min, 3 weeks	65.47 (8.34) 67.09 (9.09) 1.62	63.00 (9.22) 53-80	6 MPO+ N/A	Type: I Description: Phase 1 and Phase 2: present pictures for naming Phase 3: PWA was presented with auditory/orthographic representations of category name and PWA generated a category member. Clinicians provided feedback and/or corrected them. Treatment started with therapist pressing a button. There was no hand movement during the correction procedure Intensity: 5x/week, 120 min, 3 weeks	71.91 (11.80) 72.89 (14.50) 0.98	Level of Evidence: IIA/class II Study protocol: + Blinding: - Sampling/allocation:+ Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: +
Des Roches, Balachandran, Ascenso, Tripodis, & Kiran, 2015	E=40; N/A C=9; M=7; F=2	62.98 (10.68) 38-83	53.3 1-178	<b>Type</b> : I <b>Description</b> : Participants completed a variety (between 2-11) of 37 different cognitive or language tasks in Constant Therapy (e.g., naming, rhyming, memory, symbol matching, etc.) <b>Intensity</b> : 5x/week, ~45 min, 10 weeks	68.90 (25.70) 72.90 (23.20) 3.91	67.11 (9.98) 53-87	98 13-359	<b>Type: I Description</b> : Participants completed a variety (between 2-14) of 37 different cognitive or language tasks in Constant Therapy (e.g., naming, rhyming, memory, symbol matching, etc.) <b>Intensity</b> : 1x/week, 40 min, 10 weeks	67.70 (31.70) 68.90 (33.60) 1.12	Level of Evidence: IIA/ class II Study protocol: + Blinding: - Sampling/allocation:+ Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest:+ Precision: + Intention to treat: +
Godecke, Hird, Lalor, Rai, & Phillips, 2012	DT=32; M=14; F=18 UC=27; M=15; F=12	70.30 (12.8)	6.1 DPO N/A	Type: I Description: Participants were administered impairment-based therapies (i.e., lexical-semantic (BOX), mapping, semantic feature analysis (SFA)) Intensity: 5x/week, 30-80 min, 4 weeks	33.78 (26.37) 56.42 (30.76) 22.64	67.70 (15.40)	3.4 DPO N/A	<b>Type:</b> I <b>Description</b> : Participants were administered impairment-based therapies (i.e., lexical-semantic (BOX), mapping, semantic feature analysis (SFA)). <b>Intensity</b> : 1x/week, 80 min, 4 weeks	20.46 (26.11) 34.12 (33.22) 13.66	Level of Evidence: IIB/ class III Study protocol: + Blinding: + Sampling/allocation:+ Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: +

								<u> </u>		Precision: + Intention to treat: +
Godecke et al., 2014	VER=20; M=12; F=8 UC=27; M=15; F=12	70.70 (14.30)	3.4 DPO N/A	<b>Type</b> : INT: <b>Description</b> : PWA received either individual or group therapy. Individual therapy consisted of Semantic Feature Analysis (SFA), Cued Naming Therapy, Lexical-Semantic (BOX), Mapping therapy and/or Phonological Feature Therapy. Group therapy consisted of Constraint Induced Aphasia Therapy (CIAT). 5x/week, 180-240 min, 4 weeks	43.53 (27.02) 67.55 (30.16) 24.02	67.7 (15.4)	3.2 DPO N/A	<b>Type:</b> I <b>Description:</b> 85% of participants did not receive direct speech and language therapy. When participants received therapy, it consisted of BOX therapy, Mapping therapy and Semantic Feature Analysis (SFA). <b>Intensity:</b> 11min, ~ 3 weeks	19.62 (26.26) 32.83 (45.62) 11.75	Level of Evidence: IIB/ class III Study protocol: + Blinding: + Sampling/allocation:CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: +
Katz & Wertz, 1997	CRT=21; N/A CS=29; N/A	61.60 (10.00) 48-83	74.4 12- 228	<b>Type:</b> I <b>Description</b> : Visual matching and reading comprehension software consisted of 10 matching activities (e.g., letters and words) and 22 reading comprehension activities (e.g., letters, words, phrases). The tasks varied in complexity (i.e., 8 difficulty levels). <b>Intensity</b> : 3x/week, 60 min, 26 weeks	68.90 (24.30) 73.60 (22.60) 4.70	66.40 (6.00) 53-76	64.80 21.6-228	Type: N/A Description: Computer stimulation software included games (e.g., Mini Putt) and cognitive rehabilitation tasks (e.g., Captain's Log). Intensity: 3x/week, 60 min, 26 weeks	61.90 (29.50) 63.40 (28.50) 1.50	Level of Evidence: IB/class I Study protocol: + Blinding: + Sampling/allocation:CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: +
Maher et al., 2006	CILT=4; M=3; F=1 PACE=5; M=3; F=2	48.25 (6.99) 40-55	38.75 24-48	<b>Type:</b> A/P <b>Description</b> : Constraint Induced Language Therapy (CILT): Treatment was given in groups of two or three with two clinicians also participating in the group. PWA were constrained to verbal expression only. Multi-modal communication was restricted and a barrier was placed between PWA to further reduce it. They played a card game in which they had to ask another participant for a card with the attempt of matching a card in their own hand. Speakers took turns and responses were shaped to increase complexity over time. <b>Intensity</b> : 4x/week, 180 min, 2 weeks	58.55 (12.99) 65.08 (10.22) 6.52	59.00 (12.81) 41-73	35.4 14-72	<b>Type</b> : A/P <b>Description</b> : Treatment used a modified Promoting Aphasics' Communication Effectiveness (PACE) approach. PWA could use multi-modal communication to perform the task. Intervention was provided to improve any incorrect responses regardless of the modality used. <b>Intensity</b> : 4x/week, 180 min, 2 weeks	53.94 (13.21) 56.90 (13.93) 2.96	Level of Evidence: IIA/ class II Study protocol: + Blinding: - Sampling/allocation:CS Treatment fidelity: + Significance of primary outcome measure: - Significance for st. outcome of interest: - Precision: + Intention to treat: +

Study Name	N; Sex	Mean Age (SD) Range	Mean MPO range	Treatment (Tx)	Pre-Tx M(SD) Post-Tx M(SD) Change Score	Mean Age(SD) Range	Mean MPO range	Treatment (Tx)	Pre-Tx M(SD) Post-Tx M(SD) Change Score	Methodological Rigor
Altmann et al., 2014	G=7; F=5; M=2 NG=7; M=6; F=1	72.10 (10.50) 62-92	N/A 6+	Type: I Description: Phase 1 and Phase 2: present pictures for naming Phase 3: PWA was presented with auditory/orthographic representations of category name and PWA generated a category member. Clinicians provided feedback and/or corrected them. Treatment started with L hand opening, reaching into a box to press a red button and making a non-meaningful circular gesture with Left hand during correction phase. Intensity: 5x/week, 120 min, 3 weeks	24.71 (13.44) 28.57 (16.07) 3.86	63.00 (9.20) 53-80	N/A 6+	<b>Type:</b> I <b>Description</b> : Phase 1 and Phase 2: present pictures for naming Phase 3: PWA was presented with auditory/orthographic representations of category name and PWA generated a category member. Clinicians provided feedback and/or corrected them. Treatment started with therapist pressing a button. There was no hand movement during the correction procedure <b>Intensity</b> : 5x/week, 120 min, 3 weeks	30.86 (6.26) 33.86 (9.56) 3.00	Level of Evidence: IIA/class II Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Des Roches, Balachandran, Ascenso, Tripodis, & Kiran, 2015	E=40; N/A C=9; M=7; F=2	62.98 (10.68) 38-83	53.3 1-178	Type: I Description: Participants completed a variety (between 2-11) of 37 different cognitive or language tasks in Constant Therapy (e.g., naming, rhyming, memory, symbol matching, etc.) Intensity: 5x/week, ~45 min, 10 weeks	28.29 (22.33) 29.45 (21.25) 1.16	67.11 (9.98) 53-87	98 13-359	<b>Type: I Description</b> : Participants completed a variety (between 2-14) of 37 different cognitive or language tasks in Constant Therapy (e.g., naming, rhyming, memory, symbol matching, etc.) <b>Intensity</b> : 1x/week, 40 min, 10 weeks	26.66 (24.40) 26.23 (23.86) 43	Level of Evidence: IIA class II Study protocol: + Blinding: - Sampling/allocation: C Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: N/A
Maher et al., 2006	CILT=4; M=3; F=1 PACE=5; M=3; F=2	48.25 (6.99) 40-55	38.752 4-48	<b>Type</b> : A/P <b>Description</b> : Constraint Induced Language Therapy (CILT): Treatment was given in groups of two or three with two clinicians also participating in the group. PWA were constrained to verbal expression only. Multi-modal communication was restricted and a barrier was placed between PWA to further reduce it. They played a card game in which they had to ask another participant for a card with the attempt of matching a card in their own hand. Speakers took turns and responses were shaped to increase complexity over time. <b>Intensity</b> : 4x/week, 180 min, 2 weeks	18.00 (16.47) 21.00 (17.32) 3.00	59.00 (12.81) 41-73	35.4 14-72	<b>Type</b> : A/P <b>Description</b> : Treatment used a modified Promoting Aphasics' Communication Effectiveness (PACE) approach. PWA could use multi-modal communication to perform the task. Intervention was provided to improve any incorrect responses regardless of the modality used. <b>Intensity</b> : 4x/week, 180 min, 2 weeks	15.20 (19.64) 18.60 (21.98) 3.40	Level of Evidence: IIA/ class II Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: -
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Raglio et al., 2016	E=10; M=7; F=3 C=10 M=7; F=3	61.30 (12.76) 42-89	chronic	Type: INT Description: Music therapy + Speech Therapy: Treatment involved a Promoting Aphasics' Communicative Effectiveness (PACE) approach with the addition of music therapy (i.e., play instruments sing with therapist) Intensity: 2x/week, 75 min, 15 weeks	23.00 (21.00) 26.00 (21.00) 3.00	70.90 (8.99) 61-89	chronic	<b>Type</b> : A/P <b>Description</b> : Treatment consisted of a Promoting Aphasics' Communicative Effectiveness (PACE) approach only. <b>Intensity</b> : 2x/week, 45 mins, 15 weeks	16 (19) 19 (19) 3.00	Level of Evidence: IB/class I Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: - Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: +
Wilssens et al., 2015	CIAT=5; N/A BOX=4; N/A	63.00 (8.00)	61 N/A	<b>Type:</b> INT <b>Description</b> : Constraint Induced Aphasia Therapy (CIAT): PWA participated in a communication-based group with card games (e.g., "Go Fish"). Verbal expression was encouraged in the game context. They were allowed to produce gestures when communicate, but these were hidden from view of other PWA with a screen. <b>Intensity</b> : daily, 120-180 min, 9-10 consecutive working days	30.20 (14.00) 39.8 (13.8) 9.6	71.00 (9.00) 60-81	52	<b>Type:</b> I <b>Description</b> : PWA were administered BOX, a treatment focused on semantic processing using written words, sentences and longer texts. <b>Intensity</b> : daily, 120-180 min, 9-10 consecutive working days	29.00 (20.10) 39.8 (13.9) 10.8	Level of Evidence: IIA/ class II Study protocol: + Blinding: - Sampling/allocation: CS Treatment fidelity: + Significance of primary outcome measure: + Significance for st. outcome of interest: + Precision: + Intention to treat: No attrition: N/A

## Supplementary Material 9: References for all included studies

## **Included Within Group Studies**

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# Supplementary Material 10: Funnel plots for meta-analyses using within group designs

These plots reflect relatively symmetric distribution of studies on both sides of the mean, suggesting limited impact of publication bias

on the overall summary effect size (SES) results.

# Funnel plot for Western Aphasia Battery-Aphasia within group meta-analysis





Funnel plot for Communicative Effectiveness Index within group meta-analysis





## Supplementary Material 11: Forest plots for subgroup analyses using within group study designs

Summary effect sizes for each subgroup and for all of the studies are provided. The difference in means column reflects the pre-treatment mean subtracted from the post-treatment mean. The lower and upper limits columns show the 95% confidence interval surrounding the difference in means. The final row describes the summary effect size, 95% CI, and p-value. The diamond represents the summary effect size. The squares reflect effect sizes of individual studies.

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Model	Group by	Study name	Statistics for each study					Difference in means and 95% Cl				
	Dose Frequency		erence means	Lower limit		p-Value						
	HDF	Babbit & Cherney 2015	7.300	4.866	9.734	0.000	I.	1	I -		1	
	HDF	Ball et al. 2011	5.070	0.344	9.796	0.000						
	HDF	Breier et al. 2006	2.230			0.030				_		
	HDF	Duncan et al. 2006	2.230			0.315						
	HDF									_		
		ML. Johnson et al. 2014	13.050		22.750	0.008						
	HDF	Kendall et al. 2008	5.650			0.000						
	HDF	Kendall et al. 2015	3.970	0.805		0.014				_		
	HDF	Mozeiko et al. 2016_I	8.300		12.475	0.000						
	HDF	Purdy & Wallace 2015	3.360	0.692		0.014				•		
	HDF	Rose et al. 2013	4.520			0.003				_		
	HDF	Wilson et al. 2012	6.180		10.338	0.004						
andom			5.166	3.721		0.000				▶		
	LDF	Aftonomos et al. 1999	9.100		12.629	0.000				<b></b>		
	LDF	Archibald et al. 2009	6.350			0.076			+	•+		
	LDF	Boles 1997		-0.688		0.103				-		
	LDF	Brown & Chobor 1989	8.400		12.029	0.000			-	<b></b>		
	LDF	Cherney et al. 2008	3.700	-3.654	11.054	0.324						
	LDF	Cherney & Halper 2008	2.100	-2.547	6.747	0.376				-		
	LDF	Chemey 2010	2.390	-3.342	8.122	0.414				<b>—</b>		
	LDF	Edmonds & Kiran 2006	10.000	0.202	19.798	0.045						
	LDF	Edmonds et al. 2009	8.270	5.912	10.628	0.000				<b>→</b> →		
	LDF	Edmonds et al. 2014	6.170	3.098	9.242	0.000			— —	<b></b> ∣		
	LDF	Falconer & Antonucci 2012	2.850	0.650	5.050	0.011			<b>——</b>			
	LDF	Ferguson et al. 2012	5.250	-0.659	11.159	0.082						
	LDF	R.K. Johnson et al. 2008	0.530	-12.161	13.221	0.935						
	LDF	Kendall et al. 2014		1.793		0.002						
	LDF	Kiran & Thompson 2003	8.220			0.001				<b></b>		
	LDF	Kiran 2005		-8.985	4.725	0.542						
	LDF	Kiran & Johnson 2008	4.000			0.001				-		
	LDF	Kiran 2008	9.060		12.723	0.000						
	LDF	Kiran et al. 2009	2.830	0.187		0.036						
	LDF	Kiran et al. 2003	3.130	0.031	6.229	0.030				_		
	LDF	Lesser et al. 1986	6.510		10.742	0.048						
	LDF	Macauley 2006		-1.147	3.207	0.003				-		
	LDF	Marshall et al. 2015	2.300	-1.147		0.536						
	LDF	Milman et al. 2013	2.300		9.562	0.000			_	<u> </u>		
	LDF	Miman et al. 2014a Miman et al. 2014b		-1.088		0.000				- <u> </u>		
	LDF									_		
	LDF	Mozeiko et al.2016_D		-0.981		0.144						
		Raymer et al. 2006a		-2.875		0.250						
	LDF	Raymer et al. 2006b		1.735		0.002						
	LDF LDF	Raymer et al. 2012		-0.421		0.066				- <u> </u>		
		Rider et al. 2008		-1.648		0.425				_		
	LDF	Rodriguez et al. 2006		-0.121	6.221	0.059				-		
	LDF	Sandberg et al. 2015	3.800	0.597		0.020				-		
	LDF	Steele et al. 2014	3.500		6.764	0.036				-		
	LDF	Thompson et al. 2003	2.180		6.207	0.289			_ <b></b>	-		
	LDF	Waller et al. 1998	7.000		13.008	0.022						
landom			4.501	3.641	5.360	0.000			🔶			
andom	Overall		4.675	3.936	5.413	0.000			♦			
							-25.00	-12.50	0.00	12.50	25.	
								Negative Effect		Positive Effect		

# Forest plot of Western Aphasia Battery –Aphasia Quotient subgroup analysis for dose frequency

Note: LDF = lower dose frequency treatment schedule, HDF = higher dose frequency treatment schedule. There were no statistically significant differences between summary effect sizes for the lower dose frequency and higher dose frequency subgroups (Q = .601, df = 1, p > .05).

Forest plot of Western Aphasia Battery –Aphasia Quotient subgroup analysis for treatment type

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Group by	Study name	Statistics for each study					Difference in means and 95% Cl			
Freatment Type	Dif	Difference Lower Upper								
	in	means	limit	limit	p-Value					
VP	Breier et al. 2006	2.230	-2.116	6.576	0.315		1		- 1	1
٧P	Cherney et al. 2008	3.700		11.054	0.324					
VP	ML. Johnson et al. 2014	13.050		22.750	0.008					_
/P	Mozeiko et al. 2016_I	8.300		12.475	0.000			-		
VP	Mozeiko et al.2016_D	2.880	-0.981	6.741	0.144				_	
/P	Rose et al. 2013	4.520	1.516	7.524	0.003				-	
/P		5.102	1.734	8.471	0.003					
	Archibald et al. 2009	6.350		13.359	0.076					
	Ball et al. 2011	5.070	0.344	9.796	0.036				<u> </u>	
	Beeson et al. 2003	-0.840	-2.363	0.683	0.280					
	Brown & Chobor 1989	8.400		12.029	0.000				<u> </u>	
	Cherney & Halper 2008	2.100	-2.547	6.747	0.376				_	
	Cherney 2010	2.390	-3.342	8.122	0.414				_	
	Doyle et al. 1987	3.600	2.353	4.847	0.000					
	Duncan et al. 2016	2.620	-1.708	6.948	0.235				_	
	Edmonds & Kiran 2006	10.000		19.798	0.045					
	Edmonds et al. 2009	8.270		10.628	0.000					
	Edmonds et al. 2014	6.170	3.098	9.242	0.000					
	Faroqi-Shah 2008	7.400		10.107	0.000				<b></b>	
	Faroqi-Shah 2013	17.600		29.040	0.003					
	Ferguson et al. 2012	5.250		11.159	0.082					
	Kendall et al. 2008	5.650	3.333	7.967	0.000			-		
	Kendall et al. 2014	4.900	1.793	8.007	0.002				-	
	Kendall et al. 2015	3.970	0.805	7.135	0.014				_	
	Kiran & Thompson 2003	8.220		13.261	0.001					
	Kiran 2005	-2.130	-8.985	4.725	0.542			-		
	Kiran & Johnson 2008	4.000	1.570	6.430	0.001				-	
	Kiran 2008	9.060		12.723	0.000					
	Kiran et al. 2009	2.830	0.187	5.473	0.036				-	
	Kiran et al. 2011	3.130	0.031	6.229	0.048				-	
	Purdy & Wallace 2015	3.360	0.692	6.028	0.014				-	
	Raymer et al. 2006a	4.080		11.035	0.250					
	Raymer et al. 2006b	4.790	1.735	7.845	0.002			_		
	Raymer et al. 2012	6.490		13.401	0.066					
	Rider et al. 2008	1.130	-1.648	3.908	0.425					
	Rodriguez et al. 2006	3.050	-0.121	6.221	0.059				_	
	Sandberg et al. 2015	3.800	0.597	7.003	0.020					
	Schneider & Thompson 2003	4.170	1.500	6.840	0.002					
	Silkes 2015	1.200	-2.410	4.810	0.515					
	Thompson et al. 2003	2.180	-1.847	6.207	0.289					
	Aftenomen et al. 1000	4.422	3.089	5.755	0.000					
NT NT	Aftonomos et al. 1999 Babbit & Cherney 2015	9.100 7.300	5.571 4.866	12.629 9.734	0.000					
NI NT	Babbit & Chemey 2015 Bakheit et al. 2005									
NT	Boles 1997	23.100	-0.688	26.334 7.488	0.000 0.103					-1
NT	Falconer & Antonucci 2012	2.850	-0.688	7.488	0.103					
NT	R.K. Johnson et al. 2008		-12.161		0.011				·	
NT	Lesser et al. 1986	6.510		13.221	0.935					
NT	Macauley 2006	1.030	-1.147	3.207	0.003					
NT	Marshall et al. 2015	2.300	-1.147	9.582	0.536		_			
NT	Miman et al. 2014a	2.300	-4.962	9.562	0.000				•• <sup>-</sup>	
NT	Milman et al. 2014a	7.700		16.488	0.000					
NT	Steele et al. 2014	3.500	0.236	6.764	0.086				_	
NT	Waller et al. 1998	7.000		13.008	0.030					
NT	Wilson et al. 2012	6.180		10.338	0.022					
NT	**115011 et al. 2012	6.476	4.384	8.568	0.004				<u>→</u>	
Verall		5.224	3.594	6.853	0.000					
worall		0.224	3.094	0.003	0.000	-25.00	-12.50	0.00	12.50	25.0
						20.00		0.00		20.0
							Negative Effect		Positive Effect	

Note: I = impairment-based treatment, A/P = activity/participation treatment, INT= integrated treatment. There were no statistically significant differences between summary effect sizes for the different treatment types (Q= 2.64, df= 2, p > .05).



Forest plot of Communicative Effectiveness Index subgroup analysis for dose frequency

Note: LDF = lower dose frequency treatment schedule, HDF = higher dose frequency treatment schedule. There were no statistically significant differences between summary effect sizes for the lower dose frequency and higher dose frequency subgroups (Q = .034, df = 1, p > .05).

Model	Group by	Study name	Statistics for each study					Difference	in means and 9	5% CI
	Dose Frequency		Difference in means	Lower limit	Upper limit	p-Value				
	HDF	Babbitt et al. 2015	4.100	1.841	6.359	0.000			│■	1
	HDF	Breier et al. 2006	-1.000	-5.610	3.610	0.671		_		
	HDF	Fridriksson et al. 2006	0.667	-1.689	3.022	0.579				
	HDF	Kendall et al. 2008	3.600	0.951	6.249	0.008				
	HDF	Kendall et al. 2015	3.270	-0.081	6.621	0.056				•
	HDF	MacGregor et al. 2015	4.420	3.097	5.743	0.000				
	HDF	Mohr et al. 2014	4.370	0.577	8,163	0.024				-
	HDF	Rodriguez et al. 2013	2.400	-3.661	8.461	0.438				_
	HDF	Rose et al. 2013	7.455	3.549	11.360	0.000			— —	<b></b>
	HDF		3.385	1,748	5.021	0.000				
	LDF	Aftonomos et al. 1997	11.100	5.461	16.739	0.000				
	LDF	Edmonds & Kiran 2006	16.633	0.187	33.079	0.047				
	LDF	Edmonds et al. 2009	8.000	3.999	12.001	0.000				
	LDF	Falconer & Antonucci 2012	2 2.750	-2.540	8.040	0.308				_
	LDF	Ferguson et al. 2012	2.750	-0.488	5.988	0.096				
	LDF	Kendall et al. 2014	0.125	-2.825	3.075	0.934			_ <b>_</b>	
	LDF	Kiran & Thompson 2003	7.305	-0.076	14.686	0.052				
	LDF	Kiran 2005	4.980	0.431	9.529	0.032				
	LDF	Kiran & Johnson 2008	9.000	-1.540	19.540	0.094				
	LDF	Kiran 2008	13.000	6.126	19.874					
	LDF	Kiran et al. 2011	0.660	-2.723	4.043	0.702			<del>_</del>	
	LDF	Kurland et al. 2014	-2.200	-7.994	3.594	0.457				
	LDF	Lacey et al. 2010	7.333	2.622	12.045	0.002				
	LDF	Milman et al. 2014b	6.333	-1.029	13.696	0.092				<u> </u>
	LDF	Nettleton & Lesser 1991	2.300	-1.485	6.085	0.234			+	
	LDF	Nickels & Osborne 2016	2.000	-3.934	7.934	0.509			<b>-</b>	-
	LDF	Raymer et al. 2006a	1.000	-1.702	3.702	0.468				
	LDF	Raymer et al. 2006b	1.220	-1.258	3.698	0.335			_+=	
	LDF	Raymer et al. 2012	-0.125	-5.473	5.223	0.963		_	<b>+</b>	
	LDF	Rider et al. 2008	3.667	0.210	7.124	0.038				-
	LDF	Rodriguez et al. 2006	2.250	-8.701	13.201	0.687				
	LDF	Kiran et al. 2009	0.990	-6.554	8.534				<u> </u>	<b>—</b>
	LDF	Sandberg et al. 2015	2.460	0.552	4.368	0.012				
	LDF	Schwartz et al. 1994	7.833	2.516		0.004			<u> </u>	
	LDF	van Hees et al. 2013	5.000	-0.159	10.159					
andom	LDF		3.545	2.333	4.757					
andom	Overall		3.488	2.514	4.462	0.000			- I 🍝	
							-25.00	-12.50	0.00	12.50
								Negative Effect		Positive Effect

# Forest plot of Boston Naming Test subgroup analysis for dose frequency

Note: LDF = lower dose frequency treatment schedule, HDF = higher dose frequency treatment schedule. There were no statistically significant differences between summary effect sizes for the lower dose frequency and higher dose frequency subgroups (Q = .024, df = 1, p > .05).

Model	Group by	Studyname	Stati	stics for e	ach stud	у		Difference in means and 95% CI			
	Treatment Type		Difference	Lower	U pper						
			in means	limit	limit	p-Value					
	A/P	Breier et al. 2006	-1.000	-5.610	3.610	0.671	1	-			
	A/P	MacGregor et al. 2015	4.420	3.097	5.743	0.000			- I - E	┣	~
	A/P	Mohr et al. 2014	4.370	0.577	8.163	0.024			<b>_</b>	<b>-</b>	
	A/P	Nickels & Osborne 2016	2.000	-3.934	7.934	0.509			_ <b>+</b> •-	-	
	A/P	Rose et al. 2013	7.455	3.549	11.360	0.000					
andom	A/P		3.892	1.645	6.138	0.001			- 4		
	1	Edmonds & Kiran 2006	16.633	0.187	33.079	0.047					
	1	Edmonds et al. 2009	8.000	3.999	12.001	0.000				<b></b>	
	1	Ferguson et al. 2012	2.750	-0.488	5.988	0.096				-	
	1	Fridriksson et al. 2006	0.667	-1.689	3.022	0.579			- <b>+</b>		
	1	Kendall et al. 2008	3.600	0.951	6.249	0.008				-	
	1	Kendall et al. 2014	0.125	-2.825	3.075	0.934			$\rightarrow$		
	1	Kendall et al. 2015	3.270	-0.081	6.621	0.056				-	
	1	Kiran & Thompson 2003	7.305	-0.076	14.686	0.052				<u> </u>	
	1	Kiran 2005	4.980	0.431	9.529	0.032				I	
	1	Kiran & Johnson 2008	9.000	-1.540	19.540	0.094			+		
	1	Kiran 2008	13.000	6.126	19.874	0.000				<u> </u>	
	1	Kiran et al. 2011	0.660	-2.723	4.043	0.702			<b></b>		
	1	Laceyet al. 2010	7.333	2.622	12.045	0.002			<u> </u>		
	1	Nettleton & Lesser 1991	2.300	-1.485	6.085	0.234			+	-	
	1	Raymer et al. 2006a	1.000	-1.702	3,702	0.468			- <b>-</b>		
	i.	Raymer et al. 2006b	1.220	-1.258	3.698	0.335			<b></b>		
	i.	Raymer et al. 2012	-0.125	-5.473	5.223	0.963		-		-	
	i	Rider et al. 2008	3.667	0.210	7.124	0.038				_	
	i	Rodriguez et al. 2006	2.250	-8.701	13.201	0.687					
	i	Kiran et al. 2009	0.990	-6.554	8.534	0.797		<u> </u>		_	
	i.	Sandberg et al. 2015	2.460	0.552	4.368	0.012			_ <b>_</b>		
	i.	Schwartz et al. 1994	7,833	2.516	13,151	0.004			<u> </u>		
	i	Silkes et al. 2015	2.500	0.803	4,197	0.004					
	i	van Hees et al. 2013	5.000	-0.159	10.159	0.057			_	<u> </u>	
andom	i		3.177	2.086	4.268	0.000			▲		
anaom	INT .	Atonomos et al. 1997	11,100	5.461	16,739	0.000			•		
	INT	Babbitt et al. 2015	4.100	1.841	6.359	0.000					
	INT	Falconer & Antonucci 2012	2.750	-2.540	8.040	0.308				<u> </u>	
	INT	Kurland et al. 2014	-2.200	-7.994	3.594	0.308					
	INT	Milman et al. 2014	6.333	-1.029	13.696	0.092					
	INT	Rodriguez et al. 20140	2.400	-3.661	8.461	0.092					
	INT	Votruba et al. 2013	1.200	-1.463	3.863	0.430					
andom		voluba et al. 2013									
			3.336	1.184	5.489 4.210	0.002			- 17		
andom	Overall		3.317	2.424	4.210	0.000	-25.00	-12.50	0.00	12.50	25.00
							-20.00		0.00		20.00
								N egative Effect		PositiveEffect	

# Forest plot of Boston Naming Test analysis for treatment type

Note: I = impairment-based treatment, A/P = activity/participation treatment, INT = integrated treatment. There were no statistically significant differences between the summary effect sizes across different treatment types (Q=.32, df= 2, p>.05).

	Study Protocol	Blinding	Sampling	Treatment Fidelity	Statistics- primary	Statistics- standardized	Precision	I-T-T
Within Group	96	10	99	47	50	40	100	N/A
Between Group	100	38	50	88	100	100	100	25

## Supplementary Material 12: Summary of study quality ratings

Note: Value reflects percentage of studies meeting criteria. Statistics-primary indicates that researchers

tested for significance on the primary outcome measure; Statistics-standardized reflects that researchers

tested for significance on the standardized outcome measure of interest (i.e., WAB, BNT, or CETI);

Precision = provided adequate information to calculate an effect size; I-T-T = intention-to-treat analysis

CERTER