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Speech and language therapy for aphasia following stroke (Review)

Kelly H, Brady MC, Enderby P



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[Intervention Review]

Speech and language therapy for aphasia following stroke

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ABSTRACT

Background

Aphasia is an acquired language impairment following brain damage which affects some or all language modalities: expression and understanding of speech, reading and writing. Approximately one-third of people who have a stroke experience aphasia.

Objectives

To assess the effectiveness of speech and language therapy (SLT) for aphasia following stroke.

Search strategy

We searched the Cochrane Stroke Group Trials Register (last searched April 2009), MEDLINE (1966 to April 2009) and CINAHL (1982 to April 2009). In an effort to identify further published, unpublished and ongoing trials we handsearched the *International Journal of Language and Communication Disorders*, searched reference lists of relevant articles and contacted other researchers and authors.

Selection criteria

Randomised controlled trials comparing SLT versus no SLT, SLT versus social support or stimulation, and one SLT intervention versus another SLT intervention. SLT refers to a formal speech and language therapy intervention that aims to improve language and communication abilities and in turn levels of communicative activity and participation. Social support and stimulation refers to an intervention which provides social support or communication stimulation but does not include targeted therapeutic interventions. Direct comparisons of different SLT interventions refers to SLT interventions that differ in terms of duration, intensity, frequency or method of intervention or in the theoretical basis for the SLT approach.

Data collection and analysis

Two review authors independently extracted the data and assessed the quality of included trials. We sought missing data from study investigators if necessary.

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Main results

We included 30 trials (41 paired comparisons) in the review: 14 subcomparisons (1064 participants) compared SLT with no SLT; six subcomparisons (279 participants) compared SLT with social support and stimulation; and 21 subcomparisons (732 participants) compared two approaches to SLT. In general, the trials randomised small numbers of participants across a range of characteristics (age, time since stroke and severity profiles), interventions and outcomes. Suitable statistical data were unavailable for several measures.

Authors' conclusions

This review shows some indication of the effectiveness of SLT for people with aphasia following stroke. We also observed a consistency in the direction of results which favoured intensive SLT over conventional SLT, though significantly more people withdrew from intensive SLT than conventional SLT. SLT facilitated by a therapist-trained and supervised volunteer appears to be as effective as the provision of SLT by a professional. There was insufficient evidence to draw any conclusions in relation to the effectiveness of one SLT approach over another.

PLAIN LANGUAGE SUMMARY

Speech and language therapy for aphasia following stroke

Language problems following a stroke are called aphasia (or dysphasia). About one-third of all people who experience stroke develop aphasia, which can affect one or more areas of communication (speaking, understanding spoken words, reading and writing). Speech and language therapists are involved in the assessment, diagnosis and treatment of aphasia at all stages of recovery, and work closely with the person with aphasia and their carers. There is no universally accepted treatment that can be applied to every person with aphasia. We identified 30 trials involving 1840 randomised participants that were suitable for inclusion in this review. Overall, the review shows evidence from randomised trials to suggest there may be a benefit from speech and language therapy but there was insufficient evidence to indicate the best approach to delivering speech and language therapy.

BACKGROUND

The term aphasia (less commonly referred to as dysphasia) is used to describe an acquired loss or impairment of the language system following brain damage (Benson 1996) and excludes other communication difficulties attributed to sensory loss, confusion, dementia or speech difficulties due to muscular weakness or dysfunction such as dysarthria. The most common cause of aphasia is a cerebrovascular accident (commonly known as stroke), mainly to the left hemisphere, where the language function of the brain is usually situated for right-handed people. About one-third of all people who experience a stroke develop aphasia (Engelter 2006; Laska 2001). The aphasic population is heterogeneous, with individual profiles of language impairment varying in terms of severity and degree of involvement across the modalities of language processing, including the expression and comprehension of speech, reading, writing and gesture (Code 2003; Parr 1997). Variation in severity of expressive impairments, for example, may range from the individual experiencing occasional word-finding difficulties to having no effective means of communication. The severity of aphasia can also change over time as one area of language difficulty may improve while others remain impaired. The impact and the consequential implications of having aphasia for the individuals themselves, their families and society highlight the importance of the effective management and rehabilitation of language difficulties caused by aphasia.

The primary aim of speech and language therapy (SLT*) in aphasia management and rehabilitation is to maximise individuals' ability to communicate. Speech and language therapists are typically responsible for the assessment, diagnosis and, where appropriate, rehabilitation of aphasia arising as a result of stroke. The ability to successfully communicate a message via spoken, written or non-verbal modalities (or a combination of these) within day-to-day interactions is known as functional communication. Recent developments have seen speech and language therapists working closely with the person with aphasia, and in partnership with their families and carers to maximise the individual's functional communication. There is no universally accepted treatment that can be applied to every patient with aphasia and therapists select from a variety of methods to manage and facilitate rehabilitation includ-

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ing, for example, impairment-based therapy and social participation approaches. We undertook this review update to incorporate new evidence, new systematic review methodologies and to reflect recent developments in clinical practice. Details of the differences between this version and the original review published in 1999 are detailed below.

* For the purposes of clarity within this review we have reserved the abbreviation of SLT for speech and language therapy alone.

Amendments to the original review

Following close inspection of the original review and detailed discussion amongst this review team, we made adjustments to the review, many of which reflect changes in Cochrane procedures, review methodologies, and style and structure in the time since the publication of the original review. These amendments were ratified by the Cochrane Stroke Group Editorial Board on 23 November 2006.

Background

We have updated the Background section to include a definition of speech and language therapy and aphasia, and to reflect current approaches and rationale to speech and language therapy interventions and outcomes.

Objectives

We amended the Objectives to a single statement according to the standard format of Cochrane reviews; that is, to examine the effectiveness of speech and language therapy interventions for aphasia following stroke.

Types of studies

It was unclear whether or not quasi-randomised controlled trials were included in the original review. We have excluded quasi-randomised trials in this update.

Types of interventions

We have compressed the Types of interventions into three broad categories: SLT versus no SLT intervention, SLT versus social support or stimulation, and SLT intervention A versus SLT intervention B (where A and B refer to two different types of therapeutic interventions or approaches).

Types of outcome measures

We have refined the Types of outcome measures to a single primary outcome measure of functional communication. Secondary outcomes include other measures of communication (receptive or expressive language, or both), psychosocial outcomes, patient satisfaction with the intervention, number of participant drop-outs for any reason, non-compliance with the allocated intervention, economic outcomes (such as cost to the patient, carers, families, health service and society) and carer or family satisfaction. Data relating to death, morbidity and cognitive skills were extracted in the original review but, on reflection, we did not consider these to be relevant indicators of the effectiveness of a speech and language therapy intervention and we therefore excluded them from this update. The original review had measures of overall functional status (e.g. Barthel Index) as one of a number of primary outcomes. As described above, we focused on a single primary outcome (in line with the current review methodology).

Data extraction tool

We could not obtain the original data extraction tool, therefore two of the review authors (HK and MB) created and piloted a new one before use.

Search methods for identification of studies

Re-running the original search strategy for the MEDLINE and CINAHL databases raised over 12.6 million references. Therefore, Brenda Thomas, the Cochrane Stroke Group Trials Search Co-ordinator, devised up-to-date search strategies. The *International Journal of Language and Communication Disorders* (previously named the *British Journal of Disorders of Communication*, *the European Journal of Disorders of Communication* and the *International Journal of Disorders of Communication)* was handsearched from 1969 to 2005. This journal has been indexed by MEDLINE since 2006 and was thus included in our electronic searches from this date.

Description of studies

The original review listed studies other than identified randomised controlled trials in the Characteristics of excluded studies table, including single case or case series studies. As there are a vast number of such studies, the updated table now only presents potentially relevant studies that appear to be randomised but which were excluded for other reasons (for example quasi-randomised or where aphasia-specific data could not be extracted).

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Comparisons

Mid-trial outcome scores were included in the original review. We have focused our reporting on post-intervention and follow-up scores. We have not included analysis of the number of participants who deteriorated on particular outcome measures.

Other amendments

As we were unable to obtain the extraction sheets for the trials included in the original review, we cross-checked the data extracted for the original review with the available published and unpublished data. We made some amendments, including exclusion of some studies and categorising the methods of allocation concealment used in the included trials.

In this review update we took the decision to exclude quasi-randomised studies and so one study, included in the original review, has been excluded from this review update (Hartman 1987).

On review of the data from another trial (Kinsey 1986), we decided that the reported comparison was not a therapy intervention as such, but rather a comparison of task performance (computer-based or with a therapist). We thus excluded this trial from the review update.

The allocation concealment for one study (MacKay 1988) was considered 'inadequate' in the original review. We failed to get confirmation of the method of allocation from the authors and therefore we amended the allocation for this trial to 'unclear'.

The original review included a matched control group of no SLT intervention for one trial (Prins 1989). However, unlike the other groups in this trial, this group was not randomised, therefore we have excluded it from this update.

Another study (Shewan 1984) had been excluded from the original review on the grounds that it was not a randomised controlled trial. Discussion with the trialists has since revealed that it was a randomised controlled trial, and we have now included it in the review.

The original review included outcomes relating to the impact of SLT on the emotional wellbeing of family members (Lincoln 1984a). We do not feel that such outcomes directly relate to the aims of this review and so we have not included these measures.

New information added to the review

Following an extensive search up to April 2009, we identified an additional 20 trials as suitable for inclusion in the review. There are now 30 included trials involving 1840 randomised participants.

OBJECTIVES

To examine the effectiveness of SLT for aphasia after stroke and in particular if:

1. SLT is more effective than no SLT;
2. SLT is more effective than social support and stimulation;
3. One SLT intervention (SLTA) is more effective than another SLT intervention (SLTB).

SLT intervention A or B refers to variations in intervention that differ in duration, intensity, frequency, method or in the theoretical basis of the approach to the intervention (for example, cognitive neurological versus psychosocial based interventions).

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials that evaluated (one or more) interventions designed to improve language or communication. We included trials that recruited participants with mixed aetiologies or impairments provided it was possible to extract the data specific to individuals with post-stroke aphasia. We did not employ any language restriction.

Types of participants

Adults who had acquired aphasia as a result of a stroke.

Types of interventions

The groupings presented in the original review were compressed into three broad groups for this review update. We have included trials which reported a comparison between a group that received a SLT intervention designed to have an impact on communication and a group that received:

- no SLT intervention; or
- social support and stimulation; or
- an alternative SLT intervention.

Speech and language therapy (SLT)

We considered SLT interventions to be any form of targeted practice tasks or methodologies with the aim of improving language or communication abilities. These are typically delivered by speech and language therapists. In the UK, 'Speech and language therapist' is a protected professional title and refers to individuals holding a professional qualification recognised by the Royal College of Speech and Language Therapists and registered with the Health Professions Council, UK. For the purposes of this review we have

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extended this definition to include therapists belonging to a body of similar professional standing elsewhere in the world.

We are aware that the speech and language therapy profession does not exist in many countries and so in trials conducted in such settings where other clinical staff (for example, medical or nursing staff) led targeted interventions that aimed to improve participants' communicative functioning we have included these interventions within this review as speech and language therapy interventions.

We also recognise that current rehabilitation practice may include SLT interventions that aim to improve communicative functioning but are delivered by non-therapists (family members, SLT assistants, SLT students, voluntary support groups). Where those delivering the intervention have received training from a speech and language therapist and deliver an intervention designed by a speech and language therapist, we have described these as volunteer-facilitated SLT interventions.

Social support and stimulation

Social support and stimulation refers to an intervention that provides social support or stimulation but does not include targeted therapeutic interventions that aim to resolve participants' expressive or receptive speech and language impairments. Interventions in this category might include, for example, emotional, psychological or creative interventions (such as art, dance or music) as delivered by other healthcare professionals (for example, art, physical or music therapists). Other social stimulation interventions, such as conversation or other informal, unstructured communicative interactions are also included in this category.

We did not include pharmacological interventions for aphasia in this review as they are addressed elsewhere (Greener 2001).

Types of outcome measures

Primary outcomes

The primary outcome to indicate the effectiveness of an intervention that aims to improve communicative ability must be the ability to communicate in real world settings, i.e. functional communication. Providing a definition for the concept of functional communication is problematic and even more difficult to evaluate. The ability to functionally communicate relates to language or communicational skills sufficient to permit the transmission of a message via spoken, written or non-verbal modalities, or a combination of these channels. Success is typically and naturalistically demonstrated through successful communication of the message - the speaker communicates their message and the listener understands the message communicated. Attempts to measure this communication success formally vary from analysis of discourse interaction in real life to sampling of specific discourse tasks. Other more formal tools might include the Communicative Abilities of Daily Living (CADL) (Holland 1980) or the Communicative Effectiveness Index (CETI) (Lomas 1989).

Secondary outcomes

Given the lack of a comprehensive, reliable, valid and globally accepted functional communication evaluation tool, surrogate outcome measures of communication ability include formal measures of receptive language (oral, written and gestural), expressive language (oral, written and gestural) or overall level of severity of aphasia where receptive and expressive language are measured using language batteries. Such tools might include, for example, the Western Aphasia Battery (WAB) (Kertesz 1982) or the Porch Index of Communicative Abilities (PICA) (Porch 1967). Other secondary outcomes of relevance to this review include psychosocial impact (i.e. impact on psychological or social wellbeing including depression, anxiety and distress); patient satisfaction with intervention; number of drop-outs (i.e. the number of participants dropping out at treatment or follow-up phases for any reason); compliance with allocated intervention (i.e. the number of participants voluntarily withdrawing from their allocated intervention); economic outcomes (such as costs to the patient, carers, families, health service and society), and carer and family satisfaction. Measures of overall functional status (e.g. Barthel) were extracted in the original review as one of a number of primary outcomes. We also extracted these data, where available, but this information is now presented as a patient descriptor within the Characteristics of included studies table. A full list of outcome measures included in the review and their references can be found in Appendix 4.

Search methods for identification of studies

See the 'Specialized register' section in the Cochrane Stroke Group module.

Electronic searches

We searched the Cochrane Stroke Group Trials Register, which was last searched by the Managing Editor on 7 April 2009. In addition, we searched MEDLINE (January 1999 to April 2009) (Appendix 1) and CINAHL (January 1999 to April 2009) (Appendix 2) using comprehensive search strategies. For the previous version of the review searches of MEDLINE (1966 to 1998) and CINAHL (1982 to 1998) were carried out using simple combinations of text words describing aphasia and speech and language therapy.

Searching other resources

1. We handsearched the *International Journal of Language and Communication Disorders* (formerly the *International Journal of Disorders of Communication*, the *European Journal of Disorders of Communication* and the *British Journal of Disorders of*

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Communication) from 1969 to December 2005. Since 2006 this journal has been indexed in MEDLINE so our comprehensive electronic search identified any relevant trials published in the journal after that date.

2. We checked reference lists of all relevant articles to identify other potentially relevant randomised studies.

3. We contacted all British universities and colleges where SLTs are trained and all relevant 'Special Interest Groups' in the UK to enquire about any relevant published, unpublished or ongoing studies.

4. We approached colleagues and authors of relevant randomised trials to identify additional studies of relevance to this review.

We did not impose any language restrictions.

Data collection and analysis

Selection of studies

Our selection criteria for inclusion in this review were:

1. the study participants included people with aphasia as a result of stroke;

2. the SLT intervention was designed to have an impact on communication; and

3. the methodological design was a randomised controlled trial.

One review author (HK) screened references identified through the search strategy described above and obtained hard copies of all trials that fulfilled the listed inclusion criteria. In the Characteristics of excluded studies table, we have listed studies judged ineligible for inclusion together with reasons for their exclusion. Two review authors (HK and MB) independently made the decision whether to include or exclude studies and they resolved any disagreements through discussion.

Data extraction and management

The data extraction form used in the original review was unavailable so we created and piloted another for use in this review update. Two review authors (HK and MB) independently confirmed the data for the trials as included in the original review and extracted the data for the additional trials included in the update. Any disagreements were resolved through discussion and we extracted the following data: number of sites; methods of randomisation; blinding; attrition from intervention; co-interventions; confounder details; number of participants; age; education; handedness; gender; native language; severity of aphasia; time post-onset; frequency and duration of therapy; details of intervention; outcome measures used and time points; evidence of an a priori sample size calculation; intention-to-treat analysis; and summary data. We attempted to contact investigators for any missing data (or data in a suitable format) for inclusion in the review.

If we identified a cross-over trial design, we considered the suitability of the trial for inclusion in the review in view of a range of factors including the intervention(s) used, the timing of the intervention(s), the impact of any treatment carry over and whether data from relevant paired comparisons within the trial were available. Whenever possible, in such cases we sought individual patient data from the trialists.

Assessment of risk of bias in included studies

We assessed the trials for methodological quality, paying attention to whether there was protection from the following types of bias: selection bias (i.e. true random sequencing and true concealment up to the time of allocation), performance bias (i.e. differences in other types of treatment (co-interventions) between the groups), attrition bias (i.e. withdrawal after trial entry), and detection bias (i.e. 'unmasked' assessment of outcome). We coded concealed allocation as 'adequate', 'unclear', or 'inadequate' according to the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008). In addition, we extracted information on whether power calculations and intention-to-treat analyses were employed. In some cases, for example where all participants were accounted for in the final results, this was not applicable.

Measures of treatment effect

We conducted the review using Review Manager (RevMan 2008) for statistical analysis. We have recorded descriptive information for each trial (characteristics of participants, interventions and outcomes) in the Characteristics of included studies table and issues relating to the methodological quality of the trial in the 'Risk of bias' tables. Where trials made a similar comparison and were judged sufficiently similar in respect of their descriptive information, we pooled the summary data (where available) using meta-analysis. We expressed continuous data as differences in means or standardised difference in means and dichotomised data as odds ratio (OR). We used 95% confidence intervals (CI) throughout the review.

The results of the trials in this review reported measures based on differences in final value scores (scores taken at the end of the intervention) and change-from-baseline scores (also known as change scores). Although the mean differences based on change-from-baseline scores in randomised trials can generally be assumed to address the same intervention effects as mean difference analysis based on final value scores, change-from-baseline scores are given higher weights in analysis than final value scores (Higgins 2008). For this reason, we have used final value scores within the meta-analyses wherever possible. We will not report change-from-baseline scores unless they are the only available values used to report trial results (Higgins 2008).

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Assessment of heterogeneity

We assessed heterogeneity using the I^2 statistic with a value of greater than 50% indicating substantial heterogeneity. Where we observed substantial heterogeneity we used a random-effects model.

Data synthesis

Where a single outcome measure was assessed and reported across trials using different measurement tools, we presented these data in a meta-analysis using a standardised mean differences summary statistic. In cases where the direction of measurement differed it was necessary to adjust the direction of some measures to ensure that all the scales operated in the same direction. For example, measures of comprehension ability generally increase with increasing ability, but in some cases (e.g. the Token Test) improving comprehension skills might be reflected by decreasing scores and so it was necessary to multiply the mean values by -1 to ensure that all the scales operated in the same direction. Standard deviation values were unaffected and we have presented these within the meta-analysis without the need for a directional change.

In cases where only partial summary data were reported, for example mean final value scores were available but standard deviations were unavailable (Wertz 1981), we attempted to calculate these values from available information. When this was not possible we imputed the standard deviation to facilitate inclusion of the trial within the review by using a standard deviation value from a similar participant group (Higgins 2008). We have reported details of where the imputed standard deviation values have come from within the text. Where there was a choice of possible standard deviation values, we took the approach of imputing the highest and lowest values to ensure that both methods provided a similar overall conclusion and then used the highest value in the presentation of the trial within the forest plot.

Where results in a particular comparison were only available in a mixture of final value and change from baseline scores, we presented these data graphically using standardised mean differences but we were unable to pool these results in a meta-analysis.

Subgroup analysis and investigation of heterogeneity

We did not plan any subgroup analyses.

Sensitivity analysis

The original review did not include any planned sensitivity analyses. However, in this updated review we aimed to reflect developments in clinical practice including trials where SLT interventions were delivered or facilitated by non-speech and language therapists. We planned to conduct sensitivity analyses to evaluate any impact the inclusion of these groups of trials may have had on the results of the review.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

The original review included 12 trials. We revisited the decision taken in the original review to include Kinsey 1986 and Hartman 1987. Quasi-randomised trials such as Hartman 1987 have been excluded from this review update while Kinsey 1986 reports a comparison of methods of providing therapy materials rather than a comparison of therapy interventions. Thus of the original 12 trials included in the review, 10 trials remain in this review update. In addition, we revised the decision to exclude one other trial (Shewan 1984) from the original review following communication with the trialists who confirmed that it was a randomised controlled trial.

Results of the search

In our substantially updated search we identified an additional 42 studies of potential relevance to the review (January 1999 to April 2009). Eight of the 42 newly identified trials required translation; six Chinese (Gu 2003; Jufeng 2005; Liu 2006, Wang 2004; Wu 2004; Zhang 2004), one Dutch (van Steenbrugge 1981) and one German paper (Jungblut 2004) for which the translation was provided by the author. Nine studies are ongoing (ACTNow; IHCOP; Kukkonen 2007; Laska 2008; Maher 2008; RATS2; SEATAS; SP-I-RiT; Varley 2005); these may be eligible for inclusion in the review at a later date. These studies are detailed in the Characteristics of ongoing studies table. One study is awaiting translation (Liu 2006). In total we identified 20 new trials as eligible for inclusion in this review update.

Included studies

We have included a total of 30 trials in this review (10 from the original review and 20 identified for this update), which randomised a total of 1840 participants. Six trials randomised individuals across three or more groups (trial arms) but for the purposes of meta-analyses we have presented and pooled the data within paired comparisons. Thus in this review, we have presented the data from these five trials in paired 'subcomparisons'. For example, data from Jufeng 2005 were divided into three subcomparisons of (1) group SLT versus no SLT (Jufeng 2005i), (2) individual SLT versus no SLT (Jufeng 2005ii) and (3) group SLT versus individual SLT (Jufeng 2005iii). Other subcomparisons were Katz 1997i; Katz 1997ii; Lincoln 1982i, Lincoln 1982ii, Lincoln 1982iii, Shewan 1984i; Shewan 1984ii; Shewan 1984iii; Smith 1981i; Smith 1981ii; Smith 1981iii; Wertz 1986i; Wertz 1986ii; Wertz 1986iii. Further details can be found in the Characteristics

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of included studies. As we used paired subcomparisons within this review, there was a risk of including the same group of participants (usually the control group) twice in a single meta-analysis. In such cases we split the number of participants in the control group across the two subcomparisons (Higgins 2008). In the case of continuous data the mean and standard deviation values remained the same. In the case of dichotomous data both the number of events and total number of patients would be split across the relevant number of arms.

Four trials (eight subcomparisons) employed a cross-over design (Elman 1999; Lincoln 1982i; Lincoln 1982ii; Lincoln 1982iii; Lincoln 1984b; Wertz 1986i; Wertz 1986ii; Wertz 1986iii). We carefully considered the suitability of each cross-over trial for inclusion within the review. We considered factors including the suitability of the design, the intervention(s) used, the timing of the intervention(s), the impact of any treatment carry over and finally whether data from relevant paired comparisons from the cross-over data were available. For five subcomparisons we only extracted data up to the point of cross-over (Elman 1999; Lincoln 1982iii; Lincoln 1984b; Wertz 1986i; Wertz 1986ii). In some cases though, the treatment that participants were allocated to receive following cross-over was 'no SLT'. In these cases, the 'no SLT' input after cross-over could be used as a follow-up period. In some cases (e.g. Wertz 1986iii) it was also possible to make suitable paired comparisons within the trial arms during this phase.

In contrast, Lincoln 1982 was also cross-over in design with participants randomly allocated to one of four groups with a sequence of interventions that included one active treatment or placebo either preceded by or followed by conventional SLT. We were very fortunate that the unpublished individual patient data were available for this review update. This access to the data, the design, nature and manner of SLT delivery within the trial and the clinical relevance of the comparisons made it possible to include two paired comparisons of those groups within the review:

- SLT + Operant Training versus SLT + Social Support (Lincoln 1982i);
- Operant Training + SLT versus Social Support + SLT (Lincoln 1982ii).

In addition, by taking the individual data at the point of measurement prior to the cross-over it was also possible to extract and compare the data from those that had received conventional SLT and compare it to those participants that received a social support and stimulation intervention (Lincoln 1982iii).

We have presented data from 41 subcomparisons as they relate to the effectiveness of SLT for aphasia following stroke, within three comparisons: 1. SLT versus no SLT; 2. SLT versus social support and stimulation; and 3. SLT A versus SLT B. We have presented details of data within each comparison below with further details on each subcomparison available in the Characteristics of included studies table. Further participant details can be found in Table 1, an overview of the SLT interventions can be found in Appendix 3 , while details of the assessment tools used can be found in Appendix 4. A summary of all the findings of the results is available at the end of the results section.

1. SLT versus no SLT

We included 14 subcomparisons in this section (Doesborgh 2004b; Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Katz 1997ii; Lincoln 1984a; Lyon 1997; MacKay 1988; Smania 2006; Smith 1981i; Smith 1981ii; Wertz 1986i; Wertz 1986ii; Wu 2004) involving 1064 randomised participants. The SLT intervention was facilitated by a therapist-trained volunteer in two subcomparisons (MacKay 1988; Wertz 1986ii) and by a doctor or nurse in three subcomparisons conducted in China, where the speech and language therapy profession does not exist (Jufeng 2005i; Jufeng 2005ii; Wu 2004). Two additional trials (Prins 1989; Shewan 1984) also compared groups that did and did not receive SLT but the participants were not randomly assigned to these 'no SLT' groups and were thus excluded from this review.

The subcomparisons in this section employed a range of SLT interventions, namely conventional SLT (Jufeng 2005ii; Lincoln 1984a; Smania 2006; Smith 1981ii; Wertz 1986i; Wu 2004), intensive SLT (Smith 1981i), group SLT (Jufeng 2005i), volunteer-facilitated (MacKay 1988; Wertz 1986ii), computer-mediated SLT (Doesborgh 2004b; Katz 1997i; Katz 1997ii) and functionally-based SLT involving a communicative partner (Lyon 1997).

Most participants randomised to the 'no SLT' groups received no alternative treatment or support (Doesborgh 2004b; Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Lincoln 1984a; Lyon 1997; MacKay 1988; Wertz 1986i; Wertz 1986ii; Wu 2004). Only four control arms described an intervention within these 'no SLT' groups. In three cases we considered the control interventions to be similar to standard post-stroke care in the UK - participants were visited at home by a health visitor (Smith 1981i; Smith 1981ii) or they received limb apraxia therapy (Smania 2006). In addition, a fourth control group received computer-based cognitive tasks ('arcade-style games') (Katz 1997ii) that had been specifically designed not to target language rehabilitation. In all four cases we included these groups as 'no SLT' control groups in the review.

SLT interventions were delivered across a wide range of times after the onset of aphasia with timings difficult to summarise because of a lack of detailed reporting. Some trialists recruited participants in the early stages after the onset of stroke - up to 10 weeks (Lincoln 1984a) or up to six months (Wertz 1986i; Wertz 1986ii). Other trials recruited participants longer after stroke, for example between two months and three years after stroke (Smania 2006). In some trials participants were recruited a year or more after their stroke - up to 17 months (Doesborgh 2004b); two years (MacKay 1988) (61% of participants); 10 years (13 to124 months) (Lyon

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1997); 19 years (Katz 1997i); or up to 22 years (Katz 1997ii) after the onset of aphasia. Five subcomparisons failed to report the timing of the SLT intervention in relation to the onset of participants' aphasia (Jufeng 2005i; Jufeng 2005ii; Smith 1981i; Smith 1981ii; Wu 2004).

The frequency of SLT was reported as hours per week or number of times daily. SLT was provided weekly for up to two hours (Doesborgh 2004b; Lincoln 1984a; Smith 1981ii), three hours (Katz 1997i; Katz 1997ii; Smania 2006), four hours (Smith 1981i), six hours (MacKay 1988), eight hours (Lyon 1997) or 10 hours (Wertz 1986i; Wertz 1986ii). SLT was provided daily (duration unclear) within two subcomparisons (Jufeng 2005i; Jufeng 2005ii) while Wu 2004 did not report the frequency of the SLT intervention. All SLT was delivered for at least a month, but in some cases SLT was provided for up to three months (Doesborgh 2004b; Jufeng 2005i; Jufeng 2005ii; Smania 2006; Wertz 1986i; Wertz 1986ii); between five and six months (Katz 1997i; Katz 1997ii; Lincoln 1984a; Lyon 1997; Wu 2004) or for up to a year (MacKay 1988; Smith 1981i; Smith 1981ii).

The subcomparisons used a wide range of outcome measures including functional communication, receptive language, expressive language, severity of impairment, psychosocial impact and economic outcomes. One of the 14 subcomparisons did not report outcome measures (Wu 2004). Nine subcomparisons carried out follow-up assessments at two months (Smania 2006), three months (Jufeng 2005i; Jufeng 2005ii; Wertz 1986i; Wertz 1986ii), six months (MacKay 1988) and 12 months (MacKay 1988) after SLT.

2. SLT versus social support and stimulation

We included six subcomparisons in this section (David 1982; Elman 1999; Lincoln 1982iii; Rochon 2005; Shewan 1984ii; Shewan 1984iii) with 279 randomised participants.

A range of SLT approaches were reported including conventional SLT (David 1982; Lincoln 1982iii; Shewan 1984iii), group SLT (Elman 1999), language-oriented SLT (Shewan 1984ii) and sentence mapping SLT (Rochon 2005). The social support and stimulation interventions were provided by volunteers not known to the participants with aphasia (David 1982), nursing staff (Shewan 1984ii; Shewan 1984iii), speech and language therapists (Lincoln 1982iii; Rochon 2005) or through other social group activities including movement classes, creative arts groups, church activities or support groups (Elman 1999). David 1982 provided the volunteers with detailed information on their patient's communication problems and they were instructed to 'encourage their patient to communicate as well as possible'. Similarly, the nursing staff volunteers (Shewan 1984ii; Shewan 1984iii) were given some information about aphasia and instructed to 'stimulate communication to the best of their ability'. In all three subcomparisons the volunteers were given no guidance or instruction in SLT techniques.

Participants were recruited with aphasia of various duration - up to four weeks (Shewan 1984ii; Shewan 1984iii); up to three years (David 1982; Lincoln 1982iii), seven months to 28 years (Elman 1999) or between two and nine years (Rochon 2005). Interventions were provided weekly for up to two (David 1982; Lincoln 1982iii), three (Shewan 1984ii; Shewan 1984iii) or five hours (Elman 1999) over the course of one (Lincoln 1982iii), four (Elman 1999), five (David 1982) or 12 months (Shewan 1984ii; Shewan 1984iii).

Outcome measures used in this comparison included measures of functional communication, receptive language, expressive language and levels of severity of impairment. Two subcomparisons carried out follow-up measures at four weeks (Rochon 2005), three months and six months (David 1982) after the treatment period.

3. SLT A versus SLT B

We included 21 subcomparisons (732 randomised participants) in this section (Bakheit 2007; Denes 1996; Di Carlo 1980; Doesborgh 2004a; Drummond 1981; Hinckley 2001; Jufeng 2005iii; Leal 1993; Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b; Meikle 1979; Meinzer 2007; ORLA 2006; Prins 1989; Pulvermuller 2001; Shewan 1984i; Smith 1981iii; van Steenbrugge 1981; Wertz 1981; Wertz 1986iii). Three subcomparisons (Bakheit 2007; Prins 1989; Shewan 1984) also reported additional groups but participants were not adequately randomised to these groups and so they have been excluded from this review.

A wide range of SLT interventions were reported including functional SLT (Hinckley 2001), intensive SLT (Bakheit 2007; Denes 1996; ORLA 2006; Smith 1981iii), volunteer-facilitated SLT (Meikle 1979; Meinzer 2007; Leal 1993; Wertz 1986iii), group SLT (Jufeng 2005iii; Pulvermuller 2001; Wertz 1981) and task-specific SLT (Drummond 1981; Prins 1989; Pulvermuller 2001; van Steenbrugge 1981; Shewan 1984i) compared to conventional SLT. Other trials compared a semantic approach to SLT with a phonological approach (Doesborgh 2004a) and filmed programmed instructions with non-programmed activity (Di Carlo 1980).

The duration of participants' aphasia ranged from up to a month (Leal 1993; Shewan 1984i; Smith 1981iii; Wertz 1981), two months (Bakheit 2007), six months (Denes 1996; Doesborgh 2004a; Wertz 1986iii), a year (Lincoln 1984b), two years (Drummond 1981), three years (Lincoln 1982i), five years (van Steenbrugge 1981; Meikle 1979), six years (Di Carlo 1980; Meinzer 2007), eight years (Hinckley 2001), 16 years (Kinsey 1986), 17 years (Prins 1989) or 19 years (Pulvermuller 2001) after the onset of aphasia. Jufeng 2005iii did not report the duration of their participants' aphasia.

Therapy was provided daily (Jufeng 2005iii) for up to three hours (Meinzer 2007; Pulvermuller 2001), or weekly for up to 30 minutes (Drummond 1981), an hour (Lincoln 1984b), one-and-a half hours (Lincoln 1982i; Smith 1981iii), two hours

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(Prins 1989; van Steenbrugge 1981), three hours (Di Carlo 1980; Doesborgh 2004a; Leal 1993; Shewan 1984i), four hours (Meikle 1979; Smith 1981iii), five hours (Bakheit 2007; Denes 1996), eight hours (Wertz 1981), 10 hours (Wertz 1986iii) or 20 hours (Hinckley 2001). Therapy was provided for two weeks (Drummond 1981), four weeks (Jufeng 2005iii), five weeks (Hinckley 2001; Pulvermuller 2001), eight weeks (Lincoln 1982i, Lincoln 1984b), nine weeks (van Steenbrugge 1981), 12 weeks (Bakheit 2007; Wertz 1986iii), 16 weeks (Lincoln 1984b), 30 weeks (Di Carlo 1980), five months (Prins 1989), up to six months (Denes 1996; Leal 1993), nine months (Doesborgh 2004a), 10 months (Wertz 1981), a year (Shewan 1984i, Smith 1981iii) or two years (Meikle 1979).

There was a wide range of outcome measures used in this comparison including measures of functional communication, receptive language, expressive language, severity of impairment and psychosocial impact. Follow-up assessments were carried out at six weeks (Wertz 1986iii) and three months (Jufeng 2005iii; Bakheit 2007) following treatment.

Excluded studies

We excluded 13 studies (Cherney 2007; Cohen 1992; Cohen 1993; Gu 2003; Hartman 1987; Jungblut 2004; Kagan 2001; Kinsey 1986; Meinzer 2005; Rudd 1997; Wang 2004; Wolfe 2000; Zhang 2004). Three additional studies had been excluded from the original review (Kalra 1993; Stoicheff 1960; Wood 1984). Reasons for exclusion were primarily due to inadequate randomisation and the unavailability of aphasia specific data (see details in the Characteristics of excluded studies table).

Risk of bias in included studies

Two review authors independently reviewed the methodological quality of the included studies and resolved disagreements through discussion. Details can be found in the 'Risk of bias' tables for each of the subcomparisons in the Characteristics of included studies table.

The number of participants randomised across subcomparisons included in the review ranged from five to 327 participants. Three comparisons randomised 10 participants or fewer (Drummond 1981; Rochon 2005; van Steenbrugge 1981). Eleven randomised between 11 and 20 participants (Denes 1996; Di Carlo 1980; Doesborgh 2004b; Hinckley 2001; Lincoln 1982i; Lincoln 1982ii; Lincoln 1982iii Lincoln 1984b; Meinzer 2007; Pulvermuller 2001). Eleven randomised up to 50 participants (Elman 1999; Katz 1997i; Katz 1997ii; Lyon 1997; Meikle 1979; Prins 1989; Shewan 1984iii; Smania 2006; Smith 1981i; Smith 1981ii; Smith 1981iii). Thirteen randomised between 51 and 100 participants (Bakheit 2007; Doesborgh 2004a; Jufeng 2005i; Jufeng 2005ii; Jufeng 2005iii; Leal 1993; MacKay 1988; Shewan 1984i; Shewan 1984ii; Wertz 1981; Wertz 1986i; Wertz 1986ii; Wertz 1986iii) and three randomised more than 150 participants (David 1982; Lincoln 1984a; Wu 2004) (see Table 1).

Of the 41 subcomparisons, only 17 listed both inclusion and exclusion criteria. Details of exclusion criteria were unavailable for 19 subcomparisons (Denes 1996; Di Carlo 1980; Hinckley 2001; Jufeng 2005i; Jufeng 2005ii; Jufeng 2005iii; Katz 1997i; Katz 1997ii; Lincoln 1984b; Lyon 1997; MacKay 1988; Meikle 1979; ORLA 2006; Prins 1989; Rochon 2005; van Steenbrugge 1981; Wertz 1981; Wertz 1986i; Wertz 1986ii; Wertz 1986iii) and two listed neither inclusion nor exclusion criteria (Drummond 1981; Wu 2004). For details, see the Characteristics of included studies table.

Suitable statistical data for communication outcomes were only available for 28 of the 41 subcomparisons (Bakheit 2007; David 1982; Denes 1996; Di Carlo 1980; Doesborgh 2004a; Doesborgh 2004b; Hinckley 2001; Jufeng 2005i; Jufeng 2005ii; Jufeng 2005iii; Katz 1997i; Katz 1997ii; Lincoln 1982i; Lincoln 1982ii; Lincoln 1982iii; Lincoln 1984a; Lincoln 1984b; Meikle 1979; Meinzer 2007; ORLA 2006; Prins 1989; Rochon 2005; Smania 2006; van Steenbrugge 1981; Wertz 1981; Wertz 1986i; Wertz 1986ii; Wertz 1986iii). An additional nine subcomparisons contributed data on the trial drop-outs or withdrawals. Psychosocial data were available for one subcomparison (Lincoln 1984a). Appropriate statistical data were not provided or could not be extracted in the remaining three subcomparisons (Drummond 1981; Lyon 1997; Wu 2004).

There was a wide range of variation in the descriptions of the SLT interventions. Most reported the use of a conventional SLT approach (Bakheit 2007; Denes 1996; Drummond 1981; Hinckley 2001; Leal 1993; Lincoln 1982iii; Lincoln 1984b; Prins 1989; Pulvermuller 2001; Shewan 1984i; Shewan 1984iii; Smania 2006; Smith 1981i; Smith 1981ii; Smith 1981iii; van Steenbrugge 1981; Wertz 1981; Wertz 1986i; Wertz 1986iii; Wu 2004) or described an intervention which reflects clinical practice where the therapist was responsible for design and delivery of the treatment (David 1982; Jufeng 2005i; Jufeng 2005ii; Jufeng 2005iii; Lincoln 1984a; Meikle 1979). Other more prescriptive SLT interventions were also evaluated (Denes 1996; Doesborgh 2004a; Doesborgh 2004b; Drummond 1981; Elman 1999; Hinckley 2001; Katz 1997i; Katz 1997ii; Kinsey 1986; Lincoln 1982i; Lincoln 1982ii; Lincoln 1984a; Lyon 1997; MacKay 1988; Meinzer 2007; ORLA 2006; Prins 1989; Pulvermuller 2001; Rochon 2005; Wertz 1981; Shewan 1984i; Shewan 1984ii; Smith 1981iii; van Steenbrugge 1981) and these will be detailed further in later sections.

Twenty-four subcomparisons reported similar groups at baseline (Bakheit 2007; Denes 1996; Di Carlo 1980; Doesborgh 2004b; Drummond 1981; Elman 1999; Hinckley 2001; Katz 1997i; Katz 1997ii; Leal 1993; Lincoln 1982i; Lincoln 1984a; Meikle 1979; Rochon 2005; Shewan 1984i; Shewan 1984ii; Shewan 1984iii; Smania 2006; Smith 1981iii; van Steenbrugge 1981; Wertz 1981; Wertz 1986i; Wertz 1986ii; Wertz 1986iii). Comparison between the groups at baseline was unclear in seven subcompar-

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isons (Jufeng 2005i; Jufeng 2005ii; Jufeng 2005iii; Lincoln 1984b; Lyon 1997; MacKay 1988; Wu 2004). For seven subcomparisons the two groups differed despite randomisation in relation to their time post-onset (Pulvermuller 2001), the severity of their aphasia (Smith 1981i; Smith 1981ii) and age (David 1982; Doesborgh 2004a; Meinzer 2007; Prins 1989). In Meikle 1979 the participants that were allocated to SLT received more weeks of the intervention than the volunteer-facilitated group (P = 0.01).

Allocation

Details of the method of generating the randomisation sequence were only available in nine of the 41 subcomparisons. Six used random numbers tables (Bakheit 2007; David 1982; Katz 1997i; Katz 1997ii; Lincoln 1984a; Smania 2006) and three were computer-generated (Doesborgh 2004a; Doesborgh 2004b; Pulvermuller 2001). The remaining 32 subcomparisons stated that participants were randomly allocated but did not report any further details. Four subcomparisons described stratifying participants by type and severity of aphasia (Leal 1993; Shewan 1984i; Shewan 1984ii; Shewan 1984iii).

Details of the allocation concealment were available for six of the 41 subcomparisons. Five used sequentially numbered sealed envelopes and were considered to be adequately concealed (Bakheit 2007; David 1982; Doesborgh 2004a; Doesborgh 2004b; Lincoln 1984a) but one described a trialist-led allocation method which inadequately concealed participant allocation to the groups (Smania 2006). Data from two subcomparisons (Smith 1981i; Smith 1981ii) are subgroups of participants with aphasia from within a larger trial examining models of stroke care. The main trial described the inclusion of 20 participants with mild dementia but it is unclear whether any of these individuals were included in the aphasia-specific data.

Blinding

Due to the nature of SLT it is difficult to blind either the patient or person carrying out the intervention. However, blinding of the outcome assessor is possible and should be in place to avert detection bias. More than half of the included subcomparisons (23/41) reported blinding of the outcome assessors (Bakheit 2007; Denes 1996; Doesborgh 2004a; Jufeng 2005i; Jufeng 2005ii; Jufeng 2005iii; Lincoln 1982i; Lincoln 1982ii; Lincoln 1982iii; Lincoln 1984a; MacKay 1988; Meinzer 2007; Pulvermuller 2001; Shewan 1984i; Shewan 1984ii; Shewan 1984iii; Smania 2006; Smith 1981i; Smith 1981ii; Smith 1981iii; Wertz 1981; Wertz 1986i; Wertz 1986ii; Wertz 1986iii; Wu 2004). In addition, David 1982 described blinding of outcome assessors but they also report that this was confounded to some extent by indications from the participants being assessed as to which group they were attending. This is likely to have occurred in more than one trial. In other cases blinding was partially in place - for example the assessor for one of several outcome measures was blinded in Lincoln 1984b while Katz 1997i and Katz 1997ii ensured blinding of a second assessor who checked 95% of assessment scores. Blinding however was unclear for eight subcomparisons (Di Carlo 1980; Doesborgh 2004b; Drummond 1981; Hinckley 2001; Leal 1993; Prins 1989; Rochon 2005; van Steenbrugge 1981). Outcome assessors were not blinded for three subcomparisons (Elman 1999; Lyon 1997; Meikle 1979).

Incomplete outcome data

Overall just over a quarter of the 1840 participants randomised across the studies included in this review withdrew or were lost to follow up (431 participants plus 51 at follow up).

Of the 1064 participants in the SLT versus no SLT comparison, a fifth (224) of participants withdrew from the treatment phase of the studies (111 from the SLT interventions and 113 from the 'no SLT' allocation). In addition, 19 participants were lost during the follow-up assessment phase (10 withdrawing from the SLT groups and nine from the 'no SLT' groups) and five more participants withdrew after randomisation but it is unclear which group they were allocated to (Smith 1981i; Smith 1981ii; Smith 1981iii).

The trials that compared SLT to social support and stimulation randomised a total of 279 participants (David 1982; Elman 1999; Lincoln 1982iii; Rochon 2005; Shewan 1984ii; Shewan 1984iii). However, over a quarter of participants (83 participants) were lost during the treatment phase (32 from the SLT group and 51 from the social support groups). Twenty-five additional participants were not included in the follow up (David 1982; Elman 1999).

The final comparison of SLT A versus SLT B involved 732 randomised participants; however a fifth (154 participants) withdrew from the trials during the treatment phase with an additional 10 withdrawing from the follow-up phase. In one trial five participants were reported to have withdrawn from the overall trial but it is unclear which subcomparison group(s) those participants were allocated to (Smith 1981i; Smith 1981ii; Smith 1981iii). Participants in one subcomparison (Meikle 1979) remained in the trial until two successful estimations on an outcome measure showed no appreciable improvement, participants requested withdrawal or until the end of the trial, however no further details were given. Where available, details of drop-outs are presented in Table 2.

Selective reporting

Two subcomparisons reported using intention-to-treat (ITT) analysis but not all participants appeared to be included in the final analyses (Bakheit 2007; Doesborgh 2004a). None of the 23 subcomparisons with participants who had dropped out from the intervention or control groups used ITT analysis (Bakheit 2007; David 1982; Doesborgh 2004a; Doesborgh 2004b; Elman

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1999; Katz 1997i; Katz 1997ii; Leal 1993; Lincoln 1982i; Lincoln 1984a; MacKay 1988; Meikle 1979; Shewan 1984i; Shewan 1984ii; Shewan 1984iii; Smania 2006; Smith 1981i; Smith 1981ii; Smith 1981iii; Wertz 1981; Wertz 1986i; Wertz 1986ii; Wertz 1986iii). All randomised participants were included in the final analyses for the remaining 15 subcomparisons.

Recruitment and retention of stroke rehabilitation trial participants is known to be a challenge and the trials in this review were no exception. However, seven trials only reported data (including demographic data) from participants that remained in the trial at the end of treatment or at follow up. David 1982 reported data from 133 of 155 randomised participants, Doesborgh 2004b reported 18 of 19 randomised participants, Katz 1997i reported 36 of 42 randomised participants, Katz 1997ii reported 40 of 42 randomised participants, Lincoln 1984a reported 191 of 327 randomised participants, MacKay 1988 reported 95 of 96 randomised participants and Smania 2006 reported 33 of 41 randomised participants. More recently, to minimise the possibility of bias, trialists have been encouraged to report data from all randomised participants.

Other potential sources of bias

Co-interventions were reported by some trialists that compared the effects of SLT with no SLT but the number and allocation of the participants and details of the intervention were unclear. For example, some participants in Doesborgh 2004b also received psychosocial group therapy. Some (or all) of the participants reported in Smith 1981i may have benefited from other intensive treatment as part of the larger multi-disciplinary stroke trial. Three subcomparisons reported that not all participants received the planned number of treatment sessions (Lincoln 1984a; Smith 1981i; Smith 1981ii).

Similarly, five subcomparisons that compared two different approaches to SLT provision reported that not all participants received the planned number of treatment sessions (Bakheit 2007; Lincoln 1982i; Lincoln 1982ii; Meikle 1979; Smith 1981iii). In one case (Meikle 1979) it was reported that five of the 16 participants receiving conventional SLT missed up to half of their possible treatment. Two trials comparing intensive SLT with conventional SLT also reported difficulties providing intensive SLT interventions as planned. Bakheit 2007 reported that only 13 of the 51 participants received 80% or more of the planned intensive intervention. Smith 1981iii reported that participants allocated to intensive therapy only received an average of 21 hours of therapy compared to the planned minimum of 50 hours during the first three months. Such difficulties in maintaining a clear distinction between the two treatment groups has significant implications when evaluating the results and considering the clinical implications of such treatment regimens.

Though all the speech and language therapists in Hinckley 2001 were trained in the characteristics of the two treatment approaches being compared, treatment review processes were in place to ensure any possible risk of overlap in therapy approach was minimised. Being part of a larger stroke trial, participants in the Smith 1981iii trial also received other intensive treatment which may have affected their levels of fatigue and ability to fully participate in SLT intervention.

Effects of interventions

The results of this review are presented below within the three comparisons: 1. SLT versus no SLT, 2. SLT versus social support and stimulation and 3. SLT A versus SLT B. Where possible results from meta-analyses are also reported. As described within the Measures of treatment effect section, we extracted the final value scores for subcomparisons for inclusion within this review whenever possible. Final values scores were available for 23 of the 41 subcomparisons and these have been included within the review. Change-from-baseline data were available for an additional three subcomparisons (Denes 1996; Doesborgh 2004a; Hinckley 2001). Where change-from-baseline data are used they are clearly marked and the data are not pooled within the meta-analyses with final value scores.

Comparison 1: SLT versus no SLT

A total of 1064 participants were randomised across 14 subcomparisons that contrasted SLT with no SLT (Doesborgh 2004b; Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Katz 1997ii; Lincoln 1984a; Lyon 1997; MacKay 1988; Smania 2006; Smith 1981i; Smith 1981ii; Wertz 1986i; Wertz 1986ii; Wu 2004). Reporting of age and other descriptions of the participants across trials varied, making it difficult to give an overview of the participants involved in this comparison. Only four trials reported age ranges, spanning 38 to 92 years of age (Lincoln 1984a; Lyon 1997; Smania 2006; Wu 2004), while others reported participants' mean age or age bands. Details can be found in Table 1. Nine subcomparisons gave an indication of the length of time since participants had experienced the onset of their aphasia: the widest post-onset time spanning from two to 36 months (Smania 2006). The shortest mean length of time since the onset of participants' aphasia was between 6.6 and 7.8 weeks (Wertz 1986i; Wertz 1986ii). Severity of aphasia was only reported by five subcomparisons (Doesborgh 2004b; Smith 1981i; Smith 1981ii; Wertz 1986i; Wertz 1986ii), although two additional subcomparisons did provide some guide to severity of impairment (Lyon 1997; Smania 2006).

Amongst the SLT interventions compared to a 'no SLT' group were interventions described as conventional SLT (Jufeng 2005ii; Smania 2006; Smith 1981ii; Wertz 1986i; Wu 2004), computer-mediated SLT (Doesborgh 2004b; Katz 1997i; Katz 1997ii); group SLT (Jufeng 2005i); functional SLT (Lyon 1997); intensive SLT (Smith 1981i); SLT plus operant training (Lincoln 1984a) and volunteer-facilitated SLT (MacKay 1988; Wertz 1986ii). We planned to conduct a sensitivity analysis on subcomparisons that

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involved the provision of SLT by non-speech and language therapists (Jufeng 2005i; Jufeng 2005ii; MacKay 1988; Wertz 1986ii) but because of the present availability of data within each outcome it was not useful to undertake this analysis.

Appropriate summary data for communication outcomes (allowing inclusion in the meta-analyses) were available for only nine of the 14 subcomparisons (Doesborgh 2004b; Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Katz 1997ii; Lincoln 1984a; Smania 2006; Wertz 1986i; Wertz 1986ii). In addition, Lincoln 1984a also reported statistical data for psychosocial outcomes. Suitable summary data were not reported (or available on request) for the remaining five subcomparisons (Lyon 1997; MacKay 1988; Smith 1981i; Smith 1981ii; Wu 2004). Where data for this comparison were available they are presented below in relation to the following: 1. functional communication; 2. receptive language; 3. expressive language; 4. severity of impairment; 5. psychosocial; 6. number of drop-outs; 7. compliance with allocated intervention; 8. economic outcomes.

1. Functional communication

Eight of the 14 subcomparisons (Doesborgh 2004b; Katz 1997i; Katz 1997ii; Lincoln 1984a; Lyon 1997; MacKay 1988; Wertz 1986i; Wertz 1986ii) compared participants that received SLT to those randomised to 'no SLT' by measuring functional communication outcomes. Five had suitable statistical data available allowing inclusion within the meta-analyses (Doesborgh 2004b; Katz 1997i; Katz 1997ii; Wertz 1986i; Wertz 1986ii). Tools used included the spontaneous speech subtest of the Western Aphasia Battery (WAB) (Katz 1997i; Katz 1997ii) and the Amsterdam-Nijmegen Everyday Language Test (ANELT-A) (Doesborgh 2004b), the Communication Activities of Daily Living (CADL) (Wertz 1986i; Wertz 1986ii) and the Functional Communication Profile (FCP) (Lincoln 1984a; Wertz 1986i; Wertz 1986ii).

Spontaneous speech

Three subcomparisons evaluated the impact of SLT by contrasting the spontaneous speech of participants who received computer-mediated SLT with those who did not (Doesborgh 2004b; Katz 1997i) or those who received computer-mediated non-linguistic tasks (Katz 1997ii). Comparisons were made using a subtest of the WAB (Katz 1997i; Katz 1997ii) or the ANELT-A (Doesborgh 2004b). There was no evidence of a significant difference in the measures of participants' spontaneous speech abilities on these measures though Doesborgh 2004b may demonstrate a trend towards better spontaneous speech skills in those participants that had access to SLT than those that did not (P = 0.08, SMD 0.88, 95% CI -0.10 to 1.87) (Analysis 1.1).

Communication Activities of Daily Living (CADL)

Four subcomparisons used the CADL to compare the functional communication skills of participants that received SLT (conventional SLT (Wertz 1986i), volunteer-facilitated SLT (MacKay 1988; Wertz 1986ii) and functional SLT (Lyon 1997)), and those that received no SLT intervention. Two subcomparisons provided statistical data which allowed inclusion within a meta-analysis (Wertz 1986i; Wertz 1986ii). There was no evidence of a difference between the groups provided with SLT and those that were not (Analysis 1.1).

Functional Communication Profile (FCP)

Three subcomparisons (Lincoln 1984a; Wertz 1986i; Wertz 1986ii) compared the pragmatic provision of SLT (approach tailored to individual participants' needs) to a deferred SLT intervention using the FCP. Appropriate summary data for Lincoln 1984a on this outcome measure were not available. There was no evidence of a difference between the groups.

In pooling the results of functional communication measures within the meta-analysis only one set of functional communication measures from Wertz 1986i and Wertz 1986ii could be included at a time. Neither pooling approach provided evidence of a difference between the groups (by including the CADL data P = 0.16, SMD 0.19, 95% CI -0.13 to 0.50; including FCP data P = 0.08, SMD 0.28, 95% CI -0.03 to 0.59). We have chosen to present the data from the FCP within the forest plot (Analysis 1.1).

2. Receptive language

Five of the 14 subcomparisons measured participants' receptive language skills (Katz 1997i; Katz 1997ii; Smania 2006; Wertz 1986i; Wertz 1986ii) and all reported statistical data which permitted inclusion in the meta-analyses. Auditory comprehension was measured using the Token Test, a WAB subtest and the Porch Index of Communicative Abilities (PICA) subtest. Reading comprehension was measured using the Reading Comprehension Battery for Aphasia and the reading subtest of the PICA. Gesture comprehension was measured using an unnamed assessment.

Auditory comprehension

Two subcomparisons used a subtest of the WAB to measure participants' auditory comprehension (Katz 1997i; Katz 1997ii). There was no evidence of a difference between the groups that received computer-mediated SLT and those that did not. The same participants' auditory comprehension skills were also measured on a subtest of the PICA. Three subcomparisons used the Token Test to measure changes in participants' auditory comprehension (Smania 2006; Wertz 1986i; Wertz 1986ii). As above, both sets of data from Katz 1997i and Katz 1997ii could not be included in the same meta-analysis. On pooling the data within two separate meta-analyses, neither demonstrated a significant difference

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between the groups (by including the WAB data P = 0.59, SMD 0.08, 95% CI -0.21 to 0.38; by including the PICA data P = 0.52, SMD 0.10, 95% CI -0.20 to 0.39). We have chosen to present the PICA data within the forest plot (Analysis 1.2).

Reading comprehension

Reading comprehension was measured by four subcomparisons (Katz 1997i; Katz 1997ii; Wertz 1986i; Wertz 1986ii) that compared participants that received SLT and those that did not. Two trials used the Reading Comprehension Battery for Aphasia to compare participants that received volunteer-facilitated SLT with those that received no SLT (Wertz 1986i; Wertz 1986ii). Similarly, two trials used the PICA reading subtest to compare participants that received computer-mediated SLT to those that received no treatment (Katz 1997i) or computer-mediated non-linguistic tasks (Katz 1997ii). On pooling of the data there was no evidence of a difference between the groups (Analysis 1.3).

Other comprehension

The PICA gestural subtest was used by four subcomparisons (Katz 1997i; Katz 1997ii; Wertz 1986i; Wertz 1986ii) and measures, not just gestural abilities, but also tests auditory and written comprehension skills. Following pooling, participants that received SLT had achieved higher scores on measures of gesture use than the groups that received no SLT (P = 0.02, MD 8.04, 95% CI 1.55 to 14.52) (Analysis 1.4).

Gesture comprehension

Smania 2006 used an unnamed gesture comprehension assessment tool to compare a group that received conventional SLT and those that received limb apraxia therapy at two time points: after intervention and again two months later. There was no evidence of a difference between the two groups' comprehension of gestures at either time point (Analysis 1.5).

3. Expressive language

Five of the 14 subcomparisons (Doesborgh 2004b; Katz 1997i; Katz 1997ii; Wertz 1986i; Wertz 1986ii) formally evaluated participants' expressive language skills using single word picture naming (Boston Naming Test and WAB naming subtests), repetition (WAB repetition subtest) and other verbal expression (PICA) skills. Written language expressive skills were measured using the PICA copying and writing subtests while the ability to communicate using gesture was measured using the PICA gesture subtest.

Expressive language: naming

Participants' spoken language abilities were measured by three subcomparisons (Doesborgh 2004b; Katz 1997i; Katz 1997ii). Doesborgh 2004b used the Boston Naming Test to compare a group receiving computer-mediated SLT and a group that did not receive SLT. Similarly, Katz 1997i and Katz 1997ii employed the WAB naming subtest. On pooling there was no evidence of a difference between the groups (Analysis 1.6).

Expressive language: general

Four subcomparisons used the PICA verbal subtest to compare the spoken language skills of groups that received SLT and those that did not (Katz 1997i; Katz 1997ii; Wertz 1986i; Wertz 1986ii). There was no evidence of a between-group difference (Analysis 1.7).

Expressive language: written

Two subcomparisons compared a group receiving computer-mediated SLT to a group receiving no SLT (Katz 1997i) or a group receiving computer-mediated non-linguistic tasks (Katz 1997ii) using the PICA copying and writing subtests. Wertz 1986i and Wertz 1986ii used the PICA Graphic subtests. Following pooling there was no evidence of a difference between the groups on any of these measures (Analysis 1.8).

Repetition

Katz 1997i and Katz 1997ii compared participants that received computer-mediated SLT with participants that received no SLT (Katz 1997i) and participants that received computer-mediated non-SLT tasks (Katz 1997ii) using the WAB repetition test. Following pooling there was no evidence of a difference in the participants' repetition skills on these measures (Analysis 1.9).

4. Severity of impairment

Ten subcomparisons compared participants that received SLT with those that did not by measuring the severity of their aphasia impairment using an aphasia quotient and language assessment batteries (Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Katz 1997ii; Lincoln 1984a; Lyon 1997; Smith 1981i; Smith 1981ii; Wertz 1986i; Wertz 1986ii). Language assessment batteries included the PICA, Boston Diagnostic Aphasia Examination (BDAE) and the Minnesota Test for Differential Diagnosis of Aphasia (MTDDA). Details of the Chinese Rehabilitation Research Centre Aphasia Examination (CRRCAE) assessment were not available to us. We were able to obtain suitable statistical summary data from these outcome measures for six subcomparisons (Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Katz 1997ii; Wertz 1986i; Wertz 1986ii). Data from two subcomparisons that used the CRRCAE to compare participants' aphasia following group SLT (Jufeng 2005i) or

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one-to-one SLT (Jufeng 2005ii) with a group that received no SLT were available. Four additional subcomparisons compared groups that received computer-mediated SLT (Katz 1997i; Katz 1997ii), conventional SLT (Wertz 1986i) or volunteer-facilitated SLT (Wertz 1986ii) to groups that received no SLT (Katz 1997i; Wertz 1986i; Wertz 1986ii) or a computer-mediated non-SLT intervention (Katz 1997ii) using the PICA. On pooling, there was no evidence of a difference between the groups that received SLT and those that did not in measures of severity of aphasia impairment using either the Katz 1997i and Katz 1997ii PICA data (P = 0.19) or the WAB data (P = 0.28). We have chosen to present the PICA data (Analysis 1.10).

Jufeng 2005i and Jufeng 2005ii also repeated the comparison of participants who received group SLT and conventional SLT with those who had not received any SLT on measures of aphasia severity at a three-month follow up. The group that received group SLT scored significantly higher than those that received no SLT but on pooling (using a random-effects model in the presence of significant statistical heterogeneity) there was no evidence of a difference between the groups (Analysis 1.11).

5. Psychosocial

Four subcomparisons compared the benefits of SLT intervention to no SLT by employing psychosocial measures including the Multiple Affect Adjective Checklist (MAAC), the General Health Questionnaire (GHQ), the Affect Balance Scale and the Psychological Wellbeing Index (Lincoln 1984a; Lyon 1997; Smith 1981i; Smith 1981ii).

Lyon 1997 used the Affect Balance Scale and Psychological Wellbeing Index to compare a group of triads (person with aphasia, caregiver and communication partner) that received functional SLT that aimed to establish and maximise effective means of communication between communication partners and a group that received no SLT. Suitable summary data for these measures were unavailable and so they could not be included in this meta-analysis. Similarly, the GHQ was used to compare groups that received either intensive SLT (Smith 1981i) or conventional SLT (Smith 1981ii) with a group that received no treatment but no summary data were available for inclusion in this analysis. Lincoln 1984a used the anxiety, depression and hostility scales of the MAAC to compare the psychosocial wellbeing of a group that received SLT (determined by the therapist) with a group that received no SLT. Comparison of the groups failed to show any evidence of a difference in the participants' anxiety, depression or hostility as measured on these scales (Analysis 1.12).

6. Number of drop-outs

Much of the information relating to the numbers of participant drop-outs (where they occurred) was available for all 14 subcomparisons (Doesborgh 2004b; Jufeng 2005i; Jufeng 2005ii; Katz 1997i; Katz 1997ii; Lincoln 1984a; Lyon 1997; MacKay 1988; Smith 1981i; Smith 1981ii; Smania 2006; Wertz 1986i; Wertz 1986ii; Wu 2004).

There was a range of reasons for the attrition of participants from the trials (see Table 2 for details). One-fifth of participants randomised to this comparison withdrew during the treatment phase (229 participants) and an additional 19 participants were lost at the follow-up phase from across 11 subcomparisons (Doesborgh 2004b; Katz 1997i; Katz 1997ii; Lincoln 1984a; MacKay 1988; Smith 1981i; Smith 1981ii; Smania 2006; Wertz 1986i; Wertz 1986ii; Wu 2004). An additional five participants withdrew from Smith 1981i and Smith 1981ii (group allocation is unclear but these withdrawals are included in the number above) and they failed to report the number of withdrawals from the no SLT group. On pooling of the available data relating to drop-outs there was no evidence of a difference between the groups (Analysis 1.13).

7. Compliance with allocated intervention

Only two (Doesborgh 2004b; Smania 2006) of the 11 subcomparisons reporting participant drop-outs also described the reasons for the 25 participants' withdrawal. Of these, a total of 12 participants were described as withdrawing because they were uncooperative or they refused the allocated treatment (all from Smania 2006) with seven withdrawing from the conventional SLT group and five withdrawing from the no SLT group. Details can be found in Table 2.

8. Economic outcomes

Only one of the 14 subcomparisons described the measurement of economic outcomes using structured questionnaires (MacKay 1988) but neither the questionnaire nor the results were available for this review.

Comparison 2: SLT versus social support and stimulation

Six subcomparisons compared the provision of SLT to the provision of informal social support and stimulation amongst a total of 279 participants (David 1982; Elman 1999; Lincoln 1982iii; Rochon 2005; Shewan 1984ii; Shewan 1984iii). As described above, the description of participant groups within trials was variable and so it is difficult to give a precise overview of the participants included in this comparison. Four subcomparisons described the participants' age range, which spanned 18 to 85 years (Elman 1999; Lincoln 1982iii; Rochon 2005; Shewan 1984ii; Shewan 1984iii). David 1982 reported participants in the SLT and social support and stimulation groups had a mean age of 70 (8.7) and 65 (10.6) years respectively, indicating a significant difference between the groups (P = 0.003). Details can be found in Table 1. All five subcomparisons detailed the length of time since the onset of participants' aphasia. Participants with the most acute

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aphasia were recruited to Shewan 1984ii and Shewan 1984iii with aphasia that was between two and four weeks since onset. In contrast, Lincoln 1982iii recruited participants between one and 36 months post-stroke while some of the other trials recruited participants much later following stroke with ranges from two to nine years (Rochon 2005) or seven months to 28 years (Elman 1999). Severity of aphasia was reported by all six subcomparisons in varying degrees of detail. Lincoln 1982iii recruited participants with moderate degrees of aphasia. The remaining five subcomparisons described the recruitment of participants with a range of mild to severe aphasia impairments (David 1982; Elman 1999; Rochon 2005; Shewan 1984ii; Shewan 1984iii) (see Table 1 for details).

There were a number of approaches to the provision of SLT interventions in the trials: four provided conventional SLT (David 1982; Elman 1999; Lincoln 1982iii; Shewan 1984iii) and the others provided sentence-mapping SLT (Rochon 2005) and language-orientated SLT (Shewan 1984ii). These SLT interventions were then compared to the provision of social support and stimulation which also took a variety of formats. The unstructured support and communicative stimulation was provided by nurses (Shewan 1984ii; Shewan 1984iii), other volunteers (David 1982), speech and language therapists (Lincoln 1982iii; Rochon 2005) or through attendance at an externally organised support group or class, for example dance classes or church groups (Elman 1999). Volunteers had been given detailed information about their own participant's particular presentation of aphasia but were not given any training in SLT techniques. Lincoln 1982iii had a specific non-therapeutic intervention protocol for the therapists whose role was to have semi-structured conversations with the participant on a series of predetermined topics. The participants in these groups received this support for one hour (Rochon 2005), two hours (David 1982; Lincoln 1982iii) or three hours (Elman 1999; Shewan 1984ii; Shewan 1984iii), each week over a period of a month (Lincoln 1982iii), two-and-a-half months (Rochon 2005), four months (Elman 1999), five months (David 1982) or a year (Shewan 1984ii; Shewan 1984iii).

Statistical data for communication outcomes were available for half the included subcomparisons (David 1982; Lincoln 1982iii; Rochon 2005). Suitable data allowing inclusion within the meta-analyses were unavailable for the remaining three subcomparisons (Elman 1999; Shewan 1984ii; Shewan 1984iii). The comparisons made (with meta-analysis where possible) are reported below as they relate to measures of: 1. functional communication; 2. receptive language; 3. expressive language; 4. severity of impairment; 5. psychosocial; 6. number of drop-outs; 7. compliance with allocated intervention. Economic outcomes were not measured.

1. Functional communication

Two subcomparisons measured functional communication (David 1982; Elman 1999) using the Functional Communication Profile (FCP), the Communication Abilities of Daily Living (CADL) and the Communicative Effectiveness Index (CETI).

Functional Communication Profile

David 1982 used the FCP to compare a group who received conventional SLT with a group that received communication treatment by volunteers. There was no evidence of a difference between the groups nor was there any evidence of a difference at three and six-month follow up (Analysis 2.1).

Communication Abilities of Daily Living and the Communicative Effectiveness Index

Elman 1999 used the CADL, the CETI and measures of connected speech to compare the functional communication skills of participants that received conventional SLT and those that did not but who attended social groups and activities instead. No suitable summary data were provided and so the data could not be included in the meta-analysis.

2. Receptive language

Four of the six subcomparisons that compared participants that received SLT or a social support and stimulation intervention did so by comparing the groups' receptive language skills (Lincoln 1982iii; Rochon 2005; Shewan 1984ii; Shewan 1984iii). Measures used included the Philadelphia Comprehension Battery (PCB), the Auditory Comprehension Test for Sentences (ACTS), the Token Test and the PICA Gestural subtest.

Philadelphia Comprehension Battery

Rochon 2005 measured participants' receptive language skills on the PCB, which includes subtests for sentence comprehension and picture comprehension. There was no evidence of a difference between the receptive language skills of the participants that received sentence-mapping SLT and those that received unstructured social support and stimulation (Analysis 2.2).

Auditory Comprehension Test for Sentences (ACTS)

Two additional subcomparisons also measured receptive language skills of a group that received either language-oriented therapy (Shewan 1984ii) or conventional SLT (Shewan 1984iii) and compared their language reception to participants that received an intervention that provided unstructured social support. Both subcomparisons used the ACTS to make this comparison but the manner in which the data are reported prevented inclusion within the meta-analysis (Analysis 2.2).

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Token Test

Lincoln 1982iii measured participants' receptive language skills using the Token Test. There was no evidence of a difference between the groups (Analysis 2.2).

Receptive language: other comprehension

Participants' auditory and written comprehension skills were measured using the PICA Gestural subtest by Lincoln 1982iii and those that had access to social support and stimulation performed significantly better on these measures than those that had access to SLT (P = 0.04, MD -0.87, 95% CI -1.70 to -0.04) (Analysis 2.3).

3. Expressive language

Three of the six subcomparisons that compared participants that received SLT or a social support and stimulation intervention did so by comparing the groups' expressive language skills (Elman 1999; Lincoln 1982iii; Rochon 2005). Measures used included the Object Naming Test (ONT), Caplan and Hanna Sentence Production Test (CHSPT), the Picture Description with Structured Modeling (PDSM) and the PICA.

Expressive language: single words

Lincoln 1982iii measured participants' naming skills on the ONT and a word fluency test and found those participants that received social support and stimulation performed significantly better on these tests than those that had received conventional SLT (P = 0.003, MD -7.00, 95% CI -11.67 to -2.33, and P < 0.0001, MD -14.00, 95% CI -20.35 to -7.65 respectively) (Analysis 2.4).

Expressive language: sentences

Rochon 2005 compared the participants who received *s*entence-mapping SLT and a group receiving unstructured social support and stimulation. Comparison of the two groups showed no evidence of a difference between the groups' performance on the Caplan and Hanna Sentence Production Test scores. Those that had received SLT did perform significantly better on treated items from the test (P = 0.01, MD 3, 95% CI 0.63 to 5.37) than the participants that received social support but there was no evidence of a difference between the groups on the untreated items (Analysis 2.5).

Expressive language: picture description

Two subcomparisons elicited samples of participants' connected speech using picture description tasks (Lincoln 1982iii; Rochon 2005). There was no evidence of a difference between the two groups. Rochon 2005 also reported the two groups' scores on the treated and untreated items but there was no evidence of a between-group difference on the treated or untreated items (Analysis 2.6).

Expressive language: general

Lincoln 1982iii and Elman 1999 compared the groups' performances on the PICA verbal subtest. Suitable statistical data were unavailable from Elman 1999 and so it could not be included in the meta-analysis. Participants that had received social support and stimulation scored significantly better than those that received SLT (P = 0.0007, MD -1.56, 95% CI -2.46 to -0.66) (Analysis 2.7).

Expressive language: written

Similarly, Lincoln 1982iii compared the groups' performances on the PICA graphic subtests and found participants that received social support performed significantly better than those that had received SLT (P = 0.01, MD -1.39, 95% CI -2.49 to -0.29) (Analysis 2.8).

4. Severity of impairment

Elman 1999, Lincoln 1982iii, Shewan 1984ii and Shewan 1984iii compared groups that had access to SLT and those that received social support and stimulation by measuring participants' aphasia severity. The assessments used included the PICA and the Western Aphasia Battery-Aphasia Quotient (WAB AQ).

PICA

Two subcomparisons used the Shortened PICA to compare participants that had received group SLT and those that had attended other social activities or groups that provided social support and stimulation (Elman 1999; Lincoln 1982iii). Suitable statistical data were unavailable from Elman 1999 and so it could not be included in the meta-analysis. Lincoln 1982iii found that participants provided with social support and stimulation were less impaired as a result of aphasia (as measured on the PICA) than those that received SLT (P = 0.005, OR 0.65, 95% CI 0.38 to 1.12). Suitable summary data were not available from Elman 1999 to allow inclusion within the meta-analysis (Analysis 2.9).

WAB

Two additional subcomparisons (Shewan 1984ii; Shewan 1984iii) also compared groups based on the severity of participants' aphasia using the WAB. They compared participants who received language-oriented SLT (Shewan 1984ii) or conventional SLT (Shewan 1984iii) with a group who received psychological support and unstructured communication provided by trained nurses.

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Suitable summary data were unavailable and so it could not be included in the meta-analysis.

5. Psychosocial

Elman 1999 compared participants that had received SLT and those that had received social support and stimulation using measures of psychosocial impact using the Affect Balance Scale but appropriate summary values were unavailable and so it could not be included in the review.

6. Number of drop-outs

Drop-outs were reported by five of the six subcomparisons in this section (David 1982; Elman 1999; Lincoln 1982iii; Shewan 1984ii; Shewan 1984iii). In the main Lincoln 1982 trial (from which the subcomparison Lincoln 1982iii has been extracted) 13 participants were excluded for failing to complete the full treatment intervention. It is unclear which intervention arms these participants were randomised to and so these drop-outs cannot be included in this meta-analysis. In the remaining subcomparisons, a total of 44 participants were lost to the groups allocated to SLT (32 from treatment and 12 at follow up) while 64 were lost to the social support and stimulation interventions (45 during the intervention and 11 at follow up). There was no evidence of a significant difference in the drop-out rates between the two groups although there seems to be a consistency in the direction of drop-outs, with a suggestion of better retention of participants in the groups given SLT but this did not reach significance (Analysis 2.10).

7. Compliance with allocated intervention

Four subcomparisons that experienced drop-outs from their trial also described the reasons for the drop-outs so that those who had voluntarily withdrawn from the allocated intervention can be identified. A total of five participants withdrew from the groups that received SLT while eight participants withdrew from the groups that were allocated to receive social support and stimulation interventions (David 1982; Shewan 1984ii; Shewan 1984iii). Elman 1999 reports one withdrawal from the SLT group and two withdrawals from the social support and stimulation group because of 'time constraints'. In addition, David 1982 also describes the withdrawal of four more participants from the social support group because of 'volunteer problems'. Details can be found in Table 2.

Comparisons: SLT A versus SLT B

A total of 719 participants were randomised across 21 subcomparisons that compared one SLT intervention (SLT A) with another SLT intervention (SLT B) (Bakheit 2007; Denes 1996; Di Carlo 1980; Doesborgh 2004a; Drummond 1981; Hinckley 2001; Jufeng 2005iii; Leal 1993; Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b; Meikle 1979; Meinzer 2007; ORLA 2006; Prins 1989; Pulvermuller 2001; Shewan 1984i; Smith 1981iii; van Steenbrugge 1981; Wertz 1981; Wertz 1986iii). As within other sections of this review, descriptions of the participants' age and other characteristics across trials varied. Participants' age ranges spanning 17 to 92 years were available for 13 subcomparisons while the remaining reported mean age (Denes 1996; Doesborgh 2004a; Drummond 1981; Hinckley 2001; Leal 1993; Smith 1981iii; Wertz 1986iii) or participants within age bands (Jufeng 2005iii). See Table 1 for details. All but two subcomparisons (Jufeng 2005iii; Smith 1981iii) reported the length of time since their participants had experienced the onset of aphasia, ranging from within a month of stroke onset (Bakheit 2007; Leal 1993; Shewan 1984i; Wertz 1981), within approximately six months of stroke (Denes 1996; Di Carlo 1980; Doesborgh 2004a; Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b; Meinzer 2007; Wertz 1986iii), or up to a year or more after stroke (Drummond 1981; Hinckley 2001; Meinzer 2007; ORLA 2006; Pulvermuller 2001; Prins 1989; van Steenbrugge 1981).

Similarly, almost all subcomparisons reported the severity of aphasia with only two failing to give an indication of how severe participants' aphasia was (Drummond 1981; Jufeng 2005iii). In most cases subcomparisons reported the range of participants' aphasia severity as measured on a suitable assessment tool but in some cases this was reported in more general terms (details can be found in Table 1). Some subcomparisons focused specifically on participants with severe aphasia (Denes 1996; Di Carlo 1980; Lincoln 1984b) while others focused on moderate to severe presentations of aphasia (Lincoln 1982i; Leal 1993).

Most of the subcomparisons included in this section compared an experimental approach to the delivery of SLT to a conventional SLT intervention. These included a comparison of functional SLT (Hinckley 2001), intensive SLT (Bakheit 2007; Denes 1996; Smith 1981iii), group SLT (Jufeng 2005iii; Wertz 1981), task-specific approaches to SLT (Drummond 1981; Prins 1989; Pulvermuller 2001; Shewan 1984i; van Steenbrugge 1981) and volunteer-facilitated SLT (Leal 1993; Meikle 1979; Wertz 1986iii) with conventional SLT.

Additional comparisons included in this section are SLT with operant training (Lincoln 1982i) or SLT with programmed instruction and operant training (Lincoln 1984b) compared to conventional SLT (with a placebo attention intervention), semantic approaches to SLT compared with phonological approaches to SLT (Doesborgh 2004a) and filmed programmed instructions compared with non-programmed activities (Di Carlo 1980).

Only 14 of the 21 subcomparisons reported suitable summary data that permitted inclusion in the meta-analyses (Bakheit 2007; Denes 1996; Di Carlo 1980; Doesborgh 2004a; Hinckley 2001; Jufeng 2005iii; Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b; Meinzer 2007; ORLA 2006; Prins 1989; van Steenbrugge 1981; Wertz 1986iii). Where data for this comparison were available they are presented below within the comparisons: 3. Functional SLT

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versus Conventional SLT; 4. Intensive SLT versus Conventional SLT; 5. Volunteer-facilitated SLT versus Conventional SLT; 6. Group SLT versus Conventional SLT; 7. Task-specific SLT versus Conventional SLT; 8. Operant training SLT versus Conventional SLT; 9. Semantic SLT versus Phonological SLT; 10. Programmed instruction versus Non-programmed instruction. (Note: for consistency with the analyses this list starts at number 3).

3. Functional SLT (SLT A) versus conventional SLT (SLT B)

Hinckley 2001 was the only subcomparison identified that contrasted a group receiving functional SLT with a group who received conventional SLT in relation to participants' (a) functional communication and (b) expressive language. They did not address participants' receptive language skills, severity of impairment, psychosocial or economic outcomes. No participants were lost during the interventions and so comparisons in relation to number of drop-outs and compliance with allocated intervention could not be made.

(a) Functional communication

Participants' functional communication skills were measured on the CADL and the CETI in order to compare the impact of a functional SLT approach and a conventional SLT approach.

CADL

Hinckley 2001 only reported the participants' change-from-baseline scores which demonstrated that participants in the conventional SLT group performed significantly better on the CADL than those participants in the functional SLT group (P = 0.001, MD -9.30, 95% CI -15.01 to -3.59) (Analysis 3.1).

CETI

The CETI was used by Hinckley 2001 to compare the groups' functional communication skills as perceived by their carer. Using final value scores there was no evidence of a difference in the carers' ratings of the participants' functional communication skills based on whether they had access to functional SLT or a conventional SLT intervention (Analysis 3.1).

Functional communication: catalogue ordering

Hinckley 2001 also developed a functional catalogue ordering task to compare the two groups' functional communication skills using change-from-baseline scores. Participants were required to order clothes from a catalogue by telephone (spoken modality) or in writing (written modality). In each modality participants were required to complete the tasks with or without a concurrent task. Participants that received the functional SLT performed significantly better on the spoken telephone order task (no concurrent task P = 0.0001, MD 32.80, 95% CI 16.16 to 49.44; with concurrent task P = 0.03, MD 16.90, 95% CI 1.31 to 32.49) than the participants that received the conventional SLT intervention. There was no evidence of any difference between the groups' performance on the written order tasks (Analysis 3.2).

(b) Expressive language

Hinckley 2001 used the PALPA to compare the expressive language skills (oral and written) of participants that received either functional SLT or conventional SLT. There was no evidence of a difference between the groups' oral naming change-from-baseline scores (Analysis 3.3) or their written naming change-from-baseline scores (Analysis 3.4) on the PALPA measure

4. Intensive SLT (SLTA) versus conventional SLT (SLTB)

Four subcomparisons compared intensive SLT to conventional SLT (Bakheit 2007; Denes 1996; ORLA 2006; Smith 1981ii). The number of weekly hours in therapy for participants in the Intensive SLT groups ranged from four hours (Smith 1981ii), five hours (Bakheit 2007; Denes 1996), to 10 hours (ORLA 2006) each week while the conventional SLT groups received 80 minutes (Smith 1981iii), two hours (Bakheit 2007), three hours (Denes 1996) or four hours (ORLA 2006) each week. Statistical data for communication outcomes were only available for three subcomparisons (Bakheit 2007; Denes 1996; ORLA 2006) and comparisons were made by measuring participants' (a) receptive language, (b) expressive language, (c) severity of impairment, (d) psychosocial impact, (e) number of drop-outs and (f) compliance with allocated intervention. Functional communication and economic outcome measures were not used.

(a) Receptive language

Measures of participants' receptive language skills were only available for Denes 1996. Participants' auditory comprehension was measured using the Aachen Aphasia Test (AAT) Comprehension subtest and the Token Test. Only change-from-baseline scores were available. Comparison of the groups' comprehension skills failed to show a difference between those that had received intensive SLT and those that had received conventional SLT on this measure, although the groups' performance on the AAT Comprehension subtest indicated a trend towards better comprehension skills amongst those participants that had received intensive SLT than those that had received conventional SLT (P = 0.06) (Analysis 4.1).

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(b) Expressive language

Expressive language: spoken

Denes 1996 measured expressive language skills using the AAT Naming and Repetition subtests. Comparison of the groups' change from baseline scores showed no evidence of a difference between those that received intensive SLT and those that received conventional SLT on either of these measures (Analysis 4.2).

Expressive language: written

Denes 1996 used the AAT written subtest to compare changes-from-baseline in participants' written language (including reading aloud and writing subtests). The group that was given intensive SLT achieved significantly higher scores on this subtest than the group that received conventional SLT intervention (P = 0.01, MD 8.9, 95% CI 1.81 to 15.99) (Analysis 4.3).

(c) Severity of impairment

Three subcomparisons (Bakheit 2007; Denes 1996; ORLA 2006) compared participants' overall level of aphasia severity following intensive or conventional SLT by using the WAB and the Aachen Aphasia Test (AAT). Smith 1981iii also measured aphasia severity using the Minnesota Test for Differential Diagnosis of Aphasia (MTDDA) but suitable statistical data allowing inclusion in the meta-analysis were unavailable. There was no evidence of a difference between the groups that received intensive SLT and those that received conventional SLT on these WAB final value scores (Bakheit 2007; ORLA 2006) or AAT change-from-baseline scores (Denes 1996) of severity either immediately post-treatment or at three-month follow up (Bakheit 2007) (Analysis 4.4).

(d) Psychosocial

Smith 1981iii used the General Health Questionnaire to compare groups receiving intensive SLT and conventional SLT. Appropriate summary data for these groups were unavailable and so the results could not be presented here.

(e) Number of drop-outs

Data relating to number of participants that dropped out of the subcomparisons were available for Bakheit 2007, Denes 1996 and ORLA 2006 and were partially available for Smith 1981iii. No participants appear to have been lost from the treatment or follow-up time points in the Denes 1996 or ORLA 2006 studies. Five additional participants were excluded from the final analysis in Smith 1981iii (three were found not to have aphasia and two died) but their group allocation was unclear. These data were not included in this overview. Across the subcomparisons significantly more participants (30 participants) were lost to the intensive SLT groups in comparison to those lost to the conventional SLT groups (17 participants) (P = 0.05, OR 2.10, 95% CI 0.99 to 4.46). Of these, some were lost at follow up, with little difference between the three participants lost from intensive SLT and the four participants lost from the conventional SLT group in the Bakheit 2007 study (Analysis 4.5).

(f) Compliance with allocated intervention

Only Bakheit 2007 reported (in part) the reasons for loss of participants from within the study. Of these, one participant voluntarily withdrew from the intensive SLT group during the treatment phase while none withdrew from the conventional SLT group.

5. Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Four subcomparisons compared participants that received volunteer-facilitated SLT and participants that received professional SLT provided directly in a clinical setting by a professional therapist (Leal 1993; Meikle 1979; Meinzer 2007; Wertz 1986iii). In most cases professional SLT was delivered by a speech and language therapist (Leal 1993; Meikle 1979; Wertz 1986iii) though delivery of the constraint-induced SLT intervention in Meinzer 2007 was delivered by a specialist psychologist. We believed that this trial was suitable for inclusion in this comparison as it compared interventions delivered by a professional clinician with delivery facilitated by a trained volunteer.

Most volunteers were family members (Leal 1993; Meinzer 2007; Wertz 1986iii) although some trialists also engaged friends (Wertz 1986iii) or recruited volunteers unknown to the participants (Meikle 1979; Wertz 1986iii). Volunteer groups across the trials all received SLT training, information on their patient's communication impairment, access to working materials or equipment, and ongoing support or supervision. Most studies indicated that the professional therapist was accountable for, or informed the design and content of the volunteer-facilitated SLT (Meikle 1979; Meinzer 2007; Wertz 1986iii).

The professional therapists were based in a formal or clinical setting (Leal 1993; Meikle 1979; Meinzer 2007; Wertz 1986iii). The duration of the professional SLT interventions varied from three hours daily for 10 consecutive days (Meinzer 2007) or up to three hours (Leal 1993), four hours (Meikle 1979) or 10 hours weekly for approximately three months (Wertz 1986iii), six months (Leal 1993) or an average of nine months (SD 22 weeks) (Meikle 1979). The duration of volunteer-facilitated SLT and professionally-delivered SLT was the same for two subcomparisons (Meinzer 2007; Wertz 1986iii). The volunteers in Meikle 1979 visited participants four times weekly over a shorter period of time (average of five months (SD 13.5 weeks)) while the duration of the volunteer-facilitated SLT in Leal 1993 is unclear. The four subcomparisons used a range of measures to compare volunteer-facilitated SLT with professional SLT delivery including (a) functional communication, (b) receptive language, (c) expressive language, (d) written language, (e) severity of impairment, (f) number of drop-outs and (g) compliance with allocation.

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(a) Functional communication

Only Wertz 1986iii formally measured the functional communication skills of the participants that received volunteer-facilitated SLT or professional SLT using the CADL and the Functional Communication Profile. There was no evidence of a difference between the groups (Analysis 5.1).

(b) Receptive language

Receptive language: auditory comprehension

Three subcomparisons evaluated participants' language comprehension abilities using the Token Test (Leal 1993; Meinzer 2007; Wertz 1986iii) but suitable statistical data were unavailable for Leal 1993. Meinzer 2007 also used the AAT to measure Auditory and Reading comprehension skills. Meinzer 2007 and Wertz 1986iii used the Token Test to measure differences in the auditory comprehension of participants that received volunteer-facilitated SLT and those that received professional therapy input. There was no significant difference between the two groups' auditory comprehension (Analysis 5.2). The comprehension subtest of the AAT measures both auditory and reading comprehension and was used by Meinzer 2007 to compare a group receiving volunteer-facilitated SLT or SLT delivered by experienced professionals. There was no evidence of a difference between the groups' comprehension on this measure (Analysis 5.2).

Receptive language: reading comprehension (RCBA)

Wertz 1986iii measured participants' reading comprehension using the Reading Comprehension Battery for Aphasia. There was no evidence of a difference between the groups (Analysis 5.3).

Receptive language: other

Wertz 1986iii compared participants' receptive language skills using the PICA Gestural subtest. There was no evidence of a difference between the groups (Analysis 5.4).

(c) Expressive language

Expressive language: spoken

Meinzer 2007 measured expressive language skills using the Naming subtests of the AAT while Wertz 1986iii used the PICA Verbal Subtest to compare participants that received volunteer-facilitated SLT and those that received professional SLT. There was no evidence of a difference between the groups (Analysis 5.5).

Expressive language: repetition

The group that received the volunteer-facilitated SLT intervention scored significantly higher on the Repetition subtest (AAT) than those that received SLT from a professional therapist (P = 0.05, MD 13.50, 95% CI 0.19 to 26.81) (Meinzer 2007) (Analysis 5.6).

Expressive language: written

The written language subtest of the AAT measures reading aloud and writing to dictation. Meinzer 2007 compared the groups that received volunteer-facilitated SLT and those that received professionally delivered SLT using this measure. Similarly, Wertz 1986iii used the PICA Graphic subtest to compare the groups but found no evidence of a difference (Analysis 5.7).

(d) Severity of impairment

Four subcomparisons compared the two groups using measures of overall severity of aphasia following either volunteer-facilitated SLT or professional SLT using the PICA (Meikle 1979; Wertz 1986iii), an aphasia quotient (Leal 1993) and the AAT profile (Meinzer 2007). Summary data from the groups' performance was unavailable for Leal 1993 preventing inclusion within the review. There was no evidence of a difference between the two groups following pooling of data from the PICA and AAT profile (Analysis 5.8).

(e) Number of drop-outs

All four subcomparisons reported the number of participants that were lost to the trial following randomisation. Across three subcomparisons a total of 30 participants were lost from the groups that experienced volunteer-facilitated SLT while 22 participants were lost from the groups that received professional SLT interventions (Leal 1993; Meikle 1979; Wertz 1986iii). Meinzer 2007 experienced no participant withdrawals. An additional participant that had received volunteer-facilitated SLT and two participants that had received professional SLT were lost at follow up (Wertz 1986iii). No participants were reported lost at follow up from Leal 1993. Overall, there was no evidence of a difference in the numbers of drop-outs between the groups that received volunteer-facilitated SLT and those that had professionally delivered SLT (Analysis 5.9).

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(f) Compliance with allocated intervention

Only two of the three trials provided details for participant withdrawals (Leal 1993; Meikle 1979). Overall, five participants declined to continue participating in the volunteer-facilitated SLT groups while four declined in the professional SLT groups.

6. Group SLT (SLTA) versus one-to-one SLT (SLT B)

Three subcomparisons compared group SLT to conventional one-to-one SLT (Jufeng 2005iii; Pulvermuller 2001; Wertz 1981). Within the group SLT interventions, participants received SLT in groups of three plus a therapist (Pulvermuller 2001), between three to seven (Wertz 1981) or 10 patients (Jufeng 2005iii). Participants allocated to group SLT in Pulvermuller 2001 received a constraint-induced approach to SLT (only verbal responses were allowed). In contrast, the group SLT intervention in Wertz 1981 encouraged group discussion and recreational activities with a therapist while Jufeng 2005iii focused on collective language strengthening training. In all cases the patients in the one-to-one SLT intervention received conventional SLT (stimulus-response treatment across all modalities). Between-intervention comparisons were made on a variety of measures: (a) functional communication, (b) receptive language, (c) expressive language, (d) severity of impairment, (e) number of drop-outs and (f) compliance with allocated intervention. Psychosocial and economic measures were not compared.

(a) Functional communication

Two subcomparisons measured change in functional communication using the Communicative Activity Log (CAL) (Pulvermuller 2001), the Conversational Rating Scale (Wertz 1981) and the Informants Rating of Functional Language (adapted form of the Functional Communication Profile) (Wertz 1981). However, suitable statistical data were unavailable and so could not be included within the review.

(b) Receptive language

Receptive language: auditory comprehension

Two subcomparisons measured participants' receptive language skills using the Token Test (Pulvermuller 2001; Wertz 1981) and the language comprehension subtest of the AAT (Pulvermuller 2001). Mean values were reported for Wertz 1981 but the standard deviation (SD) values were unavailable. To facilitate inclusion of these data within the review, the standard deviation value (13.93) has been imputed from the Lincoln 1982 Token Test summary data. The reason for choosing this value was both Wertz 1981 and Lincoln 1982 used the same form of the Token Test and used it to measure the language skills of similar participant groups. On pooling these data with the Token Test data from the Pulvermuller 2001 comparison, there was no evidence of a difference between the groups' auditory comprehension skills, nor was there any indication of a difference between the groups on the AAT comprehension subtest (Pulvermuller 2001) (Analysis 6.1).

Receptive language: other

Wertz 1981 used the PICA Gestural Subtest to compare participants that had received group SLT and those that had received one-to-one SLT. Though the mean values were available to the review the SD values were unavailable. A standard deviation value (25.67) was identified and imputed from Wertz 1986 where the highest of three possible values in this trial from relevant clinical groups was chosen to facilitate inclusion of the study within the review (Analysis 6.2).

(c) Expressive language

Expressive language: spoken

Pulvermuller 2001 and Wertz 1981 measured participants' expressive language skills using the naming subtest of the AAT, measures of word fluency, and the PICA verbal subtest. Using the AAT naming subtest Pulvermuller 2001 found no evidence of a difference between the groups' expressive language skills (Analysis 6.3). Wertz 1981 used the verbal subtest of the PICA to measure participants' language comprehension skills. The mean scores of participants that received group SLT and those that received one-to-one SLT were available but SD data were not. A standard deviation value (20.01) was identified and imputed from Wertz 1986 where the highest of three possible values in this trial from relevant clinical groups was chosen to facilitate inclusion of the study within the review (Analysis 6.3). There was no evidence of a difference between the groups.

Expressive language: word fluency

Measures of word fluency were used by Wertz 1981 to compare participants' word finding skills. Mean values for the participants receiving group SLT and those receiving one-to-one SLT were reported but no SDs were available and so these data could not be included in this review.

Expressive language: repetition

Participants' repetition abilities were compared by Pulvermuller 2001 using the AAT repetition subtest and no evidence of a difference between the groups was found (Analysis 6.4).

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Expressive language: written

Wertz 1981 used the Graphic Subtest of the PICA to compare participants' written language skills. Mean values for those participants that received group SLT and those that received one-to-one SLT were reported but SDs were unavailable. As with the other PICA data from Wertz 1981, a standard deviation value (21.74) was identified and imputed from Wertz 1986 where the highest of three possible values in this trial from relevant clinical groups was chosen to facilitate inclusion of the study within the review (Analysis 6.5). There was no evidence of a difference between the groups.

(d) Severity of impairment

Three subcomparisons measured the severity of participants' aphasia following interventions using the CRRCAE (Jufeng 2005iii), the PICA (Wertz 1981) and the AAT (Pulvermuller 2001). Summary data from Jufeng 2005iii and Pulvermuller 2001 were available for inclusion within the meta-analysis. Though the mean values for Wertz 1981 trial were available the SD data were missing. We imputed a SD value (24.64) from Wertz 1986 to facilitate inclusion of the data within the review. There was no evidence of a difference between the scores of participants that received group SLT and those that received one-to-one SLT on this measure (Analysis 6.6). On follow up at three months the participants that had received group SLT performed significantly better on the CRRCAE than those that had received one-to-one SLT ($P < 0.0001$, MD 33.41, 95% CI 16.76 to 50.06) (Analysis 6.7).

(e) Number of drop-outs

Information on the number of participants leaving during the trials were available for all three subcomparisons (Jufeng 2005iii; Pulvermuller 2001; Wertz 1981). Two subcomparisons experienced no drop-outs (Jufeng 2005iii; Pulvermuller 2001). In contrast, almost half those randomised in Wertz 1981 failed to remain in the study (33 drop-outs) but there was no evidence of a difference in the numbers lost to each intervention (Analysis 6.8).

(f) Compliance with allocated intervention

Twenty-two participants were reported to have returned home or declined to travel to receive the allocated treatment intervention (see Table 2) but further details on the exact number of participants declining the interventions or how these numbers are split across groups was unavailable.

7. Task-specific SLT (SLT A) versus conventional SLT (SLT B)

Eight subcomparisons compared the use of a task-specific approach to SLT with a more generalist conventional SLT approach (Drummond 1981; Lincoln 1984b; Lincoln 1982i; Lincoln 1982ii; Prins 1989; Pulvermuller 2001; Shewan 1984i; van Steenbrugge 1981). The range of task-specific SLT A interventions included AMERIND signs used as cues for word-finding impairment (Drummond 1981); operant training (Lincoln 1982i; Lincoln 1982ii); operant training with programmed instruction (Lincoln 1984b); Systematic Therapy for Auditory Comprehension Disorders in Aphasic Patients (STACDAP) (Prins 1989); constraint-induced therapy (Pulvermuller 2001); language-oriented SLT (Shewan 1984i) and SLT for naming and constructing sentences (van Steenbrugge 1981).

Within this comparison we have included data from Lincoln 1982i, Lincoln 1982ii and Lincoln 1984b, which has been extracted from two cross-over trials (described earlier).

Lincoln 1982i and Lincoln 1982ii randomised participants across four groups that compared SLT including an operant training adjunct to SLT with a social support and stimulation adjunct. The social support and stimulation component acted as a placebo for the operant training adjunct in the comparison groups. In both of these subcomparisons the means and SD have been extracted from the unpublished individual patient data and is inclusive of the treatment cross-over period. Given the complementary nature of the cross-over intervention (SLT plus operant training) or (SLT plus social support) and the clinically relevant nature of the cross-over treatments we felt it was appropriate to include these data within this section of the review. As recommended, we have also analysed and presented the cross-over inclusive data from these subcomparisons in separate meta-analyses for readers' information (Analysis 8.1; Analysis 8.2; Analysis 8.3; Analysis 8.4; Analysis 8.5).

All eight subcomparisons evaluating the impact of these specialised SLT interventions did so by comparing them with conventional SLT. However, in Lincoln 1984b the conventional SLT group also had a non-verbal tasks (matching, copying and recall of designs plus manual dexterity tasks) which acted as a control for the specialist intervention. Similarly, in Lincoln 1982i and Lincoln 1982ii the participants in the conventional SLT group also had access to additional structured social stimulation in the form of topic-led conversations with the therapist.

A range of outcome measures were used by these subcomparisons: (a) functional communication, (b) receptive language, (c) expressive language, (d) severity of impairment, (e) number of drop-outs and (f) compliance with allocated intervention.

(a) Functional communication

Two subcomparisons reported functional communication skills of participants as measured on the Functional Expression Scale (Prins 1989; van Steenbrugge 1981). Pulvermuller 2001 measured functional skills using the Communication Activity Log but these data were unavailable for the review. On pooling the available data there was no evidence of a difference between the groups' functional communication skills (Analysis 7.1).

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(b) Receptive language

Receptive language: auditory comprehension of single words

Six subcomparisons considered participants' auditory comprehension skills across a range of comprehension complexities (Lincoln 1984b; Lincoln 1982i; Lincoln 1982ii; Prins 1989; Pulvermuller 2001; Shewan 1984i). Two subcomparisons measured participants' ability to understand single words using the Word Naming BDAE subtest (Lincoln 1984b; Prins 1989), the Body part identification BDAE subtest (Prins 1989) and the Peabody Picture Vocabulary Test (Lincoln 1984b). Following pooling of the results, where possible, there was no indication of a difference between the groups that received task-specific SLT interventions and those that had received conventional SLT (Analysis 7.2).

Receptive language: other auditory comprehension

Two subcomparisons measured participants' ability to comprehend sentences using Miscellaneous Commands (Prins 1989) and the Aphasia Comprehension Test for Sentences (Shewan 1984i). Appropriate statistical data from Shewan 1984i were unavailable and so could not be included in the meta-analysis. There was no evidence of a difference between the groups' sentence comprehension abilities (Analysis 7.3). Prins 1989 measured participants' comprehension skills across levels of complexity on the AmAT Comprehension Subtest. There was no evidence of a difference between the groups' comprehension skills on this measure (Analysis 7.3). Participants' auditory comprehension skills on the AAT subtest were tested by Pulvermuller 2001 and there was no evidence of a difference between the groups' performance on this measure (Analysis 7.2). Five subcomparisons evaluated comprehension skills using the Token Test (Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b; Prins 1989; Pulvermuller 2001). On pooling of the available data there was no evidence of a difference between the groups' comprehension skills (Analysis 7.3).

Receptive language: auditory comprehension (treated items)

One subcomparison also reported separate results for components of word and sentence comprehension that had been targeted within the STADCAP SLT treatment intervention. Participants' ability to comprehend three tests of word or sentence comprehension that depended on phoneme recognition, lexicon and morphological skills (Prins 1989) were measured and compared. There was no evidence of a difference between the groups given task-specific SLT or conventional SLT (Analysis 7.4).

Receptive language: reading comprehension

One subcomparison measured participants' ability to comprehend written words (Prins 1989). There was no evidence of a difference between the groups (Analysis 7.5).

Receptive language: other

Three subcomparisons measured 'gestural skills' on the PICA subtests which incorporates measures of not just gesture abilities but also subtests of auditory comprehension and reading abilities (Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b). Following pooling of these data there was no evidence of a difference in the 'gestural' skills of participants that received SLT with operant training and those that received SLT with a placebo adjunct (Analysis 7.6).

(c) Expressive language

Participants' expressive language skills were considered by seven subcomparisons (Drummond 1981; Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b; Prins 1989; Pulvermuller 2001; van Steenbrugge 1981) across a range of levels of complexity from object naming to sentence construction tasks.

Expressive language: spoken naming

Six subcomparisons asked participants to name a variety of nouns using the Object Naming Test (Lincoln 1982i; Lincoln 1982ii), the AmAT Naming Test (Prins 1989; van Steenbrugge 1981), 20 items from the Taylor Aphasia Therapy Kit (Drummond 1981) and the AAT Naming Subtest (Pulvermuller 2001). We were unable to obtain suitable summary data from Drummond 1981 to permit inclusion within the meta-analysis. There was no evidence of a difference between the groups' naming skills. Nor was there any evidence of a naming difference between the groups in the van Steenbrugge 1981 subcomparison at three-week follow up (Analysis 7.7).

Expressive language: spoken sentence construction

Prins 1989 and van Steenbrugge 1981 also compared participants' ability to construct sentences but there was no evidence of a difference between the groups nor was any indication of a difference between the groups at three-week follow up (van Steenbrugge 1981) (Analysis 7.8).

Expressive language: other spoken tasks

Lincoln 1982i and Lincoln 1982ii compared participants expressive language skills using word fluency tasks and on pooling found

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those that received conventional SLT performed better than those that had received task-specific SLT (P = 0.02, SMD -1.05, 95% CI -1.93 to -0.17). The two subcomparisons also asked participants to describe a picture and compared their abilities on this expressive language task but there was no evidence of a difference between the groups. The PICA Verbal Subtest was used by three subcomparisons to compare participants that received task-specific SLT and conventional SLT but on pooling there was no evidence of a difference between the groups (Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b) (Analysis 7.9).

Expressive language: spoken (treated items)

Participants' expressive language skills on items that had been treated within the specialist Naming and Sentence Construction SLT intervention were compared to participants' expressive abilities on these items following conventional SLT (van Steenbrugge 1981). There was some trend towards better naming of treated items (P = 0.06) from those participants that had received conventional SLT as compared with those who had received task-specific SLT, with a similar trend observed at three-week follow up. There was no evidence of a difference between the groups' sentence construction skills (Analysis 7.10).

Expressive language: repetition

Pulvermuller 2001 was the only subcomparison to compare participants' repetition skills following constraint-induced therapy or conventional SLT interventions and there was no evidence of a difference between the groups (Analysis 7.11).

Expressive language: written

Three subcomparisons measured participants written language expressive skills on the PICA Graphic subtest (Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b). On pooling, those participants that had received conventional SLT were found to have significantly better written expressive language skills that those that had received task-specific SLT (P = 0.05, MD -0.85, 95% CI -1.69 to -0.1) (Analysis 7.12).

(d) Severity of impairment

Participants' overall severity of aphasia impairment was considered by five subcomparisons using the PICA (Lincoln 1982i; Lincoln 1982ii; Lincoln 1984b), the AAT (Pulvermuller 2001) and the WAB (Shewan 1984i). Suitable data from Shewan 1984i were unavailable and so could not be included in this meta-analysis. Following pooling of the PICA data, conventional SLT participants were found to experience significantly less impairment than those that received a task-specific SLT intervention that included operant training (P = 0.05, MD -0.74, 95% CI -1.50 to 0.01) (Analysis 8.5). There was no evidence of a difference between the groups on the AAT measure (Pulvermuller 2001) (Analysis 7.13).

(e) Number of drop-outs

Only three subcomparisons reported a loss of participants from their trials (Lincoln 1982i; Lincoln 1982ii; Shewan 1984i). No participants were lost from the other five subcomparisons. Thirteen participants were lost across the four groups in Lincoln 1982i and Lincoln 1982ii but it is unclear to which groups these participants had been randomised. In contrast, Shewan 1984i reported that six participants dropped out from the language-orientated SLT intervention while only one dropped out of the conventional SLT group. There was no significant difference between the numbers of participants lost to each intervention (Analysis 7.14).

(f) Compliance with allocated intervention

As described above, only one subcomparison provided details of the participants that dropped out of their trial (Shewan 1984i) with only two deciding to withdraw from the language-orientated SLT intervention. None voluntarily withdrew from the conventional SLT group.

8. Operant training SLT (SLT A) versus conventional SLT (SLTB)

The subcomparisons taken from the cross-over trials are presented separately within the data and analysis table for information purposes.

9. Semantic SLT (SLT A) versus phonological SLT (SLTB)

Doesborgh 2004a randomised 58 participants to receive either semantic SLT or phonological SLT. The semantic SLT approach focused on improving semantic processing by employing semantic decision tasks at word, sentence and text level while the phonological SLT approach focused on sound structure by targeting phonological input and output. Between group comparisons were made on the basis of (a) functional communication, (b) receptive language, (c) expressive language, (d) number of drop-outs and (e) compliance with allocated intervention. The psychosocial impact, severity of impairment and economic outcomes were not measured.

(a) Functional communication

Doesborgh 2004a used the ANELT-A to compare groups that received semantic SLT to those that received phonological SLT. There was no evidence of a difference between the two groups' functional communication skills (Analysis 9.1).

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(b) Receptive language

Receptive language: auditory comprehension

Participants' auditory comprehension skills were measured by Doesborgh 2004a using the Semantic Association Test and the Auditory Lexical Decision Subtests of the PALPA. Using change-from-baseline values there was no evidence of a difference between the groups on the Semantic Association Test but the group that received the phonological SLT performed significantly better on the Auditory Lexical Decision Subtest than those that received semantic SLT (P = 0.01, MD -3.50, 95% CI -6.23 to -0.77) (Analysis 9.2).

Receptive language: reading

Doesborgh 2004a also measured the two groups' synonym judgements using a subtest of the PALPA. This test required both synonym judgement and reading comprehension abilities. There was no evidence of a difference between the groups (Analysis 9.3).

(c) Expressive language: repetition

The only measure of expressive skill used by Doesborgh 2004a was that of the PALPA non-word repetition subtest. There was no evidence of a difference between the two groups (Analysis 9.4).

(d) Number of drop-outs

Doesborgh 2004a reported the loss from follow up of a total of 12 participants. Equal numbers were lost from both the semantic SLT and the phonological SLT groups (Analysis 9.5).

(e) Compliance with allocated intervention

Reasons for the loss of 12 participants from the treatment phase were given by Doesborgh 2004a. Within the semantic SLT group four participants received less than 40 hours of the planned treatment intervention while in the phonological SLT group two participants received less than 40 hours of treatment and two participants declined to complete the final assessment.

10. Programmed instruction (SLT A) versus non-programme instruction (SLTB)

One subcomparison (Di Carlo 1980) investigated the effectiveness of a filmed programmed instruction intervention compared to non-programmed activity, described by the trialists as viewing slides and bibliotherapy. Both groups had received conventional SLT and continued to do so throughout the trial. Di Carlo 1980 compared the groups on measures of receptive language. They did not report group comparisons on the basis of functional communication, expressive language, severity of impairment or economic outcome measures. No participants withdrew from the study so comparison based on the number of drop-outs was not possible.

(a) Receptive language

Receptive language: auditory

The participants' word comprehension skills were measured using a vocabulary test constructed by Di Carlo 1980. There was no evidence of a difference between the groups (Analysis 10.1).

Receptive language: reading

Di Carlo 1980 compared the two groups' reading comprehension skills using the Reading Recognition and Reading Comprehension Test. There was no evidence of a difference between the groups on either of these measures (Analysis 10.2).

Summary of results

1. SLT versus no SLT (14 subcomparisons)

- *Functional communication:* eight subcomparisons (data from five); four measures; no evidence of a difference.
- *Receptive language:* five subcomparisons (data from five); seven measures; PICA gestural subtest favours SLT P = 0.02, no other evidence of a difference.
- *Expressive language:* five subcomparisons (data from five); seven measures; no evidence of a difference.
- *Severity of impairment:* 10 subcomparisons (data from six); four measures; no evidence of a difference.
- *Psychosocial impact:* four subcomparisons (data from one); six measures; no evidence of a difference.
- *Drop-outs:* 14 subcomparisons (data from 14); no evidence of a difference.
- *Compliance:* 11 subcomparisons (data from two); no evidence of a difference.
- *Economic outcomes:* one subcomparison (no data).

2. SLT versus social support and stimulation (six subcomparisons)

- *Functional communication:* two subcomparisons (data from one); three measures; no evidence of a difference.
- *Receptive language:* four subcomparisons (data from two); five measures; PICA subtest favours social support and stimulation group (P = 0.04); no other evidence of a difference.

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- *Expressive language:* three subcomparisons (data from two); six measures; Object Naming Test and Word Fluency favours social support and stimulation group (P = 0.003 and P < 0.0001); Caplan and Hanna Sentence Production Test (treated items) favours SLT (P = 0.01); PICA Verbal and Graphic subtests favour social support and stimulation group (P = 0.0007; P = 0.01).
- *Severity:* four subcomparisons (data from one); two measures; PICA favours social support and stimulation group (P = 0.005).
- *Psychosocial impact:* one subcomparison (no data).
- *Drop-outs:* five subcomparisons (data from four); no evidence of a difference.
- *Compliance:* four subcomparisons (data from four); no evidence of a difference.
- *Economic outcomes:* not measured.

3. SLT A versus SLT B (21 subcomparisons)

Functional SLT versus conventional SLT (one subcomparison)

- *Functional communication:* one subcomparison (data from one); six measures; CADL change-from-baseline favours conventional SLT (P = 0.001); Telephone Ordering Task (with and without concurrent task) favours functional SLT (P = 0.0001 and P = 0.03).
- *Receptive language:* not measured.
- *Expressive language:* one subcomparison (data from one); two measures; no evidence of a difference.
- *Severity of impairment:* not measured.
- *Psychosocial impact:* not measured.
- *Drop-outs:* one subcomparison (data from one); no drop-outs.
- *Compliance:* not applicable.
- *Economic outcomes:* not measured.

Intensive versus conventional SLT (four subcomparisons)

- *Functional communication:* not measured.
- *Receptive language:* one subcomparison (data from one); two measures; AAT Comprehension subtest approaching significance, favouring intensive SLT (P = 0.06); no other evidence of a difference.
- *Expressive language:* one subcomparison (data from one); three measures; AAT written subtest favours intensive SLT (P = 0.01); no other evidence of a difference.
- S*everity of impairment:* four subcomparisons (data from three); three measures; no evidence of a difference; AAT profile change from baseline scores suggesting a trend towards favouring intensive SLT (P = 0.08).
- *Psychosocial impact:* one subcomparison (no data).
- *Drop-outs:* four subcomparisons (data from two); favours conventional SLT (P = 0.05).
- *Compliance:* two subcomparisons (data from one); no evidence of a difference.
- *Economic outcomes:* not measured.

Volunteer-facilitated SLT versus professional SLT (four subcomparisons)

- *Functional communication:* one subcomparison (data from one); two measures; no evidence of a difference.
- *Receptive language:* three subcomparisons (data from two); four measures; no evidence of a difference.
- *Expressive language:* two subcomparisons (data from two); five measures; AAT Repetition subtest favoured volunteer-facilitated SLT (P = 0.05); no other evidence of a difference.
- S*everity of impairment:* four subcomparisons (data from three); three measures; no evidence of a difference.
- *Psychosocial impact:* not measured.
- *Drop-outs:* four subcomparisons (data from four); no evidence of a difference.
- *Compliance:* three subcomparisons (data from two); no evidence of a difference.
- *Economic outcomes:* not measured.

Group SLT versus conventional SLT (three subcomparisons)

- *Functional communication:* two subcomparisons (no data); three measures.
- *Receptive language:* two subcomparisons (data from two); three measures; no evidence of a difference.
- *Expressive language:* two subcomparisons (data from two); five measures; no evidence of a difference.
- S*everity of impairment:* three subcomparisons (data from three); three measures; CRRCAE favoured group SLT at three-month follow up (P < 0.0001); no other evidence of a difference.
- *Psychosocial impact:* not measured.
- *Drop-outs:* three subcomparisons (data from three); no evidence of a difference.
- *Compliance:* one subcomparison (no data).
- *Economic outcomes:* not measured.

Task-specific SLT versus conventional SLT (eight subcomparisons)

- *Functional communication:* three subcomparisons (data from two); two measures; no evidence of a difference.
- *Receptive language:* six subcomparisons (data from five); 12 measures; no evidence of a difference.
- *Expressive language:* seven subcomparisons (data from six); 12 measures; word fluency and written language favoured conventional SLT (P = 0.02 and P = 0.05); naming (treated

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items) and at three-week follow up there was a trend towards favouring task-specific SLT (P = 0.06).

- S*everity of impairment: five* subcomparisons (data from four); three measures; PICA favours conventional SLT (P = 0.05).
- *Psychosocial impact:* not measured.
- *Drop-outs:* eight subcomparisons (data from six); no evidence of a difference.
- *Compliance:* one subcomparison (data from one); no evidence of a difference.
- *Economic outcomes:* not measured.

Operant training versus conventional SLT (three subcomparisons)

- *Functional communication:* not measured
- *Receptive language:* three subcomparisons (data from three); four measures; no evidence of a difference.
- *Expressive language:* three subcomparisons (data from three); five measures; word fluency and PICA Graphic subtest favoured conventional SLT (P = 0.02 and P = 0.05); no other evidence of a difference.
- S*everity of impairment:* three subcomparisons (data from three); one measure; PICA overall favoured conventional SLT (P = 0.05).
- *Psychosocial impact:* not measured.
- *Drop-outs:* two subcomparisons (no data).
- *Compliance:* two subcomparisons (no data).
- *Economic outcomes:* not measured.

Semantic SLT versus phonological SLT (one subcomparison)

- *Functional communication:* one subcomparison (data from one); one measure; no evidence of a difference.
- *Receptive language:* one subcomparison (data from one); three measures; Auditory Lexical Decision favoured phonological SLT (P = 0.01); no other evidence of a difference.
- *Expressive language:* one subcomparison (data from one); one measure; no evidence of a difference.
- S*everity of impairment:* not measured.
- *Psychosocial impact:* not measured.
- *Drop-outs:* one subcomparison (data from one); no evidence of a difference.
- *Compliance:* one subcomparison (data from one); no evidence of a difference.
- *Economic outcomes:* not measured.

Programmed instruction versus non-programmed instruction (one subcomparison)

- *Functional communication:* not measured.
- *Receptive language:* one subcomparison (data from one); three measures; no evidence of a difference.
- *Expressive language:* not measured.
- S*everity of impairment:* not measured.
- *Psychosocial impact:* not measured.
- *Drop-outs:* not measured.
- *Compliance:* not measured.
- *Economic outcomes:* not measured.

DISCUSSION

We updated this complex review of the effectiveness of speech and language therapy interventions for people with aphasia following stroke to reflect new evidence and developments in clinical practice. We assessed whether (1) SLT is more effective than no SLT, (2) SLT is more effective than social support and stimulation and (3) one SLT intervention is more effective than another. The data from 20 additional trials were identified, synthesised and presented together with data from 10 trials included in the original review.

Summary of main results

A total of 1840 participants were randomised across 41 subcomparisons. Fourteen compared participants who received SLT with those who did not. Significant differences between the groups' scores were few but there was some indication of a consistency in the direction of the results which favoured the provision of SLT. More data are required to further inform this comparison.

Six subcomparisons compared groups who received SLT with groups who received social support and stimulation. Most of the data derived from one small trial prior to cross-over which provided some evidence of a difference in receptive and expressive language skills and severity which favoured the social support and stimulation group. This finding is heavily reliant on the data from a single trial and additional data are required to confirm whether social support and stimulation provides benefits to some aspects of participants' language skills and on measures of severity of aphasia impairment.

Twenty-one subcomparisons compared two different types of SLT. In general, comparisons were based on a small number of subcomparisons involving few participants. Based on the findings of one trial, functional SLT was found to improve functional tasks but in more general measures of communicative activities of daily living the conventional SLT approach was better. Additional data are required to further inform the comparison.

Intensive SLT was compared to conventional SLT by four subcomparisons and the intensive approach was found to result in benefits in participants' written language skills with some indications of improvements in their receptive language and severity of impairment measures as compared to a conventional SLT approach. However, the number of participants dropping out from the intensive SLT groups was significantly higher than the conventional

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SLT group suggesting that such an intensive approach to therapy is not suited to all patients.

Volunteer-facilitated SLT did not seem to differ remarkably from professional SLT. This is unsurprising as the volunteers providing the SLT interventions were trained by the professional therapists, had been given access to the relevant therapy materials and the plan for therapeutic interventions was developed by (or under the direction of) the professional therapist. The only between-group difference identified in this comparison (derived from a single trial) indicated that the volunteer-facilitated group scored better on measures of spoken repetition than the conventional SLT group.

There were very limited data and little evidence of any difference between group SLT and one-to-one SLT.

Comparisons of task-specific SLT approaches to the provision of generalist conventional SLT approaches found little evidence of a between-group difference. Only on the PICA measure of severity of impairment were the groups found to differ, favouring the conventional SLT approach rather than an operant training SLT approach. This was further supported on closer examination of the operant training SLT in comparison to conventional SLT when, in addition to less severity, the conventional SLT groups were also found to have significantly better scores on measures of word fluency and writing than the operant training SLT groups. While task-specific approaches may provide more benefits in the retrieval of language items targeted in therapy than conventional SLT approaches, this raises the question of how functionally relevant such improvements are.

Overall completeness and applicability of evidence

We identified a great number of trials (and subcomparisons) of relevance to our review question with most eligible for inclusion within the review. However, across the trials included in the review there was a lack of comprehensive data collection, a wide range of outcome tools employed and disappointingly inadequate reporting of outcome measures. Within the review, approximately half of the subcomparisons described measuring receptive (N = 23) and expressive language skills (N = 23) with only two-thirds reporting suitable data in published format, which permitted inclusion within this review. Thanks to several trialists' contributions of unpublished data we were able to fully include approximately 70% to 80% of the receptive measures (N = 19) and expressive measures (N = 21) within the review. The severity of participants' aphasia impairment was evaluated by 30 subcomparisons but unfortunately we were only able to included suitable data from 20 subcomparisons. Similarly, while one subcomparison reported measuring economic outcomes, no data were available. Few subcomparisons measured participants' functional and psychosocial outcomes, measures that are probably most closely aligned to the patients' sense of recovery and return to 'normal'. From the total of 41 subcomparisons, less than half (N = 17) described measuring changes in functional communication and of these only half (N = 11) reported data that could be included within the review. Even fewer measured psychosocial outcomes (N = 5) and only one reported data suitable for inclusion within the review.

The degree to which the models of conventional SLT employed within the trials are reflective of therapists' current practice should be carefully considered across individual treatments in terms of the frequency, duration and the extent of therapeutic intervention. Participants came from across a wide age range and were experiencing a range of aphasia impairments. However, the length of time since participants' stroke raises questions of how clinically relevant some recruitment parameters were to a SLT clinical population. Only a quarter of the included subcomparisons (N = 10) recruited participants within the first few weeks following their stroke (a participant group of high clinical relevance) while almost half the subcomparisons (N = 18) recruited participants six months or more (in some cases many years) following their stroke: a group that are highly unlikely to be seen in a clinical setting for rehabilitation purposes. Such recruitment procedures and the involvement of some participants up to 28 years after the onset of their aphasia is of limited application to either a clinical or treatment evaluation setting.

Quality of the evidence

This update adds a significant amount of data to the original review and so, together with newly improved systematic review methodologies, we are in a better position to draw conclusions regarding the effectiveness of SLT for aphasia following stroke. In this review we have included a total of 30 trials (which consisted of 41 subcomparisons) involving data from 1840 patients. Methods of random sequence generation and concealment of allocation were considered adequate in 13 and six subcomparisons respectively. The randomisation methodology for most of the remaining subcomparisons had been inadequately described and so it was not possible to judge the quality of randomisation. The lack of description and detail does not necessarily mean inadequate procedures were in place but rather a lack of reporting of this detail (Soares 2004). The prevalence of good methodology in relation to blinding of outcome assessors may support this interpretation. Blinding of the outcome assessors was much more widely reported with more than half of the subcomparisons within the review, 23 of them, describing adequate blinding procedures. Only eight were considered not to have adequately blinded assessors with 10 providing too little detail to make a judgement regarding the quality of blinding.

Almost three-quarters of the subcomparisons in this review (N = 30) were published before the CONSORT statement (Consolidated Standards of Reporting Trials) (Altman 2001; Moher 2001). Disappointingly, of the 11 subcomparisons published in the last five years (and after the implementation of the CONSORT state-

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ment) only four reported the method of generating the randomisation sequence and the methods of concealing allocation. This is however an improvement on the 30 earlier subcomparisons where the method of random sequence generation and concealment of allocation was only available for one-fifth of subcomparisons. Thus, there is some indication of improvements in the quality of the trial methodologies or of their reporting.

Only two trials reported an a priori power size calculation, which is reflected in the small numbers of randomised participants across the subcomparisons: three randomised 10 or fewer participants, 22 randomised up to 50 participants, 13 between 50 and 100 participants, and only three subcomparisons randomised over 100 participants. The randomisation of such small numbers of participants reduces the power of the statistical analyses, raises questions of the reliability of findings and (given the complexity of various aphasia impairments) will cause difficulties in ensuring the comparability of the groups at baseline. In this review, we found one-fifth of the included subcomparisons had groups that significantly differed at baseline and group comparability was unclear for another fifth.

Despite these reporting and methodological limitations we have synthesised a large number of trials that address the effectiveness of SLT for aphasia following stroke across a number of outcome measures. Across these measures there is some indication of a consistency in the direction of results when looking at SLT versus no SLT which appears to favour SLT. With at least nine additional trials of relevance to this review currently ongoing or about to report, the picture based on the current evidence for SLT for aphasia following stroke will develop further over time. With a clear consistency in the direction of results to date in many of the measures we can be hopeful that with the availability of additional data the evidence will become more conclusive in relation to the effectiveness of SLT, social support and different approaches to SLT provision.

Sixteen of the 41 subcomparisons in this review included all randomised participants in their final analyses. The remaining 25 subcomparisons lost participants during the treatment or follow-up phases but none employed an intention-to-treat analysis. In some cases large proportions of participants withdrew from some interventions and in some this appeared to be linked to the intervention itself, with significantly more participants withdrawing from intensive SLT than conventional SLT. There was a similar suggestion (and a consistency in direction) of higher withdrawals from groups that were receiving social support and stimulation than SLT interventions but this did not reach significance (P = 0.09). Unfortunately few trials gave detailed reasons for withdrawals and so it was not possible to explore these findings further.

Potential biases in the review process

Within this review we refined the original search strategy and conducted a comprehensive search for high quality trials that evaluated the effectiveness of SLT for aphasia following stroke. While we are confident we have identified most published trials of relevance to the review it is possible, despite our efforts, that we may be unaware of additional unpublished work. Our search strategy and study selection criteria were agreed in advance and applied to all identified trials. Our data extraction processes were completed independently and then compared. Whenever possible we extracted all relevant data and sought missing data directly from the trialists for inclusion within the review. We considered it appropriate to include cross-over data within our review given the nature of the comparisons, the points at which the data were extracted and, in some cases, the availability of individual patient data.

This review has been informed by the availability of individual patient data (N = 305). In three subcomparisons the individual data were presented within the associated publications, while for the remaining nine subcomparisons we are very grateful to the trialists for the unpublished data thus allowing inclusion within the review. In addition, other trialists generously contributed the relevant summary values thus permitting (for the first time) the full inclusion of important trials from this field (Wertz 1986i; Wertz 1986ii; Wertz 1986iii) within a systematic review. However, there still remain a number of other trials that could not be fully included. In some cases the outcome measure summary data were reported in a format that made it unsuitable for full inclusion within the review's meta-analyses. For three additional trials, outcome measure data were not reported at all (nor were they available from the authors).

Agreements and disagreements with other studies or reviews

One of the first reviews in this area was Robey 1994 who reviewed 21 published studies (restricted to English language but not to randomised controlled trials). They identified at least 19 more studies that they were unable to include because of the manner in which the data had been reported. They concluded that the provision of SLT in the acute stages of aphasia following stroke was twice as effective as natural recovery patterns. Therapy started after that acute period had less of an impact but was still evident. They called for better reporting of data and the use of large sample sizes. This team later updated this review (Robey 1998a), employing the same methodologies and included 55 studies looking specifically at the amount and type of SLT intervention and the impact of the severity and type of aphasia. Again, they concluded that SLT was effective, particularly SLT in the acute stages following stroke and if two or more hours of therapy were provided each week. However, they again did not have access to all the relevant data and some key trials such as Wertz 1986 were excluded.

Bhogal 2003 reviewed 10 English language publications of controlled trials from a MEDLINE search (1975 to 2002) and associated references. They found that intensive SLT delivered significant treatment effects (when at least nine hours per week were

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delivered) but that studies that failed to demonstrate a treatment effect had only provided about two hours of SLT per week. The total duration of SLT provision was also negatively correlated with language outcomes. Cherney 2008 also reviewed 10 English language publications (1990 to 2006; 15 electronic databases; not all RCTs) and found modest evidence for intensive SLT and benefits of constraint-inducted language therapy.

In contrast, Moss 2006 reviewed 23 single patient reports involving the provision by a therapist on a one-to-one basis of SLT which targeted spoken output or auditory comprehension in 57 participants identified following a systematic search (1985 to 2003) of published or indexed work. They concluded that time since stroke (and aphasia onset) is not linked to the response to SLT though they indicate (based on their data) that response to SLT may decline eight years after stroke. However, the highly selected nature of participants in single cases studies means that reviews based on such a population group are of questionable relevance to a general clinical population. Individuals (and their carers) within such reports are likely to be highly motivated, educated, dedicated and reliable participants (Moss 2006).

AUTHORS' CONCLUSIONS

Implications for practice

The evidence presented within this review shows some indication of the effectiveness of SLT for people with aphasia following stroke, especially in relation to functional communication, expressive language and the severity of aphasia.

We also observed a consistency in the direction of results which favours intensive SLT over conventional SLT, though significantly more people withdrew from intensive SLT treatment than conventional SLT.

SLT facilitated by a trained volunteer under the direction of a therapist appears to be as effective as the provision of SLT from a professional therapist. This is probably unsurprising as the volunteers receive specialist training, have access to therapy materials and in many cases are delivering therapy interventions designed and overseen by a professional therapist. This is a model of treatment often used in therapy in the UK. There was insufficient evidence to draw any conclusions in relation to the effectiveness of group SLT as compared to conventional one-to-one SLT.

There is some very limited evidence that social support and stimulation may be beneficial to patients' receptive and expressive language skills based on a single cross-over trial.

There was insufficient evidence within this review to establish the effectiveness of one SLT approach over another.

Implications for research

This review presents a synthesis of SLT trial data which shows some indications of the effectiveness of SLT for people with aphasia following stroke. Results from those additional trials recently completed and currently ongoing will further contribute to this evidence base. The prevalence of outcome assessor blinding amongst the trials included in this review is evidence of the quality of research undertaken to date. Future trials in this area should build upon this by ensuring the use of standardised objective outcome measures by assessors blinded to the participants' background and intervention. Digitally recording conversational interactions or test performance for rating by independent assessors is one model of outcome assessment that should be encouraged.

Some of the limitations of the review findings reflect limitations in the availability of suitable data for inclusion within the review. Researchers, funders, reviewers and editors should ensure that the findings from future trials are fully published. The recommendations of the CONSORT statement (Altman 2001; Moher 2001) should be adhered to, thus ensuring the quality of the trial is fully demonstrated. Similarly, trialists should provide full descriptions of the relevant statistical summary data (means and standard deviations of final value scores) thus allowing inclusion of their data within relevant meta-analyses.

Future work might consider the more detailed examination of the effectiveness of SLT as it applies across a range of patients differing in aphasia profile, the length of time since their stroke and other factors. It is possible that some SLT approaches may be more effective for some patient groups (and aphasia profiles) than others.

We saw some suggestion within the review of the effectiveness of intensive approaches to SLT when compared to conventional SLT. We need more data on volunteer-facilitated SLT, group SLT and functional SLT approaches before we can be confident about drawing conclusions in relation to their effectiveness. We still need to establish what is the optimum approach, frequency, duration of allocation and format of SLT provision for specific patient groups. Future investigations should also consider contributing to the evidence base as it relates to the effectiveness of a social support and stimulation intervention in comparison to a SLT intervention.

A priori sample size calculations should be employed thus ensuring SLT trials are adequately powered to demonstrate differences. The challenge for SLT researchers and clinicians will be to design, develop, conduct and support larger trials. It is essential for the success of these trials that the work is undertaken in a collaborative manner between patients, clinicians and researchers. Standardised outcome measures should be employed to evaluate the impact of SLT on participants' functional communication, expressive and receptive language skills and the severity of their aphasia.

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* *Indicates the major publication for the study*

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Bakheit 2007

Methods	RCT
Participants	Inclusion criteria: first stroke, below normal on WAB, native English speaker, medically stable, fit for participation Exclusion criteria: depression, Parkinson's disease, unlikely to survive, severe dysarthria, more than 15 miles from hospital Group 1: 51 participants Group 2: 46 participants Groups comparable at baseline
Interventions	1. Intensive SLT (1 hour therapy 5 times weekly for 12 weeks) 2. Conventional SLT (1 hour therapy 2 sessions weekly for 12 weeks) Intensive SLT and conventional SLT: tasks included picture-object selection, object naming, recognition and associations; expression of feelings and opinions; improving conversational skills; gestural and non-verbal communication (including communication aids and equipment)
Outcomes	Western Aphasia Battery Assessed at baseline and weeks 4, 8, 12 and 24
Notes	UK A further 'NHS Group' was not randomised (first 6 consecutive participants allocated to this group) and were therefore excluded from this review Drop-outs: 31 participants (Intensive 20; Conventional 11)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	Yes	Sequentially numbered sealed envelopes
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Yes	Statistical data included in the review
Free of other bias?	Unclear	Sample size calculation not reported Only 13/51 participants in intensive SLT group received 80% or more of prescribed treatment

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David 1982

Methods	Parallel group RCT
Participants	Inclusion criteria: aphasia, less than 85% on Functional Communication Profile (x 2), English speaking, at least 3 weeks after stroke Exclusion criteria: previous SLT, deafness, blindness or confusion preventing participation Group 1: 65 participants Group 2: 68 participants Baseline between group difference: the conventional SLT group were older
Interventions	1. Conventional SLT (30 hours therapy for up to 20 weeks) 2. Social support and stimulation (30 hours contact for up to 20 weeks) Conventional SLT: therapist directed SLT Social support and stimulation: untrained volunteers received details about participant's aphasia, general support and within-treatment assessment scores. They were not given instruction in SLT techniques
Outcomes	Functional Communication Profile, Schuell Assessment Assessed twice at baseline and at 2, 4, 8, 12 weeks and post-treatment (3 and 6-month follow ups)
Notes	UK Randomisation details provided through personal communication with authors of original review Drop-outs: 82 participants (conventional SLT 34; social support 48)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	Yes	Adequate
Blinding? All outcomes	Yes	Outcome assessor not treating therapist
Incomplete outcome data addressed? All outcomes	No	ITT analysis was not used
Free of selective reporting?	Unclear	Statistical data included in the review
Free of other bias?	Unclear	Sample size calculation not reported Participants in the social support and stimulation group were younger (mean age 65 years; SD 10.6) than those in the conventional SLT group (mean age 70 years; SD 8.7)

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Denes 1996

Methods	Parallel group RCT
Participants	Inclusion criteria: global aphasia, left CVA, within first year after stroke, right-handed, native Italian speakers, literate Exclusion criteria: none listed Group 1: 8 participants Group 2: 9 participants Groups comparable at baseline
Interventions	1. Intensive SLT (45 to 60-minute session approximately 5 times weekly for 6 months) 2. Conventional SLT (45 to 60-minute session approximately 3 times weekly for 6 months) Intensive SLT: 'conversational approach' more focus on comprehension (e.g. picture-matching to understanding complex scenes, short stories, engaging patient in conversation, retelling personally relevant stories) Conventional SLT: based on 'stimulation approach'
Outcomes	Aachen Aphasia Test Assessed at baseline and 6 months
Notes	Italy Data from an additional 4 non-randomised participants with global aphasia were also reported. They received no SLT intervention but were assessed at 6-monthly intervals and their scores were used to account for spontaneous recovery. They were not included in this review

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analysis
Free of selective reporting?	Yes	Statistical data included in the review
Free of other bias?	Unclear	Sample size calculation not reported Groups comparable at baseline

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Di Carlo 1980

Methods	Parallel group RCT
Participants	Inclusion criteria: right-handed, left MCA stroke Exclusion criteria: none listed Group 1: 7 participants Group 2: 7 participants Groups comparable at baseline
Interventions	1. Conventional SLT with filmed programmed instruction (programme lasted at least 80 hours for between 5 to 22 months) 2. Conventional SLT with non-programmed activity (lasted at least 80 hours for between 6 to 9 months) Filmed programmed instruction: perceptual, thinking and language training films (designed for population with hearing impairment) based on linguistic learning theory; passing criterion of 80%, then progression to the next film Non-programme activity: viewing slides, bibliotherapy
Outcomes	Reading recognition, reading comprehension, visual closure, visual learning, vocabulary learning Assessed at baseline, mid-test and at end of treatment
Notes	USA

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor blinding not described
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analysis
Free of selective reporting?	Yes	Individual patient data reported across all measures
Free of other bias?	Unclear	Sample size calculation not reported Groups comparable at baseline

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Doesborgh 2004a

Methods	Parallel group RCT
Participants	Inclusion criteria: > 3 months after stroke, experiencing both semantic and phonological deficits, moderate/severe aphasia Exclusion criteria: illiterate, non-native speaker, dysarthria, global aphasia, developmental/severe acquired dyslexia, visual perceptual deficit, recovered/no aphasia Group 1: 29 participants Group 2: 29 participants Group 1 older than Group 2
Interventions	1. Semantic treatment SLT (1.5 to 3 hours in 2 to 3 sessions weekly for up to 40 weeks) 2. Phonological treatment SLT (1.5 to 3 hours in 2 to 3 sessions weekly for up to 40 weeks) Semantic treatment SLT: aimed to enhance semantic processing (multiple choice, right/wrong format), several levels of difficulty Phonological treatment SLT: sound structure targeting phonological input and output routes, e.g. rhyming consonant clusters, stress patterns, compiling words, syllabification, phonetic similarity
Outcomes	Amsterdam Nijmegen Everyday Language Test Scale A (ANELT-A), Semantic Association Test (SAT), PALPA synonym judgement, PALPA repetition of non-words, PALPA auditory lexical decision Assessed at baseline and end of treatment
Notes	The Netherlands Co-morbidity: memory and executive function impairment Drop-outs: 12 participants (semantic SLT 6; phonological SLT 6) A priori sample size calculated

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer-generated
Allocation concealment?	Yes	Sequentially numbered sealed envelopes
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	Trialists reported ITT 3 participants not included (ANELT scores missing) On-treatment analysis used
Free of selective reporting?	Yes	Statistical data included in the review
Free of other bias?	No	Semantic SLT group older than phonological SLT group Sample size calculation not reported

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Doesborgh 2004b

Methods	RCT
Participants	Inclusion criteria: age 20 to 86 years, native Dutch speaker, minimum 11 months after stroke with moderate to severe naming deficits Exclusion criteria: illiterate, global or rest aphasia, developmental dyslexia Group 1: 9 participants Group 2: 10 participants Groups similar at baseline
Interventions	1. Computer-mediated SLT (30 to 45 minutes 2 to 3 sessions weekly for 2 months) 2. No SLT (6 to 8 weeks) Computer-mediated SLT: improve naming using computer cueing programme
Outcomes	Assessed at baseline and end of treatment Boston Naming Test, ANELT-A
Notes	The Netherlands Co-intervention: psychosocial group therapy aimed at coping with consequences of aphasia, unclear if all participated Patient confounder: executive function deficits Drop-outs: 1 participant (computer-mediated SLT 1; no SLT 0) A priori sample size calculated

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer-generated sequence
Allocation concealment?	Yes	Concealment in sequentially numbered opaque sealed envelopes
Blinding? All outcomes	No	Trialists were the outcome assessors
Incomplete outcome data addressed? All outcomes	No	ITT analysis was not used
Free of selective reporting?	Yes	Statistical data included in the review
Free of other bias?	Yes	A priori sample size calculated Groups similar at baseline

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Drummond 1981

Methods	Parallel group RCT
Participants	Inclusion criteria: none listed Exclusion criteria: none listed Group 1: 4 participants Group 2: 4 participants Groups similar at baseline
Interventions	1. Gesture Cueing SLT: 15 to 30 minutes daily for 2 weeks 2. Conventional SLT: 15 to 30 minutes daily for 2 weeks Gestural cueing (AMERIND): signs to facilitate word finding Conventional SLT: initial syllable and sentence completion cues to facilitate word finding
Outcomes	Picture naming test (20/30 items from the Aphasia Therapy Kit Taylor 1959), response times Assessed at baseline and at end of treatment
Notes	USA

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	-
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analysis
Free of selective reporting?	Unclear	Suitable statistical data permitting inclusion within the review unavailable
Free of other bias?	Unclear	Inclusion criteria not listed Groups similar at baseline Sample size calculation not reported

Elman 1999

Methods	Cross-over group RCT (only data collected prior to cross-over treatment included in this review)
Participants	Inclusion criteria: > 6 months after stroke, completed SLT available via insurance, single left hemisphere stroke, 80 years or younger, premorbidly literate in English, no medical complications or history of alcoholism, 10th to 90th overall percentile on SPICA on entry, attend more than 80% of therapy

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Elman 1999 (*Continued*)

	Exclusion criteria: multiple brain lesions, diagnosed alcoholism Group 1: 12 participants Group 2: 12 participants Groups comparable at baseline (age, education level, aphasia severity)
Interventions	1. Conventional SLT: 2.5 hour session twice weekly for 4 months 2. Social support and stimulation: at least 3 hours weekly for 4 months) Conventional SLT: improve ability to convey message using any verbal/non-verbal methods in group format, social breaks for communication practice, performance artist (1 hour weekly) to facilitate physical exercises, creative expression Social support and stimulation: participants attended social group activities of their choice, e.g. church groups
Outcomes	Shortened Porch Index of Communicative Ability, Western Aphasia Battery AQ, Communicative Activities in Daily Living Assessed at baseline, 2 and 4 months and 4 to 6 weeks from end of treatment
Notes	USA Drop-outs: 7 participants (conventional SLT 3; social support and stimulation 4)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessor inadequately blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis was not used
Free of selective reporting?	Unclear	Statistical data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Groups comparable at baseline (age, education level, aphasia severity) Sample size calculation not reported

Hinckley 2001

Methods	Parallel group RCT
Participants	Inclusion criteria: single left hemisphere stroke, native English speaker, minimum 3 months after stroke, hearing and vision corrected to normal, minimum high school education, chronic non-fluent aphasia

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Hinckley 2001 (*Continued*)

	Exclusion criteria: none listed Group 1: 6 participants Group 2: 6 participants Groups comparable at baseline (age, time post-onset, aphasia severity, education, occupation)
Interventions	1. Functional SLT: 20 hours weekly for 5 weeks 2. Conventional SLT: 20 hours weekly for 5 weeks Functional SLT: disability based, context trained, role plays of functional tasks, establish compensatory strategies (practise ordering by telephone, self-generate individualised strategies) Conventional SLT: impairment based, skill trained, aimed at remediating deficit areas using cueing hierarchies
Outcomes	CADL-2, CETI (completed by primary carer), phone and written functional task developed for project (catalogue ordering quiet and tone), PALPA oral and written picture naming Assessed at baseline and end of treatment
Notes	USA 5 additional participants were non-randomly assigned to a 'baseline' group (both functional SLT and conventional SLT) but they were excluded from this review In the functional SLT group, therapy was discontinued when performance on training probes (50% trained items) reached a minimum of 90% accuracy for 3 consecutive sessions All SLTs were trained in 2 treatment approaches

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor not reported
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups comparable at baseline (age, time post-onset, aphasia severity, education, occupation) Sample size calculation not reported

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Jufeng 2005i

Methods	Parallel group RCT
Participants	Inclusion criteria: post-stroke aphasia Exclusion criteria: none listed Group 1: 30 participants Group 2: 30 participants Comparability of groups at baseline unclear
Interventions	1. Group SLT: daily for 28 days 2. No SLT Group SLT: participants talk with a doctor/nurse in small groups (10 participants) Participants encouraged to communicate with each other
Outcomes	Chinese Rehabilitation Research Centre Aphasia Examination (CRRCAE) Assessed at baseline, 28 days and 3-month follow up
Notes	China Translated by Chinese Cochrane Centre

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessor blinded
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Comparability of groups at baseline unclear Limited inclusion criteria listed and no exclusion criteria Sample size calculation not reported

Jufeng 2005ii

Methods	Parallel group RCT
Participants	Inclusion criteria: post-stroke aphasia Exclusion criteria: none listed Group 1: 24 participants Group 2: 30 participants Comparability of groups at baseline unclear

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Jufeng 2005ii (*Continued*)

Interventions	1. Conventional SLT: daily for 28 days 2. No SLT Conventional SLT: 1-to-1 rehabilitative training, i.e. 1 nurse talked with 1 participant
Outcomes	Chinese Rehabilitation Research Centre Aphasia Examination (CRRCAE) Assessed at baseline, 28 days and 3-month follow up
Notes	China Translated by Chinese Cochrane Centre

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	B - Unclear
Blinding? All outcomes	Yes	Outcome assessor blinded
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Comparability of groups at baseline unclear Limited inclusion criteria listed and no exclusion criteria Sample size calculation not reported

Jufeng 2005iii

Methods	Parallel group RCT
Participants	Inclusion criteria: aphasia following stroke Exclusion criteria: none listed Group 1: 30 participants Group 2: 24 participants Comparability of groups at baseline unclear
Interventions	1. Group SLT: daily for 28 days 2. Conventional SLT: daily for 28 days Group SLT: participants talk with a doctor/nurse in small groups (10 participants) Participants encouraged to communicate with each other Conventional SLT: 1-to-1 rehabilitative training, i.e. 1 nurse talked with 1 participant

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Jufeng 2005iii (*Continued*)

Outcomes	Chinese Rehabilitation Research Centre Aphasia Examination (CRRCAE) Assessed at baseline, 28 days and 3-month follow up
Notes	China Translated by Chinese Cochrane Centre

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessor blinded
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Comparability of groups at baseline unclear Limited inclusion criteria listed and no exclusion criteria Sample size calculation not reported

Katz 1997i

Methods	Parallel group RCT
Participants	Inclusion criteria: single left hemisphere stroke, maximum 85 years, minimum 1 year after stroke, PICA overall between 15th to 90th percentile, premorbidly right handed, minimum education 8th grade, premorbidly literate in English, vision no worse than 20/100 corrected in better eye, hearing no worse than 40 dB unaided in better ear, no language treatment 3 months before entry to study, non-institutionalised living environment Exclusion criteria: premorbid psychiatric, reading or writing problems Group 1: 21 participants Group 2: 21 participants Groups were comparable at baseline
Interventions	1. Computer-mediated SLT: 3 hours weekly for 26 weeks 2. No SLT Computer-mediated SLT: computerised language tasks using visual matching and reading comprehension software No SLT: no computer-based reading intervention or stimulation

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Katz 1997i (*Continued*)

Outcomes	Porch Index of Communicative Ability, Western Aphasia Battery Aphasia Quotient Assessed at baseline, 13 and 26 weeks
Notes	USA Drop-outs: 6 participants (computer-mediated SLT 0, no SLT 6) Across 6 hospitals, 2 community stroke groups across 5 cities

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	Unclear	B - Unclear
Blinding? All outcomes	Yes	Outcomes measured by 1 of 4 SLTs, 95% checked by second SLT with no knowledge of group allocation
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups were comparable at baseline Sample size calculation not reported

Katz 1997ii

Methods	Parallel group RCT
Participants	Inclusion criteria: single left hemisphere stroke, maximum 85 years, minimum 1 year after stroke, PICA overall between 15th to 90th percentile, premorbidly right handed, minimum education 8th grade, premorbidly literate in English, vision no worse than 20/100 corrected, hearing no worse than 40 dB unaided, no language treatment 3 months before entry to study, non-institutionalised living environment Exclusion criteria: premorbid psychiatric, reading or writing problems Group 1: 21 participants Group 2: 21 participants Groups were comparable at baseline
Interventions	1. Computer-mediated SLT: 3 hours weekly for 26 weeks 2. Computer-based placebo: 3 hours weekly for 26 weeks Computer-mediated SLT: computerised language tasks using visual matching and reading comprehension software Computer-based placebo: computerised cognitive rehabilitation software and arcade-style games, no language stimulation

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Katz 1997ii (*Continued*)

Outcomes	Porch Index of Communicative Ability, Western Aphasia Battery Aphasia Quotient Assessed at baseline, 13 and 26 weeks
Notes	USA Drop-outs: 2 participants (computer-mediated SLT 0; no SLT/computer-based placebo 2) Across 6 hospitals, 2 community stroke groups across 5 cities

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	Unclear	B - Unclear
Blinding? All outcomes	Yes	Outcomes measured by 1 of 4 SLTs, 95% checked by 2nd SLT with no knowledge of group allocation
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups were comparable at baseline Sample size calculation not reported

Leal 1993

Methods	Parallel group RCT (stratified by aphasia type)
Participants	Inclusion criteria: no history of neurologic or psychiatric disease, first left stroke (single) , first month after stroke, moderate-severe aphasia, good health, maximum 70 years, residing near hospital with flexible transport Exclusion criteria: mild aphasia (i.e. Aphasia Quotient above 80% on Test Battery for Aphasia) Group 1: 59 participants Group 2: 35 participants
Interventions	1. Conventional SLT: 3 sessions weekly for 6 months 2. Volunteer-facilitated SLT: unclear Conventional SLT: conventional hospital-based SLT rehabilitation programme Volunteer-facilitated SLT: speech and language therapist provided relatives with information and working material; they were encouraged to stimulate the patient as much as possible; monitored monthly by therapist

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Leal 1993 (*Continued*)

Outcomes	Test Battery for Aphasia created by trialists (reported to have good correlation with Western Aphasia Battery) Assessed at baseline and 6 months post stroke
Notes	Portugal Drop-outs: 34 participants (conventional SLT 21; volunteer-facilitated SLT 13)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessor not therapist
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Statistical data reported in a manner unsuitable for inclusion within the review
Free of other bias?	Unclear	Groups were comparable at baseline. Sample size calculation not reported

Lincoln 1982i

Methods	Cross-over RCT (data extracted after completion of cross-over treatment)
Participants	Inclusion criteria: moderate aphasia after stroke, no previous history of brain damage, to attend for a minimum of eight weeks, PICA overall between 35th to 65th percentile Exclusion criteria: severely or mildly aphasic Group 1: 6 participants Group 2: 6 participants
Interventions	1. Conventional SLT followed by operant training SLT (30-minute session 4 times weekly for 4 weeks followed by another 4 weeks with cross-over intervention 2. Conventional SLT followed by social support and stimulation (30-minute session 4 times weekly for 4 weeks followed by another 4 weeks with cross-over intervention Social support and stimulation: pre-determined topics of conversation, participant initiates as able, direct questioning/verbal encouragement given, no attempts to correct responses Conventional SLT: automatic and serial speech, picture-word/sentence matching, reading, writing, verbal encouragement Operant training: verbal conditioning procedure (reinforcement, tokens for correct responses, incorrect responses ignored)

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Lincoln 1982i (*Continued*)

Outcomes	Porch Index of Communicative Ability, Token Test (shortened), object naming test, word fluency naming tasks, picture description, self-rating abilities Assessed at baseline and end of treatment
Notes	UK Some participants unable to complete full number of sessions (leaving slightly early, insufficient therapist time, holidays occurring during trial) Drop-outs: 13 participants (group allocation unclear)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	No	Partial: participants recruited by speech and language therapists then assigned to intervention by trialist
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Yes	Groups were comparable at baseline Sample size calculation not reported

Lincoln 1982ii

Methods	Cross-over RCT (data extracted after completion of cross-over treatment)
Participants	Inclusion criteria: moderate aphasia after stroke, no previous history of brain damage, to attend for a minimum of eight weeks, PICA overall between 35th to 65th percentile Exclusion criteria: severely or mildly aphasic Group 1: 6 participants Group 2: 6 participants
Interventions	1. Operant training SLT followed by conventional SLT: 30-minute session 4 times weekly for 4 weeks followed by another 4 weeks with cross-over intervention 2. Social support and stimulation followed by conventional SLT: 30-minute session 4 times weekly for 4 weeks followed by another 4 weeks with cross-over intervention Social support and stimulation: pre-determined topics of conversation, participant initiates as able, direct questioning/verbal encouragement given, no attempts to correct responses Conventional SLT: automatic and serial speech, picture-word/sentence matching, read-

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Lincoln 1982ii (*Continued*)

	ing, writing, verbal encouragement Operant training: verbal conditioning procedure (reinforcement, tokens for correct responses, incorrect responses ignored)
Outcomes	Porch Index of Communicative Ability, Token Test (shortened), object naming test, word fluency naming tasks, picture description, self-rating abilities Assessed at baseline and end of treatment
Notes	UK Some participants unable to complete full number of sessions (leaving slightly early, insufficient therapist time, holidays occurring during trial) Drop-outs: 13 participants (group allocation unclear)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	No	Partial: participants recruited by speech and language therapists then assigned to intervention by trialist
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	Unclear	ITT analysis not used
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups were comparable at baseline Sample size calculation not reported

Lincoln 1982iii

Methods	Cross-over RCT (data extracted up to point of cross-over)
Participants	Inclusion criteria: moderate aphasia after stroke, no previous history of brain damage, to attend for a minimum of 8 weeks, PICA overall between 35th to 65th percentile Exclusion criteria: severely or mildly aphasic Group 1: 12 participants Group 2: 6 participants
Interventions	1. Conventional SLT: 30-minute session 4 times weekly for 4 weeks (before cross-over) 2. Social support and stimulation: 30-minute session 4 times weekly for 4 weeks (before cross-over) Social support and stimulation: pre-determined topics of conversation, participant ini-

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Lincoln 1982iii (*Continued*)

	tiates as able, direct questioning/verbal encouragement given, no attempts to correct responses Conventional SLT: automatic and serial speech, picture-word/sentence matching, reading, writing, verbal encouragement
Outcomes	Porch Index of Communicative Ability, Token Test (shortened), object naming test, word fluency naming tasks, picture description, self-rating abilities Assessed at baseline and end of treatment
Notes	UK Some participants unable to complete full number of sessions (leaving slightly early, insufficient therapist time, holidays occurring during trial) Drop-outs: 13 participants (group allocation unclear)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	No	Partial: participants recruited by speech and language therapists then assigned to intervention by trialist
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	Unclear	ITT analysis not used
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups were comparable at baseline Sample size calculation not reported

Lincoln 1984a

Methods	Parallel group RCT
Participants	Inclusion criteria: acute stroke, admitted to Nottingham hospital Exclusion criteria: unable to tolerate full language testing at 10 weeks, very mild aphasia, severe dysarthria Group 1: 163 participants Group 2: 164 participants Data reported: 191 participants Groups comparable at baseline (age, gender, aphasia types)

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Lincoln 1984a (*Continued*)

Interventions	1. Conventional SLT: 1-hour session 2 times weekly for 24 weeks 2. No SLT (deferred SLT) Conventional SLT: as chosen by each SLT
Outcomes	Porch Index of Communicative Ability, Functional Communication Profile Secondary outcome: Multiple Adjective Affect Checklist Assessed at baseline, 12 weeks and at end of treatment at 24 weeks
Notes	UK Method of randomisation and concealed allocation provided through personal communication with authors of original review Other hospital treatment given as normal Not all patients received planned number of sessions mainly due to recovery or withdrawal from treatment Drop-outs: 166 participants (conventional SLT 76; no SLT 90)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	Yes	Sequentially numbered sealed envelopes
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Yes	Statistical data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Groups were comparable at baseline Sample size calculation not reported

Lincoln 1984b

Methods	Cross-over RCT (only data collected prior to cross-over treatment included in this review)
Participants	Inclusion criteria: < 35th percentile of Porch Index of Communicative Ability, severe aphasia following stroke, spontaneous speech (few single words), writing limited to copying, poor auditory comprehension, < average non-verbal intellectual functioning Exclusion criteria: none listed Group 1: 6 participants Group 2: 6 participants

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Lincoln 1984b (*Continued*)

Interventions	1. Programmed instruction with operant training plus conventional SLT: 30 minute session twice weekly for 4 weeks, followed by cross-over 2. Attention placebo plus conventional SLT: 30-minute session twice weekly for 4 weeks, followed by cross-over Programmed instruction with operant training: electric board graded language tasks, board lights in response to correct answer plus therapist provides verbal praise; for incorrect answers, there is no light response, the therapist shakes head and provides verbal feedback - 'no' Attention placebo: non-verbal tasks (matching, copying, recall of designs, performance scale of WAIS, manual dexterity tasks) Conventional SLT: as provided by qualified speech and language therapist
Outcomes	Porch Index of Communicative Ability, Token Test, Peabody PCT, object naming test Assessed at baseline, 4 weeks then 8 weeks following cross-over
Notes	UK The same therapist provided conventional SLT to both groups Manner of reporting prevents inclusion of data within the meta-analyses Comparisons between group 1 and group 2 showed group 2 performed significantly better on PICA test (reading cards) and copying shapes than group 1

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	No	Partial: participants recruited by speech and language therapists then assigned to intervention by trialist
Blinding? All outcomes	Unclear	Outcome assessor blinded for one measure only (PICA)
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups comparable at baseline Sample size calculation not reported

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Lyon 1997

Methods	Parallel group RCT
Participants	Inclusion criteria (patient): minimum 1 year after stroke, no bilateral brain damage, ability to ambulate short distances, function independently in primary ADL, English primary language, normal range of cognition, hearing and vision, weekly contact with primary caregiver, history free of psychosis Inclusion criteria (caregiver): normal cognitive, hearing and vision, no history of psychiatric problems Exclusion criteria: none reported Group 1: 18 participants (7 triads) Group 2: 9 participants (3 triads) Each triad comprised 1 person with aphasia, 1 caregiver, 1 communication partner Comparability of groups at baseline unclear
Interventions	1. Functional SLT: Phase A: 1 to 1.5 hours twice weekly for 6 weeks; Phase B: 1 to 2-hour session (clinic) plus 2 to 4-hour session (community) once weekly for 14 weeks 2. No SLT intervention Functional SLT: Phase A: clinic-based, establishing effective means of communication between person with aphasia and communication partner, maximise pair's communication strategies; Phase B: home or community-based, activities chosen by person with aphasia
Outcomes	Boston Diagnostic Aphasia Examination, Communicative Abilities of Daily Living, Affect Balance Scale, Psychological Wellbeing Index, Communication Readiness and Use Index, informal subjective measures Assessed at baseline and post-treatment
Notes	USA

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessors inadequately blinded
Incomplete outcome data addressed? All outcomes	Unclear	All randomised participants appear to have been included in analyses but it is unclear
Free of selective reporting?	No	Statistical data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Comparability of groups at baseline unclear. Sample size calculation not reported

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MacKay 1988

Methods	Parallel group RCT
Participants	Inclusion criteria: minimum age 30 years, post-stroke aphasia, minimum 6 months post-onset, living within 50 mile radius of hospital/specified geographical area Exclusion criteria: none listed 96 participants in total: division between groups unclear Unclear whether groups were comparable at baseline
Interventions	1. Volunteer-facilitated SLT: 3 to 6 hours once weekly for 1 year 2. No SLT Volunteer-facilitated SLT: language and social stimulation
Outcomes	Communicative Abilities of Daily Living, trialist assessment measuring social/interpersonal skills, structured questionnaires assessing economic, medical and demographic factors (completed by carers/family members) Assessed at baseline, 6, 12, 18 and 24 months
Notes	USA Participants continued individual medical/nursing care Drop-outs: 1 (no SLT group 1)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis was not used
Free of selective reporting?	No	Data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Comparability of groups at baseline unclear Sample size calculation not reported

Meikle 1979

Methods	Parallel group RCT
Participants	Inclusion criteria: aphasia after stroke, minimum 3 weeks after stroke Exclusion criteria: none listed Group 1: 15 participants Group 2: 16 participants

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Meikle 1979 (*Continued*)

	Group that received conventional SLT had more weeks in the trial than the volunteer-facilitated SLT group
Interventions	1. Volunteer-facilitated SLT: 4 home visits weekly plus group sessions for a mean of 20.8 (13.5) (range 2 to 46) weeks 2. Conventional SLT: 45-minute session 3 to 5 times weekly plus group sessions for a mean of 37.13 (21.89) (range 7 to 84) weeks Volunteer-facilitated SLT: volunteers given basic background to aphasia, standard items of SLT equipment, initial and ongoing support and advice, encouraged to use initiative and ingenuity in developing therapeutic techniques Conventional SLT: chosen by SLT (no details)
Outcomes	Porch Index of Communicative Ability Assessed at baseline and at 6-week intervals until end of trial Wolfson Test (unpublished) (comprehension, verbal expression, writing, spelling) Assessed at baseline, after 3 months and at end of treatment
Notes	UK In the conventional SLT group 5 participants missed up to half their possible treatments (illness, holidays, transport difficulties) Unclear whether volunteer supervisor was a speech and language therapist Participants remained in trial until 2 successful estimations on PICA showed no appreciable improvement, they requested withdrawal or until end of trial in December 1978 Participants who plateaued exited trial and counted as successes Drop-outs: 2 (conventional SLT 0; volunteer-facilitated SLT 2)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessor not blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis was not used
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Group that received conventional SLT had more weeks in the trial than the volunteer-facilitated SLT group In the conventional SLT group 5 participants missed up to half their possible treatments (illness, holidays, transport difficulties) Sample size calculation not reported

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Meinzer 2007

Methods	Parallel group RCT
Participants	Inclusion criteria: 1 or more participating relative, single left hemisphere stroke, aphasia, minimum 6 months post-onset, globally aphasic if residual expressive language, i.e. repeat short phrases Exclusion criteria: none listed Group 1: 10 participants (4 subgroups) Group 2: 10 participants (4 subgroups) Participants receiving constraint-induced SLT were younger than those in the volunteer-facilitated group
Interventions	1. Constraint-induced SLT: 3 hours daily for 10 consecutive working days 2. Volunteer-facilitated constraint-induced SLT: 3 hours daily for 10 consecutive working days Constraint-induced SLT: communicative language games, pairs of cards depicting objects, everyday situations or words; screens between the participants prevents seeing each others cards; participant must choose a card from their own set and ask for the identical card from another participant; can be adjusted to target different levels of language complexity Volunteer-facilitated constraint-induced SLT: relatives volunteered to receive 2-hour introduction to constraint-induced SLT; they were supervised during first 2 of 10 sessions by experienced therapist; following 8 sessions experts were available, further group training sessions at end of each daily training session; where 2 or more relatives were available they alternated each day
Outcomes	Aachen Aphasia Test (Token Test, repetition, written language, naming, comprehension) Assessed at baseline and immediately post-treatment
Notes	Germany One participant in each group had mild apraxia of speech

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessor blinded
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review

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Free of other bias?	Unclear	Participants receiving constraint-induced SLT were younger than those in the trained volunteers group Sample size calculation not reported

ORLA 2006

Methods	RCT
Participants	Inclusion criteria: right-handed, non-fluent aphasia, single left ischaemic stroke at least 6 months post-onset Exclusion criteria: none listed Group 1: 6 participants Group 2: 7 participants Groups seem to be comparable
Interventions	1. Intensive SLT: 10 hours weekly for 6 weeks 2. Conventional SLT: 4 hours weekly for 6 weeks In both interventions patients used a computer programme which allows patient to practise reading sentences aloud together with a virtual therapist A non-randomised third group that acted as a control group was also included in the study report but was excluded from this review
Outcomes	Western Aphasia Battery Aphasia Quotient
Notes	

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	-
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	Groups seem to be comparable at baseline Sample size calculation not reported

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Prins 1989

Methods	Parallel group RCT
Participants	Inclusion criteria: unilateral left CVA, minimum 3 months post-onset, < 80% on auditory comprehension test, good prognosis for auditory comprehension per SLT, motivated and fit for participation Exclusion criteria: none listed Group 1: 10 participants Group 2: 11 participants
Interventions	1. STACDAP SLT: 2 sessions weekly for 5 months 2. Conventional SLT: 2 sessions weekly for 5 months STACDAP SLT: a series of 28 tasks; non-verbal, phonology, lexical-semantics and morphosyntax of increasing complexity Conventional SLT: conventional stimulation therapy
Outcomes	Word discrimination, body-part identification, Token Test, miscellaneous commands, reading comprehension, naming, sentence construction, spontaneous speech, STACDAP phonology, lexicon and morphosyntax Assessed at baseline and at the end of treatment
Notes	The Netherlands Participants in additional 'no treatment' group were not randomly allocated but matched to other groups, and were therefore excluded from the review

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor blinding not reported
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Unclear	STACDAP SLT group were older than the conventional SLT group at baseline Sample size calculation not reported

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Pulvermuller 2001

Methods	Parallel group RCT
Participants	Inclusion criteria: single left MCA stroke, monolingual, competent German speakers Exclusion criteria: severe cognitive or perceptual difficulties affecting participation, left handed, additional neurological diseases, depression Group 1: 10 participants Group 2: 7 participants Constraint-induced SLT group were longer since stroke (mean 98.2 (74.2) months) than conventional SLT group (mean 24 (20.6) months)
Interventions	1. Constraint-induced SLT: 3 to 4 hours daily for 10 days 2. Conventional SLT: 2 to 3 hours daily for approximately 4 weeks Constraint-induced SLT: small groups (2 to 3 participants) with speech and language therapist involving barrier therapeutic games; all communication verbal, pointing or gestures not permitted Conventional SLT: syndrome-specific intervention for example naming, repetition, sentence completion, following instructions, conversation topics of participants' own choice
Outcomes	Aachen Aphasia Test (Token Test, comprehension, repetition, naming), Communicative Activity Log Assessed at baseline and at end of treatment
Notes	Germany

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer-generated
Allocation concealment?	Yes	-
Blinding? All outcomes	Yes	Outcome assessor blinded
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	No	Constraint-induced SLT group were longer after stroke (mean 98.2 (74.2) months) than conventional SLT Group (mean 24 (20.6) months) at baseline Sample size calculation not reported

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Rochon 2005

Methods	Parallel group RCT
Participants	Inclusion criteria: chronic Broca's aphasia (BDAE), produce sufficient speech for analyses, single left hemisphere stroke, native English speaker, normal hearing on screening Exclusion criteria: none listed Group 1: 3 participants Group 2: 2 participants Groups comparable at baseline
Interventions	1. Sentence mapping SLT: 1 hour session twice weekly for approximately 2.5 months 2. Social support and stimulation: 1 hour session twice weekly for approximately 2.5 months Sentence mapping SLT: 4 levels of treatment: active, subject cleft, passive, object cleft sentences Social support and stimulation: unstructured conversation about current events; participants were given a narrative retelling task on alternate sessions
Outcomes	Trained sentence structures: (1) active, (2) subject cleft, (3) passive, (4) object cleft; Caplan and Hanna Sentence Production Test; Picture Description and Structure Modeling Test; narrative task: (1) mean length of utterance, (2) percentage words in sentences, (3) percentage well formed words, (4) sentence elaboration index; Philadelphia Comprehension Battery (reversible sentences); Picture Comprehension Test Assessed at baseline, end of treatment and 4-week follow up Social support and stimulation group also participated in between level probes
Notes	Canada Only 1 group 1 participant entered all 4 levels; 1 only entered levels 1 and 2 (did not need levels 3 to 4); 1 participant entered levels 1, 2 and 4

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessor blinding inadequate Primary examiner scored all outcome measures A fifth of measures were also scored by independent assessor Point-to-point agreement was 98%
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Unclear	Statistical data included within the review
Free of other bias?	Unclear	Sample size calculation not reported

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Shewan 1984i

Methods	Parallel group RCT (stratified for type and severity of aphasia)
Participants	Inclusion criteria: unilateral first CVA, Global, Broca's, Wernicke's, anomic, conduction per WAB, occlusive/stable intracerebral haemorrhagic stroke, functional English speakers Exclusion criteria: non-stroke, symptoms lasting fewer than 5 days, language recovery within 2 to 4 weeks post-onset, unstable illness, arteriovenous malfunction, aneurysm rupture, subarachnoid haemorrhage, hearing or visual impairment, WAB aphasia quotient at or above 93.8 Group 1: 28 participants Group 2: 24 participants Groups comparable at baseline
Interventions	1. Language-orientated SLT: 1 hour session 3 times weekly* for 1 year 2. Conventional SLT: 1 hour session 3 times weekly* for 1 year *(or 1.5 hours twice weekly) Language-orientated SLT: based on psycholinguistic principles provided by speech and language therapists Conventional SLT: stimulation-facilitation therapy based on Schuell and Wepman's approaches provided by speech and language therapists
Outcomes	Western Aphasia Battery, Auditory Comprehension Test for Sentences Assessed at baseline, 3, 6 and 12 months
Notes	Canada Participants refusing or unable to participate were allocated to a third no-treatment group. This group were not included in this review Drop-outs: 7 participants (language-orientated SLT 6; conventional SLT 1)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor blinding unclear
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Sample size calculation not reported Groups comparable at baseline

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Shewan 1984ii

Methods	Parallel group RCT (stratified for type and severity of aphasia)
Participants	Inclusion criteria: unilateral first CVA, Global, Broca's, Wernicke's, anomic, conduction per WAB, occlusive/stable intracerebral haemorrhagic stroke, functional English speakers Exclusion criteria: non-stroke, symptoms lasting fewer than 5 days, language recovery within 2 to 4 weeks post-onset, unstable illness Group 1: 28 participants Group 2: 25 participants Groups comparable at baseline
Interventions	1. Language-orientated SLT: 1-hour session 3 times weekly* for 1 year 2. Social stimulation and support: 1-hour session 3 times weekly* for 1 year *(or 1.5 hours twice weekly) Language-orientated SLT: based on psycholinguistic principles provided by speech and language therapists Social stimulation and support: based on stimulation orientation, providing psychological support, communication in unstructured settings carried out by nurses
Outcomes	Western Aphasia Battery, Auditory Comprehension Test for Sentences Assessed at baseline, 3, 6 and 12 months
Notes	Canada Participants refusing or unable to participate were allocated to a third no-treatment group but were not included in this review Drop-outs: 12 participants (language-orientated SLT 6; social stimulation and support 6)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor blinding unclear
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Sample size calculation not reported Groups comparable at baseline

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Shewan 1984iii

Methods	Parallel group RCT (stratified for type and severity of aphasia)
Participants	Inclusion criteria: unilateral first stroke, Global, Broca's, Wernicke's, anomic, conduction as per WAB, occlusive or stable intracerebral haemorrhagic stroke, functional English speakers Exclusion criteria: non-stroke, symptoms lasting fewer than 5 days, language recovery within 2 to 4 weeks after stroke, unstable illness Group 1: 24 participants Group 2: 25 participants Groups comparable at baseline
Interventions	1. Conventional SLT: 1 hour 3 times weekly for 1 year (or 1.5 hours twice weekly) 2. Social stimulation and support: 1 hour 3 times weekly for 1 year (or 1.5 hours twice weekly) Conventional SLT: stimulation-facilitation therapy based on Schuell and Wepman's approaches provided by speech and language therapists Social stimulation and support: based on stimulation orientation, providing psychological support, communication in unstructured settings carried out by nurses
Outcomes	Western Aphasia Battery, Auditory Comprehension Test for Sentences Assessed at baseline, 3, 6 and 12 months
Notes	Canada Participants refusing or unable to participate were allocated to a third no-treatment group but were not included in this review Drop-outs: 7 participants (conventional SLT 1; social stimulation and support 6)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor blinding unclear
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	Sample size calculation not reported. Groups comparable at baseline

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Smania 2006

Methods	Parallel group RCT
Participants	Inclusion criteria: left unilateral CVA, limb apraxia lasting a minimum of 2 months, aphasia Exclusion criteria: previous CVA or other neurological disorders, > 80 years of age, unco-operative, orthopedic or other disabling disorders Group 1: 20 participants Group 2: 21 participants Groups comparable at baseline
Interventions	1. Conventional SLT: 50 minutes 3 times weekly for 10 weeks 2. No SLT: limb apraxia therapy over 10 weeks Conventional SLT: based on Basso et al 1979 approach No SLT: limb apraxia therapy only
Outcomes	Token Test, Gestural comprehension (not described) Assessed at baseline, end of treatment and 2-month follow up
Notes	Italy All participants had apraxia Drop-outs: 24 participants (conventional SLT 12; no SLT 12)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Random numbers table
Allocation concealment?	No	Co-ordinating trialist allocated participants to groups
Blinding? All outcomes	Yes	Outcome assessor blinded
Incomplete outcome data addressed? All outcomes	No	ITT was not used
Free of selective reporting?	Unclear	Statistical data included within the review
Free of other bias?	Unclear	Sample size calculation not reported Groups comparable at baseline

Smith 1981i

Methods	Parallel group RCT (subgroup within larger trial)
Participants	Inclusion criteria: hospital catchment area, measurable residual neurological deficit, no life threatening concurrent illness, fit for intensive therapy, independent prior to stroke, inpatient for not more than 2 months after stroke

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Smith 1981i (*Continued*)

	Exclusion criteria: too old or frail to travel to hospital, some non-described reasons Group 1: 16 participants Group 2: 17 participants Group 1 (intensive SLT) had higher mean percentage error scores on MTDDA than group 2 (no SLT)
Interventions	1. Intensive SLT: 1 hour 4 times weekly for up to 12 months 2. No SLT Intensive SLT: not described No SLT: participants were visited at home by health visitor but frequency is unclear
Outcomes	Minnesota Test for the Differential Diagnosis of Aphasia, General Health Questionnaire Assessed at baseline, 3, 6 and 12 months after trial admission
Notes	UK Difficult to maintain intensive SLT input after first 3 months Participants were also receiving physiotherapy and occupational therapy No restrictions on other treatments prescribed by hospital staff or GP Drop-outs: 10 plus ? (5 participants withdrawn prior to final analyses (3 with dysarthria but no aphasia; 2 died before first re-assessment but grouping not advised) plus intensive SLT 10; no SLT: none reported

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessors not blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Statistical data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	20 patients in main trial had mild dementia, unclear whether any were participants with aphasia Group 1 (intensive SLT) had lower mean percentage error scores on MTDDA than group 2 (no SLT); it is unclear whether this was a significant difference Sample size calculation not reported

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Smith 1981ii

Methods	Parallel group RCT (subgroup within larger trial)
Participants	Inclusion criteria: lives in hospital catchment area, measurable residual neurological deficit, no life-threatening concurrent illness, fit for intensive therapy if assigned, independent prior to stroke, inpatient for not more than 2 months post-onset Exclusion criteria: too old or frail to travel to hospital, some non-described reasons Group 1: 14 participants Group 2: 17 participants Group 1 (conventional SLT) had higher mean percentage error scores on MTDDA than group 2 (no SLT)
Interventions	1. Conventional SLT: 40 minutes twice weekly for up to 12 months 2. No SLT Conventional SLT: not described No SLT: participants were visited at home by health visitor but frequency is unclear
Outcomes	Minnesota Test for the Differential Diagnosis of Aphasia, General Health Questionnaire Assessed at baseline, 3, 6 and 12 months after trial admission
Notes	UK Participants also receiving physiotherapy and occupational therapy No restrictions of other treatments prescribed by the hospital or GP Drop-outs: 5 participants withdrawn prior to final analyses (3 with dysarthria but no aphasia; 2 died before first re-assessment but grouping not advised) plus 6 participants (conventional SLT 6; no SLT: none reported)

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessors not blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Statistical data reported unsuitable for inclusion within the review
Free of other bias?	Unclear	20 patients in main trial had mild dementia, unclear whether any were participants with aphasia Group 1 (conventional SLT) had higher mean percentage error scores on MTDDA than group 2 (no SLT)

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Smith 1981ii (*Continued*)

		Sample size calculation not reported

Smith 1981iii

Methods	Parallel group RCT (subgroup within larger trial)
Participants	Inclusion criteria: lives in hospital catchment area, measurable residual neurological deficit, no life-threatening concurrent illness, fit for intensive therapy if assigned, independent prior to stroke, inpatient for not more than 2 months post-onset Exclusion criteria: too old or frail to travel to hospital, some non-described reasons Group 1: 16 participants Group 2: 14 participants Groups comparable at baseline
Interventions	1. Intensive SLT: 1 hour 4 times weekly for up to 12 months 2. Conventional SLT: 40 minutes twice weekly for up to 12 months Intensive SLT: not described Conventional SLT: not described
Outcomes	Minnesota Test for the Differential Diagnosis of Aphasia, General Health Questionnaire Assessed at baseline, 3, 6 and 12 months after trial admission
Notes	UK Distinction between intensive and conventional became impossible to maintain after first 3 months as individual patterns of therapy attendance emerged; in first 3 months mean 21/50 hours intended Conventional SLT group received additional group treatment; also received physiotherapy and occupational therapy No restrictions of other treatments prescribed by the hospital or GP Drop-outs: 5 participants withdrawn prior to final analyses (3 with dysarthria but no aphasia; 2 died before first re-assessment but grouping not advised) plus 16 participants (intensive SLT 10; conventional SLT 6)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	No	Outcome assessors not blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Statistical data reported unsuitable for inclusion within the review

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Smith 1981iii (*Continued*)

Free of other bias?	Unclear	20 patients in main trial had mild dementia, unclear whether any were participants with aphasia Sample size calculation not reported

van Steenbrugge 1981

Methods	Parallel group RCT
Participants	Inclusion criteria: neurologically stable, > 3 months after stroke, aphasia, motivated, clear but 'not too severe' naming difficulties Exclusion criteria: none listed Group 1: 5 participants Group 2: 5 participants Groups comparable at baseline
Interventions	1. Task-specific SLT: 1 hour twice weekly for 6 weeks (followed by 3 weeks 'free therapy' from patients' own therapists) 2. Conventional SLT: unclear but continued for 9 weeks Task-specific SLT: for naming and constructing sentences: Phase 1 delivered by research speech and language therapists, Phase 2 delivered by participant's own therapist Conventional SLT: expressive tasks (no details)
Outcomes	FE-Scale (expression), naming (test not specified), sentence construction (not described) Assessed at baseline, 6 and follow up at 9 weeks
Notes	The Netherlands Translated by Mrs Christine Versluis (Netherlands)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Unclear	Outcome assessor blinding unclear
Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	Unclear	Statistical data included within the review
Free of other bias?	Unclear	Groups comparable at baseline (age, time post-stroke) Sample size calculation not reported

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Wertz 1981

Methods	Parallel group RCT
Participants	Inclusion criteria: male veteran, aged 40 to 80 years old, premorbidly literate in English, first thromboembolic left CVA, no co-existing major medical complications, hearing no worse than 40 dB in poorer ear, corrected vision no worse than 20/100 in poorer eye, adequate sensory/motor ability in 1 hand to write/gesture, 4 weeks post-onset, language severity 15th to 75th overall percentile on PICA Exclusion criteria: none listed Group 1: 32 participants Group 2: 35 participants Groups comparable at baseline
Interventions	1. Group SLT: 4 hours in group with therapist plus 4 hours of group activities weekly for up to 44 weeks 2. Conventional SLT: 4 hours with therapist plus 4 hours machine-assisted treatment and SLT drills weekly for up to 44 weeks Group SLT: each week, 4 hours direct SLT contact in groups of 3 to 7 participants designed to stimulate language through social interaction; no direct manipulation of deficits; encouraged group discussion on current events and topics; no direct attempts to improve or correct incorrect responses; in addition, 4 hours of group recreational activities weekly Conventional SLT: direct, stimulus-response manipulation of speech and language deficits plus 4 hours of machine-assisted treatment and SLT drill
Outcomes	Porch Index of Communicative Ability, Token Test, word fluency measure, Conversational Rating, Informants ratings of functional language use Assessed at baseline and every 11 weeks until end of 44-week treatment or withdrawal of participant
Notes	USA over 5 sites Drop-outs: 33 participants (group SLT 16; conventional SLT 17)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Some statistical data included within the review

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Wertz 1981 (*Continued*)

Free of other bias?	Unclear	Groups comparable at baseline Sample size calculation not reported

Wertz 1986i

Methods	Cross-over group RCT (only data collected prior to cross-over treatment included in this review)
Participants	Inclusion criteria: male veteran, maximum 75 years old, 2 to 24 weeks post-onset, single left thromboembolic CVA, no previous or co-existing neurologic, serious medical or psychological disorder, no worse than 20/100 corrected vision in better eye, hearing no worse than 40 dB unaided in better ear, sensory/motor ability in 1 upper limb to gesture or write, premorbidly literate in English, maximum 2 weeks between onset and trial entry, language severity 10th to 80th PICA overall, non-institutionalised living environment, outside assistant volunteer available Exclusion: none listed Group 1: 38 participants Group 2: 40 participants Groups comparable at baseline
Interventions	1. Conventional SLT: 8 to10 hours weekly for 12 weeks 2. No SLT: deferred SLT for 12 weeks Conventional SLT: delivered by therapist in clinic; stimulus-response (auditory comprehension, reading, oral-expressive language and writing); aphasia-specific techniques; followed by 12 weeks of no SLT
Outcomes	Porch Index of Communicative Ability, Communicative Abilities in Daily Living, Reading Comprehension Battery for Aphasia, Token Test Assessed at baseline, 6 and 12 weeks with follow ups at 18 and 24 weeks
Notes	USA over 5 sites Estimated sample size Drop-outs: 20 participants (conventional SLT 9; no SLT 11)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used

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Wertz 1986i (*Continued*)

Free of selective reporting?	Yes	Statistical data included within the review
Free of other bias?	Yes	Groups comparable at baseline

Wertz 1986ii

Methods	Cross-over group RCT (only data collected prior to cross-over treatment included in this review)
Participants	Inclusion criteria: male veteran, maximum 75 years old, 2 to 24 weeks post-onset, single left thromboembolic CVA, no previous neurologic involvement/co-existing serious medical or psychological disorder, no worse than 20/100 corrected vision in better eye, hearing no worse than 40 dB unaided in better ear, sensory/motor ability in 1 upper limb to gesture/write, premorbidly literate in English, maximum 2 weeks between onset and trial entry, language severity 10th to 80th PICA overall, non-institutionalised living environment, outside assistant volunteer available Exclusion: none listed Group 1: 43 participants Group 2: 40 participants Groups comparable at baseline
Interventions	1. Volunteer-facilitated SLT: 8 to 10 hours weekly for 12 weeks 2. No SLT: deferred conventional SLT Volunteer-facilitated SLT: planned and directed by speech and language therapist, administered at home by trained volunteer (family member/friend) with no previous healthcare experience, followed by 12 weeks of no SLT Volunteers received 6 to10 hours training, information about aphasia, observation of treatment on videotapes, demonstration and practise with techniques; weekly face-to-face and telephone contact with SLT for advice and support; every 2 weeks volunteers videotaped a session to be reviewed with SLT and adjustments suggested
Outcomes	Porch Index of Communicative Ability, Communicative Abilities in Daily Living, Reading Comprehension Battery for Aphasia, Token Test Assessed at baseline, 6 and 12 weeks with follow ups at 18 and 24 weeks
Notes	USA over 5 sites Estimated sample size Drop-outs: 18 participants (trained volunteer SLT 7; no SLT 11)

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-

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Wertz 1986ii (*Continued*)

Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis was not used
Free of selective reporting?	Unclear	Statistical data included within the review
Free of other bias?	Unclear	Groups comparable at baseline

Wertz 1986iii

Methods	Cross-over group RCT (only data collected prior to cross-over treatment included in this review)
Participants	Inclusion criteria: male veteran, maximum 75 years old, 2 to 24 weeks after single left thromboembolic stroke, no previous neurologic involvement/co-existing serious medical or psychological disorder, at least 20/100 corrected vision, hearing at least 40 dB unaided, sensory/motor ability in 1 upper limb to gesture or write, premorbidly literate in English, maximum 2 weeks between onset and trial entry, language severity 10th to 80th percentile on PICA, non-institutionalised living, volunteer available Exclusion: none listed Group 1: 43 participants Group 2: 38 participants Groups comparable at baseline
Interventions	1. Volunteer-facilitated SLT: 8 to 10 hours weekly for 12 weeks 2. Conventional SLT: 8 to 10 hours weekly for 12 weeks Volunteer-facilitated SLT: prepared by speech and language therapist; administered at home by trained volunteer (family member/friend) with no previous healthcare experience; followed by 12 weeks of no SLT Volunteers received 6 to 10 hours training, information about aphasia, observation of treatment on videotapes, demonstration and practise with techniques; weekly face-to-face and telephone contact with SLT for advice and support; every 2 weeks volunteers videotaped a session to be reviewed with SLT and adjustments suggested Conventional SLT: delivered by therapist in clinic; stimulus-response (auditory comprehension, reading, oral-expressive language and writing); aphasia-specific techniques; followed by 12 weeks of no SLT
Outcomes	Porch Index of Communicative Ability, Communicative Abilities in Daily Living, Reading Comprehension Battery for Aphasia, Token Test Assessed at baseline, 6 and 12 weeks with follow ups at 18 and 24 weeks
Notes	USA over 5 sites Estimated sample size Drop-outs: 16 participants (Volunteer-facilitated SLT 9; conventional SLT 7)
Risk of bias	

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Wertz 1986iii (*Continued*)

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessors blinded
Incomplete outcome data addressed? All outcomes	No	ITT analysis not used
Free of selective reporting?	Unclear	Statistical data included within the review
Free of other bias?	Unclear	Groups comparable at baseline

Wu 2004

Methods	Parallel group RCT
Participants	Inclusion criteria: none described Exclusion criteria: none described Group 1: 120 participants Group 2: 116 participants Unclear whether groups were comparable at baseline
Interventions	1. Conventional SLT: frequency of therapy unclear; for 6 months 2. No SLT Conventional SLT: 2-part intervention including visual stimulation, gesture and 'word pattern' for comprehension, pronunciation, reading single words and 'entertainments' (not described) Part 1: inpatient intervention (doctors); Part 2: outpatient intervention (family members trained by doctors)
Outcomes	None available
Notes	China Translated by Chinese Cochrane Centre

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	-
Allocation concealment?	Unclear	-
Blinding? All outcomes	Yes	Outcome assessor blinded

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Wu 2004 (*Continued*)

Incomplete outcome data addressed? All outcomes	Yes	All randomised participants included in analyses
Free of selective reporting?	No	Statistical data not reported
Free of other bias?	Unclear	Unclear whether groups were comparable at baseline Sample size calculation not reported

ADL: activities of daily living
ANELT: Amsterdam-Nijmegen Everyday Language Test
BDAE: Boston Diagnostic Aphasia Examination
CADL: communicative abilities of daily living
CETI: Communicative Effectiveness Index
CVA: cerebrovascular accident
dB: decibels
GP: general practitioner
ITT: intention-to-treat
MCA: middle cerebral artery
MTDDA: Minnesota Test for the Differential Diagnosis of Aphasia
NHS: National Health Service (UK)
PALPA: psycholinguistic assessments of language processing in aphasia
PICA: Porch Index of Communicative Abilities
RCT: randomised controlled trial
SD: standard deviation
SLT: speech and language therapy/therapist
SPICA: Shortened Porch Index of Communicative Abilities
STACDAP: systematic therapy for auditory comprehension disorders in aphasic patients

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Cherney 2007	Experimental and control groups had same SLT intervention with experimental group also receiving cortical stimulation
Cohen 1992	Included conditions other than stroke Unable to obtain aphasia-specific data
Cohen 1993	Included conditions other than stroke Unable to obtain aphasia-specific data
Gu 2003	Unable to obtain aphasia-specific data
Hartman 1987	Quasi -randomisation

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(*Continued*)

Jungblut 2004	Randomisation to groups not adequate: group allocation could be predicted
Kagan 2001	Quasi-randomisation
Kalra 1993	Not all participants had aphasia Unable to obtain aphasia-specific data
Kinsey 1986	Randomisation dictated order of task presentation Aimed to establish impact of task delivery on performance Not a therapeutic intervention
Meinzer 2005	Randomisation to groups inadequate; group allocation could be predicted
Rudd 1997	Unable to obtain aphasia-specific data
Stoicheff 1960	Included conditions other than stroke Unable to obtain aphasia-specific data
Wang 2004	Not all participants had aphasia Unable to obtain aphasia-specific data
Wolfe 2000	Unable to obtain aphasia-specific data
Wood 1984	Included conditions other than stroke Unable to obtain aphasia-specific data
Zhang 2004	Unable to obtain aphasic-specific data

SLT: speech and language therapy

Characteristics of studies awaiting assessment *[ordered by study ID]*

Liu 2006

Methods	Aphasia rehabilitation programme, 30 to 60 minutes daily or every other day
Participants	-
Interventions	1. SLT aphasia rehabilitation 2. Control
Outcomes	Unclear Follow-up measures at 3 months

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Notes	-

SLT: speech and language therapy

Characteristics of ongoing studies *[ordered by study ID]*

ACTNow

Trial name or title	ACTNow: Assessing the effectiveness of Communication Therapy in the North west
Methods	Pragmatic, multi-centre RCT with a nested qualitative study and full economic evaluation
Participants	170 (revised from 330)
Interventions	1. Early SLT from NHS therapists; up to 3 sessions per week for maximum of 16 weeks 2. Control group: similar level of contact with a 'visitor' (paid part-time staff) trained to deliver a manualised attention control
Outcomes	Primary outcome: functional communication; expert blinded therapist rating of semi-structured conversation using Therapy Outcomes Measures Scale (TOMS) Secondary outcome: participant and carers' own perception of functional communication and quality of life Costs of communication therapy compared to that of attention control
Starting date	October 2006
Contact information	Emma Patchick or Audrey Bowen emma.patchick@manchester.ac.uk or audrey.bowen@manchester.ac.uk http://www.psych-sci.manchester.ac.uk/actnow/
Notes	Expected completion: 2010

IHCOP

Trial name or title	The effects of phoneme discrimination and semantic therapies for speech perception deficits in aphasia
Methods	-
Participants	20
Interventions	1. Phoneme discrimination therapy, e.g. discrimination tasks or matching spoken to written words 2. Semantic therapy, e.g. word to picture matching with provided semantic context
Outcomes	Minimal pair discrimination with pictures Lexical decision Synonym judgement

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IHCOP (*Continued*)

	Telephone message task Control task: written sentence to picture matching Treated versus untreated words using a cross-modal priming task
Starting date	February 2006
Contact information	Dr Celia Woolf
Notes	Expected completion: 2009

Kukkonen 2007

Trial name or title	-
Methods	40 participants with aphasia randomised into 4 groups that vary in the intensity of SLT allocated and in the onset of therapy Participants have also been stratified by age: younger group (50 to 65 years) and older group (66 to 80 years) SLT was provided over a 1-year period with periods of therapy sessions and family counselling
Participants	Inclusion criteria: aged 50 to 80 years old, first CVA in the left hemisphere, living locally, diagnosis in university hospital, diagnosis confirmed by CT/MRI, availability of a relative
Interventions	1. High intensity SLT: 45 minutes 2 times per day, 5 days per week for 6 weeks 2. Moderate intensity SLT: 45 minutes 2 times per day, 2 days per week for 6 weeks 3. Conventional SLT: 45 minutes per week for 6 weeks 4. Control group: no individual SLT Spouses or carers received support and information from the speech and language therapists 3 times
Outcomes	Speech comprehension (Token Test, BDAE) Speech production (BDAE and BNT), story telling from cartoon frames Functional communicative skills (CETI) Functional Independence Measurement and 15D Pizzamigglio Sentence Test Quick Aphasia Screening Test Montgomery & Åberg Depression scale and with Beck´ s Depression scale Assessments were administered at 1 week, 1, 4, 7 and 13 months post-stroke Each participants had a 1.5 year follow up
Starting date	-
Contact information	Tarja Kukkonen Speech Therapist, Lecturer in Logopedics Puheopin laitos 33014 Tampereen yliopisto Finland Tel. +358 3 35514086 Tarja.Kukkonen@uta.fi

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Kukkonen 2007 (*Continued*)

Notes	-

Laska 2008

Trial name or title	Early speech and language therapy in patients with acute stroke and aphasia
Methods	Patients stratified according to NIHSS result Randomised by use of consecutive sealed envelopes Outcome measures conducted and assessed by blinded speech and language therapists
Participants	Consecutive admissions to Stroke Unit Inclusion criteria: first ischaemic stroke with aphasia, can start SLT within 2 days of stroke onset Exclusion criteria: dementia, drug abuse, unable to participate in therapy
Interventions	1. Early Intensive SLT (language enrichment therapy): 45 minutes per day for 15 working days 2. No SLT for 3 weeks
Outcomes	Primary outcome: ANELT at day 16 Secondary outcome: Norsk Grunntest for Afasi (NGA) at day 16 Other measures include NIHSS, ADL measured at baseline, 3 weeks and 6 months, NGA, ANELT, Nottingham Health Profile (NHP), EuQoL at 3 weeks and 6 months Relatives complete the CETI at 3 weeks and 6 months
Starting date	Recruitment complete
Contact information	Ann Charlotte Laska Department of Internal Medicine Danderyd Hospital Stockholm Sweden Tel: +46 8 655 6409 ann-charlotte.laska@ds.se
Notes	Funded by the Stockholm County Council Foundation (Expo-95), Karolinska Institutet, Marianne and Marcus Wallenberg Foundation and AFA Insurances Results expected Autumn 2009

Maher 2008

Trial name or title	An investigation of constraint-induced language therapy for aphasia
Methods	2 different intensities of therapy
Participants	48 participants collected at 3 sites (Houston, Gainesville and Tampa VAMCs) Inclusion criteria: moderate - moderately severe, non-fluent aphasia, unilateral left CVA, right-handed, English as first language, adequate hearing and vision to participate in therapy Exclusion criteria: multiple strokes, history of other neurological impairment, non-English speaking, inadequate auditory comprehension, severe speech apraxia

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Maher 2008 (*Continued*)

Interventions	1. Intensive CILT 2. Intensive PACE therapy 3. Distributed CILT 4. Distributed PACE therapy
Outcomes	Language assessment, discourse sample, daily probe measures and qualitative interviews will be used to measure treatment effects 1-month follow up
Starting date	August 2002
Contact information	Lynn M Maher Department of Communication Sciences and Disorders University of Houston lmmaher@uh.edu
Notes	Completion date: June 2006

RATS2

Trial name or title	RATS2: the efficacy of cognitive linguistic therapy in the acute stage of aphasia: a randomised control trial
Methods	Cognitive linguistic SLT versus conventional SLT (from 3 weeks up to 6 months post-onset)
Participants	80
Interventions	1. Cognitive linguistic therapy (paper and computer) using BOX (lexical semantic treatment programme) and/or FIKS (phonological treatment programme) or a combination of the two depending on individual language disorders 2. Control group: communicative therapy targeting verbal and nonverbal strategies to communicate message (e.g. PACE); no focus on semantics, phonology or syntax is permitted
Outcomes	Primary outcome: ANELT-A Secondary outcome: Verbal Semantic Association Task (SAT), semantic association of words with low imageability (PALPA), non-words repetition (PALPA) and auditory lexical decision (PALPA), semantic word fluency, letter fluency and Boston Naming Test
Starting date	September 2006
Contact information	Dr EG Visch-Brink e.visch-brink@erasmusmc.nl Dr M de Jon-Hagelstein m.hagelstein@erasmusmc.nl http://www.controlled-trials.com/ISRCTN67723958
Notes	Results available at the end of 2009

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RATS3

Trial name or title	The efficacy of cognitive linguistic therapy in the acute stage of aphasia: a randomised control trial
Methods	Cognitive linguistic SLT versus no SLT Massed practice: 2 weeks post-onset up to 2 months post-onset
Participants	80
Interventions	1. Cognitive linguistic therapy: BOX (semantic therapy) or/and FIKS (phonological therapy) for 6 weeks 2. No SLT: deferred SLT after 6 weeks
Outcomes	Primary outcome: ANELT-A Secondary outcome: Verbal Semantic Association Test (SAT), semantic Association of words with low imageability (PALPA), non-words repetition (PALPA), Auditory Lexical Decision (PALPA), Semantic Word Fluency, Letter Fluency, Boston Naming Test
Starting date	Autumn 2009
Contact information	EG Visch-Brink e.visch-brink@erasmusmc.nl M de Jong-Hagelstein m.hagelstein@erasmusmc.nl http://www.controlled-trials.com/ISRCTN67723958
Notes	Results available at the end of 2012

SEATAS

Trial name or title	Study of Early Aphasia Therapy After Stroke (SEATAS)
Methods	Prospective, randomised, open-label, single-blinded controlled trial
Participants	59 participants with moderate to severe aphasia following stroke
Interventions	1. Intensive daily SLT (32 participants): 30 to 80 minutes 5 days per week up to 4 weeks or 20 sessions 2. Conventional SLT (weekly) (27 participants): 1 session per week up to 4 weeks or 20 sessions Three therapy types used: • Lexical-sematic (BOX) therapy • Mapping Therapy • Semantic Feature Analysis All participants had a SLT programme individually tailored to suit their needs and therapists were instructed to provide treatment from the above therapy types, according the participant's needs The therapist could use only these therapy approaches (one or more) Therapy types and tasks for each participant were recorded Picture description task: all participants receiving SLT attempted a picture description task at each session during the acute hospital stay
Outcomes	Primary outcome measures: Aphasia Quotient (AQ) and Functional Communication Profile (FCP) at acute hospital discharge Secondary outcome measures: AQ, FCP and Discourse Analysis (DA) scores at six months post stroke

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SEATAS (*Continued*)

Starting date	Recruitment April 2000 to September 2003
Contact information	Erin Godecke Human Communication Science, School of Psychology and Speech Pathology Curtin University of Technology, GPO Box U1987 Perth, Australia Tel: +61 8 9266 3039 e.godecke@curtin.edu.au
Notes	Results available 2010

SP-I-RiT

Trial name or title	SPeech Intensive Rehabilitation Therapy
Methods	-
Participants	120
Interventions	To evaluate the efficacy of intensive speech therapy in aphasic stroke patients
Outcomes	Primary outcome: increase of the Aphasia Quotient of at least 15% at the end of therapy Secondary outcome: differences in Aphasia Quotient defined by Lisbon Aphasia Battery Functional Communication Profile Sustained improvement in the intensive speech therapy group between 10th and 50th week Costs of therapy, per therapeutic group Number of missed therapeutic sessions and non-attendances in each group Patient satisfaction as measured by patient global impression scale
Starting date	September 2004
Contact information	Dr Martin Lauterbach email: mlauterbach@fm.ul.pt http://www.imm.ul.pt
Notes	Expected completion: 2008

Varley 2005

Trial name or title	-
Methods	Self-administered intervention for word production impairments following stroke
Participants	50 participants with apraxia of speech; 20 participants with non-apraxic word production impairments
Interventions	Both interventions self-administered via software programs loaded onto laptop computer 1. Speech program is based around SWORD, a word-level intervention for apraxia of speech 2. Placebo intervention: does not target speech, but trains visual attention and memory

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Varley 2005 (*Continued*)

Outcomes	Word production measured across sets of treated, untreated phonetically matched, and untreated phonetically unmatched words immediately post-treatment and at 8 weeks post-treatment Word production evaluated for functional adequacy and acoustic measures of speech cohesion Generalisation to spontaneous speech measured via narrative production Untreated control behaviours (word reading and spoken sentence comprehension) evaluated Study also includes health economic assessment
Starting date	June 2008
Contact information	Professor Rosemary Varley, Human Communication Sciences, University of Sheffield
Notes	Funded by The BUPA Foundation. Expected Completion: October 2010

ADL: activities of daily living
ANELT: Amsterdam-Nijmegen Everyday Language Test
BDAE: Boston Diagnostic Aphasia Examination
BNT: Boston Naming Test
CETI: Communicative Effectiveness Index
CILT: constraint-induced language therapy
CT: computerised tomography
CVA: cerebrovascular accident
NHS: National Health Service (UK)
NIHSS: National Institutes of Health Stroke Scales
MRI: magnetic resonance imaging
PALPA: psycholinguistic assessments of language processing in aphasia
PACE: promoting aphasics' communicative effectiveness therapy
RCT: randomised controlled trial
SLT: speech and language therapy

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DATA AND ANALYSES

Comparison 1. SLT versus no SLT

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Functional communication	5	176	Std. Mean Difference (IV, Fixed, 95% CI)	0.28 [-0.03, 0.59]
1.1 WAB	2	55	Std. Mean Difference (IV, Fixed, 95% CI)	0.14 [-0.40, 0.69]
1.2 ANELT-A	1	18	Std. Mean Difference (IV, Fixed, 95% CI)	0.88 [-0.10, 1.87]
1.3 Functional Communication Profile	2	103	Std. Mean Difference (IV, Fixed, 95% CI)	0.25 [-0.16, 0.66]
2 Receptive language: auditory comprehension	5	191	Std. Mean Difference (IV, Fixed, 95% CI)	0.10 [-0.20, 0.39]
2.1 PICA subtest	2	55	Std. Mean Difference (IV, Fixed, 95% CI)	0.15 [-0.40, 0.69]
2.2 Token Test	3	136	Std. Mean Difference (IV, Fixed, 95% CI)	0.08 [-0.27, 0.43]
3 Receptive language: reading comprehension	4	158	Std. Mean Difference (IV, Fixed, 95% CI)	0.11 [-0.21, 0.44]
3.1 Reading Comprehension Battery for Aphasia	2	103	Std. Mean Difference (IV, Fixed, 95% CI)	0.11 [-0.30, 0.52]
3.2 PICA reading subtest	2	55	Std. Mean Difference (IV, Fixed, 95% CI)	0.12 [-0.42, 0.67]
4 Receptive language: other	4		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 PICA Gestural subtest	4	158	Mean Difference (IV, Fixed, 95% CI)	8.04 [1.55, 14.52]
5 Receptive language: gesture comprehension (unnamed)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
5.1 Gesture (unnamed)	1	33	Mean Difference (IV, Fixed, 95% CI)	-0.92 [-2.19, 0.35]
5.2 Gesture (unnamed) 2-month follow up	1	17	Mean Difference (IV, Fixed, 95% CI)	-1.14 [-3.23, 0.95]
6 Expressive language: naming	3	73	Std. Mean Difference (IV, Fixed, 95% CI)	0.20 [-0.27, 0.68]
6.1 Boston Naming Test	1	18	Std. Mean Difference (IV, Fixed, 95% CI)	-0.00 [-0.93, 0.93]
6.2 WAB Naming subtest	2	55	Std. Mean Difference (IV, Fixed, 95% CI)	0.27 [-0.27, 0.82]
7 Expressive language: general	4	158	Mean Difference (IV, Fixed, 95% CI)	5.28 [-1.33, 11.89]
7.1 PICA Verbal subtest	4	158	Mean Difference (IV, Fixed, 95% CI)	5.28 [-1.33, 11.89]
8 Expressive language: written	4		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
8.1 PICA Copying subtest	2	55	Mean Difference (IV, Fixed, 95% CI)	3.88 [-5.75, 13.50]
8.2 PICA Writing subtest	2	55	Mean Difference (IV, Fixed, 95% CI)	8.38 [-4.47, 21.22]
8.3 PICA Graphic	2	103	Mean Difference (IV, Fixed, 95% CI)	5.15 [-3.64, 13.94]
9 Expressive language: repetition	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 WAB Repetition subtest	2	55	Mean Difference (IV, Fixed, 95% CI)	0.92 [-0.76, 2.61]
10 Severity of impairment: Aphasia Battery Score (+ PICA)	6	249	Std. Mean Difference (IV, Fixed, 95% CI)	0.18 [-0.09, 0.44]
10.1 Aphasia Quotient (CRRCAE)	2	84	Std. Mean Difference (IV, Fixed, 95% CI)	0.02 [-0.43, 0.47]
10.2 Porch Index of Communicative Ability	4	165	Std. Mean Difference (IV, Fixed, 95% CI)	0.26 [-0.07, 0.58]
11 Severity of impairment: Aphasia Battery Score (3-month follow up)	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
11.1 Aphasia Quotient (CRRCAE) 3-month follow up	2	84	Mean Difference (IV, Random, 95% CI)	20.74 [-12.01, 53.48]

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12 Psychosocial: MAACL	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
12.1 Anxiety Scale (MAACL)	1	137	Mean Difference (IV, Fixed, 95% CI)	0.40 [-0.57, 1.37]
12.2 Depression Scale (MAACL)	1	137	Mean Difference (IV, Fixed, 95% CI)	0.70 [-1.38, 2.78]
12.3 Hostility Scale (MAACL)	1	137	Mean Difference (IV, Fixed, 95% CI)	-0.10 [-0.90, 0.70]
13 Number of drop-outs (any reason)	10	714	Odds Ratio (M-H, Fixed, 95% CI)	0.86 [0.61, 1.20]

Comparison 2. SLT versus social support and stimulation

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Functional communication	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Functional Communication Profile	1	96	Mean Difference (IV, Fixed, 95% CI)	-2.20 [-10.75, 6.35]
1.2 FCP (3-month follow up)	1	73	Mean Difference (IV, Fixed, 95% CI)	1.40 [-8.01, 10.81]
1.3 FCP (6-month follow up)	1	73	Mean Difference (IV, Fixed, 95% CI)	1.30 [-8.07, 10.67]
2 Receptive language: auditory comprehension	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Sentence Comprehension Test (PCB)	1	5	Mean Difference (IV, Fixed, 95% CI)	6.00 [-12.94, 24.94]
2.2 Picture Comprehension Test (PCB)	1	5	Mean Difference (IV, Fixed, 95% CI)	8.0 [-10.94, 26.94]
2.3 Token Test	1	18	Mean Difference (IV, Fixed, 95% CI)	-3.83 [-18.95, 11.29]
3 Receptive language: other	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 PICA Gestural subtest	1	18	Mean Difference (IV, Fixed, 95% CI)	-0.87 [-1.70, -0.04]
4 Expressive language: single words	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Object Naming Test (ONT)	1	18	Mean Difference (IV, Fixed, 95% CI)	-5.00 [-11.67, -2.33]
4.2 Word fluency	1	18	Mean Difference (IV, Fixed, 95% CI)	-14.0 [-20.35, -7.65]
5 Expressive language: sentences	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
5.1 Caplan & Hanna Test: total	1	5	Mean Difference (IV, Fixed, 95% CI)	2.0 [-2.73, 6.73]
5.2 Caplan & Hanna Test: treated	1	5	Mean Difference (IV, Fixed, 95% CI)	3.00 [0.63, 5.37]
5.3 Caplan & Hanna Test: untreated	1	5	Mean Difference (IV, Fixed, 95% CI)	-1.0 [-5.31, 3.31]
6 Expressive language: picture description	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6.1 Picture description	2	23	Std. Mean Difference (IV, Fixed, 95% CI)	0.26 [-0.62, 1.15]
6.2 Picture description with structure modelling: treated items	1	5	Std. Mean Difference (IV, Fixed, 95% CI)	0.45 [-1.44, 2.33]
6.3 Picture description with structure modelling: untreated items	1	5	Std. Mean Difference (IV, Fixed, 95% CI)	0.41 [-1.46, 2.28]

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7 Expressive language: overall spoken	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 PICA verbal subtest	1	18	Mean Difference (IV, Fixed, 95% CI)	-1.56 [-2.46, -0.66]
8 Expressive language: written	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
8.1 PICA graphic subtests	1	18	Mean Difference (IV, Fixed, 95% CI)	-1.39 [-2.49, -0.29]
9 Severity of impairment: Aphasia Battery Score	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 PICA	1	18	Mean Difference (IV, Fixed, 95% CI)	-1.13 [-1.91, -0.35]
10 Number of drop-outs for any reason	4	260	Odds Ratio (M-H, Random, 95% CI)	0.65 [0.38, 1.12]

Comparison 3. Functional SLT (SLTA) versus conventional SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Functional communication	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 CADL (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	-9.3 [-15.01, -3.59]
1.2 CETI	1	12	Mean Difference (IV, Fixed, 95% CI)	-3.90 [-8.65, 0.85]
2 Functional communication: catalogue ordering	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Telephone order (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	32.8 [16.16, 49.44]
2.2 Telephone order (+ concurrent task) (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	16.9 [1.31, 32.49]
2.3 Written order (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	-5.00 [-19.81, 9.81]
2.4 Written order (+ concurrent task) (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	9.8 [-10.13, 29.73]
3 Expressive language: spoken	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Oral naming: PALPA (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	6.0 [-8.21, 20.21]
4 Expressive language: written	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Written naming: PALPA (change from baseline)	1	12	Mean Difference (IV, Fixed, 95% CI)	-2.20 [-11.26, 6.86]

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Comparison 4. Intensive SLT (SLTA) versus conventional SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Receptive language: auditory comprehension (change from baseline)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 AAT Comprehension subtest	1	17	Mean Difference (IV, Fixed, 95% CI)	10.3 [-0.52, 21.12]
1.2 Token Test	1	17	Mean Difference (IV, Fixed, 95% CI)	6.2 [-3.32, 15.72]
2 Expressive language: spoken (change from baseline scores)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Naming subtest (AAT)	1	17	Mean Difference (IV, Fixed, 95% CI)	5.70 [-1.69, 13.09]
2.2 Repetition subtest (AAT)	1	17	Mean Difference (IV, Fixed, 95% CI)	2.80 [-3.86, 9.46]
3 Written language: (change from baseline scores)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Written subtest (AAT)	1	17	Mean Difference (IV, Fixed, 95% CI)	8.9 [1.81, 15.99]
4 Severity of impairment: Aphasia Battery Score	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Aphasia Quotient (WAB)	2	86	Mean Difference (IV, Fixed, 95% CI)	2.00 [-8.21, 12.20]
4.2 AAT profile (change from baseline)	1	17	Mean Difference (IV, Fixed, 95% CI)	5.70 [-0.76, 12.16]
4.3 Aphasia Quotient (WAB) 3-month follow up	1	66	Mean Difference (IV, Fixed, 95% CI)	1.90 [-10.53, 14.33]
5 Number of drop-outs for any reason	2	127	Odds Ratio (M-H, Fixed, 95% CI)	2.10 [0.99, 4.46]

Comparison 5. Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Functional communication	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 CADL	1	68	Mean Difference (IV, Fixed, 95% CI)	1.64 [-11.70, 14.98]
1.2 Functional Communication Profile	1	68	Mean Difference (IV, Fixed, 95% CI)	2.70 [-7.16, 12.56]
2 Receptive language: auditory comprehension	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Token Test	2	88	Std. Mean Difference (IV, Fixed, 95% CI)	0.06 [-0.36, 0.47]
2.2 AAT subtest	1	20	Std. Mean Difference (IV, Fixed, 95% CI)	-0.37 [-1.25, 0.52]
3 Receptive language: reading comprehension	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Reading Comprehension Battery for Aphasia	1	68	Mean Difference (IV, Fixed, 95% CI)	0.34 [-8.64, 9.32]
4 Receptive language: other	1	68	Mean Difference (IV, Fixed, 95% CI)	-2.54 [-13.18, 8.10]
4.1 PICA gestural subtest	1	68	Mean Difference (IV, Fixed, 95% CI)	-2.54 [-13.18, 8.10]
5 Expressive language: spoken	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only

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5.1 AAT naming subtest	1	20	Mean Difference (IV, Fixed, 95% CI)	8.40 [-12.68, 29.48]
5.2 PICA verbal subtest	1	68	Mean Difference (IV, Fixed, 95% CI)	0.93 [-8.18, 10.04]
6 Expressive language: repetition	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6.1 AAT Repetition subtest	1	20	Mean Difference (IV, Fixed, 95% CI)	13.5 [0.19, 26.81]
7 Expressive language: written	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 AAT written language subtest	1	20	Mean Difference (IV, Fixed, 95% CI)	9.5 [-11.63, 30.63]
7.2 PICA graphic subtests	1	68	Mean Difference (IV, Fixed, 95% CI)	2.22 [-6.90, 11.34]
8 Severity of impairment: Aphasia Battery Score	3	126	Std. Mean Difference (IV, Fixed, 95% CI)	-0.12 [-0.47, 0.23]
8.1 PICA	2	106	Std. Mean Difference (IV, Fixed, 95% CI)	-0.06 [-0.44, 0.32]
8.2 AAT	1	20	Std. Mean Difference (IV, Fixed, 95% CI)	-0.45 [-1.34, 0.44]
9 Number of drop-outs for any reason	3	206	Odds Ratio (M-H, Random, 95% CI)	1.05 [0.54, 2.04]

Comparison 6. Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Receptive language: auditory comprehension	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Token Test	2	51	Std. Mean Difference (IV, Fixed, 95% CI)	0.25 [-0.30, 0.81]
1.2 AAT comprehension subtest	1	17	Std. Mean Difference (IV, Fixed, 95% CI)	0.47 [-0.51, 1.45]
2 Receptive language: other	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 PICA gestural subtest	1	34	Mean Difference (IV, Fixed, 95% CI)	1.78 [-15.51, 19.07]
3 Expressive language: spoken	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 AAT naming subtest	1	17	Std. Mean Difference (IV, Fixed, 95% CI)	0.34 [-0.64, 1.31]
3.2 PICA verbal subtest	1	34	Std. Mean Difference (IV, Fixed, 95% CI)	0.04 [-0.63, 0.71]
4 Expressive language: repetition	1	17	Mean Difference (IV, Fixed, 95% CI)	-0.64 [-7.27, 5.99]
4.1 AAT repetition subtest	1	17	Mean Difference (IV, Fixed, 95% CI)	-0.64 [-7.27, 5.99]
5 Expressive language: written	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
5.1 PICA graphic	1	34	Mean Difference (IV, Fixed, 95% CI)	-6.03 [-20.67, 8.61]
6 Severity of impairment: Aphasia Battery Score	3	105	Std. Mean Difference (IV, Fixed, 95% CI)	0.17 [-0.22, 0.56]
6.1 Aphasia Quotient CRRCAE	1	54	Std. Mean Difference (IV, Fixed, 95% CI)	0.30 [-0.24, 0.84]
6.2 PICA overall	1	34	Std. Mean Difference (IV, Fixed, 95% CI)	-0.06 [-0.73, 0.61]
6.3 AAT overall	1	17	Std. Mean Difference (IV, Fixed, 95% CI)	0.23 [-0.74, 1.20]
7 Severity of impairment: Aphasia Battery Score (3-month follow up)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 Aphasia Quotient CRRCAE (3-month follow up)	1	54	Mean Difference (IV, Fixed, 95% CI)	33.41 [16.76, 50.06]
8 Number of drop-outs for any reason	1	67	Odds Ratio (M-H, Fixed, 95% CI)	0.94 [0.36, 2.46]

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Comparison 7. Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Functional communication	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Functional expression	2	31	Std. Mean Difference (IV, Fixed, 95% CI)	-0.25 [-0.96, 0.46]
2 Receptive language: auditory comprehension - word	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Word comprehension (BDAE subtest)	2	33	Std. Mean Difference (IV, Fixed, 95% CI)	-0.02 [-0.70, 0.67]
2.2 Identify body part (BDAE subtest)	1	21	Std. Mean Difference (IV, Fixed, 95% CI)	-0.22 [-1.08, 0.64]
2.3 Peabody PVT	1	12	Std. Mean Difference (IV, Fixed, 95% CI)	0.13 [-1.01, 1.26]
3 Receptive language: other auditory comprehension	5		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Sentence comprehension	1	21	Std. Mean Difference (IV, Fixed, 95% CI)	-0.51 [-1.39, 0.36]
3.2 AAT comprehension subtest	1	17	Std. Mean Difference (IV, Fixed, 95% CI)	0.47 [-0.51, 1.45]
3.3 Token Test	5	74	Std. Mean Difference (IV, Fixed, 95% CI)	-0.00 [-0.46, 0.46]
4 Receptive language: auditory comprehension (treated items)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Word comprehension (phonology)	1	21	Mean Difference (IV, Fixed, 95% CI)	-2.0 [-8.45, 4.45]
4.2 Word comprehension (lexicon)	1	21	Mean Difference (IV, Fixed, 95% CI)	-5.0 [-22.80, 12.80]
4.3 Sentence comprehension (morphosyntax)	1	21	Mean Difference (IV, Fixed, 95% CI)	-12.00 [-52.89, 24.89]
5 Receptive language: reading comprehension	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
5.1 Reading comprehension	1	21	Mean Difference (IV, Fixed, 95% CI)	5.0 [-6.51, 16.51]
6 Receptive language: other	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6.1 PICA gestural subtest	3	36	Mean Difference (IV, Fixed, 95% CI)	-0.29 [-0.97, 0.39]
7 Expressive language: spoken naming	5		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
7.1 Naming	5	72	Std. Mean Difference (IV, Fixed, 95% CI)	0.04 [-0.43, 0.51]
7.2 Naming (3-week follow up)	1	10	Std. Mean Difference (IV, Fixed, 95% CI)	0.70 [-0.60, 2.00]
8 Expressive language: spoken sentence construction	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
8.1 Sentence construction (AmAT)	2	31	Std. Mean Difference (IV, Fixed, 95% CI)	0.02 [-0.69, 0.72]
8.2 Sentence construction (AmAT) 3-week follow up	1	10	Std. Mean Difference (IV, Fixed, 95% CI)	-0.25 [-1.50, 1.00]
9 Expressive language: other spoken tasks	3		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 Word fluency	2	24	Std. Mean Difference (IV, Fixed, 95% CI)	-1.05 [-1.93, -0.17]
9.2 Picture description	2	24	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-1.04, 0.64]
9.3 PICA verbal subtest	3	36	Std. Mean Difference (IV, Fixed, 95% CI)	-0.31 [-0.99, 0.37]

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10 Expressive language: spoken (treated items)	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
10.1 Naming (treated)	1	10	Mean Difference (IV, Fixed, 95% CI)	8.0 [-0.46, 16.46]
10.2 Sentence construction (treated)	1	10	Mean Difference (IV, Fixed, 95% CI)	3.2 [-1.06, 7.46]
10.3 Naming (treated: 3-week follow up)	1	10	Mean Difference (IV, Fixed, 95% CI)	6.20 [-0.37, 12.77]
10.4 Sentence construction (treated: 3-week follow up)	1	10	Mean Difference (IV, Fixed, 95% CI)	4.00 [-1.16, 9.16]
11 Expressive language: repetition	1	17	Mean Difference (IV, Fixed, 95% CI)	-0.64 [-7.27, 5.99]
11.1 AAT repetition subtest	1	17	Mean Difference (IV, Fixed, 95% CI)	-0.64 [-7.27, 5.99]
12 Expressive language: written	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
12.1 PICA graphic subtest	3	36	Mean Difference (IV, Fixed, 95% CI)	-0.85 [-1.69, -0.01]
13 Severity of impairment	4		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
13.1 PICA overall	3	36	Mean Difference (IV, Fixed, 95% CI)	-0.74 [-1.50, 0.01]
13.2 AAT overall	1	17	Mean Difference (IV, Fixed, 95% CI)	1.44 [-4.48, 7.36]
14 Number of drop-outs for any reason	1	52	Odds Ratio (M-H, Random, 95% CI)	6.27 [0.70, 56.40]

Comparison 8. Operant training SLT (SLTA) versus conventional SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Receptive language: auditory comprehension	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Word comprehension (BDAE subtest)	1	12	Mean Difference (IV, Fixed, 95% CI)	1.5 [-10.73, 13.73]
1.2 Peabody PCT	1	12	Mean Difference (IV, Fixed, 95% CI)	1.5 [-10.73, 13.73]
1.3 Token Test	3	36	Mean Difference (IV, Fixed, 95% CI)	4.99 [-7.05, 17.02]
2 Receptive language: other	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 PICA gestural subtest	3	36	Mean Difference (IV, Fixed, 95% CI)	-0.29 [-0.97, 0.39]
3 Expressive language: spoken	3		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Naming	3	36	Std. Mean Difference (IV, Fixed, 95% CI)	-0.25 [-0.92, 0.41]
3.2 Word fluency	2	24	Std. Mean Difference (IV, Fixed, 95% CI)	-1.05 [-1.93, -0.17]
3.3 Picture description	2	24	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-1.04, 0.64]
3.4 PICA verbal subtest	3	36	Std. Mean Difference (IV, Fixed, 95% CI)	-0.31 [-0.99, 0.37]
4 Expressive language: written	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 PICA graphic subtest	3	36	Mean Difference (IV, Fixed, 95% CI)	-0.85 [-1.69, -0.01]
5 Severity of impairment	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
5.1 PICA overall	3	36	Mean Difference (IV, Fixed, 95% CI)	-0.74 [-1.50, 0.01]

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Comparison 9. Semantic SLT (SLTA) versus phonological SLT (SLT B)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Functional communication	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 ANELT-A	1	55	Mean Difference (IV, Fixed, 95% CI)	0.40 [-5.68, 6.48]
2 Receptive language: auditory	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Semantic Association Test: PALPA (change from baseline)	1	46	Mean Difference (IV, Fixed, 95% CI)	1.30 [-1.00, 3.60]
2.2 Auditory lexical decision: PALPA (change from baseline)	1	46	Mean Difference (IV, Fixed, 95% CI)	-3.5 [-6.23, -0.77]
3 Receptive language: reading	1	46	Mean Difference (IV, Fixed, 95% CI)	1.60 [-1.85, 5.05]
3.1 Synonym judgement: PALPA (change from baseline)	1	46	Mean Difference (IV, Fixed, 95% CI)	1.60 [-1.85, 5.05]
4 Expressive language: repetition	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4.1 Non-words: PALPA (change from baseline)	1	46	Mean Difference (IV, Fixed, 95% CI)	-1.7 [-4.49, 1.09]
5 Number of drop-outs for any reason	1	58	Odds Ratio (M-H, Fixed, 95% CI)	1.0 [0.28, 3.56]

Comparison 10. Filmed programmed instruction SLT (SLT A) versus non-programmed activity SLT (SLTB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Receptive language: auditory	1	14	Mean Difference (IV, Fixed, 95% CI)	0.72 [-2.41, 3.85]
1.1 Word comprehension	1	14	Mean Difference (IV, Fixed, 95% CI)	0.72 [-2.41, 3.85]
2 Receptive language: reading	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Reading comprehension	1	14	Mean Difference (IV, Fixed, 95% CI)	-0.08 [-1.50, 1.34]
2.2 Reading recognition	1	14	Mean Difference (IV, Fixed, 95% CI)	-0.10 [-1.45, 1.25]

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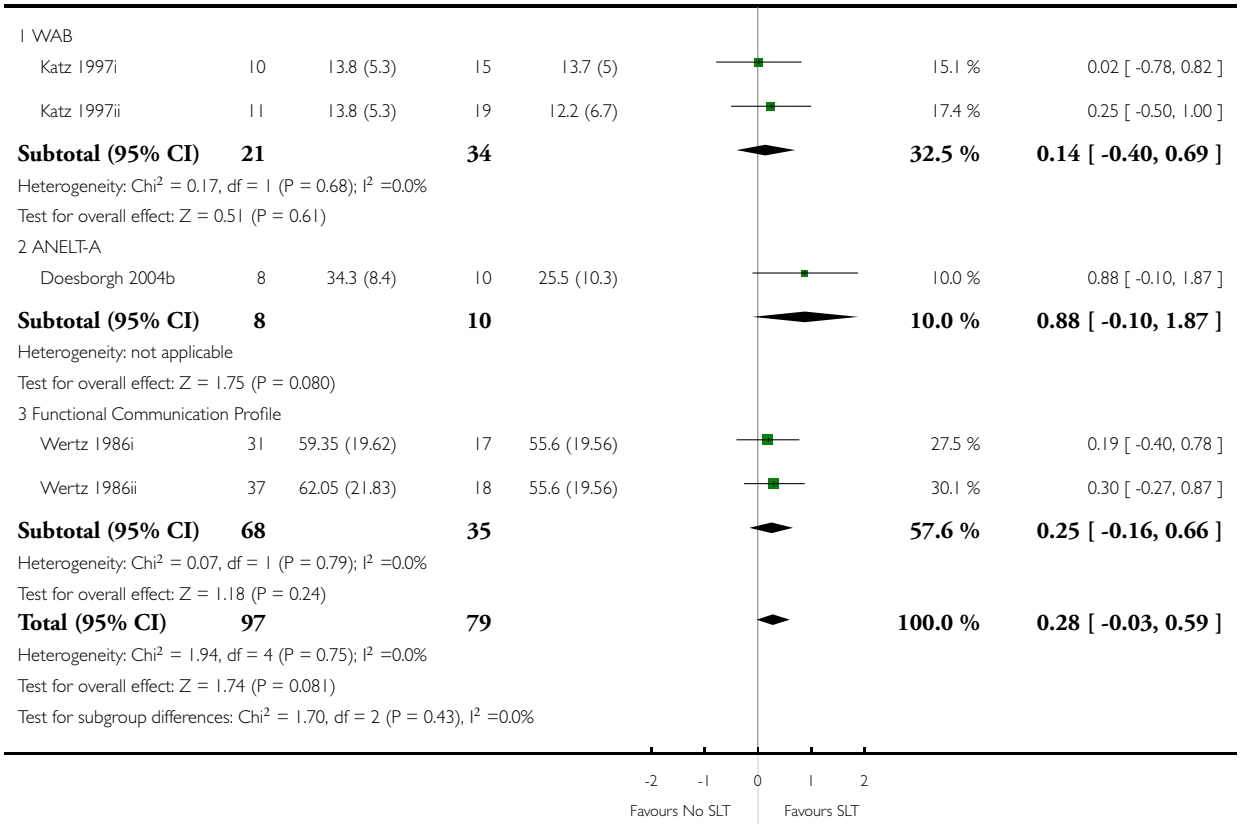
Analysis 1.1. Comparison 1 SLT versus no SLT, Outcome 1 Functional communication.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 1 Functional communication

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 WAB							
Katz 1997i	10	13.8 (5.3)	15	13.7 (5)		15.1 %	0.02 [-0.78, 0.82]
Katz 1997ii	11	13.8 (5.3)	19	12.2 (6.7)		17.4 %	0.25 [-0.50, 1.00]
Subtotal (95% CI)	**21**		**34**			**32.5 %**	**0.14 [-0.40, 0.69]**
Heterogeneity: Chi^2 = 0.17, df = 1 (P = 0.68); I^2 =0.0%							
Test for overall effect: Z = 0.51 (P = 0.61)							
2 ANELT-A							
Doesborgh 2004b	8	34.3 (8.4)	10	25.5 (10.3)		10.0 %	0.88 [-0.10, 1.87]
Subtotal (95% CI)	**8**		**10**			**10.0 %**	**0.88 [-0.10, 1.87]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.75 (P = 0.080)							
3 Functional Communication Profile							
Wertz 1986i	31	59.35 (19.62)	17	55.6 (19.56)		27.5 %	0.19 [-0.40, 0.78]
Wertz 1986ii	37	62.05 (21.83)	18	55.6 (19.56)		30.1 %	0.30 [-0.27, 0.87]
Subtotal (95% CI)	**68**		**35**			**57.6 %**	**0.25 [-0.16, 0.66]**
Heterogeneity: Chi^2 = 0.07, df = 1 (P = 0.79); I^2 =0.0%							
Test for overall effect: Z = 1.18 (P = 0.24)							
Total (95% CI)	**97**		**79**			**100.0 %**	**0.28 [-0.03, 0.59]**
Heterogeneity: Chi^2 = 1.94, df = 4 (P = 0.75); I^2 =0.0%							
Test for overall effect: Z = 1.74 (P = 0.081)							
Test for subgroup differences: Chi^2 = 1.70, df = 2 (P = 0.43), I^2 =0.0%							



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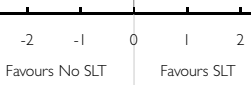
Analysis 1.2. Comparison 1 SLT versus no SLT, Outcome 2 Receptive language: auditory comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 2 Receptive language: auditory comprehension

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 PICA subtest							
Katz 1997i	10	61.7 (19.8)	15	58.7 (25.3)		13.6 %	0.12 [-0.68, 0.93]
Katz 1997ii	11	61.7 (19.8)	19	57.9 (23.9)		15.8 %	0.16 [-0.58, 0.91]
Subtotal (95% CI)	**21**		**34**			**29.3 %**	**0.15 [-0.40, 0.69]**
Heterogeneity: Chi^2 = 0.01, df = 1 (P = 0.94); I^2 =0.0%							
Test for overall effect: Z = 0.52 (P = 0.60)							
2 Token Test							
Smania 2006	15	18.2 (7.65)	18	14.94 (10.23)		18.3 %	0.35 [-0.34, 1.04]
Wertz 1986i	31	118.39 (41.95)	17	119.91 (38.48)		24.9 %	-0.04 [-0.63, 0.55]
Wertz 1986ii	37	119.89 (45.06)	18	119.91 (38.48)		27.5 %	0.00 [-0.56, 0.56]
Subtotal (95% CI)	**83**		**53**			**70.7 %**	**0.08 [-0.27, 0.43]**
Heterogeneity: Chi^2 = 0.80, df = 2 (P = 0.67); I^2 =0.0%							
Test for overall effect: Z = 0.43 (P = 0.67)							
Total (95% CI)	**104**		**87**			**100.0 %**	**0.10 [-0.20, 0.39]**
Heterogeneity: Chi^2 = 0.85, df = 4 (P = 0.93); I^2 =0.0%							
Test for overall effect: Z = 0.64 (P = 0.52)							
Test for subgroup differences: Chi^2 = 0.04, df = 1 (P = 0.83), I^2 =0.0%							



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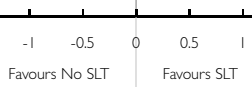
Analysis 1.3. Comparison 1 SLT versus no SLT, Outcome 3 Receptive language: reading comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 3 Receptive language: reading comprehension

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Reading Comprehension Battery for Aphasia							
Wertz 1986i	31	76.9 (16.97)	17	75.03 (18.06)		30.5 %	0.11 [-0.49, 0.70]
Wertz 1986ii	37	77.24 (20.79)	18	75.03 (18.06)		33.6 %	0.11 [-0.45, 0.67]
Subtotal (95% CI)	**68**		**35**			**64.1 %**	**0.11 [-0.30, 0.52]**
Heterogeneity: Chi^2 = 0.00, df = 1 (P = 0.99); I^2 =0.0%							
Test for overall effect: Z = 0.52 (P = 0.61)							
2 PICA reading subtest							
Katz 1997i	10	69.8 (22.6)	15	69.3 (20.2)		16.7 %	0.02 [-0.78, 0.82]
Katz 1997ii	11	69.8 (22.6)	19	65.1 (22.2)		19.3 %	0.20 [-0.54, 0.95]
Subtotal (95% CI)	**21**		**34**			**35.9 %**	**0.12 [-0.42, 0.67]**
Heterogeneity: Chi^2 = 0.11, df = 1 (P = 0.74); I^2 =0.0%							
Test for overall effect: Z = 0.43 (P = 0.67)							
Total (95% CI)	**89**		**69**			**100.0 %**	**0.11 [-0.21, 0.44]**
Heterogeneity: Chi^2 = 0.11, df = 3 (P = 0.99); I^2 =0.0%							
Test for overall effect: Z = 0.67 (P = 0.50)							
Test for subgroup differences: Chi^2 = 0.00, df = 1 (P = 0.97), I^2 =0.0%							



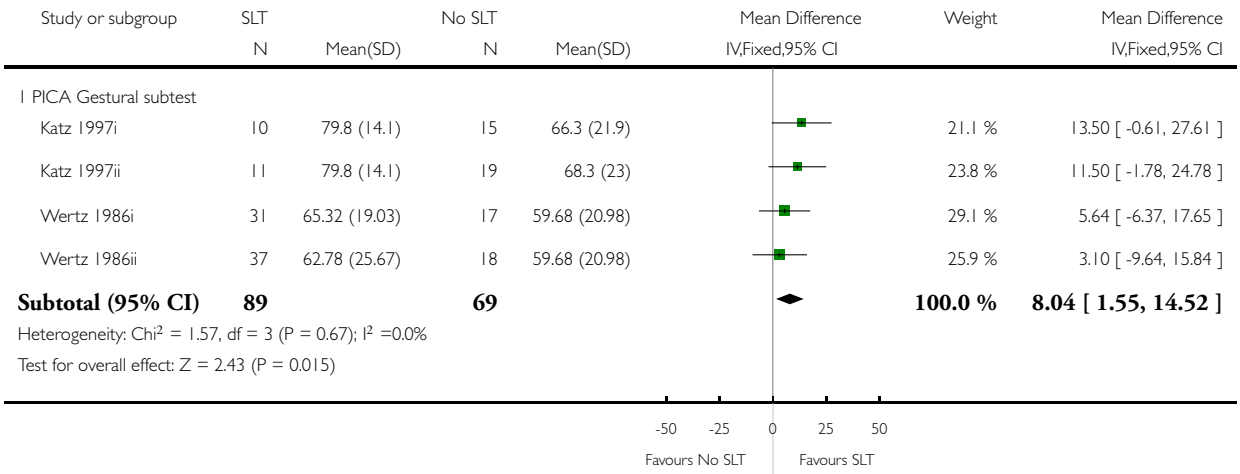
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Analysis 1.4. Comparison 1 SLT versus no SLT, Outcome 4 Receptive language: other.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 4 Receptive language: other

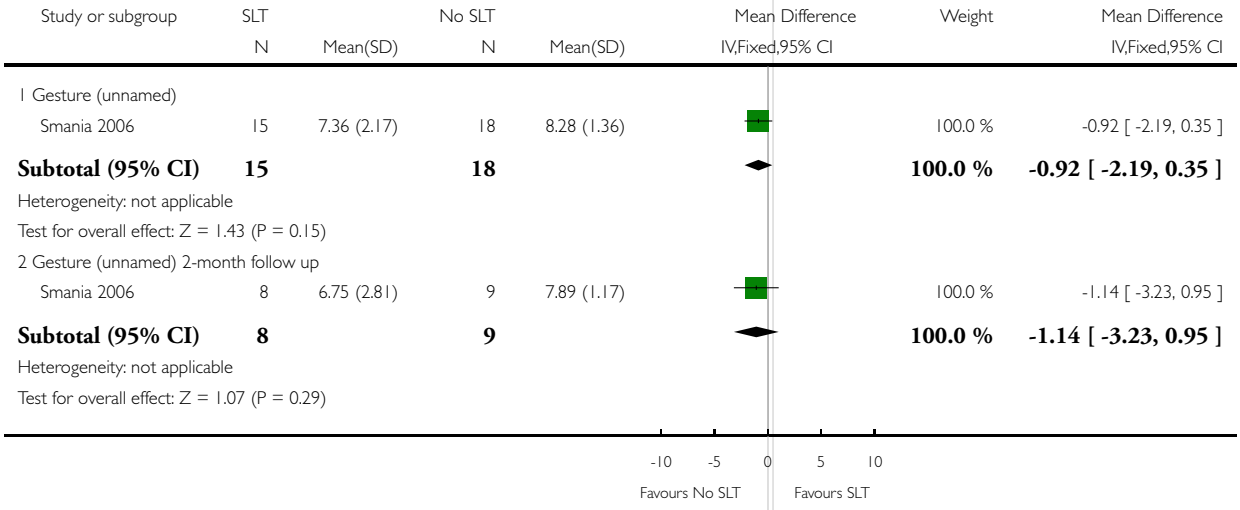


Analysis 1.5. Comparison 1 SLT versus no SLT, Outcome 5 Receptive language: gesture comprehension (unnamed).

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 5 Receptive language: gesture comprehension (unnamed)



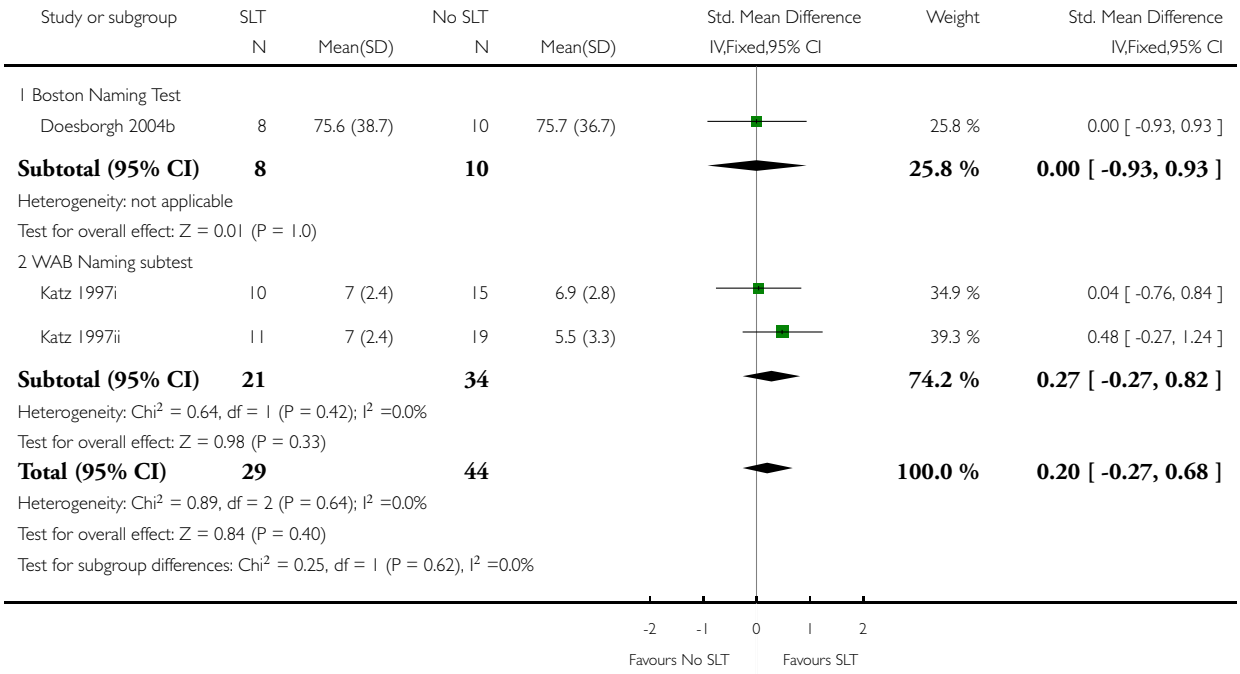
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Analysis 1.6. Comparison 1 SLT versus no SLT, Outcome 6 Expressive language: naming.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 6 Expressive language: naming



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Analysis 1.7. Comparison 1 SLT versus no SLT, Outcome 7 Expressive language: general.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

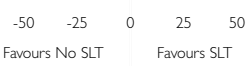
Outcome: 7 Expressive language: general

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PICA Verbal subtest							
Katz 1997i	10	62.3 (22.3)	15	58.1 (19.1)		15.4 %	4.20 [-12.67, 21.07]
Katz 1997ii	11	62.3 (22.3)	19	50.6 (24.5)		14.8 %	11.70 [-5.48, 28.88]
Wertz 1986i	31	56.48 (18.29)	17	52.8 (19.48)		34.3 %	3.68 [-7.60, 14.96]
Wertz 1986ii	37	57.41 (20.1)	18	52.8 (19.48)		35.5 %	4.61 [-6.48, 15.70]
Total (95% CI)	**89**		**69**			**100.0 %**	**5.28 [-1.33, 11.89]**

Heterogeneity: $Chi^2 = 0.64$, df = 3 (P = 0.89); $I^2 = 0.0\%$

Test for overall effect: Z = 1.57 (P = 0.12)

Test for subgroup differences: Not applicable



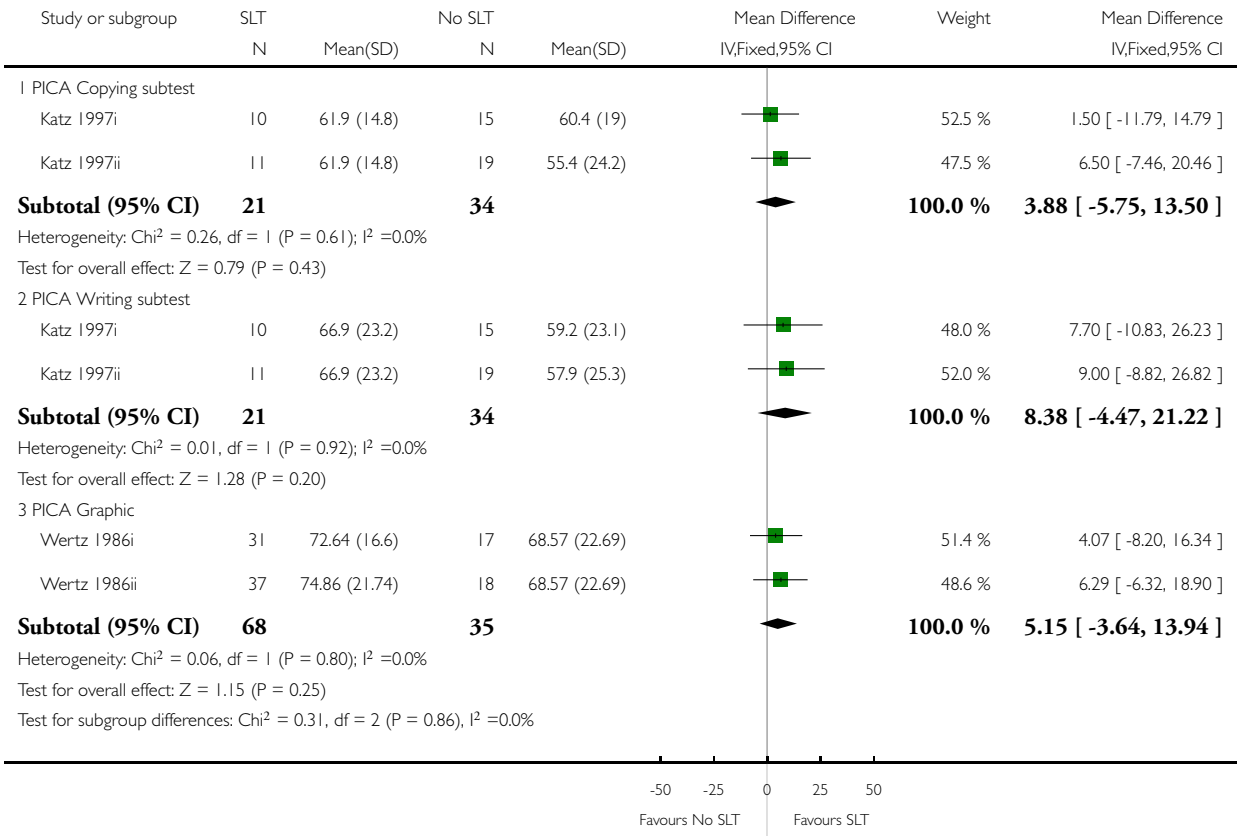
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Analysis 1.8. Comparison 1 SLT versus no SLT, Outcome 8 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 8 Expressive language: written



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Analysis 1.9. Comparison 1 SLT versus no SLT, Outcome 9 Expressive language: repetition.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

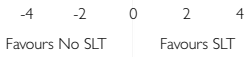
Outcome: 9 Expressive language: repetition

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 WAB Repetition subtest							
Katz 1997i	10	7.3 (2.9)	15	6.7 (3.4)		46.0 %	0.60 [-1.89, 3.09]
Katz 1997ii	11	7.3 (2.9)	19	6.1 (3.4)		54.0 %	1.20 [-1.10, 3.50]
Subtotal (95% CI)	**21**		**34**			**100.0 %**	**0.92 [-0.76, 2.61]**

Heterogeneity: $Chi^2 = 0.12$, df = 1 (P = 0.73); $I^2 = 0.0\%$

Test for overall effect: Z = 1.07 (P = 0.28)

Test for subgroup differences: Not applicable



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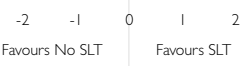
Analysis 1.10. Comparison 1 SLT versus no SLT, Outcome 10 Severity of impairment: Aphasia Battery Score (+ PICA).

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 10 Severity of impairment: Aphasia Battery Score (+ PICA)

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Aphasia Quotient (CRRCAE)							
Jufeng 2005i	30	66.93 (25.62)	15	62.4 (27.46)		17.9 %	0.17 [-0.45, 0.79]
Jufeng 2005ii	24	57.8 (34.81)	15	62.4 (27.46)		16.6 %	-0.14 [-0.79, 0.51]
Subtotal (95% CI)	**54**		**30**			**34.5 %**	**0.02 [-0.43, 0.47]**
Heterogeneity: Chi² = 0.46, df = 1 (P = 0.50); I² =0.0%							
Test for overall effect: Z = 0.09 (P = 0.93)							
2 Porch Index of Communicative Ability							
Katz 1997i	11	66.4 (19.4)	15	61.3 (17.4)		11.3 %	0.27 [-0.51, 1.05]
Katz 1997ii	10	66.4 (19.4)	19	56.3 (20.9)		11.4 %	0.48 [-0.30, 1.26]
Wertz 1986i	38	65.65 (24.64)	18	61.66 (21.21)		21.9 %	0.17 [-0.40, 0.73]
Wertz 1986ii	37	67.19 (24.64)	17	61.66 (21.21)		20.8 %	0.23 [-0.35, 0.81]
Subtotal (95% CI)	**96**		**69**			**65.5 %**	**0.26 [-0.07, 0.58]**
Heterogeneity: Chi² = 0.43, df = 3 (P = 0.93); I² =0.0%							
Test for overall effect: Z = 1.57 (P = 0.12)							
Total (95% CI)	**150**		**99**			**100.0 %**	**0.18 [-0.09, 0.44]**
Heterogeneity: Chi² = 1.60, df = 5 (P = 0.90); I² =0.0%							
Test for overall effect: Z = 1.32 (P = 0.19)							
Test for subgroup differences: Chi² = 0.72, df = 1 (P = 0.40), I² =0.0%							



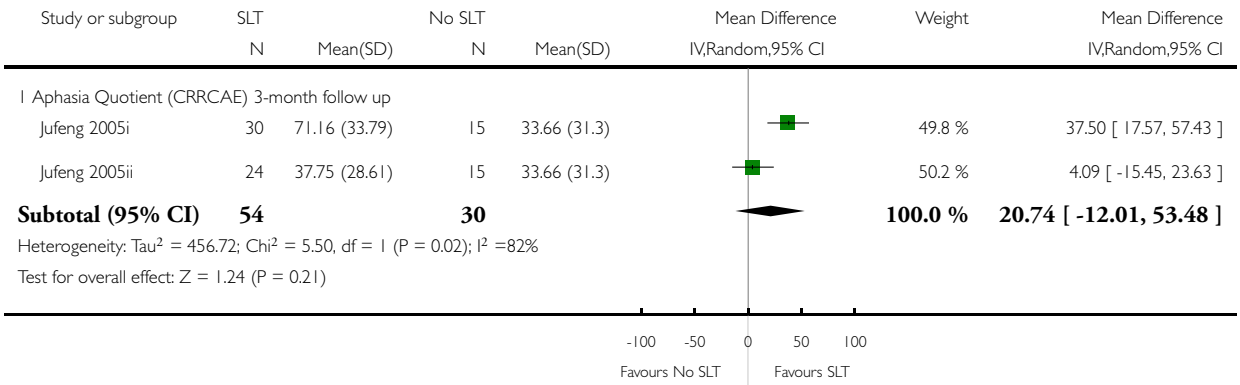
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Analysis 1.11. Comparison 1 SLT versus no SLT, Outcome 11 Severity of impairment: Aphasia Battery Score (3-month follow up).

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 11 Severity of impairment: Aphasia Battery Score (3-month follow up)

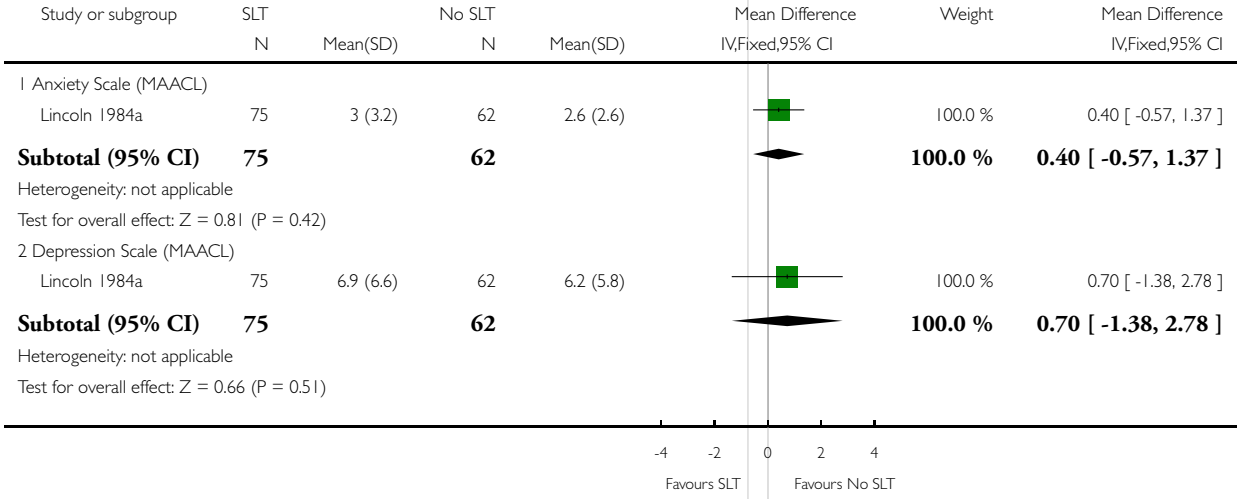


Analysis 1.12. Comparison 1 SLT versus no SLT, Outcome 12 Psychosocial: MAACL.

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 12 Psychosocial: MAACL



(*Continued* . . .)

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(. . . *Continued*)

Study or subgroup	SLT N	Mean(SD)	No SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
3 Hostility Scale (MAACL)							
Lincoln 1984a	75	2.7 (2.7)	62	2.8 (2.1)		100.0 %	-0.10 [-0.90, 0.70]
Subtotal (95% CI)	**75**		**62**			**100.0 %**	**-0.10 [-0.90, 0.70]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.24 (P = 0.81)							



Analysis 1.13. Comparison 1 SLT versus no SLT, Outcome 13 Number of drop-outs (any reason).

Review: Speech and language therapy for aphasia following stroke

Comparison: 1 SLT versus no SLT

Outcome: 13 Number of drop-outs (any reason)

Study or subgroup	SLT n/N	No SLT n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Doesborgh 2004b	1/9	0/10		0.6 %	3.71 [0.13, 103.11]
Katz 1997i	0/10	6/21		5.7 %	0.11 [0.01, 2.24]
Katz 1997ii	0/11	2/21		2.3 %	0.34 [0.01, 7.70]
Lincoln 1984a	76/163	90/164		65.8 %	0.72 [0.46, 1.11]
MacKay 1988	0/48	1/48		2.0 %	0.33 [0.01, 8.22]
Smania 2006	12/20	12/21		6.4 %	1.13 [0.32, 3.90]
Smith 1981i	10/16	0/9		0.3 %	30.69 [1.52, 621.02]
Smith 1981ii	6/14	0/8		0.5 %	13.00 [0.63, 268.93]
Wertz 1986i	9/38	5/20		6.9 %	0.93 [0.26, 3.28]
Wertz 1986ii	7/43	6/20		9.4 %	0.45 [0.13, 1.59]
Total (95% CI)	**372**	**342**		**100.0 %**	**0.86 [0.61, 1.20]**
Total events: 121 (SLT), 122 (No SLT)					
Heterogeneity: Chi^2 = 13.56, df = 9 (P = 0.14); I^2 =34%					
Test for overall effect: Z = 0.89 (P = 0.38)					



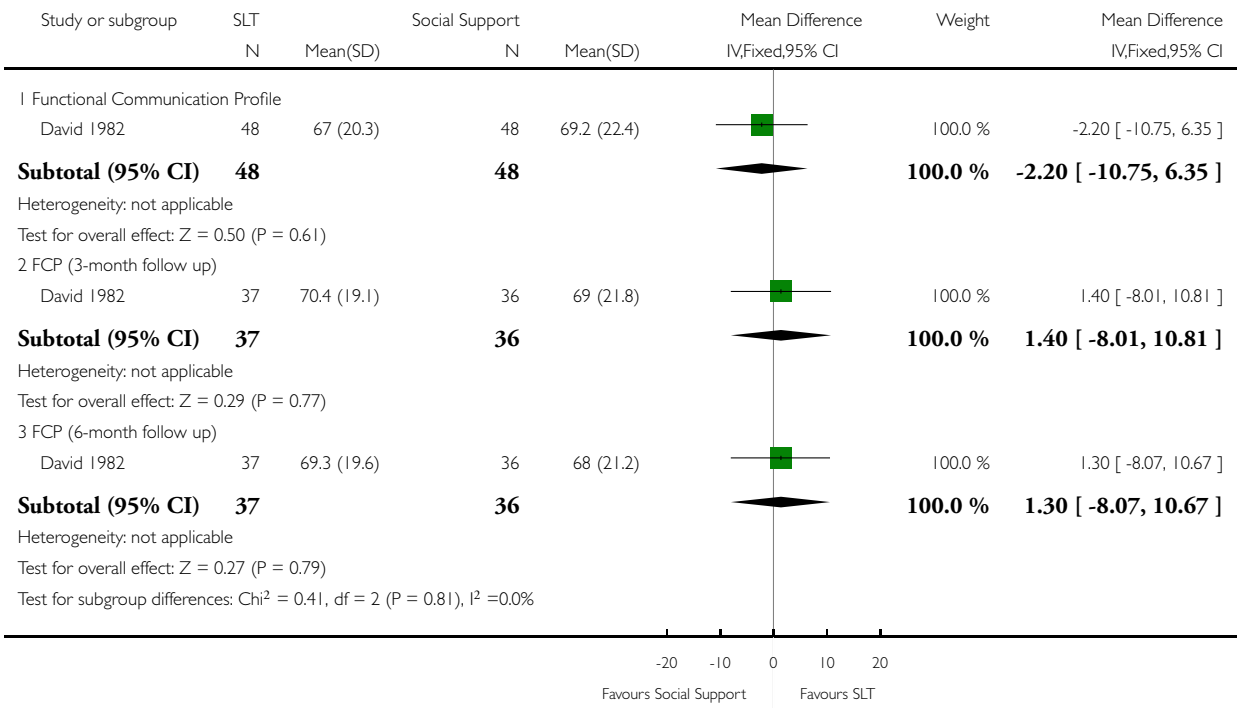
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Analysis 2.1. Comparison 2 SLT versus social support and stimulation, Outcome 1 Functional communication.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 1 Functional communication



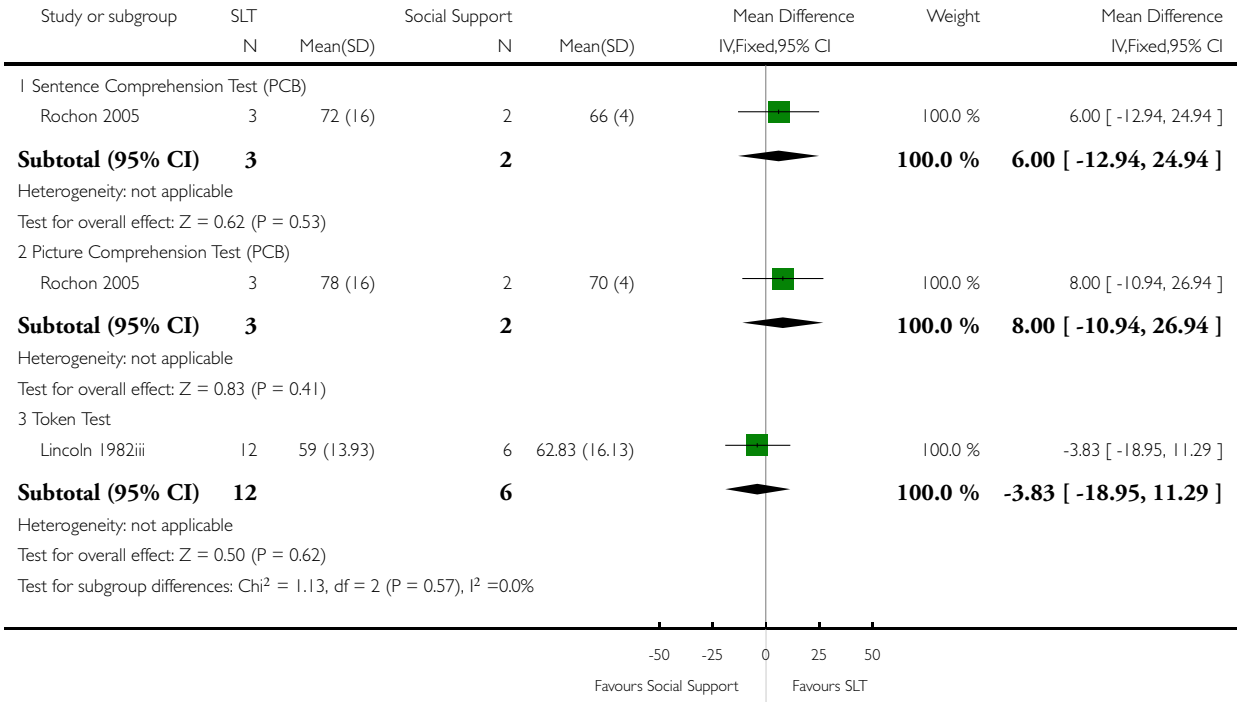
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Analysis 2.2. Comparison 2 SLT versus social support and stimulation, Outcome 2 Receptive language: auditory comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 2 Receptive language: auditory comprehension



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Analysis 2.3. Comparison 2 SLT versus social support and stimulation, Outcome 3 Receptive language: other.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 3 Receptive language: other

Study or subgroup	SLT N	Mean(SD)	Social Support N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PICA Gestural subtest							
Lincoln 1982iii	12	12.14 (0.8)	6	13.01 (0.87)		100.0 %	-0.87 [-1.70, -0.04]
Subtotal (95% CI)	**12**		**6**			**100.0 %**	**-0.87 [-1.70, -0.04]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.05 (P = 0.040)							
Test for subgroup differences: Not applicable							



Analysis 2.4. Comparison 2 SLT versus social support and stimulation, Outcome 4 Expressive language: single words.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 4 Expressive language: single words

Study or subgroup	SLT N	Mean(SD)	Social Support N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Object Naming Test (ONT)							
Lincoln 1982iii	12	9.83 (6.32)	6	16.83 (3.76)		100.0 %	-7.00 [-11.67, -2.33]
Subtotal (95% CI)	**12**		**6**			**100.0 %**	**-7.00 [-11.67, -2.33]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.94 (P = 0.0033)							
2 Word fluency							
Lincoln 1982iii	12	10 (5.98)	6	24 (6.72)		100.0 %	-14.00 [-20.35, -7.65]
Subtotal (95% CI)	**12**		**6**			**100.0 %**	**-14.00 [-20.35, -7.65]**
Heterogeneity: not applicable							
Test for overall effect: Z = 4.32 (P = 0.000016)							
Test for subgroup differences: Chi^2 = 3.03, df = 1 (P = 0.08), I^2 =67%							



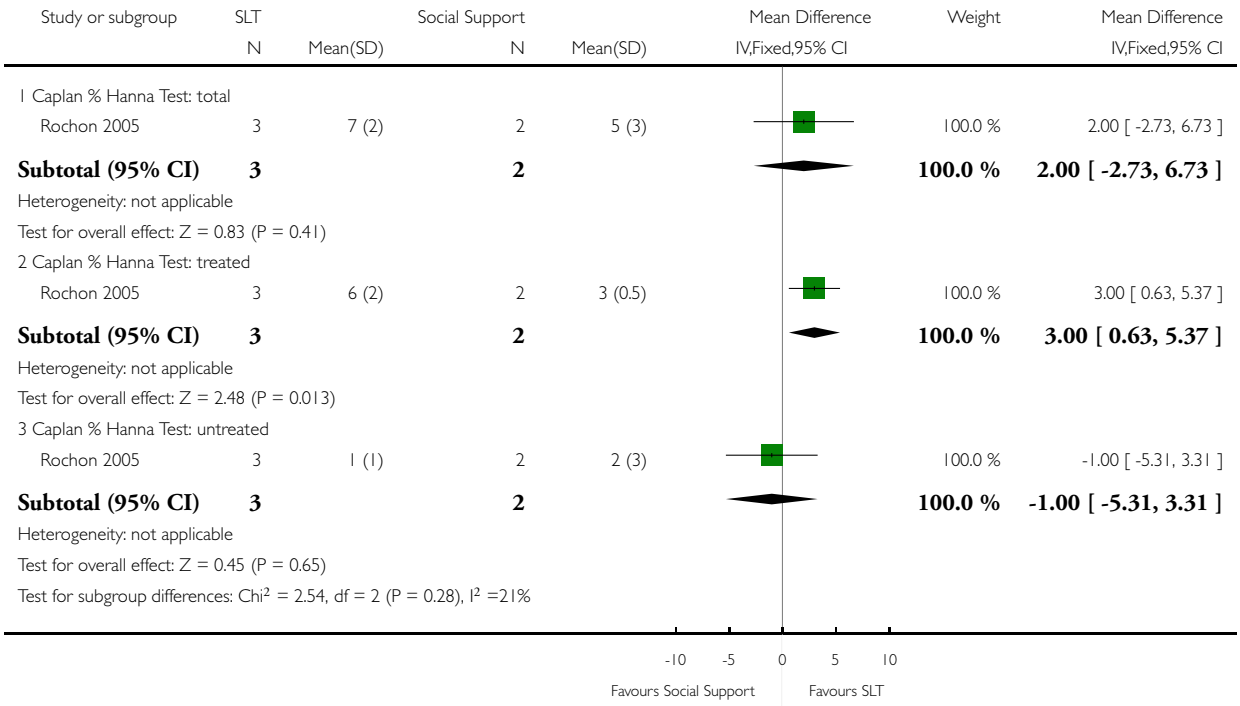
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Analysis 2.5. Comparison 2 SLT versus social support and stimulation, Outcome 5 Expressive language: sentences.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 5 Expressive language: sentences



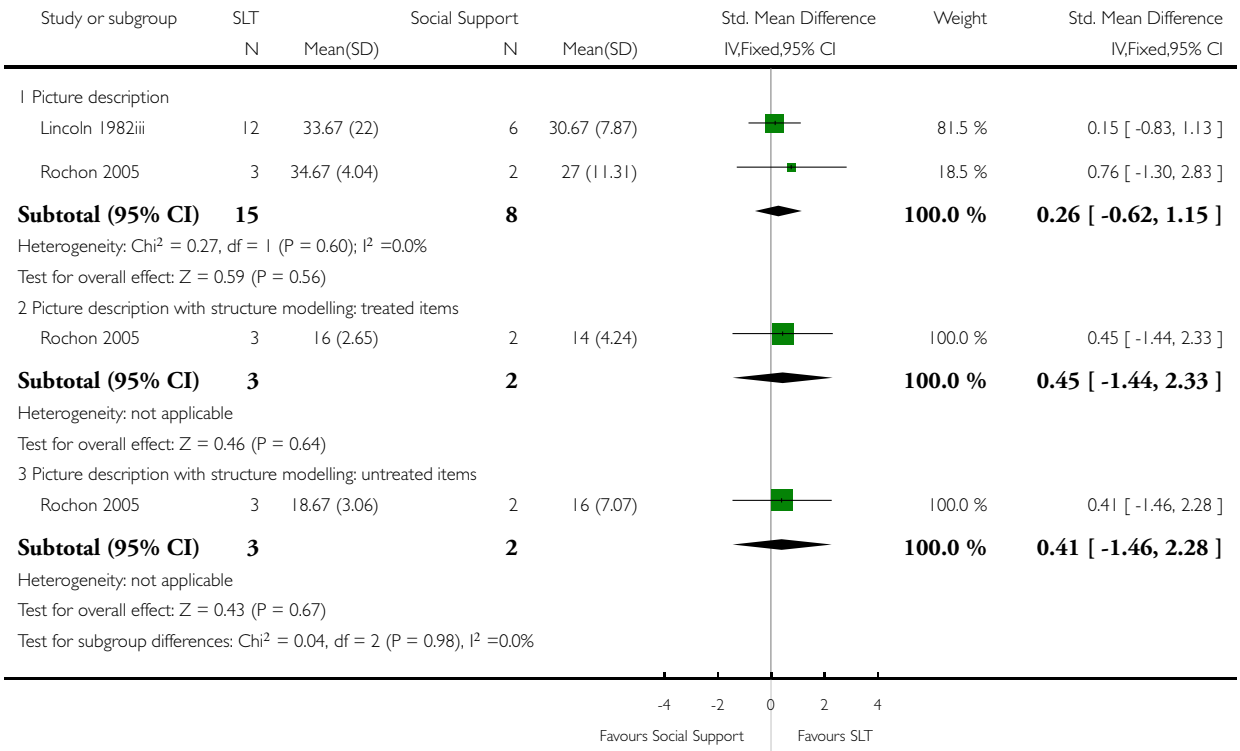
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Analysis 2.6. Comparison 2 SLT versus social support and stimulation, Outcome 6 Expressive language: picture description.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 6 Expressive language: picture description



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Analysis 2.7. Comparison 2 SLT versus social support and stimulation, Outcome 7 Expressive language: overall spoken.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

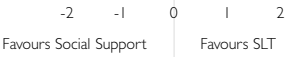
Outcome: 7 Expressive language: overall spoken

Study or subgroup	SLT N	Mean(SD)	Social Support N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PICA verbal subtest							
Lincoln 1982iii	12	10.52 (1.2)	6	12.08 (0.74)		100.0 %	-1.56 [-2.46, -0.66]
Subtotal (95% CI)	**12**		**6**			**100.0 %**	**-1.56 [-2.46, -0.66]**

Heterogeneity: not applicable

Test for overall effect: Z = 3.39 (P = 0.00069)

Test for subgroup differences: Not applicable



Analysis 2.8. Comparison 2 SLT versus social support and stimulation, Outcome 8 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

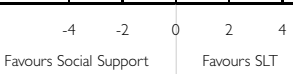
Outcome: 8 Expressive language: written

Study or subgroup	SLT N	Mean(SD)	Social Support N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PICA graphic subtests							
Lincoln 1982iii	12	7.52 (1.34)	6	8.91 (1)		100.0 %	-1.39 [-2.49, -0.29]
Subtotal (95% CI)	**12**		**6**			**100.0 %**	**-1.39 [-2.49, -0.29]**

Heterogeneity: not applicable

Test for overall effect: Z = 2.47 (P = 0.013)

Test for subgroup differences: Not applicable



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Analysis 2.9. Comparison 2 SLT versus social support and stimulation, Outcome 9 Severity of impairment: Aphasia Battery Score.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

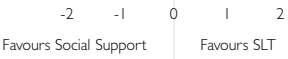
Outcome: 9 Severity of impairment: Aphasia Battery Score

Study or subgroup	SLT N	Mean(SD)	Social Support N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PICA							
Lincoln 1982iii	12	10.3 (1.01)	6	11.43 (0.67)		100.0 %	-1.13 [-1.91, -0.35]
Subtotal (95% CI)	**12**		**6**			**100.0 %**	**-1.13 [-1.91, -0.35]**

Heterogeneity: not applicable

Test for overall effect: Z = 2.83 (P = 0.0047)

Test for subgroup differences: Not applicable



Analysis 2.10. Comparison 2 SLT versus social support and stimulation, Outcome 10 Number of drop-outs for any reason.

Review: Speech and language therapy for aphasia following stroke

Comparison: 2 SLT versus social support and stimulation

Outcome: 10 Number of drop-outs for any reason

Study or subgroup	SLT n/N	Social Support n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
David 1982	34/71	48/84		73.0 %	0.69 [0.37, 1.30]
Elman 1999	3/14	4/14		9.9 %	0.68 [0.12, 3.83]
Shewan 1984ii	6/28	3/13		11.9 %	0.91 [0.19, 4.39]
Shewan 1984iii	1/24	3/12		5.2 %	0.13 [0.01, 1.42]
Total (95% CI)	**137**	**123**		**100.0 %**	**0.65 [0.38, 1.12]**

Total events: 44 (SLT), 58 (Social Support)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.95$, df = 3 (P = 0.58); $I^2 = 0.0\%$

Test for overall effect: Z = 1.54 (P = 0.12)



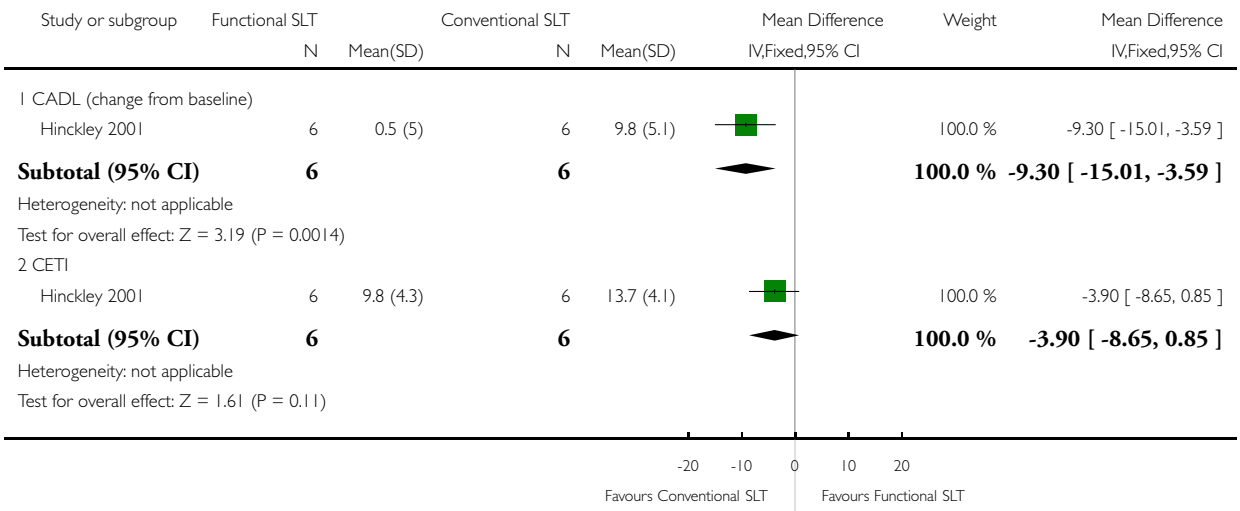
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Analysis 3.1. Comparison 3 Functional SLT (SLTA) versus conventional SLT (SLTB), Outcome 1 Functional communication.

Review: Speech and language therapy for aphasia following stroke

Comparison: 3 Functional SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 1 Functional communication



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Analysis 3.2. Comparison 3 Functional SLT (SLTA) versus conventional SLT (SLTB), Outcome 2 Functional communication: catalogue ordering.

Review: Speech and language therapy for aphasia following stroke

Comparison: 3 Functional SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 2 Functional communication: catalogue ordering

Study or subgroup	Functional SLT N	Mean(SD)	Conventional SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Telephone order (change from baseline)							
Hinckley 2001	6	32.3 (15)	6	-0.5 (14.4)		100.0 %	32.80 [16.16, 49.44]
Subtotal (95% CI)	**6**		**6**			**100.0 %**	**32.80 [16.16, 49.44]**
Heterogeneity: not applicable							
Test for overall effect: Z = 3.86 (P = 0.00011)							
2 Telephone order (+ concurrent task) (change from baseline)							
Hinckley 2001	6	24.2 (15.5)	6	7.3 (11.8)		100.0 %	16.90 [1.31, 32.49]
Subtotal (95% CI)	**6**		**6**			**100.0 %**	**16.90 [1.31, 32.49]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.13 (P = 0.034)							
3 Written order (change from baseline)							
Hinckley 2001	6	6.8 (14.5)	6	11.8 (11.5)		100.0 %	-5.00 [-19.81, 9.81]
Subtotal (95% CI)	**6**		**6**			**100.0 %**	**-5.00 [-19.81, 9.81]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.66 (P = 0.51)							
4 Written order (+ concurrent task) (change from baseline)							
Hinckley 2001	6	24.3 (20.6)	6	14.5 (14)		100.0 %	9.80 [-10.13, 29.73]
Subtotal (95% CI)	**6**		**6**			**100.0 %**	**9.80 [-10.13, 29.73]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.96 (P = 0.34)							



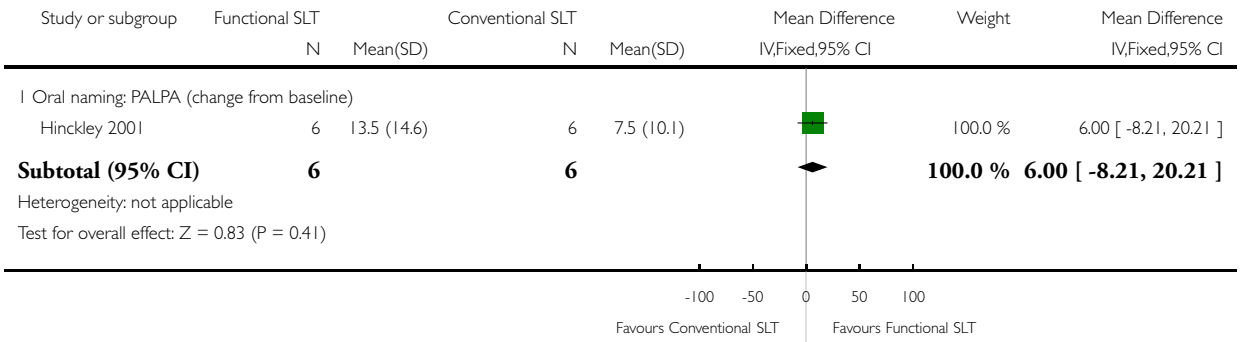
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Analysis 3.3. Comparison 3 Functional SLT (SLTA) versus conventional SLT (SLTB), Outcome 3 Expressive language: spoken.

Review: Speech and language therapy for aphasia following stroke

Comparison: 3 Functional SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 3 Expressive language: spoken

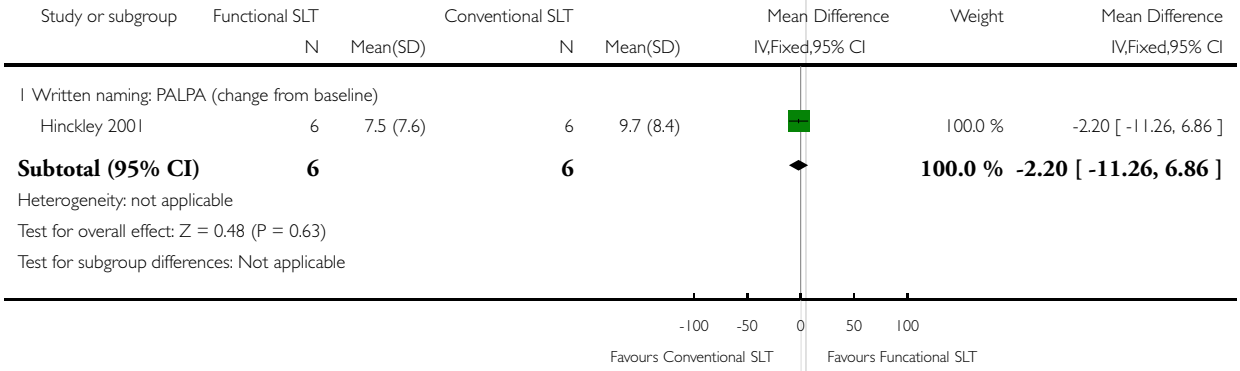


Analysis 3.4. Comparison 3 Functional SLT (SLTA) versus conventional SLT (SLTB), Outcome 4 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 3 Functional SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 4 Expressive language: written



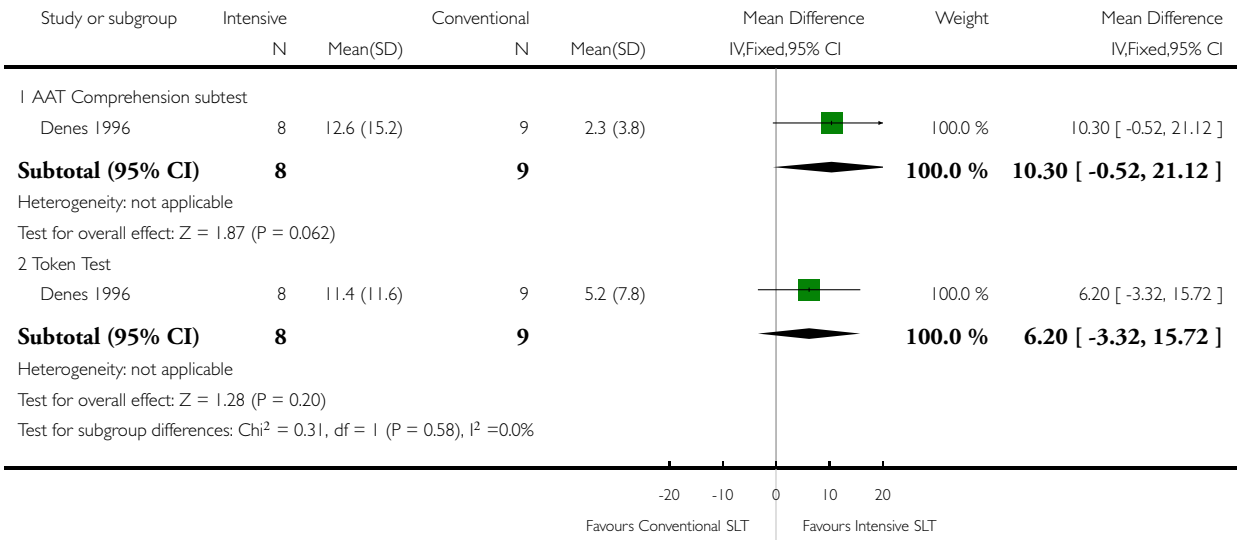
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Analysis 4.1. Comparison 4 Intensive SLT (SLTA) versus conventional SLT (SLTB), Outcome 1 Receptive language: auditory comprehension (change from baseline).

Review: Speech and language therapy for aphasia following stroke

Comparison: 4 Intensive SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 1 Receptive language: auditory comprehension (change from baseline)



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Analysis 4.2. Comparison 4 Intensive SLT (SLTA) versus conventional SLT (SLTB), Outcome 2 Expressive language: spoken (change from baseline scores).

Review: Speech and language therapy for aphasia following stroke

Comparison: 4 Intensive SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 2 Expressive language: spoken (change from baseline scores)

Study or subgroup	Intensive N	Mean(SD)	Conventional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Naming subtest (AAT)							
Denes 1996	8	10.2 (9.9)	9	4.5 (4.2)		100.0 %	5.70 [-1.69, 13.09]
Subtotal (95% CI)	**8**		**9**			**100.0 %**	**5.70 [-1.69, 13.09]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.51 (P = 0.13)							
2 Repetition subtest (AAT)							
Denes 1996	8	8.9 (7.7)	9	6.1 (6.1)		100.0 %	2.80 [-3.86, 9.46]
Subtotal (95% CI)	**8**		**9**			**100.0 %**	**2.80 [-3.86, 9.46]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.82 (P = 0.41)							



Analysis 4.3. Comparison 4 Intensive SLT (SLTA) versus conventional SLT (SLTB), Outcome 3 Written language: (change from baseline scores).

Review: Speech and language therapy for aphasia following stroke

Comparison: 4 Intensive SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 3 Written language: (change from baseline scores)

Study or subgroup	Intensive N	Mean(SD)	Conventional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Written subtest (AAT)							
Denes 1996	8	11 (9.8)	9	2.1 (3.1)		100.0 %	8.90 [1.81, 15.99]
Subtotal (95% CI)	**8**		**9**			**100.0 %**	**8.90 [1.81, 15.99]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.46 (P = 0.014)							



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Analysis 4.4. Comparison 4 Intensive SLT (SLTA) versus conventional SLT (SLTB), Outcome 4 Severity of impairment: Aphasia Battery Score.

Review: Speech and language therapy for aphasia following stroke

Comparison: 4 Intensive SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 4 Severity of impairment: Aphasia Battery Score

Study or subgroup	Intensive N	Mean(SD)	Conventional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Aphasia Quotient (WAB)							
Bakheit 2007	35	70.3 (26.9)	38	66.2 (26.2)		69.9 %	4.10 [-8.10, 16.30]
ORLA 2006	6	57.58 (14.82)	7	60.48 (19.35)		30.1 %	-2.90 [-21.50, 15.70]
Subtotal (95% CI)	**41**		**45**			**100.0 %**	**2.00 [-8.21, 12.20]**
Heterogeneity: Chi^2 = 0.38, df = 1 (P = 0.54); I^2 =0.0%							
Test for overall effect: Z = 0.38 (P = 0.70)							
2 AAT profile (change from baseline)							
Denes 1996	8	10 (8.6)	9	4.3 (3.8)		100.0 %	5.70 [-0.76, 12.16]
Subtotal (95% CI)	**8**		**9**			**100.0 %**	**5.70 [-0.76, 12.16]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.73 (P = 0.084)							
3 Aphasia Quotient (WAB) 3-month follow up							
Bakheit 2007	31	69.9 (25.2)	35	68 (26.3)		100.0 %	1.90 [-10.53, 14.33]
Subtotal (95% CI)	**31**		**35**			**100.0 %**	**1.90 [-10.53, 14.33]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.30 (P = 0.76)							
Test for subgroup differences: Chi^2 = 0.52, df = 2 (P = 0.77), I^2 =0.0%							



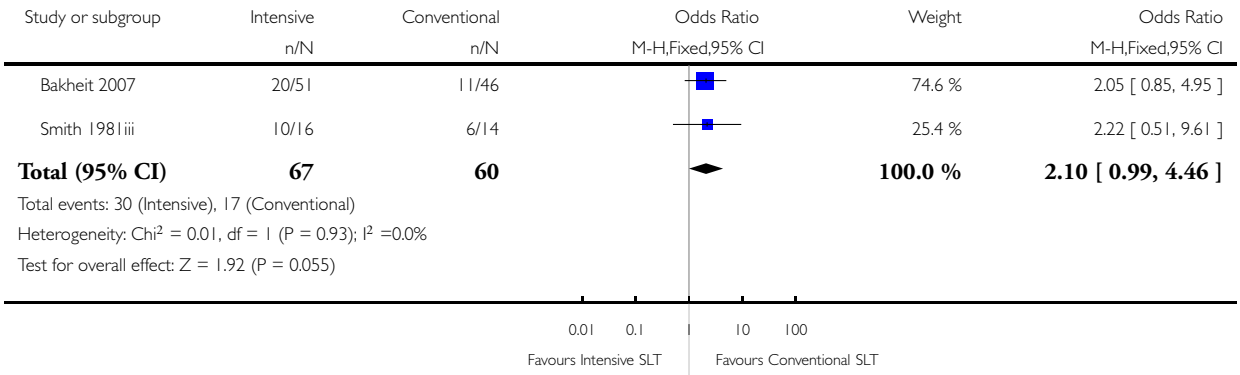
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Analysis 4.5. Comparison 4 Intensive SLT (SLTA) versus conventional SLT (SLTB), Outcome 5 Number of drop-outs for any reason.

Review: Speech and language therapy for aphasia following stroke

Comparison: 4 Intensive SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 5 Number of drop-outs for any reason

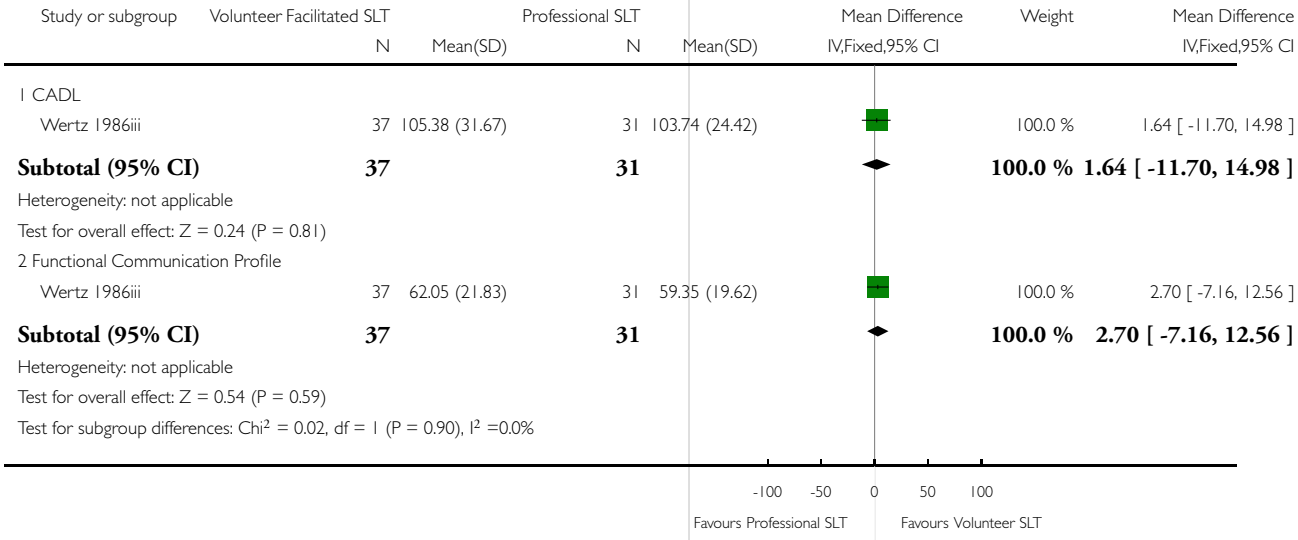


Analysis 5.1. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 1 Functional communication.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 1 Functional communication



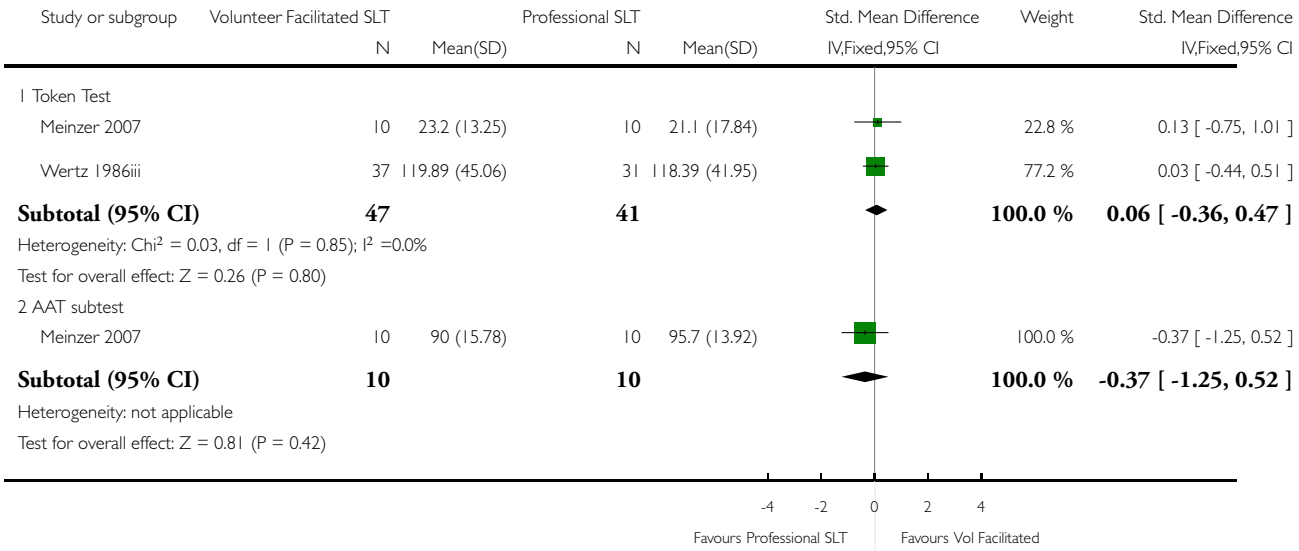
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Analysis 5.2. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 2 Receptive language: auditory comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 2 Receptive language: auditory comprehension



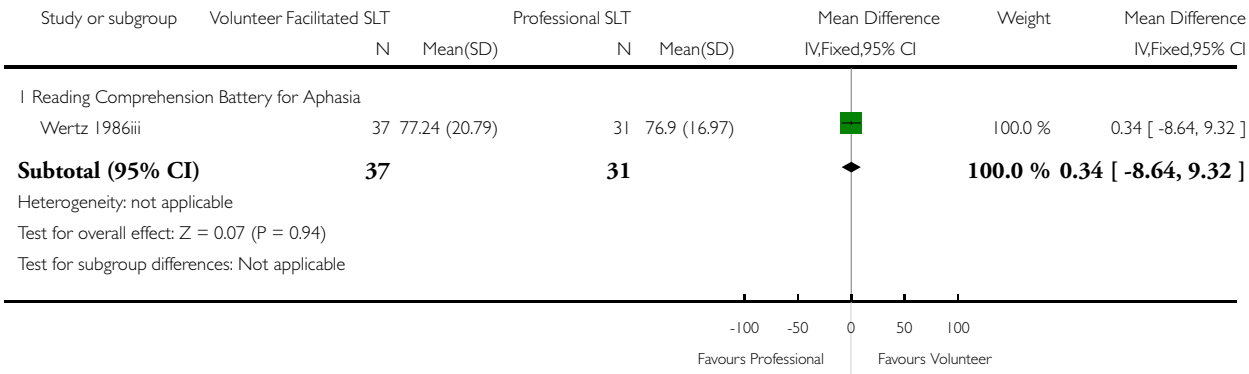
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Analysis 5.3. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 3 Receptive language: reading comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 3 Receptive language: reading comprehension

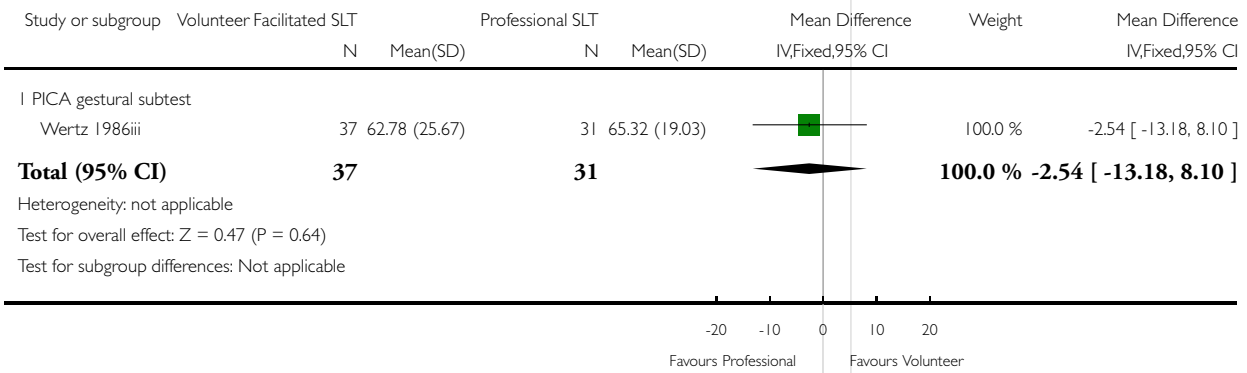


Analysis 5.4. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 4 Receptive language: other.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 4 Receptive language: other



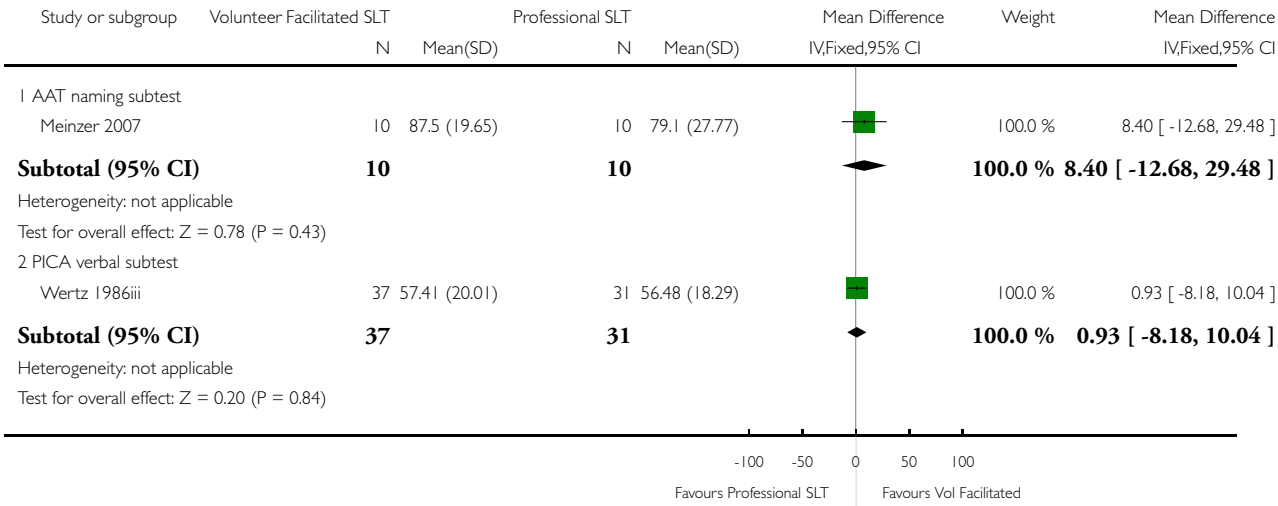
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Analysis 5.5. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 5 Expressive language: spoken.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 5 Expressive language: spoken

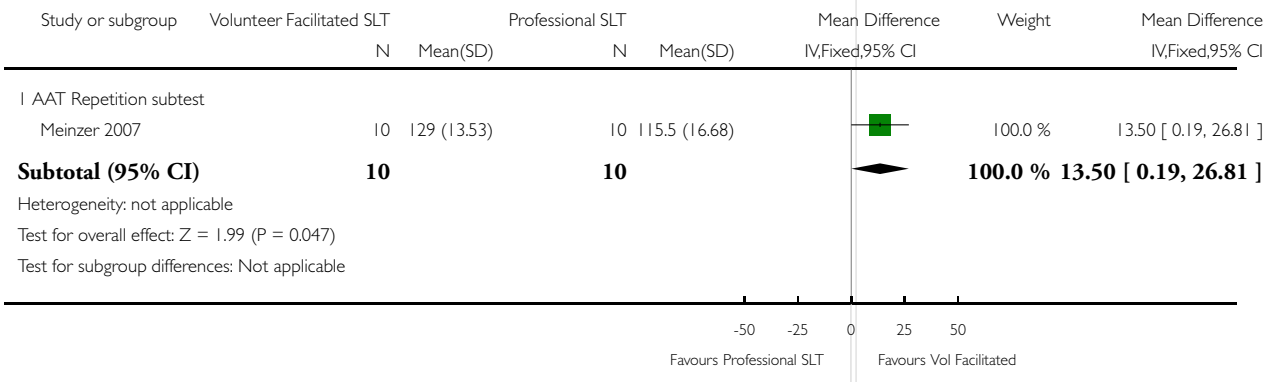


Analysis 5.6. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 6 Expressive language: repetition.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 6 Expressive language: repetition



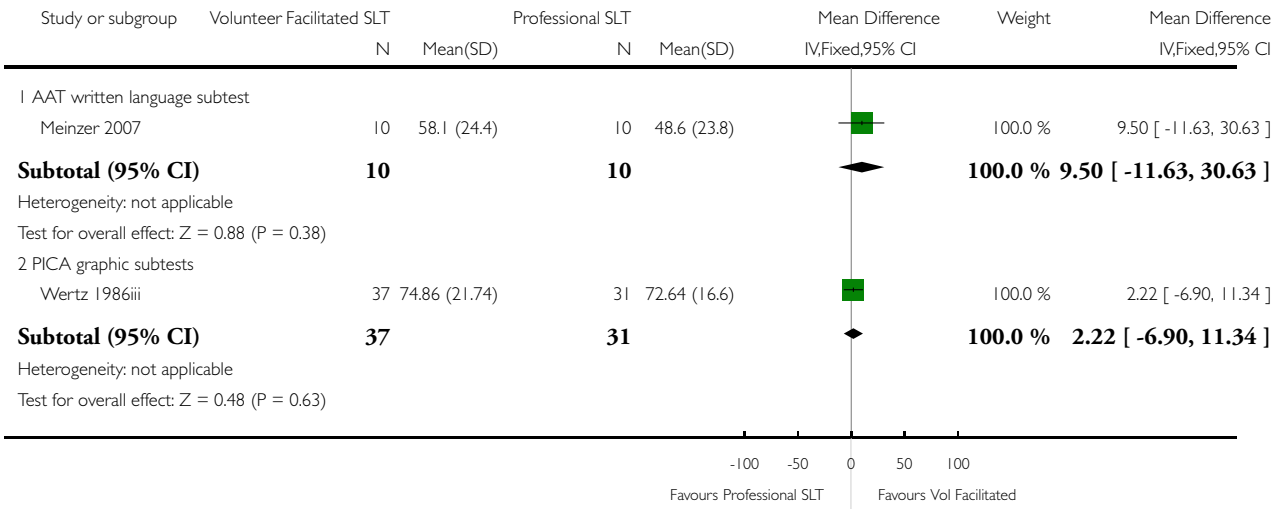
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Analysis 5.7. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 7 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 7 Expressive language: written



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Analysis 5.8. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 8 Severity of impairment: Aphasia Battery Score.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

Outcome: 8 Severity of impairment: Aphasia Battery Score

Study or subgroup	Volunteer Facilitated SLT N	Mean(SD)	Professional SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 PICA							
Meikle 1979	15	62.2 (27.12)	16	72 (22.9)		24.3 %	-0.38 [-1.09, 0.33]
Wertz 1986iii	37	67.19 (24.64)	38	65.65 (18.85)		60.1 %	0.07 [-0.38, 0.52]
Subtotal (95% CI)	**52**		**54**			**84.5 %**	**-0.06 [-0.44, 0.32]**
Heterogeneity: Chi^2 = 1.10, df = 1 (P = 0.29); I^2 =9%							
Test for overall effect: Z = 0.31 (P = 0.76)							
2 AAT							
Meinzer 2007	10	52.96 (5.49)	10	55.54 (5.44)		15.5 %	-0.45 [-1.34, 0.44]
Subtotal (95% CI)	**10**		**10**			**15.5 %**	**-0.45 [-1.34, 0.44]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.00 (P = 0.32)							
Total (95% CI)	**62**		**64**			**100.0 %**	**-0.12 [-0.47, 0.23]**
Heterogeneity: Chi^2 = 1.73, df = 2 (P = 0.42); I^2 =0.0%							
Test for overall effect: Z = 0.68 (P = 0.50)							
Test for subgroup differences: Chi^2 = 0.63, df = 1 (P = 0.43), I^2 =0.0%							



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Analysis 5.9. Comparison 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB), Outcome 9 Number of drop-outs for any reason.

Review: Speech and language therapy for aphasia following stroke

Comparison: 5 Volunteer-facilitated SLT (SLTA) versus professional SLT (SLTB)

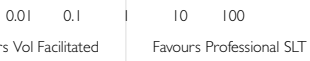
Outcome: 9 Number of drop-outs for any reason

Study or subgroup	Volunteer Facilitated SLT n/N	Professional SLT n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Leal 1993	21/59	13/35		58.9 %	0.94 [0.39, 2.23]
Meikle 1979	0/16	2/15		4.6 %	0.16 [0.01, 3.71]
Wertz 1986iii	9/38	7/43		36.6 %	1.60 [0.53, 4.81]
Total (95% CI)	**113**	**93**		**100.0 %**	**1.05 [0.54, 2.04]**

Total events: 30 (Volunteer Facilitated SLT), 22 (Professional SLT)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 2.00$, df = 2 (P = 0.37); $I^2 = 0.0\%$

Test for overall effect: Z = 0.14 (P = 0.89)



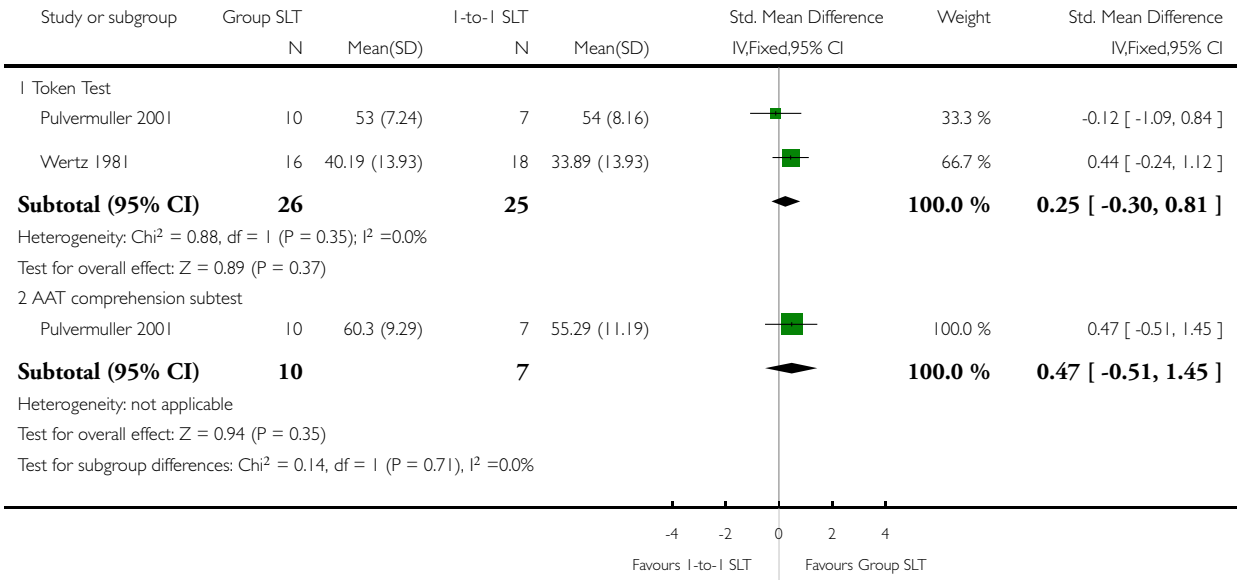
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Analysis 6.1. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 1 Receptive language: auditory comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 1 Receptive language: auditory comprehension

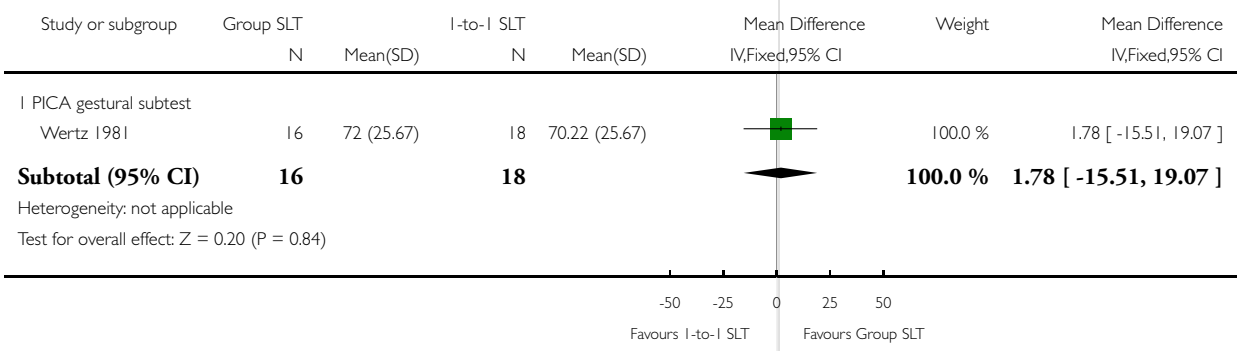


Analysis 6.2. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 2 Receptive language: other.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 2 Receptive language: other



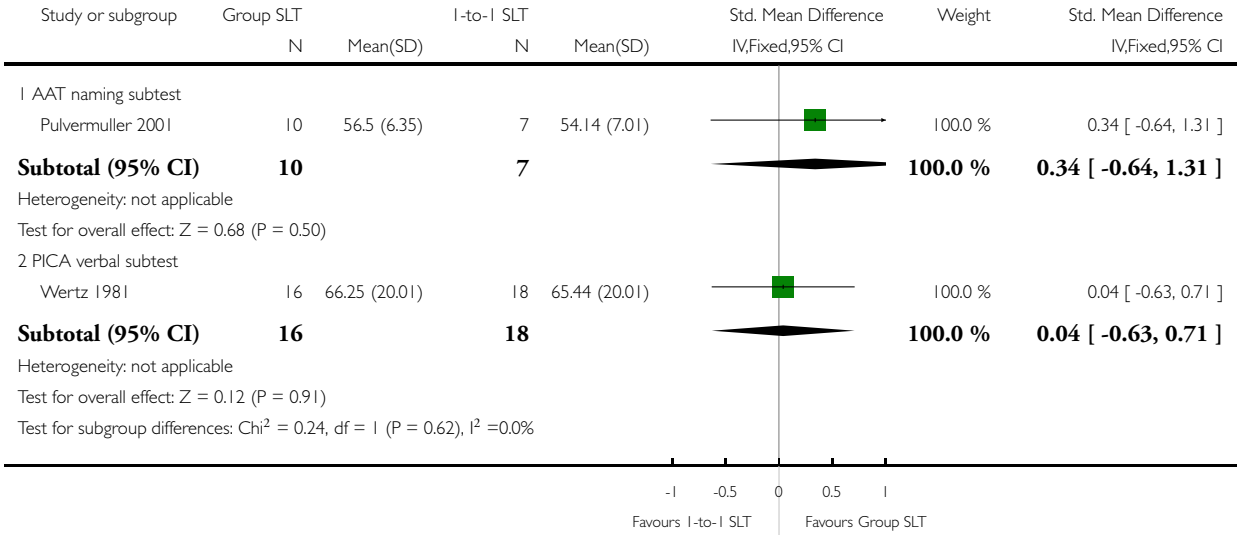
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Analysis 6.3. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 3 Expressive language: spoken.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 3 Expressive language: spoken



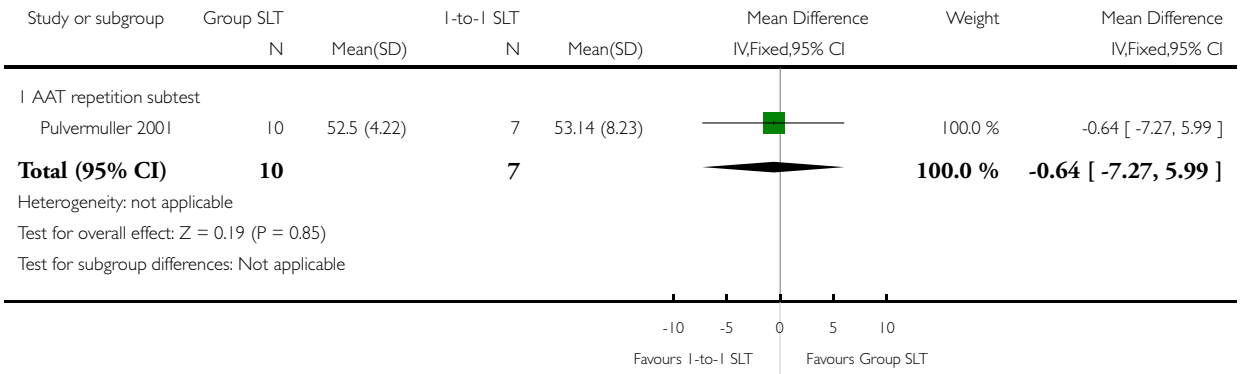
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Analysis 6.4. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 4 Expressive language: repetition.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 4 Expressive language: repetition

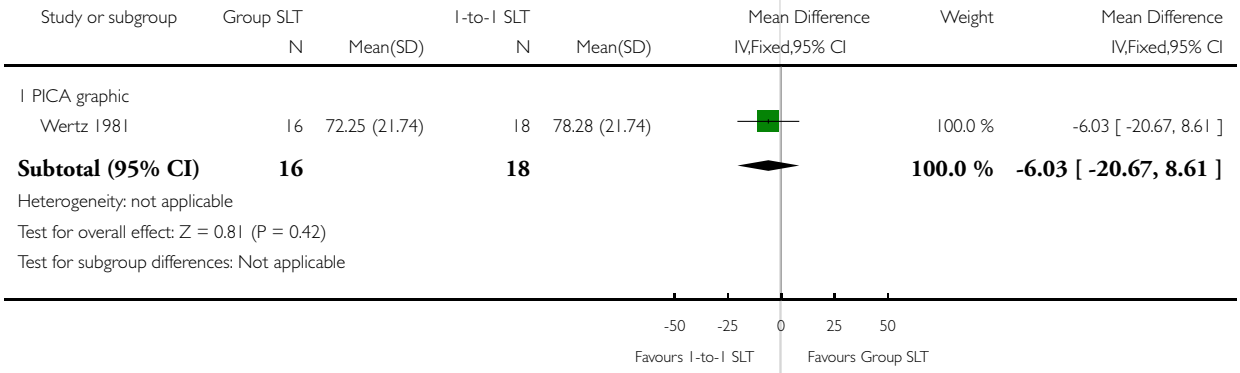


Analysis 6.5. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 5 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 5 Expressive language: written



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Analysis 6.6. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 6 Severity of impairment: Aphasia Battery Score.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 6 Severity of impairment: Aphasia Battery Score

Study or subgroup	Group SLT N	Mean(SD)	1-to-1 SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Aphasia Quotient CRRCAE							
Jufeng 2005iii	30	66.93 (25.62)	24	57.8 (34.81)		51.2 %	0.30 [-0.24, 0.84]
Subtotal (95% CI)	**30**		**24**			**51.2 %**	**0.30 [-0.24, 0.84]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.09 (P = 0.28)							
2 PICA overall							
Wertz 1981	16	70.69 (24.64)	18	72.17 (24.64)		32.9 %	-0.06 [-0.73, 0.61]
Subtotal (95% CI)	**16**		**18**			**32.9 %**	**-0.06 [-0.73, 0.61]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.17 (P = 0.86)							
3 AAT overall							
Pulvermuller 2001	10	55.58 (5.88)	7	54.14 (6.3)		15.9 %	0.23 [-0.74, 1.20]
Subtotal (95% CI)	**10**		**7**			**15.9 %**	**0.23 [-0.74, 1.20]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.46 (P = 0.65)							
Total (95% CI)	**56**		**49**			**100.0 %**	**0.17 [-0.22, 0.56]**
Heterogeneity: Chi^2 = 0.68, df = 2 (P = 0.71); I^2 =0.0%							
Test for overall effect: Z = 0.86 (P = 0.39)							
Test for subgroup differences: Chi^2 = 0.68, df = 2 (P = 0.71), I^2 =0.0%							



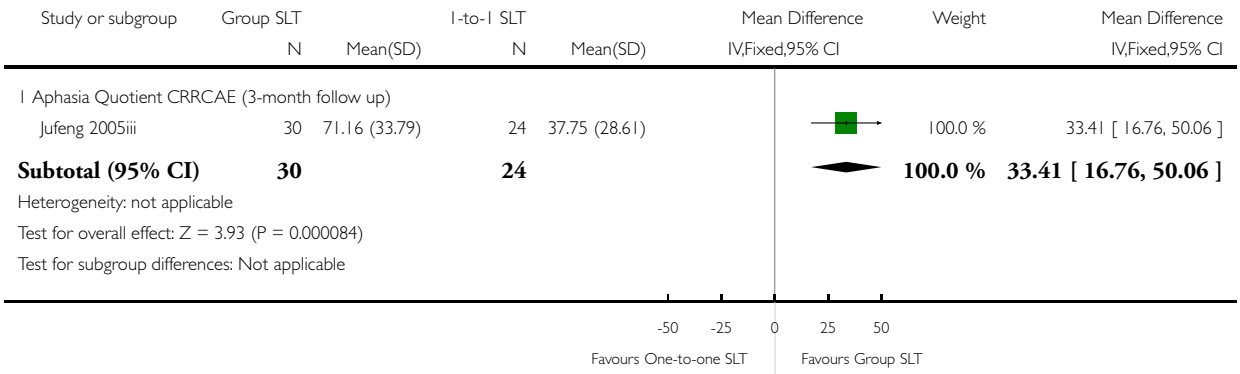
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Analysis 6.7. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 7 Severity of impairment: Aphasia Battery Score (3-month follow up).

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 7 Severity of impairment: Aphasia Battery Score (3-month follow up)

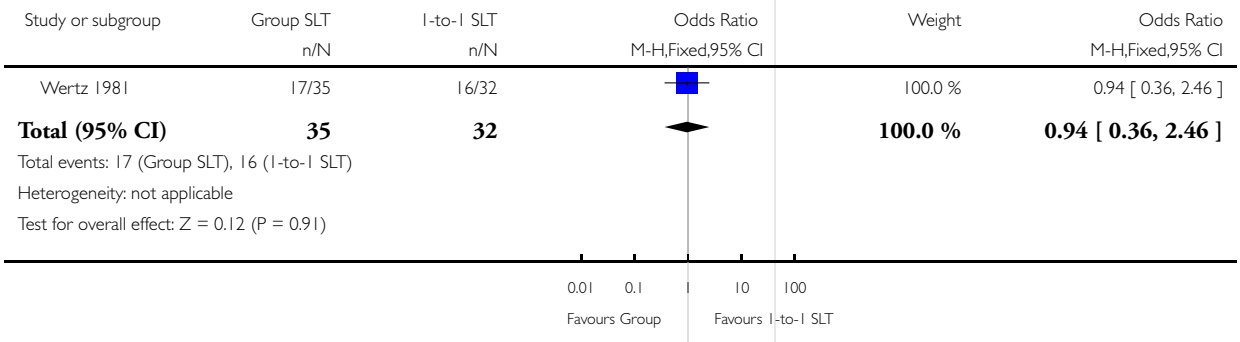


Analysis 6.8. Comparison 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB), Outcome 8 Number of drop-outs for any reason.

Review: Speech and language therapy for aphasia following stroke

Comparison: 6 Group SLT (SLTA) versus 1-to-1 SLT (SLTB)

Outcome: 8 Number of drop-outs for any reason



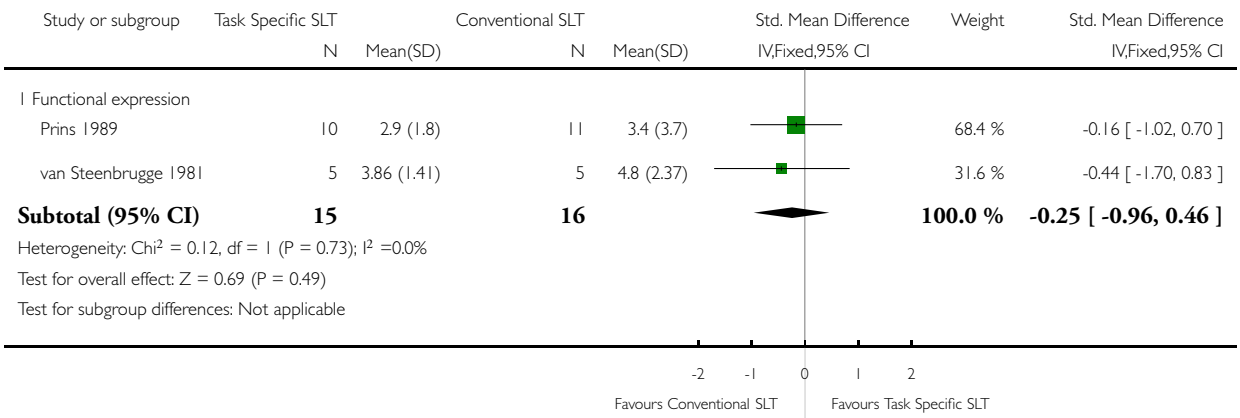
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Analysis 7.1. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 1 Functional communication.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 1 Functional communication



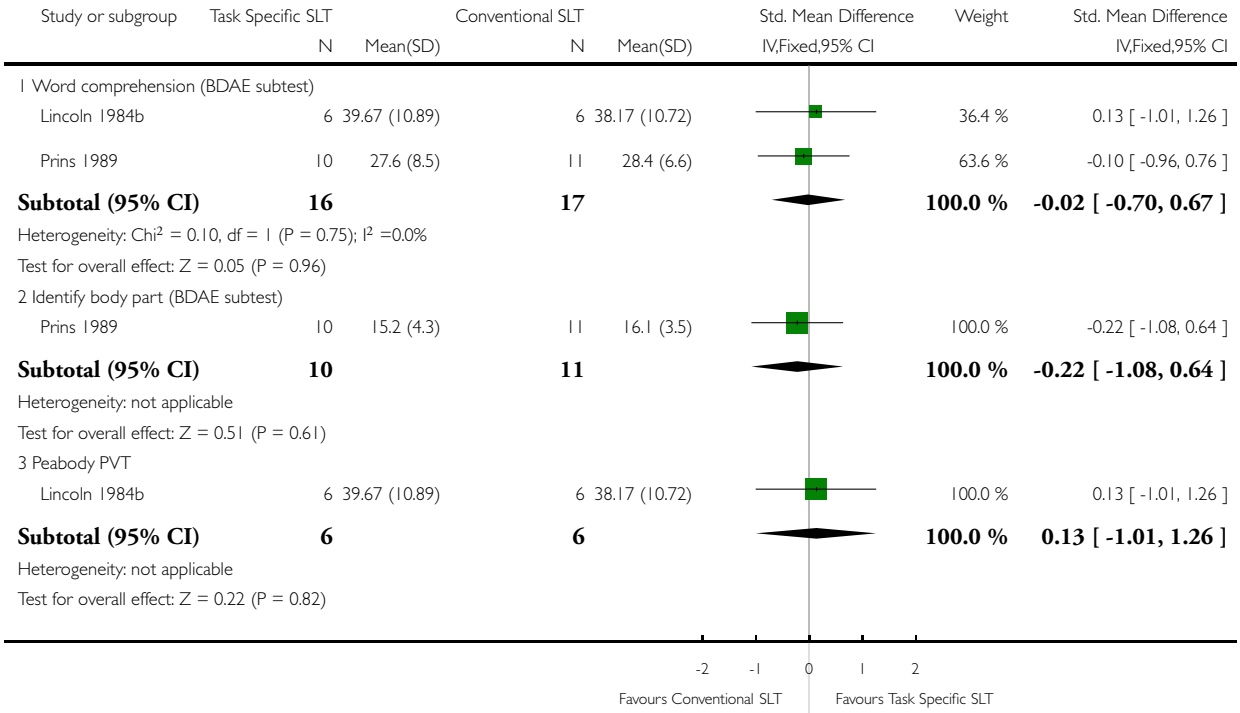
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Analysis 7.2. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 2 Receptive language: auditory comprehension - word.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 2 Receptive language: auditory comprehension - word



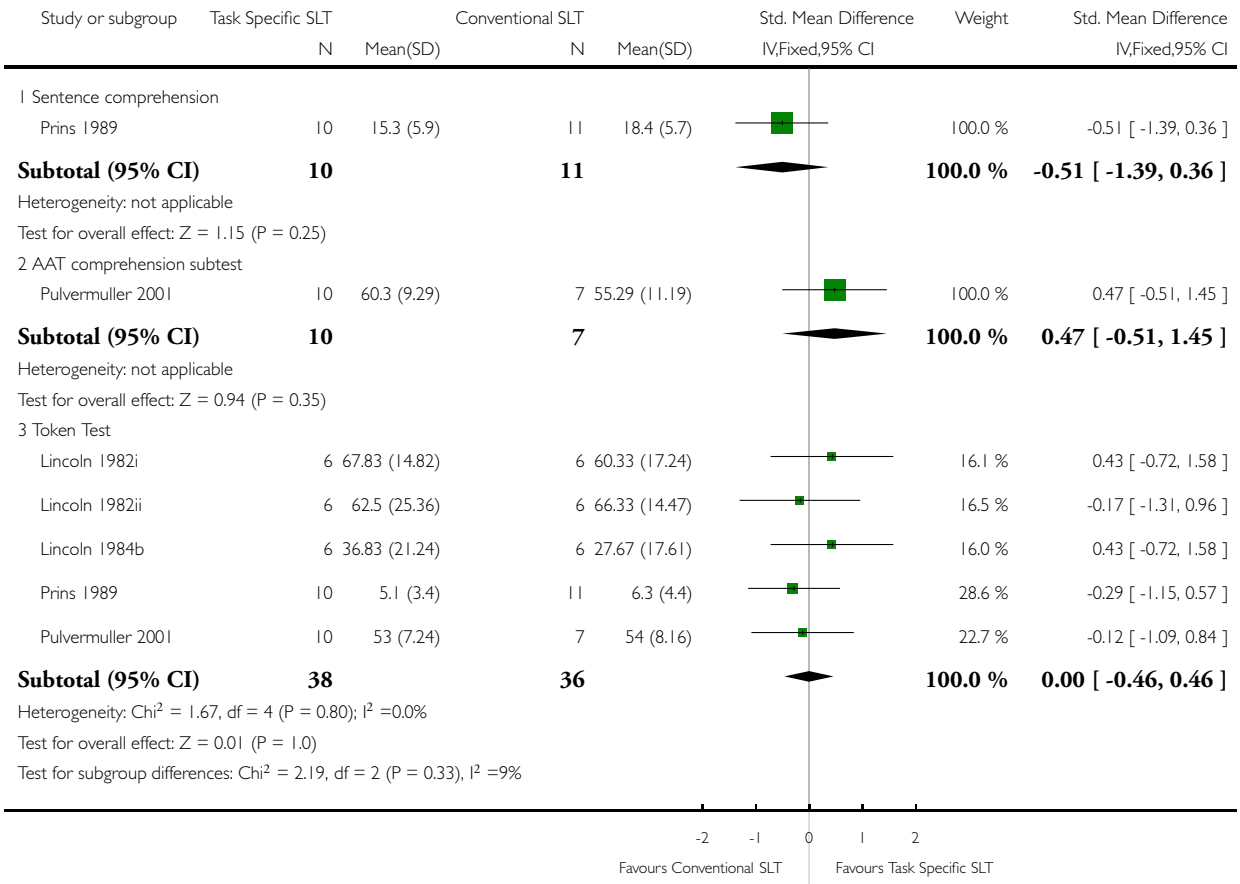
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Analysis 7.3. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 3 Receptive language: other auditory comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 3 Receptive language: other auditory comprehension



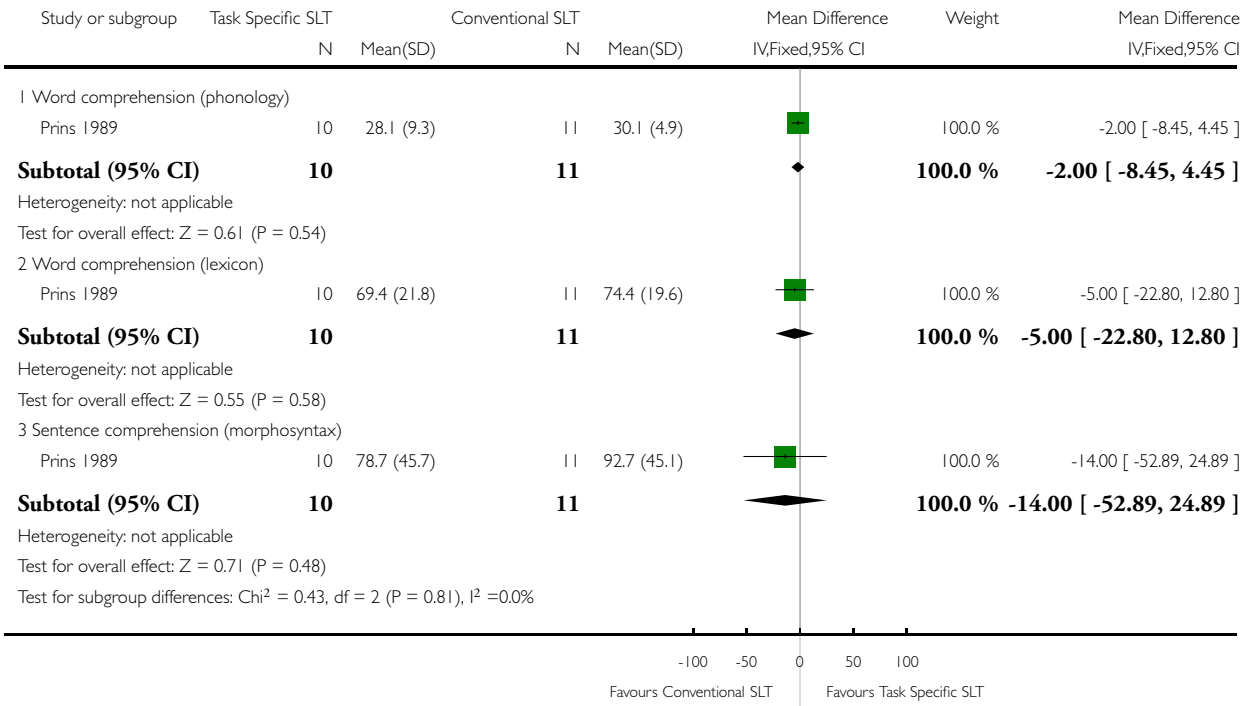
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Analysis 7.4. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 4 Receptive language: auditory comprehension (treated items).

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 4 Receptive language: auditory comprehension (treated items)



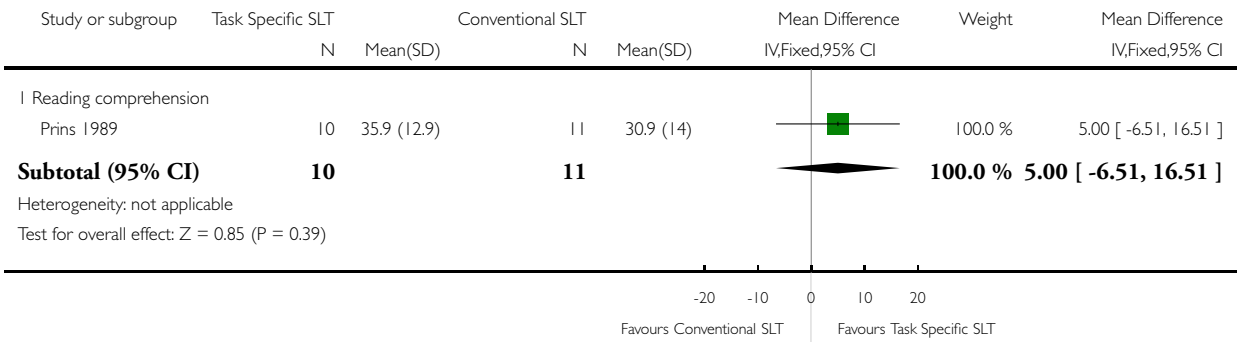
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Analysis 7.5. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 5 Receptive language: reading comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 5 Receptive language: reading comprehension

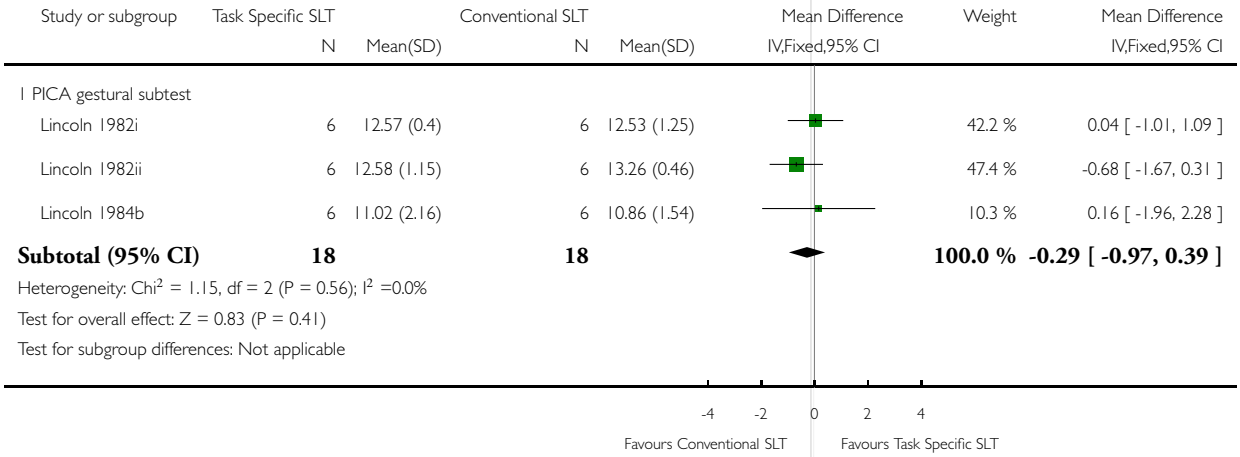


Analysis 7.6. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 6 Receptive language: other.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 6 Receptive language: other



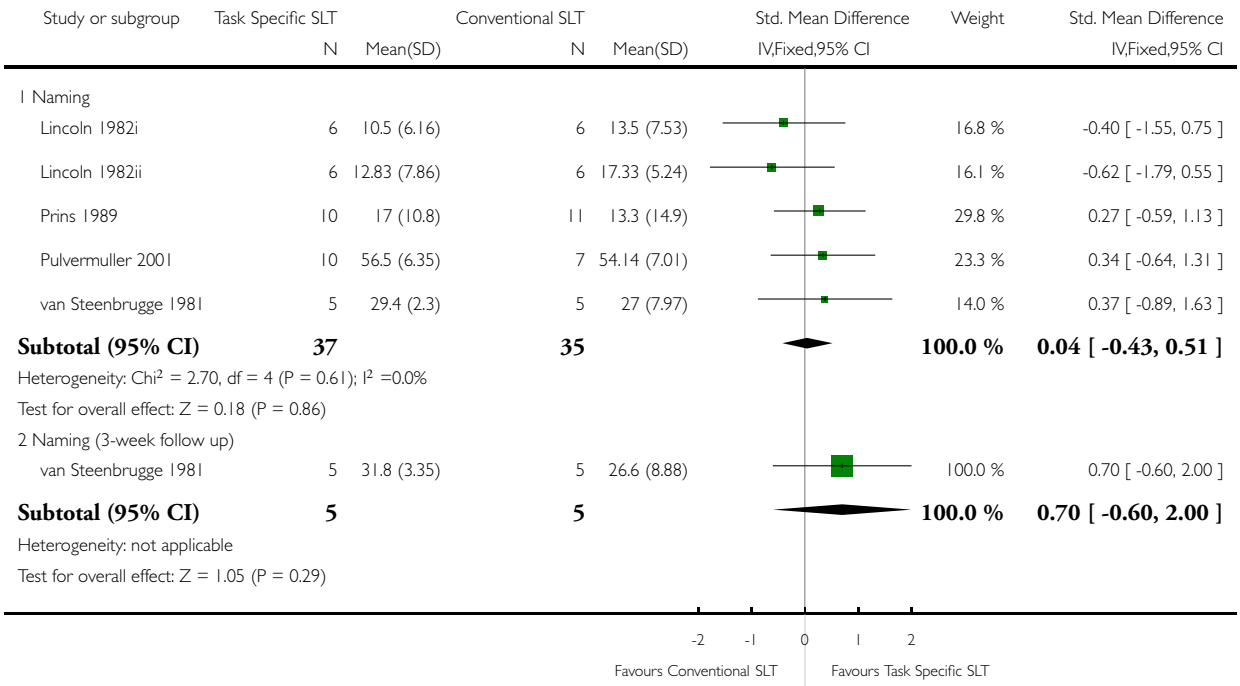
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Analysis 7.7. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 7 Expressive language: spoken naming.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 7 Expressive language: spoken naming



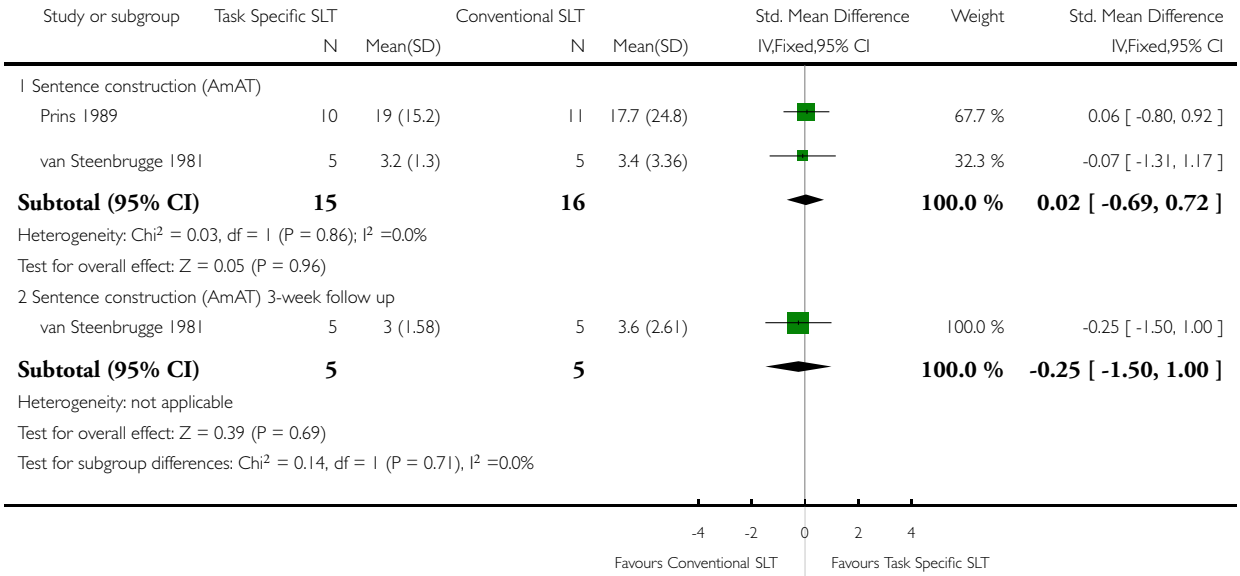
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Analysis 7.8. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 8 Expressive language: spoken sentence construction.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 8 Expressive language: spoken sentence construction



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Analysis 7.9. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 9 Expressive language: other spoken tasks.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 9 Expressive language: other spoken tasks

Study or subgroup	Task Specific SLT N	Mean(SD)	Conventional SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Word fluency							
Lincoln 1982i	6	8.83 (5.85)	6	16.5 (6.06)		47.8 %	-1.19 [-2.46, 0.08]
Lincoln 1982ii	6	14.5 (12.58)	6	24 (4.77)		52.2 %	-0.92 [-2.14, 0.30]
Subtotal (95% CI)	**12**		**12**			**100.0 %**	**-1.05 [-1.93, -0.17]**
Heterogeneity: Chi² = 0.09, df = 1 (P = 0.77); I² =0.0%							
Test for overall effect: Z = 2.34 (P = 0.019)							
2 Picture description							
Lincoln 1982i	6	38.83 (17.07)	6	30.67 (16.21)		52.8 %	0.45 [-0.70, 1.61]
Lincoln 1982ii	6	23 (18.55)	6	36.67 (4.89)		47.2 %	-0.93 [-2.15, 0.29]
Subtotal (95% CI)	**12**		**12**			**100.0 %**	**-0.20 [-1.04, 0.64]**
Heterogeneity: Chi² = 2.61, df = 1 (P = 0.11); I² =62%							
Test for overall effect: Z = 0.47 (P = 0.64)							
3 PICA verbal subtest							
Lincoln 1982i	6	11.33 (1.43)	6	10.61 (2.34)		35.4 %	0.34 [-0.80, 1.49]
Lincoln 1982ii	6	10.39 (2)	6	12.37 (0.95)		28.9 %	-1.17 [-2.43, 0.10]
Lincoln 1984b	6	5.09 (2.26)	6	5.61 (1.4)		35.7 %	-0.26 [-1.39, 0.88]
Subtotal (95% CI)	**18**		**18**			**100.0 %**	**-0.31 [-0.99, 0.37]**
Heterogeneity: Chi² = 3.02, df = 2 (P = 0.22); I² =34%							
Test for overall effect: Z = 0.88 (P = 0.38)							
Test for subgroup differences: Chi² = 2.29, df = 2 (P = 0.32), I² =13%							



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Analysis 7.10. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 10 Expressive language: spoken (treated items).

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 10 Expressive language: spoken (treated items)

Study or subgroup	Task Specific SLT N	Mean(SD)	Conventional SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Naming (treated)							
van Steenbrugge 1981	5	35 (5.15)	5	27 (8.16)		100.0 %	8.00 [-0.46, 16.46]
Subtotal (95% CI)	**5**		**5**			**100.0 %**	**8.00 [-0.46, 16.46]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.85 (P = 0.064)							
2 Sentence construction (treated)							
van Steenbrugge 1981	5	8 (2.74)	5	4.8 (4.02)		100.0 %	3.20 [-1.06, 7.46]
Subtotal (95% CI)	**5**		**5**			**100.0 %**	**3.20 [-1.06, 7.46]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.47 (P = 0.14)							
3 Naming (treated: 3-week follow up)							
van Steenbrugge 1981	5	33.2 (3.96)	5	27 (6.36)		100.0 %	6.20 [-0.37, 12.77]
Subtotal (95% CI)	**5**		**5**			**100.0 %**	**6.20 [-0.37, 12.77]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.85 (P = 0.064)							
4 Sentence construction (treated: 3-week follow up)							
van Steenbrugge 1981	5	7.6 (3.78)	5	3.6 (4.51)		100.0 %	4.00 [-1.16, 9.16]
Subtotal (95% CI)	**5**		**5**			**100.0 %**	**4.00 [-1.16, 9.16]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.52 (P = 0.13)							
Test for subgroup differences: Chi^2 = 1.31, df = 3 (P = 0.73), I^2 =0.0%							



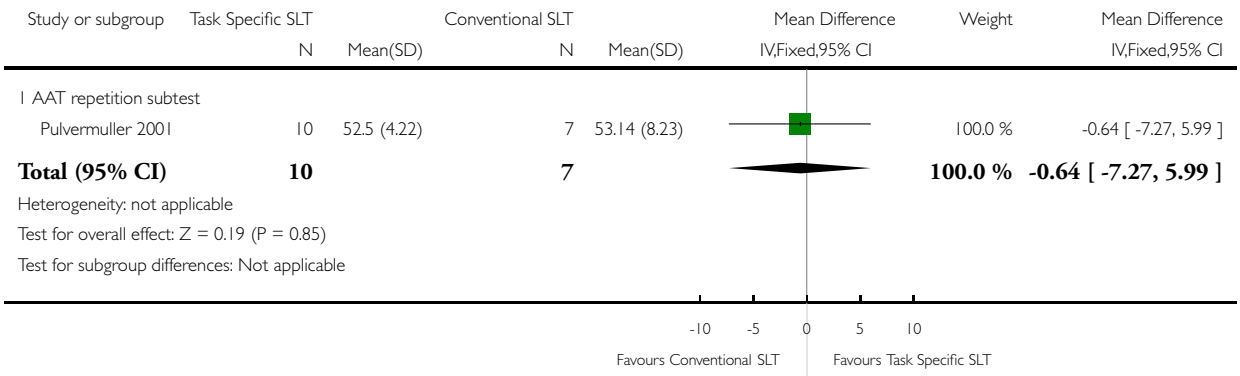
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Analysis 7.11. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 11 Expressive language: repetition.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 11 Expressive language: repetition

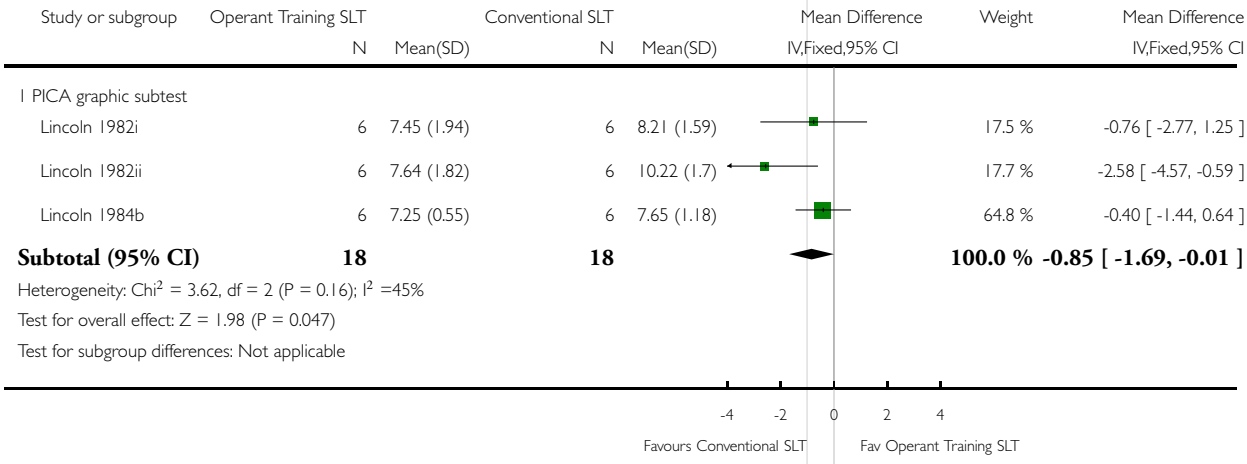


Analysis 7.12. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 12 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 12 Expressive language: written



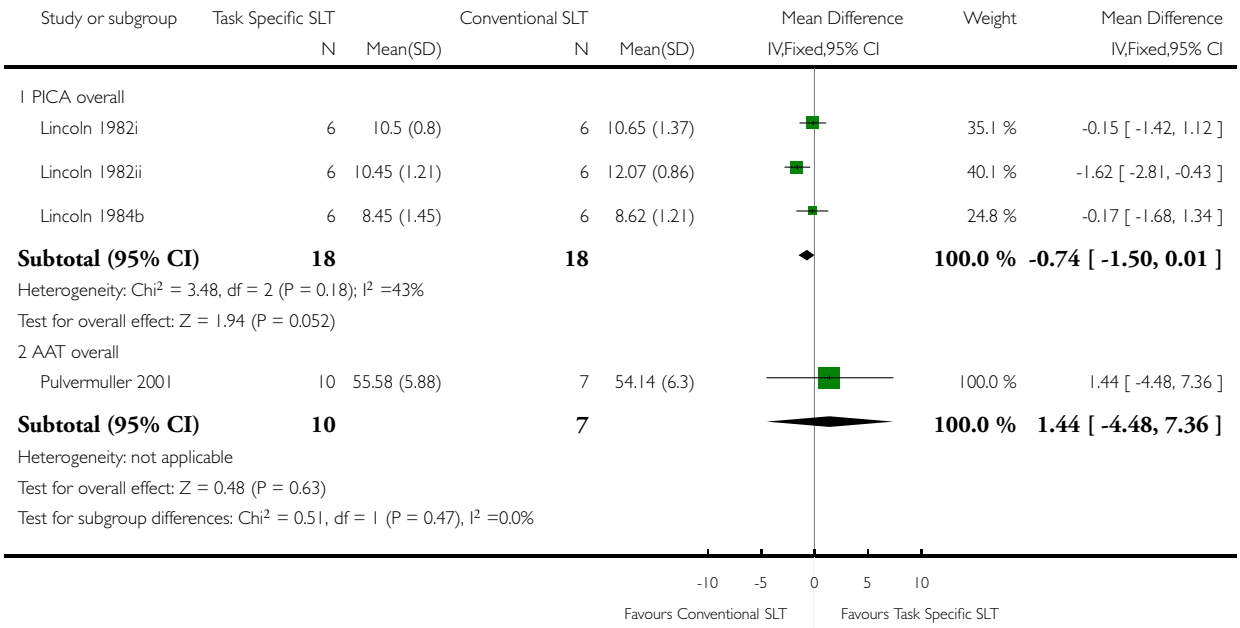
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Analysis 7.13. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 13 Severity of impairment.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 13 Severity of impairment



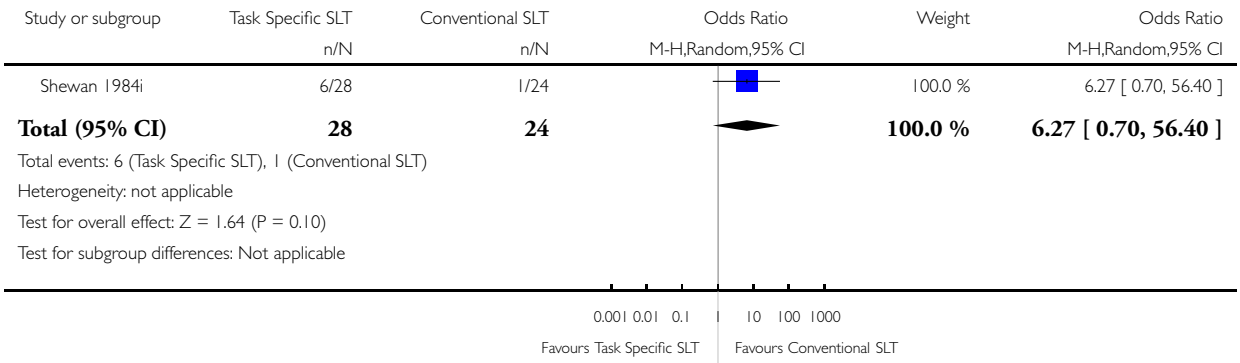
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Analysis 7.14. Comparison 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB), Outcome 14 Number of drop-outs for any reason.

Review: Speech and language therapy for aphasia following stroke

Comparison: 7 Task-specific SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 14 Number of drop-outs for any reason

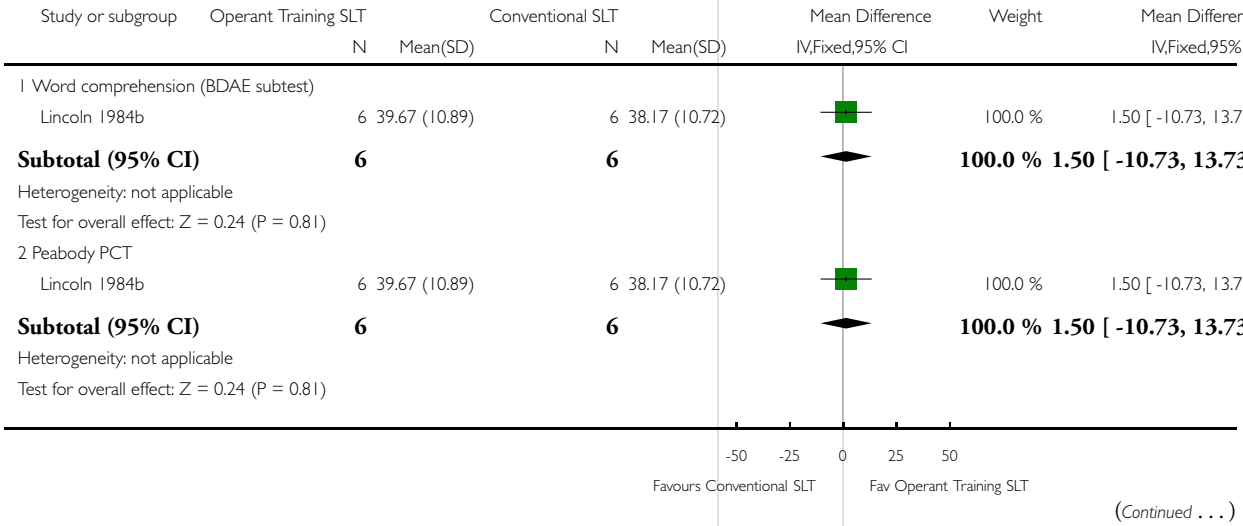


Analysis 8.1. Comparison 8 Operant training SLT (SLTA) versus conventional SLT (SLTB), Outcome 1 Receptive language: auditory comprehension.

Review: Speech and language therapy for aphasia following stroke

Comparison: 8 Operant training SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 1 Receptive language: auditory comprehension



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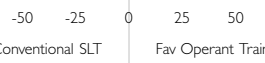
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Study or subgroup	Operant Training SLT N	Mean(SD)	Conventional SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
3 Token Test							
Lincoln 1982i	6	67.83 (14.82)	6	60.33 (17.24)		43.8 %	7.50 [-10.69, 25.69]
Lincoln 1982ii	6	62.5 (25.36)	6	66.33 (14.47)		26.5 %	-3.83 [-27.19, 19.53]
Lincoln 1984b	6	36.83 (21.24)	6	27.67 (17.61)		29.7 %	9.16 [-12.92, 31.24]
Subtotal (95% CI)	**18**		**18**			**100.0 %**	**4.99 [-7.05, 17.02]**

Heterogeneity: Chi² = 0.76, df = 2 (P = 0.68); I² =0.0%

Test for overall effect: Z = 0.81 (P = 0.42)

Test for subgroup differences: Chi² = 0.21, df = 2 (P = 0.90), I² =0.0%



Analysis 8.2. Comparison 8 Operant training SLT (SLTA) versus conventional SLT (SLTB), Outcome 2 Receptive language: other.

Review: Speech and language therapy for aphasia following stroke

Comparison: 8 Operant training SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 2 Receptive language: other

Study or subgroup	Operant Training SLT N	Mean(SD)	Conventional SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 PICA gestural subtest							
Lincoln 1982i	6	12.57 (0.4)	6	12.53 (1.25)		42.2 %	0.04 [-1.01, 1.09]
Lincoln 1982ii	6	12.58 (1.15)	6	13.26 (0.46)		47.4 %	-0.68 [-1.67, 0.31]
Lincoln 1984b	6	11.02 (2.16)	6	10.86 (1.54)		10.3 %	0.16 [-1.96, 2.28]
Subtotal (95% CI)	**18**		**18**			**100.0 %**	**-0.29 [-0.97, 0.39]**

Heterogeneity: Chi² = 1.15, df = 2 (P = 0.56); I² =0.0%

Test for overall effect: Z = 0.83 (P = 0.41)

Test for subgroup differences: Not applicable



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Analysis 8.3. Comparison 8 Operant training SLT (SLTA) versus conventional SLT (SLTB), Outcome 3 Expressive language: spoken.

Review: Speech and language therapy for aphasia following stroke

Comparison: 8 Operant training SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 3 Expressive language: spoken

Study or subgroup	Operant Training SLT N	Mean(SD)	Conventional SLT N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
1 Naming							
Lincoln 1982i	6	10.5 (6.16)	6	13.5 (7.53)		33.6 %	-0.40 [-1.55, 0.75]
Lincoln 1982ii	6	12.83 (7.86)	6	17.33 (5.24)		32.2 %	-0.62 [-1.79, 0.55]
Lincoln 1984b	6	0.83 (1.6)	6	0.5 (0.84)		34.2 %	0.24 [-0.90, 1.38]
Subtotal (95% CI)	**18**		**18**			**100.0 %**	**-0.25 [-0.92, 0.41]**
Heterogeneity: Chi² = 1.16, df = 2 (P = 0.56); I² =0.0%							
Test for overall effect: Z = 0.75 (P = 0.45)							
2 Word fluency							
Lincoln 1982i	6	8.83 (5.85)	6	16.5 (6.06)		47.8 %	-1.19 [-2.46, 0.08]
Lincoln 1982ii	6	14.5 (12.58)	6	24 (4.77)		52.2 %	-0.92 [-2.14, 0.30]
Subtotal (95% CI)	**12**		**12**			**100.0 %**	**-1.05 [-1.93, -0.17]**
Heterogeneity: Chi² = 0.09, df = 1 (P = 0.77); I² =0.0%							
Test for overall effect: Z = 2.34 (P = 0.019)							
3 Picture description							
Lincoln 1982i	6	38.83 (17.07)	6	30.67 (16.21)		52.8 %	0.45 [-0.70, 1.61]
Lincoln 1982ii	6	23 (18.55)	6	36.67 (4.89)		47.2 %	-0.93 [-2.15, 0.29]
Subtotal (95% CI)	**12**		**12**			**100.0 %**	**-0.20 [-1.04, 0.64]**
Heterogeneity: Chi² = 2.61, df = 1 (P = 0.11); I² =62%							
Test for overall effect: Z = 0.47 (P = 0.64)							
4 PICA verbal subtest							
Lincoln 1982i	6	11.33 (1.43)	6	10.61 (2.34)		35.4 %	0.34 [-0.80, 1.49]
Lincoln 1982ii	6	10.39 (2)	6	12.37 (0.95)		28.9 %	-1.17 [-2.43, 0.10]
Lincoln 1984b	6	5.09 (2.26)	6	5.61 (1.4)		35.7 %	-0.26 [-1.39, 0.88]
Subtotal (95% CI)	**18**		**18**			**100.0 %**	**-0.31 [-0.99, 0.37]**
Heterogeneity: Chi² = 3.02, df = 2 (P = 0.22); I² =34%							
Test for overall effect: Z = 0.88 (P = 0.38)							
Test for subgroup differences: Chi² = 2.57, df = 3 (P = 0.46), I² =0.0%							



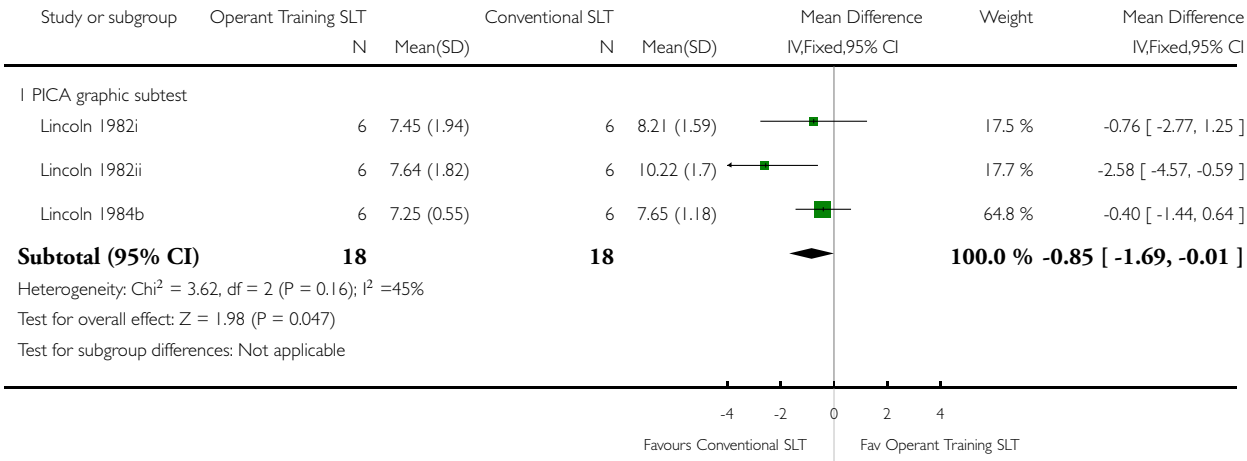
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Analysis 8.4. Comparison 8 Operant training SLT (SLTA) versus conventional SLT (SLTB), Outcome 4 Expressive language: written.

Review: Speech and language therapy for aphasia following stroke

Comparison: 8 Operant training SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 4 Expressive language: written

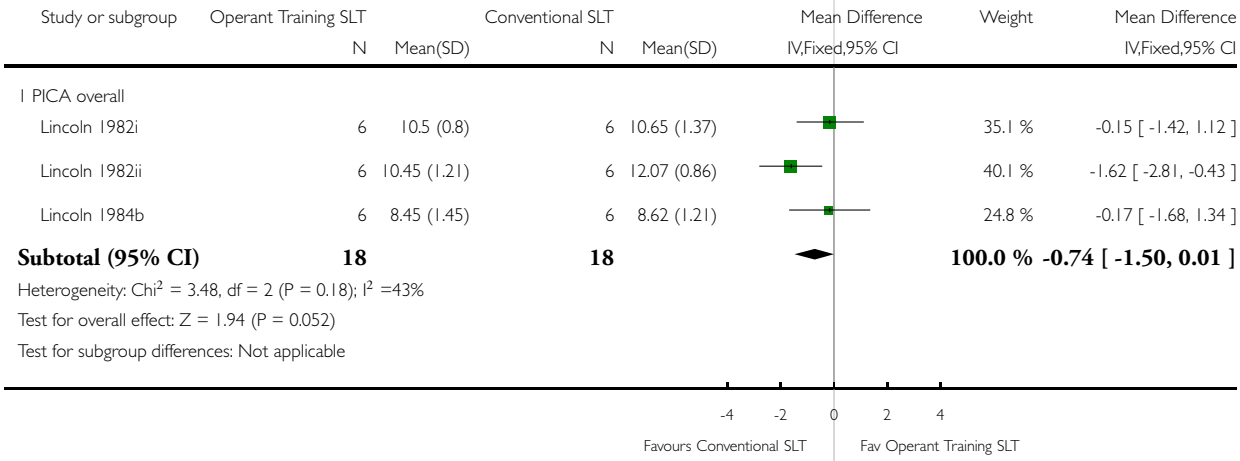


Analysis 8.5. Comparison 8 Operant training SLT (SLTA) versus conventional SLT (SLTB), Outcome 5 Severity of impairment.

Review: Speech and language therapy for aphasia following stroke

Comparison: 8 Operant training SLT (SLTA) versus conventional SLT (SLTB)

Outcome: 5 Severity of impairment



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Analysis 9.1. Comparison 9 Semantic SLT (SLTA) versus phonological SLT (SLT B), Outcome 1 Functional communication.

Review: Speech and language therapy for aphasia following stroke

Comparison: 9 Semantic SLT (SLTA) versus phonological SLT (SLT B)

Outcome: 1 Functional communication



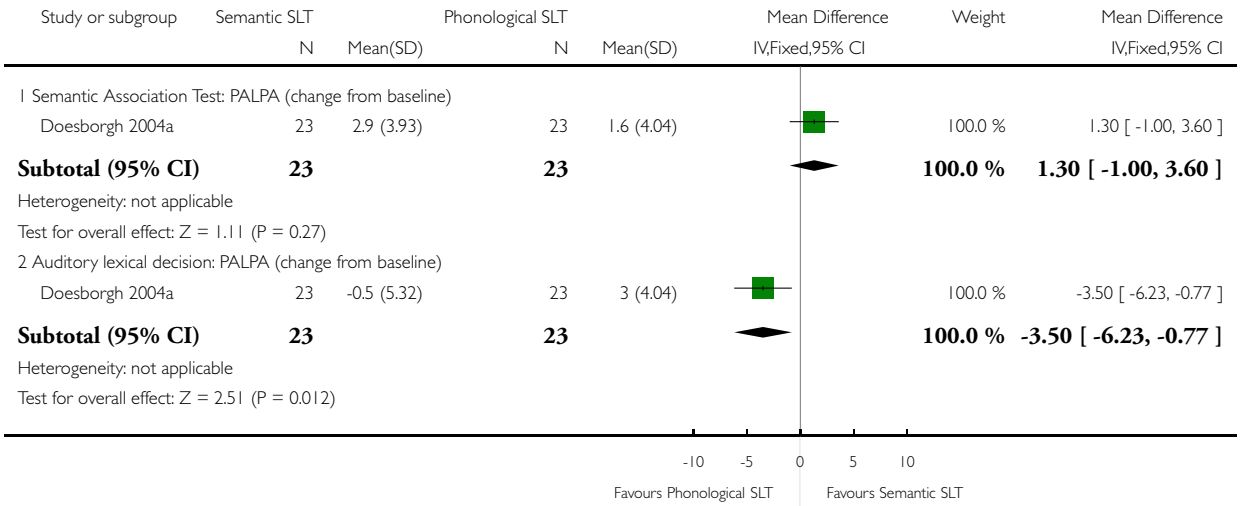
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Analysis 9.2. Comparison 9 Semantic SLT (SLTA) versus phonological SLT (SLT B), Outcome 2 Receptive language: auditory.

Review: Speech and language therapy for aphasia following stroke

Comparison: 9 Semantic SLT (SLTA) versus phonological SLT (SLT B)

Outcome: 2 Receptive language: auditory

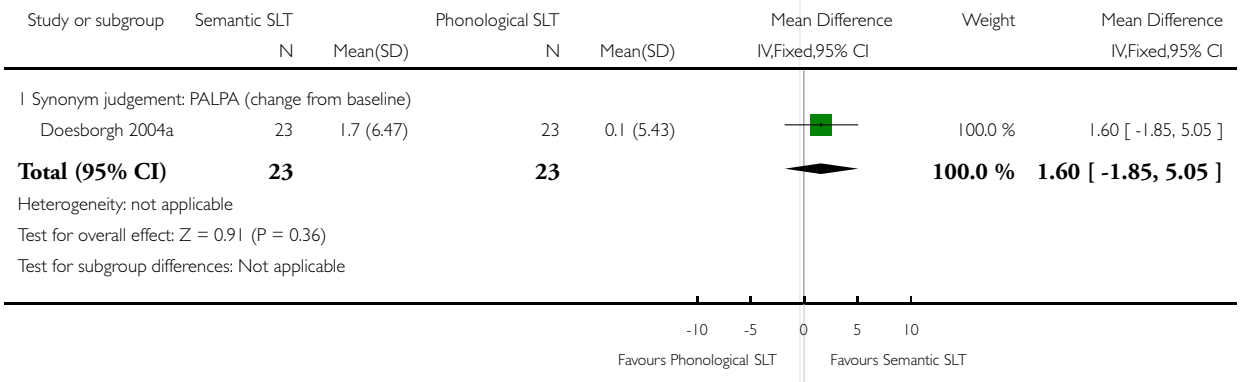


Analysis 9.3. Comparison 9 Semantic SLT (SLTA) versus phonological SLT (SLT B), Outcome 3 Receptive language: reading.

Review: Speech and language therapy for aphasia following stroke

Comparison: 9 Semantic SLT (SLTA) versus phonological SLT (SLT B)

Outcome: 3 Receptive language: reading



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Analysis 9.4. Comparison 9 Semantic SLT (SLTA) versus phonological SLT (SLT B), Outcome 4 Expressive language: repetition.

Review: Speech and language therapy for aphasia following stroke

Comparison: 9 Semantic SLT (SLTA) versus phonological SLT (SLT B)

Outcome: 4 Expressive language: repetition

Study or subgroup	Semantic SLT N	Mean(SD)	Phonological SLT N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Non-words: PALPA (change from baseline)							
Doesborgh 2004a	23	1.3 (5.66)	23	3 (3.81)		100.0 %	-1.70 [-4.49, 1.09]
Subtotal (95% CI)	**23**		**23**			**100.0 %**	**-1.70 [-4.49, 1.09]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.19 (P = 0.23)							



Analysis 9.5. Comparison 9 Semantic SLT (SLTA) versus phonological SLT (SLT B), Outcome 5 Number of drop-outs for any reason.

Review: Speech and language therapy for aphasia following stroke

Comparison: 9 Semantic SLT (SLTA) versus phonological SLT (SLT B)

Outcome: 5 Number of drop-outs for any reason

Study or subgroup	Semantic SLT n/N	Phonological SLT n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Doesborgh 2004a	6/29	6/29		100.0 %	1.00 [0.28, 3.56]
Total (95% CI)	**29**	**29**		**100.0 %**	**1.00 [0.28, 3.56]**
Total events: 6 (Semantic SLT), 6 (Phonological SLT)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.0 (P = 1.0)					



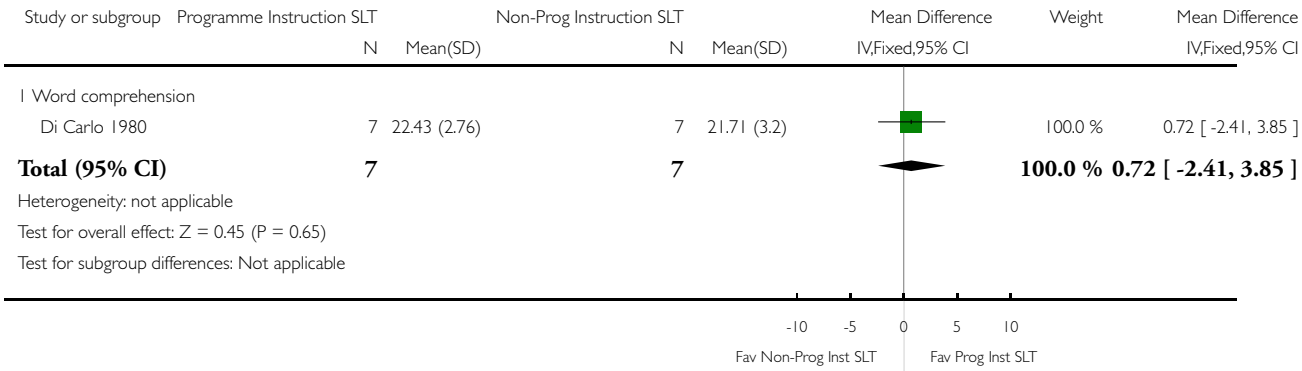
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Analysis 10.1. Comparison 10 Filmed programmed instruction SLT (SLT A) versus non-programmed activity SLT (SLTB), Outcome 1 Receptive language: auditory.

Review: Speech and language therapy for aphasia following stroke

Comparison: 10 Filmed programmed instruction SLT (SLT A) versus non-programmed activity SLT (SLTB)

Outcome: 1 Receptive language: auditory

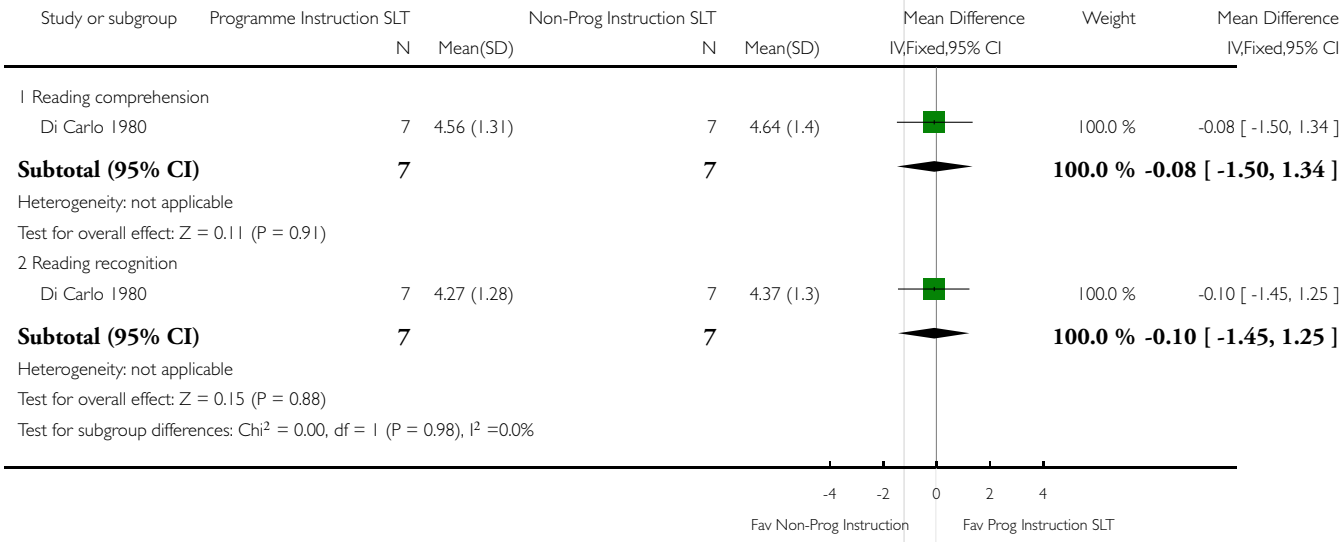


Analysis 10.2. Comparison 10 Filmed programmed instruction SLT (SLT A) versus non-programmed activity SLT (SLTB), Outcome 2 Receptive language: reading.

Review: Speech and language therapy for aphasia following stroke

Comparison: 10 Filmed programmed instruction SLT (SLT A) versus non-programmed activity SLT (SLTB)

Outcome: 2 Receptive language: reading



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ADDITIONAL TABLES

Table 1. Characteristics of participants in included studies

Study ID	Number	Male/female	Age in years mean (standard deviation)	Post-onset mean (standard deviation) (range)	Aphasia severity mean (standard deviation)
Bakheit 2007	97	Intensive: 26/25 Conventional: 21/25	Intensive: 71.2 (14.9) (range 26 to 92) Conventional: 69.7 (15) (range 17 to 91)	Intensive: 34.2 (19.1) days Conventional: 28.1 (14.9) days	WAB scores Intensive: 44.2 (30.2) Conventional: 37.9 (27.2)
David 1982	133 (of 155 randomised)	Conventional: 35/30 Social support: 42/26	Conventional: 70 (8.7) Social support: 65 (10.6)	Conventional: median 4 (range 4 to 266) weeks Social support: median 5 (range 4 to 432) weeks	Not reported
Denes 1996	17	Intensive: 5/3 Conventional: 3/6	Intensive: 58.1 (11.8) Conventional: 62.1 (8.7)	Intensive: 3.2 (1.8) months Conventional: 3 (1.6) months	AAT Intensive: severe Conventional: severe
Di Carlo 1980	14	Programmed instruction: 7/0 Non-programmed instruction: 7/0	Programmed instruction: 57.6 (9.2) (range 44 to 69) Non-programmed instruction: 55.3 (13) (range 32 to 70)	Programmed instruction: 24.7 (23.6) (range 0 to 66) months Non-programmed instruction: 16.3 (16.9) (range 1 to 38) months	Programmed instruction: severe Non-programmed instruction: severe
Doesborgh 2004a	58	Semantic: 18/11 Phonologic: 15/14	Semantic: 66 (10) Phonologic: 58 (14)	Semantic: mean 4 (range 3 to 5) months Phonologic: mean 4 (range 3 to 5) months	ANELT-A score Semantic: 24.8 (11) Phonologic: 23.3 (8)
Doesborgh 2004b	18 (of 19 randomised)	Computer-mediated: 4/4 No SLT: 5/5	Computer-mediated: 62 (9.0) No SLT: 65 (12.0)	Computer-mediated: 13 (range 11 to 16) months No SLT: 13 (range 11 to 17) months	Computer-mediated: ANELT- A 34 (9); BNT 63 (37) No SLT: ANELT-A 29 (12); BNT 74

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Table 1. Characteristics of participants in included studies (*Continued*)

					(35)
Drummond 1981	8	Not reported	Gesture cue: 52.9 (6.0) Conventional: 50.04 (4.5)	Gesture cue: 15.3 (4.1) (range 10 to 20) months Conventional: 17.8 (7.1) (range 9 to 24) months	Not reported
Elman 1999	24	Conventional: 7/5 Social support: 6/6	Conventional: 58.3 (11.4) (range 38 to 79) Social support: 60.7 (10.6) (range 47 to 80)	Conventional: 32.5 (28.7) (range 7 to 103) months Social support: 71.7 (94.2) (range 7 to 336) months	Conventional: SPICA 7 mild-moderate, 7 moderate to severe Social support: SPICA 7 mild-moderate, 7 moderate to severe
Hinckley 2001	12	Functional SLT: 5/1 Conventional SLT: 6/0	Functional: 51.6 (15) Conventional: 50.3 (13.6)	Functional: 26.8 (20.1) (range 6 to 58) months Conventional: 26.8 (37.6) (range 4 to 102) months	BDAE Severity Rating Functional: 2.5 (0.8) Conventional: 1.83 (0.9)
Jufeng 2005i	60	Group SLT: unclear No SLT: unclear (Jufeng 2005: 50/34)	Group SLT: unclear No SLT: unclear (Jufeng 2005: < 40 years = 3; 40s = 23; 50s = 23; 60s = 25; 70s = 8; > 80 years = 2)	Unclear	Unclear
Jufeng 2005ii	54	Group SLT: unclear No SLT: unclear (Jufeng 2005: 50/34)	Group SLT: unclear No SLT: unclear (Jufeng 2005: < 40 years = 3; 40s = 23; 50s = 23; 60s = 25; 70s = 8; > 80 years = 2)	Unclear	Unclear
Jufeng 2005iii	54	Group SLT: unclear No SLT: unclear (Jufeng 2005: 50/34)	Group SLT: unclear No SLT: unclear (Jufeng 2005: < 40 years = 3; 40s = 23; 50s = 23; 60s = 25; 70s = 8; > 80 years = 2)	Unclear	Unclear

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Table 1. Characteristics of participants in included studies (*Continued*)

Katz 1997i	42 (reported data on 36)	Computer-mediated: unclear No SLT: unclear (Katz 1997: 44/11)	Computer-mediated: 61.6 (10) No SLT: 62.8 (5.1)	Computer-mediated: 6.2 (5.2) years No SLT: 8.5 (5.4) years	Not reported
Katz 1997ii	40 (of 42 randomised)	Computer-mediated: unclear Computer placebo: unclear (Katz 1997: 44/11)	Computer-mediated: 61.6 (10) Computer placebo: 66.4 (6)	Compute-mediated: 6.2 (5.2) years Computer placebo: 5.4 (4.6) years	Not reported
Leal 1993	94	Conventional: 38/21 Volunteer-facilitated: 22/13	Conventional: 56 (17) Volunteer-facilitated: 59 (13)	Within first month after stroke	Conventional: moderate-severe Volunteer-facilitated: moderate-severe
Lincoln 1982i	12	SLT/operant train: 3/3 SLT/Social support: 4/2	SLT/Operant train: 54.33 (6.68) (range 45 to 63) SLT/Social support: 51.33 (7.97) (range 39 to 63)	SLT/Operant train: 3.17 (1.60) (range 1 to 5) months SLT/Social support: 5.17 (3.43) (range 1 to 10) months	SLT/Operant train: moderate SLT/Social support: moderate
Lincoln 1982ii	12	Operant train/SLT: 5/1 Social support/SLT: 5/1	Operant train/SLT: 57.67 (5.72) (range 51 to 64) Social support/SLT: 42.33 (16.91) (range 28 to 60)	Operant train/SLT: 2.33 (1.55) (range 1 to 5) months Social support/SLT: 8.83 (13.59) (range 1 to 36) months	Operant train/SLT: moderate Social support/SLT: moderate
Lincoln 1982iii	18	Conventional SLT: 7/5 Social support: 5/1	Conventional SLT: 52.83 (7.18) (range 39 to 63) Social support: 42.33 (16.91) (range 28 to 60)	Conventional SLT: 4.17 (2.76) (range 1 to 10) Social support: 8.83 (13.59) (range 1 to 36) months	Conventional SLT: moderate Social support: moderate
Lincoln 1984a (Data for 58% of randomised participants)	191 (of 327 randomised)	Conventional: unclear No SLT: unclear (Lincoln 1984a: 109/ 82)	Conventional: unclear No SLT: unclear Lincoln 1984a: 68.2 (10.2) (range 38 to 92)	Conventional: 10 weeks No SLT: 10 weeks	Not reported
Lincoln 1984b	12	Operant train: 4/2 Placebo: 5/1	Operant train: 52.33 (11.50)	Operant train: 5.5 (4.89) (range 1 to	Operant train: severe

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Table 1. Characteristics of participants in included studies (*Continued*)

			(range 32 to 64) Placebo: 52.5 (14.9) (range 26 to 66)	12) months Placebo: 2.83 (2.32) (range 1 to 7) months	Placebo: severe
Lyon 1997	30	Functional: unclear No SLT: unclear (Lyon 1997: person with aphasia: 8/2; caregiver: 4/6; communication partner: 1/9)	Functional: unclear No SLT: unclear (Lyon 1997: person with aphasia: 68.6 (12.1) (range 54 to 86); caregiver 60.2 (14.9) (range 28 to 84); communication partner: 44.9 (17.5) (range 25 to 74))	Functional: unclear No SLT: unclear (Lyon 1997: 43.5 (32.2) months)	Functional: unclear No SLT: unclear (Lyon 1997: receptive = mild; expressive = moderate)
MacKay 1988	95 (of 96 randomised)	MacKay 1988: 46/49	MacKay 1988: median 75	MacKay 1988: mean 30 months	Not reported
Meikle 1979	31	Volunteer-facilitated: 12/3 Conventional: 10/6	Volunteer-facilitated: 67.2 (8.6) Conventional: 64.8 (7.9)	Volunteer-facilitated: 30.9 (29.5) (range 4 to 115) weeks Conventional: 39.8 (69.4) (range 4 to 268) weeks	PICA percentile Volunteer-facilitated: 53.9 (23.5) Conventional: 55.8 (19.78)
Meinzer 2007	20	Constraint-induced: 7/3 Volunteer-facilitated: 9/1	Constraint-induced: 50.2 (10.13) Volunteer-facilitated: 62 (8.9)	Constrain-induced: 30.7 (18.9) (range 6 to 72) months Volunteer-facilitated: 46.5 (17.2) (range 24 to 79) months	AAT profile score Constraint-induced: 5 mild, 3 moderate, 2 severe Volunteer-facilitated: 3 mild, 6 moderate, 1 severe
ORLA 2006	13	Intensive SLT: 6 Conventional SLT: 7	Intensive SLT: 61.4 (9.72) (range 48.44 to 74.5) Conventional SLT: 53.1 (18.1) (range 31.34 to 77.98).	Intensive SLT: 36.2 (28.2) (range 8.6 to 69.8) months Conventional SLT: 43.6 (51.1) (range 7.3 to 154) months	WAB Aphasia Quotient Intensive SLT: 51.1 (17.8) (range 28.0 to 69.4) Conventional SLT: 55.1 (18) (range 34.1 to 77.1)
Prins 1989	21	STADCAP: 5/5 Conventional: 5/6	STADCAP: 70.3 (range 58 to 83) Conventional: 66 (range 45 to 78)	STADCAP: 15.2 (range 3 to 35) months Conventional: 15.2	STADCAP: FE-scale 2.6 (0 to 6), Oral comp (BDAE and Token

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Table 1. Characteristics of participants in included studies (*Continued*)

				(range 3 to 36) months	Test) 26.4 (0 to 46) Conventional: FE-scale 2.7 (0 to 9), Oral comp (BDAE and Token Test) 29.6 (2 to 48)
Pulvermuller 2001	17	Constraint-induced: 6/4 Conventional: 6/1	Constraint-induced: 55.4 (10.9) Conventional: 53.9 (7.4)	Constraint-induced: 98.2 (74.2) months Conventional: 24 (20.6) months	Constraint-induced: 2 mild, 5 moderate, 3 severe Conventional: 2 mild, 4 moderate, 1 severe
Rochon 2005	5	Sentence mapping: 0/3 Social support: 0/2	Sentence mapping: 31 to 74 Social support: 32 to 82	Sentence mapping: (range 2 to 9) years Social support: (range 2 to 4) years	Sentence mapping: BDAE 1 to 2, phrase length 2.5 to 4 Social support: BDAE 1 to 2, phrase length 4
Shewan 1984i	52	Language-orientated: 18/10 Conventional: 14/10	Language-orientated: 62.18 (range 29 to 82) Conventional: 65.63 (range 48 to 85)	Language-orientated: (range 2 to 4) weeks Conventional: (range 2 to 4 weeks)	Language-orientated: 9 mild, 6 moderate, 13 severe Conventional: 8 mild, 3 moderate, 13 severe
Shewan 1984ii	53	Language-orientated: 18/10 Social support: 14/11	Language-orientated: 62.18 (range 29 to 82) Social support: 66.12 (range 39 to 82)	Language-orientated: (range 2 to 4) weeks Social support: (range 2 to 4) weeks	Language-orientated: 9 mild, 6 moderate, 13 severe Social support: 7 mild, 5 moderate, 13 severe
Shewan 1984iii	49	Conventional: 14/10 Social support: 14/11	Conventional: 65.63 (range 48 to 85) Social support: 66.12 (range 39 to 82)	Conventional: (range 2 to 4) weeks Social support: (range 2 to 4) weeks	Conventional: 8 mild, 3 moderate, 13 severe Social support: 7 mild, 5 moderate, 13 severe
Smania 2006	33 (of 41 randomised)	Conventional: 11/4 No SLT: 12/6	Conventional: 65.73 (8.78) (range 48 to 77) No SLT: 65.67 (9.83) (range 41 to 77)	Conventional: 17.4 (24.07) (range 2 to 36) months No SLT: 10.39 (7.96) (range 3 to 32) months	Aphasia severity: unclear Neurological severity: Conventional: 6.07 (4.3) (range 0 to16) No SLT: 6.94 (5.83)

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Table 1. Characteristics of participants in included studies (*Continued*)

					(range 0 to 15)
Smith 1981i	33	Intensive: 12/4 No SLT: 10/7	Intensive: 62 No SLT: 65	Not reported	MTDDA (mean error score percentage) Intensive: 39 No SLT: 26
Smith 1981ii	31	Conventional: 10/4 No SLT : 10/7	Conventional: 63 No SLT: 65	Not reported	MTDDA (mean error score percentage) Conventional: 44 No SLT: 26
Smith 1981iii	30	Intensive: 12/4 Conventional: 10/4	Intensive: 62 Conventional: 63	Not reported	MTDDA (mean error score percentage) Intensive: 39 Conventional: 44
van Steenbrugge 1981	10	Task-specific: 0/5 Conventional: 2/3	Task-specific: 61.8 (17.05) (range 40 to 77) Conventional: 63.6 (10.9) (range 48 to 77)	Task-specific: 21 (22.4) (range 5 to 60) months Conventional: 20.6 (23.7) (range 5 to 60) months	FE-scale and M-S Comprehension Test Task-specific: 4 (1.9) Conventional: 6 (2.9)
Wertz 1981	67	Not reported	(15 weeks after stroke) Group SLT: 60.24 (range 40 to 79) Conventional: 57.07 (range 41 to 79)	Group SLT: 4 weeks Conventional: 4 weeks	(15 weeks after stroke) PICA overall percentile Group SLT: 45.21 (range 15 to 74) Conventional: 45.62 (range 16 to 74)
Wertz 1986i	78	Conventional: unclear No SLT: unclear	Conventional: 59.2 (6.7) No SLT: 57.2 (6.8)	Conventional: 6.6 (4.8) weeks No SLT: 7.8 (6.6) weeks	PICA overall percentile Conventional: 46.59 (16.05) No SLT: 49.18 (19.46)
Wertz 1986ii	83	Volunteer-facilitated: 37/6 No SLT: unclear	Volunteer-facilitated: 60.2 (6.7) No SLT: 57.2 (6.8)	Volunteer-facilitated: 7.1 (5.8) weeks No SLT: 7.8 (6.6)	PICA overall percentile Volunteer-facilitated: 49.97

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Table 1. Characteristics of participants in included studies (*Continued*)

				weeks	(22.77) No SLT: 49.18 (19.46)
Wertz 1986iii	81	Volunteer-facilitated: 37/6 Conventional: unclear	Volunteer-facilitated:60.2 (6.7) Conventional: 59.2 (6.7)	Volunteer-facilitated: 7.1 (5.8) weeks Conventional: 6.6 (4.8) weeks	PICA overall percentile Volunteer-facilitated: 49.97 (22.77) Conventional: 46.59 (16.05)
Wu 2004	236	Conventional: unclear No SLT: unclear (Wu 2004: 159/ 77)	Conventional: (range 39 to 81) No SLT: (range 40 to 78)	Not reported	Not reported

AAT: Aachen Aphasia Test
ANELT: Amsterdam-Nijmegen Everyday Language Test
BDAE: Boston Diagnostic Aphasia Examination
BNT: Boston Naming Test
FE-scale: Functional-Expression scale
MTDDA: Minnesota Test for the Differential Diagnosis of Aphasia
PICA: Porch Index of Communicative Abilities
SLT: speech and language therapy/therapist
SPICA: Shortened Porch Index of Communicative Abilities
STACDAP: systematic therapy for auditory comprehension disorders in aphasic patients
WAB: Western Aphasia Battery

Table 2. Details of drop-outs

Study ID	Intervention	Reasons	Follow up	Reasons
Bakheit 2007	Intensive: 16 Conventional: 8	Intensive: 2 died, 14 withdrew Conventional: 8 withdrew (Across trial: withdrew 13, died 4, illness 4, not tolerating therapy 3, relocation 2, further stroke 1, diagnosis revised 1)	Intensive: 4 Conventional: 3	Not reported
David 1982	Conventional: 23 Social support: 36	Conventional: 4 died; 5 new stroke; 2 self discharge; 5 illness , 3 moved, 4 other Social support: 6 died, 5	Conventional: 11 Social support: 12	Not reported

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Table 2. Details of drop-outs (*Continued*)

		new stroke, 5 transport, 6 self-discharge, 3 illness, 4 volunteer issues, 2 relocated, 5 other undescribed		
Doesborgh 2004a	Semantic: 6 Phonological: 6	Semantic: 4 received less than 40 hours treatment, 2 severe neurological illness Phonological: 2 received less than 40 hours treatment, 1 severe neurological illness, 3 ANELT score missing (2 refused, 1 missing)	No follow up	
Doesborgh 2004b	Computer-mediated: 1 No SLT: 0	Computer-mediated: 1 illness No SLT: 0	No follow up	
Elman 1999	Conventional: 2 Social support: 3	Conventional: 1 transport, 1 time constraints, 1 medical complications Social support: 2 time constraints	Conventional: 0 Social support: 0	
Katz 1997i	Computer-mediated: 0 No SLT: 6	Prolonged illness, new stroke, death	Computer-mediated: 0 No SLT: 0	
Katz 1997ii	Computer-mediated: 0 No SLT (computer placebo): 2	Prolonged illness, new stroke, death	Computer-mediated: 0 No SLT (computer placebo): 0	
Leal 1993	Conventional: 21 Volunteer-facilitated: 13	Conventional: 2 death, 3 new stroke, 3 transport; 4 refused, 2 moved, 5 illness, 2 transfer Volunteer-facilitated: 1 death, 1 new stroke, 3 transport, 4 refused, 2 moved, 0 illness, 2 transfer	Conventional: 0 Volunteer-facilitated: 0	
Lincoln 1982i	Social support: ? Operant training: ? (13: groups unclear)	Homesickness, illness	No follow up	
Lincoln 1982ii	Social support: ? Operant training: ?	Homesickness, illness	No follow up	

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Table 2. Details of drop-outs (*Continued*)

	(13: groups unclear)			
Lincoln 1982iii	Social support: ? Operant training: ? (13: groups unclear)	Homesickness, illness	No follow up	
Lincoln 1984a	Conventional: 78 No SLT: 79	Death, refused, illness, recovered, unsuitable, relocated	No follow up	
MacKay 1988	Volunteer-facilitated: 0 No SLT: 1	Reason not reported	No follow up	
Meikle 1979	Conventional: 0 Volunteer-facilitated: 2	Conventional: 0 Volunteer-facilitated: 1 refused, 1 moved	No follow up	
Shewan 1984i	Language orientated: 6 Conventional: 1	Language orientated: 1 death, 2 relocation, 3 withdrew Conventional: 1 death	No follow up	
Shewan 1984ii	Language orientated: 6 Social support: 6	Language orientated: 1 death, 2 relocation, 3 withdrew Social support: 1 death, 2 illness, 1 relocation, 2 withdrew	No follow up	
Shewan 1984iii	Conventional: 1 Social support: 6	Conventional: 1 death Social support: 1 death, 2 illness, 1 relocation, 2 withdrew	No follow up	
Smania 2006	Conventional: 5 No SLT: 3	Conventional: 3 unco-operative, 2 illness No SLT: 1 unco-operative, 2 illness	Conventional: 7 No SLT: 9	Conventional: 3 illness, 4 refused No SLT: 1 death, 2 illness, 4 refused, 2 relocated
Smith 1981i	Intensive: 6 No SLT: not reported	Reasons not detailed Additional 5 withdrawn but not advised of groupings	Intensive: 4 No SLT: not reported	Not reported
Smith 1981ii	Conventional: 2 No SLT: not reported	Reasons not detailed Additional 5 withdrawn but not advised of groupings	Conventional: 4 No SLT: not reported	Not reported

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Table 2. Details of drop-outs (*Continued*)

Smith 1981iii	Intensive: 6 Conventional: 2	Reasons not detailed Additional 5 withdrawn but not advised of groupings	Intensive: 4 Conventional: 4	Not reported
Wertz 1981	Group: 17 Conventional: 16	22 self-discharged (return home or declined to travel), 4 illness, 2 stroke, 3 died, 2 returned to work	No follow up	
Wertz 1986i	Conventional: 7 No SLT: 5	Illness, new stroke	Conventional: 2 No SLT: 6	Illness, new stroke
Wertz 1986ii	Volunteer-facilitated: 6 No SLT: 5	Illness, new stroke	Volunteer-facilitated: 1 No SLT: 6	Illness, new stroke
Wertz 1986iii	Conventional: 7 Volunteer-facilitated: 6	Illness, new stroke	Conventional: 2 Volunteer-facilitated: 1	Illness, new stroke

ANELT: Amsterdam-Nijmegen Everyday Language Test
SLT: speech and language therapy

APPENDICES

Appendix 1. MEDLINE search strategy

1. exp aphasia/
2. language disorders/ or anomia/
3. (aphasi$ or dysphasi$ or anomia or anomic).tw.
4. ((language or linguistic) adj5 (disorder$ or impair$ or problem$ or dysfunction)).tw.
5. 1 or 2 or 3 or 4
6. language therapy/ or speech therapy/
7. Speech-Language Pathology/
8. ((speech or language or aphasia or dysphasia) adj5 (therap$ or train$ or rehabilitat$ or treat$ or remediat$ or pathol$)).tw.
9. remedial therap$.tw.
10. 6 or 7 or 8 or 9
11. 5 and 10
12. exp aphasia/rh, th or language disorders/rh, th or anomia/rh, th
13. 11 or 12
14. Randomized Controlled Trials/
15. random allocation/
16. Controlled Clinical Trials/
17. control groups/
18. clinical trials/
19. double-blind method/

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20. single-blind method/
21. Multicenter Studies/
22. Therapies, Investigational/
23. Research Design/
24. Program Evaluation/
25. evaluation studies/
26. randomized controlled trial.pt.
27. controlled clinical trial.pt.
28. clinical trial.pt.
29. multicenter study.pt.
30. evaluation studies.pt.
31. random$.tw.
32. (controlled adj5 (trial$ or stud$)).tw.
33. (clinical$ adj5 trial$).tw.
34. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
35. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
36. ((multicenter or multicentre or therapeutic) adj5 (trial$ or stud$)).tw.
37. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
38. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
39. (coin adj5 (flip or flipped or toss$)).tw.
40. latin square.tw.
41. versus.tw.
42. (assign$ or alternate or allocat$ or counterbalance$ or multiple baseline).tw.
43. controls.tw.
44. or/14-43
45. 13 and 44
46. child$.ti.
47. 45 not 46

Appendix 2. CINAHL search strategy

1. aphasia/ or aphasia, broca/ or aphasia, wernicke/
2. Language Disorders/
3. (aphasi$ or dysphasi$ or anomia or anomic).tw.
4. ((language or linguistic) adj5 (disorder$ or impair$ or problem$ or dysfunction)).tw.
5. 1 or 2 or 3 or 4
6. "rehabilitation, speech and language"/ or "alternative and augmentative communication"/ or language therapy/ or exp speech, alaryngeal/ or speech therapy/
7. Speech-Language Pathology/ or communication skills training/
8. Speech-Language Pathologists/
9. ((speech or language or aphasia or dysphasia) adj5 (therap$ or train$ or rehabilitat$ or treat$ or pathol$)).tw.
10. 6 or 7 or 8 or 9
11. 5 and 10
12. language disorders/rh, th or aphasia/rh, th or aphasia, broca/rh, th or aphasia, wernicke/rh, th
13. 11 or 12
14. random assignment/
15. random sample/
16. Crossover design/
17. exp Clinical trials/
18. Comparative studies/
19. "control (research)"/
20. Control group/

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21. Factorial design/
22. quasi-experimental studies/
23. Nonrandomized trials/
24. Clinical nursing research/ or Clinical research/
25. Community trials/ or Experimental studies/ or One-shot case study/ or Pretest-posttest design/ or Solomon four-group design/ or Static group comparison/ or Study design/
26. "clinical trial".pt.
27. random$.tw.
28. ((singl$ or doubl$ or tripl$ or trebl$) adj25 (blind$ or mask$)).tw.
29. (cross?over or control$ or factorial or sham?).tw.
30. ((clin$ or intervention$ or compar$ or experiment$ or therapeutic) adj10 trial$).tw.
31. (assign$ or alternate or allocat$ or counterbalance$ or multiple baseline$ or ABAB design$).tw.
32. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
33. or/14-32
34. 13 and 33
35. 34 not child$.ti.

Appendix 3. Speech and Language Therapy approaches

Type of SLT	Speech and Language Therapy	Study ID
Conventional	Any form of targeted practice tasks or methodologies that aim to maximise the understanding and production of language and communication abilities across spoken and written modalities. Generally conducted on a patient-therapist (1-to-1) basis and using stimulation-facilitation approaches	Bakheit 2007; David 1982; Denes 1996; Di Carlo 1980; Elman 1999; Drummond 1981; Hinckley 2001; (Jufeng 2005ii; Jufeng 2005iii) ; Leal 1993; Lincoln 1982i; Lincoln 1984a; Lincoln 1984b; Meikle 1979; Prins 1989; Pulvermuller 2001; Shewan 1984i; Shewan 1984iii; Smania 2006; Smith 1981i; Smith 1981ii; Smith 1981iii; van Steenbrugge 1981; Wertz 1981; Wertz 1986i; Wertz 1986iii; (Wu 2004)
Computer-mediated	Targeted practice tasks or methodologies that aim to improve a patient's language or communication abilities but that are accessed via a computer program	Doesborgh 2004b; Katz 1997i; Katz 1997ii; ORLA 2006
Constraint-induced	Participants required to use spoken communication alone Other communicative methods such as gesture are not encouraged or permitted	Meinzer 2007; Pulvermuller 2001
Functional	Targets improvement in communication tasks considered to be useful in day-to-day functioning	Denes 1996; Elman 1999; Hinckley 2001; Lyon 1997
Gestural cueing	Use of gesture as a cue to facilitate word-finding	Drummond 1981 (AMERIND)

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(*Continued*)

Group	A SLT intervention involving 2 or more participants with aphasia	Elman 1999; Jufeng 2005i; Jufeng 2005iii; Wertz 1981
Intensive	At least 4 or more hours of therapeutic intervention each week	Bakheit 2007; Denes 1996; ORLA 2006; Smith 1981i; Smith 1981iii
Language-orientated	Follows psycholinguistic principles	Shewan 1984i; Shewan 1984ii
Operant training	Not a widely practiced approach to SLT but it is a verbal conditioning procedure with the purpose (in the examples included in this review) of improving communication skills	Lincoln 1984a; Lincoln 1982i
Phonological treatment	Focuses on improving the sound structure of language Therapy is directed at the phonological input and output routes	Doesborgh 2004a
Semantic treatment	Focuses on interpretation of language with the aim of improving semantic processing	Doesborgh 2004a
Sentence mapping	Targets the mapping between the meaning and syntactic structure of sentences	Rochon 2005
Task-specific	Therapy focused on specific areas of communication impairment	Prins 1989 (STACDAP); Rochon 2005 (Sentence Mapping Therapy); van Steenbrugge 1981 (naming and sentence construction); Drummond 1981 (word finding); constraint-induced therapy (Meinzer 2007; Pulvermuller 2001)
Volunteer-facilitated (trained)	Targeted practice tasks or methodologies that aim to improve a patient's language or communication abilities but delivered by a volunteer Training, material and intervention plans are usually provided to support the volunteer	Leal 1993; MacKay 1988; Meikle 1979; Meinzer 2007; Wertz 1986ii; Wertz 1986iii
Social support and stimulation	An intervention which provides social support or stimulation but does not include targeted interventions that aim to resolve participants' expressive/receptive speech and language impairments	Elman 1999; David 1982; Rochon 2005; Shewan 1984ii; Shewan 1984iii
Programmed instruction	Behavioural intervention that employs a book or film to present materials for learning Participants can progress through the tasks at their own pace, using queries to test their new learning Progression to the next stage only occurs once	Di Carlo 1980

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(*Continued*)

	they have been successful at an earlier stage	
Placebo	An intervention that mimics the experimental intervention in nature but does not have components that aim to resolve or improve participants' expressive/receptive speech and language skills	Di Carlo 1980 (non-programmed activity); Katz 1997ii ('arcade-style games': non-language computer based); Lincoln 1982i (attention non-specific); Lincoln 1984b (non-specific placebo)

Appendix 4. Assessments

Name of assessment	Abbreviation	Reference
Aachen Aphasia Test	AAT	Huber 1984
Affect Balance Scale	ABS	Bradburn 1969
Amsterdam Aphasia Test	AmAT	Prins 1980; Vermeulen 1979
Amsterdam-Nijmegen Everyday Language Test-A	ANELT-A	Blomert 1994
Auditory Comprehension Test for Sentences	ACTS	Shewan 1979
Boston Diagnostic Aphasia Examination	BDAE	Goodglass 1972 and Goodglass 1983
Boston Naming Test	BNT	Kaplan 1983
Caplan and Hanna Sentence Production Test	CHSPT	Caplan 1998
Chinese Rehabilitation Research Centre Aphasia Examination	CRRCAE	Reference unavailable
Communicative Abilities of Daily Living	CADL	Holland 1980; Holland 1998
Communicative Activity Log	CAL	Pulvermuller 2001
Communicative Effectiveness Index	CETI	Lomas 1989
Communicative Readiness and Use Scale and Psychological Wellbeing Index	-	Lyon 1997
Conversational Rating Scale	CRS	Wertz 1981
Functional Communication Profile	FCP	Sarno 1969

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(*Continued*)

Functional-Expression scale	FE Scale	Prins 1980
General Health Questionnaire	GHQ	Goldberg 1972
Leal 1993 Aphasia Quotient	AQ	Castro-Caldas 1979
Minnesota Test for Differential Diagnosis of Aphasia	MTDDA	Schuell 1965
Multiple Adjective Affect CheckList	MAACL	Zuckerman 1965
Object Naming Test	ONT	Oldfield 1965
Philadelphia Comprehension Battery	PCB	Saffran 1988
Picture Description with Structured Modeling	PDSM	Fink 1994
Porch Index of Communicative Abilities	PICA	Porch 1967; Porch 1971; Porch 1981
Psycholinguistic Assessments of Language Processing in Aphasia	PALPA	Kay 1992; Bastiaanse 1995
Reading Comprehension Battery for Aphasia	RCBA	LaPointe 1979
Semantic Association Test	SAT	Visch-Brink 1996
Token Test (shortened and standard versions)	TT	DeRenzi 1962; Spreen 1969; Lincoln 1979
Western Aphasia Battery	WAB	Kertesz 1982
Western Aphasia Battery Aphasia Quotient	WABAQ	Kertesz 1982
Word Fluency	-	Borkowski 1967

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WHAT'S NEW

Last assessed as up-to-date: 8 November 2009.

Date	Event	Description
18 May 2010	Amended	Contact details updated.

HISTORY

Protocol first published: Issue 4, 1997

Review first published: Issue 4, 1999

Date	Event	Description
15 December 2008	New search has been performed	This is a major revision of the original review, which was first published in 1999, and involves the use of a new search strategy, amended objectives and refined inclusion criteria for studies, types of interventions and outcome measures of interest. Full details of the amendments are listed in the Background section of the review. We have included 20 new trials, bringing the total number of included studies to 30, involving 1840 participants
12 December 2008	New citation required but conclusions have not changed	This update has been completed by a different team of authors
24 July 2008	Amended	Converted to new review format.

CONTRIBUTIONS OF AUTHORS

HK conducted the search, screened and retrieved references for inclusion or exclusion, contacted relevant authors and academic institutions, obtained translations for non-English publications, obtained unpublished data, extracted the data from included trials, evaluated methodological quality, entered data into RevMan, conducted data analysis, interpreted the data and co-wrote the review.

MB designed the review, retrieved references, screened references for inclusion and exclusion criteria and contributed to discussions relating to these decisions, contacted relevant authors, obtained translations for non-English publications, obtained unpublished data, extracted data from included trials, evaluated methodological quality, entered and analysed the data, interpreted the data and co-wrote the review.

PE co-authored the original review and commented on the updated review.

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DECLARATIONS OF INTEREST

Helen Kelly is a speech and language therapist.

Marian Brady is a speech and language therapist, member of the Royal College of Speech and Language Therapists, and is registered with the Health Professions Council, UK.

Pam Enderby has been involved in two studies included in this review. She did not contribute to the assessment or interpretation of either of these studies.

SOURCES OF SUPPORT

Internal sources

- Nursing, Midwifery and Allied Health Professions Research Unit, UK.
- Queen Margaret University, Edinburgh, UK.

External sources

- Chief Scientist Office Scotland, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Language Therapy; *Speech Therapy; Aphasia [*etiology; *therapy]; Randomized Controlled Trials as Topic; Stroke [*complications]

MeSH check words

Humans

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