

DRAFT 3

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Strategy training in language learning – a systematic review of available research

Systematic review conducted by the EPPI Modern Languages Group

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LIST OF ABBREVIATIONS

DfES	Department for Education and Skills
EFL	English as a Foreign language
ELT	English Language Teaching
ESL	English as a Second Language
ESOL	English for Speakers of Other Languages

1. BACKGROUND

1.1 Aims and rationale for current review

Strategy research in language learning and the training of learners in these strategies have been topical since the 1970s, but the research methods have been diverse, the findings often not incontrovertible, and the need for greater detail or focus clear though not explicit. At the same time, with a decline in language learning and teaching in many educational sectors in the UK, often excused if not explained by the public at large as a perceived inability to successfully learn languages, the need for discovering or describing effective ways to teach and learn languages is perhaps more sharply relevant than ever.

The UK government has presented its *Framework for teaching modern foreign languages* (2003) and this incorporates clear strategies if not strategy training in its objectives (see for example Objectives 7W1 on vocabulary, 8W3 on reflective learning, 9W7 on inferencing, 7T1 on structural mapping in reading comprehension, 8L4 on communication strategies, and 7C5 on social and linguistic conventions), yet no comprehensive or systematic overview of the evidence base for this has been carried out to underpin its introduction. As is often the case, there is a vast expertise and a critical mass of tacit knowledge in the field, but no structured overview based on research typologies and associated reliability.

The need for the review stems primarily from the absence of any systematic overview of the research into strategy training for language learners. Literature reviews (eg McDonough 1999), do not describe the criteria by which the research is selected, and do not take into account the reliability of the findings as a function of the research method (although in fairness, the example cited did not claim to be a systematic review of effectiveness).

Furthermore, the literature reviews which do exist are all paper publications and do not include updates or contemporaneous feedback and reaction: this is significant given the amount and quality of recent and ongoing research.

The aims of the review are to

- Review systematically the research evidence on the effectiveness of strategy training in improving proficiency in language learning
- Descriptively map identified research into strategy training
- Assess the quality of research into strategy training

This Review will be updated on an annual basis with reports of primary research incorporated as and when they are identified or published.

1.1.1 Strategy Training Context

This review defines a learning strategy as any intervention which focuses on the strategies regularly to be adopted and deployed by learners in order to develop language proficiency, improve language task achievement or both. This incorporates the essence of the definitions found in the research literature, for example Weinstein and Mayor 1986, Chamot 1987, Wenden & Rubin 1987, Oxford 1990, Cohen 1998 as reported in Macaro 2001.

The sense in which it is used in this review is to cover activities or programmes that explicitly set out to equip language learners with 'learning tools' prior to embarking on (or

during) their principal course or programme of language study. In its simplest form it might be 2 or 3 sessions, prior to starting the course work proper, on *how* to learn vocabulary, or what it means to learn grammar, or discussion of definitions of communicative performance versus competence. A more complex model might be a package of strategies, either before or during a course, that the learner develops and maintains for him or herself, assessing progress as the course goes on (self-evaluation and reflection), and adjusts learning style and strategies to the tasks in hand.

All language learning (if not all learning) involves a degree of change in awareness as well as language proficiency: it seems virtually impossible to take a language course and not learn something about the learning process on the way, and it is likely that even the least successful learners do so (O'Malley 1987). However, this review focuses on research attempts to proactively achieve this, though it is necessary to take into account both the explicitness of this awareness, and differences in awareness that may already exist at different stages in an individual's progress.

Advances in our understanding of cognition in general and the relationship between working memory and long term memory in particular (Miyake & Shah 1999, Eysenck 2001), allow us to explore with much greater direction and purpose the processes involved in acquiring a foreign language. We are becoming increasingly aware that underlying these processes are a series and range of learning strategies and a considerable body of descriptive research bears testimony to this although prospective, empirical, experimental studies have not necessarily matched it.

One of the foremost promoters of strategy training, Barbara Sinclair, at a British Council conference in Oxford in July 1999, started a presentation by stating that even after 10 years of strategy training, she didn't know if it worked (Sinclair 1999). As far back as 1969, researchers expressed doubts about the effectiveness of strategy training and claimed amongst other things, that the learners rarely see the relevance of what they're doing (Politzer & Weiss 1969, Carton 1971, Carroll 1973; Smith 1985, Rees-Miller 1993, Benson 1995). Much of the rationale for practicing strategy training is theoretical and ranges, from the instinctively attractive proposition that good learners are independent, to the plethora of ways in which practitioners claim to go about achieving it. Dickinson 1992 states "*Few teachers would seek to make learners dependent on teaching for evermore; most of us recognise that the ability to learn independently is a proper outcome of teaching...*" although Macaro 1997 is more circumspect, stating "*...there is no evidence as yet of a link between increased strategy use and increased language competence.*" However Macaro 2001 finds sufficient evidence for more optimism that a link exists and his ongoing research in the field (Macaro, Vanderplank & Richards 2003) will contribute further evidence one way or another.

Strategies, most in the area of ELT, have been theoretically or non-empirically described and designed for a variety of learning needs, including reading (Zhicheng 1992, El-Koumy 1997, Singhal 1998, Kern 1989); writing (Kresovich 1990, Gooden-Jones 1998); speaking (Ishii 1980, Luk 1992); listening (Viswat & Jackson 1994, El-Koumy 1997); global language ability (Chamot & O'Malley 1996) or discrete areas such as grammar (Jo 1997), vocabulary (Kaelin 1991, Weatherford 1990).

The strategies may be implemented in a number of pedagogical formats or modes, for example cooperative learning (Correa 1995, Gooden-Jones et al 1998), awareness raising (Yang 1995) or via academic study skills and access and foundation courses.

A variety of means of assessing or measuring the strategies is used, including collaborative feedback (Lane & Potter 1998), video filmed assessment of performance,

learner profile questionnaire (Oxford 1990), negotiated syllabi and process oriented tasks.

A recurrent strand to strategy training is concerned with learners gaining greater language awareness, or meta-cognitive awareness, and a subsequent self-initiated deployment or use of the strategies leading to greater autonomy and independence (Moulden 1981, Baird 1984, Yang 1995).

Some of the strategies are self-learned or self-taught while others, or alternative modes of delivery involve taught elements, ie strategy training can be implemented as a self-directed or a taught component of a programme. Both are of interest in this review if the underlying intention is to proactively introduce or nurture an adoption of learning strategies by the learners.

However, much of the justification for strategy training is opinion, selective research, personal experience, theory, and speculation (Biggs 1987). While the rationale for learners having more autonomy in their learning is intuitively desirable, and much of the theory rationally and persuasively underpinned, there is no comprehensive reliable overview of research evidence that shows either that successful learner outcomes are related to such strategies, or that unsuccessful learners could learn them, could use them and that they would have the desired outcome (Harris 1997). There is a need for a survey of the quantity and breadth, and an evaluation of the quality of such research as is available, and an attempt to bring it together to obtain a more comprehensive, transparent, reliable and applied knowledge base.

So while the use of strategy training is based on theory as much as sound evidence, research continues (Rubin 1975, Rubin 1981, Oxford 1986, Starks-Martin 1996, Chamot & O'Malley 1996,) into the strategies used by both successful and less successful language learners, on the assumption that by identifying and analysing such strategies, and then developing them into teachable or learnable pieces, that learners can benefit. However, even if this is the case, the mechanisms are not known with much certainty (Perez 1990). Additionally, the success of training may well be entirely dependent on the learning and cognitive style preferences of the individual (Wenden & Rubin 1987).

Language learning and teaching in schools in the UK at the beginning of the millennium are in recession in a number of ways. Teachers are leaving the profession, recruitment of language teachers is difficult, and the number of students taking modern and foreign languages at exam level at school (and therefore at university) is dropping significantly. This situation is all the more disturbing as the UK is perceived to be standing in the wings of Europe while its continental neighbours forge ahead in economic and monetary union where language skills are key tools (UK Government Green paper 2002).

The Nuffield Enquiry report (Nuffield 2000) has made plain in its recommendations many of the areas that might be given attention, and recent UK government initiatives aim to both improve the recruitment and training of teachers and increase the numbers of students taking foreign and modern languages.

Much work has been carried out on learning strategies, but previous reviews of strategy training are either not systematic or comprehensive (McDonough 1999) or are not primarily reviews of effectiveness (Weinstein & Mayer 1986, O'Malley 1990). Lack of valid and reliable evidence is a problem that besets our knowledge of the effectiveness of strategy training, and a considerable amount of what poses for theory driven research within education is in fact merely opinion, and this is often reflected in traditional literature reviews. A systematic review of research evidence (and not just a selection of *some* evidence), carried out and maintained on the basis of a transparent protocol that

specifies outcomes, interventions and research methodology as vital elements, may go some way to providing a more reliable synthesis on which practitioners and individuals can base decisions. Within the context of such a systematic review, and particularly concerning the modes of delivery and processes involved in strategy training, descriptive research will play its part.

1.2 Definitional and conceptual issues

1.2.1 Traditional Definitions of Strategies

Since the start of research into strategies in the 1970s, an accepted framework for describing them has emerged based on the work of Rubin 1975 and Stern 1975 followed by work from O'Malley and Chamot 1990 that have crystallised into taxonomies of strategies (see for example Ellis & Sinclair 1989) that have served until now in providing the basis for description in the following tri-partite way:

1. Metacognitive strategies such as advance preparation, analysing needs, comparing, expressing beliefs, prioritising, setting short term aims, monitoring, evaluating;
2. Cognitive strategies including defining, inferencing, keeping a diary, listening for gist, predicting, reading aloud, skimming, translation;
3. Affective/social strategies like discussing, joining a group, motivation, attitude.

This perspective on strategies, based on much empirical though not experimental research, has provided the theoretical framework within which most strategies training research and development have taken place.

For this review it was perceived, despite a general acceptance of the traditional framework in language learning and teaching that a tighter definition of strategies was needed. This was built into the guidelines for assessing the studies with a view to differentiating more precisely between strategies and what might only be teaching or learning methods. That this includes the **autonomous use** of training strategies is an essential element in this review but is not necessarily included in the traditional strategy training definition. To distinguish between teaching methods and strategy training the following guidelines were used:

- Have the strategies been defined (if X and Y then Z) by the researcher/teacher?
- Is the way the strategy is supposed to lead to learning or improved proficiency clear?
- Is there a clear relationship between the strategy training (what the teacher did with the students) and what the students would be expected to do eventually as independent individual learners?

1.2.2 Additional issues in defining strategy training

Education and psychology rather than specifically language?

A query of a more general nature concerns the distinction that may be drawn between strategies, skills and behaviours that are unique to modern foreign language learning and those which are non-language specific. The difference is not obvious, and a pragmatic acceptance has been adopted for this review inasmuch as the setting (ie language

teaching and learning) is the factor which makes the intervention relevant even if the skills can be deployed by learners in other areas of their education and lives.

Problem of assessing training but necessarily testing the strategy at the same time:

This review focuses less on the effectiveness of particular strategies than on research investigating the training of learners in the strategies (whatever they are). However, this raises the difficulty that theoretically we might therefore be interested in the effectiveness of training in strategies that don't work, which *a priori* is not a very relevant or useful endeavour. Furthermore, it would require a complex study design to test such hypotheses and none set out to do this. More relevantly, the review accepts that the effectiveness of the training is tied in closely with the effectiveness of the strategies themselves, and in all cases it seems, it is the association of the use of the strategy with learning outcomes that is proxy witness to the effect of the training.

1.3 Policy and practice background

1.3.1 Evidence based policy

It would be reasonable to assume that with so much research on strategies and their importance in language learning and teaching that there should already be a clear picture of the state of affairs regarding its mainstream use in schools, universities and language learning in general.

However, this is not the case and despite the research, the perceived value of strategy training is still very much based on opinion, received wisdom and claims of good and best practice. A kind of orthodoxy has grown up around strategy training, and apart from a period of time when Learner Training became fashionable and conjoined with process oriented syllabi in ELT, there has been no systematic incorporation of strategy training in the mainstream.

In this context, allied with the maturity of the field, and with an increasing will to base practice on reliable evidence, an overview of such research into the effectiveness is desirable and should be available.

This is perhaps particularly necessary in the UK school domain following the Nuffield Languages Report, current concern at the falling numbers taking or teaching languages, and recent changes by the UK government to policy on languages in schools.

1.4 Research background summary

Wider picture

- No systematic reviews of strategy training but one or two overviews and literature reviews.
- Considerable amount of quasi-experimental and descriptive research
- Abundance of opinion reports and articles which are regularly cited as research.

No standard approaches

- Outcomes of training (competence, performance, learning etc) are not measured by standardised tools or means.

- Sometimes proficiency is an outcome of interest, sometimes not.
- Effect of interventions is usually not assessed by delayed and long term post-intervention testing
- A significant amount of research has been carried out in the area, but there is no harmonised approach, and aggregation of findings across the field is not straightforward
- Research questions sometimes remain unanswered and the research itself is sometimes not focused productively.
- Some of the research identified for this review has apparently not been cited anywhere, yet contains extensive research data and evidence

1.5 Authors, funders, and other users of the review

1.5.1 Users of the review

The initial motivation for this review was the contact author's desire as a practicing teacher of languages to find out whether it was justified or not to systematically incorporate strategy training in language teaching and learning. Discussion, and the research identified on an *ad hoc* basis did not provide a straightforward answer.

The review is intended for a number of different end users, but ultimately it is for learners of foreign languages who stand to benefit most directly from any reliable knowledge originating from research. If it is clear via research (and other evidence as a review cannot definitively answer the question and there will always be caveats) that strategy training is effective, then the profession can inform its policy and practice decisions with greater confidence. Other questions will undoubtedly emerge as the picture becomes clearer, surrounding such issues as the kind of strategy training for specific circumstances and for whom. Notwithstanding these, teachers of languages and researchers of means and methods will be able to make use of the review.

In addition to learners and teachers, wider benefits will accrue to parents, curriculum and materials designers and policy makers, and versions of this review for different areas of interest are expected to be made available.

1.5.2 Authors

The authors of the review all have an interest in the knowledge that the review can uncover and present, and as such they represent the various parties likely to use the review.

Ernesto Macaro, published author and researcher in the area of learner strategies is a teacher trainer and director of the Applied Linguistics master's degree at Oxford and is currently conducting experimental research into strategy training Robert Vanderplank is Director of the Language Centre at Oxford University concerned amongst other things with undergraduates' ongoing language skills maintenance; Deborah Mason, Assistant Director of the Language Centre at Oxford University, teaches English for academic studies to post graduates. Both are concerned with both policy and management; Peter Smith and Xavière Hassan are lecturers in French at the Open University and directly involved in devising materials for and teaching adult learners of languages; Gail Nye is a teacher of ESOL, and learner and user of Spanish, in Florida, USA.

1.5.3 Policy

The current decision-making climate calls for increased reference to research and its use as a basis for policy, and despite reservations in certain quarters about both the theory and practice of this, it looks set to continue for the time being. The language teaching profession can do this, and become more evidence informed in a number of ways while still maintaining independence of thought. According to Pachler (2003) for example, researchers can “*provide research training to practitioners interested in engaging in evidence-based practice; focus their research on areas perceived to be of relevance by practitioners; write the findings up in a way that engages with the discourse conventions used by practitioners and disseminate them in forums practitioners readily access; and play a vital role in synthesising and summarising existing research evidence to make it more readily accessible*” and this review addresses these needs.

The review is timely not only in relation to the Nuffield Languages Inquiry Report and its recommendations (14. “*Ensure policy is reliably and consistently informed*”, and particularly 14.3 “*specify key areas for attention in language teaching and learning, such as autonomous learning...*” p97) but also in relation to research into strategies (see for example the strategies referred to in the Key Skills stage 3 descriptions earlier) aimed at making language learning more effective. While it is generally accepted that successful learners use strategies, the perceptions of the strategies by learners themselves are not necessarily comprehensive or well-developed (Cajkler and Thornton 1999).

The Government’s 14-19 Green Paper (the section on languages) also highlights the need to raise standards in language teaching and learning, though it does not spell out specifically how it might be done according to some (Pachler, 2002). It does aim however to establish specialist language colleges, and this review is relevant to such achievement of higher standards – not least as it looks at strategy training across any and all modern languages rather than particular or a limited range of languages. With specialist language presumably expected or intended to be focal points of good or best practice, it is planned to involve one such school, recently granted specialist status, in consultation on the preliminary findings of this review.

1.5.4 Funding

The review is funded primarily by funding received from the DfES via EPPI, although much of the work on the review is contributed by its authors on HEFCE funded time, and in the case of Gail Nye, her own time during a sabbatical year from teaching.

1.6 Review questions

The primary question addressed by the review is **what is the effectiveness of strategy training?** This includes the following set of sub-questions:

1. Does strategy training work
 - for all language skills (reading, writing, listening, speaking, overall proficiency? grammar ability, motivation)?
 - for all learners?
 - for all languages?
 - at all stages of language learning instruction?
2. If it appears not to work, what might be the reasons?

As the first stage of this review, a descriptive map was produced. The aim was to provide a broad overview, both comprehensively and systematically, to identify the research available and point to areas where there are gaps in the knowledge/evidence base.

Sufficient references to experimental research were identified to warrant an in-depth review of these alone. Therefore this review includes an in-depth review that concentrates on a subset of mapped studies

2. METHODS USED IN THE REVIEW

2.1 User involvement

2.1.1 Approach and rationale

The approach to user involvement for this review was to incorporate, through the authors becoming the reviewers, different aspects of experience and interest in language learning and teaching. This has applied from the planning and preparation of the review, throughout the different stages, and in the drafting of the findings. At various stages during the review, other users have been involved in the process, and the findings will be presented to a consultative group prior to preparation of the review report.

The authors, five out of 6 of whom had no prior experience of systematic reviewing, and only 1 of whom had specialist knowledge of strategies and strategy training, brought in relevant experience, as potential users of the review, in the following ways:

- Language learning (all 6 authors are learners and users of modern languages)
- Parents of children learning languages at school (4 out of the 6 authors)
- Language teaching (all 6 authors are or have been language teachers, covering young learner, school and tertiary level, and adult learners)
- Policy making (1 Director of Language centre, 1 Assistant Director)
- Researchers (4 out of the 6 authors)

2.1.2 Methods used for User involvement

All the authors – all modern language learners, users and teachers, were involved in all stages of the review.

In addition, at the in-depth evaluation of included studies a study evaluation day was organised with a group of MA in Applied Linguistics students. This was aimed at introducing additional users to the process and also expediting the study evaluations. Two of these students (one practicing lecturer in Spanish and researcher, and one educational researcher) each completed an evaluation of a study, working as the second reviewer with one of the report authors in both cases.)

2.2 Identifying and describing studies

2.2.1 Defining relevant studies: inclusion and exclusion criteria

To be included in the map, reports needed to be

1. of a strategy training intervention in language learning;
2. of an intervention carried out in a formal setting such as groups of learners in schools, universities and language centres;
3. a study not primarily involving bilingual learners;
4. of primary, empirical research;
5. of research carried out since 1960.

Strategy training interventions were defined for the purposes of the review as interventions that set out to train learners to notice, and then do something in order to

improve an aspect of their ability to learn the language. To distinguish between teaching methods and strategy training the following guidelines were used:

- Have the strategies been defined (if X and Y then Z) by the researcher/teacher?
- Is the way the strategy is supposed to lead to learning or improved proficiency clear?
- Is there a clear relationship between the strategy training (what the teacher did with the students) and what the students would be expected to do eventually as independent individual learners?

As described in section 2.3.1 below, this definition of a strategy training intervention was developed after the initial screening of studies for inclusion in the review's descriptive map, at the stage of screening studies for inclusion in the in-depth review (studies had initially been recognised as being about strategy training by reference to a strategy in the title or abstract of the report). It was then applied retrospectively to all studies initially included in the map to check that the distinction between teaching methods and strategy training had been made.

The review is less concerned with such learning strategies, or the relative merits of strategies, than with the effectiveness of training learners to use, and then deploy autonomously, the strategies – whatever they are. Such interventions might be training learners how to plan and organise their study consciously, how to improve their reading comprehension, how to guess the meaning of unknown words, or training them to write better essays – but crucially the interventions must include the element of training and not merely be teaching of the outcome.

2.2.2 Identification of potential studies: search strategy.

Reports were sought via database searches, by contacting colleagues in the field and by non-systematic handsearches of a limited number of journals.

Key databases were identified and a draft search strategy was developed during January and February 2002 while searches up to the cut-off date were run from June to September 2002. The databases searched and the terms used to build database searches are listed in Appendix 2. It was decided to search for reports that referred to

- i) strategies, strategy learning, or strategy training, and
- ii) language learning or teaching.

Searches used database controlled terms, free text searches, and both depending on the individual database and the availability of database controlled terms and thesauri, although this was not implemented systematically. The searches were recorded, and a quality check of the searching process conducted afterwards (see 2.2.5).

No systematic effort was made to identify relevant studies in the non-English language research literature, although any non-English language reports found were included in the review process.

2.2.3 Screening studies: applying inclusion and exclusion criteria

The mapping inclusion/exclusion criteria were first applied independently to each of the abstracts and/or titles of reports by two reviewers. A list was drawn up indicating whether to include or exclude according to the criteria set out in section 2.2.1. This list was scrutinised further against the inclusion/exclusion criteria at two separate

meetings of the review authors. After this, full reports were sought for studies marked for inclusion. A cut-off date for retrieval was set at 21st May 2003.

Once obtained, full reports of studies were screened again using the criteria. At this point, additional guidance on defining strategy training was developed, as described in section 2.2.1. This final screening for the map was conducted by one reviewer (PS) who consulted at least one of the review authors when proposing that a study be excluded. Excluded studies were retained for background and supporting material.

2.2.4 Characterising included studies

Full reports were obtained and classified according to a standardised 'core' keywording system developed by the EPPI-Centre (EPPI-Centre, 2002a). This classifies studies in terms of the type of study; the country where the study was carried out; the educational focus of the study; and the study population. For outcome evaluations, studies were also keyworded in terms of the intervention provider and the type of intervention.

2.2.5 Identifying and describing studies: quality and assurance process

Some known references did not appear in the database search yields. Therefore checks were carried out across the searches to gauge their effectiveness. A total of 26 reports by known authors that had not been identified by the searches were tracked to determine why their studies had not been identified.

The application of inclusion/exclusion criteria and the allocation of keywords were both independently considered by a member of the EPPI-Centre (RR) for a total of 19 reports. The lead author also checked the application of core keywords for all reports finally included in the map.

2.3 In-depth review

2.3.1 Moving from broad characterisation (mapping) to in-depth review

In establishing the criteria for which studies to include in the in-depth review, the team balanced the need to focus on research such as large scale studies that control for various sources of bias, with other descriptive research that also forms part of the overall picture for the purposes of policy considerations.

Criteria were drawn up to identify studies from the map that would be reviewed in-depth. All reports included in the map were independently screened by two reviewers using all six criteria. To be included in the in-depth review, studies needed to be

1. of a strategy training intervention in language learning;
2. of an intervention carried out in a formal setting such as groups of learners in schools, universities and language centres;
3. a study not primarily involving bilingual learners or learners on their third or subsequent language (where this is identifiable from study reports);
4. of primary empirical research;
5. of research carried out since 1960, and
6. experimental studies testing the effect of the intervention against another intervention, or standard practice or no intervention.

The protocol for this review originally proposed that studies would only be included in the in-depth review if the strategy training intervention under evaluation was a minimum of two hours in duration. It was felt that nothing less could have a genuine effect on overall language learning proficiency. At the stage of screening studies for inclusion in the in-depth review, through discussion with EPPI and within the group, the decision was taken to include studies of interventions shorter than 2 hours. On balance, it was agreed that moments of epiphany, or the discovery of something one didn't previously know can be of considerable 'life changing' value for a learner and the impact of an intervention therefore, is not necessarily a function of its duration. The initial criterion was determined to have been untenable, and interventions to raise awareness might have been unjustifiably excluded. This modification to the protocol resulted in the inclusion of 2 further studies.

The group also identified aspects of studies that would be included that were of particular interest to explore further, as follows:

Types of participants

Learners at different stages of development (young learner, school, university, adult) were included in the selected studies (as long as they were not bilingual or on their third or subsequent language as far as could be determined in reports). For the purposes of the in-depth review learners were grouped according to different parameters including age, language, level of proficiency. Learners of languages who are living or resident in the country or culture whose language they are learning (ie learning Spanish in Spain rather than in Canada) were included. It was considered likely that a lot of the available research might be in the area of ELT or ESOL and so it was anticipated that sub-grouping of the populations could be carried out as a guard against reaching potentially confounded findings.

Types of Educational Settings

A major motivation as described earlier for the review was to identify the evidence relevant to the UK school situation, and where possible findings would be grouped to inform this and other specific educational settings.

Outcomes

The review was interested specifically in studies that looked for improved proficiency on one or a number of measures as a result of the strategy training provided for the learners. This could mean overall learning proficiency as measured in regular exams and assessments, or specific areas of improvement such as vocabulary acquisition, accuracy in oral expression, grammar ability, reading comprehension or a number of other measures – whether or not they are also proxies for overall ability. It was felt that self-report indicators of change or improvement were also of interest, but measures of triangulation would be desirable in such cases to counter the well-known problems associated with self-report. In addition independent measures of strategy deployment, regardless of proficiency or ability indicators, were of interest and deemed essential to identify measurement of change after a period had elapsed post-intervention. Given that the notions of effective strategy training and the nurturing of independent (autonomous) learning are mutually dependent in language learning, it seemed self-evident that the effect of a successful intervention should not disappear rapidly after the end of the experiment, so delayed post-testing was incorporated as an outcome of interest.

2.3.2 Detailed description of studies in the in-depth review

Data were double-entered into EPPI Reviewer (software) by two reviewers working independently on each included study. In cases where there was initial disagreement about data extraction or quality appraisal, this was discussed and resolved. Two members of the EPPI-Centre (RR and ZG) were involved in this process.

A standardised data extraction framework was used: the EPPI-Centre's Review guidelines for extracting data and quality assessing primary studies in educational research (EPPI-Centre, 2002b). For each study, data were collected on the aims, study sample, recruitment, data collection and analysis methods, findings and authors' conclusions. An additional set of guidelines, drawn up by the review team was used to further classify studies in terms of the type of strategy training provided and outcomes measured (see Appendix 2.3).

Additional aspects of interest were:

1. whether the strategies were sufficiently well-described to the reader so that the study could be replicated, and
2. what the long term effect of the strategy training was and whether the study addressed this.

2.3.3 Assessing quality of studies and weight of evidence for the review question

The quality of the studies was evaluated using questions contained in the EPPI-Centre's Review guidelines, referenced above, with the aim of assessing to what degree readers could depend on the reported study findings to address the question of the review. This took into consideration the following to provide a classification of reliability (A and B) plus relevance (C), to arrive at a classification (D) of each study's overall contribution (as high, medium or low) to the weight of evidence in relation to the review question:

A: Soundness of method (the extent to which a study is carried out within the terms of that method.

This was summarised in section M11 of the EPPI Reviewer guidelines amalgamating considerations of study quality, and fed into B2 of the Review specific questions (appropriateness)

B: Appropriateness of study type to answer the review question (appropriateness of methods to the review question)

This was summarised in section M12 of the EPPI Reviewer guidelines amalgamating the findings on the relationships of the study method and conclusions, and fed into B2 of the Review specific questions (appropriateness)

C: Relevance of the study focus to the review question

Summary of EPPI Reviewer sections B Study aims and rationale of study, and C Study research questions and policy or practice focus, feeding into B3 of the Review specific questions (relevance)

D: Overall weight of evidence that can be attributed to the results of the study

Compound summary of A, B and C and the findings from the Additional validity and reliability Review specific questions (see Appendix 2.3)

2.3.4 Synthesis of evidence

Frequency and cross-tabulated reports were run on the studies. Study findings were grouped according to the following 2 broad bands of criteria:

Descriptive characteristics

- Study type
- Sample size
- Year of study
- Publication type
- Language skills studied
- Intervention type
- Intervention length
- Outcomes measured
- Education sector
- Country of study

Evaluated findings

- Speaking ability
- Reading comprehension ability
- Writing ability
- Listening comprehension ability
- Overall language ability

Findings might have been grouped in a number of different ways, the 'bluntest' approach being lumping all together and seeking to comment on all the studies as exponents of strategy training in the broadest sense. However, this was considered undesirable due to the many differences between studies along the parameters referred to above.

Consequently, the justified degree of meaningful 'lumping' was considered to be in terms of domain or outcome, ie speaking, reading, writing, listening and overall ability where there is a greater uniformity of metric (ie measurement of say reading comprehension). This does of course limit the number of studies that might be combined in pursuit of an aggregated assessment of evidence, and questions of whether this compares like with like may still arise for some.

At this stage of the review, numerical data were not extracted and meta-analyses were not conducted. An update of the review intends to consider the possibility and desirability of such meta-analysis.

2.3.5 In-depth review: quality assurance process

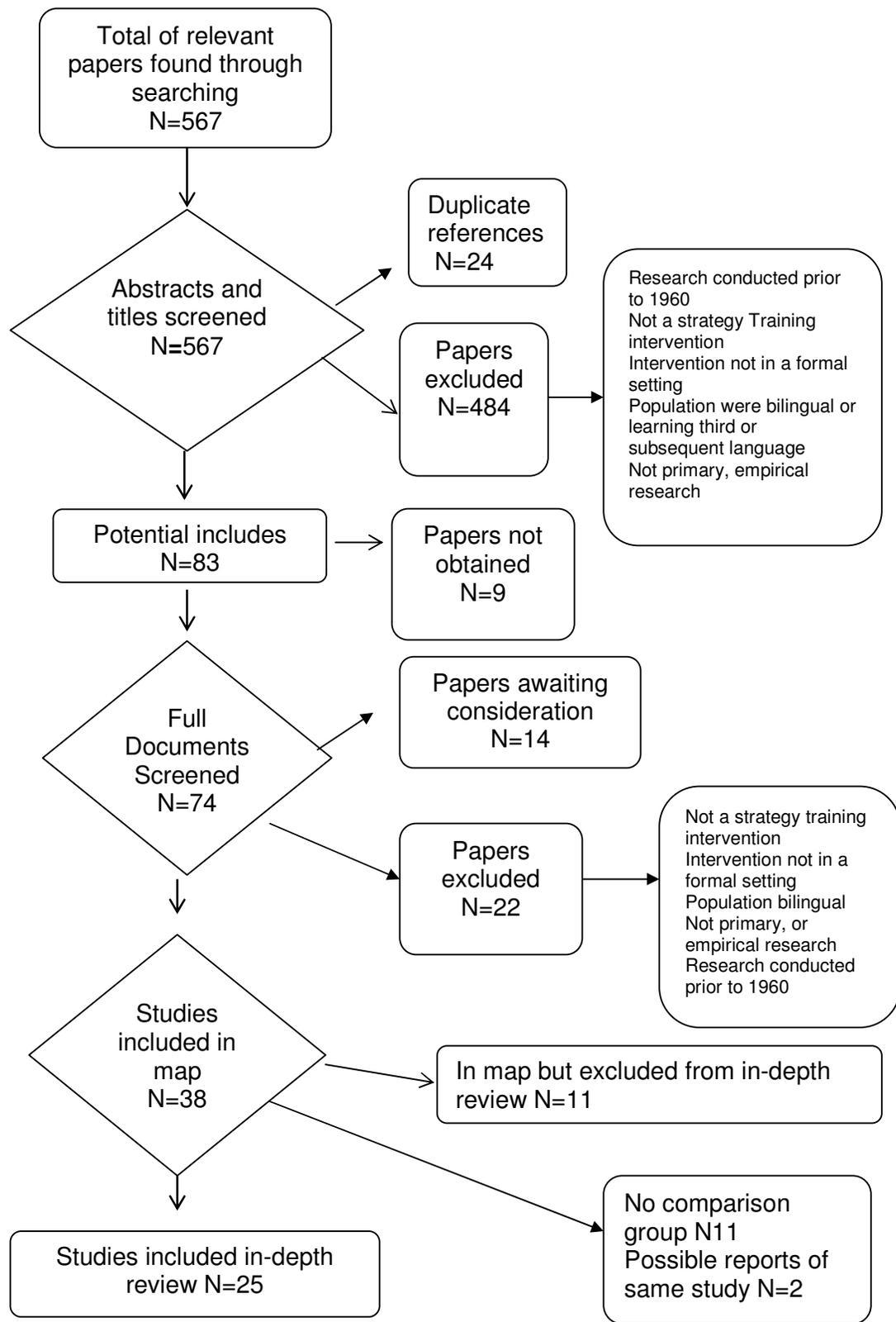
An EPPI staff member (RR) was present at an initial meeting where the review team completed data extraction as a group on one study. For 11 of the final data extractions, data extractions were conducted independently by one of two EPPI staff members (RR and ZG).

3. IDENTIFYING AND DESCRIBING STUDIES: RESULTS

3.1 Studies included from searching and screening

567 potentially relevant references were found through the searches described in section 2.2.2. Figure 3.1 summarises the number of studies at each stage of the review. Full hard copies were sought through library loans or other means for 83 reports. Of these, full text reports for 74 studies were obtained before the retrieval cut-off date, and of these 18 failed to meet the map's inclusion criteria and so were excluded. Fourteen are still awaiting further consideration. A total of 38 reports were therefore included in the map.

Figure 3.1 Record of search process and yields



3.2 Characteristics of the mapped studies

The map includes a total of 38 studies conducted since 1980 reported in a total of 40 reports, and 2 are still awaiting confirmation as to whether they are second reports of a study or whether they are of different studies.

It reveals a marked increase in the number of studies planned and carried out since the mid 1990s: since 1996 to the present (end of 2003), 27 studies were carried out; prior to that, 13 studies were completed with the earliest found in 1981. Over all the studies, a total of over 3000 learners of languages participated, with sample sizes ranging from 1 to 863 depending on the study design. The majority of studies have sample sizes over 30 – but this is not necessarily an indicator of robustness considering that many of them were cluster randomisations (whole groups, perhaps only 2 or 3 classes) and perhaps only large samples of over 200 are more realistic for cluster randomisation trials in terms of assuring the power of the sample to detect an effect reliably. This said, in some studies individuals rather than groups were randomised.

Table 3.2 Sample size in studies

Band	sample sizes (participants in studies)	number of studies
1-5	1, 4, 5	3
6-10	7, 8, 10	3
11-20	20, 21	2
21-30	26, 28	2
31-40	30, 32, 32, 32, 34, 36, 40,	7
41-50	43, 45, 48	3
51-60	51, 58,	2
61-100	68, 71, 91, 75	4
100-200	108, 119, 141, 143, 151, 158, 187,	7
>200	229, 244, 338, 863	4
unclear		1
		38

The following sections describe details of the designs used in these studies, the language skills, intervention types, intervention length, language learning and outcomes studied and the country and educational sector that were the setting for the intervention.

3.2.1 Study type

As Table 3.2.1 indicates, the majority of the strategy training studies in the descriptive map used experimental comparative/controlled designs - **28 out of the 38** were comparative or randomised comparative studies. Some had control groups receiving no intervention or participants receiving their regular language courses while others were comparisons between two or more alternative interventions.

Table 3.2.1 Study types used to test strategy training interventions (N=38)

Type	N
RCT (randomised controlled or comparative trial)	16
Comparative study (controlled trials that did not use random allocation)	12
Descriptive intervention study	5
Case study	2
Ethnography	1
Action research	1
Interrupted Times Series	1
Total	38

3.2.2 Language skills studied

Table 3.2.2 Language skill studied (N=38 studies but a study may cover 2 or 3 domains, so total >38)

Skill/domain*	N
Reading	12
Vocabulary	6
Listening	6
Speaking	4
Proficiency	5
Strategy use	4
Writing	3
Awareness	3
Grammar	1
Total	44

As Table 3.2.2 indicates, the majority of the studies examined reading, but 9 principal aspects of language skill were covered altogether. Thirty four of the studies concentrated on one skill, while 4 studies looked at 2 skills, and 1 looked at 3, in the same study.

3.2.3 Intervention type studied

Table 3.2.3 presents the training interventions described in terms of whether they targeted cognitive, metacognitive or socio-affective processes, or a combination of these. The majority of the interventions involved cognitive strategy training, either alone or in combination with training in other strategy types.

Table 3.2.3 Intervention type studied (N=38)

Intervention type	N
Cognitive strategy training only	24
Metacognitive strategy training only	8
Socio-affective strategy training only	0

Mixed strategy training (meta cog & cog)	4
Mixed strategy training (metacog, cog and socioaffective)	2
Total	38

Table 3.2.4 presents the different strategies used in training. Only the principal strategies have been listed from each study.

Table 3.2.4 Strategies tested

Cognitive interventions

Asking higher order questions
 Awareness raising
 Clarifying & checking
 Contextualisation
 Delaying speaking
 Dictionary strategies
 Focussing on specifics/selective attention items
 Grouping/recombination
 Identifying task purpose
 Ignore and continue
 Inference
 Input & output based instruction
 Inventories
 Keyword, mnemonics & association strategies
 Learner diary
 Notetaking
 Predicting
 Referential links (discourse/grammar)
 Reflection & guided reflection
 Revision & redrafting
 Semantic mapping, glossing, précising
 Summarising
 Text structure & content exposition

Metacognitive

Awareness raising
 Planning
 Self-evaluation
 Self-monitoring
 Verbalisation

Affective

Avoiding frustration
 Cooperating with peers
 Deep breathing
 Not giving up
 Rehearsal
 Self-rewarding
 Self-encouragement

The total number of strategies involved in training bears little relation to the number of studies as more than one type of strategy was generally involved in any one strategy training intervention.

In many cases, the study interventions had multiple facets (and the composition of the intervention may be central to any effect it has), so this table should only be seen as illustrative of the type of interventions found rather than as a comprehensive description of more complex interventions. For example, in the case of input- and output-based instruction, the input-based element of the intervention was measured against an outcome of *comprehension* while the output-based instruction was measured with reference to *production* of language items.

3.2.5 Intervention length

It was difficult to summarise the different configurations of the interventions due to the variety in their composition and descriptions incorporating numbers of sessions over weeks and months in chunks of hours or minutes, sometimes integrated and other times in discrete chunks, sometimes given as self-access or independent study and sometimes as whole group work. As an illustration of the types found, the following table shows the diversity. The number of studies that do not report or do not make clear the length of intervention is of concern (N=7):

Table 3.2.5 Intervention length (N=38)

Intervention length	N
2 sessions (90 mins)	1
3 sessions	1
< 2 hours	4
2-5 hours	3
6-10 hours	4
11 to 20 hours	4
>20 hours	4
1 – 5 weeks	1
6 – 10 weeks	4
11 – 20 weeks	3
21-26 weeks	1
27-52 weeks	1
unclear	7
Total	38

3.2.6 Language being learned

As table 3.2.6 illustrates, in the majority of studies, the participants were learning English (N=24), either as a second or foreign language, and while this reflects the high amount of research carried out in ELT in general, just under half of these were of learners of English as a foreign language similar to learners of the other foreign languages listed.

Table 3.2.6 Language being learned (Studies, N=38)

Language	N
English as a second language (ESL)	14
English as a foreign language (EFL)	10
Spanish*	5
French*	4
Japanese	2
German	1
Italian	1
Latin	1
Russian	1
Total	39

One study looked at both French and Spanish

3.2.7 Outcomes measured

A wide range of outcomes was measured in the different studies, and as might be expected there were often more than one or two outcomes per study. In some studies attempts were made to triangulate the effect of the strategy training with different measures, some global proficiency, some more narrowly focused. Over the mapped studies, the outcomes measured in order to demonstrate the effect of the strategy training were as below although sometimes there appears little to choose between what appears to be different expressions of the same thing: this is not a comprehensive picture as it presents only the principal outcomes measured in any study for the purpose of giving a broad idea of the range of major outcomes (see Appendix 3.2.6 for Outcomes and study names).

Table 3.2.7 Outcomes measured

Outcome	N
Accuracy of output	2
Asking & answering higher order questions	1
Attitude	1
Aural ability	2
Awareness	3
Comprehension	19
Global proficiency	8
Grammar accuracy	5
No measurement of outcome	1
Oral ability	2
Recall (content/meaning units)	2
Self-perception of ability	2
Strategy transfer	1
Strategy use	10

Unclear	1
Vocabulary acquisition	5
Writing ability (accuracy & quality)	2
Interpreting meaning	1
Metacognitive knowledge	1
Strategy awareness	1
	20

3.2.8 Education sector

As illustrated by table 3.2.8, the majority of studies were in the adult, tertiary or higher education sector (n=29; 76%). Of those conducted in middle and secondary schools (N=11), all but 2 were studies whose participants were learning English (N=9). None of the studies was conducted in primary schools.

Only 1 study in schools was found that looked at strategy training in languages other than English – and the language in question was Latin (while strictly speaking Latin is not exactly a modern language, it was felt that there was no reason to exclude it).

Two of the studies were across different education sectors, so the total in the table is >38.

Table 3.2.8 Education sector (N=38)

Education sector	N
Higher Education (non-univ)	3
Adult	6
Secondary school	11
University	20
Total	40

See Appendix 3.2.8 for Education sector and study name

3.2.9 Country studied

Almost half (42%) of the mapped studies in strategy training were conducted in the USA, while the rest were spread quite widely around the world – although only five were conducted in Europe, and only one in the UK. Of the randomised controlled studies, 9 were carried out in the USA and 7 elsewhere. Of the studies carried out in the USA, all were controlled or randomised controlled trials except for one case study and one action research study.

Table 3.2.9 Country of study (N=38)

Country	N
USA	16
Canada	4
Australia	3
Hong Kong	3
Japan	2
Egypt	1
Germany*	1
Korea	1
Netherlands	1
New Zealand	1
Poland*	1
Singapore	1
Turkey	1
UK	1
unclear	1
Total	38

*Country deduced as it was not stated explicitly in the reports

3.4 Summary of descriptive map

Thirty eight reports of experimental studies relevant to addressing the review question were found and have been included in the descriptive map. Description of these studies finds that

- Coverage in published and unpublished research since 1980 is spread over those years, with an increase from the mid 1990s.
- English (both EFL and ESL) is the language most studied.
- Empirical intervention studies of all types represent about 7% of the research on strategies found during searching. This is not to say that the other 93% is dismissed or of no value, but simply that the mapped studies in this review are tightly focussed on
 - 1) strategy training (not just strategies),
 - 2) experimental studies, ie testing an intervention of some sort,
 - 3) formal instruction settings,
 - 4) research that is practical rather than theoretical (primary research).

Twenty eight of the 38 mapped studies were comparative studies (1 or more intervention compared, sometimes with a control group or non-intervention group) and 57% of these were randomised controlled trials (where participants from a homogeneous cohort are allocated randomly to one or other intervention, ideally with neither they nor the assessors being aware of who is receiving what). The benefits of the RCT model (control of bias, isolation of the effect of the intervention, reliability of findings, amenability of statistical analysis) need to be considered however against the effect of the intervention often being carried out in a non-naturalistic setting (ie the experimenter adapts the situation to the experiment to some extent different to what the learners ordinarily would have had): however this also occurs with non-RCT studies, perhaps to an even greater extent. Of concern also in the RCT model is the frequent absence of blinding or allocation

concealment as part of the study design (students, assessors, researcher knowing or not who receives the intervention), and the sampling methods and sizes - often clusters, ie groups of classes, are randomised rather than individuals).

A substantial number of the studies in the descriptive map looked at reading (N=12) vocabulary (N=6) and listening (N=6) and together these outcomes accounted for two thirds of the studies found and included in the mapping (24 out of 38). None of the studies looked specifically at socioaffective strategy training though several studies do report participants' perceptions, attitudes and feelings as aspects of the training. Most of the interventions were either cognitive strategy training or mixed in a package with meta-cognitive strategies, and more than half of the cognitive strategy training were interventions that comprised clarifying and checking as a skill. In *toto* however (cognitive, metacognitive and socioaffective), 35 different interventions or elements of interventions were identified – some individually composed and others as parts of combination packages – and they were measured on 20 different major outcomes. Comprehension, understandably to some extent perhaps, was the most common (in 19 of the studies) - this raises the question of whether a useful distinction could be drawn between active and passive strategy training.

The length of interventions varied considerably, ranging from 'single deliveries or events of an hour or less to interventions spread out over a year. A number of the studies (19 out of 40) evaluated interventions of between 2 and 20 hours in length - perhaps a distinction is warranted between strategy training for awareness purposes (which could include short sharp shock type effects) and training that may depend on a cumulative effect over time (practice based strategies). Whatever the case, there is a clear lack of measurement of the effect over time in all the studies – none carried out any long-term follow-up measurement that looked at the duration of the effect of training and this would severely limit any evaluation of effectiveness in terms of cost-benefit for example. Five studies had some form of follow-up testing, but none of these was any longer than a month after the end of the intervention or retested exactly the same sample.

Only 11 of the studies look at strategy training in the school sector and the vast majority (29 out of 38) are studies in the higher education sector (university and adult). The USA accounts for just under half of the studies carried out (16 out of 38 or 42%) and the rest are spread around the world in Europe (5), Asia (7) Canada (3) and Australia (3).

As mentioned above, there has been a marked increase in the number of studies planned and carried out since the mid-1990s. This may well have occurred as a result of the greater importance, from around that time onwards, given to issues of learner autonomy, self access learning, independent study and learner training particularly in the ELT field. However, it would also fit with language providers increasingly needing to rationalise delivery costs and find more effective ways of teaching large, though dwindling numbers of learners. Dissemination of reports of studies has been primarily through journal articles (52%) and post graduate dissertations (34%) since the 1980s and the rest in reports, book chapters or conference papers (see Appendix 3.2.9). It has not been possible here to estimate how many of the post-graduate dissertations have gone on to be published in the mainstream academic literature: until recently, post graduate publications remained 'grey' literature, and however good they might have been, many did not see the light of day. However, with electronic indexing, this bias has been reduced, and dissertations are increasingly available at least in citation reference form online or on electronic databases/indexes.

3.3 Identifying and describing studies: quality assurance results

Of the 26 potentially relevant reports checked for an explanation of why they were not found in database searches, 13 did not appear in any of the databases that had been searched. Of the 13 that did appear in the databases when searched for under author name, the reason for not identifying them were as follows:

- Idiosyncrasies of searching one or multiple databases at the same time (4)
- Indexing of the report does not identify it as modern or foreign language research (4)
- Searcher error in excluding wrongly (4)
- Possibility that the reference was added to the database post-search (1).

The studies found through these checks were added to the total that was screened for inclusion.

The independent screening conducted by the EPPI-Centre identified difficulties in applying inclusion criteria and this led to the production of a tighter definition of strategy training (as described in 2.2.1). This revised definition was then reapplied to all studies by the lead author for all initially included reports.

Three studies remain of concern and need clarification. Multiple attempts to contact the authors have gone unanswered, and it has been decided to deal with these studies as described below for the present. The studies in questions are as follows:

Lawson & Hogben (1998) and Hogben & Lawson (1994)

Two publications apparently reporting 2 studies, 4 years apart, but which possibly use the same data: it is unclear which publication refers to the primary study. Therefore only the 1998 publication (Lawson & Hogben) has been included. Three emails were sent to the authors but no reply has been received.

Tumposky

A reference to a potentially relevant study was identified, but is not obtainable due to copyright restrictions, and the author has not replied to 2 emails

Lam & Wong

It has not been possible to ascertain whether the study had a comparison group or not, and there has been no reply to 2 emails sent to the authors.

4. IN-DEPTH REVIEW: RESULTS

This chapter presents the findings from the studies included in the in-depth review and a synthesis of evidence addressing the review question gathered from these studies.

4.1 *Selecting studies for the in-depth review*

Application of the criteria for the in-depth review (see 2.3.1) resulted in 25 of the 40 mapped studies being included for in depth evaluation. These are listed in full in chapter 6.1. The studies excluded at this point, with reasons for exclusion (N=16) are listed at 6.2.

4.2 *Characteristics of studies included in the in-depth review*

All the studies in the in-depth review (N=25) were relevant to the topic of the Review, reported a clear strategy training intervention, and incorporated a comparison group in their research design. These differed from the remaining 15 studies included in the Descriptive Map which were still primary research but did not include a comparison, or did not include a clear demonstrable intervention, were not clearly strategy training, or were not in a formal setting.

The 25 studies in the in-depth review, grouped in terms of the main language skill or domain targeted by strategy training are listed in Appendix 4.1 while Table 4.1 presents the language skills focused upon by the training interventions (in 3 cases the strategy training focused equally upon two skills or outcomes). There is no obvious reason why reading (or reading comprehension) is the most frequently studied while the other skills are addressed in approximately similar proportions: one suggestion is the possibility that it underpins more centrally, as an indicator of learning, the other productive language skills.

Table 4.1 The language skill focus of training (Studies N=25)

Language skill/domain	N
Awareness	3
Speaking/oral	3
Reading	9
Global proficiency	6
Vocabulary	2
Listening/aural	5
Writing	2
Total	30

The total is greater than the 25 studies as 4 studies address 2 outcomes (Feyten & Flaitz, Flaitz & Feyten, O'Malley et al, Kusiak and Burgos-Kohler

Table 4.2 shows that a minority (N=10) of the studies explicitly categorised the intervention by strategy category. Those which did so were split evenly between those that looked at metacognitive strategies and those that looked at a mixture of strategies. And in fact, when all the studies were classified according to type of intervention, the majority were found to be interested in cognitive interventions.

Table 4.2 Intervention type studied (N=25)

Intervention type	N as reported by study authors	N as interpreted in review
Cognitive strategy training only	0	14
Metacognitive strategy training only	5	7
Socio-affective strategy training only	0	0
Mixed strategy training		
Cognitive + metacognitive	3	2
Cognitive, metacognitive + socio affective	2	2
Not stated/unclear	15	0
Total	25	25

See Appendix 4.2 for studies by strategy type and/or intervention type

The picture is complex and serves to highlight the questions both of defining the strategies, and of what actually matters: it is probably more of academic interest than real relevance (to learners at least) that a strategy is cognitive, metacognitive or socio-affective. This said the difference is illuminating inasmuch as it points out at least 2 features: firstly, for example, the relative absence of research into socio-affective strategies, despite a renewed interest of late in motivation and attitudes of learners, and in intercultural competence. Secondly, the research identified for the review has focussed more on getting learners to do things (cognitive) rather than to know or notice things only (metacognitive) although the distinction is somewhat simplistic, as the latter does not prevent learners taking action themselves..

Table 4.3 Strategies grouped by intervention type

It is not a straightforward task to transpose the studies clearly into the table below, as different studies describe interventions in different ways and are often combinations of interventions in packages. So this table should be used rather as a means of finding where to look for studies involving particular interventions.

Cognitive interventions

Asking higher order questions	1	Ayaduray
Awareness raising	2	Feyten, Kitajima
Dictionary strategies	1	Bishop,
Focussing on specifics/selective attention items	2	McGruddy, Bimmel
Inference	1	McGruddy
Input & output based instruction	1	Cadierno-Lopez
Keyword, mnemonics & association strategies	2	Burgos-Kohler, Lawson,
Notetaking	3	McGuire, Najar, O'Malley
Onscreen messaging	1	Meskill
Predicting	1	McGruddy
Referential links (discourse/grammar)	1	Kitajima
Revision and/or redrafting	2	Sengupta, Bishop
Semantic mapping, glosses, précising, text	5	Carrell, El Koumy, Bimmel

structure & content exposition	(transfer to L2), McGuire, Raymond
Cognitive package of strategies (including clarifying & checking, inferencing, predicting)	5 McGruddy, O'Malley, Ozeki, Paulauskas, Seo
Metacognitive	
Awareness raising	4 Feyten, Flaitz, Kusiak, Talbot
Verbalisation	1 Holunga
Metacognitive strategy package (including planning, defining goals, monitoring, evaluation)	8 Carrell, Holunga, O'Malley, Ozeki, Seo, Talbot, Kusiak, Thompson
Affective	
Cooperating with peers	2 O'Malley, Ozeki

4.3 Further detail of studies included in in-depth review

This section summarises the included studies one by one, with brief descriptions of each intervention and its research method. The reviewers comments are incorporated, summarising the findings in terms of relevance to the review question, and the weight of evidence the study provides in addressing the both the study question and the review question. Preceding each group of summaries is a table that aggregates the findings of these studies, grouped according to the skill targeted by the intervention. It is intended that this permits the reader to get an overall handle on the evidence available for each skill and to locate each summarised study within this.

Speaking ability

Summary of evidence on strategy training for oral ability – 3 studies, positive findings

Relevance	Reliability	Weight of evidence
1 high, 1 medium, 1 low	1 med, 1 high, 1 low	1 medium, 2 low

Can learner strategy instruction succeed? The case of higher order questions and elaborated responses

Ayaduray and Jacobs (1997) evaluated the effect on oral skills of 10 weeks of training of 2 groups of secondary school learners (N=32) of English in Singapore in asking and answering higher order questions. The rationale for this according to the study authors is the importance of the role that question-asking plays in the promotion of thinking skills. Following the intervention, the learners were recorded participating in group discussions. In the analyses of the contributions comparing intervention and non-intervention group, the study found that the intervention group more frequently asked higher order questions and gave elaborated responses. They concluded that their results support the view that it is possible to train students to adopt new, more effective learner strategies: with the appropriate preparation (providing instruction and opportunities to ask higher order questions) and that particularly in this area, learners can be trained therefore to become more effective questioners. They go further and propose that such training should be integrated into language instruction.

The small sample (2 groups/32 individuals), the unclear randomisation procedures and the absence of blinding in the allocation and assessment are limitations to the strength of the findings. The intervention group was reminded for the post testing to use the strategy that had been taught and this may have exerted an influence on their performance beyond the effect of the intervention itself. Overall, while highly relevant to addressing the question of this review, for these above reasons the weight of evidence in addressing both the study question and the review question are considered medium.

1997, Singapore, ESL, secondary school, oral, comparative study, 10 weeks, N=16/32 in 2 groups, learners become better questioners/group discussion improves, medium relevance, medium reliability, medium weight of evidence

The effect of meta-cognitive strategy training with verbalization on the oral accuracy of adult second language learners?

Holunga (1994) trained a group of 9 participants in a study of 48 adult advanced English learners in Canada to use metacognitive strategies comprised of predicting, planning, monitoring and evaluating. Another group in the 48 were given metacognitive strategy training with verbalisation, while a third group was used as control. On testing of discrete item oral accuracy (verb forms), the metacognitive strategies with verbalisation group improved the most, although the group without verbalisation also improved, while the control group showed no improvement. The differences were significant. One caveat is that the performance of the two intervention groups was on particular tasks that focussed on form – there were no measures of general improvement or overall proficiency changes. Delayed post testing after a month found that the effect of the intervention had lasted.

While highly relevant to the review question, and a well-conducted study, it study carries a low weight of evidence in answering the review question as the generalisability of the findings to any other population than the study sample is very limited.

1994, Canada, ESL, adult, oral, comparative study, 15 hours/3 weeks, N=48 in 3 groups, oral accuracy improves, high relevance, high reliability, low weight of evidence

Learner strategy applications with students of English as a second language

O'Malley, Chamot, Stewner-Manzanares, Russo & Kupper (1985) in a randomised controlled trial of 75 secondary school 'intermediate' learners of ESL in the USA set out to evaluate the effect of strategy training (metacognitive, cognitive and socioaffective) on learners' speaking, listening and vocabulary skills. In the experiment, a control group carried out the same task but without the strategy training received by the 2 intervention groups. The training was carried out in 50 minute lessons over 8 days, and the outcomes were assessed in listening and speaking tests.

The data showed a tendency towards better performance for the 2 intervention groups on the listening task, but the association was statistically non-significant. On the speaking task the intervention group performed better, and the result was statistically significant. The vocabulary intervention and findings are not reported.

No baseline measurements are reported, and no data are given for pre-test or interim test performance, and so the conclusions of the study need to be treated cautiously.

(NB this study is also reported in the section below on Listening)

1985, USA, ESL, secondary school, oral, listening & vocabulary, randomised controlled trial, 8 days x 50 minutes, N=75 in 3 groups, speaking improves, high relevance, low reliability, medium weight of evidence

Reading comprehension ability

Summary of evidence on strategy training for reading comprehension ability – 9 studies, 6 with positive results, 1 with negative results and 2 with mixed results.		
Relevance	Reliability	Weight of evidence
7 high, 2 medium,	2 high, 3 medium, 4 low	1 high, 5 medium, 3 low

Effects of strategy training on reading comprehension in first and foreign language

Bimmel, van den Bergh & Oostdam (2001) in a study over 15 weeks, tested a group of 15 year old Dutch secondary school students (N=131 - but 12 in the experimental group and 119 used as a control group) to see whether the reading comprehension strategies taught to them were successful firstly for reading in Dutch, and then whether they transfer to their reading in English. The reading strategies involved comprised

- Identifying key fragments in text
- Identifying hinge words (the connectors that give a handle on a text)
- Questioning (the learner's interrogation of the text)
- Semantic mapping (having an understanding of the main units of the text)

Learners were trained in these in 2 modes, 1) explanation method and 2) consciousness-raising

There was no significant difference as measured by comprehension between the groups concerning transfer of the training effect to English. However, the authors found significant differences in favour of the intervention group on the incidence of identifying key fragments, semantic mapping and hinge words (but not on questioning) that provided evidence of the effect of the strategy training for Dutch, (they concluded that the reading strategies training for L1 was effective).

The study is of medium relevance to the review question as the training takes place for the learners' first language, and it is only transfer to their English which is germane to the review. Due to aspects of sample size and selection, and significant differences in variance on 2 out of 7 baseline measures, there are limitations to the weight of the evidence in addressing the review question which is judged to be low, mainly because the strategy training is for the learners' L1 and it is only the transfer of the effect that is assessed in L2). The authors discuss many of the limitations themselves and the reliability of the findings is low. The researchers also state that they explicitly pressured the participants to use at least one of the strategies in the Dutch and English reading comprehension tests – this may have influenced the effect of the intervention and any autonomous deployment of the strategies by the learners.

2001, Netherlands, English, secondary school, reading, comparative study, 15 weeks, N=131 in X groups? strategy training effective in L1 but doesn't transfer to L2, medium relevance, low reliability, low weight of evidence,

Metacognitive strategy training for ESL reading?

Carrell, Pharis & Liberto (1989) evaluated the effect of two metacognitive interventions on reading ability on 18 of a group of 26 adult, mixed linguistic background university language learners in the USA. The interventions comprised semantic mapping (explicitly organising and categorising information before reading a text, then 'mapping' it against the text) in one group and ETR (Experience Text Relationship) in the other (training the reader to activate personal knowledge in order to improve comprehension of the text).

The authors found no significant difference between the intervention groups and comparison groups on comprehension as measured by multiple choice questions. There were significant differences in favour of the intervention groups on open-ended questions. ETR scored more highly than semantic mapping on a 'partial semantic map' and ETR scored more highly on open ended semantic mapping. They did find however, that learning style and type of intervention had a significant influence on the effect. Overall the authors claim that metacognitive training, in this case semantic mapping and ETR, enhances reading.

However, the small sample size (4 groups and 26 individuals), lack of randomisation, and some aspects of the testing of comprehension limit the reliability of the study findings. Specifically this includes the similarity between intervention and testing – semantic mapping was part of the test as well as the intervention: the control group would not be likely to perform well on the test, yet this could not be a valid assessment of reading comprehension ability.

1989, USA, English, University, Reading comprehension, Comparative study, 4 days, N=18/26 in 4 groups, mixed findings, high relevance, low reliability, medium weight of evidence

Effects of three semantic mapping strategies on EFL students' reading comprehension

El Koumy (1999) in a study similar to that of Carrell, Pharis & Liberto (1989) investigated 3 variations of semantic mapping on reading comprehension (English) on 60 in a group of 237 students majoring in French in an Egyptian university. The intervention of interest to this review trained learners to generate their own maps of the texts to be read, and the study author reports that there was no difference between student-mediated and teacher-initiated semantic mapping (but that teacher-student interactive mapping was significantly better than the former two: this is to be expected but we do not know what happens when the scaffolding provided by the teacher is no longer there). The author concludes that more research is needed.

1999, Egypt, English, University, Reading comprehension, Randomised comparative study, 20 hours/5 months, N=60/237 in 3 intervention groups, mixed findings, medium relevance, medium reliability, medium weight of evidence
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Referential strategy training for second language reading comprehension of Japanese texts

Kitajima (1997) in a study of 28 American college students taking Japanese trained the participants in the intervention group to identify phrasal divisions by listing verbs and conjunctions, to identify logical connections between clauses by specifying functions of conjunctions and adverbials and also forming questions based on verbs and cohesive devices and then comparing the analysis with what they found while reading. A control or

comparison group had taken the same course a semester earlier (though this is a limitation given that the sample is not from the same frame).

For the outcome of overall reading comprehension, the study reports no significant difference between groups on paragraph 1 of the test text that was used, but significant differences between the groups on paragraphs 2,3 and 4. On the second outcome, that of identifying referential ties in the texts, no differences were found on paragraphs 1 and 2 while significant differences were found on paragraphs 3 and 4. From this the author concludes that in spite of the limitations, “strategy training that directs students’ attention to monitoring coreferential ties can be considered to have positive effects on their comprehension of Japanese texts.”

The author discusses the limitations of the study which include the possibility of influence from confounding variables and the interactivity with variables other than the one of interest. Selection methods of the samples, absence of measurement of strategy use after the intervention, and the possibility of experimenter bias are also limiting factors.

1997, USA, Japanese, University, Reading comprehension, comparative study, 4 times a week for 15 weeks, N=28 in 2 groups, mixed findings with some positive effect, high relevance, low reliability, low weight of evidence

The effect of metacognitive strategy training on reading comprehension and metacognitive knowledge

Kusiak (2001) in a comparative study on 78 out of 158 secondary school learners of English, evaluated the effect of training in metacognitive strategies on reading comprehension and metacognitive knowledge. The intervention consisted of eight 45 minute lessons, additional to their regular language study, in which they were made aware of strategies, practiced basic reading strategies, observed their own and peers’ use of strategies and worked on assignments at home. (The experimental group also had a few extra lessons but the teachers were asked not to teach reading skills.)

The study reports positive findings for self-evaluation skills and reading comprehension and the author concludes that the study points to the effectiveness of metacognitive strategy training for students of intermediate level, and that it was more effective for learners of lower ability.

2001, Poland, English, Secondary school, Reading comprehension & metacognitive knowledge, comparative study, 8 x 45 mins for 15 weeks, N=78/158 in 2 groups, metacognitive training effective for reading comprehension on intermediate learners, high relevance, medium reliability, medium weight of evidence

NB This study is also included in the section on Awareness

Generative précising as a reading comprehension strategy for adult ESL learners

McGuire (1999) in a study of 54 in 71 fee-paying adult learners on an English for professional purposes course in the USA evaluated the teaching of a strategy in a short intervention of around an hour’s duration: it comprised the comparison of 2 versions of highlighting meaning in text with generative précising (the learner makes notes in short translated chunks in the margin of the reading text). The 3 interventions were underlining and signalling, re-reading and repetition and then the generative précising (a ‘control’ 4th group had a grammar topic but it is unclear to what extent this genuinely provided a control group for comparison

purposes as it is not stated if this was standard practice and it could itself have exerted an influence on performance.

While the study found a positive effect of generative précising on reading comprehension, the robustness of the findings is compromised by a number of the study's characteristics including queries surrounding the choice of interventions for comparison, a significant difference between low ability and high ability learners at baseline, unclear evidence as to what extent the strategy of précising was being used by the 3 or 4 groups (control group not reported, and only absence of evidence reported for re-reading group). While the interventions were randomised to the 4 groups, there is no indication of any concealment of allocation or of how the individuals assigned themselves to the 4 groups (other than them being constrained by scheduling).

While the author discusses the potential problem of the difference between generative précising (the intervention of interest) and underlining, and states that the former is 'meaning-creation' while the latter is 'selection', the study still compares them as a means of evaluating the effectiveness of précising. In light of this, it seems self-evident that the former would prove relatively effective unless both can be clearly shown to influence reading comprehension: this seems to be borne out by that fact that the re-reading and underlining are apparently not more effective than the control group activity. Furthermore, the control group gain scores were higher than the underlining and re-reading gain scores: in fact in the higher ability group, the gain score of the control group was very close to that of the précis group.

1999, USA, ESL, Tertiary, Reading comprehension, RCT, 6 hours including testing over 3 sessions in 6 weeks, N=54/71 in 4 groups, generative précising (note-taking) works for reading comprehension for adult learners, high relevance, low reliability, low weight of evidence

The effect of note-taking strategy instruction on comprehension in ESL texts

Najar (1997) in a randomised controlled trial on 135 of 338 college learners of English in Japan in 10 groups allocated to intervention or control, evaluated the effect on strategy use and reading comprehension of teaching them how to take notes.

The results showed that notetaking had a positive effect on reading comprehension (comprehension test), and that within the intervention groups there was a difference between those who used the strategy and those who did not – however, some selection of data to use appears to have occurred as “only learners who used the note-taking strategy on the post test were used to measure notetaking strategy transfer.” The effect did not show any greater use on the ‘transfer’ task, ie a second similar comprehension test.

No information is given on dropouts or non-completers (at least 9 participants in the intervention group), and a difference found between intervention groups was ascribable to teacher differences.

1997, Japan, English, Technology institute, note-taking & reading comprehension ability, RCT, 9 weeks, N=135/338 in 10 groups, positive findings with caveats, high relevance, medium reliability, medium weight of evidence
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The effects of structure strategy training on the recall of expository prose for university students reading French as a second language

Raymond (1993) in a randomised controlled trial of 43 first year university learners of French in Canada, trained the intervention group in strategies to derive the content of a reading text by unpicking and describing its structure: five frequently found 'Top Level Structures' (TLS) in prose were identified to inform the training, viz description, collection, causation, problem-solution, comparison (although only problem-solution was tested). The reading component of a proficiency test was given to all participants before the study, and both groups received 5 hours of training. An outside instructor taught the intervention group covering each TLS in a session, while the control group spent a comparable time reading without training.

One month after the intervention all participants were given a similar test using a second text. The study found that the experimental group scored higher in content recall than the control group at post-testing – but only on one of the texts used. The researchers found that some more proficient learners were already using TLS strategies – perhaps spontaneously transferring skills from L1 (cf Bimmel's study which didn't find evidence of transfer of taught strategies from L1 to L2). The author concluded that there is some evidence for a positive effect of strategy training using the TLS strategy, the statement being restrained by discussion of the complexity of strategy interventions and interconnectivity of factors in educational interventions. Interestingly the author writes that a clearer picture will in the end come from accumulation of evidence from research.

The robustness may be limited by the cluster randomisation (not individuals) in conjunction with the small sample size. Participants were paid to take part in the study, and it was not reported whether or not allocation was concealed.

1993, Canada, French, University, text structure mapping for reading comprehension ability, RCT, 5 hours, N=43 in 2 groups, positive findings, high relevance, high reliability, medium weight of evidence

Meta-cognitive strategy training for reading: Developing second language learners' awareness of expository text patterns

Talbot (1995) in a randomised cluster trial (12 intact groups rather than individuals randomised to intervention and control arms) of 183 + 51 in a total of 244 Chinese background Hong Kong learners from post secondary training colleges, trained the intervention group in metacognitive awareness of text structure in English. The control group continued with its standard syllabus, and both arms were pre and post tested at 5 weeks: additionally the intervention group was tested again after 4 months to assess the duration of any training effect – this is one of the few studies that incorporate delayed post testing.

The primary outcome of interest is performance on reading comprehension tests, but the effect of the intervention was assessed against other variables including gender, L2 proficiency level, self-rating of reading ability, and learning approach.

The study found that the intervention groups made statistically significant gains over the control groups with gains on 3 out of the 4 components of the testing (but not on the component 'using textual clues to reconstruct scrambled expository text'). The group classified as 'medium proficiency' gained more than the other two levels (low and high) and this difference was significant. Removing the controls from this analysis, the low and medium both gain more than the high level learners. Qualitative data were also favourable to the intervention groups. The author concludes that strategy training in expository text structure awareness was effective in its influence on learning performance.

Delayed post testing after 4 months relied upon data sampled from selected intervention participants and did not involve retesting comprehension.

1999, Hong Kong, ESL, HE, reading, randomised controlled trial, 10 x 1 hour lessons over 5 weeks & 4 month delayed post test, N=183/244 in 12 intact groups, statistically significant difference in favour of intervention, high relevance, high reliability, high weight of evidence.

Writing ability

Summary of evidence on strategy training for writing ability – 2 studies, both positive		
Relevance	Reliability	Weight of evidence
2 high	2 medium	2 medium

Using quality and accuracy ratings to quantify the value added of a dictionary skills training course

Bishop (2001) evaluated the effect of training a group of 15 out of 30 adult distance learners of French to use a dictionary when redrafting and revising an essay. The training consisted of learners spending 3 to 6 hours reading and working through the dictionary course that they received, and then redrafting an essay that they had written. A control group, although not from exactly the same body of students, redrafted their essay without having the dictionary skills course. Bishop found that the intervention group improved by around 14% and the control group by about 1.5% in language accuracy scores on the redrafted essay, and 11% and 2.2 respectively for the two groups on quality scores at redraft.

The study is very relevant to the question of the review regarding strategy training. While there are limitations to the strength (medium) of the findings of the study due to aspects of the sample selection, absence of measurement of strategy use (how much and in what ways did they use the dictionaries?) and analyses of variance in the results, the simple intervention with clear outcome measurement and the apparently large effect size of >10% improvement) make this a noteworthy study of medium weight of evidence in answering the review question.

2001, UK, French, adult, writing, comparative study, 10 hours, N=15/30 in 2 groups, >10% improvement in writing, high relevance, medium reliability, medium weight of evidence.

An investigation into the effects of revision strategy instruction on L2 secondary school learners

Sengupta (2000) in a study carried out around 1997 though not published until 2000, evaluated the effect of getting secondary school learners in Hong Kong to redraft their essay first drafts. The strategies for redraft included training in making student texts more reader friendly by unpicking variables such as attitude to writing, and student definition of a good composition, while the main outcome measured was gain score on the rewritten essay. Six compositions were treated during the year and teacher scaffolding was gradually reduced. The study population of 118 girls, in pre-existing class groups, was allocated to 2 intervention groups and 2 control groups (although one of the latter was excluded before the intervention began) – details of selection are not reported.

The compositions were marked holistically, and gain scores compared after redrafting. Participants perceptions were recorded by questionnaire (only the intervention groups), and a sample (N=8) of participants was interviewed towards the end of the study. An interesting aspect of the study was that it preserved as much as possible of the standard school situation

The study reports that the 2 intervention groups made greater gain scores than the control groups, and concludes that the findings corroborate the theoretical belief that revision ha the potential of a new assignment and thus may be worth the time and effort. However, analysis did not control for what happened in the classroom (ie differences between classes, teachers and delivery of intervention). Data are reported on 100 students only although 118 took part, and the sample was female only and this cannot be controlled for.

2000, Hong Kong, English, secondary school – female only, writing, comparative study, 6 compositions over the year, N=118 in 4 groups, training was effective but ;earners preferred traditional methods, high relevance, medium reliability, medium weight of evidence.

Overall language ability

Summary of evidence on strategy training for overall language ability – 5 studies, 1 positive, 1 negative and 3 mixed results		
Relevance	Reliability	Weight of evidence
3 high, 1 medium, 1 low	3 med, 2 low	1 high, 2 medium, 2 low

The effect of a selected group of language learning strategies upon language development

Burgos-Kohler (1991) examined whether students learning Spanish in an American university, trained in keyword, elaboration, association, grouping, recombination and contextualisation strategies for vocabulary learning using an embedded instruction approach would improve their Spanish vocabulary and their overall proficiency in Spanish more than those not receiving training for Spanish vocabulary. "This six week study compared the achievement of students in three groups. The students in experimental group 1 were given instruction on various language learning strategies and were provided exercises in which to apply these strategies. Students in experimental group 2 were only given lists of vocabulary words to study and use in sentences. Students in the Control Group were left to their own learning devices." (pvii)

Statistically significant positive results were reported for both vocabulary acquisition measures and end of semester grades. Confounding factors including the effect of the intervention group being given additional materials to work with as self-study, selection of the test vocabulary items from the beginners course books, possible unclear division between intervention and test, may affect the strength and reliability (medium and medium) of the findings, although overall the study is very relevant and is considered to carry high weight in addressing this review question.

1991, USA, Spanish, University, vocabulary & language proficiency, comparative study, 6 weeks (8 x 10 minutes), N=104/143 in 6 groups, improvement in vocabulary and overall proficiency, high relevance, medium reliability, high weight of evidence.

NB This study is also included under the section on Vocabulary

Explicit instruction in grammar: a comparison of input based and output based instruction in second language acquisition

Cadierno-Lopez (1992) compared the impact of two different forms of instruction and on the way learners, in this case 6 groups of Spanish learners at a US university, process incoming linguistic information. The study investigates teaching Spanish learners to focus

*explicitly on comprehension of grammar (input), or

*explicitly on producing examples (output) of the grammar item

as compared with a group that received no training.

The researcher hypothesised that input processing is more effective than output processing or no training on either vocabulary acquisition or overall proficiency, both in terms of understanding the input and in accuracy of output.

There was no significant difference between processing instruction and traditional instruction although both were statistically significantly better than no instruction at all. However, the researchers discuss the possibility that the repeated testing could have had an instructional effect itself and contributed to the effects found.

The study is not highly relevant to the review question as it is to some extent an investigation of 2 teaching methods. However, the awareness aspect embodied in it brings it into the realm of strategy training from the learners' point of view.

1992, USA, Spanish, University, language proficiency (comprehension, grammar, vocabulary), RCT, duration ?, N=94/141 in 6 groups, mixed findings, medium relevance, medium reliability, medium weight of evidence

Consciousness raising and strategy use

Feyten, Flaitz & LaRocca (1999) in the second phase of a randomised controlled trial with 863 secondary, middle school and university learners of French and Spanish, in the USA, looked at the effect of giving an metacognitive awareness raising (MAR) handout on 26 strategies, and a cognitive awareness raising (CAR) handout on 26 reasons for studying a language. These were compared with a control/placebo group that completed a survey on myths about learning languages – although no information was available in the report on the relative numbers of experimental and control groups. The effect of these 'short sharp shock' awareness raising interventions was assessed via the participants' performance on their regular final exam grades.

The findings were mixed, including a non-significant positive effect in the control group amongst the university learners of French, a non-significant positive effect of CAR in the secondary school group, and a greater effect in the control group of University Spanish and French learners. The findings in support of CAR were non-significant and only in one group (secondary school) yet the authors conclude that MAR and CAR seemed to be having some effect on learners.

1996, USA, Spanish, University, Secondary school, Middle school, language proficiency, RCT, 50 mins, N=863 in 6 groups, mixed findings, high relevance, low reliability, low weight of evidence

NB this study is also reported in the section on Awareness raising (it is included here on the basis of its relevance to the outcome of global proficiency rather than the intervention)

A two phase study involving consciousness raising and strategy use for foreign language learners

Flaitz & Feyten (1996) in phase 1 of their 2 phase study, a randomised trial, looked at the effect of strategy awareness raising on 130 + 99 first year university learners of Spanish. The intervention comprised a handout called ‘How to survive Spanish 1 or 2’ outlining 26 language learning strategies and an activity to categorise these strategies: the control groups received a ‘placebo questionnaire’ but this may have had some effect on the learners if it differed from standard practice. The effect was investigated via regular end of semester tests and questionnaires about strategy use.

The findings included a significant difference between experimental and control groups in favour of the intervention as measured by final grades although the authors also discuss the possibility of confounding variables (eg teacher differences, enthusiasm) playing a part, and they conclude from their results that awareness raising in a short sharp burst has the potential to be effective.

1994, USA, Spanish, University, strategy use & language proficiency, RCT, 50 mins, N=130/229 in 12 groups, mixed findings, high relevance, medium reliability, medium weight of evidence

NB this study is also reported in the section on Awareness raising while it is included here for its relevance to the outcome of overall proficiency.

Language learning strategies advice: a study on the effects of on-line messaging

Meskill (1991) in a study with a group of 34 ESL learners at a university in the USA, looked at the effect of strategy advice messages appearing on screen as they worked on video language tasks online. One group received messages while the other did not. Participants were observed to ascertain whether or not they read the messages and whether or not they followed the advice in them. Outcomes of interest measured in the study by observation were whether learners stayed on task longer, read the messages, took the advice and performed as well as good language learning strategists on a post-test of oral ability, and attitude.

While the quantitative findings show that the messages have no significant effect on performance, the author still concludes from the qualitative data that student reactions to the messages are suggestive of positive effects.

However, insufficient data in the report, inconsistencies between the reported results and conclusions, the absence of pre-testing and sparse information on participants make it difficult to see to what extent the performance and intervention were affected by participant ability and characteristics, or other influences.

1991, USA, ESL, University, online strategy messages to learners, Comparative study, 50 mins, N=34 in 2 groups, no significant differences found, low relevance, low reliability, low weight of evidence

Vocabulary ability

Summary of evidence on strategy training for vocabulary ability – 2 studies, both positive results		
Relevance	Reliability	Weight of evidence
2 high	2 medium	1 high, 1 medium

The effect of a selected group of language learning strategies upon language development

Burgos-Kohler (1991) examined whether students learning Spanish in an American university, trained in keyword, elaboration, association, grouping, recombination and contextualisation strategies for vocabulary learning using an embedded instruction approach would improve their Spanish vocabulary and their overall proficiency in Spanish more than those not receiving training for Spanish vocabulary. "This six week study compared the achievement of students in three groups. The students in experimental group 1 were given instruction on various language learning strategies and were provided exercises in which to apply these strategies. Students in experimental group 2 were only given lists of vocabulary words to study and use in sentences. Students in the Control Group were left to their own learning devices." (pvii)

Statistically significant positive results were reported for both vocabulary acquisition measures and end of semester grades. Confounding factors including the effect of the intervention group being given additional materials to work with as self-study, selection of the test vocabulary items from the beginners course books, possible unclear division between intervention and test, may affect the strength and reliability (medium and medium) of the findings, although overall the study is very relevant and is considered to carry high weight in addressing this review question.

1991, USA, Spanish, University, vocabulary & language proficiency, comparative study, 6 weeks (8 x 10 minutes), N=104/143 in 6 groups, improvement in vocabulary and overall proficiency, high relevance, medium reliability, high weight of evidence.
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NB This study is also included under the section on Overall ability

Learning and recall of foreign language vocabulary: effects of a keyword strategy for immediate and delayed recall

Lawson & Hogben (1998) trained 2 intervention groups and a control group in a sample of 40 secondary school girls learning Italian in Australia, in the keyword and an elaborated keyword method to test the effect on vocabulary recall. The intervention (N=26) comprised the participants devising their own keywords for a set of 9 nouns in a booklet given to them. The keyword method was then explained to them and how they should use it to remember vocabulary items, and they were encouraged not to abandon the search for keywords even when they found it hard. The control group had no specific instruction on vocabulary learning methods. Over the 10 days after the intervention the students were tested 3 times for their ability to recall the listed words.

The study reports a significant positive effect for the elaborated keyword method and the keyword method, but the reliability is limited due to lack of reporting on sampling and sample selection, and the shortage of detail on testing and assessment in the study. Perhaps more importantly, it is difficult to determine the material difference between keyword and elaborated keyword interventions such that they could give rise to significant differences. In such a bundle of strategies as the elaborated keyword method, it is important to unpick the compound effect.

1998, Australia, Italian, Secondary school – girls only, keyword method for vocabulary recall, RCT, 2 x 45 mins, N=40 in 2 groups of matched pairs, statistically significant positive findings in favour of intervention, high relevance, medium reliability, medium weight of evidence
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Listening comprehension ability

Summary of evidence on strategy training for listening comprehension ability – 6 studies, all positive results		
Relevance	Reliability	Weight of evidence
1 high, 5 medium	2 medium, 4 low	4 medium, 2 low

The effect of listening comprehension strategy training with advanced level ESL students

While this study by McGruddy (1995) reports statistically significant difference in favour of the intervention group, it is only on the outcome of selective attention that the intervention group increased their strategy use. The researcher found that the listening logs were not as productive as anticipated and that prediction and inferring strategies were not frequently mentioned. Overall, the author concludes that training selective attention as a strategy may be useful in improving listening comprehension ability – however, there appears to be a difference between the abstract and discussion sections of the report, where the former reports positive intervention group change on the Michigan test for listening and the latter reports no change on this test.

Confounding variables are not discussed in the study and it is possible that bias was introduced by the selection of a specific class for the intervention group. Differential attrition between the groups (failure to complete or do the intervention or remain in the study) cannot be assessed as the attrition is not reported and the numbers are unclear.

1995, USA, ESL, University, prediction, inference & selective attention for listening comprehension, Comparative study, 1.5 hours x 14 weeks, N=10/32 in 3 groups, statistically significant positive findings in favour of intervention, medium relevance, low reliability, low weight of evidence

Listening strategy instruction for female EFL college students in Japan

Ozeki (2001) in an unpublished doctoral dissertation reports on the effects of strategy instruction for a group of 25 in 45 female EFL first year college students in Japan on their listening ability. The intervention was 'embedded, integrated' training that consisted of metacognitive strategies (directed attention, selective attention, self-evaluation), cognitive strategies (note-taking, inferencing, summarisation) and socioaffective strategies (questioning for clarification, cooperation) and the intervention group was compared with a control group that did not receive strategy training.

The effect of the intervention was measured via listening comprehension ability, attitude towards the strategies, and the students' use of them.

The control group in fact used the cognitive and socioaffective strategies more than the intervention group, though the intervention group used metacognitive strategies more. Overall, the intervention group's use of strategies was higher.

On the outcome of listening comprehension ability, there was no significant difference between experimental and control groups, both of which gained significantly at post testing. In fact the gain of the control group was greater than half of the gain of the experimental group.

Interestingly, the authors conclude all the same that the strategy training was successful (for both groups), that students had positive attitudes towards the strategies (only the experimental group reported on these in journals), and that they used them and continued to use them beyond the end of the intervention (although there were no delayed post-tests).

2001, Japan, EFL, College - female, integrated strategy training for listening comprehension, controlled comparative study, 6/7 months at 90 mins/week, N=25/45 in 2 groups, Positive results, medium relevance, low reliability, low weight of evidence
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Learner strategy applications with students of English as a second language

O'Malley, Chamot, Stewner-Manzanares, Russo & Kupper (1985) in a randomised controlled trial of 75 secondary school 'intermediate' learners of ESL in the USA set out to evaluate the effect of strategy training (metacognitive, cognitive and socioaffective) on learners' speaking, listening and vocabulary skills. In the experiment, a control group carried out the same task but without the strategy training received by the 2 intervention groups. The training was carried out in 50 minute lessons over 8 days, and the outcomes were assessed in listening and speaking tests.

The data showed a tendency towards better performance for the 2 intervention groups on the listening task, but the association was statistically non-significant. On the speaking task the intervention group performed better, and the result was statistically significant. The vocabulary intervention and findings are not reported.

No baseline measurements are reported, and no data are given for pre-test or interim test performance, and so the conclusions of the study need to be treated cautiously.

NB This study is also reported in the section on speaking

1985, USA, ESL, secondary school, oral, listening & vocabulary, randomised controlled trial, 8 days x 50 minutes, N=75 in 3 groups, speaking improves, high relevance, low reliability, medium weight of evidence

The effects of strategy training on the aural comprehension of L2 adult learners at the high beginning/low intermediate proficiency level

Paulauskas (1994) in a doctoral dissertation on a comparative study in a Canadian university, looked at the effect of training 44 adult ESL learners at beginner/intermediate level in four comprehension-fostering strategies – predicting text content, summarising main ideas, questioning for comprehension, and clarifying comprehension difficulties. One of the intervention groups received reciprocal training (taking the role of experimenter or teacher in instructing the strategies) as well as the strategies, the second group had no reciprocal training, and the control group received the materials with no training in how to use them.

The outcomes were tested via an L2 listening comprehension test, and a specifically designed strategy test, and the study found that the 2 strategy groups performed better than the control group on the listening tests, but that there was no difference between the 2 intervention groups.

Not all the participants (N=5) were randomised due to timetable constraints, and in conjunction with small group sizes, this may have affected the robustness of the findings.

1994, Canada, ESL, Adult, strategies for listening comprehension, Randomised controlled study, 3 times per week to 12 hours, N=44 in 3 groups, statistically significant positive findings in favour of interventions, **medium** relevance, medium reliability, medium weight of evidence

Intervening in tertiary students' strategic listening in Japanese as a foreign language

Seo (2000) conducted a doctoral study, in which 10 university level learners of Japanese in Australia were given cognitive and metacognitive strategy training and the effect on their listening comprehension ability tested via the use of video news broadcasts in Japanese. The intervention group received training in identifying key terms, elaborating and inferencing which the author explains are derived from metacognitive strategies of planning, defining goals, monitoring and evaluation, and in cognitive strategies of predicting content, listening to the known, listening for redundancy, listening to tone of voice and intonation, and resourcing.

Participants decided, based on their timetable needs, which group to join. There was no concealment of allocation, and learner variability was not discussed. The author discusses limitations of findings due to sample size - the sampling frame was 40 but voluntary participants numbered 10. There was baseline testing of Japanese ability (audio only) and the post testing was audio-visual.

The study reports positive findings, that the intervention group performance overtook that of the control group in the 2 final tests in a series of 8 (tests were conducted on both groups from the outset each week and a possible effect from the test must be considered – as does the author - as well as the performance on the first 6 tests).

2000, Australia, Japanese, University, metacognitive & cognitive strategies for listening comprehension, controlled study, 19 weeks, N=10 in 2 groups, positive findings in favour of intervention, medium relevance, low reliability, medium weight of evidence

Can strategy instruction improve listening comprehension?

Thompson & Rubin (1996) in a study (carried out in 1991/92 but only published in 1996) of 24 +12 third year Russian learners in an American university, evaluated the effect on their listening comprehension of listening strategies incorporated into 45 video clips, amounting to 15 hours, watched over the academic year (the control group had the same clips). The intervention and control groups had different lesson plans.

The training consisted of meta-cognitive strategies – planning, defining goals, monitoring, evaluating; cognitive strategies included predicting content, listening to the know, listening for redundancy, listening to tone of voice and intonation, and resourcing (eg jotting down phrases to see what they mean).

At the end of 2 semesters, both groups were tested using the same video and audio comprehension tests. The following year, the group taking 3rd year Russian course was given the same intervention and test and their results were added to those of the intervention group of the previous year.

Authors accept that the sample is small and lacks power. In addition to this, there are risks present to reliability from use of historical data for control group comparison, and the combining of data from 2 years – indeed without control group data for the 3rd intervention group.

1996, USA, Russian, University, Listening, randomised controlled trial, 3 times a week x 50 minutes for 15 hours, N=24/36 in 2 groups, Significant improvement in favour of intervention, medium relevance, medium reliability, medium weight of evidence.

4.4 Synthesis of evidence

Speaking

The three studies of strategy training to improve speaking ability are of mixed relevance and reliability with regards the review question, but the review finds that there is some reliable evidence in favour of a beneficial effect of strategy training on speaking ability. The evidence is not very strong due to small samples, unclear randomisation procedures, absence of concealment of allocation in the studies and inadequate reporting of data. All three studies report positive findings, but while there is a consensual picture concerning the effect of training on the major outcome of speaking ability, the differences in the interventions and between the studies must be borne in mind. The studies were from 3 different countries though all were of ESL learners and this may further constrain generalisability to other languages and other settings.

Ayaduray & Jacobs (1997)	Training in higher order questions and elaborated responses	Better questioning, better group discussions
Holunga (1994)	Metacognitive training (predicting, planning, monitoring & evaluating) with and without verbalisation	Greater oral accuracy in both intervention groups
O'Malley et al (1985)	Mixture of cognitive, metacognitive and affective strategy training on listening, speaking and vocabulary (though the latter is not reported)	Better speaking

Reading (comprehension)

Compared to studies looking at other outcomes of interest, those testing interventions on reading comprehension show fewer differences in the approaches taken, both in the interventions (mainly metacognitive/semantic mapping) and in the outcomes of interest (mainly reading comprehension). This makes synthesis of the findings less problematic. Seven of the 9 studies on strategy training for reading are considered of high relevance in addressing the review question, most of them look at reading comprehension as the outcome, and most are interventions of semantic mapping or structural mapping to improve comprehension. More than half of the studies (5 out of 9) are either of medium or high reliability and the overall contribution in terms of weight of evidence of these studies to addressing the review question is quite high (7 out of 9 are high or medium). In summary then, a body of reliable evidence emerges to show that strategy training for reading comprehension is effective.

Two of the studies found a differential effect depending on the ability level of learners, and this may indicate an avenue for further research to establish where the strategy training might be more effectively focussed if it is not a general benefit. A third study found similar differences for level – but the differences were already present at baseline.

The studies were carried out between 1989 and 2001 with most being completed in the late 1990s in the Netherlands, USA, Egypt, Poland, Japan, Hong Kong and Canada and the languages involved were mainly English but also Japanese and French. This diversity of setting plus the generally cautiously understated positive findings may support a degree of generalisability.

Sample sizes varied considerably (between 28 and 338) and none of the studies randomised individuals - a characteristic that has a bearing on the robustness of any findings (with cluster analysis, ie randomisation of groups, the power to detect an effect is reduced).

Other aspects of some of the study designs and methods used that constrain the reliability include;

- Small sample sizes and potential selection bias
- Influence of experimenter on the study
- Absence of randomisation (only 5 of the 9 were RCTs)
- Variance (heterogeneity in groups at baseline)
- Validity issues on assessment of reading comprehension
- Confounding variables and their non-investigation
- Lack of information of dropouts and non-completers
- Absence of concealment
- Overstated reporting of results
- Poor reporting

On the other hand, the Talbot study was one of the very few of the included studies to incorporate any longer term follow up measurement of the intervention effect (delayed post testing) though it was qualitative and of selected participants and did not replicate the quantitative immediate post tests.

Bimmel et al (2001)	Do reading strategies (semantic mapping inter alia) taught in L1 (Dutch) transfer to English?	No transfer, even though the strategies worked in L1 (but some indication of partial transfer)
Carrell et al (1989)	Metacognitive training (semantic mapping) for reading comprehension	No effect on comprehension as measured in MCQs but there was a positive effect when measured by open ended questions
El Koumy (1989)	Semantic mapping for comprehension	Positive effect found when accompanied by high degree of scaffolding from teacher
Kitajima (1997)	Identifying certain text discourse features to improve comprehension	Some indication of a positive effect (but overstated perhaps)
Kusiak (2001)	Metacognitive strategy training - practice of reading strategies, observing peers (working on assignments at home) for metacognitive knowledge and reading comprehension	Positive findings, and more effective for low ability learners
McGuire (1999)	Notetaking (generative	Positive findings – generative

	précising - translated notes of chunks of meaning in the margin) to help reading comprehension	précising helps reading comprehension
Najar (1997)	Notetaking for reading comprehension	Mixed findings, though reported as positive effect
Raymond (1993)	Understanding text structure to help in recall of contents	Some indication of positive effect though author includes caveats on this.
Talbot (1995)	Metacognitive strategy training (awareness of text structure)	Positive effect, and subgroup classified as 'medium' proficiency' did better than high and low on reading comprehension tests

Writing ability

It is difficult to make claims for strong evidence on the basis of 2 studies that show strategy training in writing has a positive effect, and one might even claim it is intuitive common sense that revising and rewriting of first drafts of essays is likely to produce better written work. However, in both the studies above, the control groups did not show the same improvement although they also redrafted their work, and one conclusion at least is that the strategy training had something to do with this. In the Bishop study, it was at the very least redrafting plus use of the dictionary that made the difference, and in the Sengupta study, carried out over a school year in a relatively naturalistic setting (ie the intervention was integrated with normal practice), it was redrafting plus removal of teacher support/scaffolding nurturing learners towards greater independence. Both studies were considered highly relevant to addressing the review question, and both were of medium reliability and weight of evidence.

Differences between the studies impinge on the degree to which one can 'lump' the findings (one was an adult distance learning population in the UK taking French, the other a female school population learning English in Hong Kong. Generalisability is likewise constrained by the limited evidence available.

Bishop (2001)	Training in dictionary skills	>10% improvement of quality and accuracy in redrafted essays
Sengupta (2000)	Redrafting of essays	Positive effect on writing

Overall language ability

Four out of the five available studies were of high or medium relevance to the review question (the online messaging study by Meskill was less directly relevant as it was less conceived as a strategy training than as a learning method).

The findings of the studies lend some support to a possible beneficial effect of strategy training on overall language ability though it is not incontrovertible by any means. A characteristic of the approach in 2 of the studies was that they retained a naturalistic element and measured the effect of the training against the regular end of term tests – although this

perhaps rendered detection of the effect more problematic, particularly if it is small. The findings are mixed, and the studies discuss both the methodological reasons and the confounding influences that might have played a part in the results.

The confounding factors include

- Additional self-study materials given to the intervention group (but not the control group) in one study
- Unclear separation between the test vocabulary items and the content of the coursebook (so any effect could not be clearly attributed to strategy training rather than familiarity through the materials)
- Repeated testing may have had an instructional effect in one study
- Teacher differences including enthusiasm (that affect delivery of the intervention)

And methodological considerations that affect the reliability include

- Non-randomised selection of samples (although 3 of the studies were randomised)
- Insufficient background data and reporting of characteristic of the participants
- No long-term follow-up of the duration of any effect
- Little measurement of deployment or use of strategies by learners

The findings themselves were mixed and negative (particularly in the Feyten and Flaitz studies, and it is reassuring that this is reported openly, without exaggeration of findings – only 2 reported positive results. The overall result however is that is difficult to claim on the basis of these studies that global proficiency can be clearly improved by strategy training. These two studies were of great interest as they numbers of participants were large, in both Spanish and French language learning and across school and tertiary education levels. They looked at usual end of semester test results as measures of the intervention effect, and while their efforts in remaining as naturalistic as possible are clearly worthy, the diversity of settings and participants may have hidden or weakened the detection of what was happening.

It is problematic to combine or synthesise the 5 studies in a straightforward manner as there are differences between the interventions and settings. However, they all looked at global performance as an outcome, and in this respect a degree of comparability is warranted.

Burgos-Kohler (1991)	Mnemonic strategies for vocabulary and overall language ability	Positive effect on vocabulary acquisition and end of semester grade scores
Cadierno-Lopez (1992)	Focussing on grammar input rather than language output for better comprehension and language production	Positive effect on comprehension and production
Feyten et al (1999)	Awareness raising on strategies (cognitive & meta-cognitive) on proficiency	Mixed findings (on end of semester grades)
Flaitz et al (1996)	Awareness raising	Mixed findings
Meskill (1991)	Cognitive strategy training/awareness raising to improve language ability	No significant improvement

Vocabulary ability

The 2 studies found that training learners to use keywords to help remember and recall vocabulary items were successful, one in Italian and one in Spanish, the former at school level (girls only) and the latter at university level. However, there are aspects of the nature of the intervention (unclear difference between keyword and elaborated keyword) and the ways in which the studies were carried out (practice effect from testing; extra work done by intervention group) that limit the reliability of the results.

An earlier study by Hogben and Lawson could not be included as it is unclear whether or not the report refers to the same study and data (the authors have not responded to efforts to clarify this). If it is a different study, it might add to the evidence available for the effect of strategy training on vocabulary acquisition.

Perhaps of greater import is the consideration of the long term effect of the strategy on learner, ie firstly whether there is any long term benefit to what is a labour-intensive way to learn new words (if it is deployed systematically for all vocabulary), and secondly whether it prevents learners developing other more effective ways of learning vocabulary (inferencing, generative examples, contextualisation).

The evidence overall is considered to be weak.

Lawson & Hogben (1998)	Mnemonic (keyword) and elaborated mnemonic approaches for vocabulary retention & recall	Positive effect of both found on vocabulary outcomes
Burgos-Kohler (1991)	Mnemonic strategies for vocabulary and overall language ability	Positive effect on vocabulary acquisition and end of semester grade scores

Listening comprehension ability

The overall evidence in favour of strategy training to improve listening comprehension is weak due to methodological characteristics of the studies: it is a pity that the research evidence does not clearly support the instinctive and professional expectations that certain strategies might improve listening ability – predicting, focussed listening, understanding redundancy seem intuitively attractive. This said, the studies generally found that the interventions had a positive effect on the learners’ listening ability. It hasn’t been shown in the studies that this effect lasts, nor that it was solely due to the intervention (and particularly in the case of the Ozeki study, the control group improved considerably and the degree of improvement was more than half that of the intervention groups).

All the studies were in the tertiary education sector and covered the learning of English, Japanese, and Russian.

Factors that affected the reliability of the studies include the following;

- Only 2 were randomised studies, one of which was unclear randomisation
- Selection of particular classes for study
- Selection bias in sampling
- Reporting inadequacies (and some claims too strong)

- Small numbers
- Effect of repeated testing

McGruddy (1995)	Selective attention for listening comprehension	May be useful
O'Malley et al (1985)	Mixed package of strategies for listening (and speaking and vocabulary)	Non-significant improvement in listening comprehension
Ozeki (2000)	Integrated strategies for listening comprehension	Both control and experimental groups improved considerably though the intervention group made greater improvements.
Paulauskas (1994)	Prediction, summarising, questioning, & clarifying (+ reciprocal method) for better listening comprehension	No difference between strategies and strategies+reciprocal method, but both were better than control group
Seo (2000)	Identifying key terms, inferencing, elaborating to improve strategic listening	Positive results in 2 of the 8 tests
Thompson (1996)	Mixed strategies (planning, goal defining, monitoring, evaluating, predicting content, listening for redundancy, querying)	Positive results

5. FINDINGS AND IMPLICATIONS

This chapter summarises the findings of the map and synthesis conducted in this review and assesses the implications of these for policy, practice and research.

5.1 Summary of principal findings

This review set out to evaluate the research evidence surrounding the training of language learners to use learning strategies. In terms of effectiveness, clear evidence regarding improvement in overall learning ability would be of great value, particularly if it could be shown to last over an extended period of time. The review focussed less on the effectiveness of the various strategies than on the effectiveness of strategy training in general. The relationship between methodological approaches and strength of findings in addressing the review question is also of interest.

A large number of interventions was found, and as would be expected with the research being carried out around the world at different times by different people, there has been little standardisation of either the packages of interventions or the outcomes that were measured. Some of the research was characterised by the type of strategies involved (metacognitive, cognitive and affective) while some focussed on the strategies themselves. Of those where the researchers chose to focus explicitly on the type of strategy, metacognitive training appeared to be the most frequent although in reality, when categorising the strategies for the review, most by far were strategies of the cognitive type. This may reflect changes of emphasis with no underlying pattern or cause other than differing theoretical conceptualisations and provenance. A degree of standardisation in research method is observed inasmuch as some of the earliest studies found (1981 and 1985) were a controlled trial and a randomised controlled trial: however there remains a wide range of difference in how the controlled studies are constructed (for example in outcomes of interest and means of evaluation) and reported and it cannot be suggested that there has been any concerted attempt to unify a research approach.

A consequence of the diversity of approach for the review is that it is no simple matter to combine the findings and doing so is necessarily relatively blunt, with the concomitant risk of trying to compare apples with oranges. Bearing this in mind, 23 of the 25 included studies are considered to be of medium or high relevance in addressing the review question, and it is reassuring to note that at the very least that the research carried out in this field is applied and of interest to the 'real world' of language teaching and learning rather than being of academic interest only. Of course, this does not reflect in any way on the studies which were of lesser relevance to this review as it was not the researchers of the studies who chose the review question!

In terms of reliability, again with the caveat of this being a blunt indicator, 13 of the 25 studies are considered to be of medium reliability, and 2 of high reliability in addressing the review question (all 25 studies are considered relatively reliable inasmuch as they provide comparative experimental rather than anecdotal evidence) although this does leave 10 studies (40%) that the review found to be of low reliability due to their methodological characteristics.

In considering the overall weight of evidence that the available research provides, factoring together the relevance and reliability indicators, 17 of the 25 studies were considered to be of medium or high weight. In broad terms, this is consistent with a view that there is a considerable amount of solid research evidence to support claims that strategy training for language learning is effective.

However, this must not be over-interpreted, and these indicators say little about the process of the actual interventions and the way in which a particular learning context impinges on the effectiveness or otherwise of an intervention.

It is reassuring that the empirical research provides evidence broadly in line with the theoretical research (which may not surprise some!) and anecdotal evidence. However, it is still vital for users of the research evidence to consider it in the context of their own situations and to weigh up the similarities and differences that should take into account such features as

- Level of education/stage of learning
- Language in question
- Age of learners
- Prior learning experience
- Generalisability of research findings from one context to another

as well as other considerations that are not covered by the research, for example cost-effectiveness, opportunity cost, and resource availability. Consequently, the compounding of these studies has been limited to relatively blunt amalgamations of findings. But keeping a perspective on matters, one should note that all the studies included in the review have compared an intervention with something else and have observed, recorded and interpreted the results. In this respect, the studies differ considerably to opinion pieces or theoretical statements on the potential for strategy training.

The variety and composition of interventions, whether single or packaged together in some way limited the degree to which studies could be combined cumulatively in this review, and for example the 2 studies on writing while similar in that they investigated the effect of revision and redrafting of written work, differed in that one was a short intervention over 2 weeks where the learners read a strategy instruction guide and then redrafted their work using a dictionary while the other study looked at the effect of redrafting essays over a school year. Both showed strong improvement, but the differences need to be borne in mind and any simple statements on the compounding of these findings would be imprudent

At the same time, reading strategy interventions allowed more confident lumping as a number of them looked at structural or semantic mapping in relation to comprehension, and all took comprehension as the prime indicator.

A major finding of this review is that none of the studies carried out any long-term post intervention testing or follow-up and it cannot be said for any of the studies, however strong their results, whether the effect of the intervention lasts a week, a month, a year or a lifetime. In terms of cost-effectiveness (regardless of pedagogic effectiveness) this is an important consideration particularly regarding questions of policy, and the review finds that there is no evidence to support policy decisions in terms of the likelihood of long term benefits of strategy training (which is however very different to finding evidence of no benefit). This is a pity, as in many studies it would have been possible to incorporate follow-up delayed testing of the intervention. A concomitant question that this leaves unanswered is whether or not the beneficial effect of any training can be maintained, reinforced or enhanced by smaller refresher 'doses' of the intervention, say through scaffolding during regular instruction. Such process evaluations would considerably strengthen the value of interventions without great increase in cost for example. Research on such a follow-up basis might be achieved for example using sampling techniques with qualitative reports from learners which would enhance the findings of interventions carried out using larger scale quantitative methods. Protocols for individual learners would enable researchers to assess the effect of

interventions on individuals and complement the findings with detail in the context of the bigger picture.

One study incorporated into its design a degree of longer term evaluation in that the study took place over a complete year (redrafting of essays) and found a positive effect – it was interesting that corroborative evidence from learners supported the findings but also revealed that the learners preferred the traditional method of not revising their essays!

The study interventions were assessed over a wide variety of outcomes for the main domains of speaking, listening, reading writing etc. Many of the studies used both externally validated tests (TOEFL, Neale etc) and locally constructed tools, questionnaires, exams etc to evaluate the effect of the interventions. Some studies used regular end-of-term or end-of-year tests as indicators, and the trade-off to be considered here is between the desirability of the naturalistic approach of using regular term/year tests and the precision perhaps afforded by specially constructed tests or less naturalistic instruments. Some studies involved self-reporting by the learners and other proxy measures, either as triangulation of findings through assessment of strategy use. This was naturally the case concerning perceptions by learners of their learning, strategy use, progress, response etc.

Interventions varied in length, with the studies looking at awareness raising typically being shorter than those testing a programme of activities. As reported, the protocol for this review was changed in light of discussion of this issue – awareness raising can happen in a moment and there is therefore no real need to specify an absolute minimum length or duration of intervention. This is an interesting matter, as it may predicate the possibility that positive benefits could be achieved simply through awareness raising rather than ‘invasive’ non-naturalistic intervention programmes.

The ways in which studies were carried out, and even more so in the ways that they were reported, varied considerably. Unlike other areas of education, there are for strategy training a relatively high number of controlled and randomised controlled trials. However, there is often a lack of detail that raises queries concerning sampling, details of interventions, characteristics of participants, and the discussion of confounding features in studies. The latter includes the traditional difficulty of controlling for experimenter bias. In some cases, no information is given about the participants and there is scarce information of baseline characteristics although some testing of homogeneity between groups is carried out in the randomised trials. Very few of the studies report any details on the randomisation procedure and sample selection and none gives full details of power calculations for sample size – this is of concern as many of the randomised trials used cluster randomisation – an approach which allows whole groups to receive an intervention and be compared with groups that don’t; but an approach that also then requires larger samples as the power to detect the effect is reduced. Further difficulties in method and reporting include a minimal concern with blinding of allocation to groups, allocation to experimenter, and blinding of assessment of the intervention. These methodological issues are probably being addressed as research methodology skills become more widespread and collaborative research employs the skills of different experts.

The review has not been able to systematically search the non-English language literature although a number of databases in languages other than English were searched, and several non-English language reports were retrieved (one is awaiting translation and the author has been emailed). In all but one case, abstracts have been available for the non-English reports identified.

The mainstream publication and dissemination of research based information on strategy training has been through journal articles and books, and this has led to a degree of publication bias as doctoral theses and master's dissertations have not generally found their

way into the knowledge base (McDonough 1999 does cite two unpublished PhD theses). This review has been able to add the findings from a number of postgraduate research studies which may otherwise not have been incorporated into the body of evidence available.

5.2 Strengths and limitations of the review

Searching.

The time and resources have not been available to do any extensive handsearching of journals, and this remains a long term objective. The results will be incorporated into updates of the review.

Lumping

Only fairly crude and blunt synthesis of study evidence has been possible due to diversity of intervention type, diversity of outcomes and diversity of measurement instruments . Further time and resources would be needed to bring together numerical data if meta-analysis were desirable and feasible. Some studies present numerical data (means and standard deviations) potentially suited to meta-analysis, but the comparability of included studies would need careful assessment.

Average answer to average question

The review is unable to capture the detail available in rich descriptive reports of individual cases, and is therefore unable to make any statement on the applicability of a specific strategy training intervention for a particular situation. However, the payoff is perhaps in greater generalisability of findings and the ability of the review to find that overall research evidence supports the effectiveness of strategy training in general.

5.3 Implications

Implications for policy

This review pulls together available research evidence and comes to the conclusion that strategy training is effective. The evidence for its effectiveness is stronger for adult and Higher Education learners, but there is no systematic picture for the ability level at which training is likely to be most effective, and it is impossible with the evidence currently available to match training interventions to learner need at particular ability levels: this is a pity as it would be useful to find out for example whether redrafting of writing (effective at secondary and adult level for whole essays) is also effective at say sentence level for beginners at primary level.

Several other aspects remain unclear:

Is a short sharp awareness training intervention any less effective than training in specific strategy behaviours? That is to say, the available research does not reveal whether an awareness training programme (potentially less resource dependent) for a given strategy or set of strategies would be any less effective than a full training intervention that incorporates implementation of the strategy.

Is the effectiveness of training related to the combination of strategies in a bundle or package or to certain discrete strategies? Or in other words, is cognitive strategy training effective or is training in certain cognitive strategies more effective in certain situations? (see for example work by Cohen (2004) "*What is often lacking is a fine-tuned description of the given strategies, and what may make such descriptions particularly useful would be having them specific to the particular language tasks that the language learners are called upon to perform*")

The evidence for the long-term effect of the benefits of strategy training is virtually non-existent. It seems reasonable to assume that if a strategy training intervention is demonstrated to be effective, that the learner somehow incorporates it into their learning mechanisms and that it is compounded along with their other learning experiences and capacities. However, it remains unclear from a research point of view whether this is or is not the case, and the cost effectiveness of any intervention will remain unsure without longer term follow-up studies. Particularly from a policy perspective, one assumes it would be unwise to invest in large scale strategy training interventions if the effect could not be demonstrated: on the other hand, low cost (time and money) strategy awareness training interventions might well be justified until long term benefit studies provide more evidence.

Implications for practice

Strategy training can be effective. Awareness raising training interventions and training in implementing the strategies themselves can be shown have a beneficial effect for learners, but the long term benefits are unclear and this has a bearing on the trade-off between the effect and the effort needed to achieve it in terms of time, resources, training etc.

Notetaking, and semantic & structure mapping are interventions that improve reading comprehension. Most of the studies led to positive findings, though not all and the findings are not necessarily transferable to all pedagogic situations.

Training learners to revise and redraft written work is worthwhile for improving accuracy and quality of output: this can probably be enhanced by training in dictionary skills between drafts 1 and 2.

Some evidence, though not strong, is available for the effectiveness of training in strategies to improve oral production (group discussions, accuracy) – eg metacognitive strategies with verbalisation of planning, predicting, monitoring and evaluating and focussing on discrete linguistic items.

Although the findings were mixed, evidence from studies on a variety of packages of strategies shows that overall language ability can be improved by such training – these include keyword and mnemonic strategies for vocabulary; focussing differentially on input and output of linguistic items; and strategy awareness raising.

Listening ability can be enhanced by strategy training, with for example training in selective attention and other metacognitive strategies (see also A systematic review of effective teaching approaches for uni-directional listening comprehension for learners of a modern language, Protocol for an EPPI Systematic Review).

Potential users of the evidence in this review should conduct a situational analysis to ensure that their own particular context has the characteristics suited to the intervention. Characteristics that are relevant in appraising the potential for effective strategy training include;

- Age
- Stage of learning
- Resources available and required
- Assessment of outcomes
- Training concomitant with or prior to language instruction

The review presents the available evidence for the effectiveness of some strategy training interventions and packages – there are doubtless many others – and these may be more

appropriate to a given situation, but may also require detailed evaluation prior to implementation.

Implications for research

- It is encouraging that experimental evidence from randomised controlled trials and controlled trials is available to accompany other research evidence. When viewed together, substantial corroboration of research findings should be available.
- Non-experimental research needs to be evaluated systematically and incorporated into the body of evidence. This is particularly important in order to understand the full detail of processes in action during strategy training and learner strategy deployment.
- Different studies had different strengths and weaknesses, and below is a summary of the characteristics that could usefully be addressed to reinforce the reliability of the methods used;
 - Clearer randomisation: the procedures used were very rarely reported, and often it was unclear whether individuals, interventions, experimenters (teachers) had been randomised. This included the lack of reporting, when referring to participant randomisation, on whether randomisation was applied to the whole sample or sample minus withdrawals at the beginning for example.
 - Larger samples if cluster randomisation to ensure the power of the sample to detect the effect of the intervention. Issues of 'leakage' in studies where cluster randomisation was used were not discussed in the vast majority of cases.
 - Concealment of allocation (to intervention, to assessor and in assessment, to participants): greater blinding of assessment would assist in control of bias, although it is often difficult to this and maintain a naturalistic setting. Crossover studies might be considered where all participants receive the intervention but at different times.
 - Standardisation of testing and assessment instruments and standardisation of outcome and intervention frameworks would enhance validity of assessment methods, cut costs of research, enable easier aggregation of findings across studies and possibly enable research funding to be used more efficiently. Validation of testing and measurement tools – or greater use of naturalistic settings and standard tests (end of term, year tests plus externally validated tests or sections of, eg TOEFL, IELTS, etc) – would also contribute to a harmonisation of approach in the research community.
 - Improved reporting of studies at the individual level is desirable, and this includes practitioner-researchers not being afraid of negative results from experiments – these are equally as valuable as positive findings. Much reporting of demographic details is minimal, as is reporting of baseline measurements prior to experiments. Often complicated statistical analyses are reported but more basic data are unavailable (such as groups scores, descriptions of basis for intervention (completers, dropouts, attrition etc not explained). Improved reporting of studies should also include more systematic coverage of previous research.
- More effectiveness research is needed, and in particular, long-term post intervention testing.
- More research into the process of how strategy training works is desirable– is it awareness raising, or the modelling of behaviours for learners to imitate, or both/

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- 3) Fraser, C. (1999) Lexical processing strategy use and vocabulary learning through reading
- 4) Halbach, A. (1999) Integrating strategy training into an existing syllabus: a model
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- 6) Salataci, R. & Akyel, A. (2002) Possible effects of strategy instruction on L1 and L2 reading
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Requiring further consideration:

- 12) Baily, C. (1996) Unobtrusive computerized observation of compensation strategies for writing to determine the effectiveness of strategy instruction
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7. TABLES AND APPENDICES

Appendix 1 Included studies - summary characteristics as reported

Author; year; method; publication type	Study title	Setting; Population (N= intervention/total)	Strategy training intervention	Domain; intervention duration	Outcomes measured	Strategy change measured?	Delayed testing?	Results as reported
Ayaduray & Jacobs 1997 RCT (cluster) Article	Can learner strategy instruction succeed? The case of higher order questions and elaborated responses	Singapore ESL Secondary school N=16/32 in 2 groups	Instruction in asking higher order questions	Oral 10 wks	1) frequency of asking higher order Qs 2) elaborated responses	no	no	Positive Learners become better questioners & group discussion improves
Bimmel et al 2001 CT Article	Effects of strategy training on reading comprehension in first and foreign language	Netherlands Secondary school EFL (& Dutch) N=12/119 in matched pairs	Looking for key fragments paying attention to structure making up questions mapping most important info	Reading 15 weeks	1) use of strategies in Dutch & comprehension in Dutch 2) reading comprehension in English (strategy training transfer from L1 to L2)	no	no	Negative Strategy training works for L1 but does not transfer to L2
Bishop 2000 CT Article	Using quality and accuracy ratings to quantify the value added of a dictionary skills training course	UK French Adult University N=15/30 in 2 groups	Using dictionary between essay draft and redraft	Writing 10 hours	1) essay length 2) vocabulary usage 3) vocabulary acquisition	no?	no	Positive >10% improvement in writing
Burgos-Kohler 1992 RCT (cluster) PhD	The effect of a selected group of language learning strategies upon language development (foreign language instruction)	USA Spanish University N=104/143 in 6 groups (2 experimental + 2 control)	Language learning strategies (keyword, elaboration, association, grouping, recombination, contextualisation)	Vocabulary achievement, Overall performance 6 wks 8 x 10 mins	1) semester grades 2) vocabulary usage 3) vocabulary acquisition	no	no	Positive Improvement in vocabulary and overall proficiency
Cadierno-Lopez 1993 RCT (cluster) PhD	Explicit instruction in grammar: a comparison of input based and out-based instruction in second language acquisition	USA Spanish University N=94/141 in 4 experimental + 2 control groups	Input vs output based instruction	Proficiency (comprehension, production, grammar)	1) interpreting meaning 2) producing correct forms	no	1 week, 1 month,	Mixed Input and output based instruction showed better results than no instruction, but no difference between 2 interventions
Carrell, Pharis & Liberto 1989 CT Article	Metacognitive strategy training for ESL reading	USA English University N=18/26 in 4 groups (2 of each)	Semantic mapping of texts vs experience-text relationship vs nothing	Reading 4 days	Reading comprehension	no	no	Mixed Both types of mapping led to better reading comprehension, but no overall difference between them

Author; year; method; publication type	Study title	Setting; Population (N= intervention/total)	Strategy training intervention	Domain; intervention duration	Outcomes measured	Strategy change measured?	Delayed testing?	Results as reported
Ei-Koumy 1999 RCT Report	Effects of three semantic mapping strategies on EFL students reading comprehension	Egypt English University N=60/187 in 3 intervention groups	Student mediated semantic mapping	Reading 5 months (20x1hr)	Reading comprehension	no	no	Positive Teacher-student mediated mapping produced better scores on TOEFL reading comprehension measures
Feyten, Flaitz, LaRocca, 1999 RCT (cluster) Article	Consciousness raising and strategy use	USA French & Spanish University, Middle & High school N=863 (numbers?)	Handout on 26 learning strategies (MAR) or handout on 26 reasons for studying a language (CAR)	Awareness – metacognitive & cognitive strategies 50 mins	Term exam grades	no	no	Mixed, Greater positive effect in control group at university level Greater positive effect at high school level MAR and CAR significantly positive effect at Middle school level
Flaitz & Feyten 1996 RCT (cluster) Report/Chapter	A two phase study – phase I	USA University Spanish N=130/229 in 6 experimental + 6 control groups	Metacognitive strategy awareness	Proficiency 50 mins	1) semester grades 2) strategy use	no	no	Positive A short sharp dose of awareness training produces better results on terms exams
Holunga 1994 RCT (pairs) PhD	The effect of metacognitive strategy training with verbalization on the oral accuracy of adult second language learners	Canada ESL Adult N=32/48 in 2 intervention and 1 control group of pairs matched for gender	Metacognitive Strategies (predicting, planning, monitoring, evaluation) with and without verbalisation	Oral 3 weeks/15 hrs	1) verb use accuracy 2) awareness of strategies	no	yes	Positive Verb use accuracy improved, but not at delayed testing
Kitajima 1997 CT Article	Referential strategy training for second language reading comprehension of Japanese texts	USA University Japanese N=28/43 in 2 groups	Recognising syntactic and discorsal links in text	Reading 15 wks/4 per week	1) Identifying referents 2) Reading comprehension	no	no	Mixed On 2,3 and 4 of the paragraphs used for testing, the intervention produced better comprehension of texts: on paras 1 and 2 better recognition of referential links

Author; year; method; publication type	Study title	Setting; Population (N= intervention/total)	Strategy training intervention	Domain; intervention duration	Outcomes measured	Strategy change measured?	Delayed testing?	Results as reported
Kusiak 2001 CT Article	The effect of metacognitive strategy training on reading comprehension and metacognitive knowledge	Poland English Secondary school 78/158 in 2 groups	Awareness in reading strategies – finding main idea, recognising topic sentences, text patterns, keywords, guessing meaning. Plus observing others and own learning	Awareness 4 wks – 8 x 45 mins	1) metacognitive knowledge 2) self evaluation of reading skills 3) reading comp test 4) general language competence	no	no	Positive Metacognitive training is effective for reading comprehension on intermediate learners
Lawson & Hogben 1998 CT Article	Learning and recall of foreign language vocabulary: effects of keyword strategy for immediate and delayed recall	Australia High school Female students Italian	Keyword (elaborated) method for vocabulary recall	Vocabulary 10 days/3 tests 2 days x 45 mins	Vocabulary recall	no	yes	Positive Statistically significant positive effect of intervention on vocabulary recall
McGruddy 1995 CT PhD	The effect of listening comprehension strategy training with advanced level ESL students	USA ESL University Advanced 10/32 in 1 intervention and 2 comparison groups	Predicting, inferring and selective attention for listening comprehension	Listening 14 wks at 100 mins/wk	1) Aural proficiency 2) Comprehension 3) Self reported strategy use	yes	no	Positive Significant differences reported, students reported perceived benefit of the training
McGuire 1999 RCT (cluster) PhD	Generative precising as a reading comprehension strategy for adult ESL learners	USA ESL Adult (private) ESL 54/71 in 3 intervention and 1 control groups	Generative précising (writing notes next to text...) vs 2 other 'strategies' and control group	Reading 3 wks/once a week	1) sentence completion 2) reading comprehension 3) strategy use	yes	no	Positive Generative précising resulted in better comprehension
Meskill 1991 RCT Article	Language learning strategies advice:a study on effects of on-line messaging	USA ESL Adult N=34	On-screen messaging advice on learning strategies	Proficiency	1) performance 2) perceptions	no	no	Negative Qualitative data suggest positive effect
Najar 1997 RCT (cluster) PhD	The effect of notetaking strategy instruction on comprehension in ESL texts	Japan EFL University 135/338 in 10 groups	Notetaking: 1. Awareness 2. Strategy	Reading 9 wks	1) reading comprehension	yes	yes 2 wks	Positive Notetaking training group produced better reading comprehension results – but possibly due to learners doing more work at home

Author; year; method; publication type	Study title	Setting; Population (N= intervention/total)	Strategy training intervention	Domain; intervention duration	Outcomes measured	Strategy change measured?	Delayed testing?	Results as reported
O'Malley, Chamot, Stewner-Manzanares, Russo, Kupper 1985 RCT Article	Language strategy applications with students of ESL	USA ESL High school N=75 (?) in 3 groups	1) Metacognitive /cognitive/socio-affective 2) Cognitive + socio-affective 3) Control	Listening Speaking (& Vocabulary) 8 days/50mins	Listening and speaking test performance	Observation but only of experimental groups	no	Mixed Training effective for speaking (not on Listening, and Vocabulary not reported)
Ozeki 2000 CT PhD	Listening strategy instruction for female EFL college students in Japan	Japan EFL College – female N=25/45 in experimental and control groups	Package of metacognitive, cognitive & affective strategies: directed & selective attention, self evaluation, notetaking, inferencing, cooperation etc	Listening 6 or 7 months at 90 mins/wk	1) Listening comprehension 2) Use of strategies	yes	no	Positive Strategies package effective for listening and learners had positive attitude towards the training
Paulauskas 1996 RCT PhD	The effects of strategy training on the aural comprehension of L2 adult learners at the high beginning/low intermediate proficiency level	Canada ESL Adult N=51 in 2 intervention and 1 control groups (details not given?)	Predicting text content, summarizing main ideas, questioning for comprehension, clarifying comprehension difficulties	Listening 4 wks at 3x1 hour	1) Listening comprehension	yes	yes	Positive No differences between 2 interventions but both were effective for listening comprehension
Raymond, 1993 RCT Article	The effects of structure strategy training on the recall of expository prose for university students reading French as a Second Language	Canada French University N=43 (no details?)	Text structure strategy training (5 Top Level Strategies)	Reading 5 hours	Difference in recall of content, pre- and post-intervention	no	1 month	Intervention group scored higher on one of the test texts, but only on delayed test (no immediate post test).
Sengupta 2000 CT Article	An investigation into the effects of revision strategy instruction on L2 secondary school learners	Hong Kong English Secondary school N=78/108 in 2 intervention & 1 comparison group	Redrafting/revision of first draft	Writing 12 essays over a year	1) Attitude to writing 2) Gain score on writing task	no	no	Positive Redrafting is an effective strategy, but learners appeared to prefer traditional methods.
Seo 2000 CT PhD	Intervening in tertiary students' strategic listening in Japanese as a foreign language	Australia Japanese University N=10 (self-assigned into 2 groups: intervention and control)	Cognitive & Metacognitive strategies	Listening 19 weeks	Proficiency: comprehension of TV broadcasts	no	no	Positive Comprehension of broadcasts improved for intervention group, but author reports familiarity with test format may be a confounding influence

Author; year; method; publication type	Study title	Setting; Population (N= intervention/total)	Strategy training intervention	Domain; intervention duration	Outcomes measured	Strategy change measured?	Delayed testing?	Results as reported
Thompson & Rubin 1996 RCT Article	Can strategy instruction improve listening comprehension?	USA Russian, University N=24/36 in 2 intervention and 1 control groups	Metacognitive strategies: predicting content, listening for the known, listening for redundancy	Listening 5 weeks at 3x50mins per wk	1) Comprehension of video 2) Audio comprehension	no	no	Mixed Training showed positive effect on video test

Appendix 2 Search strategy for electronic databases

Databases searched

BEI (British Educational Index)
CERUK (Current Educational Research in the UK)
Dissertation Abstracts
ERIC
REEL
SPECTR (Social, Psychological and Educational Controlled Trials Register)
PsycINFO
Linguistics and Language Behavior Abstracts
Educational Administration Abstracts
ISI Citation Indexes
Mental Measurements Yearbook
MLA International Bibliography
UNESBIB (UNESCO Bibliographic Database)
UNESDOC (UNESCO documents collection)
IAED (International Archive of Education Data)
PAIS (Public Affairs Information Service)
CILT (Centre for Information on Language Teaching)

Appendix 2.1 Search strategy

The following terms were used in database searches (using database controlled terms where possible)

Terms for strategies, strategy learning, or strategy training

1. affective-strateg*
2. autonomie-guidée
3. autonomisation
4. autonomous-learning
5. cognitive-strateg*
6. cognitive-style
7. language-learning-strateg*
8. learner-autonomy
9. learner-strateg*
10. learner-train*
11. learner-based-teaching
12. learn*-style*
13. lernerautonomie
14. meta-cognit*-strateg*
15. self-directed-learn*
16. self-managed-learning
17. self-instruction
18. strateg*
19. strategies-based-instruction
20. strateg*-training
21. student-autonomy
22. student-centred-learning

Appendix 2.2 Journals handsearched online or in a library

Journal	Dates searched

Appendix 2.3 Review-specific questions

Additional questions about the strategy training that was evaluated:

A.1 Have the strategies been defined (if X and Y then Z) by the researcher/teacher?

A.2 Is the way the strategy is supposed to lead to learning or improved proficiency clear?

A.3 Is there a clear relationship between the strategy training (what the teacher did with the students) and what the students would be expected to do eventually as independent individual learners?

A.4 Has the intervention been made explicit to the reader (even if it is not necessarily explicit to the learners) *consider the way it was carried out; length of time; number of repeated exposure to a strategy; whether scaffolded or unscaffolded; monitored or unmonitored; evaluated*

A.5 Is there an investigation as to change in strategic behaviour as a result of the intervention?

Additional questions about outcome measurement

A.6 Is there an attempt to collect data as to (at least) associative evidence between strategy training and proficiency gains? Or, if not, then is there an attempt to collect data as to (at least) associative evidence between strategy training and another outcome

A.7 Have delayed post-tests been carried out after a period of withdrawal from strategy training?

A.8 Do the post-tests measure both strategic behaviour and other variables such as proficiency gains or motivation?

A.9 Is it clear that there is no equivalence between the strategies used in the training and the testing method used in the proficiency measures in order not to favour the experimental group?

A.10 Is there any triangulation (other than in A. 5 above) on the effectiveness of strategy training on proficiency? *For example by asking the learners' opinions*

A.11 Does the strategy training time come out of normal teaching time?

Appendix 3.2 Studies by sample size

Sample sizes varied considerably and ranged from very small studies of just a few individuals up to large scale intervention studies with hundreds of participants.

(total N=38)	Randomised controlled trials N=16	Comparative studies N=12	Cohort studies N=5	Case studies N=2	Ethno-graphy N=1	Action research N=1	ITS N=1
	863	236	100	7	4	1	8
	473	186	68	1			
	427	151	58				
	359	131	20				
	247	71	8				
	247	70	unknown				
	235	45					
	125	44					
	80	42					
	75	40					
	60	21					
	51	10					
	48						
	43						
	34						
	28						
total	3395	1047	254	8	4	1	8
mean	212	87	50	4	4	1	8

Overall total 4717
Overall mean 124

Appendix 3.2.6 Studies by outcomes and study names

Outcome	N
Asking & answering higher order questions	Ayaduray
Attitude	Sengupta
Aural ability	McGruddy, O'Malley et al
Awareness	Holunga, Talbot, Kusiak
Comprehension	McGruddy, Thompson & Rubin, Kitajima, Cadierno-Lopez, Paulauskas, Ozeki, Kusiak, Najar, McGuire, Bimmel, Seo, Carrel & Pharis, El Koumy, Tang & Moore, Salataci, Song, Talbot, Kusiak
Global proficiency	Kusiak, Meskill, Flaitz & Feyten, Burgos-Kohler, Stokes, Seo, Feyten & Flaitz, Kusiak
Grammar accuracy	Holunga, Aninao, Kitajima, Cadierno-Lopez, McGuire
Not stated	Halbach
Oral ability	Lam & Wong, O'Malley et al
Recall	Raymond, Lawson & Hogben
(content/meaning units)	
Self-perception of ability	Kusiak, Meskill
Strategy transfer	Bimmel

Strategy use	Ozeki, Flaitz & Feyten, McGuire, Holunga, Aninao, Baily, Simmons, Riley, McGruddy
Vocabulary acquisition	Anderson, Burgos-Kohler, Aninao, Fraser, Lawson & Hogben,
Writing ability (accuracy & quality)	Sengupta, Bishop,
Interpreting meaning	Cadierno-Lopez
Metacognitive knowledge	Kusiak
Strategy awareness	Holunga

Appendix 3.2.8 Studies by education sector

Education sector

Higher Education (non-univ)	Ozeki, Talbot, Riley
Adult	Baily, Holunga, McGuire, Meskill, Paulauskas, Simmons
Secondary school	Anderson, Aninao, Ayaduray, Bimmel, Feyten & Flaitz, Kusiak, Lam & Wong, Lawson & Hogben, O'Malley et al, Sengupta, Tang & Moore
University	Bishop, Burgos-Kohler, Cadierno-Lopez, Carrel & Pharis, El Koumy, Feyten & Flaitz, Flaitz & Feyten, Fraser, Holunga, , Kitajima, McGruddy, Najar, Raymond, Ridley, Salataci, Seo, Song, Stokes, Tang & Moore, Thompson & Rubin

Appendix 3.2.9 Studies by publication type and date

With an increasing number of research reports both at master and doctoral level being added to electronic indexes, and therefore more readily amenable to searching outside libraries, a high number of PhD theses were found during searching for this review on strategy training research.

Just over half the studies found (18 out of 40 are not published journal articles, so a degree of publication bias exists inasmuch as the standard literature in the field tends not to cite unpublished or post graduate research. This is exacerbated by the fact that since 1995, an equal amount of research was published in journal articles and non-journal articles (N=14, N=14), and these together comprise around 70% of the total research evidence available since 1981.

It seems reasonable to assume that over time with increasing electronic indexing and searching (not to mention systematic reviewing) it is likely that this bias will reduce. It is unknown at this point in time what influence the journal type has on any bias, though this review sought published and unpublished material in non-English language journals as well as the high impact journals.

	Journal article	Dissertation	Report	Book chapter	Conference paper
1981		1			

1985	1				
1989	1				
1991	1				
1992	1	1			
1993	1	2			
1994		1			
1995	1	1			
1996	1	1	1	2	
1997	3	2			
1998	1	1			
1999	3	1	1		1
2000	3	2			
2001	2				
2002	1				
	20	13	2	2	1

Appendix 3.2.10 Studies by year

Since 1993 to the present (end of 2003), about 29 studies have been carried out. Prior to that, going back to 1980, 10 studies were completed. The mid-90s therefore appears to mark the beginning of an increase in the number of studies - on average 0.8 compared to 2.9 studies per year for the two periods respectively, ie greater than a threefold increase. Dates of the study are recorded where known, or date of publication minus 1 year where the date is not explicit in the report.

Date	N	Running total
1981	1	1
1985	1	2
1989	1	3
1991	1	4
1992	2	6
1993	3	9
1994	1	10
1995	2	12
1996	5	17
1997	5	22
1998	2	24
1999	6	30
2000	5	35
2001	2	37
2002	1	38
Total	38	

Appendix 4.1 Studies by language skill focus of training

Language skill/domain	study
Awareness	Kusiak, Feyten & Flaitz
Speaking/oral	Ayaduray, Holunga, O'Malley
Reading	Bimmel, Carrell & Pharis, El Koumy, Kitajima, McGuire, Najjar, Raymond, Talbot,
Global proficiency	Meskill, Flaitz & Feyten, Cadierno-Lopez,
Vocabulary	Lawson & Hogben, Burgos-Kohler, O'Malley
Listening/aural	McGuire, Paulauskas, Seo, Ozeki, O'Malley
Writing	Bishop, Sengupta

Appendix 4.2 – Studies in the in-depth review by strategy type and/or intervention type

	Cog	Metacog	Socio affective
Ayaduray	●		
Bimmel	●		
Bishop	●		
Burgos-Kohler	●		
Cadierno-Lopez	●		
Carrell	○	●	
El Koumy	●		
Feyten	●	●	
Flaitz		●	
Holunga	○	●	
Kitajima		●	
Kusiak	○	●	
Lawson	●		
McGruddy	●	●	
McGuire	●		
Meskill	●	○	
Najar	●		
O'Malley	●	●	●
Ozeki	●	●	●
Paulauskas	●		
Raymond	●		
Sengupta	●	○	
Seo	●	●	
Talbot		●	
Thompson	●	●	

Key

- = nature of intervention according to reviewers or author but not designated explicitly
- = possible alternative nature of intervention according to reviewers
- shaded cell = nature of study as designated explicitly by author

Stop Press

Early feedback on drafts of the review has brought to light 3 additional studies that are relevant to the review. These have been received beyond the cut-off date for consideration in this version of the review but will be incorporated into its first update where appropriate. We are in any case grateful to the authors of these studies for making us aware of their work:

Ikeda, M & Takeuchi, O (2003) *Can Strategy Instruction Help EFL Learners to Improve Their Reading Ability?: An Empirical Study*, JACET Bulletin 37, pp49-60

Paige M, Cohen A, Shively R (2004 in press) *Assessing the Impact of a Strategies-Based Curriculum on Language and Culture Learning Abroad* (to appear in *Frontiers: The interdisciplinary Journal of Study Abroad*, 10)

Takeuchi, O & Wakamoto, N (2001) *Language Learning Strategies used by Japanese College Learners of English: a Synthesis of Four Empirical Studies*, *Language Education & Technology*, 38, pp21-43