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The Effectiveness of Strategy-Based Instruction in Teaching English as a Second or Foreign Language: A Meta-analysis of Experimental Studies

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A large number of single research studies on the effects of strategy-based instruction (SBI) teaching English as a foreign or second language have been conducted so far. However, the lack of a comprehensive meta-analysis of experimental studies targeting the effectiveness of English language SBI is observed. Therefore, this study aimed to meta-analyze the effects of SBI experimental studies conducted in the field of learning English as a foreign or second language to clarify the aroused controversial issues regarding their overall effectiveness and their related variables. After a comprehensive search to collect the population of experimental SBI of English language studies, effect sizes under random effects model in terms of Hedge's *g* were calculated for 26 primary studies, contributing a total of 84 independent effect sizes. The findings indicated that summary effect size of studies with learners at different proficiency levels turned out to be bigger than 0.60. Furthermore, SBI in English as a foreign language context was more effective than the one under English as a second language context. Finally, SBI study samples with treatment time of more than two weeks and English language learners over the age of 14 were more effective than those with less than two week treatment time and learners under the age of 14.

Keywords: strategy-based instruction, meta-analysis, proficiency, age, strategy type, outcome, context

Introduction

Learning strategies research commenced with the research study of "good language learners". Researchers in this domain (Naiman, Frohlich, Stern, & Todesco, 1978; Rubin, 1975; Stern, 1975, cited in Plonsky, 2011, p. 935), who aimed to explain the variability in L2 achievement, began to describe the qualities and activities of successful language learners with the promise of understanding them and training them to less successful learners. However, the characteristics of good language learners were found to differ, which made the hypothesis of a comprehensive prescription of successful L2 learning difficult in reality (Gan, Humphreys, & Hamp-Lyons, 2004; Politzer & McGroarty, 1985; Stevick, 1989). Therefore, the researchers changed their focus to L2 strategies.

Oxford (1990) defined L2 strategies as the steps that language learners take to improve their learning. This definition paved the way for a more goal-oriented pursuit of L2 strategies due to the wide applicability of

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strategies to different contexts, tasks, and learners and the complexity latent in L2 learning (Chamot, 1993; Griffiths & Parr, 2001; Hong-Nam & Leavell, 2006). With the rise of learner-centered methods, research studies on L2 strategies, especially SBI, emphasized an individualized orientation towards language learning (see Tudor, 1996; Wenden, 2002). Moreover, in line with such concern with language learners on an individualized level, strategies gained a highlighted position in second language acquisition (SLA) as they were included in the models of communicative competence (Bachman, 1990; Bachman & Palmer, 1996; Canale & Swain, 1980).

Furthermore, despite the fact that strategic competence mainly emphasized the compensatory role of language learner strategies in language skills such as listening and speaking (Canale & Swain, 1980), proponents of SBI stressed that this line of inquiry supports the theoretical foundations of strategies for more pragmatic concerns related to applications of different types of strategies. With such support both teachers and researchers have used SBI to both theoretical and practical aims. The effects of SBI, especially within the field of English language, have been examined broadly with different learning treatments, contexts, and outcome measures (Plonsky, 2011, p. 996). However, expect Plonsky (2011) who conducted a meta-analysis on second language strategy instruction, a relative lack of comprehensiveness in secondary research studies on SBI of English language is apparent. They only describe SBI across a single aspect (e.g., outcome variables), and are less systematic compared with meta-analytic methods. Although (as mentioned by Plonsky, 2011, p. 996) over 100 articles and books chapters with reviews and methodological suggestions on SBI are available, the collected findings are highly controversial and the firm models are expected to emerge. Thus, to reach a better insight about the need for a research synthesis on the effectiveness of English language SBI, the rest of the review of literature covers SBI research across the dimensions of treatments, learning contexts, and outcome measures (Derived from Plonsky, 2011).

Research Questions

(1) What is the relative effectiveness of different types of treatment in English language SBI?

(2) What is the relative effectiveness of second or foreign contexts in English language SBI?

(3) What is the relative effectiveness of different measures of outcome in English language SBI?

Review of Literature

Treatments

Despite widespread consensus among language practitioners and researchers on the merits of language learner strategies, there is much less approval to how to foster a learner's ability to use strategies for language learning. Certainly, researchers should consider many treatment-related variables, but few research studies have explored the relative effects of different methods of SBI (Walters, 2006). Besides, the inadequacy of a comprehensive theory in this domain has left both practitioners and researchers to develop studies of SBI mainly based on intuition and convenience.

One important step in developing an SBI program is deciding how many and which strategies to instruct whether the objective is pedagogical or empirical. The variety of strategies and strategy classifications available presents one of the greatest opportunities to researchers interested in SBI. But such variety poses one of the greatest challenges to theoretical and practical accounts of this domain, as there is no agreement on a particular type of classification for presenting the findings appropriately (Chamot, 1993; Oxford, 1994).

However, cognitive, metacognitive, and social/socio-affective strategies draw a distinction among classification types because they are the most common ones to several classification types (e.g., Gan, Humphreys, & Hamp-Lyons, 2004). Cognitive strategies encompass activities such as organization, elaboration, and rehearsal and are used when learners are actively engaged in second or foreign language learning (O'Malley & Chamot, 1990). Some examples of such strategies observed in studies of SBI are developing questions while reading (Bimmel, van den Bergh, & Oostdam, 2001) and the keyword method (Avila & Sadoski, 1996).

Metacognitive strategies, which include planning forward prior to doing L2 tasks, are considered as an important constituent to enhancing L2 in previous SBI studies (Macaro, Graham, & Vanderplank, 2007; Vandergrift, 2003). For example, metacognitive strategies used in Dreyer and Nel (2003) involved planning how to read while setting goals for reading.

Social strategies mainly deal with interaction with others. Two examples of such strategies are cooperation with peers and clarification requests which are reported in O'Malley, Chamot, Stewner-Manzaranes, Stewner-Manzaranes, and Kuper's (1985) early study of SBI.

All of the strategies schemes explained above, derived from educational psychology, have been used broadly in studies of L2 strategies (e.g., O'Malley & Chamot, 1990). But, more schemes have been designed with different purposes. For example, Bialystok (1990) and Dörnyei (1995) formed strategies based on whether their purpose is to improve L2 learning or use. Other schemes of strategies sorted certain types of strategies based on the skills they were used with such as reading and writing. Such skill-bound strategies, which have been reported in different SBI studies (Chamot, 2005; Cohen & Macaro, 2009; McDonough, 1995; Oxford, 1994), have made the comparison of SBI findings easier.

Finally, despite such variety of strategy types, many researchers interested in SBI maintain that only those strategies which have empirically supported effectiveness should be instructed and the reason for their selection ought to be mentioned to the language learners (e.g., Chamot & Rubin, 1994; Rivera-Mills & Plonsky, 2007). Furthermore, regardless of different types of strategies, the length of treatment may moderate the effectiveness of SBI (Manchón, 2007; Nyikos & Fan, 2007). This fact has raised controversies about the cost/benefit ratio of SBI. For instance, Bialystok (1990) asserted that the purpose of language teaching is to teach the language not the strategies.

On the other hand, other scholars, taking a more moderate side, suggest that the time given to SBI must be justified as a useful departure away from other L2 language-oriented tasks (Feyten, Flaitz, & LaRocca, 1999; Oxford, 1993). Also, for an effective SBI sufficient time and guided opportunities must be given to language learners to fully understand when and how to use the strategies (Chamot & O'Malley, 1994; Nyikos & Fan, 2007).

SBI studies indicate a wide variability of dimensions in this area. For example, instruction of strategies cover a range of more intensive treatments of five hours in two weeks (Raymond, 1993) to program periods which take longer hours like that of Macaro and Erler's (2007) longitudinal study of 14 months. Regardless of the period of treatments, Macaro (2001) recommended that teaching materials be organized with the allocation of adequate time to different tasks such as evaluation, awareness-raising, scaffolding, and practice.

Several other issues must be clarified relating to how SBI is implemented. One issue is whether the strategies are instructed as a separate or embedded constituent of the curriculum, with most experts suggesting the latter (O'Malley & Chamot, 1990; Oxford, 1993; Walters, 2006). Another issue involves whether the

researcher or teacher should carry out the instruction, as well as the language of the instruction especially among beginner-level learners and for foreign language contexts (e.g., Chamot, 2005).

On the one hand, researcher-oriented SBI may enhance the balance of instruction among experimental groups, familiarity of strategies, and full disclosure of treatment procedures in the written report. On the other hand, teacher-oriented SBI may take advantage of an established rapport with learners and a deeper understanding of their needs, preferences, and backgrounds (e.g., Chen, 2007).

Contexts

As Carrell (1998) referred to, successful strategy instruction is context-dependent. It means that effective SBI may depend on the context in which strategies are used and taught. Therefore, a description of the contextual variables which can moderate the effectiveness of SBI is needed. Proficiency level of language learners can be considered one of them.

For a better understanding of how proficiency might influence instruction of strategies, it is also worthwhile to consider how it affects use of strategies. A large amount of research has focused on the two variables, and the findings have mainly demonstrated their correlation as positive and linear (Cohen, 1998; Green & Oxford, 1995; Wharton, 2000).

However, some curvilinear relationships have also been found between the two variables indicating less frequent use of strategies by low- or high-proficiency learners than intermediate learners (Hong-Nam & Leavell, 2006). Moreover, a related challenging issue is the lack of studies that have controlled for proficiency. Most studies have examined the effects of SBI with beginner (e.g., Morin, 2003), intermediate (e.g., Cohen, Weaver, & Li, 1995), or, to a lesser extent, advanced and mixed-proficiency groups (e.g., Linan-Thompson, Vaughn, Hickman-Davis, & Kouzekanani, 2003; Walters, 2006). Just very few researchers like Ikeda and Takeuchi (2003) has investigated the relative effects of SBI at different proficiency levels, as recommended by Ikeda (2002). Both studies concluded that the higher proficiency group could benefit more from the treatment than the lower proficiency group. Ikeda and Takeuchi discussed that this result may be because of higher and lower level processing.

However, Chularut and DeBacker's (2004) comparison of learners at different proficiency levels revealed that there is no advantage for SBI in more advanced levels (see also Maxim, 2002). Despite the lack of control for proficiency level in primary studies, the meta-analysis of the current study allows for making comparisons between different levels of proficiency.

Besides various proficiency levels, SBI has also been examined in both foreign language environments (e.g., Barnett, 1988; El-Koumy, 1999) and second language (e.g., Fraser, 1999; O'Malley, Chamot, Stewner-Manzaranes, & Kuper, 1985). Owing to logistical constraints, primary research studies have paid little attention to differences between foreign and second language use of strategies and the comparative effects of SBI in both contexts. In a research study done by Riley and Harsch (1999) no difference between the two contexts was found for the treatment, although pretreatment differences were observed between the two groups.

Meta-analysis

To gain a better understanding of the general effectiveness of SBI, meta-analysis research is needed instead of another individual study. Therefore, a meta-analysis of the body of empirical research is best suited for the current research purpose since meta-analysis is the statistical review of individual studies. To gain a thorough understanding of meta-analysis the characteristics of meta-analysis backgrounds of meta-analysis will

be discussed to comprehend the history of this method.

Method

Procedure

In the same way that the individual study participant supplies data for primary research, the individual study supplies data for meta-analysis. However, unlike primary research, where individuals are representatively or randomly sampled from a population to which findings will be generalized, secondary research attempts to sample the entire population of primary research studies in order to summarize the state of existing findings within a domain (Cooper, 1998).

To access the initial body of literature, key and subject-word searches were conducted within the Educational Resources Information Center (ERIC) computer data base; searches used the following words and word combinations: (1) strategy-based instruction; (2) second language strategy training; and (3) strategy interventions.

Besides, several other research techniques were used. Several academic journals were browsed for relevant research studies. Also, reference sections from a number of reviews of the research domain were consulted (e.g., Hunter & Schmidt, 2004). Moreover, reference sections from each retrieved study were cross-checked for additional research studies. Due to some limitations in gaining access to all the identified articles, the researchers tried to purchase some directly from publishers, or request them personally from individuals with access to the particular sources.

Also, in the current study the researchers attempted to retrieve the so-called "fugitive" literature (e.g., unpublished papers, dissertations and theses, and conference presentations). Rosenthal (1994) maintained that the most comprehensive synthesis of the state of knowledge about a research question should include not only published sources but also hard to find fugitive sources. There are generally two reasons for including the fugitive literature. First, it may be that some research reports that simply have not reached a published forum, for any number of reasons, could nevertheless provide further primary data to increase the accuracy of a synthesis of the overall findings within a research domain.

The second and more tangible reason for retrieving fugitive sources is to avoid the risk of incurring the "file-drawer" problem in research synthesis (Rosenthal, 1994). The file-drawer problem issues from the well-attested fact that studies reporting statistically significant findings tend to be accepted for publication over studies reporting no statistically significant findings.

Unfortunately, as Cooper (1998) has pointed out, "the bias is present in the decisions made by both reviewers and primary researchers" (p. 54). As a direct result of such publication bias, it is assumed that a large number of studies exist in the file drawers of researchers who, having failed to reach statistical significance with a particular study, have filed the results away and tried again with a new study. To do this, the publication bias of the studies in the current meta-analysis was analyzed via different approaches which are explained in details in the results section.

Instrument

The instrument used in this study was Comprehensive Meta-analysis (CMA) 2.0 (Borenstein, Hedges, Higgins, & Rothstein, 2005). One of the advantages of using this software is its flexibility in managing different kinds of data at the same time. Other advantages are its ease of application and its strength in

customizing the output including forest plots.

Criteria for Inclusion in the Meta-analysis

The researchers aimed to retrieve 300 potentially relevant research studies from the initial research literature. They tried to review each report to determine the actual relevance of the study to the research domain and current research questions. The research studies were coded according to the following criteria.

(1) The study should be published between 1990 and 2011. Finally, the inclusion criteria starts from 1990 because as mentioned in the review of literature of the article the concept of language learning strategies gained prominence with Oxford (1990) and O'Malley and Chamot (1990);

(2) The study has an experimental or quasi-experimental design. Only those studies experimentally investigating the effectiveness of particular SBI treatments could contribute data for the calculation of effect sizes;

(3) Independent variables are the general and specific strategies, the number of strategies taught, length of treatment, second or foreign context, particular age, proficiency level of language learners, and participants' L1;

(4) Dependent variables are the measures, means, standard deviations, and effect sizes.

Analysis of the Studies

In total, 246 studies were collected out of which only 26 studies, covering 84 study samples, were selected for the meta-analysis. 220 studies were excluded for the following reasons. First, 54 studies addressed teaching strategies of other languages like French, Spanish, and Italian. Second, 47 studies lacked experimental designs. Third, 38 studies focused on language learning rather than language learning strategies. Fourth, 11 studies reported their findings in qualitative terms. Fifth, 23 studies were related to teaching strategies of English language as the first language. Sixth, 29 articles and 14 theses were not freely accessible. Finally, few studies, just four, reported effect size statistics; therefore, it was needed to calculate the effect size of each single study sample from the reported descriptive statistics such as sample size, reported means, and standard deviations. Moreover, 11 studies missed the required data for the calculation of effect size.

Coding Study Reports

After the identification of the body of research literature meeting inclusion criteria, the researchers categorized the identified studies according to a variety of study features. Coding was undertaken in order to: (1) describe systematically how researchers have investigated the effect of SBI techniques; (2) clarify the variables of interest to the research domain by using categories generic to all studies; (3) classify studies according to similarities among research variables; and (4) identify research findings in the form of data appropriate for inclusion in the quantitative meta-analysis.

Moreover, coding proceeded according to a series of stages, and checks on researchers' judgments were included at each of these stages to ensure the reliability of the process.

Results

Publication Bias

Funnel plot of standard error by standard differences in means. Figure 1 indicates funnel plot of standard error by standard differences in means under the random effect model. The main issue with regard to the publication bias is that first not all completed individual studies are published and second the process of the

selection is not random, thus, biased. In other words, single studies reporting large effect sizes are more likely to be submitted for publication compared to those with modest effect sizes. Therefore, the true treatment effect might be overestimated due to the estimated treatment effects from a biased collection of individual studies.

The funnel plot includes standard error or precision as a measure of the study size on the vertical axis and the effect size on the horizontal axis.

In funnel plots, large studies tend to appear toward the top of the graph, and cluster around the mean effect size. On the other hand, smaller studies tend to cluster toward the bottom of the graph. In other words, since there is more sampling variation in small studies, effect size estimates are dispersed within a range of values.

Thus, in the absence of publication bias, the single studies are supposed to be distributed symmetrically around the combined effect size.

However, in the presence of bias, the bottom of the plot is expected to demonstrate a higher concentration of single studies on one side of the mean. That is, this would indicate the fact that smaller studies, appearing around the bottom, are supposed to be published if they have larger than average effect sizes, making them more likely to meet the statistical significance criterion.

In addition, effect sizes which are at a greater distance from the mean, especially those out of 95% confidence interval, are supposed to have larger standard errors, showing less precision due to their smaller samples. As shown in Figure 1, the effect sizes are not normally distributed around the mean effect size and some of them are out of 95% confidence interval on the right side of the plot indicating the bias for the publication of larger effect studies with smaller samples. If the outliers were removed, it could be interpreted that both large and small effect sizes are equally published.

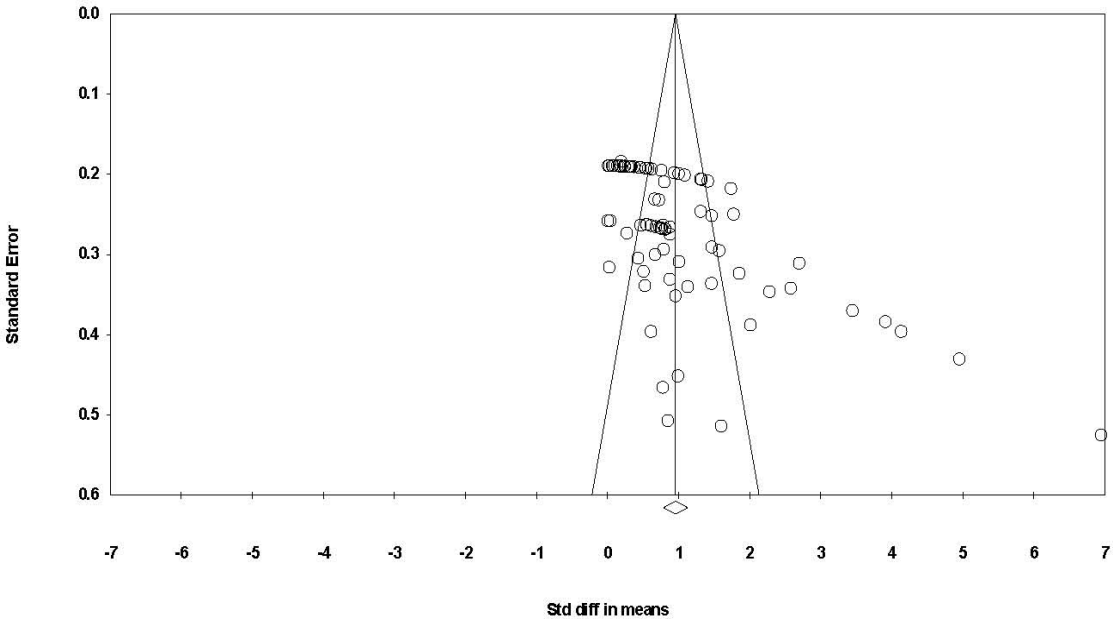

Figure 1. Funnel plot of standard error by standard differences in means under the random effects model.

Funnel plot of standard error with imputed studies. Figure 2 indicates the funnel plot with imputed studies. The observed studies are illustrated as open circles and the observed point estimate in log units is demonstrated as an open diamond. Also, the imputed studies are shown as filled circles and the imputed point

estimate in log units is shown as a filled diamond. As shown, the adjusted point estimate indicates a lower summary effect compared to that of the observed summary effect, indicating the difference between the present state of bias with the ideal state of lack of bias.

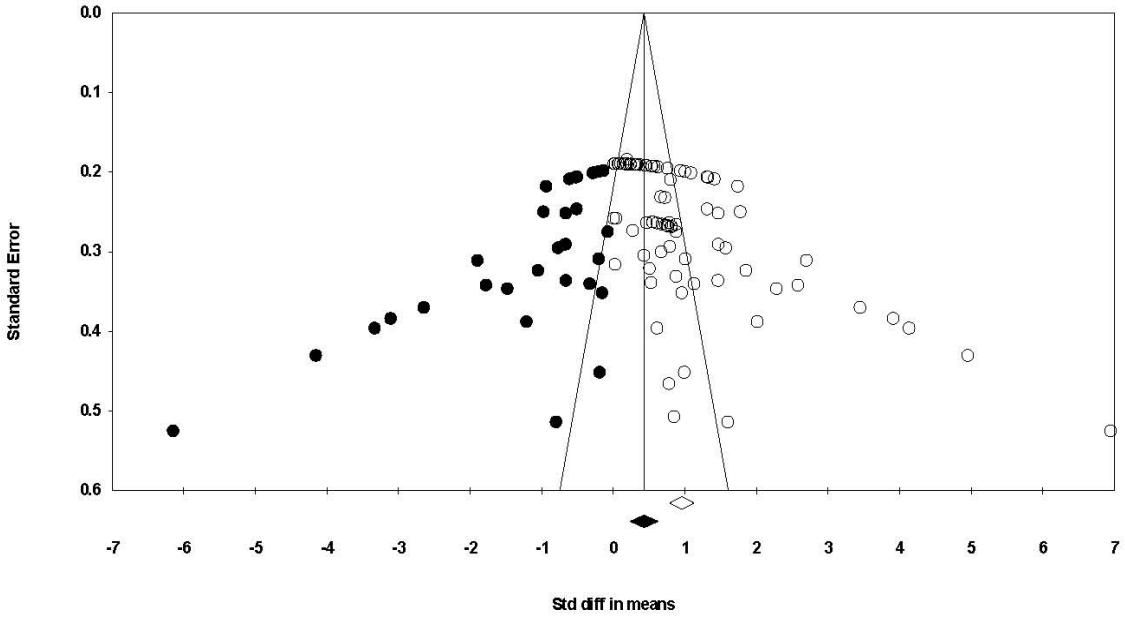

Figure 2. Funnel plot of standard error with imputed studies.

Funnel plot of precision by standard differences in means. Figure 3 shows the funnel plot of precision by standard differences in means. The funnel plot includes precision as a measure of the study size on the vertical axis and the effect size on the horizontal axis.

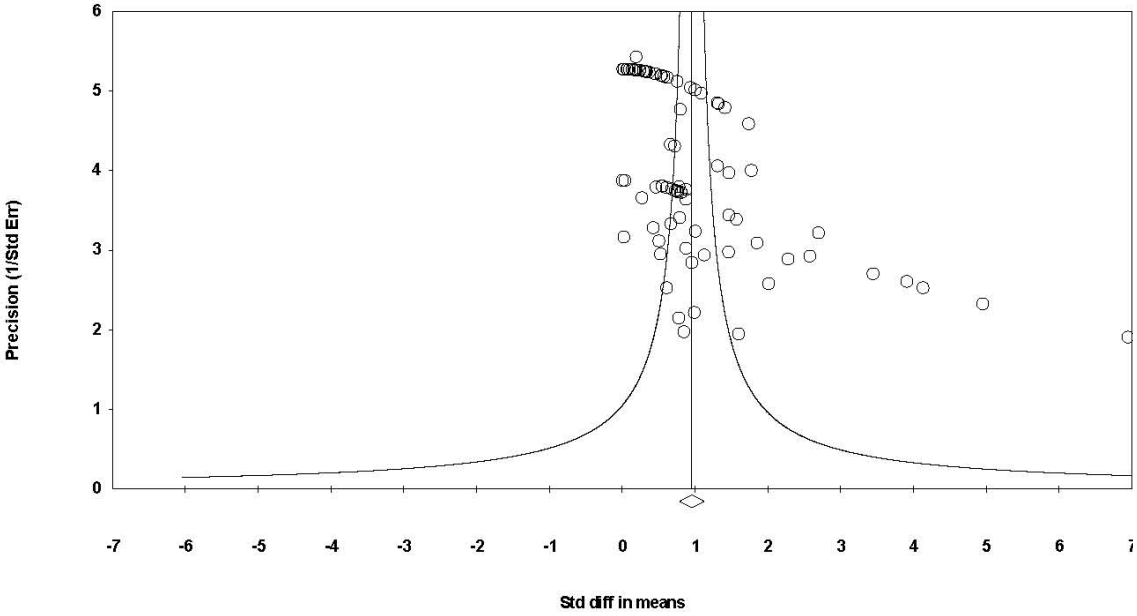

Figure 3. Funnel plot of precision by standard differences in means with imputed studies.

Forest plot under the random effects model. Figure 4 illustrates the forest plot of the meta-analysis

under the random effects model. As seen different studies have different weights, depicted by squares, and different precisions, the width of the squares. The diamond, representing the summary effect, is at 0.95 and stretches from 0.79 to 1.12.

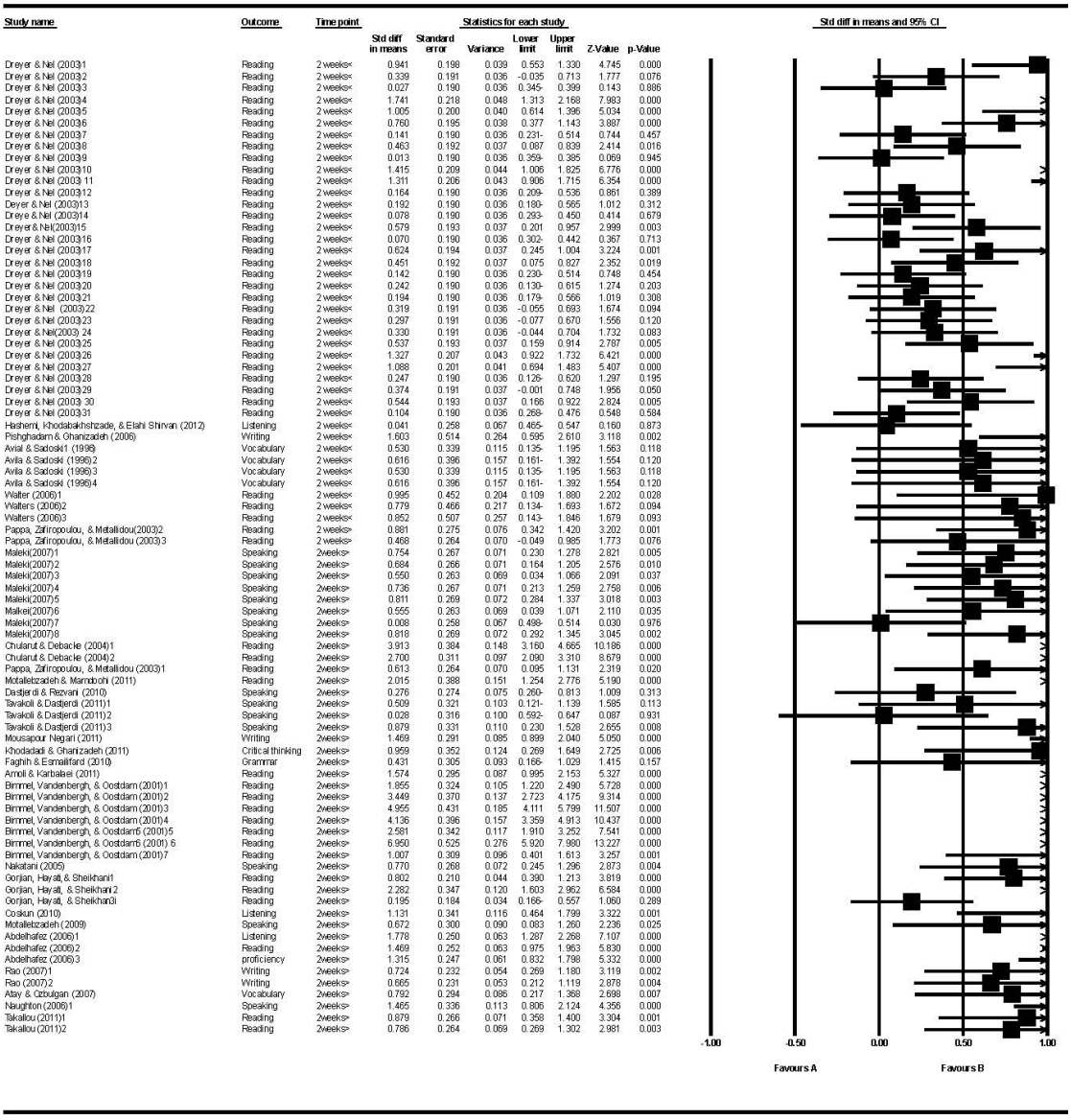

Figure 4. Forest plot under the random effects model.

Meta-analysis of SBI With Regard to Proficiency Level

Table 1 illustrates the summary effect of SBI studies based on the proficiency level of the participants of the studies in terms of hedges' *g*. As seen, the summary effects of SBI studies at advanced levels, all levels, elementary level, and intermediate level under the random effects models are 2.162, 0.87, 1.039, and 0.903 respectively.

Table 1

Comparing Summary Effects of SBI With Regard to Proficiency Level

Model	Group by Proficiency	Study name	Outcome	Time point	Statistics for each study						
					Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Fixed	Advanced				2.164	0.232	0.054	1.710	2.618	9.342	0.000
Random	Advanced				2.162	0.972	0.945	0.257	4.067	2.224	0.026
Fixed	All				0.879	0.273	0.075	0.344	1.415	3.217	0.001
Random	All				0.879	0.273	0.075	0.344	1.415	3.217	0.001
Fixed	Elemantary				0.891	0.096	0.009	0.704	1.079	9.330	0.000
Random	Elemantary				1.039	0.289	0.084	0.472	1.606	3.593	0.000
Fixed	Intermidiate				0.689	0.028	0.001	0.634	0.743	24.722	0.000
Random	Intermidiate				0.903	0.090	0.008	0.726	1.080	10.007	0.000

Meta-analysis of SBI With Regard to SBI Time

Table 2 indicates the summary effect of SBI study samples related to the time given to the instruction of strategies in terms of Hedge's *g*. As seen, SBI studies with time period of less than two weeks have summary effects of 0.528 under the random effects model. On the other hand, individual sample studies with time period of more than two weeks have summary effects of 1.356 under the random effects model.

Table 2

Comparing Summary Effects of SBI With Regard to SBI Time

Model	Group by Time point	Study name	Outcome	Time point	Statistics for each study						
					Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Fixed	2 weeks<				0.492	0.033	0.001	0.426	0.557	14.750	0.000
Random	2 weeks<				0.528	0.071	0.005	0.390	0.666	7.489	0.000
Fixed	2 weeks>				1.083	0.042	0.002	1.000	1.166	25.608	0.000
Random	2 weeks>				1.356	0.153	0.023	1.056	1.656	8.856	0.000

Meta-analysis of SBI With Regard to Context in Terms of Hedges' *g*

Table 3 illustrates the summary effect of SBI sample studies concerning the context of English, whether it is a second language or a foreign language. As seen, under the random effects model, SBI studies with English language as foreign language have summary effect sizes of 1.183. On the other hand, the summary effect size of SBI studies with English as a second language under the random effects model is 0.657.

Table 3

Comparing Summary Effects of SBI With Regard to Context in Terms of Hedges' g

Model	Group by Setting	Study name	Outcome	Time point	Statistics for each study						
					Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Fixed	Foregin				0.987	0.042	0.002	0.905	1.069	23.666	0.000
Random	Foregin				1.199	0.136	0.019	0.932	1.466	8.807	0.000
Fixed	Second				0.549	0.034	0.001	0.482	0.616	16.059	0.000
Random	Second				0.663	0.099	0.010	0.469	0.857	6.691	0.000

Meta-analysis of SBI With Regard to Strategy Types

Table 4 indicates the summary effects of the study samples with regard to the strategy types practiced in each study sample in terms of Hedges' *g*. As seen, the summary effects range from 0.46 to 1.46. The summary effect size of affective strategies under both fixed and random effects model was 0.613. Second, the summary effect size of study samples using all types of strategies was 0.672 under both fixed and random effects model. Third, the summary effect sizes of study samples applying cognitive strategies was 0.672 under fixed effect model and 1.109 under random effects model. Moreover, the summary effect size of cognoaffective strategies under the fixed and random effects model was 0.468. In addition, the summary effect size of study samples experimenting communicative strategies was 0.552 under both fixed effect and random effects model. Furthermore, the summary effect size of study samples with metacognitive strategies turned out to be 0.728 under the fixed effect model and 0.816 under the random effects model. Finally, the summary effect size of study samples with social strategies was 1.465 under both fixed and random effects model.

Table 4

Comparing Summary Effects of SBI With Regard to Strategy Types

Model	Group by Strategy	Study name	Outcome	Time point	Statistics for each study						
					Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Fixed	Affective				0.613	0.264	0.070	0.095	1.131	2.319	0.020
Random	Affective				0.613	0.264	0.070	0.095	1.131	2.319	0.020
Fixed	All				0.672	0.300	0.090	0.083	1.260	2.236	0.025
Random	All				0.672	0.300	0.090	0.083	1.260	2.236	0.025
Fixed	Cognitive				0.752	0.032	0.001	0.689	0.815	23.348	0.000
Random	Cognitive				1.109	0.123	0.015	0.868	1.350	9.025	0.000
Fixed	Cognoaffect				0.468	0.264	0.070	-0.049	0.985	1.773	0.076
Random	Cognoaffect				0.468	0.264	0.070	-0.049	0.985	1.773	0.076
Fixed	Communica				0.552	0.080	0.006	0.395	0.709	6.898	0.000
Random	Communica				0.552	0.085	0.007	0.385	0.719	6.485	0.000
Fixed	Metacogniti				0.728	0.062	0.004	0.607	0.849	11.762	0.000
Random	Metacogniti				0.816	0.141	0.020	0.539	1.092	5.787	0.000
Fixed	Social				1.465	0.336	0.113	0.806	2.124	4.356	0.000
Random	Social				1.465	0.336	0.113	0.806	2.124	4.356	0.000

Discussion

One major issue, having occupied the mind of English language teachers and scholars for about more than 30 years, is the instruction of language learning strategies. The question is whether the time of the classroom should be spent learning the language or learning how to learn the language.

According to Vygotsky (1962), individuals can reach higher order processes via the aid of mediators. Such mediators can mediate between language learners and their environment, the context of leaning language, and push them forward by improving their potential learning. Thus, it has been hypothesized in the field of SLA that instruction of language learning strategies, those used by "good" language learners, can encourage English language learners to flourish their competence. Therefore, so many research studies addressing the effect of SBI have been conducted so far. However, the problem faced by researchers is that the findings of such countless studies are somehow controversial. Some are significant, some are not. Some researchers following identical design and approaches have come up with different results. Such shaky ground has made some scholars like Dörnyei (2005) and Ellis (2008) to minimize the effect of SBI and pose some counter-arguments for it.

Meticulous analysis of such a shaky ground, not only in the zone of SBI but also in so many controversially main issues in SLA, might arise out of inaccurate interpretations of findings based on statistical significance level. The main problem with statistical significance level is that it is sample dependent, that is, more possibility of rejecting the hypothesis with larger samples. Thus, studies with the same design but different samples might reveal different levels of significance level. Thus, the need for a statistic which is sample free and a method for their analysis are felt. Such a statistic is effect size and the appropriate method is meta-analysis. Therefore, the influence of some moderator variables on English SBI such as setting, strategy type, proficiency level, and age were meta-analyzed in terms of Hedges' *g*.

Findings from the analysis of the moderator variables show a clear image of how different aspects of individual studies such as contexts, treatments, and outcomes are related to the effectiveness of SBI. First of all, the results of the summery effects of the studies with regard to their proficiency levels indicated that studies with their participants at the advanced level had the highest summery effects under both fixed effect and random effects models. However, the confidence intervals for the intermediate and the advanced level are wider than the elementary ones, that is, such a difference in effect sizes must be considered with caution. This does not mean that such differences do not exist but it means that they should be discussed with regard to the nature of proficiency, because the concept of proficiency, as maintained by Bachman and Palmer (1996), is a complex trait. The review of literature of language learning strategies involves several studies indicating that intermediate and advanced language learners use strategies more frequently and more effectively than beginners (Wharton, 2000; Shmais, 2003, cited in Plonsky, 2011, p. 1014). Thus, perhaps due to such higher level of proficiency, advanced and intermediate foreign or second language learners are more able to benefit from novel strategies more accurately. However, second or foreign language instructors are supposed to implement the strategies which are suitable for the level of their learners (Chamot & Rubin, 1994; Grenfell & Harris, 1999; Harris, 2003, cited in Plonsky, 2011, p. 1014).

Second, the higher summary effects of SBI in English as a foreign language context over English as second language context might seem surprising at first glance because it might be expected that second language learners of English are more exposed to English and have greater opportunities to practice their skill related strategies (Dörnyei, 2005). However, the higher summary effect for English as a foreign language context may be due more consciousness under the foreign context. That is, learning strategies under the second context might be looked taken for granted and need less attention and consciousness on the part of language learners. This result is in sharp contrast with that of Plonsky (2011) in which larger effects were obtained in second language settings ($d = 0.84$) than foreign language settings ($d = 0.46$). However, due to an outlier among the sample of studies in the L2 context ($d = 3.92$), this result "must be interpreted with caution" (Plonsky, 2011, p. 1010) because the mean score of the effect sizes is sensitive to outliers or extreme scores and one outlier in the study can influence the calculations of the mean score.

Moreover, as mentioned in the review of literature, Norris and Ortega (2000) conducted a meta-analysis on the effectiveness of L2 instruction summarizing findings from experimental and quai-experimental studies published between 1980 and 1998. Their finding indicated that explicit studies were more effective than the implicit ones. This finding can pave the way to conclude that instructing learning strategies in English as foreign language contexts, which mainly take place explicitly, might lead to larger summary effects than contexts in which English is a second language.

Third, findings from summary group effects across different strategy types lie within a range of 0.46 to 1.46. This indicates the importance of strategy selection in SBI of English and that instructing different types of strategies, used in whatever program, can be moderately or highly effective. Moreover, cognitive and metacognitive strategies have almost equal summary effects under both fixed effect and random effects models but study samples with metacognitive strategies are more effective than those with cognitive ones under the fixed effect model. This finding is in line with the findings of a recent study done by Pishghadam and Khajavi (2013) who investigated the power of intelligence and metacognition to predict English language achievement. They found metacognition a stronger predictor of achievement than intelligence. This finding is not consistent with that of Plonsky (2011). That is, studies with instruction on cognitive strategies had lower effect size (d = 0.24) than those with instruction on metacognitive strategies (d = 0.48). This might be due to the difference between the scopes of the two studies. In other words, when instructions of strategies are limited to English language only, the difference between teaching cognitive and metacognitive strategies is negligible.

Fourth, meta-analysis of the single study samples with regard to their treatment time revealed larger summary effects for longer treatments, those with more than two weeks, under both fixed effect and random effects model. This gains more plausibility since the standard errors of such effects are within the same range. This finding corroborates that of Hattie, Biggs, and Purdie (1996) discussing the effect treatment length on SBI in L1 contexts. This is in line with the findings of Plonsky (2011). From a practical point of view (as dubbed by Plonsky, 2011, p. 1015), these findings may pose some questions regarding the time spent for teaching language learning strategies. Some researchers like Kellerman (1991) and Rees-Miller (1993) might argue that the time in the classroom should be spent learning the language rather than learning strategies, which means learning how to use the language. However, the time dependent summary effects of SBI strengthens the claim that better achievements result from SBI of English when learners are given time to develop their application of strategies, as claimed by Chamot and O'Malley (1994, cited in Plonsky, 2011, p. 1015).

Fifth, the findings for subgroups based on outcome variables indicated a medium to high range for the summary findings under both the fixed effect and random effects models, with the least Hedges' *g* for grammar and the highest Hedges' *g* for proficiency. In addition, the values for the standard errors and 95% confidence interval seem close to each other. In other words, the instruction of English learning strategies can lead to a consistent range of effect sizes with regard to the outcome. Furthermore, it is worth noting that the possible differences in standard error and confidence interval might be due to the reliability of the measurement of the outcomes. Based on classical true score model, the reliability of the outcomes are measured in terms of the language learners' raw scores and the facility or difficulty level of the items depends on the learners' ability. That is, the items for measuring English language learners' competence in listening, reading, writing, or proficiency are person dependent and their competence in such skills is item-dependent. Thus, meaningful interpretation of language learners' performance in different language skills is possible when the calibration of tests is person free and the measurement of language learners' competence or achievement is test-free. To do so, the classical interpretations should be altered with the new measurements like Rasch measurement (see Rasch, 1960). These more accurate measures of reliability and interpretability are what some scholars like Dörnyei (2005) and Gao (2005) were looking for.

Finally, the result of the meta-analysis based on the age of the participants in the single study samples showed that the summary effect of those with participants older than 14 years old was larger than those younger than 14 under both fixed effect and random effects model. This can be discussed from the eye of Pigetian

personal constructivism. According to Piaget (1966), the cognitive development and construction of reality of the participants develop as they grow older. For example, language learners before puberty might be within a preoperational or concrete operational stage of construction of reality, that is, they are not able to operationalize what they learn, turn them into rules, or understand the abstract concepts in the process of their language learning. Thus, it is postulated that language learners older than 14 benefit more from the instruction of strategies than the younger ones. However, such postulate can be counter-agued by Vygotskian meditative leaning theory (1962) in practice. One might claim that younger English language learners might take better advantage of learning strategies if exposed to or receive assistance from mediators other than their teachers such as computer programs. This might justify the contrast observed in the findings of this study and those of Plonsky's (2011) in which studies with participants under 12 had larger effect sizes than those with participants under 12.

Considering the above, the researcher of the current research maintains that the findings of explicit and implicit instructions can make a contribution to reach a compromise between the abovementioned interpretations. As mentioned in the review of literature, Norris and Ortega (2000) conducted a meta-analysis on the effectiveness of L2 instruction summarizing findings from experimental and quasi-experimental studies published between 1980 and 1998. Their findings indicated that the explicit studies were more effective than the implicit ones. Such a finding justifies that adults, who are over 14, might benefit from learning strategies more than children because they tend to learn them explicitly. On the other hand, children, who are under 14, might not take advantage from explicit learning of strategies because they tend to learn them implicitly. So whatever effort to explicitly introduce strategies to younger EFL learners might be useless since their inclination to learn them is implicitly-oriented.

Conclusion

The summary effects of the English SBI showed that the summary effects of SBI studies at advanced levels under the fixed and random effects models were 2.164 and 2.162 respectively. On the other hand, the summary effect of SBI with participants at all levels was 0.879 under both the fixed and random effects model. In addition, the summary effects of study samples with the elementary level participants were 0.891 and 1.039 respectively. Finally, the summary effects of study samples with the participants at the intermediate level were 0.689 and 0.903 respectively.

The meta-analysis of the SBI study samples regarding their treatment time indicated that SBI studies with time period of less than two weeks had summary effects of 0.492 and 0.528 under the fixed and random effects model respectively but individual sample studies with time period of more than two weeks had summary effects of 1.053 and 1.356 under the fixed and random effects model respectively.

Besides, the summary effects of the context of the SBI study samples revealed that under the fixed effect model and random effects model, SBI studies with English language as foreign language had summary effect sizes of 0.970 and 1.183 respectively but the summary effect sizes of SBI studies with English as a second language under the fixed effect and random effects model were 0.546 and 0.657 respectively.

Furthermore, the summary effects of study samples with different strategy types ranged from 0.46 to 1.46.

Finally, the summary effects of the study samples with regard to their age showed that the summary effect size of studies with the participants less than 14 under the fixed effect and random effect sizes was 0.522. However, the summary effect size of studies with participants more than 14 under the fixed effect and random effects model was 0.722 and 0.966 respectively.

The current research study was an attempt to provide an insight of the implications of English SBI study samples. It is worth noting that like many secondary research studies, the comprehensiveness of the present study, the precision of the meta-analysis, is dependent on a population of primary single studies that are supposed to provide researchers with findings to the questions posed with regard to English SBI. The reflection on such attempts is among the responsibilities of the community of English language. To take this responsibility seriously, a synthetically oriented approach on the part of researchers is needed (see Norris & Ortega, 2006).

Bearing this in mind, the following suggestions for English SBI research are offered, many of which encompass previous suggestions for more general reform of EFL research efforts (see, e.g., Ellis; 2006; Norris & Ortega, 2000, 2006; Plonsky & Gass, 2011): First of all, the value of English SBI depends on whether its effects last over time or not; few study samples in this meta-analysis included delayed posttests; thus, the need for more measurements of the persisting summary effects of English SBI is felt.

Second, more detailed explanations of treatment procedures and more meticulous reporting practices by researchers of primary studies can contribute more accurately to the current state of knowledge of English SBI.

Third, due to some statistically insignificant results, some primary researchers might lose their willingness to publish their efforts. Therefore, the availability of unpublished data, which indeed contribute to the reality of the English SBI effects, decreases. Therefore, primary researchers should be encouraged by the L2 community to seriously consider the contribution of their findings to secondary research and meta-analysis.

Finally, the heavy reliance on P-value and null hypotheses testing in the field of EFL has somehow misled the researchers from the right understanding. As seen in the review of the literature examples, some of the statistically significant studies revealed modest effect sizes while some insignificant ones revealed huge effect sizes. Therefore, the traditional null hypothesis can keep the researchers within a yes/no dichotomy whose legacy will be accompanied with a complete fallacy.

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