Teaching Expressive Writing to Students with Learning Disabilities: A Meta-Analysis

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Abstract

We present results of a meta-analysis on writing interventions for students with learning disabilities and draw implications for practice. 13 studies designed to teach students with learning disabilities to write better expository or narrative text were analyzed. Results indicated that the interventions used in the research studies consistently produced strong effects on the quality of students' writing as well as students' sense of efficacy and understanding of the writing process. Findings suggested that 3 components should be part of any comprehensive instructional program. Explicit teaching of (*a*) the steps of the writing process and (*b*) the critical dimensions of different writing genres should be provided, as well as (*c*) structures for giving extensive feedback to students on the quality of their writing from either teachers or peers.

Over the past 15 years, innovative research in special education has developed exciting new methods for teaching students with learning disabilities to write essays. This research has explored ways to teach students how to analyze material learned in the classroom and to write both personal narratives, based on students' own interpretations of life experiences, and persuasive essays, in which students take positions on topical social and political issues. Initially stimulated by studies in reading comprehension, research on teaching expressive writing increasingly has taken on a life of its own. In the past 10 years, it has surpassed research topics such as reading comprehension in breadth of coverage as well as instructional implications for improving classroom practice (see, e.g., Gersten, Williams, Fuchs, & Baker, 2000; and Mastropieri, Scruggs, Bakken, & Whedon, 1996, for contrast).

There are several reasons for the emergence of this body of high-quality research. Interest in developing methods for teaching students with learning disabilities to express their own ideas was influential from the beginning. Writing, of course, is an excellent vehicle for expressing personal perspectives and opinions and serves a legitimate academic purpose. Even more factual expository writing allows students to demonstrate their unique perspectives on, and understanding of, social, political, and historical issues.

Early researchers viewed instruction in expressive writing as a way to expand special education teaching to include activities both cognitively demanding and intrinsically motivating. Indeed, many of the instructional approaches developed by special education researchers, such as Englert, Raphael, Anderson, Anthony, and Stevens (1991) and Graham and Harris (1989), have played a major role in shaping classroom practice in general education.

Clearly, there is a strong need for instructional strategies that help students with learning disabilities write more effectively. On every conceivable measure of writing performance—including both measures of writing quality and quantity, and occurring across narrative and a range of expository text structures—students with learning disabilities write much more poorly than do students without disabilities (Englert et al., 1991; Graham & Harris, 1997). In summarizing their writing skills compared to their peers, when students with learning disabilities write, "little attention is directed to the needs of the audience, the organization of text, the development of rhetorical goals, or the constraints imposed by the topic" (Graham & Harris, 1997, p. 414).

A shift in thinking also helped spur the rapid growth of research in expressive-writing instruction. Early evidence suggested that the academic strengths of students with learning disabilities could be elicited more effectively if writing instruction focused less on mechanics (e.g., legibility and punctuation) and more on content. Goldman, Hasselbring, and the Cognition Technology Group at Vanderbilt University (1997) summarized this shift by noting, "Research studies indicate that when asked to write about complex ideas, students with learning disabilities often demonstrate conceptual performance that far exceeds what would be predicted based on their performance on lower level skills such as capitalization, punctuation and spelling" (p. 203). It was special education research in expressive writing that first clearly demonstrated this phenomenon.

Also, writing instruction was viewed as a means to help students understand the linkages between reading and writing (Englert, Raphael, & Anderson, 1992; Graves, 1978, 1983). As students began learning how different types of texts are structured, this helped them better understand what they were reading. Therefore, it made sense to encourage them to use their growing awareness of text structure in their own writing assignments. Students learned, for example, that they could use the major elements of the stories they read—characters, settings, problems—in their own stories to make them more enjoyable to read and to write.

A final reason for the shift from comprehension research to expressive writing research may be that expressive writing, though quite difficult to assess in a valid fashion, may be somewhat easier to assess than reading comprehension (see, e.g., Kucan & Beck, 1997). For example, products of writing ability are easier to collect than products of reading comprehension, thus making it easier for assessment experts to work on developing tasks that not only meet traditional criteria for reliability and validity but also satisfy current conceptualizations regarding assessment task authenticity. In fact, the measures used in expressive writing research often have served as models for means to validly assess writing samples used in state assessments. Not

surprisingly, students with disabilities are increasingly included in high-stakes writing assessments in many states. By contrast, developing valid measures of reading comprehension has remained an elusive goal (Garcia & Pearson, 1994; Kucan & Beck, 1997).

The purpose of the present synthesis was to summarize research conducted on interventions in expressive writing for students with learning disabilities. We believe there is a need for this type of synthesis, as interventions have incorporated different components, used different expressive writing text structures, and employed a variety of approaches for teaching students the essentials of writing. This fruitful area of recent research has incorporated intervention components associated with both the effective teaching literature of the 1980s (Brophy & Good, 1986; Gersten, Woodward, & Darch, 1986), as well as insights from more cognitive-oriented breakthroughs of the 1990s (Bransford, Brown, & Cocking, 1999; Englert et al., 1991; Harris & Pressley, 1991; Kucan & Beck, 1997).

For this meta-analysis, we defined expressive writing as *writing for the purpose of displaying knowledge or supporting self-expression* (Graham & Harris, 1989). In the studies we analyzed, students used writing to demonstrate their knowledge by describing, informing, and convincing. Self-expression was promoted by giving students opportunities to select their own topics for journal writing, personal narratives, and stories. In the words of Isaacson (1994, p. 40), expressive writing "can be considered a product of the interaction among the task, the learner, and the instructional environment."

Butler, Elaschuk, and Poole (in press) provide a vivid description of the goals of expressive writing instruction. They note that "effective writers are self-regulating . . . They analyze task requirements, articulate writing goals, and then select, adapt, or even invent strategic approaches to achieve their objectives. They monitor the success of their efforts as they engage recursively in planning, text production, and editing activities. If obstacles are encountered, effective writers adaptively adjust goals . . . or writing strategies." As will be seen, each of the studies in the meta-analysis attempts to help students become more effective writers according to the dimensions outlined in the Butler et al. (in press) definition.

Our criteria for including studies in this synthesis were that they focus on students with disabilities and on instruction targeting the writing process (i.e., composing, editing, revising) rather than writing mechanics. In other words, for the purposes of this meta-analysis, we intentionally exclude studies that address writing mechanics only. Rather, we follow the conceptualization of Butler et al. (in press) and Wong (1994).

Method

Search Procedures

Our search procedure was organized around the following question: Of those studies designed explicitly to improve the writing of students with learning disabilities, which interventions and intervention components are most effective, and what is the strength of those effects?

We employed three procedures to identify studies for the meta-analysis. First, using the reference list from a recent study investigating the effectiveness of all types of interventions on the academic, social, and cognitive outcomes of students with learning disabilities (Swanson, Hoskyn, & Lee, 1999), we identified those studies that included at least one dependent measure of expressive writing. Swanson et al. searched all relevant on-line databases, including PsycINFO, MEDline, and ERIC, from 1963 to 1997, and contacted numerous researchers and state directors of special education to locate relevant studies. After reading these potential studies, we selected for closer scrutiny those in which the main purpose of the intervention was to improve the quality of student writing.

The second search procedure we employed was to manually explore all of the major special education journals (e.g., *Journal of Learning Disabilities*, *Journal of Special Education*, *Learning Disability Quarterly*, *Learning Disabilities Research and Practice*, *Exceptional Children*) and other relevant journals (e.g., *Journal of Educational Psychology*) from 1998 and 1999. For the third search procedure, we invited three prominent scholars in the area of expressive writing to review our list of studies and assess it for comprehensiveness; we also asked them to suggest other published studies, dissertations, and unpublished papers that might be included. A number of potential studies, which we otherwise would have missed, turned up this way, including two that met our criteria for inclusion.

Eligibility Criteria

We included both experimental studies (i.e., those with random assignment of students to instructional conditions) and quasi-experimental studies (where assignment of students to conditions was not random, but groups were shown to be equivalent on relevant pretest writing measures) if they met all of the following criteria:

1. An independent variable pertaining to written expression was a primary focus of the study.
2. The intervention lasted at least 45 minutes and occurred across at least 3 days of instruction.
3. At least one dependent measure of student writing performance was collected.
4. The intervention focused on improving the writing disabilities of students with identified learning disabilities. That is, students in the sample were assessed by the school district and met the district and state's criteria for a learning disability, making them eligible for special education services.
5. At least 66% of the sample comprised students with learning disabilities. If the percentage was less than that, separate outcome data for the sample of students with learning disabilities were presented.
6. The study included a comparison group, and students in the comparison group were students with learning disabilities.

Coding of Studies

Thirteen studies met the criteria for inclusion in the meta-analysis. These studies and major descriptive information are presented in Table 1. Initial coding involved determining the following information: (*a*) whether the study used random assignment of students to treatment, (*b*) number of students per condition, (*c*) grade level(s) of students, and (*d*) whether the focus was on narrative or expository writing.

The more detailed coding scheme for the set of studies was developed over the course of rereading each study a number of times to determine major categories and subcategories. The following section is organized around the two major categories identified: the nature of the instructional intervention and the measures used to assess performance.

Nature of the instructional intervention. Three studies investigated the effects of curriculum programs that taught students to think and write creatively. Creativity studies were included in the meta-analysis because the intent of these studies, like the intent of the other included studies, was to help students generate quality writing through the use of effective instructional practices. Though these studies are recognized within the meta-analysis, they have been categorized as a separate subset of studies from those that dealt with more contemporary approaches to writing instruction.

The expressive writing studies were coded to reflect specific aspects of the instructional intervention that were utilized in the experimental and comparison groups. We classified the nature of instruction according to two dimensions, the major focus of the instructional intervention, and the more detailed instructional components central to the intervention. The way the

TABLE 1. Studies in Meta-Analysis

References by Writing Category	Random Assignment	Grade Levels	Number in Experimental and Control Groups: E	C
Expository writing:				
Englert et al., 1991	No	4–5	33	22
Englert et al., 1995	No	1–4	E_1 = 22 E_2 = 35	31
MacArthur et al., 1995	No	Elementary	110	58
Reynolds, 1986	No	6–8	E_1 = 18 E_2 = 17	18
Welch, 1992	No	6	7	11
Wong et al., 1994	No	8–9	E_1 = 10[a] E_2 = 8[a]	13
Wong et al., 1996	No	8–9	18[b]	20
Narrative writing:				
De La Paz & Graham, 1997a	Yes	5–7	11	10
Englert et al., 1995	No	1–4	E_1 = 22 E_2 = 35	31
MacArthur et al., 1995	No	Elementary	110	58
MacArthur et al., 1991	No	4–6	13	16
Sawyer et al., 1992	No[c]	5–6	E_1 = 11 E_2 = 11 E_3 = 11	10
Creative writing:				
Fortner, 1986	No	3–6	25	24
Jaben, 1983	Yes	Intermediate	25	24
Jaben, 1987	Yes	Intermediate	25	25

[a]LD means not analyzed separately. However, 78% of students in experimental condition had LD, as did 75% of students in the control group.

[b]LD means not analyzed separately. However, 90% and 75% of students in the two experimental conditions had LD, as did 100% of control group.

[c]Random assignment to three experimental conditions, nonrandom assignment for comparison group.

studies were coded on each dimension is presented in the appendix.

Major focus of the intervention: Each study was coded to determine whether two primary features of writing instruction were included. The first was text structure, which was coded as present if students received instruction in how to write following a specific type of text structure. For example, in learning to write in a narrative text structure, students might have been taught to include a description of the setting, characters, or attempts to solve the story's main problem. Instruction in expository text was coded if students were taught to write according to specific expository styles. Seven studies included writing instruction that targeted a specific type of text structure.

The second primary feature was whether the study emphasized instruction that addressed the writing process, including instruction that helped students plan, organize, and actually carry out the task of writing. These "plans of action" are essentially an encapsulation of the procedures skilled writers use when they compose (e.g., Englert et al., 1991; Graham & Harris, 1989). Teaching these plans of action has been a key feature of expressive writing research, from the first seminal studies (e.g., Englert et al., 1991; Graham & Harris, 1989), to the most recent (e.g., De La Paz & Graham, 1997a, 1997b; Wong, Butler, Ficzere, & Kuperis, 1997). Ten of the 13 studies included instruction that emphasized the writing process.

Detailed instructional components: We coded each study on nine features that represented salient aspects of writing instruction (see the appendix). In some cases these features were part of the writing process described above, but because their presence or absence varied considerably among studies, and they were considered essential components of the intervention in and of themselves, we included them in separate coding categories.

Instruction for the comparison group was coded in one of two ways: (*a*) writing instruction was provided, but more traditional methods were used than that used in the experimental group, or (*b*) no writing instruction was provided, that is, a practice-only comparison group was used. Students in the no-instruction comparison group practiced their writing skills in a variety of contexts set up by the researchers and spent as much time on writing activities as students in the experimental group. When the comparison group received writing instruction, we coded that instruction on the same dimensions as the experimental group.

Dependent measures. We analyzed two types of dependent measures for writing instruction: (*a*) actual measures of student writing and (*b*) measures that examined students' understanding of the process of writing, including students' views of themselves as writers (a measure of metacognitive awareness). These two types of dependent measures were divided into a number of categories for the meta-analysis.

Student writing: All 13 studies included at least one overall measure of student writing quality. Each measure was coded as either: (*a*) a holistic, qualitative rating of the total writing sample (e.g., qualitative rating on a Likert scale) or (*b*) a total score of the writing sample based on the sum of individual rubrics, such as organization, coherence, and content. In the latter category (i.e., the total score of the writing sample, based on rubrics) we also included three studies that used a standardized measure of writing, such as the Test of Written Language (TOWL; Hammill & Larsen, 1978). Standardized measures were included in this category because their total score is the sum of individual rubrics (e.g., fluency, flexibility, and originality).

Eight studies also assessed student writing performance on more molecular aspects of the writing sample. These were coded according to one of three categories:

1. Quality of written language conventions, including traditional elements, such as punctuation and capitalization, as well as length and reader sensitivity.

2. Thought units, or T-units, which assessed the number of independent pieces of information in the sample.

3. An assessment of the degree to which specific features of text structure (e.g., story grammar elements) were present in the written sample. This genre-specific measure fit either the story grammar elements of narrative text structure (Sawyer, Graham, & Harris, 1992) or some aspect of expository text structure, such as compare/contrast (Englert et al., 1991).

We calculated the mean of all measures of writing performance to determine an aggregate writing score. This score was used in the majority of calculations in which an overall effect size was computed across multiple studies.

Attitude and metacognition: We also coded studies according to students' attitudes and understandings about writing. Although these categories were not based on actual measures of student writing, they reflected outcomes of writing instruction that researchers and practitioners considered important. Six studies contained these types of measures, which we coded on the following three dimensions: 1. Student attitudes toward writing; 2. Students' strategy use while writing, measured via metacognitive surveys; and 3. Measures of self-efficacy.

Meta-Analysis Calculations

The basic index of effect size used in this meta-analysis was Cohen's *d*, defined as the

difference between the treatment and comparison group means divided by the pooled standard deviation (Cooper & Hedges, 1994). For studies that reported pretest and posttest scores, we calculated posttest effect sizes adjusting for pretest performance, using the following equations (Wortman & Bryant, 1985): adjusted effect size = unadjusted d − pretest correction; pretest correction = $(M_{E[pretest]} - M_{C[pretest]})/SD_{pooled\ [pretest]}$.

Results

Effect sizes are summarized in Tables 2, 3, and 4. Table 2 presents the effect sizes related to the nature of the independent variable. In this table, we present both weighted and unweighted mean effect sizes for each feature. Confidence intervals are presented, following procedures in Cooper and Hedges (1994).

Effect sizes for the dependent measure categories are presented in Tables 3 and 4. Table 3 presents the effect sizes and summary statistics for the writing performance measures. Table 4 provides a summary of weighted effect sizes for dependent measures regarding student attitudes and understanding of writing.

Summed across all 13 studies, the mean effect size on the aggregate writing measure was 0.81. In educational research, an effect size of this magnitude is typically considered a strong effect (Cohen, 1988). The 95% confidence interval was 0.65–0.97, providing clear evidence that the writing interventions had a significant positive effect on the quality of students' writing. The weighted and unweighted effect sizes were 0.81 and 0.99, suggesting that the studies with larger sample sizes resulted in somewhat smaller effects. Positive effect sizes were found in each of the 13 studies (see Table 3), ranging in magnitude from 0.30 (MacArthur, Graham, Schwartz, & Schafer, 1995) to 1.73 (Wong, Butler, Ficzere, & Kuperis, 1996).

Two factors support the validity of the findings of this meta-analysis. First, weighted and unweighted effect sizes for the aggregate and the three major categories (qualitative rating of the sample, trait or rubric score, and standardized test score) were all moderate to high. Second, the confidence intervals around each of the weighted effect sizes consistently indicated that the writing interventions were at least of moderate effect across the different writing measures. Taken together, these effect-size calculations suggest that the innovative instructional interventions in writing produced moderate to strong effects.

TABLE 2. Summary of Mean Effect Sizes and Confidence Intervals (CI) Related to the Nature of the Independent Variable

			Mean Effect Sizes		95% CI for Weighted ES	
	N	k	Weighted	Unweighted	Lower	Upper
Experimental study feature:						
No-instruction control	3	8	1.39	1.34	.92	1.85
Minimal-instruction control	10	49	.76	.94	.59	.94
True experiment	3	14	1.19	1.19	.83	1.55
Quasi experiment	10	45	.71	.93	.53	.89
Instructional feature:						
Collaborative practice with teacher	5	23	.76	.85	.48	1.03
Collaborative practice with peers	6	33	.70	.98	.49	.90
Teacher modeling of strategy use	9	36	.69	.90	.51	.88
Use of procedural prompts	8	33	.86	.96	.63	1.09
Use of computers	4	24	.64	1.06	.38	.90

NOTE.—N = number of studies; k = number of effect sizes aggregated.

TABLE 3. Effect Sizes for Dependent Measures for Each Study

Study	Aggregate[a]	Qualitative Rating of Writing Sample	Trait Score Based on Rubrics	Standardized Measure of Writing	Conventions	T-Units	Genre-Specific/ Text Structure
De La Paz & Graham, 1997a	.80[b]	.65			1.21	.89	
Englert et al., 1991	.97[c]	.97				.56	1.07
Englert et al., 1995	.68	.64	.77			.59	
Fortner, 1986	.83			.81		.84	
Jaben, 1983	1.38			1.38			
Jaben, 1987	1.38			1.38			
MacArthur et al., 1991	.86[d]	1.33			.38		
MacArthur et al., 1995	.30	.49			.11		
Reynolds, 1986	.46		.12		.79		
Sawyer et al., 1992	.97	.73					1.21
Welch, 1992	1.20		1.20				
Wong et al., 1994	1.33		1.33				
Wong et al., 1996	1.73		1.73				
Mean effect size	.99	.80	1.03	1.19	.62	.72	1.14
Weighted mean effect size	.81	.67	.85	1.17	.41	.69	1.11
95% confidence interval	.65–.97	.47–.88	.56–1.13	.82–1.52	.16–.65	.42–.96	.62–1.60
k	59	10	12	10	19	6	2

[a]The aggregate effect size is the average of qualitative rating, trait score, or standardized measure of writing, and conventions, t-units, and genre-specific effect sizes. Other effect sizes are included in the average when indicated.

[b]The aggregate effect size also includes an effect size for length of passage for De La Paz and Graham (1997a).

[c]The aggregate effect size also includes an effect size for reader sensitivity for Englert et al. (1991).

TABLE 4. Summary of Effect Sizes (Weighted) for Measures of Students' Regard of the Writing Process

Study	Attitudes toward Writing	Metacognitive Survey (Self-Report)	Self-Efficacy
Englert et al., 1991		1.05	
Englert et al., 1995		.53	
MacArthur et al., 1991		.23	
Sawyer et al., 1992			−.11
Welch, 1992	1.53	1.48	
Wong et al., 1994	−.13	.27	1.12
Wong et al., 1996	.41	.62	.68
Unweighted average	.60	.70	.56
Weighted average	.40	.64	.61

Study Characteristics Influencing Magnitude of Effect Size

The difference in magnitude of effect sizes found between the studies by MacArthur et al. (1995; $d = 0.30$) and Wong et al. (1996; $d = 1.73$) may be due less to the quality of the intervention and more to the measures collected and the nature of the comparison group. The comparison group in the MacArthur et al. (1995) study received more extensive instruction in writing than the comparison group in the Wong et al. (1996) study. For example, comparison students in the MacArthur et al. (1995) study received instruction in the writing process, whereas the comparison group students in the Wong et al. (1996) study did not. Also, the aggregate effect size in the MacArthur et al. (1995) study was the average of the global qualitative rating (0.49) and conventions (0.11). The aggregate effect size was reduced considerably by the very small effect the intervention had on writing conventions, a less important aspect of the intervention than the overall rating of the writing sample.

In the first row of Table 2, we contrast effect sizes related to types of comparison groups. Ten studies had a comparison group that received at least a minimal amount of writing instruction. In three studies, students in the comparison groups received practice in writing but did not receive any actual writing instruction. The mean weighted effect size for the 10 studies with comparison groups that received at least minimal writing instruction was 0.76. The mean weighted effect size for the three studies that included comparison groups that received practice only was 1.39 (unweighted effect size = 1.34). As one would expect, the effect size was lower when the comparison group received at least some writing instruction.

A second contrast that emerged from the combination of specific studies was that of true experimental studies (i.e., those that randomly assigned students to treatment conditions) versus quasi experiments (those that did not). Three studies used random assignment, and 10 did not. (In the study by Sawyer et al., 1992, students were randomly assigned to three experimental groups, but a nonrandomized procedure was used to assign students to the comparison group. Therefore, we coded the study as a quasi experiment.)

As shown in Table 2, true experiments had an effect size of 1.19 (unweighted, 1.19) and quasi experiments had an effect size of 0.71 (unweighted, 0.93). Most meta-analyses (e.g., Swanson et al., 1999) have shown lower effect sizes when true experiments are used. The fact that this is not the case here indicates the high quality of the quasi experiments. Also, all three of the true experiments were creativity studies by Jaben (1983, 1987) and Fortner (1986), which were conducted before the 1990s, when writing interventions became more process oriented.

Effects on Overall Writing Quality or Performance

Each study included either a global rating of the quality of posttest writing samples or a total score based on the sum of scoring rubric (including traits such as coherence or organization). The study by Englert et al. (1995) included both types of scores. In three cases, standardized writing measures were used, and their scoring procedures were followed to obtain a total score. Thus, for each study, we have an overall index of the quality of the students' writing sample.

Six of the 13 studies had an overall-quality score. The weighted mean effect size was 0.67, with a range of 0.49 (MacArthur et al., 1995) to 1.33 (MacArthur, Schwartz, & Graham, 1991). The effect size representing the 95% confidence interval was 0.47–0.88, indicating that students in experimental groups did significantly better than students in comparison groups.

In eight studies we calculated a total score based on the mean of the rubrics used to score the writing samples. The weighted mean effect size was 0.98, with a range of 0.12 (Reynolds, 1986) to 1.73 (Wong et al., 1996). The 95% confidence interval was 0.76–1.20, indicating that students in experimental conditions did significantly better than students in comparison conditions.

One explanation for the low effect size in the Reynolds (1986) study supports the integrity of the meta-analysis: the difference in instruction between experimental and comparison groups in that study was considerably less than in any of the other 12 studies. The low effect of 0.12 reflects this minimal difference. In the Reynolds study, the difference between experimental and comparison group instruction was reflected by the magnitude of the effect size in the conventions category (ES = 0.79). In other words, the intervention did have a strong effect on aspects of writing outcomes that reflected the focus of the writing intervention.

Three studies used standardized writing measures to assess outcomes, and 10 studies used experimenter-developed measures. The primary difference between the two is that the standardized measures are published and include normative data on performance. Both rely on subjective ratings of writing quality to assess performance. All of the studies implemented training procedures to ensure that raters achieved acceptable levels of reliability before they scored students' writing samples.

The mean weighted effect size of the experimenter-developed measures of overall writing performance was 0.74, with a confidence interval of 0.55–0.92; the weighted effect size for standardized measures was 1.17, and the confidence interval was 0.82–1.52. That the mean effect size was higher on standardized measures than experimenter-developed measures is important, especially in the context of previous research using meta-analyses. Larger effect sizes are typically found with experimenter-developed measures versus standardized measures (e.g., Swanson & Hoskyn, 1998), and the concern is that intervention effects may be inflated when interpreting performance on experimenter-developed measures. Previous meta-analyses have shown that the degree of alignment between independent and dependent variables, typically reflected in experimenter-developed versus standardized measures, significantly influences the magnitude of the effect sizes (Gersten & Baker, in press; Swanson & Hoskyn, 1998). The fact that standardized measures produced a larger effect strongly indicates that the expressive writing studies employing experimenter-developed measures did not have artificially inflated effect sizes.

Creativity Training Studies

We included three studies, conducted in the 1980s, with some reluctance because they only partially addressed writing abilities. Each examined the effects of an instructional intervention designed to promote creative thinking and creative writing among students with learning disabilities (Fortner,

1986; Jaben, 1983, 1987). Because writing was a key medium of instruction and the key dependent measure, we decided to include them. The two studies by Jaben (1983, 1987) used the Torrance Test of Creative Thinking (Torrance, 1974) as the primary outcome measure. Student writing on this measure was evaluated on the basis of fluency, flexibility, and originality. In the Fortner study (1986), the Test of Written Language (TOWL; Hammill & Larsen, 1978) was used along with the Torrance test.

Although it is easy statistically to integrate these three studies with the others, they are quite different conceptually. Each used a packaged creativity curriculum but provided little explanation about what the curriculum entailed or specification about how it was implemented in the study. Consequently, it was difficult to code these studies in terms of the independent variable. It is likely that the creativity studies used instructional procedures quite different from those used in the other 10 studies. Yet, the creativity studies did produce consistent positive effects. Because they used standardized measures for assessing effects, the weighted mean effect size was 1.17. It may well be that the types of instructional approaches used in the "packaged" creativity curricula include important components that help students with learning disabilities become better writers.

Individual Writing Components

Writing conventions. Four studies assessed aspects of writing that we classified as writing conventions. These assessments included conventions such as standard punctuation and spelling. A more contemporary assessment of conventions was used by De La Paz and Graham (1997a), who rated papers on a combination of grammatical errors and the way sentences were linked together.

T-units. "Thought units," or T-units, measure the number of independent pieces of information in a writing sample. Therefore, the number of clauses written in a sample is counted rather than the number of sentences (Hunt, 1965). Four studies in our meta-analysis included writing measures that we coded as T-units. The mean weighted effect size of these four studies was 0.69, with a confidence interval range of 0.42–0.96.

Text structures. A third writing component relates to the use of text structures. Two of the 13 studies included a score of how well students wrote their posttests following the text structure they were taught in the intervention (Englert et al., 1991; Sawyer et al., 1992). In the Englert et al. (1991) study, text structure scores were recorded for two expository writing samples—either a compare/contrast sample or an explanation sample. For example, the explanation papers were rated on the following elements: (*a*) introduction of the topic, (*b*) inclusion of a sequence of steps, (*c*) inclusion of key organization words, such as first, second, and third, and (*d*) adherence to an organizational technique acceptable for an explanation essay. In Sawyer et al. (1992), the text structure was narrative. For each of eight story grammar elements—main character, locale, time, starter event, goal, action, ending, and reaction—a score was recorded. In both studies, we used the sum of individual text structure scores as a measure of genre-specific writing.

The mean weighted effect size of the two studies was 1.11. Individual effect sizes in the two studies (1.07; Englert et al., 1991; and 1.21; Sawyer et al., 1992) were very close, indicating strong consistency in outcomes related to text structures specifically taught. Also, the effect sizes are the largest of any of the aggregations. However, because only two studies comprised this category, inferences about meaning should be made cautiously.

Studies That Employed More than One Experimental Condition

We now present a series of analyses of five studies that included more than one ex-

perimental condition. De La Paz and Graham (1997a) used two treatment groups to determine effects of the physical demands of writing on learning outcomes. The two treatment groups were identical except that students in one group dictated the essays instead of writing them. The overall effect size was 0.58, favoring students in the dictation group. This finding lends credibility to the idea that for students with learning disabilities, measures of the overall quality of their written products may underestimate the quality of content they present. This sentiment has been expressed recently by Goldman et al. (1997).

A seminal study of writing instruction conducted by Graham and Harris (1989) was not included in our meta-analysis because there was no comparison group. We want to discuss the study briefly, however, because it provides critical background to our discussion of the Sawyer et al. (1992) study that follows.

In the Graham and Harris (1989) study, two groups of fifth- and sixth-grade students with learning disabilities received the primary intervention: instruction in the use of a writing strategy. One group also received instruction in (*a*) self-monitoring their performance (recording and graphing the number and kind of story grammar elements they included in their stories) and (*b*) setting goals for the number of elements they would include. Overall, students in both groups made considerable gains in writing performance, which the authors were able to attribute to the strategy instruction training, the main focus of instruction.

However, contrary to expectations that self-monitoring and specific goal-setting would lead to additional positive effects, the opposite seems to have occurred (Graham & Harris, 1989). Students who received the strategy training but not the self-monitoring and goal-setting component made greater gains. The effect size was 0.58 favoring the strategy-only group. Although the effect size was moderate, it was not significant. Still, it remains a puzzling finding. It is not immediately clear why explicit self-regulation and goal setting would have a negative effect, but Graham and Harris offer a plausible explanation. They point out that those students who did not receive explicit instruction in self-regulation and goal setting probably used at least some implicit self-regulation to complete the writing tasks.

In a subsequent study, Sawyer et al. (1992) further investigated the influence of specific goal-setting and self-monitoring on the writing performance of fifth- and sixth-grade students with learning disabilities. This time there were three conditions, two of which were the same as in the Graham and Harris (1989) study: one group received writing strategy instruction only, and another group received both writing strategy instruction and self-regulation. The third condition was the comparison group, which the authors defined as direct teaching. In the comparison conditions, students were taught the components of the writing strategy, but instructional procedures that may have induced implicit self-regulation were omitted. These eliminated components included teacher modeling, collaborative practice with the teacher, and student personalization of the strategy for use in actual writing tasks. As we expected, there was a strong effect when the two primary experimental groups—those who received full instruction in the writing strategy either with or without self regulation—were compared to students in the direct teaching comparison condition who received a streamlined version of the strategy instruction. The effect size when the two primary experimental conditions were compared to the comparison condition was 0.55.

When the two strategy groups were compared to each other (i.e., with and without self-regulation), the addition of self-regulation produced a positive effect ($d = 0.66$), which was the opposite of what Graham and Harris (1989) found. Sawyer et al. (1992) speculated that the apparent

difference in the studies was that students were provided with feedback on pretest story performance in the Graham and Harris study but not the Sawyer et al. study. Sawyer et al. suggested that discussing feedback with students at pretest may have induced implicit goal-setting on their part.

Recent research in the area of goal-setting and self-regulation has expanded the implicit versus explicit goal-setting interpretations of the Graham and Harris (1989) and Sawyer et al. (1992) studies. Graham, MacArthur, and Schwartz (1995), for example, found that goal-setting strategies involving skills that were well within the range of student capabilities did not contribute to successful goal attainment. For instance, students with learning disabilities in the Graham et al. (1995) study were asked to add three things to their compositions when revising. Interpreting the findings, Graham et al. (1995) suggested that adding three new ideas to a composition was a superfluous task. This goal did not extend students' potential contributions to their writing beyond what normally might have been expected or prescribed. In a recent study examining student goal-setting in the context of essays incorporating refutations and counter arguments, Page-Voth and Graham (in press) discuss how challenging goals that extend beyond prescribed expectations can assist students in writing longer and better essays.

Research conducted by Wong et al. (1994) also included two experimental groups and one comparison group. Students in the two experimental groups differed in the types of interactive dialogue they had about their writing drafts and how they should be revised. Both experimental groups were provided with a complete instructional intervention that included both a focus on the text structure and the writing process. Both conditions also included dialogical and compositional collaboration between two class members. In the first condition, this collaborative practice involved the teacher and the student. The second condition involved two students collaborating. Our prediction was that the collaboration between the teacher and student would result in better-written products than two students collaborating together. However, the effect size favored the student collaboration condition over the student-teacher condition (0.53). This finding has important implications for the potential widespread application of peer tutoring to improve the quality of students' writing.

In all of the studies with more that one experimental condition, we expected to find at least small differences between the experimental groups because of explicit variations in the independent variable. In the Reynolds (1986) study, however, we expected no differences between the two contrasting conditions because they were so similar. In this study, variations in the order of the revising and editing strategies used by students in groups were the primary contrast. The two components of revising and editing were (*a*) the use of a specific strategy to address mechanical aspects of the paper and (*b*) specific editing strategies students could use to modify what they wrote in their first drafts. The difference between the two experimental groups was the order in which these two strategies were used. The effect size was 0.04, supporting our expectations that the ordering of the intervention components would not have an effect on writing performance.

Intervention Effects on Attitudes and Understandings

Seven of the 13 studies assessed the effects of instructional interventions on student attitudes and understandings (see Table 4). The most frequent measure in this category was metacognition. Across six studies, the weighted effect size on metacognitive surveys was 0.64. We interpret this moderate effect to mean that students' understandings of the writing process, the purpose of text structure in writing, and other essential goals of the interventions were positively influenced by the interven-

tions. There is a great deal of variability in the effect sizes among the studies, however, so the conclusion is tenuous. It may be that writing is an excellent subject area for the development of metacognitive knowledge over brief periods of time, as some of the studies indicated (e.g., Englert et al., 1991; Welch, 1992). Or, it may be that, as Wong et al. (1996) point out, metacognitive knowledge is slower to develop and typically occurs after changes in actual measures of student performance are evident.

A great deal of variability also characterized changes in students' attitudes toward writing. As with changes in metacognition, conclusions are also tenuous for this reason. In addition, there are only three studies in this category, so drawing firm conclusions is problematic for this reason as well. This lack of clarity surrounding intervention effects for metacognition and attitudes toward writing is likely attributable, in part, to the difficulties involved in measuring both concepts accurately.

The overall effect size on attitudes was positive (0.40) and relatively small, suggesting that writing interventions of the type in the current set of studies may not result in strong changes in the attitudes students have about writing. The overall effect size for self-efficacy was somewhat larger (0.61), but drawing firm conclusions is also hampered by the small number of studies. Overall, the findings supporting changes in students' attitudes toward writing, their feelings about themselves as writers, and their understandings of how to communicate through writing are tenuous, at best. Writing interventions designed to improve quality of writing appear to result in positive changes (albeit perhaps small) in students' attitudes and understandings.

Discussion

Wong et al. (1994) noted that teaching cognitive strategies in expressive writing should not be a difficult instructional objective. Our meta-analysis suggests that achieving it will result in considerable benefits for students with learning disabilities. Indeed, all of the interventions developed to improve the expressive writing skills of students with learning disabilities had positive effects. The quality of their written products improved, the effect sizes were consistently moderate to large, and effects were relatively consistent across studies. Intervention effects were also consistent across writing genres (e.g., comparison essays vs. narrative stories) and across procedures used to assess quality (e.g., global rating of quality vs. the sum of scores for individual writing traits or rubrics).

It is encouraging that the findings from the small body of more clinical multiple-baseline studies on writing interventions for students with learning disabilities have supported the findings of this meta-analysis. Overall, the multiple-baseline studies suggest that writing interventions for students with learning disabilities are effective and feasible (see, e.g., Danoff, Harris, & Graham, 1993; De La Paz, 1997; Graham, MacArthur, Schwartz, & Page-Voth, 1992; Montague & Leavell, 1994; Wallace & Bott, 1989; Zipprich, 1995).

We also found evidence of positive effects on students' sense of efficacy, that is, their sense of being able to write. Although the number of studies is not extremely large, it is large enough, and the quality of the research is solid enough, to allow inferences to be made about the improvement of classroom practice.

Most important, the meta-analysis highlights a range of research-based instructional approaches that educators should use when teaching written expression to students with learning disabilities. Ten of the 13 interventions provided relatively detailed descriptions of the instructional approach used. Our analysis of the instructional interventions indicates that they share many features.

Virtually all of the interventions were comprised of several components. We have organized these components according to three areas: the writing process, awareness

of text structures, and feedback. These areas are discussed below.

Explicit Teaching of the Critical Steps in the Writing Process

Most interventions adhered to the framework of three basic steps in the writing process: planning, writing, and revising. Invariably, explicit teaching of each step was provided by the teacher through several examples, often supported by a "think sheet," a prompt card, or a mnemonic.

Teaching students to write requires showing them how to develop and organize what they want to say and guiding them in the process of getting it down on paper. The plans students develop for this are critically important. They must entail structures that encourage and prompt the overlapping and recursive processes required in writing. In order to help students conceive and effectively use a "plan of action," teachers, or peers competent in reading and writing, verbalize the steps they take when they read or write. These plans of action, sometimes referred to as "procedural facilitators," assist the teacher (or peer) in the unfamiliar task of verbalizing how one actually composes a piece of writing.

Procedural facilitators also serve two related purposes. First, they provide students with a map for engaging in the writing process, providing suggestions for what to do when the student feels "stuck" or overwhelmed. In other words, they give students a permanent reminder of the content and structure of the writing task. Second, they provide a common language that teachers and students can use to focus and enhance the quality of dialogue they might have about expressive writing. We believe this dialogical function represents a major advance of writing instruction over traditional methods, which required students to work in relative isolation as they wrote.

Well-developed plans for writing result in better first drafts. Revising and editing skills are also critical to the writing process. Developing methods to help students with learning disabilities refine and edit their work has been difficult, but a few researchers have begun to develop specific strategies that appear quite promising (e.g., Englert et al., 1991; Harris & Graham, 1992; MacArthur et al., 1991; Schumaker, Nolan, & Deshler, 1985; Wong et al., 1996). The use of peer editing, for instance, is an integral and recurrent strategy in the research of Englert, Wong, and MacArthur.

Explicit Teaching of the Conventions of a Writing Genre

Different types of writing are based on different structural elements. A persuasive essay, for example, contains a thesis and supporting arguments—elements that differ considerably from those found in narrative writing. In narrative writing, for example, some writers like to begin with the climax of a story and then proceed with character development, while others like to develop their characters before developing the plot. The organizational approach used to construct a narrative is not, in and of itself, what makes a story engaging. Rather, good writing involves utilizing what Englert et al. (1991) call "overlapping and recursive processes" (p. 364). These processes do not proceed in a particular order, and one process may inform another in such a way that the author returns to previous steps for update or revision on a regular basis.

Explicit teaching of text structures provides a useful guide for undertaking the writing task, whether it is a persuasive essay, a personal narrative, or an essay comparing and contrasting two phenomena. Instruction typically includes numerous explicit models and prompts. Greater levels of specificity provided by the prompts appear to be associated with better written products.

Procedural facilitators make writing using text structures visible to students and help demystify the writing process. Figure 1 presents a procedural facilitator called a

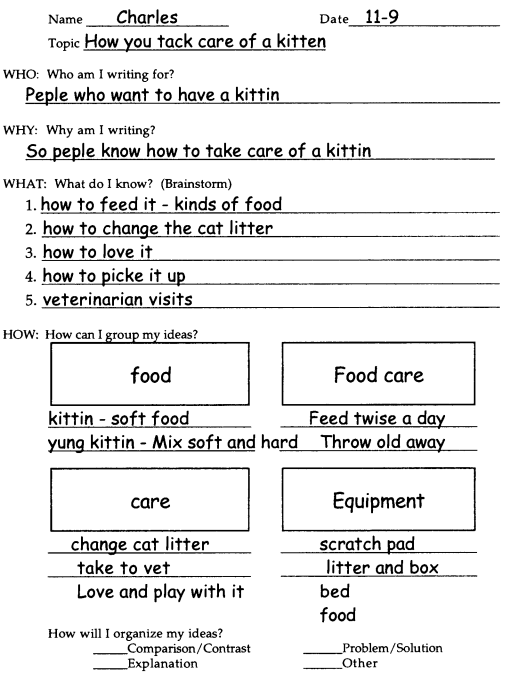

FIG. 1.—Example of a completed plan think-sheet. Source: Englert et al. (1992).

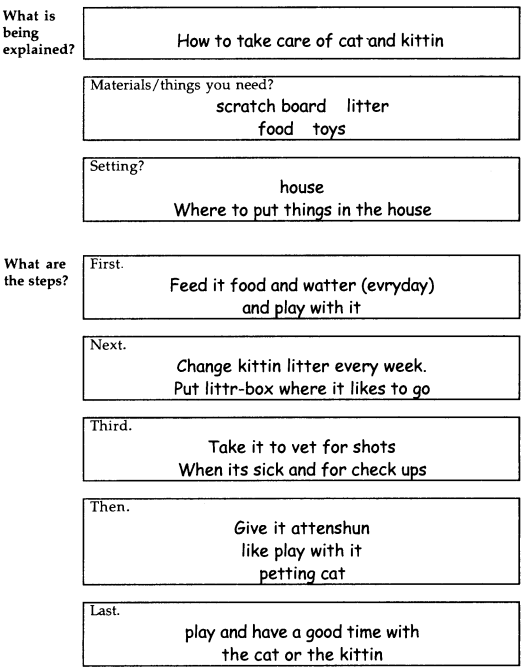

FIG. 2.—Example of a completed explanation organization form. Source: Englert et al. (1992).

"planning think sheet," which was used in several studies by Englert and colleagues (e.g., Englert et al., 1991, 1992). The think sheet helps students plan their writing through a series of sequential and structured prompts. Figure 2 presents a procedural facilitator that would be used specifically for an explanation text structure (Englert et al., 1992).

The use of targeted procedural facilitators for specific writing tasks helps students recognize the sameness, or reoccurring text patterns, in order to guide their "efforts to produce well-organized texts and fuel their ability to interpret, monitor, and talk about texts" (Englert & Mariage, 1991, p. 333). Similarly, in the context of dictating ideas for written compositions, De La Paz and Graham (1997a) showed clearly that concrete structures for advanced planning were critical to the completeness and overall quality of expository essays produced by students with learning disabilities.

Guided Feedback

The third component common to all interventions was guided feedback. Either teachers or peers provided frequent feedback to students on the overall quality of writing, missing elements, and strengths. When feedback was combined with instruction on the writing process or text structure, a common vocabulary was created that gave teachers and students a meaningful way to engage in dialogue, which resulted in improved written products. The prompts helped give teachers or peers concrete suggestions for providing appropriate feedback. With the benefit of such feedback, students demonstrated "reader sensitivity" (Englert et al., 1991). (Englert et al. called "reader sensitivity" what others call "writing style.") In other words, students began to develop the ability to write in a way that was not only clear and factually correct, but also engaging for specific readers, because the style began to take into account reader

expectations and ways to keep them engaged.

Some of the studies in our meta-analysis set up elaborate systems for peer feedback and review (Englert et al., 1991; MacArthur et al., 1991; Wong et al., 1996, 1997). Wong et al. (1997) used guided interactive dialogue between peers, first to engage them in the process of preparing a comparison essay and then in revising the first draft. De La Paz and Graham (1997a) demonstrated the importance of interactive dialogue between teacher and student, who together focused on key components of the writing strategies. Wong and her colleagues hypothesized that interactive dialogues, which lead students through multiple cycles of reflection, realization, and redress of problems, helped them "see" their thoughts and write from another's perspective.

In all cases, procedural facilitators were used to initiate and focus dialogue about a writing task. Wong et al. (1996) modeled procedures for students and teachers to use in providing feedback so that they would attend not only to the surface features of writing (i.e., spelling, punctuation) but also to the presentation of ideas. Across the studies, teachers and peers had an organizational framework and a language to use in providing feedback to students about their attempts at organization, originality, and interpretation. Consequently, new ways of organizing and analyzing were practiced.

The question of *who* should provide feedback (i.e., teacher vs. peer) may be less crucial than the quality of the feedback offered. Only one study specifically compared teacher feedback to peer feedback (Wong et al., 1996) and found essentially equivalent results. What appears to be most important is that elaborate and explicit systems are set up for giving feedback (Englert et al., 1991; Wong et al., 1996).

The Future of Expressive Writing Research

The research remains unclear regarding the relative benefits of explicitly teaching students to monitor their own performance (Graham & Harris, 1989), as Sawyer et al. (1992) concluded. It may well be that providing frequent, detailed feedback to students with learning disabilities about their writing—and frequently talking about the process of writing—induces sufficient self-monitoring.

The three components outlined above—explicit teaching of critical steps in the writing process; adherence to a basic framework of planning, writing, and revision; and the provision of feedback—have reliably and consistently led to improved outcomes in teaching expressive writing to students with learning disabilities. Yet, with few notable exceptions, they are rarely implemented in either general or special education classrooms. Nevertheless, increasing interest in these approaches is likely as more students with disabilities take state assessments, which typically include a writing component. The research provides numerous examples of how to proceed. Two clear examples are Self-Regulated Strategy Development (SRSD; Graham & Harris, 1989) and Cognitive Strategy Instruction in Writing (Englert et al., 1991).

We conclude with a discussion of several important contemporary issues in expressive writing research. The first involves dictation versus actual writing. This issue is likely to become increasingly salient as more students with learning disabilities take state assessments and are provided with accommodations such as the ability to dictate text to a scribe rather than actually writing it down. The study by De La Paz and Graham (1997a) casts some light on this issue. Their data suggest that performance is better when students dictate to an adult than when they write text out themselves, especially when they are given structured guides for planning what they want to say. Dictating can eliminate mechanical difficulties, as well as contribute to improved quality and length of compositions (MacArthur & Graham, 1987). Obviously, students need to learn to do their own writing at some point, but these findings suggest a possible

"bridge" to higher performance that has yet to be systematically investigated.

Another emerging trend is the realization that expressive writing instruction should include more than just writing mechanics, as was common 10 or 15 years ago. Writing instruction must address "not only the social and creative aspects of writing, but the organizational and mechanical as well" (Isaacson, 1994, p. 39). Instruction should integrate work on lower-order transcription skills with higher-order organization, text structure, and revision skills. Students with learning disabilities experience difficulties with both aspects of good writing. Over the decades, studies have consistently shown that these difficulties result in writing that is very short, poorly organized, and lifeless (Isaacson, 1995).

In the past several years we have witnessed renewed interest in explicit teaching of transcription skills, that is, spelling, grammar, punctuation (Berninger et al., 1997, 1998), as well as attempts to integrate transcription skills within the writing process (Berninger, 1999; Graham et al., 1996; Wong et al., 1997). Students with learning disabilities often struggle to master proficient use of mechanics. When faced with the task of composing an essay, for example, students who have not obtained fluent transcription skills often become laboriously consumed with handwriting, grammar, and/or spelling as they struggle to get their writing onto paper.

The research of Brooks, Vaughan, and Berninger (in press) suggests that daily writing instruction should contain both time devoted to lower-order aspects of writing such as punctuation and handwriting and time devoted to systematic teaching of the writing process. The authors' rationale is that increased automaticity will enable cognitive resources to be directed to the complexities of planning, composing, and revising. The emerging research on transcription reminds us that problems with the mechanical aspects of writing must be addressed within expressive writing instruction, and that there is a reciprocal relationship between mastery of transcription skills and growth in writing quality (Berninger, 1999). Graham (1999) further emphasizes the value of addressing both transcription and composition writing. He observes that "an important goal in writing instruction is to strike an appropriate and effective balance of form, process, and content" (Graham, 1999, p. 76).

Wong (1994) articulated another very different type of challenge. She noted that although teaching writing strategies to students with learning disabilities is quite possible, it is far more difficult to design ways to promote "their spontaneous selection and deployment in various learning contexts" (p. 110) so that their overall levels of academic achievement are raised.

Many of the studies in this meta-analysis did not seriously investigate transfer of writing skills. In other words, students were assessed on precisely the types of writing tasks that they were taught. When transfer measures were included (e.g., Englert et al., 1991), results were decidedly mixed. Wong (1994) has urged refinement in writing interventions to promote transfer. In order to reach this goal, she said that "insufficient mindfulness during strategy learning appears to explain the difficulties in obtaining transfer among students with learning disabilities. This is because the typical intervention with students with learning disabilities rarely permits them to engage in the kind of deep and intent thinking necessary for transfer" (Wong, 1994, p. 111).

Wong (1994) calls for instruction that provides students with learning disabilities the opportunity to reflect on "the relationship between their strategy [and] ... the subsequent successful learning outcome" (p. 111). Citing seminal research by Borkowski, Weyhing, and Carr (1988), she argues that when students are provided such opportunities, transfer is greatly enhanced. The issue of spontaneous, routine use of strategies learned by students with learning disabilities is likely to be the next frontier in the area of expressive writing research.

Appendix

The Nature of Independent Variables among Expressive Writing Studies

Independent Variables	N/E	Major Foci		Components										Control Groups	
Group Design Studies	Narrative or Expository	Text Structure	Emphasis on Writing Process	Revising and Editing	Instruction Focusing on Building Creativity	Teacher Modeling of Strategy Use	Explicit Goal Setting/Monitoring	Collaborative Practice with Teacher	Collaborative Practice with Peers	Use of Procedural Facilitators/Prompts	Brainstorming	Use of Computers	Minimal Instruction in Comparison Group	No Instruction/ Practice Only
DeLaPaz & Graham, 1997a	E													
E Planning and Writing		√	√			√		√		√	√			
C		√											√	
Englert et al., 1991	E													
E Cognitive Strategy Instruction in Writing		√	√	√		√			√	√				
C			√								√		√	
Englert et al., 1995	E & N													
E1 Students of teachers using the curriculum for the first year		√	√	√		√		√	√	√	√			
E2 Students of teachers using the curriculum for the second year		√	√	√		√		√	√	√	√			
C													√	
MacArthur et al., 1991	N													
E Revision/Use of Computers			√	√		√			√	√		√		
C			√										√	
MacArthur et al., 1995	E & N													
E Word processing, strategy instruction, process approach		√	√	√		√			√			√		
C													√	
Reynolds, 1986	E													
E1 Revising Strategies			√	√		√		√		√	√			
E2 Revising Strategies			√	√		√		√		√	√			
C			√			√		√		√	√		√	
Sawyer et al., 1992[a]	N													
E1 Self-Regulated Strategy Development		√	√			√	√	√		√	√			
E2 Self-Regulated Strategy Development Without Goal Setting & Self-Monitoring		√	√			√		√		√	√			
E3 Direct Teaching		√								√				
C														√
Welch, 1992	E													
E Writing Strategy Instruction			√	√						√				
C													√	
Wong et al.,1996	E													
E Plan/Write/Revise		√	√	√		√			√	√	√	√		
C														√
Wong et al.,1994	E													
E1 Individual		√	√	√		√		√			√	√		
E2 Dyad		√	√	√		√		√	√		√	√		
C														√
Creativity Training Studies														
Fortner,1986														
E New Directions in Creativity					√						√			
C														√
Jaben, 1983														
E Purdue Creative Thinking Program					√						√			
C														√
Jaben, 1987														
E Purdue Creative Thinking Program					√						√			
C														√

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