Strategic Interventions for Post-Secondary Students with Learning Disabilities

Deborah L. Butler, Cory L. Elaschuk, Shannon L. Poole, W. B. MacLeod, & Kim D. Syer

University of British Columbia

Running Head: Strategic Interventions

Paper presented at the 1997 (June) meeting of Canadian Society for Studies in Education in St. John's, Newfoundland. This research was supported in part by a Social Sciences and Humanities Research Council of Canada Research Grant awarded to the first author. Correspondence concerning this article should be addressed to Deborah L. Butler, Department of Educational Psychology and Special Education, Faculty of Education, University of British Columbia, Vancouver, B.C. V6T 1Z4, Canada

Recent descriptions of effective learners suggest that they are self-regulating (Butler & Winne, 1995). Self-regulated learners approach academic tasks strategically. They analyze task requirements, define criteria for successful performance, and set realistic and productive goals. Unlike their less successful counterparts, effective learners select and invent strategic approaches to achieve their objectives, monitor the success of their efforts, and adaptively adjust their strategies to foster success (Butler & Winne, 1995; Zimmerman, 1989).

The development and implementation of instructional approaches that promote self-regulated learning presents a significant challenge for all educators, particularly for students with learning disabilities (Wong, 1991). Indeed, educational researchers have spent considerable effort in defining instructional approaches that support students to take ownership and control over learning and that foster development of self-regulation (e.g., Borkowski & Muthukrishna, 1992; Butler, 1995; Ellis, 1993; Harris & Graham, 1996; Pressley et al., 1995; Schumaker & Deshler, 1992). One instructional model designed to promote self-directed learning is the Strategic Content Learning approach (SCL; Butler, 1993; 1994; 1995; 1996; 1997; in press-a). SCL was designed as a model to support students to develop, master, and implement powerful task-specific strategies to learn important curricular content, and to use those strategies flexibly and adaptively in the context of meaningful tasks (Butler, in press-a). Previous research on SCL efficacy has demonstrated the usefulness of the model for providing individualized assistance to students with LD's in postsecondary settings (Butler, 1993; 1994; 1995; 1996; 1997; in press-a). This paper reports on extensions of that original research, summarizing findings from two pilot projects assessing the feasibility of implementing SCL as a model for providing peer-tutoring.

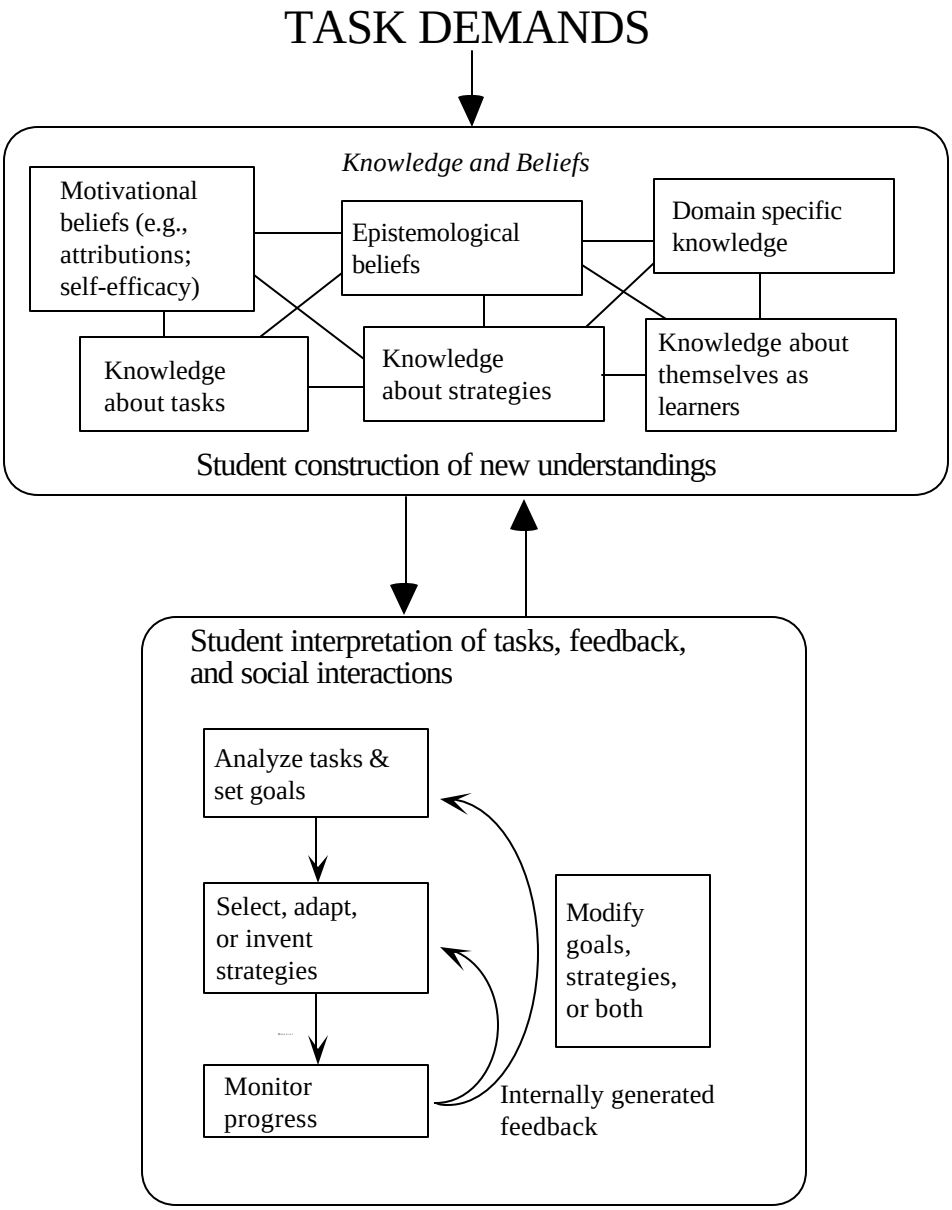
SCL Instruction: An Overview

Figure 1 presents a simplified overview of the cognitive processes central to self-regulation (Butler & Winne, 1995; Carver & Scheier, 1990; Corno, 1993; Zimmerman, 1989; 1994). First, self-regulated learners actively analyze task demands to interpret their purposes for learning (e.g., to memorize details; to read for main ideas) and set corresponding task goals. This step in self-regulation is critically important because the goals students select establish the direction for all further learning activities (Butler, 1994; Butler & Winne, 1995; Dweck, 1986). Second, once goals are established, self-regulated learners select, adapt, or even invent strategies designed to meet their objectives (e.g., to make up cue cards; to outline main ideas), based on their perception of task demands. Finally, effective learners monitor the success of their efforts in terms of their perception of task requirements and strategically modify their approaches to learning if they perceive their progress as unsatisfactory. Instructional efforts designed to promote students' development of self-regulation must assist students to engage in this sequence of cognitive processes reflectively, flexibly, and recursively.

In SCL, instructors provide calibrated (i.e., scaffolded) support to students as they flexibly undertake each of the cognitive activities central to self-regulation. Instructors also engage students in interactive discussions about learning processes to promote construction and revision of understandings and beliefs that support self-regulation (e.g., understandings about typical task requirements;

perceptions of self-efficacy; see Figure 1). To date, SCL has been applied as a model for supporting students with learning disabilities (LD's) in postsecondary contexts. Given the research demonstrating that LD students are often deficient in their strategic approaches to tasks (Butler, in press-b; Swanson, 1990; Torgesen, 1977), the SCL intervention was well suited for this population. Indeed, students with LD's have been found to benefit from interventions, like SCL, that support them to approach learning tasks more strategically (e.g., Graham & Harris, 1989; Sawyer, Graham, & Harris, 1992; Schumaker & Deshler, 1992; Wong, Butler, Ficzere, & Kuperis, 1996).

Figure 1. A Model of Self-Regulated Learning.



In postsecondary settings, three service delivery models are commonly used to support students with LD's. These three alternatives are: individualized tutoring in a counselling/learning center setting provided by teachers, counsellors, or LD specialists, individualized tutoring provided by peers, and group-based instruction in study skills classes. In prior research, the SCL approach was implemented in four studies using the first method of service delivery (see Butler, 1993; 1994; 1995; 1996; 1997; in press-a). In each of the four studies, individualized SCL tutoring was provided by teachers, counsellors, or LD specialists to students as an adjunct to regular classroom instruction. In the first study, one instructor provided individualized tutoring to six postsecondary students with LD's (Butler, 1993; 1995). In the second SCL study, three SCL instructors were trained in the SCL approach and provided tutoring to a total of 13 students with LD's (Butler, 1996). The third and fourth SCL studies were completed as part of a large pilot project. In the two years of the project, four trained graduate students tutored 12 and 9 students in years one and two, respectively (see Butler, 1997).

Postsecondary students generally bring to support services a need for immediate assistance with pressing concerns related to completion of actual course work. Thus, to provide support as realistically as possible, in each SCL study, participants selected tasks from their courses that would provide the focus of the SCL intervention (usually variants of reading, writing, studying, or math tasks). During each meeting, students prioritized assignments based on course requirements and SCL tutors provided calibrated assistance as students self-regulated completion of those tasks (Butler, 1993; 1995; 1996; 1997; in press-a). SCL support was provided through interactive discussions focused on completing the targeted task (e.g., brainstorming to write an assignment) and the process of learning (e.g., the benefits of brainstorming). Tutors continually supported students to analyze the task, articulate performance criteria, and set specific goals. If a student held misconceptions about a task that interfered with identifying realistic performance criteria, the instructor supported the student to scrutinize task descriptions in order to develop more accurate conceptions of the task (Butler, 1993; 1994; 1995; 1996; 1997; in press-a). At every stage of the SCL process, students were asked to articulate their developing understandings about task requirements and about all facets of learning that would help them on subsequent tasks and across various learning contexts (i.e., transfer). Finally, instructors supported students to select, adapt, and invent strategies based on the task requirements. Students were supported to implement selected strategies, monitor their effectiveness, and to maintain or revise them based on how goals were, or were not, being achieved. It should be noted that in every stage of SCL, students were consistently required to make all final decisions regarding goals and strategy evaluation, selection, and adaptation. Although tutors sometimes provided suggestions or ideas to think about, all decisions were ultimately in the hands of the students.

The results from the four SCL studies were consistent with expectations (see Butler 1993; 1994; 1995; 1996; 1997; in press-a). That is, results revealed that participants benefited from the SCL intervention. Improvements were observed in students' task performance and in their metacognitive knowledge about tasks, strategies, and self-monitoring. Further, SCL participants built more positive perceptions of task-specific self-efficacy and were more likely to attribute successes to effort or strategy use (Butler, in press-a). Finally, SCL students took an active role in developing personalized strategies that addressed their individual needs, transferred strategic approaches across contexts, and flexibly adapted strategies for use across tasks (Butler, 1997).

This paper presents the findings of preliminary, pilot investigations of SCL implementation within the second model of postsecondary service delivery, individualized peer tutoring. Two concurrent,

year-long peer tutoring projects were conducted in cooperation with existing Student Service departments at local postsecondary institutions which offered peer tutoring services to students with LD's. The remaining sections provide a selective review of research on peer tutoring models, an explanation of how SCL was implemented as a model for peer tutoring, a description of the two pilot studies, and, finally, a discussion of conclusions and implications.

A Selective Review of Research on Peer Tutoring

Some research has demonstrated the benefits of having peers provide instruction and/or feedback to one another as part of the instructional process. For example, Simmons, Fuchs, Fuchs, Mathes, and Hodge (1995) investigated the impact of combining peer tutoring with explicit teacher-directed instruction on the reading achievement of low-performing students (LP) and students with LD in intact, inclusive classrooms. Twenty-four general education teachers volunteered to participate in the study. Eight were taught to provide explicit teaching (ET; teacher-directed group reading instruction), 8 provided explicit teaching in combination with peer tutoring which took place outside of the classroom (the ETPT condition), and 8 teachers served as controls, providing reading instruction as they normally would. Within the participating classrooms, forty-four students with LD and 24 LP students in grades two to five were included in the 16-week intervention. Observations of teacher and student behaviours during classroom instruction revealed no significant differences between groups during teacher directed instruction, suggesting that teachers did not modify their instructional procedures as a result of the training they received. However, results indicated that students in the ETPT classes scored significantly higher on measures of reading fluency and comprehension at posttest than did students in the other two groups, while students in the ET group did not achieve significantly better than controls. The authors conclude that peer tutoring was a useful adjunct to instruction because it provided opportunities for lower achieving students to receive supervised reading practice that is not ordinarily available to them to an inclusive classroom setting.

In another study, MacArthur, Schwartz, and Graham (1991) examined the impact of a reciprocal peer editing strategy on the metacognitive knowledge about writing and writing performance of grade 4 to 6 students with LD's. Participants were randomly assigned to one of two groups. Students in a strategy instruction group received 6 to 8 weeks of instruction in how to employ a student-editor strategy when revising their writing, while students in a control group participated in the regular course curriculum. During strategy instruction, students were taught how to edit a piece of writing and then worked in dyads to discuss and edit each other's papers. Results indicated that students in the strategy group made more revisions and wrote higher quality papers when receiving peer support than did students in the control group. However, when students in the strategy group were asked to edit their work independently, they made more revisions but did not write higher quality papers than those students who received regular classroom instruction. On a metacognitive interview created to assess students' knowledge of criteria for good writing and writing processes, students in the strategy group were significantly more aware than control students of criteria used to evaluate writing, but only when they were asked general questions about writing. Metacognitive gains were not apparent when students responded to questions on evaluating or revising particular papers.

Taken together, these studies suggest that some benefits arise when peers collaborate to develop reading and writing skills, although students with LD's may need additional support to use learned strategies independently. However, both studies were conducted with children in elementary

grades. Recently, Rich and Gentile (1995) argued for the importance of establishing and evaluating peer tutoring models at the postsecondary level. Specifically, they suggested that, compared to high school contexts, at the postsecondary level there is often an increase in the student—teacher ratio, a higher academic standard, a less personalized support system, and a less protective atmosphere (Rich & Gentile, 1995). At the same time, individualized support by teachers or counsellors for students struggling in postsecondary contexts is often unavailable. Thus, postsecondary institutions present an ideal environment for the development of peer tutoring programs.

Further, Rich and Gentile (1995) argue that a major difficulty with most peer tutoring programs in postsecondary settings is that, although tutors generally possess content knowledge related to tutees' areas of study, they often lack understanding and experience with instructional models designed to promote strategic learning. In response to this problem, they designed a peer tutoring model for students with LD's that included two components: collaborative tutoring from a special education specialist trained to help students develop strategies applicable to their course work, and content-area tutoring from a peer with subject matter expertise. They implemented their program at a small American college where students with LD's were integrated into courses with non-disabled peers. To evaluate their program's effectiveness, Rich and Gentile (1995) completed a case study of one student involved in the program. They found that, during strategy instruction, the special educator provided the student with emotional support, modeled several learning strategies for her (e.g., predicting, self-questioning, and summarizing), encouraged her to use learned strategies independently in her work with her peer tutor, and provided her with feedback. Rich and Gentile (1995) also found that, as the student "demonstrated competence in strategy use, the special educator gradually reduced her role and relinquished responsibility of the teaching-learning process to her student" (p. 99). The authors reported that, as a result of participating in the intervention, the student acquired content-specific knowledge, was an active participant in the decision making process, and recognized that learning strategies need to be applied on a regular basis (Rich & Gentile, 1995).

SCL and Peer Tutoring

As Rich and Gentile (1995) apply point out, in most peer tutor models, students with content expertise are hired to provide subject-specific tutoring to their peers with learning difficulties. An advantage of this approach to tutoring is that students receive assistance with immediately pressing problems that arise in their actual course work. At the same time, students may not learn the skills that they need to perform tasks independently when their tutor is not available to help. And, as was noted earlier, the lack of academic success by students with LD's can often be attributed, at least in part, to deficient study skills. Thus, the research described here was undertaken to evaluate whether peer tutors could be trained to use the SCL approach to promote both content mastery *and* strategic learning by peers with LD's. The aim was to keep the best of the content-tutor model (e.g., immediate and targeted assistance provided by a subject-matter expert) while simultaneously supporting students' strategic development. Thus, in the present studies, peer tutors were provided with instruction to develop the strategy training competencies that they have been presumed to lack (Rich & Gentile, 1995).

In the two pilot projects described here, the SCL approach was implemented in the context of existing peer tutoring programs at two postsecondary institutions in the greater Vancouver area. A program coordinator familiar with the SCL approach was assigned to work collaboratively with

personnel at each institution in order to recruit and train peer tutors. Under the coordinators' supervision, the tutors then provided support to students with LD's and/or head injuries over the course of roughly one semester. Evaluation of SCL efficacy followed procedures used in previous studies. Data were collected to measure participants' gains in metacognitive knowledge about tasks and strategies, perceptions of self-efficacy, attributions for success and failure, and active involvement in strategy development and transfer across contexts and across tasks. At one of the campuses, tutors also completed a questionnaire at the end of the study to determine their perceptions regarding the program's effectiveness.

Method

Design

The research design employed in each SCL study, including the present investigation, has been selected on the basis of three overriding objectives. These were first, to trace the process of students' development of self-regulation while engaged in instructional sessions; second, to evaluate SCL efficacy in naturalistic contexts using realistic service delivery models; and third, to evaluate the consistency of SCL efficacy across students, tasks, instructors, and settings. In order to simultaneously achieve these objectives, a mixed design has been employed. To investigate changes in students' self-regulated approaches and associated gains, multiple, in-depth case studies were conducted wherein changes in students' knowledge and beliefs, strategic approaches to tasks, and task performance were carefully traced within and across intervention sessions (Merriam, 1988; Yin, 1994). At the same time, these multiple case studies were embedded within a pre-post design in order to facilitate cross-case comparisons. During pre- and posttest sessions, parallel questionnaires, observations, and interviews were employed to measure common effects across students (see Butler, 1995).

Participants

Two postsecondary institutions participated in the SCL peer tutoring project, one a local university and the other a local college. Eleven students with documented LD's (6 males, 5 females) took part in the university study. Fourteen students (6 males, 8 females) participated in the college study, 11 of whom had documented LD's, and 3 of whom experienced learning difficulties associated with previous head injuries.

One program coordinator familiar with the SCL approach was assigned to each institution. The coordinator worked collaboratively with personnel from the institutions' support services to identify eligible participants, to recruit tutors, and to match tutors with students based on the subject areas with which students requested assistance (e.g., French conversation; law). Tutors were paired with a student if they were proficient in the subject area with which the student needed assistance. In some cases, tutors worked with more than one student (though they always met with students individually). Ten tutors were trained at each institution (3 males and 7 females at the University; 2 males and 8 females at the college).

Measures

Metacognition. Students' metacognitive understandings were assessed at pre- and posttest via a Metacognitive Questionnaire (see Butler, 1995; in preparation; Butler, Elaschuk, & Poole, in

preparation). This questionnaire was composed of 10 short-answer questions that asked students to describe in writing their perceptions about chosen tasks and strategic approaches for completing them. Students' responses across the 10 questions were then evaluated to measure metacognitive awareness across four dimensions: (a) task description (conceptions of task requirements), (b) strategy description (the clarity of students' descriptions of task-specific strategies), (c) strategy focus (the degree to which described strategies were focused, personalized, and connected to task demands), and (d) monitoring (students' descriptions of how they self-evaluated progress and self-directed learning activities accordingly). On each dimension, student responses were rated on a scale from 1 to 3, where 1 and 3 represented low and high metacognitive awareness respectively. Finally, ratings were averaged to produce one overall measure of metacognition.

Self-Efficacy. Students' self-efficacy was assessed at pre- and posttest via two written questionnaires. The Self-Efficacy Questionnaire was composed of three parts: the first was designed to assess students' general perceptions of competence and expectations for success (i.e., general self-efficacy). Students rated how much they agreed with each of six statements on a likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The next two parts were designed to assess students' task-specific self-efficacy. Specifically, the second part assessed students' confidence in their ability to complete task-specific requirements (e.g., to organize ideas for an essay). Students rated their confidence across 8 questions on a likert-type scale ranging from 1 (not at all confident) to 5 (very confident). The third part assessed students' perceptions of the ease or difficulty of specific task requirements (using a similar likert-type scale). The Self-Effiacy Across Tasks Questionnaire was used to assess students' perceptions of task-specific self-efficacy across more than one task. Specifically, this questionnaire asked students to rate on a scale from 1 to 5 their level of difficulty in completing (a) their chosen task, and (b) a second task required of them during the semester but not addressed during interventions.

Attributions. In the Attribution Questionnaire, students were asked to think of the last time they were either successful or unsuccessful at completing their chosen tasks, and then to rate how much each of the 14 factors were responsible for their performance in each case. Ratings were scaled from 1 ("not a reason I did well") to 5 ("a major reason I did well"). The factors included 8 internal (ability, effort, task interest, motivation, mood, relaxed, strategy use/method, knowledge of task) and 6 external (environmental setting, task ease, motivated by others, help from others, luck, time) explanations identified as important in previous research (see Butler, 1993; 1995).

Strategy Development and Transfer. To trace changes in students' strategic approaches to tasks, students were asked to articulate descriptions of their emerging strategies during intervention sessions. These strategy descriptions were chronicled over time and then related to students' specific difficulties with tasks. Further, students' strategies were coded based on the origin of each strategy step. Possible origins included (a) steps students described at pretest (prior to the intervention), (b) steps that emerged based on collaborative discussions with peer tutors, and (c) steps that students developed independently without input from tutors.

Copies of notes, outlines, and other documents that reflected students' strategy use were copied. Additionally, students' self-reports of strategy implementation at home, in class, in test situations, or in other environments outside of the intervention sessions were recorded. This information was collected in order to provide evidence of independent strategy use and transfer of strategies across

contexts. Further, whenever students spontaneously described applying or adapting strategies for use in non-instructed tasks, their descriptions were summarized. These descriptions provided evidence of students' spontaneous transfer of strategic approaches to *tasks* not addressed during the intervention sessions.

Peer Tutor Feedback Form. In the University project, tutors were requested to provide comments and feedback regarding their training, individualized feedback they received from project coordinators, and the utility of the SCL approach for their students. Responses were rated on a five point Likert scale ranging from 1 (e.g., did not benefit) to 5 (e.g., benefited a lot). Tutors were also given the opportunity to provide written comments and suggestions for improving the program.

Procedures

At the beginning of the semester, project coordinators met with personnel from participating institutions to identify potential participants. To be eligible for participation, students had to provide evidence of a specific learning disability and/or head injury and documentation of a need for peer tutoring. Simultaneously, a notice was circulated across the two postsecondary campuses advertising job positions for peer tutors. Once students in need of support were identified, the campus support agencies identified potential tutors from the set of applicants. Students and tutors were matched following the criteria outlined earlier. Unfortunately, at both institutions this administrative process took up to a month to complete.

Students participated in pretest assessments (conducted by trained research assistants) prior to receiving peer tutoring. During that session, the student responded in writing to the attribution, metacognitive, and self-efficacy questionnaires, in that order. In a second pretest assessment, both tutors joined the research assistants to assess their assigned students' current approaches to tasks. When possible, the research assistants modeled SCL interactions for the peer tutors at these sessions. Once pretest assessments were completed, students received support from peer tutors roughly 2 times per week during one hour sessions. At each session, the student and tutor collaborated to strategically complete students' course assignments. During this process, student-researcher interactions were tape-recorded and all strategy development, use, and modification were described on meeting record forms. At the end of the intervention period, students participated in a final, posttest session, completing the same measures they had completed at pretest. Finally, tutors in the University study were asked to fill out a Peer Tutor Feedback form once the study was completed.

During peer tutor training, small groups of tutors were provided with three hours of instruction that introduced the theoretical rationale underlying the SCL approach, concrete strategies for providing tutoring to students, and procedures for data collection. Then, once tutors had an opportunity to interact with their students, coordinators provided support to tutors on a one-to-one basis. Although coordinators did not directly observe tutor-student sessions, they listened to tape-recorded sessions after-the-fact and provided individualized feedback. Small group sessions were also held midway through the term, providing tutors with a forum in which to share their experiences, as well as opportunities to brainstorm and role play. In most cases, support for tutors was most intensive at the beginning of tutoring, and was gradually faded as students became more adept at the SCL approach.

Results

As a first step in data analysis, project coordinators assessed the success of the peer-tutor training efforts. Based on a review of session audio-tapes and their experiences with tutors during the study, the two project coordinators identified tutors who had successfully mastered and implemented the SCL approach while working with students. They determined that, across the two projects, 17 out of the 23 tutors used SCL when tutoring their students. As a result, out of the 25 students who participated in the two projects, 68% received tutoring consistent with the SCL approach (n = 17; note that some tutors worked with more than one student). However, the quality of SCL tutoring provided was variable. These findings suggests that, unlike previous studies, the training procedures utilized in this study were not completely successful in promoting tutors' use of the SCL approach. This problem will be discussed further below.

To provide a fair test of SCL efficacy, only data from those tutor-tutee pairs where SCL was actually implemented and for whom complete pre-posttest data were available were included in further analyses (n = 15). Fourteen of these students had LD's; one was a student with a head injury. Further, based on a complete review of students' files, a subset of students were selected for case study analysis (n = 10). These were cases for whom the data collected by peer tutors during the intervention period were sufficiently rich to permit an analysis of trends. Note that these data were only available for 10 out of the 25 participants. We suspect that tutors had difficulty keeping complete data, in part because of pragmatic constraints (e.g., lack of access to photocopiers; limited time), and in part because they found it difficult to divide their attention between tutoring and data collection.

To evaluate SCL efficacy, four approaches to data analysis were used, each of which included only those students who had received SCL tutoring (n = 17). In the first set of analyses, all students who had complete data from pre-posttest questionnaires (on metacognition, self-efficacy, and attributions) were included. Gains on each of the pre-posttest measures were evaluated across these 15 students. A second set of analyses was conducted on the questionnaire data but included only those students who had complete *case study data* (n = 10). These analyses were conducted under the assumption that those tutors who had kept the best data were likely those most committed to the SCL approach, and who would provide the best test of the success of the method. Because of the small number of participants in the two pilot projects, data were pooled across projects for all analyses that involved these pre-posttest comparisons. In the third set of analyses, trends across cases were examined based on available evidence related to students' role in strategy development and transfer. Finally, in a fourth set of analyses, case study data were examined to identify whether individuals profited differentially from participating in SCL tutoring. This set of analyses allowed us to ascertain whether peer-tutor training could be associated with positive outcomes for some students (i.e., when peer-tutor training efforts were successful) and to provide a holistic depiction of beneficial outcomes within ideal cases.

Results from each of these sets of analyses are presented below. To begin, results from comparisons of pre- and posttest measures on metacognition, self-efficacy, and attributions are summarized, both for the complete set of students who received SCL training, and for the subset of students with complete case study data. This is followed by a cross-case analysis of students' involvement in strategy development and of their transfer of strategic approaches across contexts and tasks. Finally, the section closes with a descripton of findings from analyses of consistent effects within cases.

Table 1. Changes in metacognition and self-efficacy for students who received SCL tutoring.

Measure	n	Pretest Means (SD)	Posttest Means (SD)	t	p<[1]	Effect Size
Metacognitive Questionnaire						
Task Description	15	1.93 (.70)	2.20 (.68)	-1.07	n.s	.39
Strategy Description	15	1.87 (.83)	2.13 (.64)	-1.17	n.s	.31
Strategy Focus	15	1.87 (.83)	2.07 (.70)	-.82	n.s	.24
Monitoring	15	2.07 (.70)	2.07 (.80)	0	n.s	0
Average Rating	15	1.93 (.55)	2.12 (.51)	-1.21	n.s	.35
Self-Efficacy Questionnaire						
Global	14	3.40 (.78)	3.26 (.58)	.82	n.s	-.18
Task Specific Confidence	14	3.02 (.63)	2.27 (.95)	-1.41	n.s	.40
Ratings of Task Ease	15	2.96 (.64)	3.12 (.80)	-1.27	n.s	.25
Total	15	3.13 (.60)	3.07 (.76)	.40	n.s	-.10
Ability Rating	15	2.57 (.56)	2.70 (.88)	-.58	n.s	.23
Self-Efficacy Across Tasks						
Own Task	14	2.81 (.88)	3.12 (1.00)	***-2.61***	***.01***	***.35***
Other Task	14	2.47 (.66)	2.72 (.88)	-1.39	.n.s	.38
Total	14	2.62 (.59)	2.90 (.81)	***-2.05***	***.03***	***.47***

[1] one-tailed

Metacognition

Comparison of pre- and posttest data on the metacognitive questionnaire for the complete set of students who received SCL training (n = 15) revealed no reliable differences on any of the metacognitive dimensions (see Table 1).

However, when considering only those cases for whom complete case study data were available (n = 10), a reliable difference was found between pre- and posttest awareness of monitoring (z = -1.60, p = .05). Table 2 presents medians, minimum-maximum ratings, and results from Wilcoxon non-parametric tests for dependent samples conducted on the metacognitive data for the case study participants. Non-parametric analyses were used for these data given the small number of participants.

Self-Efficacy

Comparison of pre- and posttest data on the two self-efficacy questionnaires for the complete set of students who received SCL training (n = 15) revealed no reliable differences on the three components of the Self-Efficacy Questionnaire (general self-efficacy; task-specific efficacy—ratings of confidence; task-specific efficacy—perceptions of task ease) (see Table 1). However, results from the Self-Efficacy Across Tasks Questionnaire indicated that students rated their difficulties as significantly lower at posttest than they had at pretest when completing their chosen tasks (t = -2.61, p < .01). Pre-

to posttest differences in students' total score on the Self-Efficacy Across Tasks questionnaire were also statistically reliable ($t = -2.05$, $p < .03$).

When only students with complete case study data were considered in the analyses, results from each scale derived from the Self-Efficacy Across Tasks questionnaire yielded significant results (see Table 2). Specifically, students reported significantly fewer difficulties in task completion for their chosen tasks ($z = -2.02$, $p = .02$) and for a second task not addressed during intervention sessions ($z = -1.95$, $p = .03$). Further, students' total score from the Self-Efficacy Across Tasks measure was significantly higher at posttest than it had been at pretest ($z = -2.13$, $p = .02$). Of the three parts comprising the Self-Efficacy Questionnaire, only students' perceptions of task specific self-efficacy (as reflected in ratings of task ease) improved between pre- and posttesting ($z = -2.19$, $p = .01$).

Table 2. Changes in metacognition and self-efficacy for students who received SCL tutoring and for whom complete case study data were available.

Measure	n	Pretest Median (mins/max)	Posttest Median (mins/max)	Wilcoxon	p[1]
Metacognitive Questionnaire					
Task Description	10	2.00 (1.00-3.00)	2.00 (2.00-3.00)	-.45	n.s
Strategy Description	10	2.00 (0-3.00)	2.00 (1.00-3.00)	-.63	n.s
Strategy Focus	10	2.00 (0-3.00)	2.00 (1.00-3.00)	-.63	n.s
Monitoring	10	2.00 (0-3.00)	2.00 (2.00-3.00)	***-1.60***	***.05***
Average Rating	10	2.00 (1.00-2.75)	2.38 (1.50-3.00)	-1.44	n.s
Self-Efficacy					
Global Self-Efficacy	9	3.17 (2.17-4.60)	3.33 (2.50-4.67)	-.70	n.s
Task Specific Confidence	9	3.13 (1.75-3.88)	3.50 (2.00-4.50)	-1.13	n.s
Ratings of Task Ease	10	2.90 (2.22-4.00)	3.30 (2.56-4.10)	***-2.19***	***.01***
Total	10	3.15 (2.04-4.00)	3.34 (1.71-4.04)	-.87	n.s
Ability Rating	10	3.00 (2.00-3.50)	3.00 (2.00-5.00)	-.76	n.s
Self-Efficacy Across Tasks					
Own	9	2.67 (1.67-4.00)	3.33 (2.00-4.33)	***-2.02***	***.02***
Other	9	2.00 (1.80-3.40)	2.80 (1.80-4.20)	***-1.95***	***.03***
Total	9	2.50 (1.57-3.50)	2.75 (1.71-4.04)	***-2.13***	***.02***

[1] one-tailed

Attributions

Compared to pretest ratings, at posttest students who received SCL training were more likely to attribute successful performance to working in an environment that enabled them to concentrate ($t = -2.32$, $p = .02$). No other consistent shifts in attributional patterns were observed. For students with complete case study data, only one statistically reliable shift in attributions was detected. Specifically, at posttest, students were less likely to attribute poor performance to a lack of time ($z = -2.02$, $p = .02$, one-tailed).

Strategy Development and Transfer

This section reports results from cross-case analyses of students' involvement in strategy development and transfer. First, coding of students' strategy steps showed that, among the participants whose tutors implemented SCL, 60% (n = 10 out of 17) independently added steps to the strategies developed for their chosen tasks. For example, in his first intervention session, all of the steps added to Amos' (all names are fictional) strategy were developed collaboratively with his tutor. In contrast, in intervention 5, Amos added strategy steps that he had devised independently outside of the intervention sessions. Indeed, for the 10 cases for whom complete case study data were available, 100% developed strategies on their own outside of intervention sessions. These data suggest that students who received the most thorough SCL instruction defined and monitored strategic approaches independently.

Second, inspection of students' final strategies suggested that, even when students worked on similar tasks, they developed unique strategies over time that were responsive to their unique needs. For example, differences between Krystal and Vivica's final reading comprehension strategies can be observed in Figure 2.

Third, physical evidence of transfer of strategy use to *similar* tasks outside the intervention session was available for 4 of the 10 students. For example, the strategies that Krystal developed for reading were used to assist her in independently reading and comprehending exam material. Similarly, Travis, who developed strategies for reading and studying science material, commented in his fourth intervention session that he could use these same strategies for studying material in his humanities courses.

Finally, evidence regarding students' adaptation of strategic approaches for use *across tasks* can be derived from students' files where complete case study data were collected. Data for these students indicate that 5 out of the 10 students for whom data were available adapted their strategies for use across tasks. For example, Vivica, who developed a flowchart to help her organize information for reading, noted that this flowchart could be adapted to help her organize information when writing.

Figure 2. A comparison of Krystal and Vivica's reading comprehension strategies.

Krystal's Strategy	Vivica's Strategy
A. look at summary, searching for key points	A. take things in smaller blocks
B. when having difficulty with a paragraph, 'chunk' it down	B. set goal to work for 1/2 hour or reading x number of cases
C. try to make connections when reading - think back to prior knowledge	C. develop a flowchart to sort through the information in a case and help in writing the CAN
D. ask myself questions to keep my attention focused	D. interpret sections into clear language
E. jot down notes after thinking about what I've read	E. have subjects under different headings and put the sections everywhere they apply
F. use the summary as a cue to identifying a problem in the case	F. underline
G. read the case first to get a general idea about the case and the problem	G. outline: sketch, list issues, ask self what is the question asking me
H. use general knowledge & model for segmentation (adapted for my needs in case studies) to segment the case. By using this model I can answer the first question and move on.	
I. identify symptoms	
J. ask what the above symptoms mean. When you answer this, you have the problem	
K. read the chapter -underline the section in the chapter that relates to the case study problem	
L. go back to the area of the chapter that applies to the case. Review the case problem. Apply the problem to the area in chapter that it relates to	
M. think about step J of the model for next session	

Individual Case Studies

A review of individuals' progress across measures within individual cases (using stringent criteria for determining success) suggested that, for a a small subset of students (n = 4), participation in SCL

peer-tutoring could be associated with consistent improvements across measures. These participants evidenced gains of at least one-half standard deviation (gains of .75 to 2.25 of a standard deviation) on the questionnaire measures (assessing metacognition and self-efficacy) and demonstrated improvements in their strategic approaches to tasks. These findings are encouraging, on the one hand, because they demonstrate that SCL peer tutoring has the potential to promote positive effects. At the same time, the small number of cases who experienced consistent gains suggests that, as implemented in these pilot projects, SCL was not as successful as expected in enhancing the effects of peer tutoring.

Summary and Conclusions

Previous research has shown SCL to be an effective model for providing individualized tutoring to postsecondary students with LD's, at least when that tutoring is provided by teachers, counsellors, and/or specialists in LD's (Butler, 1993; 1995; 1996; 1997; in preparation). The present studies were designed to extend that original line of research by evaluating SCL as a model for providing peer-tutoring. It was expected that, after training that supplemented their content-area expertise with specific information about strategy training, peer tutors would be able to duplicate the same set of outcomes achieved by SCL tutors in previous research. Specifically, it was anticipated that participating students (tutees) would develop greater content area competence and improvements in metacognitive awareness, perceptions of task-specific self-efficacy, patterns of attributions, and self-regulated approaches to tasks.

The results from the two pilot studies described here suggest that, although SCL has some potential as a model for providing peer tutoring, the approach was not as effective as expected, at least as it was implemented here. For example, although some limited gains were found across students in metacognitive awareness and perceptions of self-efficacy, these gains were not as consistent as expected (across measures or across students). Expected shifts in attributional patterns were also not observed. It was encouraging that students generally developed personalized strategies responsive to their unique needs, that some students showed evidence of independent strategy development and transfer, and that consistent improvements could be observed across measures within several "ideal" cases. Nonetheless, both within- and across-case analyses did not convincingly establish the efficacy of the intervention approach. It should be noted, however, that tutors had difficulty keeping complete data, which impeded our efforts to evaluate progress adequately for all project participants. Perhaps with more complete case study data, more consistent effects would have emerged.

Nonetheless, we suspect that several factors impeded the success of the SCL approach within the peer-tutoring framework used in the two pilot projects. First, among both tutors and tutees there was a resistance to shifting from a traditional tutoring paradigm, wherein tutors draw on their subject-matter expertise to provide direct explanations about content, to a more collaborative and process-oriented approach to tutoring. For instance, Garth (a student) reported that he had expected a tutor who would explain things to him rather than one who encouraged him to direct his own learning. Similarly, both Maude and Vanessa reported that their tutors did not provide enough direction or explain clearly enough how to solve academic problems. Similarly, in their feedback forms, some tutors stated that their students wanted a more direct method of instruction. And, because at both campuses it took almost a month to pair tutors with students and thus to begin training and pretesting, students were midway through the semester (and incredibly anxious) before tutoring could even be provided. At that

point, both tutors and tutees felt very pressured to produce results quickly, so that tutors felt they had little time to develop instructional competencies or to experiment with a new approach.

These difficulties were exacerbated because, although tutors were provided with introductory workshops and then individualized feedback on their use of the instructional method, they often did not feel confident enough in their understanding of SCL to apply the method adequately, particularly early in the project. In their feedback forms, tutors commented on problems they experienced when learning the approach and on ways in which the training could have been improved. For example, some tutors commented that they received training too early, before being paired a student, and so had trouble remembering instructional principles once tutoring started. Other tutors found the group feedback sessions helpful, but wished they had been held earlier and more frequently to guide their initial attempts at tutoring. Finally individualized feedback was only provided to tutors after a period of delay (so that coordinators could listen to session tapes). Especially when first learning the SCL method, tutors needed on-line support and/or feedback to help them master the approach more quickly.

This combination of factors worked against tutors sticking with the intervention approach when working with their students. In previous research it was found that tutee's initial resistence to a new tutoring approach was very common, but could be overcome if the purpose of the approach were clearly explained, if instructors were confident that the approach actually worked, and if students could see results quickly. Unfortunately, in these peer-tutor studies, the tutors themeselves lacked confidence in the method and in their ability to produce positive results. Thus, in many instances, tutors and tutees reverted to using traditional tutoring methods with which they were more familiar. (It is therefore also a commentary of the efficacy of traditional tutoring that more significant results were not found.)

We conclude that, for SCL to be effective within a peer-tutoring program, certain modifications to our procedures would have to be made. For example, to improve training, some tutors suggested using role playing to demonstrate differences between SCL and a traditional tutoring approach. They also asked for more practice sessions, during which they could receive on-line feedback prior to initiating SCL tutoring. Immediate access to an SCL expert while sessions were underway would also help tutors resolve difficulties or concerns more quickly. This could be accomplished, for example, by housing peer tutoring in a convenient location where consistent supervision were available. It would also be helpful to establish administrative procedures that allow for more efficient identification and hiring of peer tutors, ideally prior to the start of a semester. Finally, although additional training is clearly desireable, it is also important to set up procedures that are realistic in terms of time and expense. Costly investments in peer tutor training will not have a long-term pay off if peer tutor turnover is high. Further research is clearly warranted to identify an effective framework for hiring and training peer tutors that is also efficient and realistic, and to determine whether the SCL model can be profitably applied in that context.

References

Borkowski, J. G., & Muthukrishna, N. (1992). Moving metacognition into the classroom: "Working models" and effective strategy teaching. In M. Pressley, K. R. Harris, & J. T. Guthrie (Eds.), Promoting academic competence and literacy in school (pp. 477-501). Toronto: Academic Press.

Butler, D. L. (1993). Promoting strategic learning by adults with learning disabilities: An alternative approach. Unpublished doctoral dissertation, Simon Fraser University, Burnaby, BC.

Butler, D. L. (1994). From learning strategies to strategic learning: Promoting self-regulated learning by post secondary students with learning disabilities. Canadian Journal of Special Education, 4, 69-101.

Butler, D. L. (1995). Promoting strategic learning by post secondary students with learning disabilities. Journal of Learning Disabilities, 28, 170-190.

Butler, D. L. (1996, April). The strategic content learning approach to promoting self-regulated learning. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.

Butler, D. L. (1997, March). The roles of goal setting and self-monitoring in students' self-regulated engagement in tasks. Presented at the annual meeting of the American Educational Research Association. Chicago, IL.

Butler, D. L. (in press-a). A strategic content learning approach to promoting self-regulated learning. In B. J. Zimmerman & D. Schunk (Eds.), Developing self-regulated learning: From teaching to self-reflective practice. New York: Guildford Publications, Inc.

Butler, D. L. (in press-b). Metacognition and learning disabilities. In B. Y. L. Wong (Ed.), Learning about Learning Disabilities (2nd ed.). New York: Academic Press.

Butler, D. L. (in preparation). The strategic content learning approach to promoting self-regulated learning: A summary of three studies.

Butler, D.L., & Winne, P.H. (1995). Feedback and self-regulated learning: A theoretical synthesis. Review of Educational Research, 65, 245-281.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. Psychological Review, 97, 19-35.

Corno, L. (1993). The best laid plans: Modern conceptions of volition and educational research. Educational Researcher, 22(2), 14-22.

Dweck, C. S. (1986). Motivational processes affecting learning. American Psychologist, 41, 1040-1048.

Ellis, E. S. (1993). Integrative strategy instruction: A potential model for teaching content area subjects to adolescents with learning disabilities. Journal of Learning Disabilities, 26, 358-383, 398.

Graham, S., & Harris, K. R. (1989). Components analysis of cognitive strategy instruction: Effects on learning disabled students' compositions and self-efficacy. Journal of Educational Psychology, 81, 353-361.

Harris K. R., & Graham, S. (1996). Making the writing process work: Strategies for composition and self-regulation. Cambridge, MA: Brookline.

MacArthur, C.A., Schwartz, S.S., & Graham, S. (1991) Effects of a reciprocal peer revision strategy in special education classrooms. Learning Disabilities Research and Practice, 6, 201-210.

Merriam, S. B. (1988). Case study research in education: A qualitative approach. San Francisco: Jossey-Bass.

Pressley, M., El-Dinary, P. B., Brown, R., Schuder, T., Bergman, J. L., York, M., & Gaskins, I. W. (1995). A transactional strategies instruction Christmas carol. In A. McKeough, J. Lupart, & A. Marini (Eds.), Teaching for transfer: Fostering generalization in learning. Mahwah, N.J.: Erlbaum.

Rich, R., & Gentile, M. (1995). Integrating content and strategy instruction at the college level: A collaborative model. Intervention in School and Clinic, 31, 97-100.

Sawyer, R. J., Graham, S., & Harris, K. R. (1992). Direct teaching, strategy instruction, and strategy instruction with explicit self-regulation: Effects on the composition skills and self-efficacy of students with learning disabilities. Journal of Educational Psychology, 84, 340-352.

Schumaker, J. B., & Deshler, D. D. (1992). Validation of learning strategy interventions for students with learning disabilities: Results of a programmatic research effort. In B. Y. L. Wong (Ed.), Contemporary Intervention Research in Learning Disabilities: An International Perspective (pp. 22-46). New York: Springer-Verlag.

Simmons, D.C., Fuchs, L.S., Fuchs, D., Mathes, P., & Hodge, J.P. (1995). Effects of explicit teaching and peer tutoring on the reading achievement of learning disabled and low-performing students in regular classrooms. Elementary School Journal, 95, 387-408.

Swanson, H. L. (1990). Instruction derived from the strategy deficit model: Overview of principles and procedures. In T. Scruggs & B. Y. L. Wong (eds.), Intervention research in learning disabilities (pp. 34-65). New York: Springer-Verlag.

Torgesen, J. K. (1977). The role of non-specific factors in the task performance of learning disabled children: A theoretical assessment. Journal of Learning Disabilities, 10, 27-34.

Wong, B. Y. L. (1991). The relevance of metacognition to learning disabilities. In B. Y. L. Wong (Ed.), Learning about learning disabilities (pp. 231-256). New York: Academic Press.

Wong, B. Y. L., Butler, D. L., Ficzere, S., & Kuperis, S. (1996). Teaching low achievers and students with learning disabilities to plan, write, and revise opinion essays. Journal of Learning Disabilities, 29, 197-212.

Yin, R. K. (1994). Case study research: Design and methods (2nd ed.). Thousand Oaks, CA: Sage.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. Journal of Educational Psychology, 81, 329-339.

Zimmerman, B. J. (1994). Dimensions of academic self-regulation: A conceptual framework for education. In D. H. Schunk & B. J. Zimmerman (Eds.), Self-regulation of learning and performance: Issues and educational applications (pp. 3-21). Hillsdale, NJ: Erlbaum.