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The Positive By-Products of a Peer Tutoring Program for Tutors and Tutees

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### Abstract

This project assessed outcomes for student tutors and tutees in a college sponsored tutoring program. Participants included tutees and tutors in the tutoring program as well as a control group comprised of students not involved with the program. Positive changes were identified across groups in both academic as well as affective skills related to school performance. Overall, tutees had more significant changes across more areas of assessment than the tutors or control group. Also, the majority of tutees and tutors identified the tutoring experience as beneficial. This project identified that students' academic skills, not just mastery of academic content, can be influenced through peer tutoring. Additionally, the peer tutoring process, for both tutors and tutees reflects benefits in social and emotional areas, which may have a significant impact on overall student performance.

### The Positive By-Products of a Peer Tutoring Program for Tutors and Tutees

Peer tutoring is characterized by students interacting in specific roles (i.e., tutor or tutee) with a high focus on curriculum content (Hartman, 1990; Topping, 2005). Traditionally, the role of tutor is held by a student who is deemed highly knowledgeable in the academic material and competent in the role of helping others effectively learn specific skills or knowledge. This basic structure of tutoring is based on Vygotsky's theory of learning. According to Vygotsky (1978), knowledge is constructed through social interactions, particularly through the exchange of language. Interactions with those more knowledgeable or skilled provide the opportunity to meaningfully organize and interpret new information. These interactions, consequently, help to improve the understanding of or independence on a task to all individuals involved, but particularly to those who are less skilled or knowledgeable. Vygotsky also recognizes imitation as a key tool for learning. As a result, structured interactions with a more knowledgeable individual, such as in peer tutoring, allows the tutee to observe, model, and imitate more accurate and correct organizations of knowledge or particular academic skills.

In the ongoing push to serve a wider range of student needs with fewer resources, many colleges and universities have adopted peer tutoring programs as an approach to support student development. One reason for this high rate of adoption is the high level of adaptability of peer tutoring. Across institutions, programs vary widely in their purpose and function. For example, programs have been developed to target specific groups of students for particular skills such as underprepared students in the development of reading, writing, and study skills (Blowers, Ramsey, Merriman, & Grooms, 2003; Chaney, Muraskin, Cahalan, & Rak, 1997), students with low English language proficiency (Mynard & Almarzouqi, 2006), students with learning

disabilities (Vogel, Fresko, & Wertheim, 2007; Kowalsky & Fresko, 2002), and first year students' communication skills (Saunders, 1992). Peer tutoring programs also vary widely in their structure, with some requiring a set number of interactions between tutor and tutee and others requiring extensive tutoring training or highly structured interactions between tutors and tutees (Cohen, Kulik, & Kulik, 1982; King, 1998). Reciprocal peer tutoring, which is a strategy in which students take turns in the roles of tutor and tutee, also have been incorporated into individual courses to help enhance student mastery of content (Groccia & Miller, 1996; Fantuzzo, Riggio, Connelly, & Dimeff, 1989; Rittschof & Griffin, 2001; Hart & Speece, 1989; Choudhury, 2002; Fantuzzo, King, & Heler, 1992; Griffin & Griffin, 1989). This wide variety in structure, focus, and function has made broad, programmatic evaluations of peer tutoring programs difficult. Although a common component of many college campuses today, there are very few systematic evaluations of tutoring programs (Maxwell, 1990). Currently, the majority of peer tutoring studies have been focused on elementary education (see Cohen, Kulik, & Kulik, 1982 for a meta-analysis) while others describe tutoring programs or activities (e.g., Topping, 1996) or discuss the theories behind the perceived benefits of tutoring (e.g., Hartman, 1990) without demonstrating actual student outcomes. This study sought to evaluate aspects of a peer tutoring program at one college campus.

Most often, the peer tutoring relationship is structured to help the tutee make academic gains, but through the tutoring interactions, tutor gains in academic skills also have been identified (Annis, 1983; Bargh & Schul, 1980). Looking more broadly, the peer tutoring relationship can be employed to enhance learning (e.g., concentration on material, asking questions, organizing work) and social skills (e.g., communication skills) (Cohen, 1986; Topping, 1996; Hartman, 1990). Additionally, activities such as reciprocal peer tutoring, have

been demonstrated to improve affective and emotional functioning (Fantuzzo, Riggio, Connelly, & Dimeff, 1989; Fantuzzo, King, & Heller, 1992) although these results have been inconsistent (Griffin & Griffin, 1989).

The findings of gains in academic skill, social skill, and/or affective functioning with peer tutoring all occurred in programs or activities with highly structured tutoring sessions or activities or involved more extensive tutor training (Fantuzzo, Riggio, Connelly, & Dimeff, 1989; Fuchs et al, 1994; Griffin & Griffin, 1998; Ismail, & Alexander, 2005; King, Sataffieri, & Adelgais, 1998; Roscoe & Chi, 2007). This study sought to identify what outcomes occur when tutors have little training in tutoring or teaching skills and when the focus, structure, and frequency of the tutoring sessions are decided upon by the tutors and tutees. Specifically, we sought to identify what gains in academic skills (e.g., time management, use of study aids, approaches to reading material, etc) as well as changes in affective and emotional functioning (e.g., levels of anxiety, motivation, attitude towards school) occurred for both tutors and tutees when engaging in a low-structure tutoring relationship.

The presumption of the peer tutoring relationship in this study is that the tutors possess academic skills and knowledge of the content that is superior to that of the tutees. In this exploratory study, our first question was to test the validity of this presumption. We hypothesized that the tutors would demonstrate stronger academic and affective skills than those receiving tutoring. Secondly, based on the theory of learning by Vygotsky, we hypothesized that the both tutees and tutors will experience greater academic or affective skill development from participating in the tutoring program than students in the control group.

## Method

### *Participants*

**Tutors.** Forty-nine tutors participated in this study. Tutors were primarily third (n=13) and fourth year (n=19) students, but also included second (n=11) and first year (n=6) students. The average GPA for the tutors was 3.55 (SD = .299) and they had an average combined SAT score of 1241 (SD= 114.5). Thirty-five of the tutors were female and 14 were male. Thirty-two of the tutors reported themselves to be students in the Natural Sciences. The remaining students identified their major area of study to be Social Sciences (n=8), Humanities (n=7), and Exploratory (n=2). The average number of courses the tutors had completed in the area in which they were tutoring was 4.69.

**Tutees.** Fifty tutees participated in this study. The tutees were predominately first year students (n=22) but included second year (n=12), third year (n=7), and fourth year (n=9) students.) The tutee group had an average GPA of 3.01 (SD = .456) and an average combined SAT score of 1127 (SD = 113.04). Forty-one of the tutees were female and nine were male. Tutees reported being students in the Natural Sciences (n=31), Social Sciences (n=9), Humanities (n=9) with the remaining being Exploratory (n=1). Across the course of one semester, the tutees reported receiving an average of 8 (SD = 7.85) hours of tutoring.

**Control.** The control group (n=100) was comprised of students who were not participating in the tutoring program at the time of the study. Members of the control group included first year (n=38), second year (n=19), third year (n=21), and fourth year (n=22) students. The average GPA for this group was 3.17 (SD = .465) with an average combined SAT score of 1166 (SD = 124).

### *Peer tutoring program*

Tutors are nominated for the position by faculty members knowledgeable about the skills and level of proficiency of the student in the specified academic subject. New tutors are required to attend a training seminar once they begin working as a tutor. The training session is approximately two hours in length and varies in focus each semester (e.g., information on learning styles, motivation, avoiding procrastination, etc.). Tutors returning to the program are not required to attend the training session in subsequent semester, although it is strongly encouraged. Tutors are paid an hourly wage for their time spent tutoring.

Tutees voluntarily seek out a peer tutor through the peer tutoring office. To receive a tutor, tutees must discuss the appropriateness of tutoring for their individual needs with the professor of the course. This step helps to inform the instructor of the struggles the student is having and provides an opportunity for the instructor to provide guidance or feedback to the student that may be helpful for the course or the tutoring sessions. The tutoring sessions are free to the tutee and are set based on the needs of the tutee as well as the schedule of the tutor and tutee. Most often, tutoring sessions are held one time a week, for one hour each meeting.

### *Measures*

Learning and Study Strategies Inventory. The Learning and Study Strategies Inventory second edition (LASSI 2<sup>nd</sup> edition) (Weinstein & Palmer, 2002) is an 80-item self-report instrument designed to measure students' awareness and use of learning strategies and study skills. The items of the LASSI cover covert and overt thoughts, behaviors, attitudes, and beliefs that are linked to theories of positive academic performance (Weinstein & Palmer, 2002). The

ten subscales of the LASSI are organized under three strategic learning components: Skill, Will, and Self-Regulation. The Skill component includes the sub-scales of information processing, selecting main ideas, and test strategies. The Self-Regulation component encompasses concentration, self-testing, study aids, and time management. The sub-scales of anxiety, attitude, and motivation make up the Will component of strategic learning. Each sub-scale has 8 to 10 statements to which respondents indicate on a 5-point Likert-type scale how much each statement represents their typical behaviors or thoughts related to academic tasks. Scores on the LASSI have been shown to be effective for evaluating the impact of study strategy courses (Haught, Hill, Wells, & Nardi, 1998; Ince & Priest, 1998; McKeachie, Pintrich, & Lin, 1985; Nist, Mealey, Simpson, & Kroc, 1990) as well as identifying differences in study and learning strategies between low and high achieving students (Proctor, Prevatt, Adams, Hurst, & Petscher, 2006; Yip & Ching, 2005).

*Peer Tutoring Survey.* A 36-item Post Tutoring survey for Tutees was created to assess tutees' reasons for requesting tutoring, the attitudes of the tutees toward their individual tutoring experience, and the academic and social benefits they may have gained as a result of being tutored. The Post Tutoring Survey for Tutors contained 31 questions designed to measure tutors' level of involvement with the tutee, their academic history, as well as perceived communicative or scholastic skills gained from the experience of tutoring. Questions on each survey concerning study techniques were rated on a 5 point Likert scale, with 0 indicating "Strongly Agree" and 4 indicating "Strongly Disagree".

### *Procedures*

Data were collected during the 2006-2007 academic year and the Fall semester 2007. All students who requested assistance in the tutoring program or served as tutors in the tutoring

program were sent an email asking for their voluntary participation in the study. To recruit students for the control group an announcement about the study was placed in the college daily web announcements and announcements were made in courses in the Psychology department. Students expressing interest in participation were sent an email that contained information concerning the study's purpose, instructions for participation, and an informed consent agreement. Students agreeing to participate were sent a link to the Web LASSI survey electronically. At the close of the semester, participants were sent instructions for completing the post measure Web LASSI. Tutors and tutees also were given instructions for completing the on-line Post Tutoring survey. During the 2006-2007 academic year, students were paid a total of \$10 for their participation. Participants received \$5 for completing the pre-surveys and received the final \$5 when they completed the post-surveys. To help increase participation, participants in the Fall semester of 2007 received a total of \$20 in gift cards for their participation. Participants received a \$10 gift card for completing the pre-surveys and then received the final \$10 gift card when the post-surveys were completed.

## Results

### *Pre-test*

A one-way ANOVA was used to identify differences between groups on the pre-test LASSI scores. Results revealed significant differences on the strategic learning components of Skill ( $F(2, 196) = 7.893, p = .001$ ) and Will ( $F(2, 196) = 13.212, p < .001$ ). Specifically, in the strategic learning component of Skill, significant differences were found on the sub-scales of selecting main ideas ( $F(2, 196) = 8.598, p < .001$ ), information processing ( $F(2, 196) = 5.075, p = .007$ ) and test strategies ( $F(2, 196) = 12.911, p < .001$ ). In the strategic learning component of

Will, significant differences were found in the sub-scales of anxiety ( $F(2, 196) = 10.554, p < .001$ ), attitude ( $F(2, 196) = 4.701, p = .010$ ), and motivation ( $F(2, 196) = 5.587, p = .004$ ).

Additionally, although no significant differences in the overall strategic learning component of Self-Regulation, a significant difference in the sub-scale of concentration was found ( $F(2, 196) = 8.278, p < .001$ ).

Tukey post-hoc analyses of the data revealed that tutors had significantly higher scores in the strategic learning component of Skill than the tutees ( $p < .001$ ) and the control group ( $p < .018$ ). Specifically, tutors had higher scores than the tutees on the sub-scales of test strategies ( $p < .001$ ) and selecting main ideas ( $p < .001$ ). Also, the tutor's scores on the information processing sub-scale were significantly higher than those in the control group ( $p = .013$ ). Interestingly, the control group's scores were significantly higher than the tutees on the test strategies ( $p < .001$ ) and selecting main idea ( $p = .013$ ) sub-scales.

On the strategic learning component of Will, post hoc analysis identified that tutor's scores were significantly higher than the tutees ( $p < .001$ ) and the control group ( $p = .012$ ). On the sub-scales of Will, tutors had significantly higher scores than the tutees in the areas of motivation ( $p = .003$ ), anxiety ( $p < .001$ ), and attitude ( $p = .008$ ). Tutors' skills on the sub-scale of anxiety also were significantly higher than the control group ( $p = .013$ ). Again, no significant differences between groups were found on the strategic learning component of Self-Regulation (sub-scales of self-testing strategies, use of study aides, time management skills, or self-testing strategies) yet on the sub-scale of concentration, the tutors and the control group's scores were significantly higher than the tutees ( $p = .000; p = .030$ ).

Additionally, a one-way ANOVA conducted on students' cumulative GPAs prior to the semester in which their data were collected revealed that tutors had significantly higher GPAs than tutees prior to their active participation in the tutoring program,  $F(2, 196) = 14.463, p < .001$ .

### *Changes Across Time and Group*

To test the hypothesis that both tutees and tutors will experience greater academic or affective skill development from participating in the tutoring program than students in the control group, a 2 (pre and post LASSI scores) X 3 (tutors, tutees, and control) repeated measures analysis of variance (ANOVA) was conducted. Main effects for time were observed on the strategic learning components of Skill ( $F(1, 196) = 16.034, p < 0.001$ ), with significance on the sub-scales of information processing ( $F(1, 196) = 14.609, p < .001$ ) and test strategies ( $F(1, 196) = 6.680, p = .010$ ), Will ( $F(1, 196) = 4.516, p = .035$ ), with significance on the sub-scale of anxiety ( $F(1, 196) = 11.263, p = .001$ ), and Self-Regulation ( $F(1, 196) = 11.649, p < .001$ ), with significance on the sub-scales of concentration ( $F(1, 196) = 8.862, p = .003$ ), self testing ( $F(1, 196) = 6.866, p = .009$ ), and time management ( $F(1, 196) = 5.936, p = .016$ ).

Main effects for group also were observed for the strategic learning components of Skill ( $F(2, 196) = 8.013$ ) (with significance on the sub-scales of information processing ( $F(2, 196) = 5.027, p = .007$ ), selecting main ideas ( $F(2, 196) = 10.025, p < .001$ ), and test strategies ( $F(2, 196) = 13.044, p < .001$ )), and Will ( $F(2, 196) = 13.905, p < .001$ ) (with significance on the sub-scales of anxiety ( $F(2, 196) = 11.540, p < .001$ ), attitude ( $F(2, 196) = 5.760, p = .004$ ), and motivation ( $F(2, 196) = 5.726, p = .004$ )). Significance also was found on the sub-scales of concentration ( $F(2, 196) = 5.998, p = .003$ ) and study aids ( $F(2, 196) = 5.449, p = .005$ ) of the strategic learning component of Self-Regulation.

Tukey post hoc analyses revealed that on the strategic learning component of Skill, tutees improved more than tutors ( $p < .001$ ) and the tutors improved more than the control group ( $p = .012$ ). On the sub-scales of Skill, a greater improvement was found for information processing skills for the control group than tutors ( $p = .016$ ), in test strategies for tutees than tutors ( $p < .001$ ) or the control group ( $p < .001$ ), and in selecting main ideas for the control group and tutors than the tutees ( $p = .007$ ,  $p < .001$ ).

On the strategic learning component of Will, greater improvement was shown for tutors and tutees in relation to the control group ( $p = .005$ ;  $p = .011$ ) and for tutors over tutees ( $p < .001$ ). On the sub-scales of Will, improvement in strategies to control anxiety was greater for the tutees than the tutors ( $p < .001$ ) or the control group ( $p = .005$ ), and an improvement in attitude was greater for the tutors than the tutees ( $p = .002$ ).

Differences on the sub-scales of the strategic learning component of Self-Regulation identified that there was a greater increase in concentration skills for tutees than tutors ( $p = .002$ ), greater improvement in motivation for tutees than tutors ( $p = .003$ ), and a greater improvement in study aids for the control group and tutors than tutees ( $p = .005$ ;  $p = .031$ ). Means and standard deviations can be found in Table 1.

Table 1.

*Descriptive Statistics for Pre and Post Test Scores on the LASSI*

LASSI Scale	Tutee		Tutor		Control	
	<u>Pre Test</u> Mean (SD)	<u>Post Test</u> Mean (SD)	<u>Pre Test</u> Mean (SD)	<u>Post Test</u> Mean (SD)	<u>Pre Test</u> Mean (SD)	<u>Post Test</u> Mean (SD)
SKILL	85.90 (13.27)	88.32 (14.05)	94.76 (10.38)	96.94 (11.38)	89.37 (10.45)	91.19 (11.16)
Information Processing	29.12 (4.20)	30.34 (5.35)	29.63 (5.04)	30.55 (5.28)	27.28 (4.77)	24.48 (5.04)
Main ideas	28.10 (5.92)	28.46 (6.22)	32.27 (4.13)	32.84 (4.61)	30.60 (5.00)	31.04 (4.64)
Test Strategies	28.68 (5.36)	29.52 (5.40)	32.86 (3.57)	33.55 (3.58)	31.49 (3.85)	31.67 (4.19)
WILL	87.56 (13.75)	89.02 (13.72)	99.37 (10.17)	100.84 (10.91)	93.59 (10.72)	94.25 (11.77)
Anxiety	24.70 (7.68)	26.06 (6.94)	30.69 (5.75)	31.80 (5.91)	27.46 (6.19)	28.28 (6.48)
Attitude	31.28 (5.31)	31.32 (5.38)	33.78 (3.59)	34.29 (4.18)	32.78 (3.61)	32.58 (3.98)
Motivation	31.58 (6.25)	31.64 (6.27)	34.90 (3.89)	34.76 (4.38)	33.35 (4.66)	33.39 (4.68)
SELF-REGULATION	104.20 (18.65)	108.20 (19.61)	108.39 (16.45)	110.10 (19.41)	103.04 (15.89)	104.67 (16.42)
Concentration	26.26 (5.92)	27.78 (5.68)	30.41 (4.20)	30.55 (5.53)	28.52 (5.03)	29.01 (5.11)
Self-testing	23.52 (5.52)	24.90 (6.04)	23.65 (6.08)	24.41 (6.42)	22.43 (5.68)	22.89 (5.95)
Study aids	28.70 (4.89)	28.54 (5.22)	26.02 (4.97)	26.65 (5.15)	26.06 (4.25)	26.23 (4.81)
Time management	25.72 (6.96)	26.98 (6.55)	28.31 (6.28)	28.49 (6.94)	26.03 (6.57)	26.54 (6.23)

### *Post-Test Changes*

A one-way ANOVA of the post-survey data revealed that significant differences on the Skill strategic learning component remained ( $F(2, 196) = 6.720, p = .002$ ) with significant differences found on the information processing ( $F(2, 196) = 3.599, p = .029$ ), selecting main ideas ( $F(2, 196) = 9.370, p < .001$ ), and use of test strategies ( $F(2, 196) = 10.449, p < .001$ ) sub-scales. Similarly, significant differences remained on the strategic learning component of Will ( $F(2, 196) = 11.888, p < .001$ ). Significant differences were found on the Will sub-scales of anxiety ( $F(2, 196) = 9.977, p < .001$ ), attitude ( $F(2, 196) = 5.637, p = .004$ ), and motivation ( $F(2, 196) = 4.732, p = .010$ ). Again, no significant differences on the overall strategic learning component of Self-Regulation were found.

Tukey post hoc analyses revealed few changes between groups. On the strategic learning component of Skill, tutors continued to have higher scores than the tutees ( $p = .001$ ) and the control group ( $p = .018$ ). On the sub-scale of selecting main ideas, the tutors and control group continued to have significantly higher scores than the tutees ( $p < .001; p = .010$ ). On the use of test strategies sub-scale, the tutors and control group continued to have significantly higher scores than the tutees ( $p < .001; p = .014$ ). However, the tutors scores increased such that the tutors scores became significantly higher than those in the control group ( $p = .039$ ).

Although no significant differences were found between groups on the overall Self-Regulation learning component, some interesting changes in sub-scale performance were identified through the Tukey post hoc analyses. On the concentration sub-scale, for example, the tutors scores continued to be significantly higher than those of the tutees ( $p = .029$ ). The tutees scores, however, improved such that their scores were no longer significantly below those of the

control group ( $p = .228$ ). Also, on the use of study aids sub-scale, although no significant differences between the groups on the pre-data analyses, the post scores revealed the tutees scores to be significantly above those in the control group ( $p = .022$ ). As in the pre-test analysis, no significant differences between groups on the sub-scales of time management or use of self-testing strategies were found.

Paired samples t-tests were used to identify the degree of change within groups on the scales of the LASSI. Table 2 contains the results. Overall, all three groups showed significant gains in the strategic learning component of Skill, with the tutees and the control group having significant gains on the sub-scale of information processing and tutees having significant gains on the sub-scale of test strategies. On the strategic learning component of Will, both tutees and tutors showed significant gains on the sub-scale of anxiety. Of notable interest, was the significant change of tutees on the strategic learning component of Self-Regulation. Tutees scores were significantly different from pre to post on the sub-scales of concentration, self-testing, and time management. No changes in these sub-scales were noted for the tutors or control group.

Table 2

*Pre-Post Scores*

LASSI Scale	<u>Tutee</u>		<u>Tutor</u>		<u>Control</u>	
	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>
SKILL	<b> 2.264 </b>	<b>.028*</b>	<b> 2.389 </b>	<b>.021*</b>	<b> 2.501 </b>	<b>.014*</b>
Information Processing	<b> 2.339 </b>	<b>.023*</b>	1.879	.066	<b> 2.864 </b>	<b>.005*</b>
Selecting Main Ideas	0.647	.521	1.544	.129	1.369	.174
Test Strategies	<b> 2.017 </b>	<b>.049*</b>	1.788	.082	0.588	.558
SELF-REGULATION	<b> 3.237 </b>	<b>.002*</b>	1.205	.234	1.664	.099
Concentration	<b> 3.323 </b>	<b>.002*</b>	0.288	.774	1.588	.116
Self-Testing	<b> 2.260 </b>	<b>.028*</b>	1.238	.222	1.017	.312
Study Aids	.317	.752	1.339	.187	0.469	.640
Time Management	<b> 2.231 </b>	<b>.030*</b>	1.205	.234	1.435	.155
WILL	1.308	.197	0.412	.682	.843	.401
Anxiety	<b> 2.307 </b>	<b>.025*</b>	<b> 2.222 </b>	<b>.031*</b>	1.705	.091
Attitude	0.092	.927	1.231	.224	0.712	.478
Motivation	0.115	.909	0.357	.722	0.129	.898

*Tutoring Survey*

Descriptive statistics calculated for the responses of tutors and tutees on the post-tutor and post-tutee surveys revealed many perceived benefits of being involved with the peer tutoring program. Questions concerning study techniques, structure of the tutoring sessions, as well as overall satisfaction of the program were rated on a 5 point Likert scale, with 0 indicating

“Strongly Agree” and 4 indicating “Strongly Disagree”. Ninety percent of tutors strongly agreed and agreed that their tutor explained material in a way they could understand. Additionally, 77.5% strongly agreed to agreed that their tutor helped them to figure out the information themselves, rather than just giving them the answer, and 57.5% strongly agreed to agreed that their tutor taught them how to learn the material on their own. Eighty-five percent of tutors also reported that peer tutoring increased their knowledge and understanding of the material and 62.5% strongly agreed and agreed that peer tutoring increased their ability to communicate ideas. Lastly, 95% of tutees indicated that would seek tutoring through the program in the future.

When asked how much they believe they had benefited from serving as a tutor in the tutoring program, 33.3% of tutors reported they had benefited “a great deal”, while 56.4% reported they had benefited only “somewhat”. Ninety-two percent of tutors strongly agreed to agreed that they helped the tutees figure out the answers for themselves rather than giving them the answers and 79.5% strongly agreed to agreed that they taught tutees how to learn on their own. The vast majority of tutors (89.8%) strongly agreed to agreed that serving as a tutor increased their knowledge and understanding of the material and that serving as a tutor increased their ability to communicate ideas (82.1%). Only 25.7% of tutors, however, strongly agreed to agreed that serving as a tutor helped to improve their performance in other courses.

### Discussion

Overall, the hypothesis that tutors would have higher academic and affective skills than the tutees was supported. Tutors scores on the pre-test LASSI were significantly higher than the tutee or control in the strategic learning components of Skill (sub-scales use of test strategies and selecting main ideas) and Will (sub-scales motivation, anxiety, and attitude). This supports the

notion that that the tutors possess a high rate of academic and social/emotional skills related to school performance. As such, it is highly plausible that the tutors serve as models for the tutees in these areas.

A notable surprise was that the control group, like the tutors and tutees, reported gains in skills across time. Specifically, the control showed gains greater than the tutees or tutors in the areas of information processing and selecting main ideas. A potential reason for these gains may be that the students in the control group had opportunities that semester to enhance their skills in these areas from their coursework. For example, a significant number of the control group was students enrolled in an Introduction to Psychology course who were explicitly taught information processing skills that semester. Also, the control group was comprised of students who scored higher than the tutees in the majority of academic and affective skills areas on the LASSI on the pre-test assessment. Perhaps a control group matched more equally in GPA and SAT scores or to pre-test level scores on the LASSI to the tutees may have a different pattern of scores across pre to post assessment. It would be interesting to see if students who had academic or affective skills within the same range as the tutees at the start of the semester would be more static in their abilities compared to those who received tutoring.

Another area of interest was that the pre and post-test scores of the tutors did not differ significantly from the tutees in the strategic learning component of self-regulation. This component includes the sub-scales of self-testing strategies, use of study aids, time management, and concentration. Tutors only differed significantly from tutees' pre and post scores on the sub-scale of concentration. The tutees scores in this area, however, did improve significantly from pre to post. Although not statistically significant, the tutees had higher average scores, both pre

and post-test on the use of study aids sub-scale. Interestingly, the study aids scale assesses the degree to which students are able to "... use or create study aids that support and increase meaningful learning and retention" (p. 12). Items on this scale include behaviors such as seeking out the help of peers to support learning as well as approaches to reviewing readings and notes. The fact that the tutees went through the processes of getting a tutor and committed to the tutoring sessions would likely place them higher on this sub-scale than the tutors and control group. Additionally, that their scores on this sub-scale were significantly higher than the control group on the post-test (but not pre-measure) may reflect their value of the tutoring relationship and support their future use of the tutoring program.

Both the tutees and the tutors reported an increased ability to cope with anxiety over the control group. Specifically, no significant changes in the control group's scores related to anxiety were identified. This change in anxiety levels for tutors and tutees is similar to outcomes found with the studies on the use of reciprocal peer tutoring (Fantuzzo, Riggio, Connelly, & Dimeff, 1989). Additional research into the relationship between peer tutoring involvement and decreases in anxiety may be warranted as this may be a very cost-effective strategy for institutions to employ to help enhance overall student performance across courses.

### *Satisfaction*

Overall, the tutors and tutees were overwhelmingly positive about their experience in the tutoring program. The majority of tutees and tutors reported that they had benefited from the tutoring experience and that they would participate in the program again in the future. Specifically, both tutors and tutees reported that peer tutoring increased their knowledge and understanding of the material. A cornerstone of peer tutoring, according to Vygotsky's theory of

learning, is that learning occurs through interaction and in particular the exchange of dialogue. Interestingly, the perception of the majority of tutors and tutees was that they gained academic knowledge as well as improved their ability to communicate their ideas through their experiences in the peer tutoring program. This perception of benefit helps to support Vygotsky's theory as well as the proposed gains of peer tutoring. Additional study into the actual gains in academic knowledge as well as in communication skills would help to better understand the degree to which these benefits occur.

Reviews of peer tutoring have identified that the level of tutor training is a core component of effective tutoring (Cohen, 1986; Hartman, 1990; Maxwell, 1990). Also, studies examining outcomes of peer tutoring have found that tutees working with tutors who had prior training (Fuchs et al, 1994) or with trained tutors in scripted or structured interactions (Ismail & Alexander, 2005; King, Staffieri, & Adalgais, 1998) had improved performance over those who received tutoring with non-trained tutors or less structured tutoring sessions. It would be of interest to see the outcomes that would occur for both tutors and tutees from more enhanced tutor training or more structured tutoring sessions. Specifically, what gains in academic and/or social/emotional skills would be acquired if particular academic skills such as testing strategies, self-testing, information processing, or time management would be addressed as standard components of peer tutoring sessions. Direct instruction in these skills could possibly translate to higher gains in tutees' skill levels. It also could be expected that, as a result of overtly teaching these skills, tutors also would demonstrate higher gains as well. This gain in tutor skills as a result of teaching information has been supported in previous studies (Annis, 1983; Bargh & Schul 1980). Increasing the academic skills of both tutors and tutees also could result in higher

gains in the social/emotional aspects of learning (i.e., managing anxiety, increased motivation and more positive attitudes towards school).

Overall, this study supports the benefits of peer tutoring. Specifically, this project helped to identify that students' academic skills, not just the level of mastery of academic content, can be influenced through peer tutoring. The degree to which these skills translate to future academic performance would be a key area of future study. This project also helped to identify that the peer tutoring process can benefit the social and emotional development of tutors and tutees. Specifically, the gains in skills related to managing anxiety may have a notable impact on these students' academic and professional performance. The degree to which these skills are maintained and utilized as well as the degree to which other aspects of social and emotional development are influenced, is another important area of future study.

REFERENCES

- Annis, L.F. (1983). The processes and effects of peer tutoring. *Human Learning*, 2, 39-47.
- Bargh, J. A., & Schul, Y. (1980). On the cognitive benefits of teaching. *Journal of Educational Psychology*, 72, (5), 593-604.
- Blowers, S., Ramsey, P., Merriman, C., & Grooms, J. (2003). *Patterns of peer tutoring in nursing*. *Journal of Nursing Education*, 42, 204-211.
- Chaney, B., Muraskin, L. Cahalan, M., & Rak, R. (1997). National study of Student Support Services. Third-year longitudinal study results and program implementation study update. Department of Education, Washington, DC.
- Choudhury, I. (2002). Use of reciprocal peer tutoring technique in an environmental control systems course at an undergraduate level. *Journal of Construction Education*, 7, (3), 137-142.
- Cohen, P. A., Kulik, J. A., & Kulik, C, C. (1982). Educational outcomes of tutoring: A meta-analysis of findings. *American Educational Research Journal*, 19, (2), 237-248.
- Cohen, J. (1986). Theoretical considerations of peer tutoring. *Psychology in the Schools*, 23, 175-186.

- Fantuzzo, J. W., Riggio, R. E., Connelly, S., & Dimeff, L. A. (1989). Effects of reciprocal peer tutoring on academic achievement and psychological adjustment: A component analysis. *Journal of Educational Psychology, 81*, (2), 173-177.
- Fantuzzo, J. W., King, J. A., & Heller, L. R. (1992). Effects of reciprocal peer tutoring on mathematics and school adjustment: A component analysis. *Journal of Educational Psychology, 84*, (3), 331-339.
- Fuchs, L. S., Fuchs, D., Bentz, J., Phillips, N. B., & Hamlett, C. L. (1994). The nature of student interactions during peer tutoring with and without prior training and experience. *American Educational Research Journal, 31*, 75-103.
- Groccia, J. E., & Miller, J. E. (1996). Collegiality in the classroom: The use of peer learning assistants in cooperative learning in introductory biology. *Innovative Higher Education, 21*, (2), 87-100.
- Griffin, M. M., & Griffin, B. W. (1989). An investigation of the effects of reciprocal peer tutoring on achievement, self-efficacy, and test anxiety. *Contemporary Educational Psychology, 23*, 298-311.

- Hart, E. R., & Speece, D. L., (1998). Reciprocal teaching goes to college: Effects for postsecondary students at risk for academic failure. *Journal of Educational Psychology*, 90, (4), 670-681.
- Hartman, H. J. (1990). Factors affecting the tutoring process. *Journal of Developmental Education*, 14, 2-7.
- Haight, P. A, Hill, L.A., Walls, R. T., & Nardi, A. H. (1998). Improved Learning Study Strategies Inventory (LASSI) and academic performance: The impact of feedback on freshmen. *Journal of the First-Year Experience*, 10, 25-40.
- Ince, E. J., & Priest, R. (1998). Changes in LASSI scores among reading and study skills students at the United States Military Academy. *Research & Teaching in Developmental Education*, 14, 19-26.
- Ismail, H. N., & Alexander, J. M. ( 2005). Learning within scripted and nonscripted peer-tutoring sessions: The Malaysian context. *Journal of Educational Research*, 99, 67-77.
- King, A. (1998). A model of transactive peer tutoring: Scaffolding cognition and metacognition. *Educational Psychology Review*, 10, 57-74.

King, A., Sataffieri, A., & Adelgais, A. (1998). Mutual peer tutoring: Effects of structuring tutorial interaction to scaffold peer learning. *Journal of Educational Psychology, 90*, 134-152.

Kowalsky, R., & Fresko, B. (2002). Peer tutoring for college students with disabilities. *Higher Education Research & Development, 21*, (3), 259-271.

Maxwell, M. (1990). Does tutoring help? A look at the literature. *Review of Research in Developmental Education, 7*, 1-5.

McKeachie, W. J., Pintrich, P. R., & Lin, Y. (1984, August). *Teaching Learning Strategies*. Paper presented at the Annual Meeting of The American Psychological Association. Toronto, Canada. (ERIC Document Reproduction Service No. 255 141)

Mynard, J. & Almarzouqi, I. (2006). Investigating peer tutoring. *ELT Journal, 60*, 13-22.

Nist, S. L., Mealey, D. L., Simpson, M. L., & Kroc, R. (1990). Measuring the affective and cognitive growth of regularly admitted and developmental studies students using the learning study strategies inventory (LASSI). *Reading Research and Instruction, 30*, 44-49.

- Proctor, B. E., Prevatt, F., Adams, K., Hurst, A., & Petscher, Y. (2006). Study skills profiles of normal-achieving and academically-struggling college students. *Journal of College Student Development, 47*, 37-51.
- Roscoe, R. D., & Chi, M. T. H. (2007). Understanding tutor learning: Knowledge-building and knowledge-telling in peer tutors' explanations and questions. *Review of Educational Research, 77*, 543-574.
- Rittschof, K. A., & Griffin, B. (2001). Reciprocal peer tutoring: Re-examining the value of cooperative learning technique to college students and instructors. *Educational Psychology, 21*, (3), 313-331.
- Saunders, D. (1992). Peer tutoring in higher education. *Studies in Higher Education, 17*, (2), 211-218.
- Topping, K. J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher Education, 32*, 321-345.
- Topping, K. J. (2005). Trends in peer learning. *Educational Psychology, 25*, (6), 631-645.
- Vogel, G., Fresko, B., Wertheim, C. (2007). Peer tutoring for college students with learning disabilities: Perceptions of tutors and tutees. *Journal of Learning Disabilities, 40* (6), 485-493.

- Vygotsky, L. S. (1978). Interaction between learning and development. In M. Cole, V. John-Steiner, S. Scribner, & E Souberman (Eds), *Mind in Society: The development of higher psychological processes* (p. 71-91). Cambridge, MA: Harvard University Press.
- Wesinstein, C.E., & Palmer, D. R. (2002). *Learning and Study Strategies Inventory (LASSI): Users Manual* (2<sup>nd</sup> ed.). Clearwater, FL: H & H.