ABSTRACT

The Effects of Guided Imagery Exercises on Perceived Academic Self-Efficacy

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In this study, the effects of guided imagery exercises on self-identified low achieving postsecondary students' perceived academic self-efficacy (PASE) were examined, as well as its effects on study skills and anxiety. Also examined was whether participants with high imagery ability (i.e., ability to have vivid, controllable imagery) would be better able to enhance PASE through imagery and relaxation exercises than low imagery ability participants.

One hundred and four participants were randomly assigned by class to an imagery, a relaxation, or a comparison group. Participants in all groups identified self-limiting academic beliefs and discussed study skills. Relaxation and imagery participants were
taught and encouraged to use diaphragmatic breathing, autosuggestion, and relaxing imagery. Imagery participants also imagined successfully coping with academic situations in which they presently had doubts, whereas relaxation participants also engaged in a muscle relaxation exercise.

Weekly, participants estimated their PASE using an adaptation of Bandura, Adams, and Beyer's (1977) procedure. At pre- and posttreatment, participants completed the Learning and Study Strategies Inventory (LASSI) (Weinstein, Schulte, & Palmer, 1987) and the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1968). Imagery ability was assessed through the Questionnaire on Imagery Control (Lane, 1976).

Imagery participants had significantly larger increases in PASE magnitude than comparison participants ($p < .001$) and higher pretreatment-corrected posttreatment PASE strength than relaxation participants ($p = .009$). The comparison group had significantly lower pretreatment-corrected posttreatment PASE strength than the combined relaxation and imagery groups ($p < .001$). Imagery participants had significantly lower pretreatment-corrected posttreatment anxiety ($p = .004$) than comparison participants. The treatment groups did not significantly differ on study skill use. Finally, more high imagery ability participants enhanced PASE magnitude than low ability participants ($p = .042$). However, ability groups did not significantly differ on PASE strength.

Considering the imagery participants' success in enhancing PASE and lowering anxiety, guided imagery may have considerable promise as an academic tool. The importance of imagery ability received less support.
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Table of Contents

List of Tables ................................................................. ix
List of Appendices ............................................................ xii
Introduction ................................................................. 1

Enhancing Academic Performance by

Enhancing Perceived Academic Self-Efficacy ............................ 1

PASE and Academic Success .................................................. 2
Cognitive Processes ............................................................. 6
  Cognitive Skill Usage ...................................................... 6
  Goal Setting ................................................................. 8
Motivational Processes ......................................................... 9
Affective Processes ............................................................. 9

Enhancing PASE Through Imagery ......................................... 11

A Very Brief Historical Outline ............................................. 11

The Structure of Imagery .................................................... 15
  Imagery's Similarity to Performance Experiences ....................... 15
  Imagery's Similarity to Nonenactive Experiences ....................... 17
Relevant Research ............................................................. 19
  Imagery Enhancing Interpersonal Skills PSE ........................... 21
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery Protecting PSE from Negative Experiences</td>
<td>24</td>
</tr>
<tr>
<td>Comparing Imagery to Verbal Persuasion</td>
<td>28</td>
</tr>
<tr>
<td>Studying Imagery's Mediating Factors</td>
<td>31</td>
</tr>
<tr>
<td>Imagery not Affecting PSE</td>
<td>33</td>
</tr>
<tr>
<td>The Effects of Guided Imagery on PASE</td>
<td>35</td>
</tr>
<tr>
<td>Conclusions</td>
<td>40</td>
</tr>
<tr>
<td>Imagery and Relaxation: Can They be Separated?</td>
<td>41</td>
</tr>
<tr>
<td>Selecting the Students who will Benefit from Imagery</td>
<td>43</td>
</tr>
<tr>
<td>Identifying the Postsecondary Students Most in Need</td>
<td>45</td>
</tr>
<tr>
<td>Summary</td>
<td>47</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>48</td>
</tr>
<tr>
<td>Method</td>
<td>50</td>
</tr>
<tr>
<td>Participants</td>
<td>50</td>
</tr>
<tr>
<td>Measures</td>
<td>56</td>
</tr>
<tr>
<td>Background Questionnaire</td>
<td>56</td>
</tr>
<tr>
<td>The Learning and Study Strategies Inventory (LASSI)</td>
<td>56</td>
</tr>
<tr>
<td>Questionnaire on Imagery Control (QIC)</td>
<td>58</td>
</tr>
<tr>
<td>Task Specific Self-Efficacy Scale (TSSE)</td>
<td>60</td>
</tr>
<tr>
<td>Raven's Standard Progressive Matrices (SPM)</td>
<td>62</td>
</tr>
<tr>
<td>The State-Trait Anxiety Inventory - State Scale (STAI)</td>
<td>64</td>
</tr>
</tbody>
</table>
Imagery and Relaxation Diaries ........................................ 64

Vocabulary Subtest of the
Wechsler Adult Intelligence Scale-Revised (WAIS-R) .................. 65

Procedures ........................................................................... 66

Outline of the Five Treatment Sessions ................................. 66

Session #1 ........................................................................ 66

Session #2 ........................................................................ 68

Sessions #3, #4, and #5 .................................................... 70

Integrity Checks ................................................................. 72

Results ................................................................................. 76

Comparison of Pretreatment Scores ..................................... 76

The Effects of the Treatments on TSSE Strength and LASSI Factors ...... 77

The Effects of the Treatments on TSSE Magnitude .................... 81

The Effects of Imagery Ability on TSSE ................................. 82

Subsidiary Analyses ............................................................ 84

Counsellor Effects ............................................................. 84

Effects of the Sex of the Participants .................................... 87

Imagery Diaries ................................................................. 90

The Effects of the Treatments on State Anxiety ....................... 92

Alternative Analyses ........................................................... 93
List of Tables

Table No.

1. Comparison of Participants who Completed the Program with Drop-Outs .... 53
2. Internal Consistency Reliabilities for the LASSI Factor and Scale Scores (alphas) 59
3. Session Outline for Experimental and Comparison Groups: Session #1 .... 67
4. The Description and Rationale of the Programs given to Participants ......... 69
5. Session Outline for Experimental and Comparison Groups: Session #2 .... 71
6. Session Outline for Experimental and Comparison Groups: Session #3 .... 74
7. Session Outline for Experimental and Comparison Groups: Sessions # 4 & 5 .... 75
8. Mean Task Specific Self-Efficacy Strength Scores by Treatment Group .... 79
9. Mean Learning and Study Strategies Inventory--Effort-Related Factor Scores by Treatment Group ........................................ 79
10. Mean Learning and Study Strategies Inventory--Goal Orientation Factor Scores by Treatment Group ........................................ 80
11. Mean Learning and Study Strategies Inventory--Cognitive Activities Factor Scores by Treatment Group ........................................ 80
12. Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Treatment Group ........................................ 83
13. Task Specific Self-Efficacy Strength Scores by Imagery Ability ............ 84
14. Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Imagery Ability .................................................. 84
15. Mean Task Specific Self-Efficacy Strength Scores by Counsellor ............... 85
16. Mean Learning and Study Strategies Inventory--Effort-Related Activities Factor Scores by Counsellor ......................................................... 86
17. Mean Learning and Study Strategies Inventory--Goal Orientation Factor Scores by Counsellor ......................................................... 86
18. Mean Learning and Study Strategies Inventory--Cognitive Activities Factor Scores by Counsellor ......................................................... 87
19. Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Counsellor ......................................................... 87
20. Mean Task Specific Self-Efficacy Strength Scores by Sex .......................... 88
21. Mean Learning and Study Strategies Inventory--Effort-Related Activities Factor Scores by Sex ................................................................. 89
22. Mean Learning and Study Strategies Inventory--Goal Orientation Factor Scores by Sex ................................................................. 89
23. Mean Learning and Study Strategies Inventory--Cognitive Activities Factor Scores by Sex ................................................................. 90
24. Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Sex ................................................................. 90
25. Mean Imagery Experience Ratings by Treatment Group .................. 92
26. Mean State Anxiety Scores by Treatment Group ....................... 93
27. When using a cutoff of TSSE's percentage of Participants who Achieved
    TSSE Magnitude by Treatment Group .................................. 200
28. Mean Scores and Univariate F-tests for the LASSI and TSSE scale .... 202
29. Mean Study Skills Scores by Treatment Group .......................... 203
30. Univariate F-tests for the LASSI and TSSE scale gain scores .......... 205
List of Appendices

Appendix

A. Background Questionnaire ................................................. 131
B. Questionnaire on Imagery Control ........................................ 134
C. Task Specific Self-Efficacy Scale ........................................ 145
D. Imagery and Relaxation Diaries ........................................ 147
E. Summaries of the Project given to the Different Treatment Groups ........................................ 158
F. Descriptions and Rationales Given to the Different Treatment Groups ........................................ 162
G. Informed Consent Forms ..................................................... 173
H. Description of the Imagery and Relaxation Exercises .......................... 175
I. Integrity Checks for the Study ................................................ 187
J. Alternative Analysis for PASE Magnitude ................................ 199
K. The Effects of the Treatments on Individual LASSI Scales and TSSE Strength ........................................ 201
L. Analyses using Gain Scores ................................................. 204
M. The Request for Volunteers .................................................. 207
Enhancing Academic Performance by Enhancing Perceived Academic Self-Efficacy

Nonintellectual factors such as anxiety, fear of failure, and motivation play important roles in academic success and failure. In fact, some of these factors have been shown to be better predictors of success than intellectual factors, especially with students who are known to have academic difficulties. For instance, Larose and Roy (1991) found that fear of failure, not being aware of the importance of effort for success, and examination anxiety were better predictors of high risk college students' school success than previous marks. Sanchez-Herrero and Sanchez (1992) found that anxiety levels were better predictors of achievement in junior high students learning a second language than general intelligence or verbal aptitude. Similarly, several studies have found motivation to be an important predictor of academic success (e.g., Sharpley & Pain, 1987; Uguroglu & Walberg, 1988). Sharpley and Pain, for example, found that motivation was a better predictor of success in a graduate level counsellor training course than were the students' previous grades.

This study considers a particular type of nonintellectual hindrance to academic success: students' perceived academic self-efficacy. Perceived self-efficacy (PSE) is defined here as people's beliefs that they can successfully perform specific behaviours (Bandura & Adams, 1977). This introduction begins with the examination of the effects
of PSE on academic achievement followed by consideration of reasons why the judicious use of imagery may enhance perceived academic self-efficacy (PASE).

PASE and Academic Success

Albert Bandura in 1977 first suggested that PSE may have predictive value. He proposed that changes in PSE may explain why behaviour change can follow from very diverse treatment approaches. In other words, Bandura believed that the important change that occurs in successful therapies is that people leave therapy believing they can do things they did not believe they could do before therapy.

Bandura and Adams (1977) and Bandura, Adams, and Beyer (1977) demonstrated that PSE was enhanced by a number of successful forms of therapy for phobics. Furthermore, the level of PSE established during the course of the interventions predicted the degree of success in overcoming fearful and avoidant behaviour. These two studies examined the effectiveness of treatments on snake phobias. In one of these studies (Bandura & Adams), the researchers examined the effects of systematic desensitization on PSE. This was not only the first study to examine the effects of imagery on PSE, but the data from this study supported the belief that PSE was a better predictor of future behaviour than anxiety and past behaviour in phobics, a result that had a great deal of theoretical significance.

Systematic desensitization is a technique in which phobic clients vividly imagine the phobic stimulus while being in a relaxed state. Wolpe popularized this technique in his 1958 book Psychotherapy by Reciprocal Inhibition. He explained the technique's
effectiveness by its ability to reduce anxiety. Wolpe believed that what caused the avoidant behaviour in phobics was the anxiety people experienced when thinking of the feared stimuli. According to this theory, the imagery would extinguish the avoidant behaviour because it reduced anxiety.

This theory has a great deal of a priori appeal. Unfortunately, reciprocal inhibition did not adequately explain differences in behaviour found in the outcome studies. For instance, as early as 1967 researchers such as Agras studied participants who had been trained to remain relaxed while imagining feared stimuli. Although all participants were equally relaxed during desensitization, these participants showed significant differences in their ability to approach what they feared. The clients' anxiety levels were not effective predictors of behaviour. Presumably, if anxiety caused avoidant behaviour, it would also predict avoidant behaviour.

There are two ways of interpreting these data. One way is to suggest that because most human behaviour is influenced by many factors, the researcher needed only to identify additional causal factors that would distinguish those participants able to achieve maximal performance and those who did not. An obvious example of this may be that phobic behaviour is extinguished through systematic desensitization in relaxed, motivated participants. However, if motivation is a distinguishing causal factor, one might question why participants need high motivation to approach a stimulus that does not cause them any anxiety. The alternative interpretation is that systematic desensitization influences
higher order variables that cause both anxiety and approach behaviour. In this case, it is anxiety that is epiphenomenal.

Bandura and Adams' (1977) work with ophidiophobes suggested that the higher order variable of cognitions was a better predictor of avoidant behaviour in phobics than was anxiety. They found that desensitization not only reduced arousal, it also enhanced the participants' PSE, but it did not do so uniformly. Some participants' PSE levels were higher and stronger than those of other participants who had been desensitized to the same low level of arousal when confronted with the phobic stimuli. The higher the level of PSE, the greater the reduction in avoidance behaviour. Bandura and Adams' cognitive explanation of change fit the avoidance data better than Wolpe's behavioural explanation. Bandura and Adams had presented fairly convincing data to suggest that anxiety was not the causal factor in avoidance behaviour. They also reported a small pilot project investigating the change of PSE at several points during and after treatment. By using participant modelling, in which participants engaged in handling snakes as part of the treatment, the researchers found that PSE was a more powerful predictor of later behaviour than was behaviour during the treatment. Although these data do not constitute a direct test of causation, they did provide support for the belief that PSE was a more likely explanation for avoidance behaviour than two well-accepted explanations: anxiety and lack of exposure.

Almost as soon as the term PSE was coined, researchers began studying the PSE of students (e.g., Brown & Inouye, 1978). The results of these studies were very
promising. In some, but not all, of the studies, PSE was the most important source of variation in academic measures. For instance, in a study of nonintellectual factors, Ferrari, Parker, and Ware (1992) studied 319 postsecondary students. Their study examined the effects of the students' locus of control, Meyers-Briggs type, and PSE on academic performance. The researchers discovered that of these variables only PSE significantly affected academic performance. Shell, Murphy, and Bruning (1989) studied the predictive utility of skill, PSE, and outcome expectancies for reading and writing tasks. Multiple regression analyses showed that only PSE and outcome expectancies predicted reading achievement, with PSE being the stronger predictor. Only PSE accounted for a significant proportion of the variance in writing achievement. Schunk's (1989) review of the literature concluded that studies of different academic endeavors have found significant and positive correlations between posttreatment PSE and skill ($r = 0.27 - 0.84$).

Furthermore, PSE remained a significant predictor when the effects of other influences on academic achievement were partialled out. Thus, the research indicates that students' beliefs that they can successfully perform academic tasks correlate with their academic performance. Bandura (1989) suggests that these beliefs affect academic behaviour both directly and indirectly through cognitive, motivational, and affective processes.
Cognitive Processes

PASE affects cognitive processes in two major ways: by increasing the use of certain cognitive skills and by facilitating the formation of goals based on the positive interpretation of one's previous behaviour.

Cognitive skill usage. Collins (1982, cited in Bandura, 1993) examined the effects of PASE on cognitive skill usage by studying children at three levels of mathematical ability: low, medium, and high. Within each of these ability levels, she found children who had low and high PASE. All the children were given difficult mathematical problems to solve. At each level of ability, children who believed strongly in their capabilities were quicker to discard faulty strategies. They chose to rework more of the problems they failed and did so more accurately than did children of equal ability who had low PASE. Finally, positive attitudes toward mathematics were better predicted by PASE than by actual ability. Bandura (1989) suggests that the reason why believing in one's abilities encourages effective skill usage can be found in the type of mental imagery high PASE encourages. In other words, students' PASE influences the types of anticipatory scenarios that run through their minds:

Those who have a high sense of efficacy visualize success scenarios that provide positive guides for performance. Those who judge themselves as inefficacious are more inclined to visualize failure scenarios that undermine performance by dwelling on how things will go wrong (Bandura, 1989, p.1176).
When people visualize themselves successfully completing academic work, they are also quite effortlessly reminding themselves of the steps needed to perform the task well. Such imagery creates a positive feedback loop that amplifies the original effects where high PASE fosters imagery of effective actions, and imagery of efficacious action strengthens PASE (Bandura, 1989).

There is also tentative evidence that PASE influences the metacognitive processes students use consciously in their studies. In a study conducted with 173 students in grade seven and eight science and English classes, Pintrich and DeGroot (1990) found that higher levels of PASE and belief in the intrinsic value of the subject matter were correlated with higher scores in their Cognitive Strategy Scale and Self Regulation Scale. The Cognitive Strategy Scale used by Pintrich and DeGroot included items on such study strategies as memorizing new terms, paraphrasing new ideas, and outlining textbook chapters. The Self-Regulation Scale was a combination of metacognitive strategies and self-regulation items. Metacognitive strategies items included such approaches as planning, skimming, and comprehension monitoring. The self-regulation components included items on persistence when studies were perceived to be uninteresting, self-testing, and use of practice exercises. The only weakness with this study was the design’s inability to determine the path of causality. It was impossible to tell whether being interested in the topics they were studying or believing that they had the ability to perform these academic activities caused the students to work smarter as well as work harder.
Goal setting. Students who believe they can perform well choose more challenging goals than those who do not believe they can perform well (Bandura, 1989, 1991, 1993). It seems this is not a direct effect. Rather, PASE affects goal setting by affecting the interpretation given to past performance. The higher the PASE, the more likely students are to perceive their past performances favorably and the less likely they are to attribute their initial failures to perform necessary behaviours as the result of the lack of ability (Bandura, 1993).

Zimmerman, Bandura, and Martin-Pons (1992) found that students' PASE correlated significantly with their grade goals and with their final grades in social studies. PASE and student goals accounted for 31% of the variance in the students' academic course attainment. Interestingly, the direct path of influence between students' prior grades and final grades was not significant, suggesting that self-regulatory factors not only mediated the influence of prior achievement, but also contributed independently to the students' academic attainment.

Related to goal setting is risk taking. Low PASE is related to low risk taking. If people doubt that they have the ability to do a new behaviour, they are less likely to attempt the behaviour. Unfortunately, academics, especially postsecondary academics, are risky business. The risks involved in academia are most likely to be assumed if people have the PASE to believe that they will be able to complete their program, and they have the outcome expectancies that their program will lead to a career.
Motivational Processes

If people do not believe they have the ability to perform certain behaviours, they are not as likely to persist in their attempts to perform these behaviours when faced with difficulties. Dale Schunk's work with low achieving children (1981, 1983) demonstrated that enhanced PASE increases persistence. Schunk's 1981 study has been described as the initial PASE research involving cognitive skill learning. Low achieving children received cognitive modelling or didactic instruction on long division. Regardless of treatment, higher PASE was associated with progressively greater division skill. A path analysis showed that PASE increased performance both directly and by increasing persistence.

Wood and Bandura's (1993) work with organizations and Lent, Brown, and Larking's (1984) study of undergraduates also demonstrated that enhanced PSE increases persistence. The study by Lent et al., also highlighted another way that PASE increases motivation. The higher the students' PASE, the more enjoyment they received from their studies.

Affective Processes

PASE directly affects the degree of physiological arousal and subjective distress students experience. Bandura (1993) explains that people only feel threatened if they believe their perceived coping capabilities are not sufficient to meet the potentially aversive aspects of the environment. In two studies, Bandura and his colleagues created different levels of PSE in participants with phobias about spiders (Bandura, Taylor, Williams, Mefford, & Barchas, 1985) or snakes (Bandura, Reese, & Adams, 1982) by
treating them with modelling or enactive treatments. Low levels of PSE were accompanied by high levels of subjective distress, autonomic arousal, and plasma catecholamine secretion. Meece, Wigfield, and Eccles (1990) found that academic failures evoked anxiety only if PASE was weakened. More important, it was the students' beliefs in their capabilities, not their anxiety levels, which best predicted their subsequent academic attainments. PASE predicted behaviour when anxiety was partialled out. Bandura asserted that these finding had "... important implications for how to alleviate scholastic anxiety. It is best reduced not by anxiety palliatives but by building a strong sense of efficacy" (Bandura, 1993, pp. 133-134).

In conclusion, there is converging evidence indicating that enhancing PASE will encourage cognitive and metacognitive skill usage, encourage the selection of challenging academic goals, increase academic motivation (e.g., persistence and enjoyment), and decrease anxiety. Thus, techniques that enhance PASE would be useful for counsellors, teachers, and students. Research on how best to enhance PASE is not only important but may be more worthwhile to individuals involved in academia than research on managing stress or enhancing low academic motivation because PASE may be a strong causal factor in these hindrances to academic success.
Enhancing PASE Through Imagery

Very little research has been conducted to assess how best to enhance PASE. However, there are three reasons to suggest that guided imagery exercises may be a good way to enhance PASE. First, imagery has a very long and successful history of clinical application and is presently extremely popular. Second, the way imagery experiences are structured, it is reasonable to believe they would be persuasive. For instance, they have the flexibility of nonenactive treatments while still being an isomorph of enactive experiences. The third and strongest reason to suggest that guided imagery exercises may be a good way to enhance PASE is that researchers have found that imagery has enhanced PSE in nonacademic areas.

Imagery is simply our imaginings. Perhaps because of its name, people often think of imagery as what they "see" in their mind's eye, but imagery can involve any sensory or perceptual experience (e.g., imagined tastes, imagined emotions, etc.) Throughout this thesis, imagery will be defined as quasi-sensory or quasi-perceptual experiences of which people are self-consciously aware. These experiences exist for them in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts (Richardson, 1983).

A Very Brief Historical Outline

Imagery is in a unique position compared to other clinical techniques. Every culture of every historical period has used imagery to some extent to help people cope with the difficulties of living (Achterberg, 1985). In fact, writers such as Jeanne
Achterberg (1985) and Samuels and Samuels (1975) remind us that even prehistorically imagery was used to cope with psychological difficulties. Achterberg provides examples of how shamans in tribal communities often spoke of using the mental images that they and their "clients" had. These images would be used to help the shamans and clients understand the clients' difficulties and help them overcome these difficulties. There is archaeological evidence to suggest that these shamanic techniques are at least 20,000 years old and imagery continues to be used by modern shamans such as healers in the Navaho nation (Achterberg, 1985).

When healers in the Western World started to write down their medical knowledge, they, too, wrote about imagery. For instance, the ancient Greek healer, Asclepius, used patients' hypnagogic images to assist him in the diagnoses of their illnesses. After Asclepius' death, more than 200 temples were eventually erected throughout the area of Greece, Italy, and Turkey to honour him and the practice of medicine which he fostered. The priests in these "Asclepia" (as these temples were called) also used hypnagogic images for diagnoses. They called it "dream therapy." Later, when the practitioners were Christian, the technique was renamed "incubation sleep." Many people found that studying these images gave them insights into their difficulties (Achterberg, 1985).

Modern psychotherapy is usually thought of as starting in the 1890s. It was during this time that Sigmund Freud published his paper, "On the Origins of Psycho-Analysis," and Freud and Bruer published Studies on Hysteria (both of which were published in
1895). Of course, there were psychotherapists before Freud. When Freud began his clinical work, perhaps the best known and most respected psychotherapist was Pierre Janet (1859-1947) (Corsini, 1989). Janet was perhaps the first modern therapist to strongly advocate for the use of imagery. He discovered that it was helpful to have hysterical patients replace one image with another because these clients often spoke of being fixated on particular images. In 1898, he published a book on this topic called Nervoses et Idées Fixes (Sheikh & Jordan, 1983).

In the early 1900s, writers in Europe, such as Carl Jung, continued to study and advocate for the use of imagery in psychotherapy. They kept the study of imagery alive in Europe while it was quickly disappearing in North America (Sheikh & Jordan, 1983).

As the popularity of behaviourism spread across North America in the early 1900s, work on all internal events was seen as imprecise and unscientific. John B. Watson labeled arguments in favor of the significance of imagery as "bunk" (Sheik, 1983). As a counselling technique, behaviourally oriented therapists saw imagery as irrelevant. This had such a profound effect on the study and use of imagery that between the years of 1920 and 1960 not a single book was published on the topic of imagery (Sheikh & Jordan, 1983).

The clinical study of imagery started to reemerge as people outside of the field of clinical psychology started publishing on imagery (Holt, 1964; Sheikh & Jordan, 1983). For instance, Wilder Penfield began evoking vivid mental images in patients by electrically stimulating brain tissue (Penfield, 1963). In the 1950s, D.O. Hebb's sensory
deprived research participants unexpectedly experienced spontaneous, uncontrollable mental imagery (Hebb, 1961). At approximately the same time, humanistic psychology started importing imagery techniques from Europe (e.g., psychosynthesis) and the Far East (e.g., Zen sitting meditations) (Sheikh & Jordan, 1983). In the early to mid-sixties, these studies and movements led to calls by both clinical and experimental psychologists to rediscover internal events. Holt, in his 1964 article entitled “Imagery: The return of the ostracized,” called to both experimental and clinical psychologists to reexamine these areas. He wrote, “. . . come on in - the water’s fine” (p. 263).

Therapists and researchers interested in imagery continue to this day to criticize North America’s behaviorist past. Nonetheless, behavioral therapists also played a role in bringing imagery back. Joseph Wolpe spoke of systematic desensitization back in 1958. This was six years before Holt’s call to “come on in.” The effectiveness of systematic desensitization not only encouraged people to reexamine imagery, it also profoundly affected the field of psychotherapy. Wolpe’s claim that 90% of his patients were either cured or markedly improved in a matter of months, when psychoanalysts were taking many years to treat the same patients, led to profound changes in the way psychologists think of psychotherapy (Wilson, 1989). Thus, imagery played a part in one of the biggest breakthroughs in modern applied psychology.

1 Wolpe was not the first person to use systematic desensitization. References to it go back as far as 1922. People associated with a technique or a discovery are seldom the first to run across it. Rather they are the people who are best able to prove its worth and advocate for its acceptance. As Timothy Ferris wrote in Coming of Age in the Milky Way (1988), there is more to science than precedence.
During the 1980s and 1990s, imagery has developed into an extremely popular topic. The psycINFO database, PsycLIT, which is an index to psychological journal articles, lists 10,293 journal entries under imagery (December, 2000; database abstracted articles from 1967 to 2000). Many universities offer courses in the clinical use of imagery. Finally, imagery is used in extremely diverse areas of psychology. For instance, it is used in behavioural medicine for pain relief (Reeb & Bush, 1996), transpersonal psychology to help people live in the moment and transcend themselves (Gawain, 1979), and physiological psychology to study localization of brain functions (Penfield, 1963).

In summary, imagery has a history that goes back 20,000 years, probably a longer history than any other clinical tool. It has been part of some of the greatest breakthroughs in psychology, such as systematic desensitization, and it has been used to help people with very diverse psychological and physical problems. There are historical reasons for suggesting that imagery may influence PSE.

The Structure of Imagery

Imagery's Similarity to Performance Experiences

Imagery is one of the two ways in which humans can symbolically represent (external or mental) events. Linguistic representation is the other form. To think in words has a different effect on people than does thinking in images. More to the point, the way we symbolically represent events may have differing effects on our PSE. Imagery is an isomorph of an actual experience. Participants engaging in imagery see, hear, and feel themselves perform the desired behaviour. Similarly, the structure of imagery (e.g.,
receiving a flood of information in one quasi-sensory experience) is almost identical to the structure of the actual sensory experiences. In these ways, imagery of the desired behaviour is very similar to a performance experience, which is the most powerful of all forms of information affecting PSE. Conversely, language, especially English, does not look, sound, smell, or kinaesthetically feel like the perceptual experiences it is attempting to describe (with the exception of a few onomatopoeias). These differences make it impossible for the content of language to resemble sensory experiences. Theorists believe these differences may make imagery more persuasive than verbal affirmations. For instance, while Bandura believes imagery can enhance PSE (Bandura, 1989), he believes affirmations often cannot enhance it:

> It should be noted that the sociocognitive benefits of a sense of personal efficacy do not arise simply from the incantation of capability. Saying something should not be confused with believing it to be so. Simply saying that one is capable is not necessarily self-convincing, especially when it contradicts preexisting firm beliefs (Bandura, 1989, p. 1179).

Because people engaging in imagery are able to experience themselves engaging in the desired behaviour, they can receive a somewhat realistic view of how successful their behaviours will be. Thus, they also learn how they can best alter their behaviour to meet their goals. The first client with whom I used imagery to enhance PSE very clearly displayed this tendency to use it to learn how to alter his behaviour to maximize performance. This person asked to imagine reading his texts without becoming physiologically aroused and having intrusive thoughts such as, "Oh my God, I don't
understand this; I don't have the intelligence to make it," etc. He stated that during the imagery exercise some of his negative thoughts and fears started to emerge. He was also able to recognize some of his own self-defeating behaviours that encouraged these intrusive thoughts and emotions. Without any prompting on my part, he chose to change his imagery. He imagined himself slowing down his rate of reading and taking more notes in the margins of his text. Through his imagery, he was able to develop strategies that allowed him to be more effective.²

**Imagery's Similarity to Nonenactive Experiences**

Unlike modelling or performance experiences, people doing imagery exercises are encouraged to daily imagine themselves engaging in the sought after behaviours (Hughes, 1990). The frequency of these images alone can make picturing success habitual and natural.

Related to repetitiveness is control. When people's doubts are highest, they cannot be assured that they will see a positive role model. Likewise, doubts often occur because of the lack of personal mastery experiences. This lack of control, especially in modelling, can be a serious hindrance to enhancing PSE. To better explore this, one should think of PSE as having three components: magnitude, strength, and generalizability.

PSE magnitude is the level of the behaviour that people believe they can successfully perform. For instance, some people may believe they could do well in an undergraduate program but doubt that they would be able to do well within a graduate

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² Some of the details of this client have been altered for the sake of anonymity.
program. Thus, one way PASE can be enhanced is by increasing how high or how far students believe they can progress in academia.

PSE strength refers to the people's degree of certainty. It is the difference between people somewhat believing that they may be able to complete an honours thesis and believing with great certainty that completing an honours thesis would be well within their abilities. An important aspect of PSE strength is the resiliency of the belief in the face of negative experiences. Thus, a second way PASE can be enhanced is by increasing how certain students are that they can progress to a specific level academically and increasing how resilient this belief is to negative experiences like a poor grade on an exam or not understanding an assignment.

PSE generalizability refers to the extent to which a change in one specific type of PSE belief could be generalized to changes in other types of PSE. For instance, students may be helped to believe that they will be able to learn the course material in an English class. It may be of interest to know whether this belief will lead to (generalize to) their believing that they have the ability to learn the course material in any humanities course.

Persuasion (like verbal affirmations, encouragement, imagery, etc.), in general, is placed with vicarious experiences as being significantly less resilient than mastery experiences because it lacks an enactive component (Bandura, Adams, & Beyer, 1977; Schunk, 1989). Thus, although such nonenactive treatments are typically effective in increasing the magnitude of PSE (Bandura & Adams, 1977), they are believed to be less effective in increasing the strength. Using imagery as a form of persuasion, though, may
be an exception to this. Because it is so similar to actually doing the event it may enhance PSE strength while continuing to give the user enough flexibility to reach maximum levels of PSE magnitude.

**Relevant Research**

Although there is very little information on the effects of imagery on PSE in academic settings (seemingly there is only one previous study, Covalt, 1996), this topic has been studied in other areas, especially sports psychology (Woolfolk, Murphy, Gottesfeld, & Aitken, 1985; Feltz & Riessinger, 1990; Ellis, Maughan-Pritchett, & Riddell, 1993; Martin & Hall, 1995; McKenzie & Howe, 1997) with some work having been done in health psychology (Gregerson, Roberts, & Amiri, 1996), interpersonal skills (Kazdin, 1979), phobias (Bandura & Adams, 1977), and addictions (Kominars, 1997).

In this section, I will summarize those seven studies (with the exception of Bandura and Adams’ [1977] study which has been discussed at the beginning of this literature review [p. 4]), that are the best examples of research on the effects of imagery on PSE (Bandura & Adams, 1977; Kazdin, 1979; Feltz & Riessinger, 1990; Ellis et al., 1993; Martin & Hall, 1995; Covalt, 1996; Gregerson et al., 1996). These seven studies are very diverse. Some researchers asked participants to imagine concrete behaviours (Martin & Hall, 1995); others asked participants to imagine symbols of strengths and problems (Covalt, 1996). Some researchers asked their participants about their imagery experiences (Ellis et al., 1993); others did not (Kazdin, 1979). However, what they all had in common was that all used research designs that allowed the researcher to separate the effects of
imagery on PSE from other variables. In the best studies (e.g., Feltz & Riessinger, 1990), this was accomplished through two means. Many studies involved a performance component (e.g., doing math quizzes or putting golf balls), and the best studies ensured that PSE was measured after the imagery but before the performance experiences, thus the researchers could state PSE did not change because the participants gained direct information from their performances. The second element of the best studies was that the researchers limited the number of independent variables. (Kazdin, 1979; Feltz & Riessinger, 1990; and Gregerson et al., 1996 are all excellent examples of this). The more independent variables the more difficult it became to conclude that it was the imagery and not some other component enhancing PSE. In fact, there are many other excellent research studies that clearly show that interventions that include imagery as one component positively affect PSE (e.g., Neck & Manz, 1996; Reeb & Bush, 1996; Kominar, 1997; Garza & Feltz, 1998). However, the above researchers clearly stated that they could not discern what particular part of the intervention was most effective or could stand alone.

When reviewing these seven studies, three points become apparent. First, and most obviously, is the paucity of research on the effects of guided imagery on PASE and the need for that research. A second consideration that becomes apparent is that in almost half of the reviewed studies (Feltz and Riessinger, 1990; Ellis et al., 1993; Gregerson et al., 1996), the imagery intervention was brief or given only once. There is a need not only for more research on the effects of guided imagery on PASE, but, as I argue in my
discussion of the Feltz and Riessinger study, future research on the ability of guided imagery to enhance PASE should include a more intensive imagery intervention. Imagery takes time to master, improves through repetition, and may be more effective in changing entrenched beliefs if used repetitively. The third consideration is that there is a need for a study on the effects of guided imagery on PASE because past research on nonacademic areas has been predominantly positive. Of the seven best studies, the majority (viz., five studies) did find guided imagery enhanced PSE. In one study that did not have positive results (Covault, 1996), the author suggested methodological reasons for the lack of significance. The second study that did not have positive results (Martin & Hall, 1995) is more disconcerting. This study was well designed, and the imagery was not a "one-shot" intervention that did not have time to be effective. In this study, the imagery group had increased performance, and yet PSE was not enhanced. In summary, in the review of the literature I will show that even though guided imagery has been shown to be effective in enhancing PSE in nonacademic areas there is a paucity of research on the effects of guided imagery on PASE and a similar paucity of research that uses guided imagery in a more intensive manner.

Imagery Enhancing Interpersonal Skills PSE

Two years after Bandura published his work on ophidiophobes, Alan Kazdin from Pennsylvania State University published a study on the effects of imagery elaboration on assertive behaviour and PSE. Kazdin's (1979) participants were 77 adults solicited from newspaper and television advertisements and posters offering free assertion training.
After completing a screening process to ensure that they were very unassertive, they were randomly placed in one of four groups. The first group was a covert modelling group. Participants in this group were asked to imagine standardized assertive scenes exactly as the therapists suggested them without making any changes. Each of the 35 scenes was imagined twice. Participants were asked to imagine a person engaging in assertive behaviour who was of similar age and the same sex as the participant. The second group was the elaboration group. These participants were given the same scenes to imagine. However, the second time the participants imagined the scene they were encouraged to elaborate on them. They could change the scene in any way as long as the model engaged in an assertive response. These elaborations were tape recorded, transcribed, and read to the third group. The third group was added to control for the effects of the content of the elaborations in the previous group. The participants in this group, the yoked group, were read the elaborations and were asked to imagine them. The fourth group, the scene control group was added to control for the process of elaboration. They were to imagine a scene where assertiveness would be called for, and they were encouraged to elaborate on the scene, but were not asked to imagine an assertive response by the model.

Kazdîn (1979) measured assertiveness through both role play and paper and pencil formats. The paper and pencil formats included the Conflict Resolution Inventory (McFall & Llilesand, 1971), the Wolpe-Lazarus Scale (Wolpe & Lazarus, 1966), and a global self-rating of assertion.
To measure PSE magnitude, participants were asked whether they believed they could respond assertively to several situations. The participants rated their PSE strength on a Likert scale for those items on which they believed they had PSE magnitude. This rating, which is very similar to Bandura's original procedure for measuring PSE (Bandura & Adams, 1977; Bandura et al., 1977), has been used in the vast majority of studies on the effects of imagery on PSE. This method of measuring PSE will simply be called "Bandura's technique" in the remainder of this thesis.

Those groups that imagined models being assertive were more assertive after treatment than the control group. As for differences between imagery groups, those participants who elaborated on their imagery were significantly more assertive than the yoked and covert modelling groups according to the role plays and one of the paper and pencil tests. The elaboration and covert modelling groups were both significantly higher in PSE magnitude than the control group. In terms of PSE strength, after treatment, the elaboration group was significantly stronger than the yoked and control groups. The covert modelling group was not significantly different from other groups.

Changes in PSE magnitude and strength were significantly correlated with changes on both role-play and the paper and pencil assertiveness tests. Finally, after treatment the covert modelling and elaboration groups' PSE scores were similar to the scores of a sample of individuals who considered themselves to be very assertive. In contrast, both the yoked and scene control groups were lower in PSE than this validation sample. Thus, imagery did enhance PSE to levels similar to those who considered
themselves to be assertive. The fact that the covert modelling group lost some ground in PSE strength is not overly concerning. As long as the imagery is permissive, there are significant changes in PSE strength.

The strength of this study was its design. Five different groups were used to ensure that the independent variables were precisely operationalized, and by explicitly defining three different research questions, Kazdin had fewer a posteriori analyses and, thus, fewer problems with statistical validity.

Imagery Protecting PSE from Negative Experiences

Feltz and Riessinger (1990) randomly assigned university undergraduates (N = 120) to one of three experimental conditions: mastery imagery plus feedback, feedback alone, or a no-treatment control condition. The study was set up in such a way that all but the control participants very frequently received negative feedback on their performance. To counter this, the mastery imagery participants received fairly brief mastery imagery experiences.

When contacted, participants were told they would be performing two related tasks that measured strength. They were informed that the study examined the relationship between the two tasks and that the participants would be scheduled in pairs to make the test somewhat competitive. In reality, the participants always "competed" against a confederate.

Feltz and Riessinger initially wanted all participants to start with similar PSE to reduce the problem of preexisting PSE influencing athletic performance and to avoid the
problem of ceiling effects. Thus, through the following method, they attempted to bring all participants PSE down to the same low level. When the participants arrived, the confederates acted as if they were completing a background questionnaire. The participants always competed against a same sex confederate. Both participants and confederates began by filling out a PSE scale based on Bandura's technique. The confederates then took off their sweat-suits. The confederates had very athletic builds. The participants and confederates were asked if they had any injuries that might hinder their performance or any previous experiences which might help their performance. The confederates commented that they ran track and lifted weights to increase leg strength. The confederates and participants then did the first task, the cybox machine.

Regardless of performance, the confederates were always told that they lifted 225 ft. lbs., at which time the researcher would state that this was "the best (performance) the experimenter had seen any subject perform in this experiment" (p. 136). Again, regardless of actual performance, the participants were told that they had lifted 150 ft. lbs. which was "... O.K., but the subject should 'really try' on the second trial" (p. 136). The participants were told that they had lifted 150 ft. lbs. on the second trial as well. PSE was again assessed and the manipulation was considered successful as participants across all groups had lower PSE after this experience. The participants were then assigned to experimental groups. One third of the participants were given imagery instruction. The other participants were told to rest for five minutes. After this, the PSE test was given a third time.
Perhaps what is most interesting about this study is the extreme brevity of the imagery training. As alluded to above, imagery training is often done daily for weeks or months (e.g., Kendall, Hrycaiko, Martin, & Kendall, 1990). Hughes (1990) stated that for effective imagery use, the imagery should be done several times a day until the visualization is clear and fluid. Conversely, the imagery exposure in Feltz and Riessinger's experiment consisted of listening to a 5 minute audiotape of mastery-producing images and then mentally practising the technique without the tape for two trials. In the pilot of this study, the trials lasted approximately 1 minute each. No mention of the time of trials was given for the actual study.

All the participants were next asked to engage in a phantom-chair competition. In the phantom-chair exercise, the participants were requested to sit against a wall with their feet shoulder-width apart and a thigh's length from the wall. Thus, it looks as if the participants were sitting in an invisible (or phantom) chair. The participants' backs were supported by the wall, but their legs and posteriors were not supported. Only their upper leg strength stopped them from sagging to the floor. It takes considerable leg strength to maintain this position. In the imagery and feedback alone conditions, regardless of how long the participants were able to endure this position, they were always told that the "other subject" had beaten their time by 10 seconds (control participants received no feedback). Participants who had received the imagery treatment were guided through in vivo imagery by listening to their tape through headphones during the competition. After
the second trial, participants completed a final PSE questionnaire and were debriefed. Thus, PSE was assessed five times during the study.

The results of this study were very promising. PSE was measured three ways: PSE magnitude, PSE strength, and how well they thought they would perform against the competitor (comparative PSE). Those in the imagery group increased on all three levels of PSE after imagery exposure. Furthermore, their PSE levels were significantly higher than the control and feedback groups for all three types of PSE. However, their PSE levels and comparative PSE were lower after the second phantom-chair exercise compared to assessments made after the first phantom-chair exercise.

Felz and Riessinger (1990) contend that their results should be interpreted conservatively. They argue that, although those participants who had received imagery training had significantly stronger PSE, most of the significant mean differences between groups were smaller than their respective standard deviations. When making this interpretation, it is unfortunate that Felz and Riessinger do not consider the brevity of their intervention more seriously. Less than 10 minutes of imagery significantly increased all measured types of PSE. That such a short intervention should have any effect is impressive. Felz and Riessinger may have hoped to have found an immediate remedy to the negative effects of detrimental cognitions. However, many writers, most notably Albert Ellis, have commented that although cognitive change is possible, it only occurs after considerable effort (Ellis, 1980).
Comparing Imagery to Verbal Persuasion

Ellis et al., (1993), in a complex study, compared the effects of positive and negative imagery and stable and ambiguous verbal persuasion on PSE, outcome judgements, persistence, and performance in a video game. PSE magnitude and strength were measured by Bandura's technique. This study had the unexpected outcome that verbal persuasion was more effective than imagery, although this may have been because the participants had difficulty doing the imagery. Nonetheless, they did conclude that imagery enhanced PSE. The participants were 90 inpatient adolescents diagnosed with major depression. They ranged in age from 13 to 17 years. Participation in this study occurred in the first week of the participants' hospitalization. In addition to recreation therapy, participants attended school and cognitive-behavioural therapy groups.

Participants were asked to play Super Mario Brothers for 5 minutes prior to the study to help them become familiar with the game. The researcher then entered the room and administered one of three imagery scenarios (success, failure, or no imagery). In the failure imagery condition, participants were guided through the process of imagining a loss in attempting to save their final man. In the imagery of a successful experience, the participants imagined a forward movement of the last man into the final and highest kingdom. Members of the no imagery group completed a leisure interest survey at that time.
Following the guided imagery session or completion of the survey, participants played the game again, this time under one of the three verbal persuasion conditions: internal/stable persuasion, ambiguous persuasion, or no persuasion. In the internal/stable group, the researcher made statements that the participants were successful because of their skills and abilities. These statements included, "You have great reaction time," "you are really skilful," and, "you have great reflexes" (p. 91). In the ambiguous persuasion condition, the researcher attributed the participants' success to unstable or external events. These statements included, "Gee, this is your lucky day," and "you got off easy there" (p. 91). In the no persuasion group the researcher either remained silent or spoke to the participant on topics unrelated to the game. Each participant played the game for 10 minutes while being exposed to one of the three verbal persuasion conditions. At the conclusion of the 10 minute period, the game scores were recorded (without comment), and the participants completed the PSE and outcome judgement questionnaires. Next, participants were given the opportunity to continue to play Super Mario Brothers without the researcher present. The amount of time that the participants continued to play was recorded and served as a measure of persistence.

Participants had difficulty evoking imagery in this study. The 60 participants who received guided imagery prior to playing the game were asked to report on their degree of success in imagining their scenarios. Only 21 reported that they had been successful in using imagery. Thirty-eight participants stated that they tried to engage in the imagery treatment but reported that they were not successful. One participant reported being
unsuccessful in using imagery and that he or she made no attempt to participate in the process.

Despite the above difficulty with the imagery, the success imagery group scored significantly higher than the failure imagery group and the no imagery group on the PSE measures. None of the remaining contrasts related to imagery were significant. The internal/stable persuasion group scored significantly higher than the ambiguous persuasion group and the no persuasion group on all dependent variables (performance, persistence, PSE, outcome judgements, and generalization).

The authors suggest that a Type II error may have been committed in their study, and that future investigations should address the problem of helping clinically depressed adolescents to successfully imagine success and failure. One difference between verbal persuasion and imagery is that imagery is under the participants' control. Depressed individuals often have difficulty imagining themselves being successful or doing well. In fact, cognitive theorists like Beck (Beck & Weishaar, 1989) base their theories of depression on this very fact. Beck's theory of the depressed person's paralysis of will being due to the belief that one lacks the ability to cope or control an event's outcome sounds very much like a definition of low PSE. Whereas the researcher had no difficulty saying, "You're a pro" (p. 91), the participants, because they were depressed, may have found it very hard to imagine being a pro. For this reason, it would have been interesting to find out if the participants who could not imagine their scenarios were disproportionately represented in the success imagery group. Finally, the criticisms I
made of Feltz and Riessinger's (1990) study are very apropos here. Once again, the imagery used was very brief. If any population warrants a longer period of exposure to success imagery, it would be those suffering from depression.

**Studying Imagery's Mediating Factors**

Gregerson et al., (1996) studied the effects of imagery and relaxation on immune responses in the body, especially mucosal immunoglobulin A (m-IgA). M-IgA indicates a rapidly occurring immune response related to pathogens entering through the oral and nasal passages. In addition, the researchers were interested in whether the cognitive factor, "absorption" mediated between the act of imagery and the increased immune response. Absorption is a person's ability to use concentration to evoke intense physiological responses. Those individuals who have good absorption abilities may be the people best able to make use of relaxation and imagery interventions.

Although no hypotheses were formulated for these additional mediating factors, the participants also completed a daily stress, a calmness, an anxiety, a PSE, and a mindfulness (defined as creative cognitive flexibility) scale. Secondary analyses were performed to determine if these variables might also be mediators between imagery and higher m-IgA levels. PSE magnitude, strength, and generalization were measured using an adaptation of Bandura's technique.

From over 400 undergraduate volunteers, 121 students were chosen to be in this study. These 121 participants were considered to be in good health, medication free, had no major immunological illnesses, and were identified as being either high or low in
absorption ability. The participants were randomly assigned to one of three conditions: relaxation; relaxation and imagery depicting powerful, positive mucosal immune functioning; or a vigilance task control group (a group that worked at discriminating between two tones after variable intervals).

The participants, upon arriving in the morning for the study, were asked to complete a battery of tests to measure the mediating factors and then provide 2 mls. of saliva. They were then randomly assigned to one of the three interventions, each lasting approximately 1 hour. After the intervention, the participants provided another saliva sample and completed a second set of questionnaires.

In terms of mediating factors, participants in the imagery condition reported higher posttreatment PSE scores corrected for pretreatment PSE than either the relaxation or the control participants. High absorption participants receiving imagery showed a greater increase in their m-IgA levels compared to all other participants. No other mediating factor was significant. Imagery enhanced PSE, and imagery effected immune functioning with absorption and PSE mediating the effect.

This study has a special relevance to this thesis because relaxation was studied by Gregerson et al., not as a state of being but as a technique. Although the data clearly indicate that PSE is a better predictor of behaviour than arousal level, as mentioned below there is some reason to believe people who successfully use relaxation techniques will, at least to some degree, enhance their PSE.
Imagery not Affecting PSE

Martin and Hall (1995), like Feltz and Riessinger (1990) examined the ability of imagery exercises to counter the effects of negative performance feedback. Martin and Hall found that imagery enhanced motivation and performance but did not affect PSE. Their results are both promising and disturbing: promising because they indicated that imagery had a strong influence on performance, but disturbing in that they did not clearly indicate the role PSE had in enhancing motivation.

In this study, 39 participants who were complete novices to golf were randomly assigned to one of three groups: a performance imagery group, a performance plus outcome imagery group, or a no imagery control group. Each participant attended six sessions with the researcher. During the first three sessions, all participants were taught how to putt a golf ball. During the initial session, participants were asked to estimate their PSE magnitude and strength using Bandura’s technique and given an introductory putting lesson. They also began their mental training programs. Performance imagery participants imagined performing a perfect stroke but were told to not imagine a golf ball. Performance plus outcome imagery participants imagined the perfect stroke and imagined the golf ball rolling across the green into the hole. The control participants were taught and asked to practice golf-related muscle stretching and strengthening exercises. At this point, the researcher explained to the participants that they were to do their imagery or physical exercises at home for at least 10 minutes each day. Participants were then offered time to practice putting before the next participant arrived. The amount of time
spent practicing was the objective measure of the dependent variable of motivation.

During the next two sessions, there were 35 minutes of training and the invitation to do some practice putting alone which was always recorded.

At session four, participants were told that they had entered the performance phase of the study and that the experimenter would record the number of putts they had sunk. Participants were presented with a list of specific goals (e.g., 6 holes in one out of 20) for each set of putts. The researcher suggested to the participants that these goals were developed from performance norms from other beginner golfers. In fact, the goals were inflated standards used to convince participants that their performance fell below average. Thus, the participants were coping with the negative feedback of being told that they were not as proficient as their peers. During sessions four and five, the experimenter read out the inflated goal for the upcoming set and asked participants to strive for it. The participants then completed the PSE scale, putted 20 balls, and were given free time to practice. Again, the free time was timed as a measure of motivation. During the sixth and final session, the participants were given the goal, putted 20 times, given free time to practice, and then told to come to the researcher’s office. When the participants came to the researcher’s office, she asked them to complete the PSE scale again and to do the questionnaire on motivation again. Participants were then informed that the experiment was over, and the participants filled out several additional questionnaires.

Martin and Hall discovered that the participants in the performance imagery condition practised significantly longer than the other groups, and the outcome imagery
group performed better (sunk more holes in one) than the other groups. Interestingly, imagining the perfect golf stroke but not "seeing" the successful putt did not improve scores at all. In fact, participants in this group occasionally performed worse than the control group.

There was no relationship between PSE and either self-reported motivation or motivation measured through time spent practising. Martin and Hall (1995) stated that this could be a floor effect because the PSE of the participants could have initially been very low. However, an alternative explanation could be that the imagery enhanced motivation without enhancing PSE. For instance, imagining the goal may have reminded people of the importance of the goal without changing their beliefs about their abilities to reach the goal.

The Effects of Guided Imagery on PASE

Only one study has directly examined the effects of imagery on PASE. Covalt (1996) examined the effects of guided imagery on mathematics anxiety, locus of control, PASE, and mathematical performance. Her 38 undergraduate educational psychology students were placed in either a guided imagery group or a relaxation group. During the first session, all participants completed the Mathematics Anxiety Rating Scale (MARS; Suinn, 1972), the motivation scales of the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991), a student survey, and a mathematics pretest that Covalt derived from two Pre-Professional Skills Test (PPST) preparation books. Next, the participants met once a week for five weeks at which time
they engaged in either relaxation exercises and mathematics practice or relaxation, imagery, drawing, and mathematics practice. During the seventh week, the participants completed posttests.

Covalt (1996) had one significant result. Those participants in the imagery group scored higher at posttreatment than they had on pretreatment on one scale of the MSLQ called the Control of Learning Beliefs scale. There were no significant differences on math performance, math anxiety, or PASE. To better understand this result, it is helpful to understand the MSLQ. Covalt analyzed two of the motivation scales of the MSLQ: the Control of Learning Beliefs scale and the Self-Efficacy for Learning and Performance scale. The Control of Learning Beliefs scale Covalt describes as a measure of another type of PASE. This is not quite true; it is a locus of control scale. As Pintrich et al., (1991) explain, this scale, "... concerns the belief that outcomes are contingent on one's own effort, in contrast to external factors such as the teacher" (p. 19). In Covalt's modification of the MSLQ, this subscale includes such items as "If I try hard enough, then I will understand the mathematics material in this mathematics workshop" or more negatively, "If I don't understand the material in this mathematics workshop, it is because I didn't try hard enough" (p. 131). Thus, those participants who did poorly on this scale (i.e., had an external locus of control) could still have had high PASE. For instance, they may think if they did not understand the material in the workshop, it was because of poor instructors, not because they did not try hard enough.
The second MSLQ scale Covalt (1996) examined more directly asked about PASE (the Self-Efficacy for Learning and Performance scale of the MSLQ). Pintrich et al., (1991) describe the variable this scale was developed to measure as, "a self-appraisal of one's ability to master a task" (p. 13). In Covalt's modification of the MSLQ, this subscale includes such items as the following: "I'm certain I can understand the most difficult questions presented in this mathematics workshop" (p. 129). Participants did not significantly change on this scale pre- to posttreatment. Thus, Covalt's intervention enhanced locus of control but not PASE.

Covalt (1996) considers some of the reasons that she did not have more significant results. Some of these reasons are quite tenable. Covalt stated that one reason that imagery did not have more positive effects was because of the type of imagery she used. The imagery used in this study involved encouraging participants to create symbols of their mathematical difficulties, their confidence and power, their skills, and the interaction of all these things together. For instance, in the second imagery session, Covalt asked the participants to imagine being a powerful gorilla, a dolphin, to evoke a memory of being confident, and then to "... allow an image to emerge that represents the feeling of power for you. It may be anything -- a symbol, a person, an object, a color, an animal -- anything is alright" (p. 172). The participants would then draw the symbol in crayon on white paper to help them to understand their symbol. Covalt comments that perhaps imaging symbols may not have been as effective as concrete imagery. She notes that anxiety is often dealt with using systematic desensitization which uses very concrete imagery.
A reason for the lack of change in anxiety scores had to do with Covalt’s sample. The sample should have had a high percentage of math anxious students. Covalt mentions that 28 out of 38 of her participants were pre-elementary education majors. According to past research elementary education students typically have disproportionate numbers of math anxious people. For some reason, her group was an exception to this norm. The participants had only moderate MARS scores at pretreatment. When answering the student survey question, “How do you feel you will perform on future mathematics tests?” only 7 of the 38 reported they believed they would do poorly. As well, in theory, most of the participants should have had a math exam in their near future. All elementary education majors at Northern Illinois University, where Covalt found her participants, were required to pass the PPST. However, only 7 of the 38 reported they were going to write the entrance exam. (It seems, unexpectedly, many participants had already taken the PPST test before participating in the study). It is hard to reduce math anxiety in people who are not presently math anxious and who do not have much math in their future.

A disappointing result in Covalt’s study was that guided imagery did not affect math performance. Covalt presents two possible reasons for this. First, the participants tried a different type of math problem in each of the five sessions in which they did math. Covalt (1996) states that the lack of improvement in math scores could have been because one session of cooperative practice was insufficient to increase mathematics skills. This seems like an unlikely explanation. In fact, Covalt follows the above statement with a comment that her goal was not to give people math skills, but to help the already skillful
do better by increasing their confidence and lowering their anxiety. The issue in Covalt’s thesis is not math skill, but use of math skills (mathematics achievement). In other words, regardless of whether they learned more skills or not, the participants should have done better if they were not panicking or losing their concentration because of intrusive negative cognitions.

The second explanation Covalt (1996) presents is more plausible. Those participants who had developed an internal locus of control may have become more persistent. However, Covalt states that her 15 minute mathematics pretest and posttest may have been too short to show any benefits of enhanced persistence. If given untimed math quizzes, the imagery participants may have scored higher at posttreatment than pretreatment because of their enhanced internal locus of control. I believe Covalt’s comments on persistence are apropos, but persistence does not just show itself in a willingness to use all available test time. Just as there was no imagery work assigned between sessions in Covalt’s study, so there were no math assignments between sessions. The math that was done during sessions was done in a group. In other words, peer pressure and Covalt were controlling persistence. In real college entrance exams, there are no teachers asking examinees if they would like to come in and do seat work. Students must have the discipline and persistence to study on their own when no one else is there to encourage them. Having an internal locus of control may well help participants believe that there will be a reward for their self-discipline. If imagery enhances math performance by enhancing persistence then Covalt would have been better off if her study included
either mathematics homework or, better still, used real academic achievement, such as the PPST scores or university grades, to measure mathematics achievement.

A third reason for the lack of significant results that Covalt did not mention was that this study, like several of the previously mentioned studies, involved using a particular imagery exercise just once. Although Covalt comments that her participants could call forth their symbol during an exam, I do not believe her procedure adequately allows participants the repetition of imagery that would make changes in self-referential beliefs more likely.

In summary, Covalt is definitely on the right path to be studying the effects of guided imagery on PASE. Admittedly, she did not get very convincing results, but she did argue convincingly that this may have been caused by methodological problems and not because of the lack of value of imagery.

Conclusions

Many studies have suggested that enhancing PASE increases academic motivation, academic achievement, cognitive skill usage, and lowers anxiety. There are three reasons to believe imagery can successfully enhance PASE. First, imagery has a long and diverse history of use. Second, imagery as a form of persuasion has many benefits by combining the control and flexibility of nonenactive treatments with the sensory and perceptual experiences of active treatments. Thirdly, previous research indicates that imagery enhances PSE in nonacademic areas. Only one study did not find this relationship. Admittedly, the one study that directly studied the effect of guided
imagery exercises on PASE did not have positive results, but there is reason to believe that with more concrete and persistent imagery use, guided imagery could prove to be a valuable tool for students.

Imagery and Relaxation: Can They be Separated?

If it is reasonable to believe that imagery exercises will significantly increase PASE magnitude and strength, it may be more useful in this study to not only determine whether this is an intervention that can enhance PASE, but whether it can enhance PASE better than other treatments. Although many studies have demonstrated how PASE affects academic achievement, few have studied how to increase PASE. Relaxation training may constitute a credible alternative treatment to imagery. Relaxation training has been found to increase the PSE of participants with other than academic concerns and relaxation training has enhanced the academic achievements of postsecondary students. In one instance, this result came as a surprise to the researchers. Streim and O'Brien (1981) compared the effects of differing arousal levels in imagery techniques on achievement and anxiety in math anxious students. Participants were placed in one of two treatment groups: those who imagined difficult academic situations while exaggerating their anxiety and those trained to relax while imagining difficult academic situations. On average, participants in both groups showed equivalent increases in the numerical abilities section of the Differential Aptitude Test and equivalent decreases in the Math Anxiety Rating Scale. These increases were significantly higher than changes in scores in one of the control groups, the waiting list control group. Surprisingly, the participants in the
treatment groups did not improve more than a fourth group that learned to imagine neutral scenes and trained to become attuned to bodily sensations. This last, nonspecific intervention, which simply lowered physiological measures of arousal, was not to have any therapeutic effect; it was added as an "attention-placebo control." Nevertheless, it was as effective as treatments that focussed on covert rehearsal of mathematics while changing arousal. In fact, the Math Anxiety Rating scale scores dropped by almost a third in this "control" group. One explanation that may help explain why these "control" participants dramatically improved could be that generalized lowered arousal enhanced PASE. Bandura (1977) has pointed out that people do use arousal levels to assess efficacy. Some people perceive their anxiety to be a sign that they do not have the resources needed to deal successfully with their present challenges. When anxious, these people will experience a reduction in PSE. It seems that no research has been conducted to determine how common this form of estimating PSE is, although it is central to some therapeutic techniques (e.g., Morita). If it is common, then we would expect that generalized relaxation exercises, in and of themselves, would be sufficient to enhance PASE. Thus, it would be interesting to determine if relaxation and imagery are equally good at enhancing PASE.

Streim and O'Brien's (1981) study was not designed to, and did not, determine if PASE was increased. Even if they had included a PASE scale, the population chosen would make the results difficult to generalize. In those who self-identify themselves as math anxious that with which they believe they cannot cope is their anxiety. It would be an interesting test of Bandura's theories on how people assess their efficacy to determine
if those who do not identify their academic difficulties as an inability to cope with anxiety could benefit from generalized relaxation exercises.

Comparing relaxation exercises to guided imagery is also very appealing in that it helps pinpoint the reason for the improvements in PASE after the intervention. Typically, imagery exercises begin with relaxation exercises and many clinicians and theorists believe these are crucial to improving the vividness and control of the clients' imagery (e.g., Pope, 1987). However, this creates a confound that has plagued most research on the effects of imagery on PSE because it is difficult to determine if it is the imagery or the preceding relaxation exercise that enhances PSE. In this thesis, relaxation interventions were compared to an imagery intervention that used a relaxation introduction.

Selecting the Students who will Benefit from Imagery

There may be client characteristics that would allow the clinician to predict which students will most likely benefit from these interventions. Theorists and researchers over the past thirty years have suggested that two individual differences in participants' ability to evoke images may be important: vividness and control. Some theorists have emphasized that those who easily control their images may be the best candidates for imagery work (Sheikh, Sheikh, & Moleski, 1987), others have emphasized vividness, (Lazarus, 1964), still others the interaction of the two (Start & Richardson, 1964), and some believe these factors are irrelevant to the success of imagery interventions (Gawain, 1979).

The early research results on these topics were equally confusing and contradictory. Some researchers found vividness was correlated to success in
desensitization (Jones, 1971). Others found vividness to be unrelated to therapeutic effectiveness in desensitization (Davis, McLemore, & London, 1970; McLemore, 1972).

Some found the interaction between control and vividness correlated with successful performances (Start & Richardson, 1964); others did not (Jones, 1971). Over the past quarter of a century, researchers have come to some agreement, but certainly not a consensus (e.g., see Ahsen, 1986 for a contrary position), that these conflicting results may be attributable to problems with the discriminant validity of vividness and controllability measures (Moran, 1993). Tests of vividness and control are attempting to measure constructs that heavily overlap and which are interdependent. Factor analyses of controllability and vividness tests suggest that they share a great deal of variability. Moran (1993) believes that these terms cannot be conceptually or empirically distinguished.

However, when tests of vividness and controllability are seen as general aptitude tests, studies using these tests have proven to be valuable. Richardson (1988) stated that research using existing tests of imagery, with all their deficiencies, have supported that voluntarily produced vivid imagery, but not vague uncontrolled imagery, assists individuals in the voluntary change of affective states, in the modification of physiological responses, and improvement of perceptual motor skills (Richardson, 1988). Thus, screening with an imagery test may be of assistance in selecting which clients will respond to imagery-based treatment to enhance PASE. In this thesis, participants in both imagery and relaxation groups will be asked to complete an imagery test to determine the effects of "imagery aptitude."
Identifying the Postsecondary Students Most in Need

In theory, using guided imagery to change PASE is an intervention that can benefit students of all aptitude levels. In practice, the research on the PASE of postsecondary students has focused on the academically "typical" or the academically gifted student (see O'Brien, Brown, and Lent, 1989 for a listing of this research). One exception to this is O'Brien et al.'s study of students on academic probation because of low American College Test scores. They introduce their study by stating that previous research has revealed that self-efficacy beliefs serve a compensatory function that assists moderate aptitude students in performing at levels typically achieved by high aptitude students. However, they go on to state, it is important to determine whether such beliefs can assist the less proficient student. They found that the probation students' PSE in achieving necessary academic milestones (e.g., to complete the social sciences core requirements with a C or above) correlated significantly with their first semester GPAs. No other academic scores (American College Test or high school rank) or demographic states (race, sex, age, etc.) related significantly to GPA. Thus, there is tentative support for the theory that PSE can assist those most in need. However, it may well be that those most in need will find it most difficult to change their beliefs. They have had the largest amount of prior information to suggest their poor expectations are accurate. This may be most true of the academic low achiever, the population of interest in this thesis.

It may be worth emphasizing that the participants in this thesis self-identified themselves as low achievers. In particular, I asked for participants who believed that their
self-doubts hindered them from doing well at school. The methodology of this study was such that participants could not have completed the questionnaires or participated in the imagery if they had not self-identified self-doubts that were hindering them academically. Admittedly, the participants also completed two aptitude tests (Vocabulary from the WAIS-R and Raven's Standard Progressive Matrices) and they were asked to provide their previous and current school grades. These scores tentatively confirmed that the participants were not receiving the school marks that their peers were receiving, and, very tentatively, they were not receiving the school grades one would expect given their aptitude test results. However, it was the students' belief that they were low achievers, not the results on a formal aptitude/achievement discrepancy model that determined inclusion in this study.

Aptitude/achievement discrepancy models have limited utility with postsecondary students partially because of the specialized nature of postsecondary classes. This specialization typically takes three forms. First, postsecondary students have fewer breadth requirements. For instance, math phobic English majors may excel at university despite poor scores on academic achievement tests. Second, professors do not have curriculum guidelines that require the assessment of basic academic skills. For example, a student who did poorly on the writing portion of an academic achievement test may perform well in a class given by a professor who marks only on “content.” Third, postsecondary classes may themselves be more specialized than most secondary classes. Two other reasons for the problems in the aptitude/achievement model in postsecondary schools are the lack of norms beyond grade 12 on many formal academic achievement
tests and the lack of variability between postsecondary students on aptitude tests (Thorndike & Hagen, 1977). Thus, self-identified low achieving students were chosen as the participants for this study. Partially, this was done because participants had to identify themselves as low achieving or it would have been impossible to measure their self-doubt or give interventions to change their self-doubt. More important, formal aptitude/achievement discrepancy models have serious validity problems when dealing with postsecondary students (some researchers such as Stanovich, 1991 and Siegel, 1989 would argue discrepancy models have fatal validity problems for any age group), thus, making the use of such formal models difficult to defend.

Summary

In summary, this thesis has four purposes. The first is to study whether postsecondary students self-identified as low achievers that have been given imagery exercises to do at home will have greater increases in their PASE than those who were not asked to engage in any exercises to enhance PASE or those who engage in relaxation exercises. The second purpose of this study is to determine whether self-identified low achieving postsecondary students asked to use imagery exercises have greater increases in their study skills (including effort-related activities, cognitive skill usage, and goal orientation) than those asked to use relaxation exercises or not requested to engage in exercises to enhance PASE. The third purpose is to determine if self-identified low achieving postsecondary students asked to engage in imagery exercises have greater increases in their grades than those asked to use relaxation exercises or not asked to
engage in exercises to enhance PASE. The third purpose is to determine whether participants who have an aptitude for imagery will also be best able to enhance their PASE by means of guided imagery. The three purposes will be operationalized in the following six ways:

**Hypotheses**

Hypothesis #1: Postexperimental perceived academic self-efficacy strength scores corrected for preexperimental scores in the imagery group will be significantly larger than the postexperimental perceived academic self-efficacy strength scores corrected for preexperimental scores in the comparison group and the relaxation group.

Hypothesis #2: Pre- to postexperimental changes in perceived academic self-efficacy magnitude scores in the imagery group will be significantly larger than the changes in the pre- to postexperimental perceived academic self-efficacy magnitude scores in the comparison group and the relaxation group.

Hypothesis #3: Postexperimental self-reported study skills scores corrected for preexperimental scores in the imagery group will be significantly larger than the postexperimental study skill scores corrected for preexperimental scores in the comparison group and the relaxation group.

Hypothesis #4: Postexperimental perceived academic self-efficacy strength scores corrected for preexperimental scores in the high aptitude imagery group will be larger than postexperimental perceived efficacy strength scores corrected for preexperimental scores in the low aptitude imagery group.
Hypothesis #5: Changes in the pre- to postexperimental perceived academic self-efficacy magnitude scores in the high aptitude imagery group will be significantly larger than the pre- to postexperimental changes in the magnitude scores in the low imagery group.

Hypothesis #6: Postexperimental perceived academic self-efficacy magnitude scores corrected for preexperimental scores in the relaxation group, will be significantly larger than corrected postexperimental scores in the comparison and significantly smaller than corrected postexperimental perceived academic self-efficacy magnitude scores in the imagery group.
Method

Participants

Participants were recruited from undergraduate classes at a university in a large Canadian city and from community college courses offered in a mid-sized Canadian centre of 68,000. When speaking in these classes, I asked for participants who believed that they had unrealistically negative beliefs about their academic abilities and that these beliefs resulted in their underachieving academically. The three experimental conditions (imagery, relaxation, and comparison) were randomly assigned by class.

Of the 104 participants, 25 were male and 79 were female. They ranged in age from 17 to 49 with a median age of 20.00 (M = 23.97, SD = 7.81, N = 104). Participants were primarily first-year students (n = 62, 59.6%), and the majority were enrolled in colleges of arts and science (either in university or community college) (n = 77, 74.04%). These arts and science students had very diverse majors; those who had indicated their major (n = 41) came from 20 different departments. Other colleges and programs the participants enrolled in included special students (e.g., upgrading, transitional year, and special students) (n = 5, 4.81%), human service programs (e.g., law & security and social service worker) (n = 4, 3.85%), business (n = 3, 2.88%), and engineering (n = 3, 2.88%) programs. The remainder of the participants were from the "undecided" and "other" categories. The majority of participants were university students with 92 (88.5%) participants enrolled in university and 12 (11.5%) enrolled in community college.
In terms of socioeconomic status, the participants came from homes with a median income of $21,000 to $30,000 (n = 15, 14.4%). However, the participants had considerable diversity in their socioeconomic status. A quarter (n = 27, 25.9%) came from homes with an income of $20,000 or less, and 31.7% (n = 33) came from homes with incomes of more than $40,000. In practical terms, this included several students who tried to fit their studies around working full-time in low paying jobs such as waitressing in bars or restaurants or working in very small family owned businesses. Two participants who spoke of having considerable problems with time management and exhaustion were single mothers with very small children. Both of these participants had low incomes that excluded the hiring of nannies or sitters. On the other end of the spectrum were people whose parents or partners had secured very high paying jobs and were paying for all of the participants’ educational and home expenses.

Of these 104 participants, 71 (68.27%) completed the program. The relaxation group had a 40.00% drop out rate with 27 out of 45 participants completing the program. The imagery group had a 20.69% drop out rate with 23 out of 29 completing the program. The control group had a 30.00% drop out rate with 21 out of 30 completing the program. There was not a significant difference between treatment groups on drop out rates ($\chi^2[2, N = 104] = 3.09, p = .213$). Similarly, there was no difference between those who completed the program and those who did not in terms of their socioeconomic status (K-S Z = .284, p = 1.000), past average ($t[94] = .91, p = .367$), or age ($t = [70.07] = -.214, p = .036$). See Table 1 for means and standard deviations. Finally, there was no significant
difference between completers and noncompleters in terms of sex ($\chi^2[1, N = 104] = 2.09, p = .148$). Twenty-five men volunteered for the program with five dropping out; 79 women volunteered for the program with 28 dropping out. The proportion of men to women who volunteered for this project does not reflect the general student body of the schools at which they studied. In the university setting, where most of the participants were enrolled, 55.80% of the full-time undergraduate students were female (Kelly, 1998). In the community college, 50.00% of the student body were female (B. Marges, personal communication, December 4, 2000). Conversely, 75.96% of those who volunteered for this project were women. This over-representation of females may better reflect the makeup of the clientele of the counselling and study skills centres in Canadian postsecondary schools where approximately 75% of the clientele are female (B. Sveinson, personal communication, December 4, 2000).

Of those who completed the program, many had taken previous workshops to help them become more effective students. For instance, 20 (28.2%) of the participants had taken a study skills workshop, 15 (21.1%) had taken a relaxation training workshop, 12 (16.9%) had taken a test taking workshop, and 5 (7.0%) had previously taken an imagery workshop.
Table 1

Comparison of Participants who Completed the Program with Drop-Outs

| Demographics | Completers | | | Completers | | | Completers | | | Completers |
|--------------|------------|---|---|------------|---|---|------------|---|---|------------|---|---|------------|
| Age          | 24.47      | 7.75 | 66 | 21.85      | 5.72 | 27 |           |   |   |           |   |   |           |
| Income⁶      | 3.53       | 1.40 | 66 | 3.48       | 1.48 | 27 |           |   |   |           |   |   |           |
| Past average | 73.21      | 9.78 | 66 | 74.91      | 7.93 | 27 |           |   |   |           |   |   |           |

*71 participants completed the program. However, only 66 submitted completed Background Questionnaires. Typically, this was because older participants could not remember past averages. One exception to this was a young first year university student living with her parents who could not estimate her family's income.

⁶The figures for income are based on the following scale: 1 = incomes < $10,000 annually, 2 = $10,000 to $20,000, 3 = $21,000 to $30,000, 4 = $31,000 to $40,000, 5 = > $40,000.

All the students had self-identified themselves as low achieving. No standardized achievement test scores were available to confirm this at the time of recruitment. There were some data to indicate that the university participants had aptitude scores similar to those of other university students and marks somewhat lower than their peers. Gregory
(1987) estimated that incoming university students would have IQs of approximately 113
(81%-ile). Similarly, the mean age-scaled WAIS-R Vocabulary score of the university
sample was in the >75%-ile range \( \bar{M} = 12.39, SD = 2.21, n = 59 \). Their mean Raven's
Standard Progressive Matrices (SPM) score was well into the grade two (≥ 75%-ile but <
95%-ile) or "Definitely above average" range \( \bar{M} = 2.52, SD = .72, n = 60 \).

Some of the school grades the university participants achieved during their last
year of academic study were lower than would be expected of students at this university.
Amongst university student participants whose past program was high school, their mean
grade was 79.06\% (SD = 8.90, n = 24). However, at this university the entering grade
average of full-time students registered in the first-year level of first-entry undergraduate
programs who applied from secondary school or CEGEP was 85.3\% (Kelly, 1998). Those
university participants who were able to provide university grades (typically those who
participated during the summer months) as their last academic program had a mean grade
of 69.05\% (SD = 9.08, n = 31). This university did not calculate overall first year
averages. However, a researcher for the department of arts and science at this university
suggested that the participants' university marks would be similar to the first year marks
for previous years in his department. These first year arts and science marks typically
ranged from 68.0% to 69.5\% (G. Artling, personal communication, June 14, 2000).

The community college sample had a different profile. There was some
information to indicate that their aptitude scores were higher than their peers, but their
marks were very similar to their peers. The community college participants had a mean
WAIS-R Vocab. score in the average range ($M = 9.83, SD = 2.12, n = 12$) and Raven's Standard Progressive Matrices (SPM) score in the grade three or "intellectually average" range (>25%-ile but <75%-ile; $M = 3.36, SD = .50, n = 11$). Tentatively, this seems higher than would be expected of this population. Recently (1999), this community college had started collecting General Aptitude Test Battery (GATB) scores from its students. The first data available, from a mean of the GATB General learning, Verbal, and Numerical sections standard scores earned by their law and justice program students, indicated that the mean score would be in the slightly below average range ($GATB = 87.39; L. Hage, personal communication, June 27, 2000$).

The mean school grades for those community college participants whose program was high school was 70% ($SD = 6.95, n = 8$). These school grades were not different from the average high school grades for this college. The reported first semester grades for students enrolled full-time in this college was only 69%, almost exactly the grade for these participants (M. Hubble, personal communication, September 2, 1999).

Two different counsellors met with the participants, thus controlling for the effects of meeting with a counsellor with a particular personality or manner. Both counsellors were doctoral students in applied psychology programs.
Measures

Background Questionnaire

The Background Questionnaire (Appendix A) elicited information about the participants' age, sex, academic program, past GPA, social-economic status, and whether they had ever been assessed for academic or cognitive problems.

The Learning and Study Strategies Inventory (LASSI)

Using the LASSI, the participants rated statements about their study skills. The LASSI (Weinstein, Schulte, & Palmer, 1987) is a norm-referenced, self-report questionnaire used in this study to compare the participants' responses to the normative responses of American university students. It consists of 77 statements that refer to the participants' study skills and attitudes. These skills and attitudes are divided into ten scales: a) Attitude, b) Motivation, c) Time Management, d) Anxiety, e) Concentration, f) Information Processing, g) Selecting Main Ideas, h) Support Aids, i) Self-Testing, and j) Test Taking Strategies. The participants received a percentile score for each of these categories but no overall score.

Weinstein (1987) reported in the manual that the coefficient alphas ranged from .68 to .86 with a median reliability of .81. Test-retest reliability was assessed for a three-week interval with values ranging from .72 to .85. The median test-retest reliability was .795 (Weinstein, 1987).

Studies with at-risk community college and at-risk university students show that the norms of the LASSI can be expanded to include these students as well as regular
university students (Deming, Valeri-Gold, & Idleman, 1994; Nist, Mealy, Simpson, & Kroc, 1990).

Factor analyses of this scale indicate that the LASSI measures three student factors: Effort-Related Activities, Goal Orientation, and Cognitive Activities (Olejnik & Nist, 1992). These factors were used in this study. To receive an estimate of the Effort-Related Activities factor one sums the raw scores for the Motivation, Time Management, and Concentration scales. Thus, through this factor one examines the degree participants persist even when their studies are dull or difficult, the degree they overcome procrastination, and the degree they focused as opposed to letting their minds wander when studying. The estimate of the Goal Orientation factor is the sum of the raw scores for the Anxiety, Test Strategies, and Selecting Main Ideas scales. Thus, through the Goal Orientation factor one examines the degree to which the participants have immediate, very short-term goals during an exam, lecture, or study session. It includes such statements as, "I try to identify the main points when I listen to lectures," or more negatively, "I do poorly on tests because I find it hard to plan my work within a short period of study" (Weinstein, Palmer, & Schulte, 1987, pp. 2-3). This factor does not examine whether the participants have general goals about completing a degree or becoming qualified for an ideal job. Finally, the estimate of the Cognitive Activities factor is the sum of the raw scores for the Information Processing, Study Aids, and Self-Testing scales. Cognitive Activities is an estimate of metacognitive skill usage and includes such statements as, "I try to find relationships between what I am learning and
what I already know,” and “I translate what I am studying into my own words” (Weinstein, Palmer, & Schulte, 1987, pp. 2-3). The tenth scale, Attitude, had relatively consistent and low loadings on all three factors. Therefore, Olejnik and Nist did not include it in their factors, and it was not used in the main analyses for this thesis. One reason for the use of the factor scores in this study was that the internal consistency reliabilities for the LASSI in this study were good for the factor scores. These scores ranged from $\alpha = .772$ for pretreatment LASSI Goal Orientation to $\alpha = .877$ for posttreatment LASSI Goal Orientation. Conversely, the internal consistency reliabilities for scale scores of this administration of the LASSI were extremely variable ranging from $\alpha = .223$ for posttreatment Support Techniques to $\alpha = .902$ for posttreatment Anxiety (see Table 2 for internal consistency reliability scores for LASSI scales and factors).

**Questionnaire on Imagery Control (QIC)**

The QIC (Lane, 1976) measures the participants' ability to manipulate their mental images. For instance, in this questionnaire, respondents are asked to imagine the sound of a thunder storm with heavy rain, wind, and thunder. Next, the participants are asked to change the image to, "The gentle patter of rain as the storm dies down" (Lane, 1976, p.99). The QIC contains seven different subscales, a subscale for each sense modality.

The reliability and validity that Lane (1976) reports for the QIC are good for the total score, but considerably lower for the subtest scores. The coefficient alpha for the total score was .85. The coefficient alphas for the subscales are as follows: Visual, .50; Auditory, .53; Cutaneous, .46; Kinaesthetic, .57; Gustatory, .56; Olfactory, .64; and
Table 2

**Internal Consistency Reliabilities for the LASSI Factor and Scale Scores (alphas)**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>.812</td>
<td>.902</td>
</tr>
<tr>
<td>Attitude</td>
<td>.674</td>
<td>.418</td>
</tr>
<tr>
<td>Concentration</td>
<td>.615</td>
<td>.500</td>
</tr>
<tr>
<td>Information processing</td>
<td>.818</td>
<td>.892</td>
</tr>
<tr>
<td>Motivation</td>
<td>.526</td>
<td>.882</td>
</tr>
<tr>
<td>Self-testing</td>
<td>.536</td>
<td>.826</td>
</tr>
<tr>
<td>Selecting main ideas</td>
<td>.713</td>
<td>.826</td>
</tr>
<tr>
<td>Support techniques</td>
<td>.510</td>
<td>.223</td>
</tr>
<tr>
<td>Test taking strategies</td>
<td>.434</td>
<td>.644</td>
</tr>
<tr>
<td>Time management</td>
<td>.859</td>
<td>.632</td>
</tr>
</tbody>
</table>

**Factors**

<table>
<thead>
<tr>
<th></th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort-related activities</td>
<td>.818</td>
<td>.812</td>
</tr>
<tr>
<td>Goal orientation</td>
<td>.772</td>
<td>.877</td>
</tr>
<tr>
<td>Cognitive activities</td>
<td>.797</td>
<td>.808</td>
</tr>
</tbody>
</table>

*Note.* \(N = 71\) for all scales and factors both pre- and posttreatment.

Feeling States, .53. Component factor analysis of modality scores yielded one factor. Loadings ranged from .76 for the Cutaneous modality (e.g., "The feel of a scratchy wool sweater next to your skin," p. 99) to .59 for the Gustatory modality ("You are eating a rich
milk chocolate bar," p. 100). In light of the above, only the total QIC score was used in this thesis. In this study, the total QIC score internal consistency reliability was $\alpha = .77$.

The QIC has moderate concurrent validity. This test has been given concurrently with two other popular tests of imagery control: the Gordon Test of Visual Imagery Control (Gordon, 1949) and the revised form of the Betts Questionnaire Upon Mental Imagery (Sheelan, 1967). The intercorrelations were all significant (QIC and Gordon .53; QIC and Betts .57; Gordon and Betts .47). Nonetheless, important differences exist between the tests. The QIC is superior to the Gordon in having scores that are more widely distributed than those on the Gordon test. The Gordon's low ceiling provides little discrimination among normal participants who generally score near the maximum on the test (Richardson, 1972). The QIC is similar to the revised Betts in that it examines more modalities than just the visual, but whereas the QIC has an imagery control emphasis, the Betts has an imagery vividness emphasis. A copy of the QIC and Lane's written permission for me to use, reproduce, and/or adapt the QIC can be found in Appendix B.

**Task Specific Self-Efficacy Scale (TSSE)**

An adaptation of the procedure Bandura, Adams, and Beyer's (1977) used to estimate PSE amongst individuals with snake phobias was used to measure PASE in this study (Appendix C). To complete this scale, the respondents write out up to five different behavioural scenarios of increasing difficulty related to their self-limiting beliefs. The most difficult scenario depicts the target behaviour in which the respondents desire to engage. For instance, a person who procrastinated when assigned readings wrote as her
easiest scenario reading three pages of university text an evening. The second scenario was reading six pages an evening; the third, 12 pages; and the fourth, 20 pages. The fifth scenario was her target or desired behaviour of reading half a chapter of university text a night.

When the behavioural scenarios are completed, the respondents are asked to check those behaviours they believe that they can presently perform. For each task that they check, they are asked to rate the strength of their efficacy belief on a 100-point scale. On this scale, 10 indicates high uncertainty. Fifty indicates moderate certainty. One hundred indicates complete certitude. In the above example, the participant only checked the first (easiest) scenario. She rated this scenario a 40, i.e., she was somewhat certain that she could read three pages of university text a night. This scale provides the user with two scores. The first, PSE magnitude, is the number of behaviours with a value of 10 and above. The second, PSE strength, is the averaged number of values (Bandura, Adams, & Beyer, 1977). TSSE test-retest reliability ranges from $r = .70$ to $r = .99$ (Feltz & Riessinger, 1990). In this study, the internal consistency reliability at pretreatment for the TSSE was $\alpha = .948$. At posttreatment, the internal consistency reliability was $\alpha = .949$.

The scoring of the TSSE was slightly adapted for this study such that the magnitude and strength scores were only based on the target (or hardest) behavioural scenarios. The reasoning for this was that for academic tasks often the participant accurately believed that unless they mastered their target behaviour they would not be successful in their studies.
Raven's Standard Progressive Matrices (SPM)

The SPM is a 60-item, untimed test of reasoning ability based on figural test stimuli. The test measures the ability to form comparisons, to reason by analogy, and to organize spatial perceptions into related wholes (Sattler, 1992). Raven designed this test to be a test of eductive mental activity. Eductive mental activity involves creating new information from what is already known. In this test, respondents educe relationships (J. C. Raven, J. H. Court, & J. Raven, 1996). In the more difficult questions in the SPM, the respondents are given a series of designs with one design missing. The participants have to decide how the given designs are related to one another to decide correctly what the missing design should be.

As one of the most commonly used aptitude tests, the SPM has had extensive standardization (J. C. Raven, J. H. Court, & J. Raven, 1996). It has excellent reliability, especially in terms of item consistency. In the US standardization, the correlations between the item difficulties established separately for different ethnic groups (African-American, Anglo, Hispanic, Asian, and Navajo) ranged from .97 to 1.00. The correlations between the item difficulties established separately in the UK, US, East and West Germany, New Zealand, and Chinese standardizations ranged from .98 to 1.00. The test is robust, measuring the same thing in a wide range of cultural, socioeconomic, and ethnic groups despite the sometimes large variation in mean scores between these groups, especially differences between groups that differ in socioeconomic status.
The majority of the split-half internal consistency coefficients reported in the literature exceeded .90, having a modal value of .91 (J.C. Raven, J. H. Court, and J. Raven). The intervals between test and retest in studies of test-retest reliability range from 1 week to 3 years. Short intervals of approximately 1 week have reliabilities around .90. Longer intervals of several months have reliabilities around .80 (J. C. Raven, J. H. Court, & J. Raven, 1996).

The SPM has extremely good construct validity and acceptable concurrent and predictive validity. Factorial construct validity is the greatest strength of the SPM. For sixty years, the SPM has been considered one of the best measures of "g" or "general intellectual functioning" available. Studies with children and adults with English and non-English participants have all found high loadings in the .80s and .90s with "g" (J.C. Raven, J. H. Court, & J. Raven, 1996).

Concurrent validity for the SPM is acceptable. For English-speaking children and adolescents, reliable correlations of the SPM with the Binet and Wechsler Scales typically range from .54 to .86 (J. C. Raven, J. H. Court, & J. Raven, 1996). The one concurrent validity Canadian study quoted in the manual did receive slightly higher scores. Rogers and Holmes (1987) demonstrated SPM and WISC-R correlations between .83 - .92 in a stratified sample of Canadian 7 to 11 year old children. Concurrent validity for adults is similar to slightly stronger in magnitude and pattern to those for children (e.g., Burke & Bingham, 1966, r = .85; 1969, r = .75; Sheppard et al., 1968, r = .88). In this study, the internal consistency reliability was very low (α = .185). The scores on the Raven's in this
study were clustered very close to the ceiling, and this lack of variability accounted largely for the lack of reliability found in this study for the Raven's.

The State-Trait Anxiety Inventory - State Scale (STAI)

The State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1968) is the most widely used measure of anxiety having been used in thousands of studies (Chaplin, 1984). It is divided into two sections: the State scale and the Trait scale. The STAI Trait scale has difficulties with construct validity as it does not discriminate well between anxiety and general psychopathology. Conversely, the STAI State scale (called SAI or State Anxiety Inventory hereafter) has good construct validity and good internal consistency with coefficient alphas ranging from .86 to .95. In this study, the internal consistency reliability at pretreatment was $\alpha = .885$ and at posttreatment it was $\alpha = .938$. Only the SAI was used in this study. The SAI is a self-administered, 20-item scale that takes less than 5 minutes to complete.

Imagery and Relaxation Diaries

The Imagery Diary and Relaxation Diary are logs in which the participants were asked to record the frequency of their use of the imagery and relaxation exercises and the vividness and controllability of their imagery. There were two questions related to controllability, "How often did you find yourself imagining irrelevant or tangential material?" and "How often were you troubled by intrusive, negative images?" The participants were also given a space to jot down any concerns they might have. The diaries allowed me to determine if the relaxation and imagery groups were similar in the
frequency of their use of the interventions and if they differed in their imagery experiences. Appendix D contains a copy of the instructions and the first page of the Imagery Diary and Relaxation Diary. The Imagery Diary and Relaxation Diary are very similar. The only major difference is the examples used in the description of tangential and intrusive images. In the Imagery Diary, the examples involve academic imagery, such as imaging giving in-class presentations and doing mathematics problems. In the Relaxation Diary, the imagery examples involve imaging relaxing, safe places.

**Vocabulary subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R)**

The Vocabulary subtest of the WAIS-R is very often used as a quick test of verbal aptitude. There is strong and multifaceted support for interpreting Vocabulary in this way. Factor Analyses of the WAIS-R have indicated that this subtest contributes substantially to the Verbal Comprehension factor (Mdn loading = .83) of the WAIS-R. Vocabulary also correlated very highly with the overall Verbal subscale of the WAIS-R ($r = .85$) (Sattler, 1992). It is also the most reliable subtest in the WAIS-R ($r = .96$). Performance on the Vocabulary subtest tends to be stable over time (Sattler, 1992). In this study, the internal consistency reliability was $\alpha = .719$.

When examining many different scholastic aptitude tests in an attempt to find a good predictor of university achievement for Ontario high school students, researchers discovered that the Vocabulary subtest of the WAIS correlated much higher with first year university grades than any scholastic aptitude test used in Canada (Khan & Richard, 1971). The Vocabulary subtest actually correlates slightly higher with first year university
marks ($r = .46$) and with high school rank at graduation ($r = .65$) than did the WAIS full scale IQ ($r = .44$; $r = .62$ respectively) (Conry & Plant, 1965).

The Vocabulary subtest contains 35 words arranged in order of increasing difficulty. Each word is presented orally and in writing and the respondents are asked to explain aloud its meaning.

**Procedures**

Outline of the Five Treatment Sessions

Summaries of the elements found in each session in which the participants attended are listed in Tables 3 through 7. Initially, the participants were randomly assigned by class to one of three treatment conditions.

**Session #1.** As can be seen in Table 3, the general format of session #1 was the same for all three groups. Typically, participants met in small groups of three to five participants. During the first session, the participants were asked to read a summary of the project (Appendix E). The comparison group summary of the project differed slightly from the imagery and relaxation groups in stating that there would be three, 1 hour meetings instead of five. The imagery and relaxation summaries were introduced with the sentence, “This project is designed to explore how people can use their own imagination to help them be more successful at school.” The comparison group summary was introduced with the line, “This project is designed to explore how people can be more
Table 3
Session Outline for Experimental and Comparison Groups

Session #1

<table>
<thead>
<tr>
<th>Imagery</th>
<th>Relaxation</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants read general summary of the program</td>
<td>Participants read general summary of the program</td>
<td>Participants read general summary of the program</td>
</tr>
<tr>
<td>Researcher gave the oral description and rationale of the Imagery program</td>
<td>Researcher gave the oral description and rationale of the Relaxation program</td>
<td>Researcher gave the oral description and rationale of the Comparison program</td>
</tr>
<tr>
<td>Participants completed informed consent forms</td>
<td>Participants completed informed consent forms</td>
<td>Participants completed informed consent forms</td>
</tr>
<tr>
<td>Participants identified and behaviourally defined academic self-doubt</td>
<td>Participants identified and behaviourally defined academic self-doubt</td>
<td>Participants identified and academic self-doubt</td>
</tr>
<tr>
<td>Participants complete pretest questionnaires including: the TSSE, the Background Questionnaire and the STAI</td>
<td>Participants complete pretest questionnaires including: the TSSE, the Background Questionnaire and the STAI</td>
<td>Participants complete pretest questionnaires including: the TSSE, the Background Questionnaire and the STAI</td>
</tr>
</tbody>
</table>

Note. Bolded procedures are procedures that differ across groups. Procedures in a regular typeface are procedures completed by participants in all three groups.
successful at school.” The researcher next gave the description and rationale for the group to which the participants had been assigned (Appendix F), participants filled-out consent forms (Appendix G), identified hindering beliefs, and filled-out pretest questionnaires.

The majority of the first 1 hour session was needed for the participants to identify and operationalize the academic self-doubts that they believed were most disruptive to their education and to complete the accompanying TSSE Scale. In two of the small groups in which the participants met, two sessions were needed to do this task as opposed to the one originally planned. As can be seen in Table 4, the description and rationales of the experimental groups varied between groups.

Discussion of hindering beliefs would, at times, result in a discussion of study skills. In all three treatment groups, questions about study skills were answered openly. Thus, in all groups, participants gained useful knowledge about how to study postsecondary level material. For at least two participants (one in the relaxation group and one in the comparison group), this information about study skills had a significant impact. For example, the participant in the comparison group relied heavily on memorization. She would copy word for word very large segments of her text into her notes and then would proceed to memorize the material word for word. Suggesting she try selecting main ideas and put them into her own words shifted her emphasis to understanding the text.

Session #2. As can be seen in Table 5, in the second session the imagery and relaxation groups received a guided imagery exercise. Notice that the imagery and
Table 4
The Description and Rationale of the Programs given to Participants

<table>
<thead>
<tr>
<th></th>
<th>Imagery</th>
<th>Relaxation</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program described as five, 1 hour meetings that involve identifying hindering beliefs, learning an imagery technique, and receiving feedback on study skills and academic aptitudes</td>
<td>Program described as five, 1 hour meetings that involve identifying hindering beliefs, learning a relaxation technique, and receiving feedback on study skills and academic aptitudes</td>
<td>Program described as three, 1 hour meetings involve identifying hindering beliefs and receiving feedback on study skills and academic aptitudes.</td>
<td></td>
</tr>
<tr>
<td>Academic self-doubt disrupts academic performance emphasized</td>
<td>Academic self-doubt disrupts academic performance by increasing anxiety emphasized</td>
<td>Academic self-doubt disrupts academic performance emphasized</td>
<td></td>
</tr>
<tr>
<td>The effectiveness of imagery exercises countering academic self-doubt emphasized</td>
<td>The effectiveness of relaxation exercises to counter the harmful effects (anxiety) of academic self-doubt emphasized</td>
<td>The effectiveness of concretely and specifically identifying self-doubt in determining whether academic self-doubts are reasonable or remediable emphasized</td>
<td></td>
</tr>
</tbody>
</table>

Note. Bolded procedures are procedures that differ across groups. Procedures in a regular typeface are procedures completed by participants in all three groups.
relaxation procedures were similar, differing in only two ways. First, the relaxation technique included a passive muscle relaxation component. In this component, the participants focused their attention on major areas in their bodies (feet and calves first, then upper legs, etc.) and then loosened and relaxed the muscles in those areas. The imagery technique did not include this component, but rather it included a component where the participants were asked to imagine as convincingly as possible their successfully engaging in the academic behaviour in which they had doubts. The overlap between these two techniques was to ensure that it was not the relaxation component of the imagery exercise that was responsible for changes in the dependent variables. Also notice, that the relaxation group was encouraged to practice their technique slightly more frequently than the imagery group. Because the rationale behind the relaxation group was symptom management, it made sense to encourage these participants to use their technique during exams and presentations. Transcripts of the exercises are found in Appendix H. A relaxation tape was played in the background when the guided exercises were done. The relaxation tape used was Oriental Sunrise by Riley Lee (1982). The comparison group completed the SPM and WAIS-R Vocab. during the second session.

Sessions #3, #4, and #5. As seen in Table 6, the third session was the final meeting for the comparison group. They completed the posttest questionnaires and were debriefed. The relaxation and imagery participants, during the third session, were initially asked for information on their experiences with the imagery or relaxation techniques. If
<table>
<thead>
<tr>
<th>Session Outline for Experimental and Comparison Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session #2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Imagery</th>
<th>Relaxation</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants completed LASSI</td>
<td>Participants completed LASSI</td>
<td>Participants completed LASSI</td>
</tr>
<tr>
<td>Imagery Procedures</td>
<td>Relaxation Procedures</td>
<td>Participants completed SPM and WAIS-R Vocab</td>
</tr>
<tr>
<td>- diaphragmatic breathing</td>
<td>- diaphragmatic breathing</td>
<td></td>
</tr>
<tr>
<td>- deepening (auto-suggestion)</td>
<td>- deepening (auto-suggestion)</td>
<td></td>
</tr>
<tr>
<td>- creating a sanctuary</td>
<td>- creating a sanctuary</td>
<td></td>
</tr>
<tr>
<td>- imagining the difficult behaviour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participants received the Imagery Diary and audiotapes of the imagery procedure</td>
<td>Participants received the Imagery Diary and audiotapes of the relaxation procedure</td>
<td></td>
</tr>
<tr>
<td>Participants encouraged to practice technique up to five times a week</td>
<td>Participants encouraged to practice technique up to five times a week</td>
<td></td>
</tr>
<tr>
<td>and before or during stressful events</td>
<td>and before or during stressful events</td>
<td></td>
</tr>
<tr>
<td>Participants completed the TSSE Scale</td>
<td>Participants completed the TSSE Scale</td>
<td>Participants completed the TSSE Scale</td>
</tr>
</tbody>
</table>

*Note. Bolded procedures are procedures that differ across groups. Procedures in a regular typeface are procedures completed by participants in all three groups.*
individuals were experiencing difficulties with these techniques, these problems would be discussed in the group. The researcher or other group members would often offer support and suggestions on how to deal with these issues. The description in Table 7 of sessions #4 and #5 is self-explanatory. In these sessions, participants completed the QIC, LASSI, STAI, and TSSE; received feedback on their study skills and academic aptitudes; and were debriefed.

**Integrity Checks**

All sessions were audio taped and a random sample of 30% of the tapes were rated by two individuals unaware of the hypotheses of the study. To be considered a valid delivery of the program, both raters had to agree that the description of the program, the explanation of the interventions, and the instructions for the standardized tests were conducted as described. To assess the audiotapes these individuals were given a checklist that contained statements or elements that were to be covered in the sessions (See Appendix I for checklists). For instance, an element from the first session for all groups was, "Ask the participants to jot down as concretely as possible the belief that is hindering them academically." In the second session, an element searched for in the relaxation and imagery groups was, "Introduce deep breathing at the beginning of the relaxation exercise." An element for all groups when introducing the SPM was, "Every page of the (SPM) test booklet has a pattern with a piece missing." The assessors were asked to check each statement that was covered in the audio taped session. To be considered valid, the session could be missing no more than one element.
There was 97.74% (130/133) agreement between assessors on their decisions whether an element was covered or not. When the assessors disagreed whether an elements was present or not, it tended to be because of stylistic differences in the presentation. For instance, one statement was, "We have to break our goals down into reasonable chunks, creating a hierarchy of goals." During one session, the counsellor stated, "We have to work up to our goals; create a hierarchy of goals." One assessor believed this was straying too much from the original statement. Over 20 sessions, the assessors searched for 133 elements that were to be included; 128 elements they agreed were clearly present on the audiotapes. Thus, 96.24% of the time the necessary elements were present. No more than one element was missing from any session.
Table 6
Session Outline for Experimental and Comparison Groups

Session #3

<table>
<thead>
<tr>
<th>Imagery</th>
<th>Relaxation</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discussion of Imagery Exercises</strong></td>
<td><strong>Discussion of Relaxation Exercises</strong></td>
<td>Participants completed posttest questionnaires including: LASSI, STAI, TSSE</td>
</tr>
<tr>
<td>Participants completed the SPM, WAIS-R Vocab., and TSSE</td>
<td>Participants completed the SPM, WAIS-R Vocab., and TSSE</td>
<td>Researcher gave participants feedback on study skills and academic aptitudes and gave suggestions on how to improve participants study skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Debriefing</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Offer to teach relaxation or imagery techniques</strong></td>
</tr>
</tbody>
</table>

**Note.** Bolded procedures are procedures that differ across groups. Procedures in a regular typeface are procedures completed by participants in all three groups.
Table 7
Session Outline for Experimental and Comparison Groups

Sessions # 4 & 5

<table>
<thead>
<tr>
<th></th>
<th>Imagery</th>
<th>Relaxation</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session #4</strong></td>
<td><strong>Discussion of Imagery experiences</strong></td>
<td><strong>Discussion of Relaxation experiences</strong></td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>completed QIC and TSSE Scale</td>
<td>Participants completed QIC and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSSE</td>
<td></td>
</tr>
<tr>
<td><strong>Session #5</strong></td>
<td>Participants complete posttest</td>
<td>Participants complete posttest</td>
<td></td>
</tr>
<tr>
<td>questionnaires</td>
<td></td>
<td>questionnaires including: LASSI,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STAI, and TSSE</td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>gave participants feedback on study</td>
<td>Researcher gave participants feedback</td>
<td></td>
</tr>
<tr>
<td></td>
<td>skills and academic aptitudes, and</td>
<td>on study skills and academic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>gave suggestions on how to improve</td>
<td>aptitudes, and gave suggestions on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>participants study skills</td>
<td>how to improve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Debriefing</td>
<td>Debriefing</td>
<td></td>
</tr>
</tbody>
</table>

Note. Bolded procedures are procedures that differ across groups. Procedures in regular typeface are procedures completed by participants in all three groups.
Results

Comparison of Pretreatment Scores

Five separate univariate ANOVAs were conducted on pretreatment scores to determine if the treatment groups differed significantly on the dependent variables before treatment. No correction for alpha slippage was made in this instance to ensure that no pretreatment differences remained undetected. As detailed below, two significant differences were found. For the dependent variables that had significant between treatment differences, Bonferroni pairwise comparisons were conducted to identify which treatment groups differed significantly from the others. The pretreatment scores can be seen in Tables 8 through 15.

There were no significant pretreatment differences between treatment groups on two LASSI factors (cognitive activities $F[2, 70] = 0.27, p = .765$; effort-related activities $F[2, 70] = 0.570, p = .568$). However, significant differences were found between treatment groups on pretreatment TSSE strength scores ($F[2, 70] = 4.08, p = .021$) and on LASSI goal orientation scores ($F[2, 70] = 3.55, p = .034$). On the pretreatment TSSE strength scores, a significant difference existed between the imagery group and the comparison group (See Table 8 for mean TSSE scores by treatment groups), and with pretreatment LASSI goal orientation scores, a significant difference existed between the imagery group and the comparison group (See Table 10 for mean LASSI goal orientation scores by treatment group). In addition to the univariate ANOVAs discussed in the
previous sentences, a Pearson chi-square was conducted on the dichotomous pretreatment TSSE magnitude scores. No significant pretreatment differences existed on this variable ($\chi^2[2, N = 71] = 4.42, p = .110$). To summarize, the treatment groups were similar at pretreatment. Out of six dependent measures, treatment groups at pretreatment differed on two dependent variables: TSSE strength and LASSI goal orientation. In any case, these pretreatment differences were taken into account somewhat in the analyses performed to test for treatment effects. In those analyses posttest scores were corrected by pretest scores.

Two other analyses were conducted to rule out pretreatment differences. A $t$-test was conducted to determine if the participants, when divided into two groups according to imagery aptitude, differed on TSSE strength. A Pearson chi-square was conducted to determine if imagery ability groups differed in TSSE magnitude. No significant differences were found (TSSE strength $t[46] = 0.40, p = .692$; TSSE magnitude $\chi^2[1, N = 48] = 0.36, p = .551$).

The Effects of the Treatments on TSSE Strength and LASSI Factors

A multivariate repeated measures design ($1 \times 4$; treatment $\times 3$ LASSI factor scores and the TSSE strength scores repeating pre- to posttreatment) was used to determine if there were any significant pretreatment-corrected posttreatment score differences among the treatment groups. Pillai's Trace was used as the test statistic. Once it had been determined that there were significant multivariate differences, univariate analyses of variances (ANOVAs) were computed to identify the dependent variables for which there
were significant treatment effects. For the dependent variables for which there were significant between treatment differences, Helmert contrasts were used to identify the treatment groups that differed significantly from the others. The $t$ tests used in the Helmert contrasts were all one-tailed.

Significant multivariate differences existed between treatment groups ($F[8, 132] = .343, p = .001; \eta^2 = .171$). Treatment groups differed in mean TSSE strength ($F[2, 68] = 12.08, p < .001; \eta^2 = .262$) with the imagery group having significantly higher pretreatment-corrected posttreatment scores than had the relaxation group on TSSE strength ($t[5.25] = 2.42, p = .009$). The comparison group had significantly lower pretreatment-corrected posttreatment TSSE strength scores than the combined TSSE strength scores of the two treatment groups (i.e., imagery and relaxation groups) ($t[4.81] = -4.38, p < .001$) (see Table 8 for mean TSSE strength scores by treatment group). The treatment groups did not differ significantly on pretreatment-corrected posttreatment effort-related activities ($F[2,68] = 0.05, p = .945; \eta^2 = .001$) goal orientation ($F[2, 68] = 0.64, p = .528; \eta^2 = .019$) or cognitive activities ($F[2, 68] = 0.33, p = .718; \eta^2 = .009$) (see Tables 9, 10 and 11 for mean LASSI effort-related activities, goal orientation, and cognitive activities scores by treatment group.)
Table 8
Mean Task Specific Self-Efficacy Strength Scores by Treatment Group

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretreatment M</th>
<th>SD</th>
<th>n</th>
<th>Posttreatment M</th>
<th>SD</th>
<th>n</th>
<th>Change M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery</td>
<td>16.09</td>
<td>22.31</td>
<td>23</td>
<td>58.26</td>
<td>27.41</td>
<td>23</td>
<td>42.17</td>
<td>28.11</td>
<td>23</td>
</tr>
<tr>
<td>Relaxation</td>
<td>29.63</td>
<td>25.76</td>
<td>27</td>
<td>53.48</td>
<td>30.31</td>
<td>27</td>
<td>23.85</td>
<td>29.26</td>
<td>27</td>
</tr>
<tr>
<td>Comparison</td>
<td>37.14</td>
<td>26.53</td>
<td>21</td>
<td>40.04</td>
<td>28.68</td>
<td>21</td>
<td>3.33</td>
<td>18.80</td>
<td>21</td>
</tr>
</tbody>
</table>

Table 9
Mean Learning and Studies Strategies Inventory—Effort-Related Factor Scores by Treatment Group

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretreatment M</th>
<th>SD</th>
<th>n</th>
<th>Posttreatment M</th>
<th>SD</th>
<th>n</th>
<th>Change M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery</td>
<td>80.13</td>
<td>13.44</td>
<td>23</td>
<td>84.13</td>
<td>16.49</td>
<td>23</td>
<td>4.00</td>
<td>13.75</td>
<td>23</td>
</tr>
<tr>
<td>Relaxation</td>
<td>75.07</td>
<td>19.85</td>
<td>27</td>
<td>78.11</td>
<td>22.81</td>
<td>27</td>
<td>3.04</td>
<td>9.26</td>
<td>27</td>
</tr>
<tr>
<td>Comparison</td>
<td>75.62</td>
<td>19.38</td>
<td>21</td>
<td>78.95</td>
<td>19.82</td>
<td>21</td>
<td>3.33</td>
<td>5.83</td>
<td>21</td>
</tr>
</tbody>
</table>
Table 10

Mean Learning and Study Strategies Inventory—Goal Orientation Factor Scores by Treatment Group

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery</td>
<td>M = 70.57</td>
<td>SD = 12.07</td>
<td>n = 23</td>
</tr>
<tr>
<td>Relaxation</td>
<td>M = 61.07</td>
<td>SD = 10.47</td>
<td>n = 27</td>
</tr>
<tr>
<td>Comparison</td>
<td>M = 65.57</td>
<td>SD = 15.30</td>
<td>n = 21</td>
</tr>
</tbody>
</table>

Table 11

Mean Learning and Study Strategies Inventory—Cognitive Activities Factor Scores by Treatment Group

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imagery</td>
<td>M = 68.78</td>
<td>SD = 11.91</td>
<td>n = 23</td>
</tr>
<tr>
<td>Relaxation</td>
<td>M = 70.85</td>
<td>SD = 14.89</td>
<td>n = 27</td>
</tr>
<tr>
<td>Comparison</td>
<td>M = 71.57</td>
<td>SD = 12.07</td>
<td>n = 21</td>
</tr>
</tbody>
</table>
The Effects of the Treatments on TSSE Magnitude

In addition to TSSE strength and LASSI factors, I was interested in whether TSSE magnitude was affected by the treatments. However, it could not be included in the initial repeated-measures design. TSSE magnitude is dichotomous; the repeated-measures analysis can only be used with continuous variables. Therefore, a Pearson chi-square test was used to determine if treatment groups differed in terms of changes in TSSE magnitude. Repeated t-tests were used to determine which groups differed significantly from each other.

Bandura (Bandura & Adams, 1977; Bandura, Adams, & Beyer, 1977) originally set the cutoff for TSSE magnitude at scores greater than 10. If participants achieved a score of greater than 10 on the TSSE scale, they were believed to have achieved PSE magnitude (i.e., they believed they could cope with the task). If they rated themselves as 10 or lower, they were believed not to possess PSE magnitude (i.e., they did not believe they could cope with the task). In this study, the TSSE cutoff score was set at 20 rather than 10 to avoid ceiling effects. Several participants began the study with TSSE scores above 10, thus making it impossible for them to gain magnitude during the course of the study. This increase in the cutoff point was not considered a meaningful theoretical change in the analyses: At both scores of 10 or 20, the participants were rating themselves as barely believing they could cope with their academic tasks. However, an analysis based on Bandura’s original cutoff score of 10 was also computed and can be found in Appendix J.
As detailed there, the results were similar to the results obtained using the higher cutoff point.

Increases in the magnitude of the participants' TSSE scores differed according to treatment group ($\chi^2[2, N = 71] = 13.79, p = .001; \eta = .441$), with the increases in the magnitude of the imagery group participants being significantly higher than increases in the TSSE magnitude scores of the comparison group ($t[30.46] = 4.47, p < .001$). In the imagery group, only 30.43% began the study with PASE magnitude. At the end of the study, 82.61% achieved PASE magnitude. Conversely, 61.9% of the participants in the comparison group started already having PASE magnitude. By the end of the study, only the same 61.90% of participants had achieved PASE magnitude. The relaxation group magnitude change scores were significantly higher than those of the comparison group ($t[38.14] = 2.75, p = .005$). In the relaxation group, 48.15% started the program with PASE magnitude. By the end of the program, 74.07% had achieved PASE magnitude (see Table 12 for group percentages).

**The Effects of Imagery Ability on TSSE**

The effects of the participants' imagery ability on pretreatment-corrected posttreatment TSSE strength scores and changes in TSSE magnitude were analyzed by splitting the relaxation and imagery participants into high and low imagery ability groups. The mean Lane's QIC score was 111.13 ($SD = 14.41, N = 48$). Those participants above 111.13 were placed in the high imagery group; those below were placed in the low imagery group. Once the two groups had been created, a two-way ANCOVA was used to
Table 12
Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude
by Treatment Group

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>True</td>
<td>30.43%</td>
<td>82.61%</td>
</tr>
<tr>
<td>Relaxation</td>
<td>48.15%</td>
<td>74.07%</td>
</tr>
<tr>
<td>Comparison</td>
<td>61.90%</td>
<td>61.90%</td>
</tr>
</tbody>
</table>

To determine if there was a treatment by imagery ability interaction and whether the imagery ability groups differed on TSSE strength pretreatment-corrected posttreatment scores, a Pearson chi-square test was used to determine if imagery ability groups differed on TSSE magnitude.

There was no significant interaction between treatment groups and imagery ability for TSSE strength ($F[1, 46] = 1.80, p = .187$; eta square $= .042$). Furthermore, the high-imagery-ability groups did not have significantly higher TSSE strength pretreatment-corrected posttreatment scores ($F[1, 46] = .72, p = .401$; eta square $= .019$). However, the high imagery ability group experienced greater gains in TSSE magnitude ($\chi^2 [1, N = 48] = 4.15, p = .042$; eta $= .294$). See Tables 13 and 14 for mean TSSE strength scores and the percentage of participants who achieved TSSE magnitude by imagery ability.
Table 13

<table>
<thead>
<tr>
<th>Task Specific Self-Efficacy Strength Scores by Imagery Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>High Ability</td>
</tr>
<tr>
<td>Low Ability</td>
</tr>
</tbody>
</table>

Note: The imagery ability of the comparison group was not assessed.

Table 14

<table>
<thead>
<tr>
<th>Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Imagery Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>High Ability</td>
</tr>
<tr>
<td>Low Ability</td>
</tr>
</tbody>
</table>

Note: The imagery ability of the comparison group was not assessed.

Subsidiary Analyses

Counsellor effects. Four subsidiary analyses were conducted. In the first analysis, the participants were split into two groups according to the counsellor who provided the intervention. A Pearson chi-square test was used to determine if counsellor groups differed on TSSE magnitude. A multivariate repeated measures design (1 x 4; counsellor
x 3 LASSI factor scores and the TSSE strength score repeating pre- to posttreatment) was used to determine if the two groups varied in their LASSI study skills or TSSE strength pretreatment-corrected posttreatment scores. Pillai’s Trace was used as a test statistic.

There were no significant differences in TSSE magnitude ($\chi^2[1, N = 71] = .657, p = .417; \eta = .096$), TSSE Strength, or LASSI factors ($F[4, 66] = .65; p = .667; \eta^2 = .040$) between participants who received the intervention from different counsellors. See Tables 15 through 19 for means, percentages, and standard deviations.

Note, however, that the groups seen by the two counsellors had unequal sample sizes. Thus, more exploration of counsellor effects in future studies could conceivably reveal differences despite the nonsignificant finding in this thesis.

Table 15
Mean Task Specific Self-Efficacy Strength Scores by Counsellor

<table>
<thead>
<tr>
<th>Counsellor</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Counsellor 1</td>
<td>28.75</td>
<td>25.79</td>
<td>64</td>
</tr>
<tr>
<td>Counsellor 2</td>
<td>15.71</td>
<td>26.99</td>
<td>7</td>
</tr>
</tbody>
</table>
Table 16
Mean Learning and Study Strategies Inventory—Effort-Related Activities Factor Scores by Counsellor

<table>
<thead>
<tr>
<th>Counsellor</th>
<th>Pretreatment M</th>
<th>SD</th>
<th>n</th>
<th>Posttreatment M</th>
<th>SD</th>
<th>n</th>
<th>Change M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counsellor 1</td>
<td>77.77</td>
<td>17.37</td>
<td>64</td>
<td>81.06</td>
<td>20.09</td>
<td>64</td>
<td>3.30</td>
<td>10.18</td>
<td>64</td>
</tr>
<tr>
<td>Counsellor 2</td>
<td>68.71</td>
<td>20.69</td>
<td>7</td>
<td>73.43</td>
<td>18.54</td>
<td>7</td>
<td>4.71</td>
<td>9.52</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 17
Mean Learning and Study Strategies Inventory—Goal Orientation Factor Scores by Counsellor

<table>
<thead>
<tr>
<th>Counsellor</th>
<th>Pretreatment M</th>
<th>SD</th>
<th>n</th>
<th>Posttreatment M</th>
<th>SD</th>
<th>n</th>
<th>Change M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counsellor 1</td>
<td>65.47</td>
<td>13.01</td>
<td>64</td>
<td>69.64</td>
<td>15.28</td>
<td>64</td>
<td>4.17</td>
<td>11.11</td>
<td>64</td>
</tr>
<tr>
<td>Counsellor 2</td>
<td>65.57</td>
<td>14.06</td>
<td>7</td>
<td>71.29</td>
<td>7.59</td>
<td>7</td>
<td>5.71</td>
<td>10.90</td>
<td>7</td>
</tr>
</tbody>
</table>
Table 18

Mean Learning and Study Strategies Inventory—Cognitive Activities Factor Scores by Counselor

<table>
<thead>
<tr>
<th>Counselor</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Counsellor 1</td>
<td>69.95</td>
<td>12.96</td>
<td>64</td>
</tr>
<tr>
<td>Counsellor 2</td>
<td>74.29</td>
<td>13.21</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 19

Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Counselor

<table>
<thead>
<tr>
<th>Counselor</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>b</td>
</tr>
<tr>
<td>Counsellor 1</td>
<td>48.44%</td>
<td>64</td>
</tr>
<tr>
<td>Counsellor 2</td>
<td>28.57%</td>
<td>7</td>
</tr>
</tbody>
</table>

Effects of the sex of the participants. There was a disproportionate number of women in the sample used for this study. To ensure this did not effect the results by the treatments having a different effect on men and women, two subsidiary analyses were
conducted. In the first analysis, a Pearson chi-square test was used to determine if men and women differed on TSSE magnitude. In the second, a multivariate repeated measures design (2 x 4; sex and treatment x 3 LASSI factor scores and the TSSE strength score repeating pre- to posttreatment) was used to determine if men and women varied in their LASSI study skills or TSSE strength pretreatment-corrected posttreatment scores. Pillai's Trace was used as a test statistic. Men and women did not significantly differ in terms of their change in TSSE magnitude ($\chi^2[1, N = 71] = .333, p = .564; \eta = .069$). There was no significant sex by treatment interaction ($F[8, 124] = .066, p = .834; \eta^2 = .033$), and there was no significant difference between men and women's pretreatment-corrected posttreatment TSSE Strength and LASSI factor scores ($F[4, 69] = .040, p = .642; \eta^2 = .040$). See Tables 20 through 25 for means, percentages, and standard deviations.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>32.5</td>
<td>28.95</td>
<td>20</td>
</tr>
<tr>
<td>Female</td>
<td>25.86</td>
<td>24.94</td>
<td>51</td>
</tr>
</tbody>
</table>
### Table 21
Mean Learning and Study Strategies Inventory—Effort-Related Activities Factor Scores by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>74.90</td>
<td>15.40</td>
<td>20</td>
</tr>
<tr>
<td>Female</td>
<td>77.02</td>
<td>18.34</td>
<td>51</td>
</tr>
</tbody>
</table>

### Table 22
Mean Learning and Study Strategies Inventory—Goal Orientation Factor Scores by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>67.95</td>
<td>10.53</td>
<td>20</td>
</tr>
<tr>
<td>Female</td>
<td>64.34</td>
<td>13.93</td>
<td>51</td>
</tr>
</tbody>
</table>
Table 23
Mean Learning and Study Strategies Inventory—Cognitive Activities Factor Scores by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>71.40</td>
<td>12.07</td>
<td>20</td>
</tr>
<tr>
<td>Female</td>
<td>69.88</td>
<td>13.5</td>
<td>51</td>
</tr>
</tbody>
</table>

Table 24
Percentage of Participants who Achieved Task Specific Self-Efficacy Magnitude by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>n</td>
</tr>
<tr>
<td>Male</td>
<td>55.00%</td>
<td>20</td>
</tr>
<tr>
<td>Female</td>
<td>43.14%</td>
<td>51</td>
</tr>
</tbody>
</table>

Imagery diaries. The second subsidiary analysis was conducted on the data from the imagery diaries. A t test was carried out to determine if the imagery and relaxation groups differed in terms of how frequently the participants performed their respective
exercises. Three \( t \) tests were executed to determine whether the relaxation and imagery groups differed in the number of irrelevant images they experienced, the negative, intrusive images they experienced, or whether they differed in the vividness of their imagery. These \( t \) tests were two-tailed because no hypotheses had been formulated to suggest a predicted outcome. Because the analyses were not hypotheses driven and there was a repeating of tests, the probability level was set at .013 (.05 divided by the number of \( t \) tests).

There were 31 diaries returned: 17 out of 23 from the imagery participants and 14 out of 27 from the relaxation participants. The treatment groups did not differ significantly in the number of times they performed their respective (imagery or relaxation) exercises during the course of the program (\( t(29) = 1.89, p = .069 \)). The imagery participants, on average, used their technique 16.88 times (SD = 6.19, \( n = 17 \)); on average, the relaxation participants used their technique 12.64 times (SD = 6.25, \( n = 14 \)).

When asked to rate their imagery experiences on a seven-point Likert scale (with higher numbers associated with more positive experiences), participants occasionally found themselves imagining irrelevant or tangential material (\( M = 4.69, SD = 1.60, N = 468 \)), occasionally found themselves troubled by intrusive negative images (\( M = 5.25, SD = 1.47, N = 468 \)), and had somewhat vivid images (\( M = 5.11, SD = 1.43, N = 461 \)). The individual group means and standard deviations on these three imagery experience variables are found in Table 20. There were no significant differences between treatment
groups in irrelevant images ($t(466) = -0.84, p = 0.399$), negative images ($t(350.49) = -0.79, p = 0.428$), or vividness ($t(410.45) = 1.96, p = 0.051$).

The effects of the treatments on state anxiety. In the third subsidiary analysis, a one-way ANCOVA was used to determine if the treatment groups differed significantly on the SAI. Because of the problem of probability pyramiding in posthoc analyses, the more conservative Bonferroni pairwise-comparison technique was used to analyze between treatment group differences on the SAI (Lomax, 1992).

Table 25

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Irrelevant</th>
<th>Negative</th>
<th>Vividness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Imagery</td>
<td>4.64</td>
<td>1.58</td>
<td>283</td>
</tr>
<tr>
<td>Relaxation</td>
<td>4.73</td>
<td>1.66</td>
<td>178</td>
</tr>
</tbody>
</table>

Note: Scores could range from 1 through 7.

Pretreatment-corrected posttreatment SAI scores did differ according to treatment group ($F(2, 63) = 5.92, p = .004$; eta square = .155), with the imagery group experiencing significantly greater reductions in their anxiety than the comparison group. The relaxation
group was not significantly different from the other groups (see Table 26 for the mean state anxiety scores by treatment group).

**Alternative Analyses**

The initial repeated-measures design is one of several possible ways of dealing with the omnibus test. Although I believe this is the best analysis of the current data, four alternative analyses were also computed. First, I reanalyzed treatment group differences using Bandura's original cutoff point of TSSE 10. Although this allows for a better comparison to some of Bandura's original research, it also allows for more problems with ceiling effects. Second, rather than using the 3 LASSI factors and TSSE strength, I conducted a repeated measures analysis using all 10 LASSI scales and TSSE strength as dependent variables. Although this may have given some additional information, it...
certainly was not a parsimonious analysis. Two additional analyses based on gain scores were conducted (one employing the 10 LASSI scales and TSSE strength and one based on the three LASSI factors and TSSE strength). These one-way MANOVAs (i.e., 1 x 11, treatment x 10 posttreatment minus pretreatment LASSI scores and posttreatment minus pretreatment TSSE strength scores) allowed for more numerous pairwise comparisons but also posed a higher risk of violating the assumptions of normality and did not deal adequately with pretreatment differences. The results of these analyses can be found in Appendices J, K, and L. Also in Appendix L are analyses based on the gain scores of the effects of imagery ability on TSSE strength.

As detailed in these appendices, the alternative analyses for TSSE magnitude, LASSI factors and LASSI scales scores and imagery ability resulted in results identical to those obtained using the analyses from the main body of this thesis.

Summary of Findings

To review some of the most notable findings that will be addressed in the Discussion section, the imagery group participants achieved significantly higher pretreatment-corrected posttreatment TSSE strength scores than the relaxation-group participants. The comparison group had significantly lower pretest-corrected posttreatment TSSE strength scores than the combined TSSE strength scores of the imagery and relaxation group. The imagery group also had significantly higher pretreatment-corrected posttreatment TSSE magnitude scores and significantly lower pretreatment-corrected posttreatment SAI scores than the comparison group. High-
imagery-ability participants experienced greater gains in TSSE magnitude than their low
imagery aptitude peers.
Discussion

In general, using guided imagery exercises assisted self-identified low achieving students and was of more assistance than using relaxation exercises alone. After treatment, the imagery participants in this study had higher PASE strength and had less generalized anxiety than the comparison group participants. The imagery participants also had significantly greater changes in PASE magnitude than did the comparison group. In addition, after treatment, imagery participants had significantly higher PASE strength than the relaxation participants. The relaxation participants did not do significantly better than the comparison group participants in terms of PASE magnitude, and, occasionally, the relaxation participants' scores were significantly lower than the imagery group participants. Finally, I found only tentative support that the participants' imagery ability was related to whether they benefitted from the guided imagery exercises. The high imagery ability participants had significantly higher PASE magnitude, but they did not have significantly higher pretreatment-corrected posttreatment PASE strength than the low imagery ability participants. These, and related results, are discussed in detail below.

The Effects of Imagery Exercises on PASE

Significantly more imagery participants went from not believing to believing that they would reach their academic goals (i.e., PASE magnitude) than did participants in the comparison group. At posttreatment, the guided-imagery participants also had more confidence in these positive beliefs (i.e., PASE strength) than either the comparison or the
relaxation participants. From these results, one can strongly endorse the use of imagery exercises to enhance the PASE of self-identified low achieving postsecondary students. These results extend previous research on guided imagery. In addition to all its previous uses, from enhancing sports performance (Martin & Hall, 1995) to increasing immune functioning (Achterberg, 1985), there is now initial evidence that guided imagery can also successfully be used to enhance the PASE of some students.

The Effects of Relaxation Exercises on PASE

These results give less support for the use of relaxation techniques to enhance PASE. I will argue below that, at best, relaxation techniques helped participants believe they could achieve their academic goals, but that relaxation participants did not have much faith in these beliefs.

The relaxation and imagery groups did not significantly differ from each other in PASE magnitude. In fact, had I used a more forgiving statistical test (i.e., not used a Bonferroni correction for alpha slippage) the relaxation group, like the imagery group, would have been found to have significantly higher PASE magnitude than the comparison group. In other words, using this more forgiving analysis, the imagery and relaxation techniques would have been considered to be equally effective in enhancing PASE magnitude. However, the relaxation-group participants clearly did not do as well as their imagery peers in terms of PASE strength, and this lack of confidence in their beliefs could result in any change in PASE magnitude being quickly reversed. As mentioned in the introduction, PASE strength is related to resiliency. Self-identified low achieving
students would (and did) occasionally receive negative feedback on their academic performance, and, thus, the resiliency of their beliefs in the face of bad news is important. Therefore, although somewhat useful, relaxation techniques would not be the technique of choice for most self-identified low achieving postsecondary students wanting to enhance their perceived efficacy.

Bandura (1995) has mentioned that people make assumptions about their PSE partially on the basis of their physiological arousal. For instance, when anxious, people may question their ability to cope. On the surface, the relatively good performance of the relaxation participants on PASE magnitude seems to provide the basis for my assertion that physiological arousal may have a small effect on PASE, but this would be unfounded. Counterintuitively, after treatment the relaxation participants did not self-report being more relaxed than the imagery group participants. In terms of the participants' general anxiety (see SAI scores) and academic anxiety (see LASSI Anxiety scale in alternative analyses), the imagery and relaxation groups were equally relaxed at posttreatment. Because there is not a clear comparison in the design between a more and a less relaxed group, and because some (i.e., those preferring the greater protection against alpha slippage) would argue that the relaxation participants did not significantly differ from the comparison participants on PASE magnitude, these results cannot be used to either support or contradict Bandura's assertion that people use physical states to assess their PSE.
The Effects of Imagery and Relaxation Exercises on Study Skills

The treatment groups did not significantly differ from each other in their study skills. Although participants did improve on their study skills, and typically the imagery group improved more than the other treatment groups, these changes were modest (3 to 6 raw scale points on scales where the maximum possible scores were 40 or less). This lack of significant results was somewhat surprising. There is no research on the effects of imagery on academic effort, but, as noted in the introduction, there is research that indicates that enhanced PASE increases effort (e.g., Schunk’s 1981, 1983 studies on children and long division). Nonetheless, in this thesis, the group with the best PASE had only marginally higher effort scores.

In the literature, there is less support for the dependent variables of cognitive factors and goal orientation. As mentioned in the Method section, these last two dependent variables measure aspects of metacognitive skill usage. There is no previous research on metacognitive skill usage and guided imagery. Thus, the use of imagery to enhance metacognitive skill usage is not supported. To speculate, one reason for this could be that metacognitive skills are better understood in terms of two variables: knowledge of metacognitive skills and use of metacognitive skills. There is anecdotal evidence to suggest that imagery did enhance the knowledge of metacognitive strategies of the participants. The client mentioned in the Introduction of this thesis (p.16) is a good example of this. This person decided to imagine reading his texts without becoming anxious and having negative intrusive thoughts about his abilities to succeed at school.
During the imagery exercise, he was able to recognize some of his own self-defeating behaviours that encouraged these intrusive thoughts and emotions. Without any prompting, he chose to imagine himself reducing his rate of reading and taking more notes in the margins of his text. In other words, through his imagery, he was able to develop metacognitive strategies that (if actually used) would allow him to be more effective. If imagery enhanced knowledge of metacognitive skills but not skill usage, there are two reasons why this would have probably gone undetected in this study. First, the study skills questionnaire used in this study, the LASSI, allowed researchers to measure skill usage not skill knowledge. Second, even if the LASSI included questions related to skill knowledge, there are reasons to believe that the participants in this study already had good knowledge of metacognitive skills, thus causing a ceiling effect. First, 28.2% of the participants had previously taken a study skills workshop, and, second, all participants had at pretreatment completed the LASSI which refers extensively to metacognitive skills. Despite the above and similar anecdotes, the speculation that imagery can increase the knowledge of metacognitive skills seems counter intuitive. If participants in this study had good knowledge of metacognitive skills, then there was a dramatic difference between knowledge and use of metacognitive skills, because the individual posttreatment LASSI scores that make up the cognitive factors variable were not close to ceiling (see alternative analysis). A dramatic difference between knowledge and practice may seem odd, but, in fact, probably existed. Many participants commented that there were large differences between what they knew about studying and their actual
practices. One participant in the relaxation group, in particular, after I gave her in-depth feedback on her posttreatment LASSI, gave me an unimpressed glance and stated she knew how to study; it was using what she knew that was difficult. In summary, the use of imagery and relaxation techniques did not enhance the use of metacognitive strategies. However, there is anecdotal evidence to suggest that imagery techniques may have affected knowledge of metacognitive strategies but not use of metacognitive strategies.

The lack of significant differences between groups on cognitive factors and goal orientation in this thesis does throw into question previous research that tentatively documented the ability of PASE to enhance metacognitive skills usage. In particular, the questions on the LASSI cognitive factors scales tap into the same sort of metacognitive skills that Pintrich and DeGroot (1990) measured in their Cognitive Strategies scale. Pintrich and DeGroot found that the students who had higher PASE and believed their studies had intrinsic value used more metacognitive techniques. Yet, in this thesis, the group with the highest PASE did not differ significantly from the comparison and relaxation group on a factor that included such metacognitive items as "I try to find relationships between what I am learning and what I already know," and "I translate what I am studying into my own words" (Weinstein, Palmer, & Schulte, 1987, pp. 2-3).

Neither Pintrich and DeGroot's study nor this thesis used designs that can be used to demonstrate the path of causality. For instance, in Pintrich and DeGroot's (1990) study, it is possible that believing in the intrinsic value of a topic, not PASE, encourages metacognitive skill usage. Unlike this thesis, Pintrich and DeGroot's study did not contain
any intervention, thus, making comments about causation is even more difficult in their study. In the case of their study, it also could be that if there is a causative effect, it is in the opposite direction, namely, those people who use more metacognitive techniques are more likely to have faith in their abilities. In the face of these ambiguities, the effect of PASE to enhance metacognitive skill usage has not been supported.

The Effects of Imagery Ability on PASE

The participants' ability to evoke controllable and vivid imagery did have a small effect on PASE. More participants with high imagery ability enhanced PASE magnitude than did participants with low imagery ability, but imagery ability groups did not differ in pretreatment-corrected posttreatment PASE strength. Although the group scores were ordered in the expected direction in terms of PASE strength, both imagery ability groups showed good gains. Superior imagery ability may not be a substantial benefit to students who want to use imagery to enhance their PASE.

To speculate, one possible reason for the lack of significant differences between imagery ability groups in PASE strength could be in the type of imagery used and the type of change desired in this study. It seems that using concrete imagery (i.e., imagining actual future events or difficult situations) as a strategy to allow participants to consciously change their attitudes and beliefs (e.g., PASE) does not require great imagery ability. Conversely, previous research (see Miller & Bower, 1993 summarized below) indicates that superior imagery ability may be needed when using symbolic or metaphorical imagery (e.g., imagining inner-guides or using hypnotic suggestions) to
change more automatic, less consciously controlled, mental events (e.g., perceived pain or cravings). Presently, difficulties exist in determining whether it is the technique (i.e., concrete or symbolic imagery) or the object of change (i.e., conscious or nonconscious) that demands the high imagery ability, because there is always a pairing of technique and goal in the successful interventions: symbolic with nonconscious and concrete with conscious. The converse is also true. Imagery as symbol or suggestion seems to be ineffective in changing conscious beliefs, and imagery as cognitive strategy may be ineffective in attempting to change automatic, nonconscious events. For example, the consciously chosen, concrete images used in this thesis did result in change in PASE and anxiety. However, Covalt (1996) was unsuccessful in enhancing PASE or lowering anxiety when she asked her participants to imagine symbols and inner-guides. Miller and Bower (1993) found the opposite results when trying to reduce perceived pain: suggestion was more effective than imagery as a coping strategy. These researchers compared stress inoculation (i.e., consciously using distraction and positive thinking to avoid pain) and hypnotic suggestion among high and low hypnotizable participants. They noted that among the high ability participants, the hypnotic suggestions were more effective than the stress inoculation in controlling pain even though, when using suggestion, the participants did not deliberately adopt strategies for coping with pain. In other words, they did not perceive their suggestions as a form of distraction or a form of attitude readjustment, they were simply given the suggestion that their arms would feel as if they were blocks of wood or stone and the perception of pain diminished. In fact, in the pain control literature
there is a well-established positive correlation between hypnotic ability and psychologically induced pain analgesia (e.g., $r^2 = .50$ in Hilgard & Hilgard, 1975). In summary, the type of imagery used in this thesis is concrete imagery to consciously change self-referential beliefs. Such imagery does not seem to require superior imagery ability. Therefore, any student who can understand the procedures and use them could benefit to some degree from this intervention.

**The Effect of Guided Imagery on Generalized Anxiety**

Imagery participants had lower overall pretreatment-corrected posttreatment anxiety than did participants in the comparison group. This is an interesting finding because the strength of both the concept of PASE and this particular imagery procedure is their specificity: Both focus exclusively on academics. It is not obvious that trying to enhance academic confidence (PASE) via imagery would in general make people more relaxed (i.e., they might continue to be worried over interpersonal difficulties, financial difficulties, etc.), and yet PASE and overall anxiety were related. To speculate, perhaps the reason that PASE is related to generalized anxiety is because beliefs about academic abilities are such an important part of students' self-concepts. Perhaps students find it impossible not to have confidence in their academic abilities and still feel calm.

Examining how a specific confidence (PASE) is related to generalized anxiety involves considering specificity in the opposite way as was done by early researchers who believed that if, in general, students had better self-concepts (i.e., thought better about their bodies, their friends, their families, etc.) then they would improve in academic specific domains.
(e.g., academic grades, academic anxiety, etc.). However, the results from research studying the value of attempting to enhance overall self-concepts in students were contradictory at best (See Dupont, 1986; Hansford & Hattie, 1982; and Lalonde, 1979 for comments on the contradictory nature of this research). The results from this study indicate that the above researchers may have had things backwards. Educators should help their students have more confidence in their academics. By doing so, educators will, in general, be helping to create calmer, more relaxed people.

As an area for future research, it would be very interesting to find out if the relationship between PASE and overall anxiety generalizes to younger students. Primary and secondary teachers are often called on to be life skills coaches, counsellors, and moral supports to the nonacademic parts of their students’ lives. The public may get more benefit from educators if they asked teachers to focus more narrowly, and to focus more closely on what they know best: academics. However, this finding that enhancing PASE in general lowers participants anxiety is a result that may not generalize well. It could well be that postsecondary students’ understanding of their value is based more on their success in school than is true of the typical primary or secondary student.

Threats to Research Validity

Issues in statistical conclusion validity. Statistical conclusion validity is concerned with the appropriate use of statistics to derive accurate conclusions (Parker, 1990). When significance is found, one must consider the possibility of a Type I error. The most common cause of Type I errors is probability pyramiding; however, there was protection
against probability pyramiding in this thesis. The analyses were typically hypothesis-driven (a priori) analyses for which probability pyramiding does not apply. (By definition, probability pyramiding occurs when researchers run statistical tests beyond those hypothesized in an attempt to find significant findings [Parker, 1990]). In the subsidiary analyses in this thesis, I used the Bonferroni correction of dividing the alpha level (.05) by the number of tests to set the probability level of subsidiary analyses at a more conservative level. In addition, when a statistical test was repeated several times, as in tests of PASE magnitude, even though the analyses were hypothesis-driven, the more conservative Bonferroni correction was used.

Not all findings were significant. For instance, for imagery ability, there were some nonsignificant findings, thus the possibility of a Type II error exists. In terms of statistical conclusion validity, there is a large number of things that can cause a Type II error. Two of these did emerge throughout the study, but they did not affect the analyses of imagery ability. For instance, one reason for erroneously believing that treatment groups are identical can be the random heterogeneity of the respondents. This can increase error variance and obscure real differences. Although in two areas in this study (TSSE strength and LASSI goal orientation), the groups were statistically different at pretreatment, this was not the case with imagery ability level. Similarly, a Type II error can occur when there are violations of assumptions such as unequal sample sizes. However, the analyses of imagery ability were the two analyses in which there were exactly the same number of participants in both treatment groups. Less positively,
nonsignificant findings also existed for the LASSI factors. There were differences in sample sizes in these analyses, and these may have contributed to the inability to find significant differences between treatment groups in study skill usage.

**Issues in construct validity.** The construct validity of a variable refers to whether the variable being studied is adequately defined and accurately measured by the instruments, procedures, manipulations, and methods employed in the study (Parker, 1990). In this study, I used multiple methods to measure the dependent variables which strengthened construct validity.

**Issues in internal validity.** Internal validity refers to the extent to which error variance is experimentally controlled (Parker, 1990). Difficulties with internal validity result in effects being caused by extraneous variables rather than by the treatment. The best technique for controlling for problems in internal validity is randomly assigning participants to treatment and control groups. This was only partially possible in this study for two reasons, one of which is relevant to internal validity (random assignment by class); one of which is relevant to external validity (volunteers within the class).

Random assignment by class as opposed to individuals was inevitable because of the slightly different introductory talks needed to recruit for the different treatment groups. In Appendix M is a copy of the request for volunteer talks given to classes for all three treatment groups. The requests only differ in one paragraph. Every attempt was made to draw treatment groups from similar classrooms, and a considerable amount of
demographic data was reported to assist the reader in determining how similar the groups were.

**Issues in external validity.** The results of this study can probably be generalized to other self-identified low achieving, female, university students who volunteer to be assisted with their academic problems. As is true of almost all intervention studies, the results cannot be generalized to nonvolunteers. In practical terms, this is not much of a concern. For instance, only “volunteers” generally come to counselling centres. Nonetheless, in at least one case, a professor suggested to me that an entire class should be given such an intervention. The value of such a practice has not been assessed.

Perhaps a comment about the relatively small number of community-college students and male students in my sample should also be made here. This makes generalization to these students tentative. It also brings up a research issue. Although I spoke to large assemblies of students at the community college, approximately half of which were male, a relatively few number of these students chose to participate. Future researchers may want to consider not only what techniques can most help these students, but also consider how to get more of these students interested in doing the extra work that is involved in these techniques.

**How this Study Informs Practice**

This research is relevant to the practice of counselling postsecondary students. Postsecondary counselling centres typically have relaxation programs for the nervous student. The results of this thesis indicate that making a very small change to these
relaxation exercises should result in postsecondary students having more PASE and less anxiety.

This research also has some relevancy to the lay population. Bookstores often carry a multitude of relaxation and imagery tapes. This research allows consumers to make a more informed decision. Given the option between the relaxation and the imagery tape, the imagery tape will probably be more helpful in reducing anxiety and enhancing PASE. However, there needs to be a caveat here. Imagery techniques range from imagining your inner master to imagining efficacious behaviour. In this study, I examined only one type of imagery technique, and, thus, the results do not indicate whether other types of imagery techniques are of more or less value.

Conclusions

Gaining a full understanding of how students can use imagery to enhance their studies is very important. At least in this one subpopulation of self-identified low-achieving postsecondary students, imagery was able to enhance PASE and reduce anxiety. Conversely, these research results indicated that PASE may not be the panacea previous researchers have suggested, and that I summarized in the introduction. Whereas past researchers argued that PASE may affect effort (Schunk, 1981, 1984; Lent, Brown, & Larking, 1984) and metacognitive skill usage (Pintrich & DeGroot, 1990), I did not find support for those conclusions in this study.

Finally, generalizing these results to other students is also of the utmost importance. A weakness of this thesis may be problems with generalizing the results to
other groups. I can say with some confidence that self-identified low achieving, female, university students receive substantial benefit from using imagery exercises to enhance their confidence. More weakly, there is some suggestion that it is effective with self-identified low achieving community-college students and male students. It would be of great interest to determine if what is true of these adults is also true of younger students. Despite these limitations, when considering the results of this study, I would suggest that imagery has considerable promise as an academic tool and that it has earned the right to be considered for future research.
References


Appendix A

ID # ___

Background Questionnaire

This questionnaire asks basic background questions to help us determine if the techniques we are studying work better for some people than others. This questionnaire is anonymous, so please do not write your name anywhere on the questionnaire. The number on the top of the questionnaire will be matched with the number on later questionnaires so your name will never be linked with this data.

1. What is your age? ___

2. What is your sex? ___

3. In what program are you presently enrolled? ________________

4. In what year are you in your program? ___
5. Have you taken any previous courses or workshops in any of the following?

  __ Study Skills
  __ Imagery
  __ Test taking strategies
  __ Relaxation Training

6. Have you ever been assessed because of suspected educational or learning problems?

  __ Yes
  __ No

  a) If yes, what were the results of this assessment?

     __ You were diagnosed as having a learning or developmental disability.
     __ The results of your assessment suggested that you did not have any
       disabilities that would disrupt your education.
     __ You do not remember the results of the assessment or choose not to disclose the results.
7. Based on the last year of your studies, approximately what is your average grade in school (in percents please)? ____

   a) In what program of study did you earn this grade? (Please mark one)

      ____ high school
      ____ college
      ____ university
      ____ other please specify __________________________
Wayne Schlapkohl
1519-30 Charles Street West
Toronto, Ontario, Canada
M4Y 1R5

Dear Mr. Schlapkohl:

Thank you for your interest in my Questionnaire on Imagery Control. You have my permission to use, reproduce, and/or adapt all or part of the questionnaire for use in your research.

Enclosed please find a copy of the 1977 article, the questionnaire items and instructions (scoring is by simple summation of ratings for modalities and of modality scores for the total score), and selected tables summarizing internal consistency and other correlational data. Questionnaire 9c was an early form of a research questionnaire developed by Auke Tellegen. I believe the current and probably published version is called the Differential Personality (or Experiences) Questionnaire. I don't have a reference handy, but I do know that the instrument was used in the Minnesota Twin Studies, which should help your search for a reference. The correlational data is the only sort of validity data available for the QIC.

I am surprised that no one has developed a more sophisticated instrument, but this may reflect the inherent difficulties in distinguishing vividness and control, as I discussed in the 1977 article. In retrospect I would develop a larger item pool and do more extensive pretesting of items and include external measures that were not dependent on self report.

You have my best wishes for your research and future endeavors.

Sincerely,

James B. Lane, Ph.D.
Director
Questionnaire on Imagery Control (Lane, 1976)

Instructions

This questionnaire is concerned with the ease with which you can control your imagery or imagination. For the purposes of this questionnaire, imagery means an experience that is like a sensation, perception, emotion or other feeling that occurs without any real, external cause. This experience is different from simply thinking about something. If you imagine that the sun is setting, you “see” it in your “mind’s eye.”

Some people find it quite easy to control their imagery, while for others it is quite difficult. For example, one person may be able to see in his mind’s eye a friend performing impossible gymnastic feats, while another may find that when he tries to recall the face of a friend, he has an image of another person. Both types of experience are normal and occur frequently.

Each item of this questionnaire consists of two parts. After reading the item, close your eyes and try to call to mind the image suggested by the first part of the item. When you have the first image clearly in your imagination, try to change it as suggested by the second part of the item. Next, rate the ease with which you were able to change the image. Be sure to refer to the accompanying Rating Scale.

Record your answers in the brackets provided. Just write the appropriate number after each item. If you find that you cannot produce any image at all for the first part of a
particular item, simply rate the item "0" and proceed to the next item. Try to rate each item independently of how you may have done on other items. Be sure to familiarize yourself with the different categories on the Rating Scale and to read the example before beginning the questionnaire. Refer to the Rating Scale provided on each page as you judge each item.

Rating Scale.

Unable to imagine the first part of the item. Rating 0
Unable to image the second part of the item. Rating 1
Able to change the image as suggested, but could not hold it steady in my imagination. Rating 2
Able to change the image as suggested and to hold it in my imagination with some effort. Rating 3
Able to change the image as suggested and to hold it in my imagination very naturally and easily. Rating 4

Example. Try to see the following scene with your mind's eye. Next change the image as suggested by the second part of the item. Consider the image carefully, paying attention to the visual aspect of it. Rate the ease with which you were able to produce the change and to hold the new image in your imagination, as specified in the Rating Scale.
An elephant walking in a circus parade.
The same elephant performing a trick, standing on its hind legs. ( )

If you were unable to see the elephant walking in the parade, you would rate the item "0." If you experience a fluctuating image of the elephant on his hind legs, you would rate the item "2," and so forth.

Now begin with the items below. Be sure to complete all items.

Try to see each of the following scenes with your mind's eye. Next, change the image as suggested by the second part of each item. Consider each item carefully, paying attention to the visual aspect of it. Rate the ease with which you were able to produce the change and to hold the new image in your imagination, as specified by the Rating Scale.

1. A close friend sitting in a chair.
The same friend now riding a bicycle. ( )

2. The Canadian flag.
The Canadian flag, now with no maple leaf. ( )

3. Watching a television screen that is very fuzzy and dim.
Seeing a bright sharp picture after adjusting the set. ( )
4. The sun shining in a cloudless sky.
   A dark cloud passing in front of the sun and hiding it.  

5. A blind man with his cane walking down a side walk.
   The same blind man walking the tightrope at the circus.  

Try to hear each of the following sounds with your mind’s ear. Next, change the image as suggested by the second part of the item. Consider each image carefully, paying attention to the sound-like aspect of it. Rate the ease with which you were able to produce and to hold the new image in your imagination, as specified in the Rating Scale.

   The singing is now accompanied by a piano.  

7. The sounds of a wooded scene, including birds and the wind.
   The wind dies down.  

8. The sound of a faucet dripping as you try to sleep.
   The gradual stopping of the sound when you turn off the tap.  

9. The sound of a thunder storm: heavy rain, wind, and thunder.
   The gentle patter of the rain as the storm dies down.  
10. A violinist playing in a large concert hall.
   He’s now playing on the beach, with surf and sea-birds in the background. 

   Try to feel each of the following sensations with your mind’s touch. Next change the image as suggested by the second part of each item. Consider each image carefully, paying attention to the touch-like aspect of it. Rate the ease with which you were able to produce the change and to hold it in your imagination as specified in the Rating Scale.

11. The texture of sand as you rub it between your fingers.
   The sand now wet. 

12. The feel of a light rain and gentle breeze on your skin.
   The breeze stops. 

13. The feel of brushing your hair gently with a fine, soft brush.
   Now you are brushing vigorously with a stiff brush. 

14. The feel of a scratchy wool sweater next to your skin.
   You take it off and replace it with a soft cotton one.
15. The feel of washing dishes in very hot water.

Suddenly your hand closes around an ice cube in the water ( )

Try to perform each of the following movements mentally. Next, change the
image as suggested by the second part of each item. Consider each item carefully, paying
attention to the movement-like aspect of it. Rate the ease with which you were able to
produce the change and to hold the new image in your imagination, as specified in the
Rating Scale.

16. You are jogging around a lake.

You come to a very steep hill and run up it ( )

17. You are speeding around a curve in an automobile.

The automobile is now going straight. ( )

18. You are coasting down a gentle hill on a bicycle.

The hill becomes much more steep and you speed up greatly. ( )

19. You are floating quietly on a rubber raft.

A large wave lifts the raft and sets it down again. ( )
20. You are riding up an escalator.
   The escalator malfunctions, and you are
   suddenly going backward.  

   Try to taste each of the following flavors with your mind's taste. Next change the
   image as suggested by the second part of each item. Consider each image carefully,
   paying attention to the flavor-like aspect of it. Rate the ease with which you were able to
   produce the change and to hold the new image in your imagination, as specified in the
   Rating Scale.

21. You are eating a rich milk chocolate bar.
   As you bite into the centre, the taste of peanut butter
   blends with the chocolate. 

22. The taste of coffee with cream and sugar.
   The taste of black coffee. 

23. The taste of a tender, juicy steak ruined by too much salt.
   The taste of the same steak with the right amount of salt. 

24. The taste of a raw onion.
   The taste of onion sauteed in butter. 

   ( )
25. The taste of the first bite into a Red Delicious apple.

You find that inside is a vanilla cream filling. ( )

Try to smell each of the following smells with your mind's nose. Next change the image as suggested by the second part of each item. Consider each image carefully, paying attention to the smell-like aspect of it. Rate the ease with which you were able to produce the change and to hold the new image in your imagination, as specified in the Rating Scale.

26. The rich smell of coffee brewing.

Add the smell of frying bacon. ( )

27. The smell of gasoline and exhaust fumes at a service station.

The smell of gasoline alone. ( )

28. The strong smell of household ammonia as you first open the bottle.

The fainter smell of ammonia used in solution to clean windows. ( )
29. The stale, musty smell of a long-closed room.
   The clean, fresh smell as you let in the night air by opening a window.  

30. The strong smell as you enter a freshly painted room.
   In the next room, the smell of peppermint is in the air.

Try to experience each of the following feelings in your imagination. Next, change the image as suggested by the second part of the item. Consider each image carefully, paying attention to the feeling aspect of it. Rate the ease with which you were able to produce the change and to hold the new image in your imagination, as specified in the Rating Scale.

   At the same time you feel full of energy.

32. Lying in a warm, snug bed, feeling very sleepy.
   Lying in the same bed, but now wide awake.
33. Feeling greatly elated at attaining an important goal.
   Feeling mildly self-satisfied at attaining a similar, but less important goal.

34. Feeling very thirsty.
   Feeling very satisfied after drinking your fill.

35. Feeling very much at peace and in love with the world.
   Hating someone intensely.
Appendix C

Date ________                  ID# ______

**Task Specific Self-Efficacy Scale**

Please write in the below spaces, five images of increasing difficulty related to the belief in your abilities that you desire to change.

1. __________________________________________
   __________________________________________
   __________________________________________

   Perceived efficacy strength ___

2. __________________________________________
   __________________________________________
   __________________________________________

   Perceived efficacy strength ___
3. ________________________________________________________________

Perceived efficacy strength __

4. ________________________________________________________________

Perceived efficacy strength __

5. ________________________________________________________________

Perceived efficacy strength __

If, at this time, you believe you can perform any of these tasks, please place a check mark beside the number. For those statements that you have checked, please describe how certain you are that you can perform these behaviours. Estimate your degree of certainty using the below scale.

10 20 30 40 50 60 70 80 90 100

Highly Somewhat Completely

Uncertain Uncertain Certain
Appendix D

Imagery and Relaxation Diaries

Imagery Diary

You have been asked to use your imagination as a tool to help you change your thinking. Part of what I am interested in is the facility you have with your imagination. In particular, I am interested in the degree to which your imagery is vivid, positive, and on topic. I am also interested in how frequently you do the exercises. What I recommend for this study is that you do the imagery exercises a minimum of once a day, five days a week, although you are certainly free to do the exercises more frequently than the minimum.

So that I may get an idea of how your imagery use is going, I will be asking that you fill out the relaxation diary. It should only take a few seconds to fill out.

Below, I have described in greater detail what information I desire in the imagery diary.

Question 1. **What is your identification number?** The number on the top of your imagery diary is your ID number. This allows me to match up your responses in the diary with your responses on the questionnaires you have done in person.

Question 2. **What day are you reporting on?** Typically this will be straightforward. This study lasts for 28 days, day number one being the day after your initial meeting with the researcher. There are sheets number 1 to 28 in your diary. The only time
this gets tricky is when you either do not do any imagery for a day or when you do imagery more than once a day.

**Fill in the questionnaire even on days you have not done any imagery.** On days you do not do any imagery please fill in the questionnaire anyway. Simply fill in the first three questions (ID number, day of the study, whether you used the technique or not). That way when I look over the diaries, I know which days participants have not used the technique as opposed to used the technique but just forgotten to fill in the questionnaire.

**Fill in the questionnaire every time you use the imagery exercises.**

For example, if you do the imagery exercises twice on day one, the first time you answer the questions call the day "day 1a," the second time call the day "day 1b."

**Question 3. Did you perform the imagery exercises today?** Self-explanatory.

**Question 4. How often did you find yourself imagining irrelevant or tangential material?**

**Question 5. How often were you troubled by intrusive, negative images?**

Question 4 and 5 are related. I am interested in the controllability of your imagery. It is possible that the controllability of your imagery can be divided into two categories. You can examine the extent to which you arbitrarily lose control of your images. This is the extent to which you find yourself drifting into unrelated images. Conversely, sometimes your fears or anxieties may cause your imagery to change in very specific and unwanted ways. These two distinctions will be discussed in greater length below.
Sometimes when you use imagery, you may find yourself losing your concentration and starting to think about or imaging irrelevant or tangential events. Maybe imagining doing mathematical problems will remind you of some high school experiences, and you find yourself day dreaming about this experience instead of doing your self-efficacy imagery. This type of lack of controllability is fairly common. When this happens just gently bring yourself back to your original imagery. By gently, I mean do not berate yourself for losing your train of thought. Don't try to force or push the other thoughts out of your mind. Simply replace them with your efficacy imagery.

Some people also find that there are times that their imagery is more negative than they wish. Their fears or negative beliefs become intrusive to the imagery. As an example, perhaps you are imagining speaking in class and your fears become intrusive. Without consciously directing your imagery to do so, you imagine yourself freezing in the presentation or stuttering. This type of loss of control of the imagery is more rare. Again, gently replace the intrusive images with your efficacy imagery. If you find this very difficult to do, it may help to remind yourself that the fantasy is under your control and then to consciously “replay” the scene with the more positive images. If the intrusive images continue you may wish to slowly change the negative imagery. For example, if you spontaneously imagine yourself becoming anxious and confused when reading textbook and you cannot seem to control these images, you may want to consciously imagine something which is easier for you to believe in. For instance, you may wish to imagine reading the textbook and getting confused but continuing to read and
understanding at least some of the materials. The next time you do the exercise again imagine being somewhat anxious, but understanding even more than previously. Conversely, you may want to simply imagine yourself reading a text that is at a simpler level. Please tell me about these experiences and we will work out a plan to get these intrusive images more under control.

**Question 6. How vivid were your images?** Vividness describes how real your imagery is to you. If your imagery is clear, distinct, vibrant, and strong, it is vivid. If it is almost like living the experience itself, it is vivid. Conversely, if you have difficulty seeing, hearing, or feeling events in your imagery, your imagery is vague.

**Question 7. Are there any concerns or problem on which you would like to be advised?** This is your opportunity to ask any questions you may have of the researcher.
Day 1

1. What is your identification number?  ____

2. What day are you reporting on? __

3. Did you perform the imagery exercises today?
   _ yes
   _ no

   If yes, answer the below questions.

4. How often did you find yourself imagining irrelevant or tangential material?

   1 2 3 4 5 6 7

   Frequently          Occasionally          Not at all
5. How often were you troubled by intrusive, negative images?

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<td></td>
<td>Frequent</td>
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6. How vivid were your images?

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<td></td>
<td>Not Vivid</td>
<td>Somewhat Vivid</td>
<td>Very Vivid</td>
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7. Are there any concerns or problems on which you would like to be advised? ________

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
Relaxation Diary

You have been asked to use your imagination as a tool to help you relax. Part of what I am interested in is the facility you have with your imagination. In particular, I am interested in the degree to which your imagery is vivid, positive, and on topic. I am also interested in how frequently you do the exercises. What I recommend for this study is that you do the imagery exercises a minimum of once a day, five days a week, although you are certainly free to do the exercises more frequently than the minimum.

So that I may get an idea of how your imagery use is going, I will be asking that you fill out the relaxation diary. It should only take a few seconds to fill out.

Below, I have described in greater detail what information I desire in the imagery diary.

Question 1. What is your identification number? The number on the top of your imagery diary is your ID number. This allows me to match up your responses in the diary with your responses on the questionnaires you have done in person.

Question 2. What day are you reporting on? Typically this will be straightforward. This study lasts for 28 days, day number one being the day after your initial meeting with the researcher. There are sheets numbered 1 to 28 in your diary. The only time this gets tricky is when you either do not do any imagery for a day or when you do imagery more than once a day.
Fill in the questionnaire even on days you have not done any imagery. On
days you do not do any imagery please fill in the questionnaire anyway. Simply fill in the
first three questions (ID number, day of the study, whether you used the technique or not).
That way when I look over the diaries, I know which days participants have not used the
technique as opposed to used the technique but just forgotten to fill in the questionnaire.

Fill in the questionnaire every time you use the imagery exercises.

For example, if you do the imagery exercises twice on day one, the first time you
answer the questions call the day "day 1a," the second time call the day "day 1b."

Question 3. Did you perform the imagery exercises today? Self-explanatory.

Question 4. How often did you find yourself imagining irrelevant or
tangential material?

Question 5. How often were you troubled by intrusive, negative images?

Question 4 and 5 are related. I am interested in the controllability of your imagery. It is
possible that the controllability of your imagery can be divided into two categories. You
can examine the extent to which you arbitrarily lose control of your images. This is the
extent to which you find yourself drifting into unrelated images. Conversely, sometimes
your fears or anxieties may cause your imagery to change in very specific and unwanted
ways. These two distinctions will be discussed in greater length below.

Sometimes when you use imagery, you may find yourself losing your
concentration and starting to think about or imaging irrelevant or tangential events.

Maybe, while imagining your ideal place, your mind drifts off to plans for the evening or
what you need to do during the day. This type of lack of controllability is fairly common. When this happens, just gently bring yourself back to your original imagery. By gently, I mean do not berate yourself for losing your train of thought. Don't try to force or push the other thoughts out of your mind. Simply replace them with your relaxation imagery.

Some people also find that there are times that their imagery is more negative than they wish. Their fears or negative beliefs become intrusive to the imagery. Perhaps you are really trying to relax and imagine a calming and safe scene, but images of your upcoming math exam intrude. This type of loss of control of the imagery is more rare. Again, gently replace the intrusive images with your imagery of an ideal, safe place. If you find this very difficult to do, it may help to remind yourself that the fantasy is under your control. Please tell me about these experiences and we will work out a plan to get these intrusive images more under control.

Question 6. How vivid were your images? Vividness describes how real your imagery is to you. If your imagery is clear, distinct, vibrant, and strong, it is vivid. If it is almost like living the experience itself, it is vivid. Conversely, if you have difficulty seeing, hearing, or feeling events in your imagery, your imagery is vague.

Question 7. Are there any concerns or problem on which you would like to be advised? This is your opportunity to ask any questions you may have of the researcher.
Day 1

1. What is your identification number? _____

2. What day are you reporting on? _____

3. Did you perform the imagery exercises today?  
   _ yes  
   _ no

   If yes, answer the below questions.

4. How often did you find yourself imagining irrelevant or tangential material?
   
   _____ _____ _____ _____ _____ _____ _____
   1   2   3   4   5   6   7
   Frequently  Occasionally  Not at all
5. How often were you troubled by intrusive, negative images?

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<td>Frequent</td>
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6. How vivid were your images?

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7. Are there any concerns or problems on which you would like to be advised? _______

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Appendix E

Summaries of the Project given to the Different Treatment Groups

Summary of the Project for the Imagery and Relaxation Groups

Dear participant

Thank you for showing an interest in this study. This project is designed to explore how people can use their own imagination to help them be more successful at school. This is an experimental intervention, although similar procedures have been proven successful in previous studies.

The study will involve your attending five 1 hour meetings. During the first session, you will be asked to identify what beliefs you think are holding you back academically. In the second session, you will be given a technique to lower anxiety and change negative beliefs. As well, you will be asked to complete a study skills questionnaire. During the third session, you will be asked to complete a puzzle solving task and a short word task. The fourth session will be somewhat shorter, consisting of discussion of the technique and a short questionnaire. A full explanation of the study will be given during the fifth session.

There are two possible benefits to participating in this study: Participation may help you do better at school, and participation may assist you in developing a more realistic view of your abilities. Not being aware of one's abilities may lead to poor future choices. In addition to these potential benefits to yourself, you are helping us develop new ways of enhancing students' academic performance.
I wish to emphasize that your participation is entirely voluntary. If for any reason you should wish to discontinue your participation in the study, you are free to do so at any time without academic penalty.

Data from the questionnaires you fill out and background information gathered during our sessions will be used in a doctoral thesis at OISE at the University of Toronto. In order to maintain confidentiality, your name will be replaced by a code number in our files. This code number will be known only by the primary researcher.

Should you be interested, a summary of this thesis will be made available at the conclusion of the study. Should you have any concerns, you are welcome to contact me at (416) 966-3569.

Thank you, once again, for your interest.

Sincerely,

Wayne Schlapkohl
Summary of the Project for the Comparison Group

Dear participant,

Thank you for showing an interest in this study. This project is designed to explore how people can be more successful at school. This is an experimental intervention, although similar procedures have been proven successful in previous studies.

The study will involve your attending three 1 hour meetings. During the first session, you will be asked to identify what beliefs you think are holding you back academically and complete two short questionnaires. During the second session, you will be asked to complete a study skills questionnaire, a puzzle solving task, and a short word task. During the third session, you will receive information on how you can improve your present study skills. A full explanation of the study will be given during this session as well as an offer for some follow-up support in your efforts to be a more efficient student.

There are two possible benefits to participating in this study: Participation may help you do better at school, and participation may assist you in developing a more realistic view of your abilities. Not being aware of one's abilities may lead to poor future choices. In addition to these potential benefits to yourself, you are helping us develop new ways of enhancing students' academic performance.

I wish to emphasize that your participation is entirely voluntary. If for any reason you should wish to discontinue your participation in the study, you are free to do so at any time without academic penalty.
Data from the questionnaires you fill out and background information gathered during our sessions will be used in a doctoral thesis at OISE at the University of Toronto. In order to maintain confidentiality, your name will be replaced by a code number in our files. This code number will be known only by the primary researcher.

Should you be interested, a summary of this thesis will be made available at the conclusion of the study. Should you have any concerns, you are welcome to contact me at (416) 923-6641 ext 2373.

Thank you, once again, for your interest.

Sincerely,

Wayne Schlapkohl
Appendix F

Descriptions and Rationales Given to the Different Treatment Groups

Description and Rationale Given to the Imagery Group.

Thank you for coming out and showing your interest in this project. Before we begin tonight, may I ask if I may audiotape this session? I use these audiotapes to ensure that every group I talk to gets essentially the same message. *(If all agree, begin taping. If the group does not consent for taping continue on with the session. However, this is far from preferred, as the data from untaped groups are considered to be harder to interpret.)*

Tonight, we will be doing three things: First, I will ask you to read over a general summary of this project, and I will give an in-depth description of the group to which you have been assigned. That way you can make an informed decision as to whether you desire to participate or not. Secondly, I will be asking you to spend some time defining as specifically and concretely as possible the negative academic belief that concerns you and you wish to change. Thirdly, I will ask you to fill-out a few questionnaires. Next time we meet, we will do an exercise related to changing those beliefs.

The first form in your package is called the "Summary of the Project" form. This form gives you a description of the program in general. It explains how much time this program will take, what sort of things I will be asking of you, and how you may benefit from this program. After you have all finished reading the summary, you are free to ask

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3Text that has been bolded is directed to the counsellor providing the treatment.
me any questions you might have about the program. I would like you to read over the
"Summary of the Project" now. (Allow three to four minutes for everyone to read over
the form.)

Do you have any questions?

In the "Summary of the Project," I state that you will be using your imagination to
change your beliefs about what academic tasks you can successfully perform. The
impetus for this study is that every year school counsellors meet students who have the
"smarts" to make it in college or university, but because of their doubts, anxieties, and
insecurities, they mess up. For these students, what messes them up is the difficulty they
have studying while being disrupted by thoughts like, "I will never understand this text," "I
am not smart enough to be in college," "Why did I come here anyway?" Similarly, it is
hard to stay motivated when in the back of their minds they have this belief that they
would never graduate from their program. Thus, the goal of this study is to learn how to
assist students in replacing these negative, persistent beliefs with more positive or realistic
beliefs about their abilities. So the question is, "How do we get people to have faith in
themselves?"

One technique used to change persistent beliefs that has been shown to be very
effective is imagery. Research has shown that those things we play over again and again
in our imagination, we tend to start to see as possible even likely. In one of my favourite
studies of this phenomenon, people who did not believe they could stand up for
themselves were asked to imagine themselves being assertive. Doing these imagery
exercises not only convinced most of them that they could be assertive, but when the researcher tested them, they had become more assertive. The imagery had helped them to change their behaviour. That is what we are shooting for in this program.

All of us who have been inhibited by our doubts have probably fantasized about being more confident and successful. The problem is that we have little faith in those images. We see those images as being merely wishful thinking. Previous research done in the areas of sports psychology, phobias, and unassertiveness suggest that our imaginations are most convincing, if the people using the imagery slowly work up to them.

For instance, let me give you an example of the sort of thing I will be asking you to do. Imagine that a woman is convinced that she could not participate in a French language lab. Her college instructor may mention that every Friday the class meets for 2 hours to practice informal conversational French with a facilitator. Immediately, this student has images of being in the laboratory, being asked a question, and not being able to find the right words. She imagines studying all those verb tenses but somehow not understanding how and when they are to be used. It is probable that such images will make her nervous and inhibit her performance in the laboratory. In fact, she may have had experiences of going to such labs and being too nervous to participate effectively.

To counter these negative beliefs (that is, to get a little confidence), she may choose to repeatedly imagine being successful with conversational French. But what exactly should she imagine? She may choose to not begin by believing she is proficient in the college level laboratory. That may seem too unrealistic. It would be hard to believe
such imaginings. Rather she may begin by imagining something a little more believable. She may begin by imagining being successful in a lab where she only needs to read simple French passages with the correct pronunciation. She might imagine this scene for a few minutes every day until she starts believing she could handle such a situation in the real world. It is realistic to believe that such could happen after a week or two. Then she would be encouraged to imagine herself being successful in a lab where she needed to answer simple questions with one sentence answers. Next, she would imagine being successful in a lab where the conversations were kept at a basic level. She would be encouraged to continue to imagine more difficult situations until she was imagining using college-level conversational French in the laboratory with her classmates. In the work we have done in this project so far, we have found that it is realistic to believe that people can become significantly more confident in the 28-day period of the study, and, usually, they change their images about four times in that period.

This is an example of the type of exercise that will be used by this group. In this group, individuals will be asked to counter their negative, unrealistic, hindering academic beliefs by replacing them with beliefs that are more positive and realistic. To encourage this change in beliefs you will be asked to imagine yourselves actually engaging in school activities that presently you believe to be too difficult for you. To make these images convincing, you will be asked to start by imagining behaviours that presently seem almost possible to you.
Thank you for coming out and showing your interest in this project. Before we begin tonight, may I ask if I may audiotape this session? I use these audiotapes to ensure that every group I talk to gets essentially the same message. (If all agree, begin taping. If the group does not consent for taping continue on with the session. However, this is far from preferred, as the data from untaped groups are considered to be harder to interpret.)

Tonight, we will be doing three things: First, I will ask you to read over a general summary of this project, and I will give an in-depth description of the group to which you have been assigned. That way you can make an informed decision as to whether you desire to participate or not. Secondly, I will be asking you to spend some time defining as specifically and concretely as possible the negative academic belief that concerns you and you wish to cope with better. Thirdly, I will ask you to fill-out a few questionnaires. Next time we meet, we will do an exercise related to coping with academic doubt.

The first form in your package is called the "Summary of the Project" form. This form gives you a description of the program in general. It explains how much time this program will take, what sort of things I will be asking of you, and how you may benefit from this program. After you have all finished reading the summary, you are free to ask me any questions you might have about the program. I would like you to read over the "Summary of the Project" now. (Allow three to four minutes for everyone to read over the form.)
Do you have any questions?

In the "Summary of the Project," I state that you will be using your imagination to change your beliefs about what academic tasks you can successfully perform. Presumably, you have volunteered for this project because you believe that your doubts or insecurities about your scholastic ability are holding you back academically. The particular group that you have been assigned to examines the link between those negative beliefs and anxiety. Many students find that, when they are studying, in the back of their minds they are saying to themselves, "I will never understand this text," "I am not smart enough to be in college," "Why did I decide to attend college anyway?" One result of all this negative self-talk is that it increases anxiety. Anxiety does not need to be increased very much before it starts to limit people's ability to concentrate. If anxiety becomes fairly high, it also hurts people's motivation. For instance, one of the simpler reasons that people have difficulties with procrastination is that being anxious is uncomfortable, and we avoid activities that make us uncomfortable. Sometimes anxiety is physically uncomfortable with people getting stress headaches or butterflies in their stomachs. Always anxiety is psychically uncomfortable. It is unpleasant for students to replay images of themselves failing courses, worrying about their parents' reactions to their grades, and worrying about the lack of future job prospects if they drop out of school. Thus, students naturally defer anxiety producing studies. There are students who say that they feel great when they are watching television. However, as soon as they sit down in front of their books they start getting the butterflies in their stomachs, and their minds
start racing with thoughts of failure. It is not surprising that these students find themselves watching too much television and not doing enough studying. Often these students will continue to put off doing their studies until the pain of not studying is worse than the pain of studying. The night before their term paper is due, they will be sitting in front of the television and they will be thinking, "What on earth am I doing? I have to get that paper done right now." So they spend the entire night finishing the paper and straggle into class looking like they have not slept in a month. This does not make for good term papers. Finally, if anxiety becomes high, it profoundly affects people's studies. For instance, it disrupts their sleep which in turn very seriously affects cognitive abilities.

We need to find a way for these self-doubting students to find their studies more tolerable. We need these students to be able to approach their studies in a more relaxed and motivated manner. In this study, I am comparing the effectiveness of different imagery interventions that attempt to help these students achieve their academic potential. As you may have guessed, the goal of the group to which you have been assigned is to help students become more motivated and to become better thinkers by lowering their anxiety. Furthermore, I am examining whether or not students who begin to think clearer and who are calmer when they are studying might also begin to start to change their negative beliefs about their academic abilities. Perhaps, they will start to believe in themselves. Therefore, the imagery technique given to you next week will function predominantly to reduce your anxiety.

Any questions at this point?
Description and Rationale Given to the Comparison Group.

Thank you for coming out and showing your interest in this project. Before we begin tonight, may I ask if I may audiotape this session? I use these audiotapes to ensure that every group I talk to gets essentially the same message. (If all agree, begin taping. If the group does not consent for taping continue on with the session. However, this is far from preferred, as the data from untaped groups are considered to be harder to interpret.)

Tonight, we will be doing three things: First, I will ask you to read over a summary of this project, and I will talk for some time about the group to which you have been assigned. That way you can make an informed decision as to whether you wish to participate or not. Secondly, I will be asking you to spend some time defining as specifically and concretely as possible the negative academic beliefs that concern you. Finally, I will ask you to do a few questionnaires.

The first form in your package is called the "Summary of the Project" form. This form gives you a description of the program in general. It explains how much time this program will take, what sort of things I will be asking of you, and how you may benefit from this program. After you have all finished reading the summary, you are free to ask me any questions you might have about the program. I would like you to read over the "Summary of the Project" now. (Allow three to four minutes for everyone to read over the form.)

Do you have any questions?
Rationale for the Project

In the "Summary of the Project," I state that you will be receiving information about your study skills and asked to identify your academic self-doubts as clearly and specifically as possible. The impetus for this study is that every year school counsellors have students who have the "smarts" to make it in college or university, but because of ineffective study skills, they mess up. Many students have never been taught how to study at the college level. They may have never learned how to figure out what are the main ideas in text or lectures. They may have not learned how to prepare for exams or how to review or organize their notes. Because of their poor study habits, they walk into the exam and find that they have studied all the wrong stuff, or the night before an exam they realize that they will never be able to cover all the material that they have to.

In this project, I am going to ask you to give me two very different types of information about how you study. I will ask you to fill out a questionnaire that helps me compare your study habits to other postsecondary students. But first I want you to identify for me as clearly and concretely as you can what you believe is holding you back academically. I have found this type of information to be extremely helpful in the past. But the key is for you to be as concrete or specific as possible. Doing this can be helpful in one of two ways. First, when you get as specific as possible in what your academic self-doubt is, you often find that it is remediable. If you just say, "Well, the problem is that I am too dumb," obviously, that is pretty hard to fix. But if you get really specific and
say, "I think the problem is that I have the hardest time putting my ideas on paper," that is something we can work on. I can give you information on the structure or outline that most academic papers follow, and this may help you narrow your topic down and organize your thinking. I can refer you to the writing lab here at the school where people will read over your drafts and correct them. The university even has personal tutors who will sit down with you and reteach you the basics of writing. The same is true of most problems that students come up with. If they get really specific, there is usually a way of remediating or accommodating their difficulty.

The second way being really specific about your academic self-doubt can be helpful is that you may find out that your self-doubt is absolutely incorrect. For example, one situation that we encountered was a woman who erroneously was told that she should be able to read over one page a minute of university level text if she was going to keep up in her studies. She was not even close to this speed, and because of this, she was a nervous wreck. When she brought this up, we were able to talk to some of our professors who said this suggested reading speed was entirely unrealistic. No truly effective student reads a page of Aristotle in a minute and adequately understands it. Nobody reads a page of organic chemistry in a minute and understands it. At best, reading 10 to 15 pages an hour would be realistic. As soon as she heard this, her anxiety became manageable and her studies became easier. Thus, in this study, we want to make sure you are not worrying about something that is inaccurate or unnecessary.
Finally, I believe that the group support that occurs when we share our fears and anxieties is also helpful. It is easy to believe that nobody in class is struggling as much as we are or that nobody has as much self-doubt as we do, and this just adds to our insecurity and fear. Sometimes that can further hinder us from reaching out to others, and such reaching out can be very important. It can be a great relief to say to someone else, "Is it just me or was that last test really difficult?" and to hear others say, "I thought I would never finish." Similarly, it is great to be able to brag to others when having a major breakthrough. Spider Robinson, the Canadian science fiction author, summed it up nicely when he stated shared joy is increased and shared pain is diminished (1986). So, in conclusion, we hope to help you study smarter and to reduce your anxieties.

Any questions at this point?
Appendix G

Informed Consent Forms

Informed Consent Form for the Imagery and Relaxation Groups

I, ________________, have read a description of the study, "The effects of imagery on perceived academic self-efficacy." I understand its purpose, and what my involvement in the study will entail, and what types of information will be used. I understand that I am able to discontinue my participation in this study at any time.

________________________________________  ______________________________
Signature of the participant                  Date

________________________________________  ______________________________
Signature of the witness                      Date
Informed Consent Form for the Comparison Group

I, ________________, have read a description of the study, "The student success project." I understand its purpose, and what my involvement in the study will entail, and what types of information will be used. I understand that I am able to discontinue my participation in this study at any time.

____________________________________   ________________
Signature of the participant               Date

____________________________________   ________________
Signature of the witness                   Date
Appendix H

Description of the Imagery and Relaxation Exercises

Description of the Imagery Exercise: Part I Relaxation

Breathing. This exercise has two parts. The first section is to help you relax. It seems to be easier to create vivid and controllable images if you are calm and quiet. In this first section, I will be first asking you to consciously choose to breath slower and deeper. This extremely simple technique is very effective in increasing relaxation. When most people breath, they do a pretty good job of keeping their abdomens or stomach areas flat, and you can see their chests rise and fall. Unfortunately, that is not a very healthy way to breathe. Our lungs go way down to the bottom of our rib cage. If you only see your chest rise and fall, you are not using the bottom half of your lungs. You're breathing shallowly. This shallow breathing makes your body work harder so you never quite relax. Your heart has to beat a bit faster; your blood pressure stays a bit higher. Part of really relaxing is to loosen our abdomen and to let air get right down to the bottom of your lungs. When you breath that deeply you will notice your abdomen will even rise and fall: not that your lungs actually go down into your lower abdomen, but because a muscle called the diaphragm is giving your lungs more room when you inhale by sticking your abdomen out a bit. That is why it is called diaphragmatic breathing.

Autosuggestion. Next, I will be giving you a lot of suggestions on how to feel more relaxed. If what is making you anxious and destroying your confidence are messages of failure and pressure, then it makes sense that it would also be successful to
give yourself messages of relaxation and calmness. I will ask you to imagine being on top
of a small flight of steps and with every step allowing yourself to feel more relaxed, more
comfortable, and more tranquil.

Imagining a sanctuary. Finally, I will be asking you to picture in your imagination
a calming place.

Description of the Imagery Exercise: Part II Imagery

The relaxation section will take approximately five minutes. The next section
consists of you creating images that will help you get a more realistic and more positive
picture of what you can achieve academically. Because you may have all chosen slightly
different images, I will be giving you very few suggestions in this section. I will ask you
to create the image you are working on and then you will have a silent period of several
minutes to create those images. Typically, what people use for an image is an image of
themselves engaging in the target behaviour. For instance, they may see themselves
giving a talk to four other people. They may hear the presentation in their imagination.
They may imagine the excitement they would feel when they find themselves actually
doing something they had doubts about. During the imagery they may say to themselves
statements that affirm their abilities. For instance, they may say to themselves, "I really
can speak in public. This is easier than I thought. If I just prepare well and use cue cards
to put my key statements down on, I do a fine job of public speaking." Many people find
these affirming statement very helpful. Conversely, they might imagine other people
coming up to them after the presentation and telling them that they perceived them to be
very good speakers, they learned a great deal from the presentation, or that they enjoyed
listening to them. Feel free to experiment with your images and to use that which you
believe to be the most convincing.

Here are two ground rules for this exercise.

1. Do what feels right to you. If you do not listen to all the suggestions that is O.K.
If you think, "The image I decided on for my sanctuary simply is not going to be
effective," feel free to replace it with another image.

2. At the beginning of this exercise, I will ask that you get into a comfortable
position. Do whatever you need to do to get comfortable. Lying on the floor or sitting
with your back straight are two good positions. I will suggest that you do not cross your
legs or arms. I find crossing your legs can be particularly annoying. This is a fairly long
exercise, and those people who cross their legs often find their feet falling asleep halfway
through it. That can be very disruptive. Nothing can break your chain of thought quite like
having pins and needles rush up your legs.

Any comments, concerns, or questions?
Please get into a comfortable position.

The Imagery Exercise. Begin by concentrating on your breathing. Breath very
deply. So deeply that your abdomen rises and falls. Just breath deeply -- slowly -- and as
you concentrate on your breathing -- your body will gradually and steadily become very,
very, relaxed. Breathing slower -- and deeper. In -- and -- out. Soon, you will feel more
and more relaxed.
Notice that you have already begun to relax. Your breathing has slowed down. Your muscles are more relaxed. Next, imagine. . . Imagine a very small flight of stairs with only five steps on it. In a moment, you are going to walk down this flight of stairs and with each step let yourself feel even more relaxed. Take the first step now, and let yourself feel more relaxed, feel more content, more at peace. And the second step, very tranquil and comfortable. And the third step, very calm and peaceful. Take the fourth, very relaxed, very comfortable, and take the fifth step, allowing yourself to feel completely relaxed and at ease.

You are now completely relaxed, and being relaxed you can imagine very clearly and very vividly. In your imagination, create an ideal place: a sanctuary. This place is a place where you will be totally safe and feel totally secure. It can be any place that you can imagine. It can be a tropical beach, a beautiful green forest, or a great mansion. Whatever you want. And when imagining this ideal place use all of your senses. Take a minute to imagine your sanctuary.

When you are ready, imagine yourself engaging in the target behaviour you have chosen for today. Just imagine this scene for a few minutes, and as you imagine this scene, recognize that this scene can and will become a reality. Imagine this scene now. (Approximately five minute break.)

When you are ready to leave this scene, you may wish to return to your sanctuary to begin the process of coming back to reality. . . In the sanctuary, you again see the small flight of five steps. In a moment, you will imagine yourself going up those steps.
With every step, allow yourself to feel more alert, more energized, and more awake. And as you become more alert, recognize that every time you do this exercise you will become more confident in your abilities, more likely to engage in the academic behaviours that you now are uncertain about, and more likely to succeed academically. Take that first step now, feeling more alert and energized. And the second step, feeling refreshed. The third step, ready to take on the day. The fourth step, more energized and invigorated. And now take the fifth step, allowing yourself to feel alert, refreshed, and now return back to this room.

Any questions or comments?

Does anyone want to mention how they felt or how the exercise went for them?

Some typical questions. There are a few concerns that are fairly typical. Just in case they are concerns that you later run into, let me mention them to you now.

Some practitioners have suggested that imagery is a learned skill. So if the imagery exercise did not work that well today, do not worry. With practice, it will get better.

How often should you do these exercises? That to some degree is up to you. However, I suggest once a day, five days a week. Those people who have been most successful with these exercises have explicitly scheduled ten to fifteen minutes a day to do these exercises. For example, some contracted with themselves to do the exercise
every evening just before they went to bed, every morning when they got up, or during their lunch break.

How long will you be asked to try out this exercise? I am asking that you try out this exercise for the next 28 days. That should give me a sense of how effective the exercise is.

What if you do not remember how to do the exercise? Up front, there are audiotape copies of the exercise we just did. You are all encouraged to take one and to use it. I will request that you return the tape after the 28 days so we may reuse them. This allows us to reduce our costs. Of course, if you desire to make a copy of the tape, you are more than welcome to do that.

Any other questions?
Description of the Relaxation Exercise

This exercise has three parts: breathing exercises, relaxing your muscles, and imagining a calming and safe scene.

Breathing. I will begin this exercise by asking you to simply breathe deeply and slowly. This extremely simple technique is very effective in increasing relaxation. I will ask that you allow air to get right down to the bottom of your lungs. Most people breathe very shallowly. When they breathe, they see only their chests rise and fall. You may want to see if, when you totally relax, your abdomen does not also raise and fall. To facilitate this, you may wish to place your hand on your abdomen while you are doing the exercise.

Passive muscle relaxation. Next, I will ask you to relax your muscles. I will do that by working through your muscle groups. First, I will ask you to relax the muscles in your feet and calves and slowly I will move all the way up to your face. When I ask you to relax a muscle group, just let that muscle go limp and soft and notice how you feel calmer and more relaxed as you do this. Stressors not only encourage us to clench our jaws and tighten our shoulders, but this muscular tension actually adds to our feelings of anxiety. For instance, such tension makes our cardiovascular system work harder increasing our pulse and blood pressure.

Autosuggestion. Next, I will be giving you a lot of suggestions on how to feel more relaxed. If what is making you anxious and destroying your confidence is messages of failure and pressure, then it makes sense that it would also be successful to give yourself messages of relaxation and calmness. I will ask you to imagine being on top of a
small flight of steps and with every step allowing yourself to feel more relaxed, more
comfortable, and more tranquil.

**Imagining a sanctuary.** Finally, I will be asking you to picture in your imagination
a calming place.

Here are two ground rules for this exercise.

1. Do what feels right to you. If you do not listen to all the suggestions that is O.K.
   If you think, "The image of a sanctuary I decided on simply is not going to be effective,"
   feel free to replace it with another image.

2. At the beginning of this exercise, I will ask that you get into a comfortable
   position. Do whatever you need to do to get comfortable. Lying on the floor, or sitting
   with your back straight are two good positions. I will suggest that you do not cross your
   legs or arms. I find crossing your legs can be particularly annoying. This is a fairly long
   exercise, and those people who cross their legs often find their feet falling asleep halfway
   through it. That can be very disruptive. Nothing can break your chain of thought quite like
   having pins and needles rush up your legs.

   Any comments, concerns, or questions?
   Please get into a comfortable position.

   **The Relaxation Exercise.** Begin by concentrating on your breathing. Breath very
deply. So deeply that your abdomen rises and falls as well as your chest. Just breath
deply -- slowly -- and as you concentrate on your breathing -- your body will gradually
and steadily become very, very, relaxed. Your arms will relax -- Your legs will relax.
Breathing slower -- and deeper. In --and -- out. Soon you will feel more and more relaxed. And as you relax, your body will feel warmer and heavier.

Notice that you have already begun to relax. Your breathing has slowed down. Your muscles are more relaxed. And that's good. Now, concentrating on the muscles in your feet and calves, completely loosen and relax those muscles. As you relax, you will notice how your feet and calves do feel warmer and heavier. Warmer and heavier. Next relax your thighs. And as you do that, notice the warmth and heaviness continue to move up. And as you feel warmer and heavier, notice how you feel more tranquil and relaxed. Relaxed and peaceful.

Next relax the muscles in your pelvis and buttocks. Feeling very relaxed and very peaceful. Next relax the muscles in your lower back and abdomen. Notice the warmth and heaviness continues to expand.

Next relax the muscles in your chest. Allowing yourself to feel warm and relaxed, tranquil and comfortable. Relax the muscles in your upper back. Feeling warmer and heavier, content and at peace. And relax the muscles in your shoulders and arms and hands. Feeling very comfortable, very much at peace. And next relax the muscles in your neck allowing yourself to feel very tranquil. And finally relax the muscles in your face: loosening the muscles of your jaw, unfrowning your brow, and releasing any tension around your eyes. And notice how you now feel very comfortable, very relaxed, very peaceful.
Imagine. . . Imagine seeing ahead of you the top of a very small flight of stairs with only five steps on it. In a moment, you are going to walk down this flight of stairs and with each step let yourself feel even more relaxed. Take the first step now, and let yourself feel more relaxed, more content, more at peace. Two, very tranquil and comfortable. Three, very calm and peaceful. Four, very relaxed, very comfortable, and five, completely relaxed and at ease.

You are now completely relaxed, and being relaxed you can imagine very clearly and very vividly. In your imagination, create an ideal place: a sanctuary. This place is a place where you will be totally safe and feel totally secure. It can be any place that you can imagine. It can be a tropical beach, a beautiful green forest, or a great mansion. Whatever you want. Take a minute to imagine your sanctuary.

And when imagining this ideal place use all of your senses.

What do you hear in your ideal place? Can you hear the waves hit the shore, or birds, a fireplace crackle? What do you hear?

And feel, what do you feel? Can you feel the sun warming your skin?

And smell. . . . Are there any aromas in the air?

And see. . . . What can you see?

When you are ready, return to the small flight of five steps. You are now on the bottom of this small flight of stairs. In a moment, you will imagine yourself going up those steps. With every step allow yourself to feel more alert, more energized and more awake. And as you become more alert, recognize that every time you do this exercise you
will be able to become relaxed quicker and stay calm longer. Being calmer and more relaxed you will be better able to concentrate on your studies and engage in other academic behaviours. Take that first step now, feeling more alert and energized. And the second step, feeling quite refreshed. The third step, ready to take on the day. The fourth step, more energized and invigorated, and take the fifth step allowing yourself to feel alert, refreshed, and return back to your room.

Any questions or comments?
Does anyone want to mention how they felt or how the exercise went for them?

Some typical questions. There are a few concerns that are fairly typical. Just in case they are concerns that you later run into, let me mention them to you now.

Some practitioners have suggested that relaxation is a learned skill. So if the relaxation exercise did not work that well today, do not worry. With practice, it will get better.

How often should you do these exercises? That to some degree is up to you. However, I suggest once a day, five days a week. Those people who have been most successful with these exercises have explicitly scheduled ten to fifteen minutes a day to do these exercises. For example, some contracted with themselves to do the exercise every evening just before they went to bed, every morning when they got up, or during their lunch break. You may also want to do this exercise just before a very stressful event like an exam or an in-class presentation.
How long will you be asked to try out this exercise? I am asking that you try out this exercise for the next 28 days. That should give me a sense of how effective the exercise is.

What if you do not remember how to do the exercise? Up front, there are audiotape copies of the exercise we just did. You are all encouraged to take one and to use it. I will request that you return the tape after the 28 days so we may reuse them. This allows us to reduce our costs. Of course, if you desire to make a copy of the tape, you are more than welcome to do that.

Any other questions?
Appendix I

Integrity Checks for the Study

The Effects of Guided Imagery Exercises on PASE

Imagery Group

In this study, although the presenters were encouraged to be flexible, certain comments should have been made. I am asking that you listen to the audiotape for session #1 and make note of the below.

Session #1: Description of the program. The goal of the first session is to have participants receive a basic understanding of the rationale for this program. To do this, I ask that the presenter mentions an example of previous research using imagery to enhance assertiveness. The presenter will explain next that the repetition of cognitions and the imagining of behaviours which seem close (i.e., slightly out of reach) to those in which the participants do believe they can engage are what make these techniques useful. Next, they should give an academic example of using imagery, and, finally, they ask the participants to jot down what cognitions they believe are hindering them academically. Please use the following checklist to see how many of these comments the presenter made.

a) ___ Individuals are practising assertive behaviours in imagination.

___ Individuals did act more assertively after imagery practice.
Repetition of cognitions makes those cognitions seem more believable.

However, imagery alone is not sufficient. The imagery must seem believable.

We have to break our goals down into reasonable chunks, creating a hierarchy of goals.

Introduce conversational French lab example of creating a hierarchy of anxiety producing situations.

Participants may be asked to imagine a class where they must repeat simple sentences in French.

Participants may be asked to imagine a class where they must have simple conversations in French.

Ask the participants to jot down as concretely as possible the belief that is hindering them academically.

Total out of a possible nine checkmarks.
Session #2: Imagery exercise. In session 2, the presenter is to describe the imagery exercise. This should involve talking about the relaxation component involving deep breathing, suggestions of calmness, and creating a sanctuary. The presenter should mention that the imagery section involves imagining the academic situation with which the participant has doubts. This session should have the following comments:

a) __ Introducing deep breathing as the beginning of the relaxation exercise.

__ The breathing exercise involves breathing deep enough that the participants can notice their abdomens, as well as chests, expanding and contracting.

b) __ The participants will give themselves suggestions of relaxation.

__ To give themselves these suggestions, the presenter will be using the example of walking down a small flight of steps.

c) __ The participants will be asked to create a sanctuary in their imagination.

d) __ The participants will be asked to imagine successfully doing that with which they have doubts.

e) __ The imagery section is not guided; the relaxation section is guided

________________ Total out of a possible seven checkmarks.
Session #3: Ravens. Much of the rest of the project involved giving self-administered tests. However, one of these tests (Raven's Progressive Matrices) involved some fairly specific instructions. Ideally, the instructions would involve the following components:

a) ___ Every page of the test booklet has a pattern with a piece missing.

b) ___ The questions are very easy at the beginning, but they progressively get more difficult.

c) ___ By doing the easier questions, the participants may get hints on how to do the harder ones (or the harder ones may become easier).

d) ___ There are no trick questions.

___________ Total out of four possible checkmarks.

___________ Signature of Reviewer
Relaxation Group

In this study, although the presenters were encouraged to be flexible, certain comments should have been made. I am asking that you listen to the audiotape for session #1 and make note of the below comments.

Session #1: Description of the program. The goal of the first session is to have participants receive a basic understanding of the rationale for this program. To do this, I ask that the presenter mentions the link between self-doubt and anxiety and that anxiety interferes with students' abilities to think clearly, promotes procrastination, and disrupts sleep. Next, the presenter should explain the goal of this group and ask the participants to jot down what cognitions they believe are hindering them academically. Please use the following checklist to see how many of these comments the presenter made.

a) ___ Many students find that when they are studying they are also engaging in negative self-talk.

___ One result of negative self-talk is the increase of anxiety.

b) ___ Anxiety does not need to be increased very much before it starts to limit people's ability to concentrate.

___ Anxiety is one of the reasons people have difficulties with procrastination.
Being anxious is uncomfortable, and we avoid activities that make us uncomfortable.

Sometimes anxiety is physically uncomfortable with people getting stress headaches or butterflies in their stomachs.

If anxiety becomes too high it can affect one's sleep.

c) The goal of this group is to help students become more motivated and become better thinkers by lowering their anxiety.

The imagery technique given to you next week will function predominantly to reduce your anxiety.

e) Ask the participants to jot down as concretely as possible the belief that is hindering them academically.

__________ Total out of a possible nine checkmarks.
Session #2: Relaxation Exercise. In session 2, the presenter is to describe the relaxation exercise. This should involve talking about deep breathing, passive muscle relaxation, suggestions of calmness, and creating a sanctuary. This section should have the following comments:

a) __ Introducing deep breathing as the beginning of the relaxation exercise.

__ The breathing exercise involves breathing deep enough that the participants can notice their abdomens, as well as chests, expanding and contracting.

b) __ First, the presenter will ask the participants to relax the muscles in their feet and calves and slowly they will move all the way up to their faces.

__ Muscular tension actually adds to our feelings of anxiety.

c) __ The participants will give themselves suggestions of relaxation.

__ To give themselves these suggestions, the presenter will be using the example of walking down a small flight of steps.

d) __ The participants will be asked to create a sanctuary in their imagination.

__________ Total out of a possible seven checkmarks.
Session #3 Ravens. Much of the rest of the project involved giving self-administered tests. However, one of these tests (Raven's Progressive Matrices) involved some fairly specific instructions. Ideally, the instructions would involve the following components:

a) ___ Every page of the test booklet has a pattern with a piece missing.

b) ___ The questions are very easy at the beginning, but they progressively get more difficult.

c) ___ By doing the easier questions, the participants may get hints on how to do the harder ones (or the harder ones may become easier).

d) ___ There are no trick questions.

___________ Total out of four possible checkmarks.

___________ Signature of Reviewer
In this study, although the presenters were encouraged to be flexible, certain comments should have been made. I am asking that you listen to the audiotape for session #1 and make note of the below comments.

**Session #1: Description of the program.** The goal of the first session is to have participants receive a basic understanding of the rationale for this program. To do this, I ask that the presenter mention that poor study skills interfere with the students' abilities to be successful in their studies, that if students are clear in defining their area of academic concern they often find their concerns are remediable, and that some academic concerns are inaccurate. Next, the participants should be encouraged to jot down what cognitions they believe are hindering them academically. Please use the following checklist to see how many of these comments the presenter made.

a) ___ I will ask you to fill out a questionnaire that helps me compare your study habits to other postsecondary students.

___ But first I want you to identify for me as clearly and concretely as you can what you believe is holding you back academically.
If they (students) get really specific in identifying their academic problems, there is usually a way of remediating or accommodating their difficulty.

Your academic self-doubt is sometimes incorrect.

b) Reading speed Example: A woman erroneously was told that she should be able to read over one page a minute of university level text if she was going to keep up in her studies.

She was not even close to this speed, and, because of this, she was a nervous wreck.

As soon as she heard that efficient studiers do not read this quickly, her anxiety became manageable and her studies became easier.

Thus, in this study, we want to make sure you are not worrying about something that is inaccurate or unnecessary.
c) ___ Ask the participants to jot down as concretely as possible the belief that is hindering them academically.

__________ Total out of a possible nine checkmarks.
Session #2: Ravens. Much of the rest of the project involved giving self-administered tests. However, one of these tests (Raven's Progressive Matrices) involved some fairly specific instructions. Ideally, the instructions would involve the following components:

a) ___ Every page of the test booklet has a pattern with a piece missing.

b) ___ The questions are very easy at the beginning, but they progressively get more difficult.

c) ___ By doing the easier questions, the participants may get hints on how to do the harder ones (or the harder ones may become easier).

d) ___ There are no trick questions.

___________ Total out of four possible checkmarks.

_________________________ Signature of Reviewer
Appendix J

Alternative Analysis for PASE Magnitude

When using a TSSE score of 10 as the cutoff for PASE magnitude, increases in the magnitude of the participants' TSSE scores continued to differ according to treatment group ($\chi^2[2, N = 71] = 10.07, p = .007; \eta = .377$) with the increases in the magnitude of the imagery group participants being significantly higher than increases in the TSSE magnitude scores of the comparison group ($t[30.34] = 3.69, p = .001$). The increases in the relaxation group’s magnitude scores were significantly higher than the comparison group ($t[38.14] = 2.75, p = .005$). See Table 22 for the percentages of participants who achieved TSSE magnitude. However, the problem of ceiling effects became very apparent. At pretreatment, the imagery group had 43.48% of the participants already possessing TSSE magnitude. The relaxation group had 48.15% of the participants possessing TSSE magnitude. However, the comparison group had 80.95% possessing TSSE magnitude. The comparison group could not have matched the 39.13% increase seen in the imagery group. A further problem with these data was that the imagery group and the comparison group were significantly different at pretreatment on TSSE magnitude ($\chi^2[2, N = 71] = 6.94, p = .031; \eta = .277$).
Table 27

When using a cutoff of TSSE' \(< 10\%\) of Participants who Achieved TSSE Magnitude

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pretreatment</th>
<th>Posttreatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>n</td>
</tr>
<tr>
<td>Imagery</td>
<td>43.48%</td>
<td>23</td>
</tr>
<tr>
<td>Relaxation</td>
<td>48.15%</td>
<td>27</td>
</tr>
<tr>
<td>Comparison</td>
<td>80.95%</td>
<td>21</td>
</tr>
</tbody>
</table>

\(^1\)Task Specific Self-Efficacy
Appendix K

The Effects of the Treatments on Individual LASSI Scales and TSSE Strength

I conducted a multivariate repeated measures analysis with treatment as the independent variable and all 10 LASSI scales and TSSE strength repeating pre- to posttreatment as the dependent variables. There were differences between treatment groups on these scales ($F[22, 118] = .469, p = .048; \text{eta square} = .235$). As seen in Table 23, the treatment groups differed on the pretreatment-corrected posttreatment TSSE strength scores. The imagery group had higher TSSE strength ($t[5.25] = 2.42, p = .009$) than the relaxation group. The comparison group had significantly lower pretreatment-corrected posttreatment TSSE strength scores ($t[4.81] = -4.28, p < .001$) than the combined means of the imagery and relaxation groups (LASSI scale pretreatment, posttreatment, and gain scores by treatment group can be found in Table 24).
Table 28

Mean Scores and Univariate F-tests for the LASSI* and TSSE* scale

<table>
<thead>
<tr>
<th>Study skills</th>
<th>Pre-treatment M (SD)</th>
<th>Post-treatment M (SD)</th>
<th>F(2, 67)</th>
<th>Sig. of F</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>22.61 (7.28)</td>
<td>23.69 (7.48)</td>
<td>0.85</td>
<td>0.431</td>
<td>0.024</td>
</tr>
<tr>
<td>Attitude (interest)</td>
<td>32.07 (4.18)</td>
<td>32.20 (4.79)</td>
<td>1.71</td>
<td>0.188</td>
<td>0.048</td>
</tr>
<tr>
<td>Concentration</td>
<td>24.99 (6.13)</td>
<td>26.39 (5.88)</td>
<td>0.21</td>
<td>0.808</td>
<td>0.006</td>
</tr>
<tr>
<td>Information processing</td>
<td>24.88 (5.33)</td>
<td>26.39 (5.45)</td>
<td>0.46</td>
<td>0.635</td>
<td>0.013</td>
</tr>
<tr>
<td>Motivation</td>
<td>28.99 (6.72)</td>
<td>30.28 (6.58)</td>
<td>0.62</td>
<td>0.541</td>
<td>0.018</td>
</tr>
<tr>
<td>Self-testing</td>
<td>22.31 (5.64)</td>
<td>24.25 (5.93)</td>
<td>0.13</td>
<td>0.879</td>
<td>0.004</td>
</tr>
<tr>
<td>Selecting main ideas</td>
<td>16.06 (3.92)</td>
<td>17.53 (4.17)</td>
<td>0.07</td>
<td>0.933</td>
<td>0.002</td>
</tr>
<tr>
<td>Support techniques</td>
<td>23.21 (4.59)</td>
<td>25.13 (5.66)</td>
<td>0.78</td>
<td>0.461</td>
<td>0.023</td>
</tr>
<tr>
<td>Test taking strategies</td>
<td>26.82 (5.24)</td>
<td>28.62 (5.83)</td>
<td>0.46</td>
<td>0.633</td>
<td>0.013</td>
</tr>
<tr>
<td>Time management</td>
<td>22.59 (7.62)</td>
<td>23.63 (8.19)</td>
<td>0.12</td>
<td>0.888</td>
<td>0.004</td>
</tr>
<tr>
<td>TSSE strength</td>
<td>27.46 (26.01)</td>
<td>51.34 (29.53)</td>
<td>12.08</td>
<td>&lt;0.001</td>
<td>0.262</td>
</tr>
</tbody>
</table>

Note. N = 71 for all scales both pre- and posttreatment

*Learning and Study Strategies Inventory

*Task Specific Self-efficacy
### Table 29
**Mean Study Skills Scores by Treatment Group**

<table>
<thead>
<tr>
<th>LASSI scales</th>
<th>Imagery (n = 23)</th>
<th>Relaxation (n = 17)</th>
<th>Comparison (n = 21)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pretest</td>
<td>posttest</td>
<td>change M (SD)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>25.74 (6.52)</td>
<td>26.13 (6.89)</td>
<td>0.39 (8.00)</td>
</tr>
<tr>
<td>Attitude</td>
<td>32.96 (3.91)</td>
<td>33.83 (4.47)</td>
<td>0.87 (3.92)</td>
</tr>
<tr>
<td>Concentration</td>
<td>26.44 (5.67)</td>
<td>28.22 (5.74)</td>
<td>1.78 (5.90)</td>
</tr>
<tr>
<td>Info. process.</td>
<td>24.26 (5.37)</td>
<td>26.26 (5.29)</td>
<td>2.00 (4.35)</td>
</tr>
<tr>
<td>Motivation</td>
<td>20.30 (5.39)</td>
<td>21.17 (5.63)</td>
<td>1.87 (4.98)</td>
</tr>
<tr>
<td>Self-testing</td>
<td>21.19 (5.22)</td>
<td>22.57 (4.99)</td>
<td>1.38 (4.20)</td>
</tr>
<tr>
<td>Multi ideas</td>
<td>16.56 (3.51)</td>
<td>18.00 (1.64)</td>
<td>1.44 (3.34)</td>
</tr>
<tr>
<td>Support tech.</td>
<td>23.13 (4.31)</td>
<td>25.17 (5.39)</td>
<td>2.04 (4.51)</td>
</tr>
<tr>
<td>Test strategies</td>
<td>28.26 (5.83)</td>
<td>30.05 (5.50)</td>
<td>1.74 (6.24)</td>
</tr>
<tr>
<td>Time manage.</td>
<td>24.39 (6.16)</td>
<td>24.74 (6.79)</td>
<td>0.35 (7.13)</td>
</tr>
</tbody>
</table>
Appendix L

Analyses using Gain Scores

Four different analyses were conducted based on gain scores. As seen below, the results based on gain scores were similar to those obtained through MANCOVAs and repeated measures analyses. The first analysis conducted on gain scores was to determine whether the treatment groups differed on LASSI scale scores and TSSE strength (one-way MANOVA; treatment x the 10 LASSI and TSSE strength gain scores). The results obtained were similar to those results obtained through the repeated measures design. In fact, the only change that occurred by moving from a repeated measures design to a MANOVA design using gain scores was a very small change in TSSE strength from $F = 12.08$ to $F = 12.05$. There were differences between treatment groups ($F[22, 118] = .470$, $p = .047$; eta square = .235) on TSSE strength (see in Table 25). The results obtained using the Bonferroni pairwise comparison technique indicated that the imagery and the relaxation groups both had significantly greater TSSE strength than the comparison group.
Table 30

Univariate F-tests for the LASST and TSSE scale gain scores

<table>
<thead>
<tr>
<th>Study Skills</th>
<th>F(2, 67)</th>
<th>Sig of F</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>0.85</td>
<td>0.431</td>
<td>0.024</td>
</tr>
<tr>
<td>Attitude</td>
<td>1.71</td>
<td>0.188</td>
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</tr>
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<td>0.45</td>
<td>0.635</td>
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<tr>
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<td>0.62</td>
<td>0.541</td>
<td>0.018</td>
</tr>
<tr>
<td>Self-testing</td>
<td>0.13</td>
<td>0.879</td>
<td>0.004</td>
</tr>
<tr>
<td>Selecting main ideas</td>
<td>0.70</td>
<td>0.933</td>
<td>0.002</td>
</tr>
<tr>
<td>Support techniques</td>
<td>0.78</td>
<td>0.461</td>
<td>0.023</td>
</tr>
<tr>
<td>Test taking strategies</td>
<td>0.56</td>
<td>0.633</td>
<td>0.013</td>
</tr>
<tr>
<td>Time management</td>
<td>0.12</td>
<td>0.888</td>
<td>0.004</td>
</tr>
<tr>
<td>TSSE Change</td>
<td>12.05</td>
<td>&lt;.001</td>
<td>0.262</td>
</tr>
</tbody>
</table>

Note. Mean scores and standard deviations reported in Table 28

*Learning and Study Strategies Inventory

**Task Specific Self-Efficacy
Gain scores were used to determine if the treatment groups varied on the three LASSI factors and TSSE strength. The omnibus test was again significant (F[8, 132] = .34, p = .001; eta square = .171) with the treatment groups differing on TSSE strength (F[2, 68] = 12.05, p < .001; eta square = .262). Using the Least Significant Difference pair-wise comparisons, the imagery group had significantly higher gain scores than the relaxation group on TSSE strength. The comparison group had significantly lower gain scores than both the relaxation and imagery group. Finally, when using gain scores, there was not a significant interaction between treatment and imagery ability on TSSE strength (F[1, 47] = .702, p = .407; eta square = .016), and there was no significant effect for imagery ability alone on TSSE strength (F[1, 47] = .554, p = .461; eta square = .078). These results were similar to those found using MANCOVAs.
Appendix M

The Request for Volunteers

Imagery Group

Thank you for letting me speak to your class. My name is Wayne Schlapkohl. I am a doctoral student in applied psychology at OISE/ U of T (say just University of Toronto when speaking to Sir Sandford Fleming students). I asked Prof. if I could speak to your class because I am looking for volunteers for a project I am doing called the Student Success Project. The Student Success Project is designed to help students who believe their doubts or insecurities are hindering them from doing well at school.

Let me give you a quick thumbnail sketch of how this program began. As part of my degree, I was asked to do several counselling internships. Half of these I did in university counselling centres. As you might imagine, in these internships, I would often work with students who had the "smarts" to make it in school, but because of their self-doubts or insecurities they would mess up. These were people who would study hard for tests, but because of their worrying and self-doubts, they could not concentrate once they got into the exam room. Or other students believed that their chance of passing was so low that they could not get motivated to do their work, so procrastination was killing them. The counsellors and I would find ourselves saying, "I wish we knew what sort of program would most help these students who are low achievers, who are smart but whose insecurities are getting in the way of their expressing their potential and stopping them..."
from doing as well as their peers." So, as my thesis, I am examining different ways of assisting low-achieving students so I can determine how best to help them. If you believe you are not doing as well as your peers, and, in particular, if you think you are not doing as well because of your self-doubts and insecurities, you are the type of volunteer for whom I am looking.

The program I am offering this class consists of three components: identifying and changing your self-defeating beliefs, feedback on your study skills, and, finally, group support. Often by having you define your self-doubts as clearly and concisely as possible you can start feeling better about yourself. First, you may feel better because some of what you are worried about is remediable. For instance, learning to write better or increasing your math skills are learnable skills. More important, doubt itself can be overcome. As part of this program, I help you have a more positive and realistic belief about your academic skills and abilities. I do this through guided imagery. Often students' doubts are maintained by their thinking about and imagining such things as failing exams and dropping out of school. I will be asking you to replace these doubts with images of success. For instance, You may have heard or read that most athletes imagine or mentally rehearse being successful and that this helps them be more confident when the heat is on. Well, in the same way that basketball players imagine the perfect basket or figure skaters imagine the perfect triple lutz before competition, I will be asking you mentally to rehearse successful academic performance. And I ask you to do this for much the same
reasons as athletes engage in mental rehearsal: often your self-doubt is the most important thing stopping you from being successful. Nonetheless, it may not be the only thing holding you back.

In the second part of the program, I will ask that you fill out a standardized study skills questionnaire. This questionnaire compares how you study to other university students. It looks at such areas as how you figure out what are the main ideas in text or lectures, how you prepare for exams, how you review or organize your notes, how motivated you are, etc. This allows me to give you feedback on how you are studying and to give you ideas on how to study more effectively. The third thing this study offers is support. Often just talking about your concerns can reduce your worry and self-doubt. As Canadian science fiction writer, Spider Robinson (1986), stated, shared joy is increased, and shared pain is diminished.

The good news about this program is that it makes a lot of sense to believe that being more confident, studying more wisely, and getting peer support will help you in your studies. However, it will take some commitment on your part. For those of you who decide to volunteer for this project, I will be asking that you meet with me or a colleague of mine for five 1-hour meetings. In addition, I will be asking that you do approximately 10 minutes of homework a day while you are in this program. So, the program has a fair bit to offer you, but it also asks a fair bit of you. Do you have any questions of me at this time?
Let me hand out these slips of paper. They have my name, my telephone number, and my e-mail address on them. If you have any interest in the program, please drop me a line. As well, I will be available at the end of the class if you want to speak to me in person.
Thank you for letting me speak to your class. My name is Wayne Schlapkohl. I am a doctoral student in applied psychology at OISE/U of T (say just University of Toronto when speaking to Sir Sandford Fleming students). I asked Prof. if I could speak to your class because I am looking for volunteers for a project I am doing called the Student Success Project. The Student Success Project is designed to help students who believe their doubts or insecurities are hindering them from doing well at school.

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you are not doing as well as your peers, and, in particular, if you think you are not doing as well because of your self-doubts and insecurities, you are the type of volunteer for whom I am looking.

The program I am offering this class consists of three components: identifying and changing your self-defeating beliefs, feedback on your study skills, and, finally, group support. Often, by having you define your self-doubts as clearly and concisely as you possibly can, you can start feeling better about yourself. How is that possible? Very often when you very specifically and concretely identify why you believe you will not be successful in university (college), you will find that your doubts centre around skills that are remediable. For instance, learning to write better, increasing your math skills, or enhancing your reading comprehension are all learnable skills. The other thing I have found is that some self-doubts are absolutely, utterly irrational, and, once you find out that your beliefs are unfounded, a great deal of self-doubt will disappear.

In the second part of the program, I will ask that you to fill out a standardized study skills questionnaire. This questionnaire compares how you study to other university students. It looks at such areas as how you figure out what are the main ideas in text or lectures, how you prepare for exams, how you review or organize your notes, how motivated you are, etc. This allows me to give you feedback on how you are studying and to give you ideas on how to study more effectively. The third thing this study offers is support. Often just talking about your concerns can reduce your worry and self-doubt. As
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The program I am offering this class consists of three components: a relaxation component, feedback on your study skills, and, finally, group support. We have known for a very long time that for cognitively challenging tasks you do best if you have a low level of arousal. Too aroused and your ability to sustain attention, your recall from memory, and your ability to comprehend complex text are all reduced. So in this project, I ask you to do two things to help you relax. First, I ask you to define your self-doubts as clearly and concisely as possible. Often you will find that when you specifically nail down what worries you about academic, that your worries centre around academic skills that are very remediable. For instance, learning to write better or increasing your math skills are learnable skills. Knowing you can learn to overcome your deficits certainly can make you feel calmer. It may not, however, be enough, and I also ask that you practice a relaxation technique during the five weeks of this program.

In the second part of the program, I will ask that you to fill out a standardized study skills questionnaire. This questionnaire compares how you study to other university students. It looks at such areas as how you figure out what are the main ideas in text or lectures, how you prepare for exams, how you review or organize your notes, how motivated you are, etc. This allows me to give you feedback on how you are studying and
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