
Relationship Between Metacognition, Motivation, Locus of Control, Self-Efficacy, and Academic Achievement

Jeffrey Landine

District #17, Oromocto, NB

John Stewart

University of New Brunswick

Abstract

The purpose of this study was to examine the relationship between metacognition and certain personality variables and the role they play in academic achievement. Biggs' (1987) model of metacognition was used as the theoretical framework for the study. Measures of metacognition, motivation, locus of control, and self-efficacy were used to compare with students' indication of current academic average. These measures were administered to a sample of 108 Grade 12 students in New Brunswick and Newfoundland. The results indicated significant positive relationships between metacognition, motivation, locus of control, self-efficacy, and academic average. It was concluded that metacognition and these personality variables are related to academic achievement.

Résumé

Cette recherche avait comme but d'étudier la relation entre la métacognition et certaines variables de personnalité, ainsi que le rôle joué par celles-ci dans le rendement scolaire. Le modèle de métacognition de Biggs (1987) a servi de cadre théorique de l'étude. On a comparé des mesures de métacognition, de motivation, de locus de contrôle et d'efficacité personnelle à la moyenne scolaire actuelle indiquée par l'étudiant(e). Ces mesures ont été appliquées à un échantillon de 108 étudiants de la 12^e année au Nouveau-Brunswick et en Terre-Neuve. Les résultats indiquent qu'il existe des corrélations positives importantes entre la métacognition, la motivation, le locus de contrôle et l'efficacité personnelle d'une part et la moyenne scolaire d'autre part. On a donc conclu que la métacognition et les variables de personnalité étudiées sont reliées au rendement scolaire.

Why are some students more motivated to learn than others? Why do some students learn more effectively than others? Counsellors, who help individuals learn new skills and behaviours deal with such questions in their professional practice. More specifically, school counsellors address these questions as they work with students who want to increase their levels of academic success. The answers to these questions are likely to be found by combining knowledge in many fields, for example personality, cognition, and learning (Boekaerts, 1986).

Lindner and Harris (1992) suggested that the self-regulated learner is "organized, autonomous, self-motivated, self-monitoring, self-instructing, in short, behaves in ways designed to maximize the efficiency and productivity of the learning process" (p. 2). Their description delineates some of the primary dimensions which interest school counsellors and educators today, i.e. metacognition, learning strategies, and personality variables.

The study of metacognition includes two broad components: a knowledge-based component, and a process-based component. The knowledge-based component focuses on information ranging from specific knowledge about personal learning strategies to more general knowledge about strategies and their use. The process-based component emphasizes the application of knowledge involving self-monitoring and self-regulation, and use of metacognitive strategies. Maximum learning outcomes are realized when the learning includes both knowledge and process components (Corno, Collins, & Capper, 1982; Jacobs & Paris, 1987).

One model that predicts increased academic success from the use of metacognition is that proposed by Biggs' (1987). Biggs (1987) defined metacognition as "knowledge concerning one's own cognitive processes . . . and the active monitoring and regulation of these processes" (p. 2). His model combines a student's motive in approaching a learning task with a metacognitive strategy to produce a distinct approach to learning. He recognized three separate approaches: a surface approach, a deep approach, and an achieving approach. A surface approach is usually composed of a surface motive, which is an attempt to meet minimum institutional requirements, and a surface strategy, limited to rote memorization of bare essentials. A deep approach combines a deep motive, such as actualizing interest and competence, with a deep strategy, such as relating information to previous knowledge. An achieving approach joins an achieving motive, such as ego enhancement through good grades, with an achieving strategy, such as organizing time and work space and regulating behaviour to that expected of a good student. Both the deep and achieving approaches are considered to involve high level uses of metacognition while the surface approach involves a shallow use of metacognition.

When faced with a learning task, students use a learning strategy that corresponds to their motivation for learning (Biggs, 1985; Watkins & Hattie, 1992). The first decision students must make is to recognize which strategy works best with their motive in approaching the learning task. Once the learner is aware of what the task demands, he or she may exercise control over his or her strategic options. Usually, students adopt a surface approach as an unthinking and short-term reaction to a learning task resulting in a strategy characterized as a shallow use of metacognition. The achieving and deep approaches presuppose high levels of metacognition as they require greater self-knowledge and task-knowledge (Biggs, 1987).

The use of metacognition appears to be related to academic achievement and enhanced learning outcomes (Jacobs & Paris, 1987; Vermunt, 1987; Wittrock, 1983). Watkins and Hattie (1992) reported that high academic achieving students are more likely to utilize strategies congru-

ent with their motivational states. From a developmental perspective, Biggs (1987) and Bondy (1984) suggested that age varies directly with capacity to understand and apply metacognitive knowledge and strategies. Metacognition does not appear, however, to be related to gender (Biggs, 1987; Otero, Hopkins & Campanario, 1992).

There appears to be a relationship between metacognition and certain personality variables including motivation, locus of control, and self-efficacy (Biggs, 1987; Corno, et al., 1982; Garcia & Pintrich, 1991). Kurtz and Borkowski (1984) and others (Biggs, 1985; Stipek, 1982) suggested a positive relationship between the use of metacognition and motivation to achieve in students. In addition to research evidence of a positive relationship between motivation and academic achievement (Corno, et al., 1982; Uguroglu & Walberg, 1986; Wittrock, 1983), there appears to be a link between high levels of motivation, high levels of self-efficacy and an internal locus of control (Harter, 1981; Schneider, Borkowski, Kurtz, & Kerwin, 1986). More specifically, intrinsic motivation has been linked to high levels of self-efficacy and self-esteem (Bandura, 1977; Johnson, 1979), an internal locus of control (Tzuriel & Haywood, 1985) and autonomy or self-determination (Clifford, Chou, Mao, Lan, & Kuo, 1990; Garcia & Pintrich, 1991).

Locus of control and self-efficacy positively correlate with academic achievement (Carns & Carns, 1991; Gorrell, 1990; Schneider, et al., 1986). Locus of control appears to be related to both metacognition and motivation (Corno, et al., 1982; Schneider, et al., 1986) primarily because of the element of internal control or self-regulation. Self-efficacy may also be related to both metacognition and motivation (Bergan, 1990; Grote & James, 1991; Harter, 1981) because it involves one's belief that he or she is able to perform a task.

In summary, there is evidence of a positive correlation between metacognition, motivation, locus of control, and self-efficacy, and each of these variables appears to be related to academic achievement. While a common thread in this research is the interest in the distinctive *ways* people learn, there is still much disagreement about the role of personality variables in learning (Biggs, 1987). While motivation (Deci & Ryan, 1985) and metacognition (Vermunt, 1987) are both related to academic achievement, little is known about how much of the relationship between metacognition and academic achievement is attributable to motivation. Biggs (1985) suggested that intrinsic motivation was an important part of the relationship between metacognitive approaches to learning and academic success. Other authors (Corno, et al., 1982; Harrison, 1991; Kurtz & Borkowski, 1984; Pintrich & De Groot, 1990) indicated that locus of control and self-efficacy also account for some of the relationship between metacognition and academic achievement. The positive rela-

tionship between metacognition and academic success, then, may be partially attributable to motivation, locus of control, and self-efficacy.

The purpose of this study was to investigate the relationship between metacognition and academic achievement, motivation, locus of control, and self-efficacy, and to determine how much variance each variable contributed to academic average. It was hypothesized that there would be a significant positive correlation between metacognition, motivation, locus of control, self-efficacy, and academic average.

METHOD

Sample

Subjects in this study were taken from two high schools. One high school, located in New Brunswick had a student population of 900 and serves both urban and rural populations. The second high school, located in Labrador had a student population of 450 and serves mainly an urban population. These schools were chosen for their representativeness of the Canadian mix of rural and urban population settings, and the willingness of the principals to participate in the study. Grade 12 students studying university preparatory English were chosen to ensure that a range of metacognitive strategy use would be found in the sample. Of the 216 students within these schools who were taking university preparatory English, 108 volunteered to participate in the study. According to Babbie (1973), a response rate of 50% is adequate for analysis and reporting. This sample population consisted of 52 females and 56 males ranging in ages from 17 to 19 years.

Instrumentation

Learning Process Questionnaire (LPQ). The *Learning Process Questionnaire* (Biggs, 1987) is a 36 item scale designed to assess the extent to which a secondary school student endorses different metacognitive approaches to learning. Students responded on a 5-point Likert scale to items as "I tend to study only what's set; I usually don't do anything extra." Their responses were summed to yield a total possible score ranging from 36 to 180. The total score is an indication of the student's approach to learning with high scores interpreted to mean a high level use of metacognition, while low scores are interpreted to mean a shallow use of metacognition.

The LPQ indicates acceptable validity and reliability. Biggs (1987) found that it related to student performance in consistent and predictable ways as indicated by the theoretical model supporting the scale. Watkins and Hattie (1992) tested the reliability of the LPQ using a sample of grades 7, 9, and 11 students from 185 schools and obtained alpha coefficients ranging from 0.51 to 0.71.

General Information Questionnaire. The *General Information Questionnaire* contained questions referring to such student characteristics as age, sex, and an indication of the academic average on a recent school reportage. This instrument was developed by Biggs (1987) and adapted for use in the Canadian educational environment.

Harter's Scale of Intrinsic Versus Extrinsic Orientation in the Classroom. *Harter's Scale of Intrinsic versus Extrinsic Orientation in the Classroom* (Harter, 1981) was used to assess students' motivational orientation toward learning. The 30-item scale measures the degree to which a student's motivational orientation for classroom learning is determined by intrinsic interest, in contrast to an extrinsic interest in learning. Each item was arranged in a bi-polar fashion, for example, "Some kids do their schoolwork because the teacher tells them to" but "Other kids do their schoolwork to find out about a lot of things they've been wanting to know." Students responded to each item by indicating "really true for me" to "sort of true for me" for one end of the pole only. These responses were scored from 1 to 4 proceeding from left (one pole) to right (other pole). Each response was summed to yield a total possible score of 30 to 120. High scores are interpreted as students showing a preference for an intrinsic motivation for classroom learning.

The scale shows evidence of reliability and validity (Harter, 1981). The scale demonstrates a Kuder-Richardson reliability coefficient ranging from 0.54 to 0.84 using students from grades 3 to 9. Test-retest reliability coefficients ranged from 0.58 to 0.76.

Nowicki-Strickland Scale. The *Nowicki-Strickland Scale* (Nowicki & Strickland, 1973) is a 40-item measure of individual locus-of-control. Students responded to such items as "Are some kids just born lucky?" with a yes or no answer. These responses are summated to give a total possible score ranging from 0 to 40. High scores are interpreted to be associated with an external orientation to control, meaning that individuals feel little control over events in their life. Conversely, a low score is associated with an internal orientation to control, meaning that individuals feel considerable control over events in their life. This scale demonstrates acceptable estimates of internal consistency ($r = .81$) and test-retest reliability ($r = .71$) (Nowicki & Strickland, 1973). Also, the scale significantly correlated with the Rotter (1966) scale of locus of control using two samples of college students ($r = .60$ and $r = .38$, $p < .01$).

General Self-Efficacy Scale. The *General Self-Efficacy Scale* (Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, & Rogers, 1982) measures general expectations of self-efficacy. The 17 items of the scale are rated on a 14-point Likert scale ranging from "strongly disagree" (14) to "strongly agree" (1). For example, one item was "If something looks too complicated, I will not even bother to try it." The higher the resulting score, the

greater the individual's expectation of success or confidence in their abilities.

This scale was chosen as a general measure of self-efficacy because most other measures of self-efficacy are situation-specific. Sherer, et al. (1982) report a Cronbach alpha reliability coefficient of .86 for the General Self-Efficacy scale. Construct validity was determined using correlational analysis to assess predicted relationships with other measures. For example, the General Self-Efficacy Scale demonstrated a negative low correlation with the Internal-External Control Scale (Rotter, 1966) ($r = -.289, p < .0001$), and a positive moderate correlation with the Interpersonal Competence Scale ($r = .451, p < .0001$).

Procedure

School district superintendents were contacted by letter to obtain permission to conduct the study in their school districts. Consent forms were given to grade 12 students along with an information sheet describing the study. All students under the age of 18 were required to have the informed consent of a parent or guardian. The instruments were administered by one researcher during a class to all students from whom informed consent had been received. Those students who chose not to participate were given an alternate activity relevant to their course work. Completion of the complete set of measures took less than 60 minutes. All participants were guaranteed anonymity. However, as an incentive, participants were given the opportunity to receive feedback about their performance on the instruments by providing their names on the General Information Questionnaire. These students were guaranteed confidentiality of their results between the researchers and the students. Individual results were made available upon request.

Students were administered a battery of five questionnaires. They were also asked to indicate their academic average as indicated on their report card received two weeks prior to completing the questionnaires. School superintendents were reluctant to release a copy of actual student grades. It was hoped that the proximity of the reportage and the volunteering for the study would add validity to the students' report of their academic average.

RESULTS

The research question asked how metacognition, motivation, locus of control, and self-efficacy were related to academic average. A Pearson product-moment correlation was used to determine the relationships between these variables. The hypothesis stated that there would be a significant positive correlation between metacognition, motivation, locus of control, self-efficacy and academic average. Table 1 displays the means, range of scores, and inter-correlations for these variables. Aca-

demographic average, with a mean of 73.56 is indicative of students whose aspirations involve further academic study. The measure for motivation ($M = 80.56$) indicates an intrinsic motivation orientation for classroom learning. Locus of control, with a mean of 12.42 indicates a slightly external orientation meaning that students felt they had less control over events in their lives. The mean of 86.05 for self-efficacy is interpreted to mean that students felt confident in their personal ability. Lastly, the mean score for metacognition is 106.57 indicating students' use of higher levels of metacognition in their approach to learning.

TABLE 1
Means, Ranges and Correlations of Study Variables (n = 108)

	Means		Range	Correlations					
	Females	Males		Total	1	2	3	4	5
1. Academic Average	75.77	71.13	73.56	50- 98	.42*	-.27†	-.38*	.24†	
2. Motivation	79.98	81.10	80.56	45-117		-.42*	-.61*	.24†	
3. Locus of Control	12.12	12.70	12.42	2- 24			.41*	-.20	
4. Self-Efficacy	90.81	81.62	86.05	19-189				-.29*	
5. Metacognition	108.73	104.57	106.57	69-145					

† $p < .01$ * $p < .001$

Correlation coefficients showed that the variables were all significantly correlated with academic average. Scores on metacognition correlated with academic average ($r = .24$, $p < .01$) in a positive direction. Motivation was positively correlated with average ($r = .42$, $p < .001$), and locus of control ($r = -.27$, $p < .01$) and self-efficacy ($r = -.38$, $p < .001$) were significantly inversely correlated with academic average.

The data was analysed relative to age and gender. As expected, neither academic average, motivation, locus of control, self-efficacy, nor metacognition correlated with age (See Table 1). Only academic average showed a low, but significant correlation with gender ($r = .23$, $p < .01$), with females performing at a higher level than males.

A standard multiple regression was performed with academic average as the dependent, or criterion variable and metacognition, motivation, locus of control, and self-efficacy as the independent or predictor variables. Table 2 displays the correlations.

Standard regressions were performed on all four variables independently with average as the dependent variable. The researchers wanted to determine the amount of variance each variable contributed separately to academic average. Metacognition, [$F(1, 106) = 6.19$, $p < .05$], con-

TABLE 2
*Standard Multiple Regression for Motivation, Locus of Control,
 Self-Efficacy Variables on Academic Average (n = 108)*

Variables	1	2	3	Academic Average (DV)			
				r	B	β	t
1. Motivation				.42	0.19	0.28	2.42*
2. Locus of Control	-.42			-.27	-0.16	-0.07	-0.75
3. Self-Efficacy	-.61	.41		-.38	-0.04	-0.15	-1.30
4. Metacognition	.24	.20	-.29	.24	0.07	0.11	1.22

Note: * $p < .05$. $R^2 = .22$. Adj $R^2 = .19$. The full regression equation provided a statistically significant means of predicting academic average, ($F(4,103) = 7.19$, $p < .001$).

tributed 5% ($R^2 = .055$) of the variability in predicting academic average. Motivation, [$F(1, 106) = 23.12$, $p < .001$], contributed 18% ($R^2 = .179$) of the variance, locus of control, [$F(1, 106) = 8.44$, $p < .01$], contributed 7% ($R^2 = .074$) of the variance, and self-efficacy, [$F(1, 106) = 17.55$, $p < .001$], contributed 14% ($R^2 = .142$) of the variance. Altogether, 22% (19% adjusted) of the variability on academic average was predicted by knowing scores on the four independent variables. When taken together, only one of the independent variables, motivation, contributed significantly to the variance in predicting academic average suggesting that it is an important variable to consider with regard to student learning outcomes.

DISCUSSION

The mean score, and the range of scores for academic average, demonstrated considerable variability which one would likely find among twelfth grade students taking university preparatory English classes. Raw scores for the motivation, locus of control, and self-efficacy variables revealed a trend for students to rate themselves toward the middle to high end of the scales describing themselves as intrinsically motivated, having an external locus of control, and having high levels of self-efficacy. Based on the literature (Garcia & Pintrich, 1991; Corno, et al., 1982; Pintrich & De Groot, 1990; Vermunt 1987) these characteristics indicate that this sample of students should be academically successful in completing their twelfth year in school since an overall average of 50% is the minimum requirement. The mean metacognition score, a measure of students general use of all three approaches, was very close to the midpoint, and the sizable range revealed a wide diversity in subject's general use of metacognition. This may suggest that while some students seem to use metacognitive approaches, a great number also probably use them occasionally or not at all (Biggs, 1987).

The correlation data showed little relation between gender and metacognition as was predicted in the literature (Biggs, 1987; Nolen, Meece, & Blumenfeld, 1986; Otero, et al., 1992). It was also expected that there would be no significant relationship between gender and locus of control (Rotter, 1966; Nowicki & Strickland, 1973) or self-efficacy (Owen & Froman, 1992), and the correlations supported this. While the literature regarding relationships between gender and motivation was contradictory (Biggs, 1987; Kurtz & Borkowski, 1984), the correlational data in this study suggests that gender is not significantly related to motivation. The only variable that correlated significantly with gender was academic average where females had significantly higher averages than males. Aspirations of male subjects in this sample may affect academic average as scholastic success may not be an important variable to their significant male role models, who hold blue collar jobs. Females may view their vocational success in progressing to higher levels of education. Age was also not a significant factor. This result would be expected due to the sample being from one grade level.

The key relationship in this research suggested that there would be a significant positive relationship between general use of metacognition and academic success (Biggs, 1987). The resulting significant positive correlation, albeit low, between the composite metacognition scores on the LPQ and the students' indication of their overall academic average, supported this idea. This positive relationship suggests that as use of metacognition increases, regardless of the approach, academic average increases. That is, while some of the students scoring high on the composite metacognitive scale may be scoring high on surface approaches and others on deep or achieving approaches, all of them seem to be benefiting from making some use of metacognitive skills (Bergan, 1990; Flavell, 1979; Nolen, et al., 1986; Vermunt, 1987; Williamson, 1991; Witrock, 1983)

The data here supports a positive relationship between use of metacognition, and motivation, and self-efficacy. That is, students' use of metacognitive strategies is significantly related to intrinsic motivation and high levels of self-efficacy. However, the lack of a positive correlation between metacognition and locus of control was not in keeping with the literature. This result was similar to that of Weed, Ryan, & Day (1984). In the present study, the lack of a significant positive correlation between metacognition and locus of control may be partially attributable to other variables uncontrolled for in this study, such as parental support, aptitudes, and aspirations.

One of the implications of this research for counsellors and teachers involves their work with under-achieving students. Counsellors should consider a number of variables including use of metacognition, motivation, self-efficacy and locus of control when working with students who

wish to improve their performance on teacher tests. Counselling focused on these variables will help students approach their learning tasks with skills and attitudes which promote academic success. With an improved ability to monitor and execute their learning, the students will experience an increase in their perceived levels of self-efficacy and locus of control and are more likely to develop intrinsic motivation to their classroom learning. School counsellors and/or teachers could model metacognitive strategies as a component in their teaching. Such modelling will illustrate for students how to analyse a learning task and how to monitor and execute its task requirements. Such modelling could be a significant learning experience for students particularly if counsellors and/or teachers explain the process and give feedback to students about the appropriateness of how they applied the strategies. In addition, when consulting with teachers and parents, counsellors could stress the role that metacognition can play in enhancing students' use of study habits and/or skills (Stewart and Landine, 1995). Students should be taught to go beyond the use of such techniques of surveying, questioning, and reviewing. They should assess their motivation for academic success, their current knowledge associated with the academic task at hand, what skills and tactics would be most helpful in accomplishing that task, and what level of success they want to achieve. Such components of metacognition would help students to improve their self-awareness and enable them to become self-regulated learners.

There are several methodological limitations inherent in this study. These limitations include the lack of anonymity of students who requested feedback, the use of self-report and the possible distorted values in the regression analysis due to the relatively small sample size. Since the researchers had to rely on students' self-report to determine academic average as well as offer feedback on student performance, it is possible that the correlations might be spurious and reflect a third factor mediation related to a number of possible personality variables such as attitude, aspirations for success, self-esteem, or need for approval. While it was not possible to use the actual grades as reported by the school, efforts should be made in future research to include a measure of academic performance that is not based on students' self-report. Additionally, the relatively small sample size may have led to the possible distorted values in the regression analysis. Consequently, these results must be interpreted with caution until further studies using larger samples are completed.

There are two important aspects which future studies need to address. The first is the continued investigation of what variables make up the learning model, one of interest to teachers and school counsellors. The significant relationship between intrinsic motivation and academic success found in this and other studies warrants further examination. The fact that motivation was the only variable in this study to contribute a

significant amount to the variability in academic average, increases its importance to the research on learning. In addition, other variables such as prior knowledge (Bergan, 1990), ability, and environmental factors would be important inclusions in future research.

The second area of research involves the metacognitive variable. More information is necessary regarding its development and its role in self-regulation. Future studies should address the role of metacognition and its interaction with other intervention strategies to produce lasting behaviour change. Such studies should employ quasi-experimental and experimental designs, using interventions coupled with the use of metacognition. The results of such studies would enhance our understanding of how personal variables such as motivation, locus of control, self-esteem, and metacognition interact with other intervention strategies to enable a person to be self-regulated, one who is able to monitor his or her behaviour and respond appropriately according to the context.

References

- Babbie, E. (1973). *Survey Research Methods*. Belmont, CA: Wadsworth Publishing Co.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bergan, J. (1990). Contributions of instructional psychology to school psychology. In T. B. Gutkin & C. R. Reynolds (Eds.), *The handbook of school psychology* (2nd ed.). (pp. 126-42). New York: John Wiley & Sons.
- Biggs, J. B. (1985). The role of metalearning in study processes. *British Journal of Educational Psychology*, 55, 185-212.
- Biggs, John B. (1987). *Student approaches to learning and studying*. Melbourne: Australian Council for Educational Research.
- Boekaerts, Monique. (1986). Motivation in theories of learning. *International Journal of Educational Research*, 10, 129-41.
- Bondy, E. (1984, March/April). Thinking about thinking: Encouraging children's use of metacognitive processes. *Childhood Education*, 234-38.
- Carns, A. & Carns, M. (1991). Teaching study skills, cognitive strategies, and metacognitive skills through self-diagnosed learning styles. *School Counselor*, 38(5), 341-46.
- Clifford, M. M., Chou, F. C., Mao, K., Lan, W. Y., & Kuo, S. (1990). Academic risk taking, development and external constraint. *Journal of Experimental Education*, 59, 45-64.
- Corno, L., Collins, K., & Capper, J. (1982, March). *Where there's a way there's a will: self-regulating the low-achieving student*. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.
- Deci, E. (1975). *Intrinsic motivation*. New York: Plenum Press.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34, 907-11.
- Garcia, T. & Pintrich, P. R. (1991, August). *The effects of autonomy on motivation, use of learning strategies, and performance in the college classroom*. Paper presented at the Annual Convention of the American Psychological Association, San Francisco, CA.
- Gorrell, J. (1990). Some contributions of self-efficacy research to self-concept theory. *Journal of Research and Development in Education*, 23(2), 73-81.

- Grote, G. F., & James, L. R. (1991). Testing behavioral consistency and coherence with the Situation-Response Measure of Achievement Motivation. *Multivariate Behavioral Research*, 26, 655-91.
- Harrison, C. (1991). Metacognition and motivation. *Reading Improvement*, 28(1), 35-39.
- Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology*, 17(3), 300-12.
- Jacobs, J. E., & Paris, S. G. (1987). Children's metacognition about reading: issues in definition, measurement, and instruction. *Educational Psychologist*, 22, 255-78.
- Johnson, David W. (1979). *Educational Psychology*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Kurtz, B. E., & Borkowski, F. G. (1984). Children's metacognition: Exploring relations among knowledge, process, and motivational variables. *Journal of Experimental Child Psychology*, 37, 335-54.
- Lindner, R., & Harris, B. (1992). *The development and evaluation of a self-regulated learning inventory and its implications for instructor-independent instruction*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.
- Nolen, S., Meece, J., & Blumenfeld, P. (1986, April). *Development of a scale to assess students' knowledge of the utility of learning strategies*. Paper presented at the meeting of the American Educational Research Association, San Francisco, CA.
- Nowicki, S., & Strickland, B. (1973). A locus of control scale for children. *Journal of Consulting and Clinical Psychology*, 40, 148-54.
- Otero, J., Hopkins, K., & Campanario, J. (1992). The relationship between academic achievement and metacognitive comprehension monitoring ability of Spanish secondary school students. *Educational and Psychological Measurement*, 52, 419-29.
- Owen, S. V., & Froman, R. D. (1992). Academic self-efficacy in at-risk elementary students. *Journal of Research in Education*, 2, 3-7.
- Pintrich, P., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80, 1-28.
- Schneider, W., Borkowski, J. G., Kurtz, B., & Kerwin, K. (1986). Metamemory and motivation: A comparison of strategy use and performance in German and American children. *Journal of Cross-Cultural Psychology*, 17, 315-36.
- Sherer, M., Maddux, J., Mercandante, B., Prentice-Dunn, S., Jacobs, B., & Rogers, R. (1982). The self-efficacy scale: Construction and validation. *Psychological Reports*, 51, 663-71.
- Stewart, J., & Landine, J. (1995). Study skills from a metacognitive perspective. *Guidance & Counselling*, 11, 16-20.
- Stipek, Deborah. (1982, July). *Motivating students to learn: A lifelong perspective*. Paper presented at the Symposium, "The student's role in learning," of the National Commission on Excellence in Education, San Diego, CA.
- Tzuriel, D., & Haywood, H. C. (1985). Locus of control and child-rearing practices in intrinsically motivated and extrinsically motivated children. *Psychological Reports*, 57, 887-94.
- Uguroglu, M. E., & Walberg, H. J. (1986). Predicting achievement and motivation. *Journal of Research and Development in Education*, 19, 1-12.
- Vermunt, J. (1987, April). *Learning styles and self-regulation*. Paper presented at the Conference of the American Educational Research Association, Washington, DC.
- Watkins, D., & Hattie, J. (1992). The motive-strategy congruence model revisited. *Contemporary Educational Psychology*, 17, 194-98.
- Weed, K., Ryan, E., & Day, J. (1984, April). *Motivational and metacognitive aspects of strategy use and transfer*. Paper presented at the Meeting of the American Educational Research Association, New Orleans.
- Williamson, M. (1991). *Implementing metacognitive processing in the mathematics classroom*. Unpublished master's thesis, University of British Columbia, Vancouver, BC.
- Wittrock, M. (1983). Students' thought processes. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching*. (3rd ed.) (pp. 297-314). New York: Macmillan Publishing Company.

About the Authors

Mr. Jeffrey Landine works as a school counsellor/teacher in District #17, Oromocto, New Brunswick. His interests centre on middle school children and the variables which influence their learning and academic success.

Dr. John Stewart is a Professor in the Faculty of Education at the University of New Brunswick, Fredericton Campus. His research interests include counselling theory, career development and the application of psychological theory to vocational decision-making difficulties.

Address Correspondence to: Dr. John Stewart, Faculty of Education, University of New Brunswick, Fredericton, NB E3B 5A3.