TYPES OF MOTIVATION AND STUDENT ACHIEVEMENT

IN GRADE EIGHT SCIENCE

by

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PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF EDUCATION

in

EDUCATION

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University of Northern British Columbia

May 2002

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Abstract

This research project examined how types of student motivation are related to school achievement in Grade 8 science. A sample of 44 students, 23 males and 21 females from a small interior British Columbia city, participated in the study. The study used the Adolescent Academic Motivation Scale (AAMS) to evaluate the student's primary self-regulatory and motivational style. Students were then assigned to Group 1 if they were less self-determined and extrinsically motivated and to Group 2 if they were more self-determined and intrinsically motivated. The overall achievement score of each student at the end of Term 1 was used to calculate the achievement mean for each group. The analysis between the respective group means revealed that the more intrinsically motivated group achieved significantly higher scores than the more extrinsically motivated group. These findings suggest that encouraging the development of self-determination and using instructional strategies that foster intrinsic motivation should be an important goal for educators.

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Types of Motivation and Student Achievement in Grade Eight Science Research Problem

Motivation to learn is an important concept in education. Motivation is relevant to learning because learning is an active process requiring conscious and deliberate activity (Stipek, 1998). As educators at the junior high school level, we face the daily struggle of generating intrinsic interest in the tasks that we assign our students. We have all been inspired by the student that arrives in our classroom with a genuine enthusiasm to learn and willingness to challenge and persist at the work that we present them. However, early adolescence sees a great number of students unwilling to participate in classroom activities, or only reluctantly so for expected marks and other tangible rewards. These unmotivated students can present management problems to their teachers and even become a destructive influence on the classroom environment.

When examining the subject of adolescent motivation, several questions arise. What are the primary motivational styles of these junior secondary students and how are they related to achievement? If intrinsic motivation, as research suggests, is related to higher achievement, how can we move our extrinsically motivated students in this direction? Educators need to examine their teaching strategies and classroom environments for ways and means of enhancing intrinsic motivation.

Literature Review

Weiner (1979) explored these questions in his research on motivation. He identified three central dimensions of stability, locus, and control as being causally related to achievement in his *attribution theory* of motivation. In general, high achievement was connected to a more internal locus of control. Low achievement was often connected to "learned helplessness" which is a belief that achievement is independent of what a person does.

A number of researchers have found a strong correlation between academic motivation and school achievement. Gottfried's (1985) research supports this view and suggests that academic intrinsic orientation is differentiated into school subject areas. She studied students in fourth and seventh grades and compared their achievement with scores on the Children's Academic Intrinsic Motivation Inventory. Her research added support to the importance of intrinsic motivation and to the varying levels of motivation across different subject areas.

Horn (1991) argues that the results of extrinsic motivation are temporary and disappear when the reward is taken away. As extrinsic motivation is not lasting Horn suggests that increasing intrinsic motivation in classrooms will achieve more long-term results.

Anderman and Maehr (1994) review recent research developments on motivation during adolescence and how they may be applied to educational change in the middle grades. Their focus was on the social cognitive theories of motivation. Research identifies major motivational shifts and declines at the transition from elementary to junior secondary or middle school. One of the major findings is that changes in classroom environments during this transition are directly linked to the changes in student motivation and performance. Educators are implored to attend to these important social considerations as student investment in schooling during early adolescence can have long term effects on career and life choices.

Cordova and Lepper (1996) conducted an experiment examining the effects of

contextualization, personalization, and choice on enhancing intrinsic motivation. Their research premise centered on the idea that the clearly documented decline in intrinsic motivation as students progress through grade school could be explained by the requirements to perform increasingly abstract concepts in seemingly irrelevant contexts and with little or no choice as to the activities they engaged in. Using a computer based instructional unit, the authors produced a convincing body of evidence that opportunities for choice and contexts that were personally relevant and had practical significance helped to foster intrinsic motivation in students.

Anderson and Midgley (1998) summarized three currently prominent motivational theories that have both special relevance for young adolescent students and implications for teachers in the classroom. These include attribution theory (Weiner, 1979) which emphasizes the students' perception of their experiences in school; *goal theory* (Maehr & Midgley, 1991) which stresses the reasons students perceive for attempting tasks and achieving; and *self-determination theory* (Deci & Ryan, 1985) that suggest students have three categories of needs: relatedness, competence, and autonomy. Task oriented goals are driven by the need to feel personal improvement and gain understanding whereas ability oriented goals are driven by the need to demonstrate competence in comparison to others. Teachers need to be aware of what students believe about their abilities and must focus on task-oriented goals rather than ability-oriented goals. Teachers must also make attempts to provide choice and decision making power to students in order to foster a sense of autonomy.

Deci and Ryan (2000) examined recent research stemming from their selfdetermination theory and their six sub-category motivational continuum. The research was primarily focussed on the study of different social and contextual environments. It led the authors to suggest that self-motivation is enhanced by the satisfaction of three basic psychological needs: competence, autonomy, and relatedness. Conditions that foster the satisfaction of these needs produce curious, inspired, confident and intrinsically motivated children. Conditions that prevent the attainment of this satisfaction not only lead to reduced motivation but also may contribute to apathetic and alienated individuals who believe they have no control over their lives and, thus, assume no responsibility for their own behaviour. The study summarizes specific implications for educators in terms of the types and nature of classroom discourse and climate that are optimal for the facilitation of intrinsic motivation in their students.

Karsenti and Thibert (1995) specifically looked at motivation in high school students. They used the *Adolescents' Academic Motivation Scale* (AAMS) to assess students' motivational styles. They were able to place students on a continuum from amotivated to intrinsically motivated. An amotivated student is simply non-motivated, refusing to participate in any classroom activities. They then compared the students' grade point averages with the scores they received on the AAMS. This study found that academic motivation is significantly related to grade point average, and that motivation does not occur under the same conditions for boys and girls or for junior high and senior high students. They suggest that further study of amotivation could lead to better understanding of adolescent academic motivation and identification of at-risk students.

Karsenti and Thibert (1996) developed and tested the *Elementary School Motivation Scale* (ESMS) to assess the same continuum of motivational style in elementary school children. The results of their study of elementary school students replicated the findings of earlier studies that used similar instruments and high school and junior college students. The research also provided statistical support for the existence of the self-determination continuum proposed by Deci and Ryan (1985).

Rationale and Research Hypothesis

The purpose of this research was to examine the types of motivation which are related to achievement in grade eight science classes. The researcher compared the academic achievement of highly self-determined students with students who were much less motivated, and suggests ways that educators can use the results.

This research project was based on the theory of motivation developed by Deci and Ryan (1985). This theory proposes three main types of motivation that can be placed on a continuum with the most self-determining at one end and the least self-determining at the other. The three main types are intrinsic motivation, extrinsic motivation and amotivation.

In this theory, intrinsic motivation is based on the assumption that humans are naturally motivated to develop their intellectual and other competencies and that they take pleasure in their accomplishments (Stipek, 1998). An example of this would be a student becoming very interested in a topic and eagerly trying to expand his knowledge.

Extrinsic motivation is defined as motivation that comes from outside of oneself. A student employs behaviours which are a means to an end and not for their own sake (Deci, 1975). However, more recently Deci and Ryan (1985) have formulated a more differentiated self-determination theory that elaborates four types of extrinsic motivation (see Table 1). From lower to higher levels of self-determination, the four types are conceptualized as external, introjected, identified and integrated regulation.

The first step toward self-determination is *external regulation*. This is behaviour that is motivated through constraints and rewards. The reinforcement theory of motivation

Table 1

Amotivation		Extrinsic	Motivation		Intrinsic Motivation
Non-Regulated	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Non-self-Determined	1.00				Self-Determined

Self-Determination Continuum and Corresponding Types of Motivation

suggests that rewards and punishments will motivate students to learn. An example would be if a student completed his homework to avoid a detention or to be allowed to go out with friends.

The second step in moving toward self-determination is *introjected regulation*. This occurs when students begin to internalize the external means regulating their actions. For example, a student who has promised to do his homework and then does not complete his work may feel guilty. This student may eventually move to *identified regulation* when the action becomes chosen and valued by the student. An example would be the student who has decided to do his homework because he wants to get a good mark in the course to please himself and others.

The most self-determined form of extrinsic motivation is *integrated regulation*. A student at this stage chooses to act in accordance with his values and beliefs. For example, a student may decide to do his homework because he has a career goal to become a scientist. There is more commitment at this stage than at the former one.

The final type of motivation that Deci and Ryan (1985) discuss is *amotivation*. A student is amotivated when he does not perceive a connection between his actions and his marks. He is basically non-motivated. A non-motivated student believes forces beyond his

control cause his actions, so it doesn't really matter what he does. An amotivated student may not bother to do his homework because he doesn't believe it will make any difference and often appears alienated and disengaged towards classroom activities.

The hypothesis investigated in this study was that when a heterogeneous sample of science eight students is separated into two groups based on their primary motivational styles as placed on the continuum defined by Deci and Ryan (1985), those students in the more self-determined motivational group will score significantly higher in overall classroom achievement than those students in a group with a less self-determined motivational style.

Method

Subjects

The participants in this study were 44 grade eight science students scheduled in two unstreamed, heterogeneous classes at a secondary school in the British Columbia interior. Grade eight students were specifically chosen, as this is their first year of high school in this school district. As the researcher is a teacher in this secondary school, having mostly new students participate in the study was designed to minimize experimenter effect. Two classes were required to furnish an adequate sample size, as the participants were eventually to be split into two groups.

Students were assigned to the classes randomly by computer. The two blocks were two of six sections of science eight that were to be offered this year in the school. Both science classes were scheduled in the first semester of the school year. Although student placement in the blocks was genuinely random in most cases, several extraneous factors may have affected the true heterogeneity of a particular class. For example, the timetabling of honors math, basic math, band and other electives could have affected the composition of the classes by removing some of the lowest achieving or some of the highest achieving students from the research group.

Although the student sample was approximately random, it was also a convenience sample in that it was two blocks of science eight scheduled into the researcher's teaching assignment. The typical science eight group contains the entire spectrum of reading levels from grade three to senior secondary and will generally have one or possibly two students on modified programs (leaving certificates) with potentially one student support worker to assist them. The two classes composing this research sample contained only students on the regular science eight program; however, one student in the sample has since been rescheduled into a modified program. One student was repeating science eight. There were 23 males and 21 females in the research group. There were 4 twelve year olds, 37 thirteen year olds, and 3 fourteen year olds in the sample.

The catchment area of the school resulted in the sample being about 85% of European ancestry, and the remaining 15% largely of Indo-Canadian ancestry with two First Nations students. The area around the school is largely middle and lower middle class, with some students, however, coming from families living below the poverty level in nearby low cost housing areas. Most students in the study have come from homes where at least one parent is employed in some facet of the forest industry or related support sectors. Educational backgrounds and levels of professional training amongst the parents of the sample will have varied widely.

Instruments

Student motivation was assessed using the Adolescents' Academic Motivation Scale (AAMS) developed by Karsenti (1993; in Karseni & Thibert, 1995). The instrument is a

modified version of the AMS (Academic Motivation Scale) developed by Vallerand et al (1989). The modifications were necessary to make the scale more suitable for adolescents as the Vallerand instrument was more specifically designed for elementary students.

The AAMS assesses motivation along the five subscales (amotivation, three types of extrinsic motivation, and intrinsic motivation) proposed by Deci and Ryan (1985). It should be noted that older versions of the AAMS demonstrated through factor analyses to be unable to distinguish integrated regulation from identified regulation and therefore the current version of the survey does not produce a measure for the integrated regulatory style of extrinsic motivation. The two main activities from which the subscales were evaluated are "going to school" and "doing homework" (Karsenti & Thibert, 1995). The questionnaire is built around the student's perceived reasons for engaging in the activities. The AAMS questionnaire assesses motivational styles with respect to academic involvement and consists of 28 items with response ratings being made on a 1 - 7 Likert scale, with 7 representing the strongest level of correspondence.

The instrument developer has shown from extensive data derived from various studies that there is substantial support for the reliability and validly of the AAMS (Karsenti & Thibert, 1995). In terms of reliability, Karsenti and Thibert found Cronbach Alpha analysis of all motivation subscales was excellent (.89 to .94). The developers also ran Pearson correlation coefficients between all five subscales, which clearly supported the existence of Deci and Ryan's motivational continuum. Closely related types of motivation were more positively correlated, while those at opposite ends of the continuum showed a clearly negative correlation.

The second measure used in this comparative study was the students' overall

achievement mark in science eight at the end of the first term. This is the percentage that was sent home on the first report card, half way through the first semester of the school year.

This percentage was based on identical criteria for each of the science eight classes. Approximately 50% of the mark was determined by exams, tests, and quizzes, and 50% by written work which included question assignments, lab reports, and research reports. All individual scores contributing to the overall percentage were recorded, weighted, and manipulated on the Windsor Integrade reporting system. This is the marks program most widely used in British Columbia high schools and required to transfer official marks to the Ministry of Education in Victoria. The final achievement score was reported to the nearest whole number percent and was based on 18 separate mark entries. It should be noted that this percentage was based strictly on academic achievement and did not include any marks, as such, for behavior, effort, or attitude.

The advantage of having used the combined overall achievement percentage rather than a single exam mark on which to base the comparison is that the effects of intervening or confounding variables that may reduce the reliability or validity of a single result would not be as significant over a range of 18 separate items.

Procedure

In the months preceding the September 2001 school year start, approval to use the AAMS and conduct this research project was granted by the survey authors, the superintendent of schools and the school principal. In June 2001, the principal cooperated in scheduling the two science eight blocks consecutively into the researcher's teaching assignment. Application for research approval was made to the UNBC Research Ethics Board in September and received in writing on October 2, 2001. The research project was explained to students and consent forms with appropriate information were delivered to all parents of potential participants.

At the end of the fourth week of school in semester one, the AAMS was administered to both science eight classes on the same morning, about one-hour apart, in the same classroom. Simple and identical instructions were given to both groups by the researcher. This early date in the semester was chosen so that responses to the motivation questionnaire would not be strongly influenced by students having received a great deal of evaluation on their academic progress in the school year, or by the development of particularly good or bad relationships with the researcher and other teachers. The AAMS could not have been effectively delivered earlier than this week because student timetable changes and classroom balancing to meet contract requirements could have changed the composition of the classes. This also allowed enough time for the students to develop some familiarity with the activities and content of the science eight program.

The results of the AAMS were not evaluated until the second week of January, long after first term grades had been calculated. This was to prevent any biases that might have developed from knowing the motivational rankings of individual students causing interference with the objective evaluation of achievement throughout the term. It should also be noted that compared to any other term in the school year, participant attrition due to dropout or expulsion is always lowest in first term and did not affect the study.

During the ten weeks of first term, each science class received exactly the same assignments, tests, quizzes, laboratory reports and instruction. When unit exams were administered, the researcher alternated which group wrote first to preserve equity that could have been adversely affected by between-class information transfer (i.e., students discussing the exam content with friends). All marking schemes, weightings and recording procedures were kept identical between the groups. The timetable rotation ensured that both classes received an equal amount of instruction in each of the four blocks of the school day. Both classes were scheduled in the same laboratory classroom.

At the end of the term, the final achievement percentage was calculated for each student in the two classes. Once the AAMS survey forms were evaluated, students were placed in one of two groups. Students showing highest levels of amotivation, external regulation and introjected regulation, the least self-determined subscales on Deci and Ryan's continuum, were assigned to one group. Those students showing higher scores on the more self-determined subscales of dentified regulation and intrinsic motivation were assigned to a second group. These groupings represent the two theoretical halves of the motivational continuum. (See Table 1.)

The first term achievement marks were then used to calculate group means and a *t*test was conducted to determine if there was a significant difference in academic performance between the two groups. The results were then analyzed with respect to the hypothesis and relevant literature.

Results

Background Data

A demographic section attached to the front of the AAMS survey form was completed by each student in the sample. The results are summarized in Table 2.

The 44 AAMS surveys were categorized according to the regulatory style and motivational type in which the student received the highest score. The students were then assigned to Group 1 if their primary regulatory style was non, external, or introjected

Table 2

Background Data of Students in Sample

1. How old are you?

	1.	12 years old	9.1	%	(4) ^a
	2.	13 years old	84.1	%	(37)
	3.	14 years old	6.8	%	(3)
2.	What gender	are you?			

1.	girl	47.7 %	(21)
2.	boy	52.3 %	(23)

3. What was you approximate average grade last year?

		Μ			F	
1.	[C- or less]	8.9 %	(2)	0	%	(0)
2.	[C]	13.0 %	(3)	4.8	%	(1)
3.	[C+]	13.0 %	(3)	0	%	(0)
4.	[B]	43.5 %	(10)	52.4	%	(11)
5.	[A]	21.2 %	(5)	38.1	%	(8)

4. What was your final letter grade in science last year?

		Μ		F	
1.	[C- or less]	4.3 %	(1)	0 %	(0)
2.	[C]	13.0 %	(3)	0 %	(0)
3.	[C+]	13.0 %	(3)	19.1 %	(4)
4.	[B]	39.1 %	(9)	33.3 %	(7)
5.	[A]	30.4 %	(7)	47.6 %	(10)

a: Actual number of students.

regulation and to Group 2 if their style was identified or intrinsic regulation. The results are summarized in Table 3. This accounts for the presence of only two motivational sub scales under Group 2 and three under Group 1 as seen in the table.

Table 3

	Primary Motivatio	onal Style and S	elf-Determination	of Students in Sample
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	•	Group 1		Gro	oup 2
	Amotivation	Extrinsic	Extrinsic	Extrinsic	Intrinsic
	Non-Reg.	Ext. Reg.	Intro. Reg.	Ident. Reg.	Intrinsic Reg.
Female	0	9	3	9	0
Male	0	10	6	7	0
Total	. 0	19	9	16	0

(n=28 for Group 1 and n=16 for Group 2)

Results show that the majority of the sample (63.6%) is primarily extrinsically motivated and responds to mostly external regulation. Amotivation scores were extremely low on all survey forms. This is not surprising, as there were no achievement marks less that 40% (or an "E" letter grade) in the entire sample. There was not one case of chronic absenteeism or total disengagement from classroom activities throughout the study that would have indicated an amotivated student.

While none of the students in the sample were evaluated as being primarily intrinsically motivated, it should be noted that a number of students in Group 2 who scored highest under identified regulation also scored very high under intrinsic motivation. (The groupings and categorization as a result of the survey should not be interpreted to suggest that students in the sample do not possess at least some level of intrinsic motivation and selfdetermination.)

A higher percentage of the females in the sample (42.9 %) scored higher in the selfdetermined intrinsic end of the scale compared to males (30.4 %). The result of this inequity is that, despite being the smaller gender group in the sample, females compose over half (56.3 %) of the more intrinsically motivated Group 2.

The achievement scores of the students in the sample at the end of Term 1 produced very similar distributions in both classes of science eight involved in the research. The mean achievement percentage for the two classes were 75.8 % and 76.9 % respectively, indicating that the treatment received by each group and the ability composition of the groups were comparable. The mean achievement score of Group 1 students at the end of Term 1 was 74.5 % while the mean of Group 2 was 83.13 %. Each group contained approximately the same number of high achievement scores. For example, each group had three achievement scores of 90 % or more. The difference between the two set of scores was that Group 1, the more extrinsic group, had the majority of lower scores. For example, Group 1 had eight students achieve less than 70 % while only two students in Group 2 scored lower than this level. The only two failing scores in the sample also occurred in Group 1.

The mean achievement score for females was 79.2 %, nearly 7.0 % higher than the mean for males at 72.5 %. This observation is not surprising given that 47.6 % of females reported receiving an A letter grade for science in grade 7 compared to only 30.4 % of the males in the sample. (See Table 2) The distribution of letter grades at the end of Term 1 in science eight was remarkably similar to that reported for grade seven science on the AAMS. For example, 75 % of the sample reported receiving a "B" or "A" letter grade in science last year and 73% of the sample received the same letter grades for science eight. This trend

appeared to be equally true across both genders.

t-Test Results

A single factor ANOVA procedure was used to analyze the variances between the two sample groups. The *F* observed value of 5.526 significantly exceeded the *F* critical value of 4.073 (df = 1, 42) indicating unequal variances existed between the two groups. Therefore an independent samples *t*-test assuming unequal variances was run to compare the two sample means. The results of the test are summarized in Table 4. The *t*-test results support the research hypothesis of this project that the mean of Group 2, the more intrinsically motivated and self-determined group, is significantly higher than that of Group 1, the less self-determined extrinsically motivated group. The *t* statistic value of 2.651 is substantially larger than the *t* critical value for a one-tail *t*-test of 1.683 at $\alpha = .05$.

Table 4

	Group 1	Group 2	
Μ	74.5	83.125	
SD^2	174.5556	69.58333	
Observations	28	16	
df	41		
t Stat	-2.65126		
P (T <=) one-tail	0.005674		
t critical one-tail	1.682879		

t-Test Results Between Less Self-Determined and More Self-Determined Motivational Groups.

<u>Note</u>. $\alpha = .05$, independent samples *t*-test assuming unequal variances

Ancillary Analysis

Careful analysis of the AAMS forms reveals several clear trends in factors that motivate these early adolescent students. The responses made by the students to each item in the survey are presented in Appendix A. Items 1, 8 and 10 in the survey show a strong belief on the part of the students that high school completion is necessary to obtain a better, well paying and interesting job. The response to this motive was virtually identical across both genders with over 80 % of the sample selecting a strong or very strong correspondence to the link between school and class attendance with better, well-paying jobs. It should probably be noted that item 10, referring to the interest level of a job, a measure of the much more intrinsic identified regulation, was more than 10 %, lower in the strong or very strong correspondence compared to items 1 and 8. These two items refer specifically to the salary component of employment and are measures of the more extrinsic, external regulation.

Items 5, 19, and 26 in the survey are measures of amotivation. In all three cases 75 % or more responses showed little or no correspondence contributing to very low amotivation scores throughout the sample. However, on all three items an average of 20 % more females responded more strongly with no correspondence at all than did males. In general, the scores for amotivation were lowest amongst the females in the group.

Items 4, 6, 9, 11, 16, 18, 25, and 27, which are measures of the intrinsic motives of fun, pleasure, interest, and enjoyment in attending class, showed that the vast majority of the sample chose at least some level of correspondence. In all but one item, a greater percentage of males chose strong or very strong correspondence compared to females, despite males having a lower mean achievement score than the females in the sample. Males also responded with much higher levels of correspondence to extremely extrinsic items as well, such as item 26 which connects attending class to being rich later on in life. Here 70 % of males chose at least strong correspondence compared to only 52 % of females. One item that also showed a marked gender difference was Item 14 which suggests that passing Science 8 would make the student feel good about him or herself. Sixty five percent of males chose at least a strong correspondence compared to only 38 % females.

Discussion

The results of this research support the belief that a student's primary style of academic motivation is significantly related to achievement in science eight. Students who are more highly self-determined and intrinsically motivated appear to score higher overall achievement marks than students who are less self-determined, more extrinsically motivated. The outcomes of this study are consistent with those of Karsenti and Thibert (1995) and provide further support for the existence of the self-determination continuum first elaborated by Deci and Ryan (1985). This relationship between intrinsic motivation and higher academic achievement has been identified many times before and has been the central focus of numerous research studies into the construct of motivation. The additional evidence provided by this research project reiterates the need for educators to examine strategies for enhancing intrinsic motivation and to question the emphasis and reliance on extrinsic reward contingencies.

The results of the study are also consistent with research suggesting that there is a continuous decline in intrinsic motivation from grade one onwards, possibly reaching its lowest point in early adolescence (Anderman & Maehr, 1994). The majority of the young children entering the school system embody the definition of intrinsic motivation in their natural curiosity, spontaneous interest, and desire to assimilate and master. However, by

middle or junior secondary school, many students strive to achieve primarily for only extrinsic rewards such as approval, avoidance of punishment and expected tangible items. This research showed that 64% of a heterogeneous sample of grade eight students had low self-determination and were primarily responding to extrinsic motivation. This decline appears to be particularly true for males who make up a much smaller fraction of those students still remaining self-determined and intrinsically motivated.

The results of this study should not be interpreted as implying that extrinsically motivated students are incapable of outstanding achievement. There were an almost identical number of "A" students in each of the study groups that made up the sample. The lower group mean of the less self-determined group can be probably attributed to lower ability students who are primarily extrinsically motivated. It appears to be this combination that can lead to at-risk, amotivated students.

The use of extrinsic rewards to motivate children presents a troublesome dilemma. Stipek (1998) suggests that children will probably need at least some external reinforcement in order to first engage in activities and behaviours that are not inherently interesting. As they learn that their parents and society as a whole value these behaviours, they themselves may internalize the values and become self-determined. As parents and educators, we are avid practitioners of this simple principle of behaviourism. Stipek also cautions that the rewards should be minimal and social in nature, rather than tangible rewards.

The inherent danger in the use of extrinsic reward may be twofold. Firstly, Deci and Ryan (2000) cite studies that have shown the use of extrinsic rewards as undermining intrinsic motivation. Not only tangible rewards but also threats, directives, and deadlines teach the students to believe that their perceived locus of control is external. Secondly, weaker students who become frustrated with their inability to attain the rewards that they see others receive begin to believe that they have no control over outcomes or behaviours. Feelings of incompetence prevail, a condition of learned helplessness may set in, and students see no value in participation. These students can become amotivated. In this condition, students see it is better not to attempt the task and avoid the likely outcome of failure. Karsenti and Thibert (1995) found that amotivation was the type of motivation most related, though negatively, to school achievement.

Anderman and Maehr (1994) point out a particularly concerning trend that exacerbates the problem of the amotivated student. As students approach adolescence, they come to believe that ability and intelligence are stable or fixed traits and less related to effort than when they were younger. Combined with the student's perception that school is placing a greater emphasis on relative ability, the teacher's job of eliciting effort from the amotivated student can become extremely problematic. The urgency in addressing the amotivated student is underlined by studies that show student effort investment in middle or junior secondary school years can have major long term effects career patterns and employment opportunities.

The research of Karsenti and Thibert (1995, 1996), Gottfried (1985), Cordova and Lepper (1996) and others documents the link between intrinsic motivation and higher achievement. In addition, these researchers identify a single characteristic of intrinsically motivated students that may be most responsible for their lack of failure. Intrinsically motivated students will persist at a task even in absence of any external reward contingencies because of the enjoyment and satisfaction they feel at mastering a task. Deci and Ryan (1985) point out that even successful extrinsically motivated individuals are not as likely to demonstrate this level of persistence. This was observed in several individuals from the sample in this study. These were notably lower ability students who were evaluated to be primarily self-determined and, in the more intrinsic group, that were still able to achieve "C" or "C+" letter grades in science. Students in the more extrinsically motivated group who were equivalent in ability were passing only marginally, or failing.

There are several implications of this research study for educators. We must prevent our students who are responding primarily to extrinsic reward from slipping into a state of amotivation. More importantly however, we must examine our teaching strategies and classroom environments for ways and means to enhance intrinsic motivation, reduce the reliance on external rewards, and move our students up the self-determination continuum to a more internally controlled, self-determined style of motivation.

Several prominent theories of motivation offer concrete suggestions for classroom teachers to facilitate this growth in intrinsic motivation. Weiner (1979) stresses in his attribution theory that students are constantly seeking an understanding of why certain events and their outcomes are taking place around them. In the classroom setting, the students' own perceptions of their educational experience can seriously impact their level of motivation. Anderman and

Midgley (1998) point out that a history of success in a certain subject area leads to persistence of effort in that area. However, a history of failure will likely result in students attributing the result to their own inabilities, and believing that there is no hope for future success. Teachers may unintentionally communicate attitudes about ability and about whether or not it is a fixed trait. The teacher must work to convince struggling students that poor achievement is the result of factors such as poor study habits and poorly developed skills that they can control.

Goal theory focuses on the reasons that students have for the need to achieve. Maehr and Midgley (1991) suggest that there are two main types of goals: task oriented goals and ability oriented goals. Task oriented goals embody the purpose of learning as personal improvement and understanding, representing an intrinsic motivational approach. An ability goal orientation is a belief that purpose in achieving is to demonstrate competence in comparison to others. Research has shown that task oriented students are more likely to engage in challenging tasks, and persist at those tasks, are more willing to seek assistance, and generally have more positive feelings about their educational experience. In order to increase task goal orientation in their students, teachers might consider reducing or eliminating some of the following: ability groupings, standardized testing, competitions and contests amongst students, normative grading, public displays of achievement marks, and emphasis on school honour rolls with excessive recognition for relative performance accomplishments. In addition, students need to be provided increased opportunity for choice and greater involvement in classroom decision making.

Maehr and Midgley (1991) suggest that at the high school level, goal orientation can greatly influence the school as a whole. A school that stresses academic accomplishments, honour roll, and academic contests associated with extrinsic rewards develops a school-wide character that is ability goal oriented. The efforts of an individual classroom teacher to move away from ability goals to a task orientation can be made impossible to sustain by the overwhelming direction of the school itself. The policies and directives of school districts, principals, and other senior administrators can dictate what is taught, how it is presented, and which resources and texts are made available and can generally subvert teachers' initiatives to change the direction of learning in their classrooms. One implication of this is that principals and other administrators must be brought to recognize the need for a school wide approach to effectively change the goal orientation of a school.

Self-determination theory describes the student as having three categories of basic needs: relatedness, competence, and autonomy. These needs must be satisfied for a student to become a self-determined, intrinsically motivated individual. Deci and Ryan (2000) describe relatedness as the satisfaction that comes from a sense of belonging and the connectedness to others in a person's social group. Teachers can provide for this need by appearing as warm, caring individuals who establish non-threatening, less directive classroom environments. Anderman and Maehr (1994) found that positive teacher-student relationships and supportive peer relationships contribute to motivation and achievement in students.

Competence involves knowing how to approach a challenging task and believing that one is able to master it (Anderman & Midgley, 1998). The classroom teacher can encourage a sense of competence by providing optimal challenges and constructive feedback that is free from harsh or demeaning evaluation. Deci and Ryan (2000) point to studies that have shown that competence will only enhance intrinsic motivation if students are simultaneously provided with an opportunity for autonomy. Autonomy involves a person's belief that his behaviour is self-determined and that he initiates and regulates his own actions. In attributional terms, Weiner (1985) suggests that the individual perceives an internal locus of control over life experiences.

Anderman and Midgley (1998) and Deci and and Ryan (2000) point out that more recent research has focussed on the issue of autonomy versus control compared to any of other of the self-determination needs. The findings these researchers suggest that teachers who are autonomy supportive and less controlling foster increased intrinsic motivation, curiosity and willingness to accept challenge in their students. Even small opportunities for input and choice can increase a student's sense of autonomy without causing major upheaval or loss of control over behaviour management in the classroom. Teachers can help students feel self-determined by providing a modicum of choice between acceptable options, by encouraging self-evaluation in students as they monitor their own progress and by helping students to break large tasks into smaller, less intimidating pieces. Imposed goals, directives, threats, and deadlines have been shown by recent research to diminish the sense of autonomy and intrinsic motivation in general.

The results of the present study and many others of a similar nature before it support the premise that a self-determined regulatory style and intrinsic motivation are significantly related to higher academic achievement. Given this conclusion, this discussion has offered research-based suggestions for fostering this motivational style in our students. Recent changes announced by the provincial government of British Columbia may make it extremely difficult for teachers to implement the ideas and advice from the various motivation theorists. Pending increases in class size and decreased resource and supply budgets may leave teachers unable to give the individual attention required to foster relatedness and autonomy. Laboratory activities that encourage autonomy, help develop peer relationships and generate intrinsic interest will likely be curtailed in under-supplied, overcrowded classrooms. In addition, the current Minister of Education has stated the Ministry's intention to make schools and school districts more accountable to the tax-paying public through increased standardized testing. Despite recent research urging educators to accept a shift towards a task goal orientation, our government appears to be issuing a province wide directive that ability goals are to be our primary educational focus. Unfortunately, it seems that the political leaders of education in British Columbia are choosing to ignore on overwhelming body of research that suggests their actions may be detrimental to student motivation and achievement in this province.

Limitations to Study

There were some limitations to this study. Probably the most significant threat to external validity was the study's sample size of 44. Another limitation was that the sample was not a true random sample but a convenience sample. The sample was also composed of two separate science classes, which limits the internal validity. However the groups were relatively heterogeneous and the computer-generated class lists appeared to be representative of science eight students in this school based on the achievement means of the two classes and their very typical mark distributions.

A further threat to external validity could be that the study may accurately reflect the connection between types of motivation and achievement in science eight, but may not generalise well to other subjects. Gottfried (1985) found that intrinsic motivation in one subject does not necessarily indicate similar trends across all subject areas. Also, Karsenti and Thibert (1995) found that motivation of junior high students differs from the motivation of older students. Therefore, generalisation of this study should probably be limited to grade eight junior high or middle school science students.

When students first enter a science eight classroom, they are 12 to 14 years old. This is a time of life when attitudes could undergo rapid changes. A change in maturity can occur in a relatively short period of time. This study took only three months to complete which

should have helped to guard against a maturation effect. However, given the nature of adolescence, the possibility of maturation effect exists as a threat to the internal validity of this study.

There could possibly be experimenter effects also limiting the internal validity of this study. Some students may have known the researcher from friends, older siblings, or other family member who have previous history with him. Whether the history is positive or negative, it could effect achievement and motivation. Even if the students had no previous experience with the researcher, they still will have responded to the teacher in different ways. The teacher/student relationship has emotional subjectivity that may have influenced student motivation in many subtle ways. From the very first class, there was emotional colouring in every student/teacher interaction. To help ameliorate these experimenter effects, the researcher did not evaluate the AAMS until the science eight course was nearly finished.

The students in this study were aware that they were part of a research project. Therefore

there is a possibility of a change in behaviour due to the Hawthorne effect. Cohen and Manion (1994) noted that "so-called Hawthorne effects threaten to contaminate experimental treatments in educational research when subjects realize their role as guinea pigs" (p. 171). The students may have tried harder in an effort to look good for the experiment. When the students completed the AAMS they had to think about their own motivations for attending school and doing homework. Their reflections on these topics may have influenced their motivation for the term and perhaps their behaviour creating a threat to the external validity of the study. The researcher's experience however was that the sample as a whole appeared to forget about the study shortly after completing the AAMS survey. The researcher was careful to teach the same lessons in the same way to the two science eight classes. However, every class has a unique mixture of individuals and a unique dynamic. Because of the group dynamics, the learning experiences would have been somewhat different for the students in the two classes. The emotional tone and the pacing may also have been slightly different. Despite a teacher's best intentions, the same lesson never goes exactly the same way to different groups of students. Intervening variables may have occurred and influenced the classroom. A grade eight science classroom is an extremely complex environment that is never under the absolute control of the teacher. The school itself has even a greater complexity, so the possibility that there were intervening variables must be recognized.

A final limitation to this study lies in the construct of motivation itself. Despite the results of this research project and many others, motivation is not the only construct that is related to achievement. Gottfried (1985) suggests that measures of motivation may reach an upper limit in their relation to achievement, after which other constructs such as ability and attitudes may account for achievement. Other factors such as home environment, time spent on instruction and quality of instruction may also contribute to achievement. In fact, perhaps the only disappointing outcome of this study in the eyes of the researcher, was learning that several of the very elite student participants with whom he had enjoyed good relationships, reported that the science eight course offered very little genuine interest, stimulation, or fun to them.

Perhaps further research needs to be applied to the relationship between types of motivation and attitudes. Most certainly the results of this study give support to a growing body of evidence that males as a group are achieving lower than females in a subject area thought to be male biased only a decade ago. Of even more serious concern is the evidence that males as a group showed a greater decline in self-determination and intrinsic motivation going into adolescence than did females. A number of questions around this phenomenon could be the topics of further research. For example, what factors are contributing to this decline in adolescent male intrinsic motivation? What adjustments can be made in our teaching strategies and classroom environments to reverse this downward trend?

Finally, a large body of research has urged educators to make intrinsic motivation an important goal. This project provides additional empirical support for this continued emphasis. We must strive for classroom environments and instructional strategies that foster self-determined intrinsic motivation because of the significance of this construct in influencing achievement.

References

- Anderman, E. & Maehr, M. (1994, Summer). Motivation and schooling in the middle grades. Review of Educational Research, 64, 287-309.
- Anderman, L. & Midgley, C. (1998). Motivation and middle school students (EDO-PS-98-5).
 Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 421 281).
- Cohen, L. & Manion, L. (1994). Research methods in education (4th ed.). New York: Routledge.
- Cordova, D. & Lepper, M. (1996). Intrinsic motivation and the process of learning: Beneficial effects of contextualization, personalization, and choice. *Journal of Educational Psychology*, 88, 715-730.
- Deci, E. (1975). Intrinsic motivation. New York: Plenum.
- Deci, E., & Ryan, R. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum.
- Deci, E. & Ryan, R. (2000). Self-Determination Theory and the Facilitation of Intrinsic
 Motivation, Social Development, and Well Being. American Psychologist, 55, 68-78.
- Gottfried, A.E. (1985). Academic Intrinsic Motivation in Young Elementary School Children. Journal of Educational Psychology, 77, 631 - 645.
- Horn, E. (1991). An Argument for Using Intrinsic Rather Than Extrinsic Motivation, with Specific Suggestions for Teachers. (ERIC Document Reproduction Service No. ED355036)
- Karsenti, T. & Thibert, G. (1996) A Motivation Scale for Elementary School Children: Refining the Extrinsic/Intrinsic Dichotomy (TM 025 325). New York, NY: Annual Meeting of the

American Educational Research Association. (ERIC Document Reproduction Service No. ED 397 139)

- Karsenti, T., & Thibert, G. (1995). What Type of Motivation is Truly Related to School Achievment? A look at 1428 High-School Students. Paper presented at Annual Meeting of the American Educational Research Association, San Francisco, CA.
- Maehr, M. & Midgley, C. (1991). Enhancing Student Motivation: A Schoolwide Approach. Educational Psychologist, 26, 399-427.

Stipek, D. (1998). Motivation to Learn (3rd ed.). Massachusetts City, MS: Allyn and Bacon.

- Vallerand, R., Blais, M., Briere, N., & Pelletier, L. (1989). Construction et validation de l'Echelle de Motivation en Education. *Revue canadienne des sciences du comportement, 21,* 323-349.
- Weiner, B. (1979). A Theory of Motivation for Some Classroom Experiences. Journal of Education Psychology, 71, 3 - 25.

Appendix A Summary of AAMS Survey Results

		do co at	1 ores not contemporal vertail	2 rresponds co ry little so	3 orresponds omewhat	4 corresponds	5 corresponds well	6 corresponds strongly	7 corresponds very strongly
		T =	4.5 (2)	4.5 (2)	9.1 (4)	27.3(12)	15.9 (7)	22.7(10)	15.9 (7)
9.	For the pleasure I feel when I discover new things	M = F =	1	2 4.3 (1) 4.8 (1)	3 8.7 (2) 9 5 (2)	4 17.4 (4) 38 1 (8)	5 17.4 (4) 14 3 (3)	6 30.4 (7) 14 3 (3)	7 21.2 (5) 9 5 (2)
_		T =					4.5 (2)	40.9(18)	54.5(24)
8.	To be able to get a better job in the future.	M = F =	1	2	3	4	.5 8.7 (2)	6 39.1 (9) 42 9 (9)	7 52.2(12) 57 2(12)
-		T =		13.6 (6)	11.4 (5)	13.6 (6)	15.9 (7)	11.4 (5)	34.1(15)
7.	To prove to myself that I can finish high school	M = F =	1	2 17.4 (4) 9.5 (2)	3 4.3 (1) 19.0 (4)	4 8.7 (2) 19.0 (4)	5 17.4 (4) 14.3 (3)	6 13.0 (3) 9.5 (2)	7 39.1 (9) 28.6 (6)
		<u>T =</u>	9.1 (4)	15.9 (7)	9.1 (4)	27.3(12)	13.6 (6)	11.4 (5)	11.4 (5)
5.	when I outperform myself.	M = F =	1 8.7 (2) 9.5 (2)	2 8.7 (2) 23.8 (5)	3 4.3 (1) 14.3 (3)	4 21.2 (5) 33.3 (7)	5 21.2 (5) 4.8 (1)	6 17.4 (4) 4.8 (1)	7 13.0 (3) 9.5 (2)
	Free the plane of the l		50.8 (25)	10.2 (0)	9.1 (4)	4.5 (2)	0.8 (5)	2.5 (1)	2.5 (1)
	really feel that I'm wasting my time in this	M = F = T =	43.5 (10) 71.4 (15) 56 8 (25)	21.2 (5) 14.3 (3)	8.7 (2) 9.5 (2) 9.1 (4)	8.7 (2)	13.0 (3)	4.3 (1)	4.8 (1)
5.	I honestly have no idea; I		1	2	3	4	5	6	7
		F = T =	4.8 (1) 4.5 (2)	9.5 (2) 4.5 (2)	4.8 (1) 2.3 (1)	28.6 (6) 29.5(13)	28.6 (6) 27.3(12)	23.8 (5) 25.0(11)	4.5 (2)
ŀ.	Because I have fun in this class.	M =	1 4.3 (1)	2	3	4 30.4 (7)	5 26.1 (6)	6 26.1 (6)	7 8.7 (2)
_	prepare me for my future career.	F = T =				4.8 (1) 2.3 (1)	23.8 (5) 15.9 (7)	23.8 (5) 38.6(17)	42.9 (9) 40.9(18)
3.	Because I believe that	M=	1	2	3	4	5	6	7
	i learn new unings.	M = F = T =	4.3 (1) 4.8(1) 4.5 (2)	4.8 (1) 2.3 (1)	4.3 (1) 14.3 (3) 9.1 (4)	30.4 (7) 9.5 (2) 20.5 (9)	39.1 (9) 38.1 (8) 38.6(17)	13.0 (3) 23.8 (5) 18.2 (8)	8.7 (2) 4.5 (2)
2.	Because I feel good when		1	2	3	4	5	6	7
_	find a well paying job.	**F = ***T =				2.3 (1)	14.2 (3) 13.6 (6)	33.3 (7) 31.8(14)	52.4(11) 52.2(23)
	Because without a high school diploma I will not	*M =	1	2	3	4 4.3 (1) ^t	5 13.6 (3)	6 30,4 (7)	7 52.2(12)

Why do you attend school? Why do you attend this class?

		do co at	all	rresponds co ry little so	orresponds of omewhat	4 corresponds	orresponds well	corresponds strongly	corresponds very strongly
			1	2	3	4	5	6	7
	trankly, I don't care.	· F = T =	76.2 (16) 65.9 (29)	9.5 (2) 11.4 (5)	4.5 (2)	9.5 (2) 13.6 (6)	2.3 (1)		4.8 (1) 2.3 (1)
	attend this class and	M =	56.5 (13)	13.0 (3)	8.7 (2)	17.4 (4)	4.3 (1)		
19.	I can't figure out why I		1	2	3	4	5	6	7
		T =	9.1 (4)	6.8 (3)	2.3 (1)	20.5 (9)	31.8(14)	18.2 (8)	11.4 (5)
		F =	9.5 (2)	9.5 (20	4.8 (1)	28.6 (6)	19.0 (4)	19.0 (4)	9.5 (2)
	class.	M =	8.7 (2)	4.3 (1)		13.0 (3)	43.5(10)	17.4 (4)	13.0 (3)
18.	Because I feel good in this		1	2	3	4	5	6	7
		T =					11.4 (5)	56.8(25)	31.8(14)
	choice.	$\mathbf{F} =$					14.3(3)	57 1(12)	28 6 (6)
17.	Because it will help me	M-	1	2	3	4	5	6	7
	me.	<u>T =</u>	2.3 (1)	6.8 (3)	6.8 (3)	18.2 (8)	22.7(10)	20.5 (9)	22.7(10)
	the subjects which interest	F =		4.8 (1)	14.3 (3)	19.0 (4)	19.0 (4)	19.0 (4)	23.8 (5)
	when I learn more about	M =	4.3 (1)	8.7 (2)	-	17.4 (4)	26.1 (6)	21.2 (5)	21.2 (5)
16.	For the pleasure I feel		1	2	3	4	5	6	7
		T =	2.3 (1)	2.3 (1)	2.3 (1)	9.1 (4)	18.2 (8)	18.2 (8)	43.2(19)
		F =	4.8 (1)	4.8 (1)		9.5 (2)	23.8 (5)	19.0 (4)	33.3 (7)
15.	later on in my life.	M =	1	2	3 4.3 (1)	4 8.7 (2)	5 13.0 (3)	6 17.4 (4)	7 52.2(12)
1.0	D								
		T =	2.3 (1)	6.8 (3)	2.5 (1)	18.2 (8)	18.2 (8)	22.7(10)	29.5(13)
	about myself.	F =	4.8 (1)	9.5(2)	4.8(1)	23.8 (5)	19.0 (4)	190(4)	190(4)
14.	Because passing this class	M-	1	2	3	4	5	6	7
					(0)	21.0(14)		20.0 (5)	10.7 (1)
	murviduai assignment.	r = T =	4.8(1)	9.5 (2) 9.1 (4)	9.5 (2)	33.3(7) 27.3(12)	4.8(1) 9.1(4)	14.3(3) 20.5(9)	23.8 (5)
	when I complete an	M =	4.3 (1)	8.7 (2)	13.0 (3)	21.2 (5)	13.0 (3)	26.1 (6)	8.7 (2)
13.	For the pleasure that I feel		1	2	3	4	5	6	7
	wity 1 do.	1-	50.0 (22)	27.3(12)	2.2 (1)	10.2 (0)	2.5 (1)		
	class, I no longer know	F= T=	57.1 (12)	33.3(7)	25(1)	9.5 (2)	25(1)		
	reasons to attend this	M =	43.5 (10)	21.2 (5)	4.3 (1)	26.1 (6)	4.3 (1)		
12.	In the past, I had good		1	2	3	4	5	6	7
		<u> </u>	4.5 (2)	4.5 (2)	13.6 (6)	9.1 (4)	31.8(14)	25.0(11)	11.4 (5)
		F =	4.8 (1)	4.8 (1)	19.0 (4)	14.3 (3)	28.6 (6)	19.0 (4)	9.5 (2)
	this class.	M =	4.3 (1)	4.3 (1)	8.7 (2)	4.3 (1)	34.8 (8)	30.4 (7)	13.0 (30
11	Because I like attending		1	2	3	4	5	6	7
		<u>T</u> =	2,3(1)			4.5 (2)	15.9 (7)	36.4(16)	40.9(18)
	field which interests me.	F =	4.8 (1)			4.8 (1)	4.8 (1)	42.9 (9)	42.9 (9)
	allow me to find a job in a	M =		_		4.3 (12)	26.1 (6)	30.4 (7)	39.1 (9)
0.	Because it will eventually		1	2	3	4	5	6	7

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		do co at	es not co prespond ve all	rresponds or ry little se	orresponds ornewhat	corresponds	corresponds well	corresponds strongly	corresponds very strongly
			1	2	3	4	5	6	7
_	high school.	T =			4.5 (2)	13.6 (6)	20.5 (9)	15.9 (7)	45.5(20)
	academically successful in	F =			0.7 (2)	14.3 (3)	28.6 (6)	9.5 (2)	47.6(10)
28.	Because I want to prove to myself that I can be	M =	1	2	3 87(2)	4	5	6	7
	special things.	T =	2.3 (1)	9.1 (4)	9.1 (4)	13.6 (6)	25.0(11)	18.2 (8)	20.5 (9)
	accomplishing new or	F =	4.8 (1)	9.5 (2)	14.3 (3)	19.0 (4)	23.8 (5)	9.5 (2)	14.3 (3)
	me to take pleasure in	M =	-	8.7 (2)	4.3 (1)	8.7 (2)	26.2 (6)	26.1 (6)	26.1 (6)
27.	Because this class allows		1	2	3	4	5	6	7
	ware at the allos.	T =	65.9 (29)	18.2 (8)	2.3 (1)	6.8 (3)	2.3 (1)	2.3 (1)	2.3 (1)
	doing in this class	F =	71.4 (15)	19.0 (4)	48(1)	13.0 (3)	4.5 (1)	4.8(1)	4.5 (1)
26.	I have no idea. I can't	M -	1	2	3	4	5	6	7
		= 1	9.1 (4)	9.1 (4)	9.1 (4)	20.5 (9)	34.1(15)	11.4 (5)	2.3 (1)
		F =	14.3 (3)	4.8 (1)	19.0 (4)	23.8 (5)	28.6 (6)	4.8(1)	22/12
	stimulating.	M =	4.3 (1)	13.0 (3)		17.4 (4)	39.1 (9)	17.4 (4)	4.3 (1)
25.	Because I find this class		1	2	3	4	5	6	7
		T =	2.3 (1)		6.8 (3)	20.5 (9)	13.6 (6)	36.4(16)	18.2 (8)
	for the job market.	F =	4.8 (1)		14.3 (3)	19.0 (4)	14.3 (3)	38.1 (8)	9.5 (2)
	make me more competent	M =				21.2 (5)	13.0 (3)	34.8 (8)	26.1 (6)
24.	Because this class will		1	2	3	4	5	6	7
	me.	T =	2.3 (1)	6.8 (3)	11.4 (5)	6.8 (3)	25.0(11)	29.5(13)	13.6 (6)
	many things that interest	F =	4.8 (1)	9.5 (2)	19.0 (4)	4.8 (1)	23.8 (5)	28.6 (6)	9.5 (2)
23.	Because this class allows me to learn more about so	M =	1	2 4.3 (1)	3 4.3 (1)	4 8.7 (2)	5 26.1 (6)	6 30.4 (7)	7 17.4 (4)
		1 -	2.5 (1)	2.3 (1)	1.5 (2)	0.0 (3)	10.2 (0)	54.1(15)	51.0(14)
		T =	4.8(1)	23(1)	4.8(1)	68(3)	23.8 (50	36.1 (8)	28.0 (0)
	on.	M =	4.9.(1)	4.3 (1)	4.3 (1)	13.0 (3)	13.0 (30	30.4 (7)	34.8 (8)
22.	To earn more money later		1	2	3	4	5	6	7
		T =	4.5 (2)	4.5 (2)	4.5 (2)	15.9 (7)	20.5 (9)	20.5 (9)	27.3(12)
		F =	()	4.8 (1)	4.8 (1)	19.0 (4)	23.8 (5)	19.0 (4)	28.6 (6)
.1.	am smart.	M =	8.7 (2)	4.3 (1)	4.3 (1)	13.0 (3)	5 17.4 (4)	21.2 (5)	26.1 (6)
01	To prove to muself that I		1	2	2	4		6	7
	projects.	T =	4.5 (2)	11.4 (5)	6.8 (3)	25.0(11)	20.5 (9)	25.0(11)	6.8 (3)
	involved in activities and	F =	4.8(1)	19.0 (4)	4.8 (1)	33.3 (7)	14.3 (3)	19.0 (4)	4.8(1)
	when I'm actively	M =	4.3 (1)	4.3 (1)	8.7 (2)	17.4 (4)	26.1 (6)	30.4 (7)	8.7 (2)
20.	For the satisfaction I feel		1	2	3	4	5	6	7

*

% of total males in sample choosing response % of total females choosing response % of total sample choosing response Values inside of brackets represent actual number of respondents. ** ***

Appendix B AAMS Survey

Types of Motivation

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Answer the following questions (circle the appropriate number)

1. How old are you? (1) [11 yrs old], (2) [12 yrs old], (3) [13 yrs old], (7) [17 yrs old], (8) [18 yrs old or more]	(4) [14 yrs old],	(5) [15 yrs old],	(6) [16 yrs old],
2. What gender are you?			
(1) [girl]; (2) [boy]		······································	
3 Do you work while you go to school?			

(1) [Yes], (2) [No]

4. If so, how many hours per week, on average? (1) [0-5 (1)], (2) [6-10], (3) [11-15], (4) [16 or more]

5. What was your approximate grade point average last year ?
(1) [60% or less (C - or less)], (2) [61%-70%(C)], (3) [71%-80%(C+)], (4) [81%-90%(B)], (5) [91%-100%(A)]

6. What was your final letter grade in science last year?
 (1) [C - or less], (2) [C], (3) [C+], (4) [B], (5) [A]

PART 2, INSTRUCTIONS:

Indicate to which extent each of the following statements corresponds at this point to one of the reasons why you are attending school or this class.

Does not correspond at all	Corresponds very little	Corresponds somewhat	Corresponds	Corresponds well	Corresponds strongly	Corresponds very strongly
1	2	· 3	4	5	6	7

WHY DO YOU ATTEND SCHOOL ? WHY DO YOU ATTEND THIS CLASS?

 Because without a high school diploma I will not find a well paying job. 	1	2	3	4	5	6	7
2. Because I feel good when I learn new things.	1	2	°3	4	E J	8	7
3. Because I believe that high school will better prepare me for my future career.	1	2	3	4	5	5	7
4. Because I have fun in this class.	1	2	3	4	5	6	7
 I honestly have no idea; I really feel that I 'm wasting my time in this class. 	1	2	3	4	5	6	7
6. For the pleasure I feel when I outperform myself.	1	2	3	4	5	6	7
7. To prove to myself that I can finish high school.	1	2	3	4	5	6	7
8. To be able to get a better job in the future.	1	2	3	4	5	6	7
9. For the pleasure I feel when I discover new things.	1	2	3	4	5	eg G	7

Does not correspond at all	Corresponds very little	Corresponds somewhat	Corresponds	Corresponds well	Corresponds strongly	Corresponds very strongly
1	2	3	4	5	6	7

Types of Motivation

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WHY DO YOU ATTEND SCHOOL ? WHY DO YOU ATTEND THIS CLASS?

10.	Because it will eventually allow me to find a job in a field which interests me.	1	2	3	4	5	6	7
11.	Because I like attending this class.	1	2	3	4	5	6	7
12.	In the past, I had good reasons to attend this class, I no longer know why I do .	1	2	3	4	5	6	7
13.	For the pleasure that I feel when I complete an individual assignment .	1	2	3	4	5	6	7
14.	Because passing this class will help me to feel good about myself.	1	2	3	4	5	6	7
15.	Because I want to be rich later on in my life.	1	2	3	4	5	6	7
16.	For the pleasure I feel when I learn more about the subjects which interest me.	1	2	3	4	5	6	7
17.	Because it will help me make a better career choice.	1	2	3	4	5	6	7
18.	Because I feel good in this class.	1	2	3	4	5	6	7
19.	I can't figure out why I attend this class and frankly, I don't care.	1	2	3	4	5	6	7
20.	For the satisfaction I feel when I'm actively involved in activities and projects.	1	2	3	4	5	6	7
21.	To prove to myself that I am smart.	1	2	3	4	5	6	7
22.	To earn more money later on.	1	2	3	4	5	6	7
23.	Because this class allows me to learn more about so many things that interest me .	1	2	3	4	5	6	7
24.	Because this class will make me more competent for job market.	the 1	2	3	4	5	6	7
25.	Because I find this class stimulating.	1	2	3	4	5	6	7
26.	I have no idea. I can't understand what I am doing in t	his cla 1	ss. 2	3	4	5	6	7
27.	Because this class allows me to take pleasure in accomplishing new or special things.	1	2	3	4	5	6	7
28	Because I want to prove to myself that I can be acade successful in high school.	mically 1	2	3	4	5	6	7

25, 2001

Mr. Napier

Id like to request your permission to conduct my Masters Degree research project with two es of Grade 8 science students this fall.

lan is to use an instrument that will determine what type of motivation the students are nding to, either intrinsic or extrinsic. At the end of the first term or possibly at the end of ourse I intend to compare academic achievement to the primary motivational style of the nt by using a statistical analysis to determine if a significant relationship exists between the variables.

than twenty minutes to complete the survey, my project will cost no additional actional time and have no impact on the instructional content of the course. Prior to instering the motivation survey, a permission letter will be sent home to all parents of ents involved. Only those students with returned and signed consent forms will participate e study. Prior to its administration the survey will be presented to the UNBC Research as Board for approval. Students will of course remain anonymous throughout the study.

copic of student motivation is one of ongoing concern to all classroom teachers, but cularly at the junior secondary level where physical and emotional change combine to create antial distractions. I hope the results of my research project offer some insights into this

k you for your time. I look forward to hearing from you.

erely yours

andall Z Ban

all Barr

Adrian Monych School Principal

n:	Thierry Karsenti <thierry.karsenti@umontreal.ca></thierry.karsenti@umontreal.ca>	
	Randall & Jean Barr <rbarr@guesnelbc.com></rbarr@guesnelbc.com>	
t:	June 24, 2001 3:17 PM	
ject:	Re: The Adolescents' Academic Motivation Scale	

ase do not hesitate to contact me at the beginning of August...

ards.

erry Karsenti

erry Karsenti wrote:

Sir,

I would be more than happy to let you use a version of the AAMS. We could also further discuss how to use the instrument.

I am leaving for Europe (conferences) in three days and will not be back in my office before August 6. I could then call you to explain how to use the scale.

I hope this is OK.

Regards,

Thierry Karsenti

Randall & Jean Barr wrote:

Hello Dr. Karsenti My name is Randall Barr. I am a high school chemistry teacher in Quesnel, BC, a small forestry community about 700 km north of Vancouver. 1 am currently working on my Masters Degree in Education at the University of Northern British Columbia in Prince George, BC. In a recent graduate course in Motivation, I wrote a research paper on Deci and Ryan's 1985 theory of motivation. As part of my paper I cited your research findings in your 1995 paper "What Type of Motivation is Truly Related to Student Achievement? A look at 1428 High School Students". As a high school teacher finishing my twenty-first year of teaching, the topic of student motivation is very important to me. For my final Masters project I would like to repeat a similar study on motivation and achievement on a group of 50 grade 8 science students in Quesnel in the upcoming 2001 - 2002 school year. Unlike the Montreal students in the 1995 study, my students are primarily rural, with very little or no experience with an urban environment. I would like to ask you if I could please use your instrument "The Adolescents' Academic Motivation Scale (AAMS)" to conduct my research. If you could send me a copy of the

this is a large request from a complete stranger, but your cooperation in this

instrument and a key to evaluate it, I will gladly send you a copy of my final paper and give you complete access to any of my findings. I understand that

June 28, 2001

Mr. Randall Barr

Fandall Dear Mr. Barr:

Thank you for your recent letter in which you state your intention to conduct a research project with two Grade 8 Science classes as part of your UNBC Masters Degree Program. Permission is granted for you to conduct this research as you have requested. Please be advised that I would like to see a copy of the instrument that you will use to determine what type of motivation the students are responding to, either intrinsic or extrinsic.

Please be cautioned that the utmost care must be taken to ensure confidentiality with respect to student information. It is understood that you will follow the University's Code of Ethics with regard to research methodologies and that you have the consent and cooperation of the School Principal in proceeding with this portion of your project.

I wish you every success in the completion of your Masters Program. Please advise if I can be of assistance. I would be pleased to review the outcomes of your project, once completed.

Yours sincerely,

S

Ed Napier Superintendent of Schools

EN:sb

cc: Mr. A. Monych, Principal, Correlieu Secondary School Personnel File

(teach-barr)

Appendix F Letter of Consent from School Principal

A. MONYCH, Principal

J. STEWART, Vice Principal

August 21, 2001

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Dear Mr. B. Barr:

I have recently received a letter from Mr. Napier approving your proposed study of student motivation. I understand that you will be conducting a survey with a number of your grade eight classes and that you will be obtaining parental permission for the survey. I support your project and the survey that you will conduct. I would very much like to review the results with you to see if there are actions that the school as a whole can undertake to improve student motivation.

Yours truly,

Adrian Monych

September 26, 2001

Dear Parent/Guardian;

As your child's Science 8 teacher this year I am conducting a research study into motivation and student achievement as part of my Masters Degree program. I would like to give each student a simple 28 item survey which will ask questions regarding their own reasons for attending class, performing homework, and believing school to be important. The 15 minutes that the survey requires for completion will be the only time lost or disruption of any form that this study will have on the regular Science 8 program. The results of the survey will be kept absolutely confidential and no one other than myself will examine them. Students will remain anonymous throughout the study and no names of individuals will appear anywhere in the research. The surveys will be stored under lock and key in the school vault for the duration of the study. Participation is purely voluntary and students may withdraw at any time. The research posses no risk of any kind to the student and will have no effect on the student's mark for this course.

The purpose and goal of the research is to help teachers to better understand what types of motivation are linked to student achievement. I hope that this will enable teachers to improve their delivery of instruction and the desire of their students to learn and be successful in school. The ability of teachers to understand what motivates students is critical in designing appropriate activities to foster student learning.

I would greatly appreciate your cooperation in signing this form below authorizing your son or daughter to be a part of this study. If you are interested, a photocopy of the study's results will be made available to parents in the school office by late spring. If you have any questions do not hesitate to contact me at 992-7007. If you have any concerns regarding this project please contact the Vice President of Research at UNBC (960-5820). Thank you.

Sincerely yours

Mr. R. J. Barr

Mr. R. T. Barr

Signature of Parent

Date

Signature of Student

Date

Please return As Soon As Possible

UNIVERSITY OF NORTHERN BRITISH COLUMBIA

3333 University Way, Prince George, BC V2N 4Z9

Dr. Alex C. Michalos Chair, Research Ethics Board Tel: (250) 960-6697 Fax: (250) 960-5746 E-mail:michalos@unbc.ca



UNBC Research Ethics Board

October 2, 2001

Randall T. Barr 2254 Bartkow Road Quesnel, BC V2J 7B3

RE: Proposal 2001.0911.74 Motivation and Student Achievement in Grade 8 Science

Dear Randall:

Thank you for submitting the revised documentation for the above noted research project. Your project has now been approved and you may commence your research.

If you have any questions, please feel free to contact me.

Sincerely,

Cely mich L

Alex C. Michalos Chair, Research Ethics Board