

## Chapter 22

# Motivation and Academic Achievement: The Effects of Personality Traits and the Quality of Experience

Mihaly Csikszentmihalyi and Maria Mei-ha Wong

Despite increasing concern with how little American students seem to be learning in school, not much is known about the personality and motivational factors involved in academic performance. The literature deals almost exclusively with the cognitive dimensions of the problem—how to break down, present, and transmit information to students (U.S. Department of Education 1986). Yet it seems the problem is not that students cannot learn the material, but that they do not want to learn it. Motivational and affective obstacles, rather than cognitive ones, appear to be at the root of the educational deficits of our students (Csikszentmihalyi 1988, 1990a; Deci and Ryan 1985b; Dweck and Elliott 1983; Harter and Connell 1984; Lepper and Hodell 1989).

This situation is especially obvious among gifted and talented children. As Bloom (1985) has found, extraordinary motivation and support are needed to develop outstanding expertise. Studies on people of exceptional abilities have consistently shown that those with unusual accomplishments have a special

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M. Csikszentmihalyi (✉)  
Claremont Graduate University, Claremont, CA, USA  
e-mail: mihaly.csikszentmihalyi@cgu.edu

M. M. Wong  
University of Chicago, Chicago, USA

fascination for and involvement with their own work (Barron 1969; Bloom and Sosniak 1981; Renzulli 1986, for a review). Renzulli (1986) called this characteristic “task commitment.” Feldhusen (1986) and Haensly et al. (1986) have also affirmed the importance of motivation and commitment in their analyses of gifted people.

The view that motivation is indispensable for distinguished achievement is not new. In a longitudinal study of gifted people, Terman and Oden (1959) concluded that more successful gifted people differed from those who were less successful in certain personality and motivational characteristics. These included persistence in the accomplishment of ends, integration towards goals, and drive to achieve. Roe (1952) and MacKinnon (1965) also found that creative people had a high level of commitment, enthusiasm, and determination.

However, during the years of adolescence, a very large proportion of talented youth gives up the strenuous training required to acquire mastery in a field, and opts for an easier lifestyle (Csikszentmihalyi and Robinson 1986). There is no question that the task of developing cognitive abilities, or of potential in general, presents emotional and motivational hurdles. In a recent study of normal adolescents, for instance, studying and doing homework were associated with a low level of motivation and happiness (Csikszentmihalyi and Larson 1984).

## Long-Term and Short-Term Rewards

In considering academic motivation, it is useful to identify two kinds of motivation: one based on the expectation of long-term rewards (e.g., fulfilling career expectations or psychological needs) and one based on the rewards of ongoing experience (e.g., enjoying the activity itself). The first type of motivation can be either extrinsic or intrinsic. If the long-term goals are autonomously chosen, their attainment would be intrinsically motivating (Deci and Ryan 1985a, 1987), yet the person may not necessarily enjoy the process of working toward these goals. The second type of motivation, based on immediate experience, always tends to be intrinsic, in that the rewards are inherent in the activity itself.

Rathunde (1989a, b) has argued that both long-term goals and momentary experience affect academic achievement. According to him, a high level of involvement in schoolwork and an awareness of the relationship between immediate experience and long-term goals would enhance academic performance.

Although both long-term and short-term rewards may be indispensable for outstanding achievement, it is not clear how they are related to one another. For example, in order to get good grades, a student must be willing to work hard and persist in spite of difficulties. This means certain other short-term goals (e.g., watching TV, going out with friends) cannot be fulfilled. Moreover, because long-term goals rarely provide immediate feedback, a successful student has to live with frustration, anxiety, and uncertainty. He or she may not enjoy schoolwork or feel happy while studying; as a result, the intensity of involvement may suffer and the quality of work may deteriorate. It will be hard for a person to keep on studying if

it brings absolutely no short-term rewards. However, if exclusive emphasis is put on immediate enjoyment, it may also be difficult to attain long-term goals. For instance, any temporary setback may disillusion a student and prevent further involvement with schoolwork.

## Personality, Motivation, and Achievement

Achievement motivation is the most widely studied personality characteristic that is believed to affect academic outcomes. The pioneers of this field focused on the need to achieve (Atkinson 1957, 1964; Atkinson and Feather 1966; Heckhausen 1967; McClelland et al. 1953). Achievement motivation has been defined as an individual characteristic reflecting the tendency “to strive to do something difficult as well and as quickly as possible” (Murray 1938, p. 81); the capacity to experience pride in successes and shame in failures (Atkinson 1964); and the willingness to work hard to attain excellence (Jackson 1984). The construct was originally measured by the Thematic Apperception Test (TAT; McClelland et al. 1953) and later questionnaire measures (e.g., the Personality Research Form [PRF; Jackson 1967, 1984]). A positive relationship between scholastic performance and achievement motivation, as measured by questionnaires, was consistently reported in numerous studies (Demos and Weijola 1966; Fink 1962; Gough 1964a, b, 1968; Gough and Fink 1964; Harper 1975; Keimowitz and Ansbacher 1960; Koenig and McKeachie 1959; Mason et al. 1966; Schneider and Green 1977). No major gender differences were reported.

However, the relationship between scholastic performance and the TAT measure of achievement motivation was more variable. Although some studies suggested that those who scored high on the TAT got better grades and selected relatively difficult fields of study (Atkinson and Litwin 1960; Kagan and Moss 1958; Raynor 1970; Veroff et al. 1960), many others reported insignificant relations between academic performance and achievement motivation [see Entwisle (1972) and Klinger (1966), for a review]. In several studies, the TAT measure of achievement motivation was positively related to scholastic performance for male respondents only (Crandall et al. 1962; Ratliff 1980; Shaw 1961; Stivers 1958).

McClelland (1980) suggested that operant measures like the TAT should be distinguished from respondent measures like personality tests. He argued that personality tests measure how much achievement is valued rather than achievement motivation. If one were to observe a significant relationship between academic performance and TAT measure of achievement, McClelland contended, it would be necessary to control for the probability of success or the level of risk in achievement situations. People with high need for achievement would only work hard if there is a moderate probability of success, not when the probability is either very high or very low.

Intrinsic motivation has been shown to have a positive impact on scholastic performance. The construct has been regarded as an attitude (Deci and Ryan 1985b; Lepper and Greene 1975; Lepper et al. 1973), a personality characteristic (Deci and Ryan 1985a, 1987), and an experiential variable (Csikszentmihalyi 1975, 1990b;

Csikszentmihalyi and Csikszentmihalyi 1988). Intrinsic motivation for specific subjects was positively correlated with achievement scores in the related content areas (Gottfried 1981). Students who reported that they did schoolwork for extrinsic reasons (e.g., to avoid disapproval) tended to score lower on the Stanford Achievement Test (Connell and Ryan 1985). When teachers were trained to promote intrinsic motivation in the classroom, the standardized achievement test scores of their students improved (DeCharms 1976). In other studies, intrinsic motivation was found to enhance conceptual learning (Grolnick and Ryan 1987) and recall of material learned (Ryan et al. 1984); extrinsic motivation impaired both. No important gender differences were reported in the above studies. In all but a few [e.g., Csikszentmihalyi (1975), Csikszentmihalyi and Csikszentmihalyi (1988)], intrinsic motivation was measured by questionnaires.

The above review leads to four observations. The first two involve theoretical issues while the last two pertain to methodological concerns. First, most studies focus solely on how a personality characteristic (e.g., achievement motivation) or an experiential construct (e.g., intrinsic motivation) affects scholastic achievement. Seldom do researchers consider them together. Although both appear to be positively related to scholastic achievement, it would be interesting to find out exactly what this relationship is and how it affects scholastic achievement. In the study described in this article, the relation between personality and experience and the relative effects on achievement were analyzed.

Second, few studies examine how scholastic performance is affected by personality characteristics other than achievement motivation and intrinsic motivation. Although achievement motivation has been widely studied, the effects of other personality characteristics (e.g., the ability to endure difficulty and to control one's impulses) on scholastic performance remain unclear. Intuitively, it seems reasonable to speculate that such a relationship exists and that it would have an impact on how achievement motivation affects scholastic performance. For instance, a person who is high on achievement motivation but low on impulse control and endurance is unlikely to succeed in school. Thus, it is important to consider several personality characteristics together. Many researchers have argued for the usefulness of "high-order traits," composed of different individual personality scales (Buss and Finn 1987; Costa and McCrae 1988; Goldberg 1982; John et al. 1984). Such traits can provide new insights as to how personality is related to everyday behavior, which may not otherwise be known by studying personality characteristics separately. In this article, we tried to identify a high-order trait that brings together personality characteristics that would facilitate productive work.

Third, intrinsic motivation is usually measured by one-time questionnaire items. Although such measures are certainly valid indicators of students' motivation for doing schoolwork, an instrument that allows the repeated measurement of motivation when students are actually studying might add valuable information. An example of such an instrument would be the Experience Sampling Method (ESM; Csikszentmihalyi and Larson 1987; Csikszentmihalyi et al. 1977; Larson and Csikszentmihalyi 1983). Subjects are asked to carry an electronic pager for a certain period of time (usually 1 week) and to answer questions about thoughts, activities,

and moods whenever they are signaled. An intriguing question is whether measures in natural settings are related to questionnaire measures at all. In fact, researchers have only begun to investigate questions of this sort (Diener et al. 1984; McAdams and Constantian 1983; Wong and Csikszentmihalyi 1991). By employing a well established personality questionnaire and the ESM, this study allows us to examine how questionnaire measures are related to measures in natural settings.

Fourth, when compared to research in achievement motivation and intrinsic motivation, very few studies have studied directly the relationship between ongoing experience and academic achievement. In the past, there was simply no easy way to measure the quality of experience in natural settings. It was not until the late 1970s that technology allowed the use of pager and electronic instruments to provide such measurement (Csikszentmihalyi and Larson 1987; Pervin 1985). In this study, the relation between experience while doing schoolwork and scholastic achievement was investigated.

## Daily Experience and Academic Achievement

There are many ways to measure experience in natural settings (e.g., Pervin 1985). Here, we focus on the ESM. Research with the ESM indicates that studying and schoolwork in general are among adolescents' least rewarding activities. When in class or doing homework they report low intrinsic motivation and negative experience. They generally feel sad, passive, constrained, bored, detached, and lonely (Csikszentmihalyi and Larson 1984). Very similar experiential patterns are obtained in other cultures, such as Italy (Carli et al. 1988) and South Korea (Won 1989).

Against this generally negative background, it seems that students who are motivated while studying perform better academically. For example, past studies (Csikszentmihalyi and Larson 1984; Mayers 1978) found that high-school students who disagreed more with the statement "Do you wish you had been doing something else?" when being paged in a given class received better grades in those classes. They also got better grades in classes they enjoyed more than in classes they enjoyed less.

In a study of talented math students, Nakamura (1988) contrasted a group of high achievers with a group of low achievers. These two groups differed significantly in how much they enjoyed schoolwork and how anxious they felt while doing it. The high achievers enjoyed their schoolwork 40 % of the time, the low achievers only 15 % of the time. By contrast the low achievers were anxious 54 % of the time while doing schoolwork, while high achievers were anxious only 30 % of the time. Similarly, Larson (1988) found a relationship between the ability to enjoy one's work and performance. He showed that controlling for ability, high-school students who enjoyed the various steps of writing a "junior theme" in English wrote essays that were rated higher by the faculty than students who were either anxious or bored while writing.

It seems clear that learning in school is not something young people find pleasant. However, as we described above, those who are able to enjoy their work

appear to perform better academically. The question this study raises is whether certain personality traits (e.g., achievement motivation, endurance) are related to the ability to derive short-term rewards from studying, and what their relative effects are on academic achievement.

The ESM measures personality characteristics by aggregating repeated self-reports over a week of paging. The assumption is that if, for example, a teenager marks the response “very much” to the item “Did you wish you were doing something else?” every time the pager signals while the student is studying, then that student has a low intrinsic motivation in schoolwork. This aggregate measure of many discrete self-reports collected in real-life contexts may not tap the same traits one would get from a more global personality test. It remains to be seen which approach (the one based on many micro measurements in real life, the other based on a single paper-and-pencil assessment) is more accurate in predicting academic achievement.

## **Goals of the Study**

In the present study, the following questions were explored: What dimensions of personality (“high-order trait”) are associated with the academic performance of talented students? How well do such personality characteristics predict scholastic achievement? How do the quality of experience while studying and the amount of time spent studying affect academic performance? Does daily experience mediate the effect of personality on academic performance? That is, does personality predict experience while studying which in turn predicts performance? Are these relationships the same for boys and girls?

## **Method**

### ***Subjects***

Teachers from two suburban Chicago high schools were asked to nominate students to participate in a 4-year longitudinal study. These students were either freshmen or sophomores who had talents in one or more of the following areas: mathematics, science, music, sports, and art. Three hundred and ninety-five students were nominated. Two hundred and eight students (58 %) agreed to participate in the study. All of them had excellent grades in the relevant subject(s). The average grades in talent areas in the first 2 years of the study were 3.79 for science, 3.38 for mathematics, 3.88 for music, 3.85 for sports, and 3.25 for art. The talented mathematics and science students had an average Preliminary Scholastic Achievement Test (PSAT) mathematics score of 59.6 (95th percentile of all U.S. juniors). Their average verbal score was 51.5 (93rd percentile for U.S. juniors).

Many of the talented music, athletic, and art students had won awards for their outstanding performance. When compared to other students, they took more courses and participated in more extracurricular activities related to their talents. The majority of the students were Caucasians from middle-class families.

In the first year of the study, 170 students (68 males, 102 females) completed the PRF and 208 students (96 males, 102 females) filled out the Experience Sampling Forms (ESFs).<sup>1</sup>

## *Measures*

*Personality.* The Personality Research Form (PRF; Form E) (Jackson 1984) measures 20 manifest needs originally defined by Murray (1938). The PRF shows both convergent and discriminant validity. Form E of the PRF consists of 352 true–false questions, which make up 20 personality scales<sup>2</sup> and two validity scales. The scales are balanced to control for acquiescence. The total score for each scale can vary from 0 to 16.

In order to identify the high-order traits that are associated with academic excellence, the personality scales of the PRF were factor-analyzed. The factor that was theoretically meaningful (i.e., contained the personality characteristics that were believed to be important in academic performance—for instance, the motive to achieve, to control impulses, endure, etc.) and had the highest correlation with academic performance was used in all subsequent analyses.

*Experience while studying.* The Experience Sampling Method (ESM) (Csikszentmihalyi et al. 1977; Larson and Csikszentmihalyi 1983) was used to measure experience while doing schoolwork and the percentage of time spent studying. The reliability and validity of the method have been demonstrated in a number of studies (Csikszentmihalyi and Larson 1987).

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<sup>1</sup> The fact that 170 students filled out the PRF and 208 students completed the ESF raises some concern about the missing data. As far as we know, there was no systematic difference between students who continued to participate in the study and those that did not. We could find only one difference between these two groups of students: The more talented the students were thought to be by teachers, the more likely they were to participate. All students who were nominated in three or more areas (i.e., math, science, music, athletics, or art) agreed to participate; about 8 out of 10 of those with two talents agreed, whereas slightly less than half of the single-talent students did. Another possible reason for subject attrition may have to do with the amount of time required to participate in the study. It is possible that some students agreed to take part in the study initially without thinking too much about the amount of time and effort required. In the first year of the study, students were required to complete several questionnaires and to be interviewed at least once. It seems understandable that some students decided to withdraw from the study.

<sup>2</sup> The 20 variables in PRF Form E are abasement, achievement, affiliation, aggression, autonomy, change, cognitive structure, defence, dominance, endurance, exhibition, harmavoidance, impulsivity, nurturance, order, play, sentience, social recognition, succorance, and understanding. The two validity scales are social desirability and infrequency (to identify invalid responses).

Students were asked to carry an electronic pager for 1 week and answered questions on the ESFs whenever they were signaled. The ESFs were bound in small pads (5.5" × 8.5"). Each pad had 15 self-report forms. Students received seven to nine random signals approximately every 2 h between 7 a.m. and 10 p.m. on weekdays and 9 a.m. and 12 midnight on weekends. In order to get a more representative sample of students' classes, signals were sent twice as often during weekdays before 3 p.m. All observations gathered when school was in session were therefore weighted as 0.5; all other observations were weighted as 1.

We focused on the following five experiential variables: intrinsic motivation, happiness, satisfaction about performance, concentration, and self-consciousness. These variables are believed to constitute different dimensions of experience (Csikszentmihalyi and Larson 1984). They were selected to be the focus of this study because they might have a close relation with academic achievement. A student who is more motivated, happier, less selfconscious, feels more satisfied about his or her work, and has higher concentration is likely to invest more time in studying, thus increasing the possibility of getting better grades. Another reason to select these variables is that they are empirically distinct. Higher correlated variables would present collinearity problems in regression analyses.

Intrinsic motivation, satisfaction with performance, concentration, and unself-consciousness were measured by the following questions, respectively, "Do you wish you had been doing something else?" "Were you satisfied with how you were doing?" "How well were you concentrating?" "How selfconscious were you?" Answers were indicated by ratings on a 10-point scale. Responses were recoded so that high scores implied a high level of motivation and unselfconsciousness. Happiness was measured by a semantic differential item: happy-sad. The score had a range of 1-7. A high score indicated a high level of happiness. To eliminate individual response biases, Z scores for each variable were computed. Responses were standardized by individual mean scores. The episodes in which students indicated that they were studying (see below) were then selected, and an average score of motivation, concentration, unselfconsciousness, and happiness was obtained for each variable.

Information about activities was obtained by the open-ended question, "What was the main thing you were doing?" Responses were first coded in a large number of specific categories (for purposes not related to this study). Categories were then collapsed into several groups for the present purposes—studying (which also included doing homework and preparing for examinations), informal social interactions (which included activities such as going to parties, dating, sexual activities, talking, going out, or meeting with friends, listening to other people, casual conversation on the phone, playing games, going downtown, cruising in a car, sightseeing, arguing with friends, etc.), watching TV, and others.

The question was coded by three experienced coders. At first, each of them coded 20 ESFs and discussed the differences in their codes. Later, they coded 60 ESFs without discussing them with one another. The interrater agreement ranged from 90 to 95 %. After this, they regularly checked their work with one another by coding the same ESFs.



The responses analyzed here were given by subjects who filled out at least 15 ESFs. Only those forms completed within 30 min after the signal were included. A total of 7,811 valid responses were given; students responded approximately 38 times on average ( $SD = 10.60$ , range = 15–63). Less than 7 % of students responded 20 times or less.

Originally, a total of 8,711 responses had been provided by the students. This amounts to a response rate of about 74 % (208 students, about 8 signals a day for 7 days). Nine hundred responses were deleted: The first response of every student was a practice trial and was therefore eliminated. In addition, incomplete responses and those that were given more than 30 min after the signal were also discarded.

According to Csikszentmihalyi and Larson (1984), respondents tend to vary in their compliance with the ESM. The response rate of blue-collar workers is 73 %, while some clerical and managerial workers respond up to 85 %. High-school students had a median response rate of 70 %. Therefore the response rate falls within expectations.

The data from the debriefing interview suggest that signals were usually not missed when studying or in school. Some students were unable to fill out their ESFs during examinations; however, they usually completed the form within 30 min of the signals even during examinations. The most common reasons for not responding to the signal immediately or not responding at all were as follows: technical problems related to beeper malfunction; forgetting to keep the beeper with them; doing competitive sports such as basketball or swimming; and engaging in activities such as napping or going to church.

*Scholastic achievement.* Information concerning grades was obtained at the end of the second year.<sup>3</sup> Grade-point averages (GPAs) were computed from all the courses that the student took during that year. Letter grades were converted into numbers: A, B, C, D, and E corresponded to 4, 3, 2, 1, and 0, respectively.

In addition to grades, we included the difficulty level of courses as an indicator of achievement. In this article, only the difficulty level of mathematics courses was analyzed. (Rating scales in other talent areas were still being developed when this article was written.) The difficulty scale for mathematics represents a Guttman scale. Students normally took lower level mathematics courses before proceeding to more advanced ones. The scale has a range of 0–9. A score of “0” indicates that no course was taken in an academic year. A score of “1” corresponds to the first two courses of elementary algebra; a score of “2,” the third course of elementary algebra and basic computer programming; a score of “3,” the two courses in plane

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<sup>3</sup> Grade information for the third and fourth years of the study was still incomplete when this article was written. The first-year GPA was not chosen as a dependent variable because we wanted to find a variable that was measured at a different time from when information about personality and experience was collected. This could ensure that the relationship between personality, experience, and grade, if found, was not simply due to the fact that they were measured in the same year. In the regression analyses, the first-year GPA was not used as a control because it was very highly correlated with the second-year GPA,  $r(195) = 0.91$ ,  $p < 0.0001$ .

geometry; a score of “4,” courses in geometry, advanced computer science, and the first course of advanced algebra; a score of “5,” advanced algebra and trigonometry; a score of “6,” college algebra and trigonometry; a score of “7,” courses in probability and statistics, analytic geometry, and advanced placement college computer science; a score of “8,” the first course on advanced placement calculus; and a score of “9,” the second course on advanced placement calculus.

*Aptitude.* Aptitude, which may confound the relations among achievement motivation, intrinsic motivation, and academic achievement, was measured by PSAT scores.<sup>4</sup> This widely used test of scholastic aptitude consists of a mathematics and a verbal part. The PSAT is similar to the Scholastic Achievement Test (SAT) and is designed for high-school sophomores and juniors. In the school we studied, it was usually taken in the second or third year. For the purpose of this article, the PSAT score was obtained by adding the mathematics and verbal scores.

### ***Procedure***

Students and parents were told that the study was designed to learn about the activities, thoughts, and feelings of adolescents. They were assured that the information obtained would be confidential.

Students were then scheduled for individual meetings with a member of the research staff. During the first meeting, the use of the pager and items in the ESF were discussed. Students filled out and discussed with the staff members a sample page of the ESF. They also completed a background questionnaire describing demographics and family relationships.

During the week, students carried the pager and filled out the ESF when they were signaled. After the paging, students were debriefed and were asked to describe their experience during the week and any problems they had with the pager. Finally, the PRF was given to be completed at home. GPAs and PSAT scores were collected from the school at the end of second and third years. Information concerning the courses taken by the respondents was collected at the end of each school year.

### ***Analytic Strategy***

The purposes of this article are to find out: (a) what personality variables are related to scholastic achievement; (b) how well personality and experiential (experience while studying, percentage of time spent studying) variables predict

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<sup>4</sup> Some argue that standardized tests are not much different from school grades as achievement indices. In view of the high correlation between the PSAT and later academic success and the discrepancies between PSAT scores and grades, we believe that the PSAT represents a valid measure of student scholastic aptitude.

academic performance; and (c) whether experiential variables mediate the effect of personality on scholastic achievement. The core of the analyses consists of factor and regression analyses.

First, the PRF scales were factor-analyzed (principal component analysis with varimax rotation). Many researchers have argued for the usefulness of using the five-factor model as the basis for a taxonomy of traits [see Costa and McCrae (1988), for a review]. These five factors are Neuroticism versus Emotional Stability, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Costa and McCrae (1988), working with an adult sample, showed that the 20 needs measured in the PRF can be meaningfully classified in the five-factor model. We believe that the five-factor model is appropriate in our study as well. A five-factor solution was therefore used in the analyses.

The factor that contains achievement motivation and personality scales that are presumably important in academic performance (e.g., the need to endure, the need to control one's impulses) was selected. Using the regression method, factor scores (mean = 0;  $SD = 1$ ) were computed for each student on this variable. These factor scores were then used in all subsequent analyses.

Second, in order to identify the direct and indirect effects of personality and ESM variables on scholastic achievement, a series of multiple regression models (ordinary least squares) were tested. Figure 22.1 summarizes the steps taken in the regression analyses. Any variable that has an arrow pointing to it was used as a dependent variable in a separate regression analysis. A variable from which the arrow originates was used as an independent variable.

It is important to note that path models such as Fig. 22.1 are not proof of causation. These models only help to estimate the strength of paths in any hypothesized causal model (Blalock 1964). The analyses in this article focus only on testing the model in Fig. 22.1. It is possible that reverse or reciprocal causality exists among the variables. Therefore, throughout this article, we will be very cautious about statements concerning causality. We are aware that such statements are only meaningful in the context of our hypothesized causal model.

There were two complications in the analyses, collinearity and the handling of missing cases. We encountered problems of collinearity in the process of identifying possible gender differences in the relationship between dependent and independent variables. Ideally, we would have combined boys and girls into one single data set and fit a model with interaction and main effects involving gender. However, because gender is a dummy variable, many of the interaction terms were highly correlated with the main effect terms and with one another. Moreover, the regression coefficients changed erratically when sex and its interaction terms were present in the model simultaneously. High correlation and erratic patterns of regression coefficients are indicative of multicollinearity (Draper and Smith 1981). Therefore, we conducted analyses separately for boys and girls. When significance tests of certain regression coefficients for the two groups showed different results (e.g., one is significant whereas one is not; one is significantly positive whereas the other is significantly negative), we assume that the two groups differed significantly from one another with respect to the effects of those independent variables.

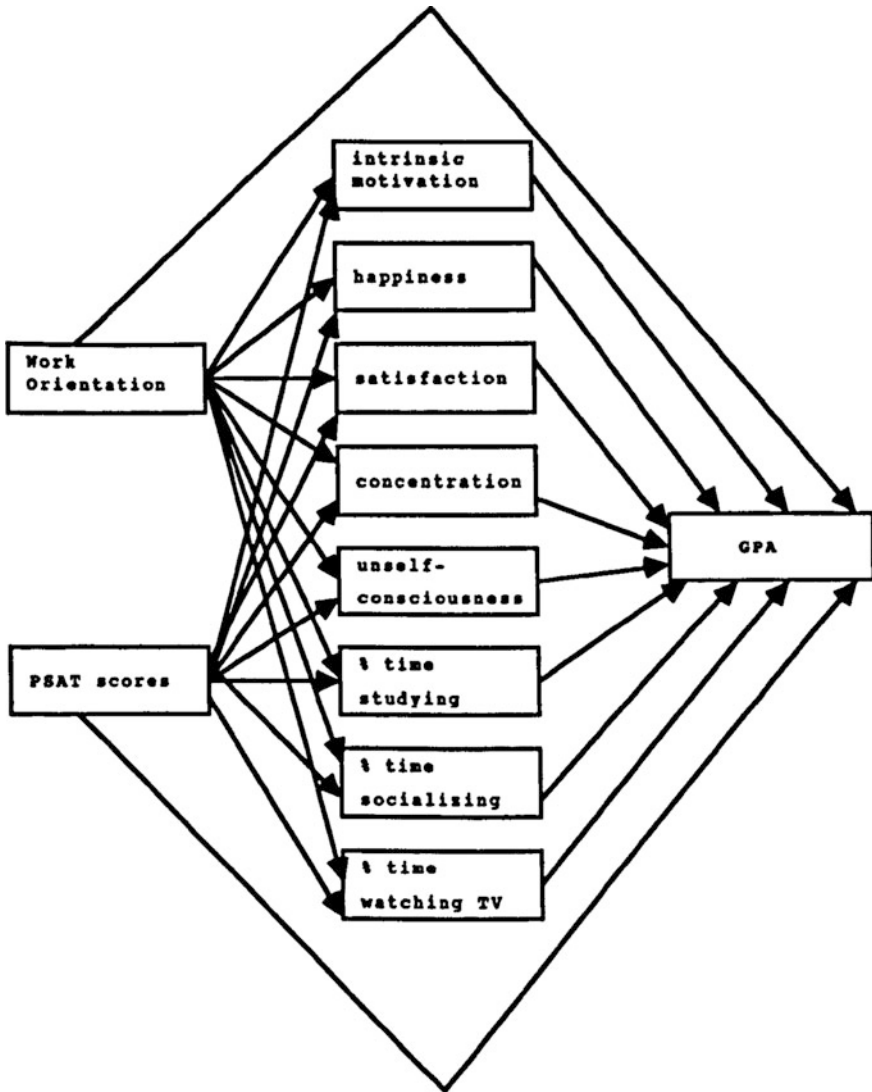


Fig. 22.1 Hypothetical relationships between personality, experience while studying, and grades

When the regression coefficients for boys and girls are both significant in the same direction,  $t$  tests were used to compare the coefficients of the two groups.  $T$  tests are appropriate for our purpose because the two samples are independent of one another and, under conventional assumptions of regression models, the least square estimators for the parameters generally are normally distributed.

We used the mean substitution method to handle missing cases. Employing listwise deletion excluded approximately 35–40 % of the data. According to (Bollen 1989; see also Haitovsky 1968; Kim and Curry 1977), researchers continue

to debate which way is least biased when dealing with missing values. We computed the regression analyses using listwise and pairwise deletion methods, and found the results to be similar to those obtained using the mean substitution method.

## Results

In this section, we will first present the results of the factor analysis on the PRF and the descriptive statistics for all variables. Then we will describe the multiple regression analyses on personality, experience, and scholastic achievement.

### *The “Work-Orientation” Factor*

A principal component analysis with varimax rotation was carried out on the PRF. The first factor that accounted for most of the variance was the same for both male (eigenvalue = 3.94, accounting for 19.7 % of variance) and female (eigenvalue = 3.60, accounting for 18.0 % of variance) students. The variables that loaded highly on the first factor were also similar for both genders. These variables were achievement (the tendency to aspire to accomplish difficult tasks, to maintain high standards, and to be willing to put forth effort to attain excellence), endurance (the willingness to work long hours), cognitive structure (the desire to make decisions based on definite knowledge), order (the concern with keeping personal effects and surroundings neat and organized), play (scored negatively) (the need to do many things “just for fun”), and impulsivity (scored negatively) (the tendency to act without deliberation) (Jackson 1984, pp. 6–7). The loadings of achievement, endurance, cognitive structure, order, play, and impulsivity were 0.75, 0.58, 0.82, 0.77, –0.59, and –0.85 for males and 0.72, 0.69, 0.72, 0.70, –0.51, and –0.76 for females. This finding is similar to the results reported by Costa and McCrae (1988). In this article we call this factor “work orientation,” for it consists of personality characteristics that together would facilitate the efficient use of personal energies and is therefore important for productive work. Factor scores were computed for each student. These scores were used in all subsequent analyses.

### *Descriptive Statistics*

Table 22.1 presents the mean scores and standard deviations of all variables. No significant gender differences were found. The mean GPA for all students was 2.98, an equivalent of a B, which was not as good as their performance in their own talent areas (see the Method section). The average PSAT verbal and mathematics scores were 46.48 (86th percentile of all U.S. juniors) and 52.51 (87th

**Table 22.1** Descriptive statistics

Variable	Mean	SD	Minimum	Maximum	N
<i>Work orientation</i>	0.00	1.00	-2.59	1.99	171
<i>PSAT</i>	98.94	20.34	46.00	149.00	206
<i>Experience while studying</i>					
Motivation	-0.51 <sup>a</sup>	0.54	-1.93	1.21	190
Happiness	-0.22 <sup>b</sup>	0.55	-3.56	1.38	189
Satisfaction with performance	-0.04	0.64	-2.97	1.99	190
Concentration	0.56 <sup>c</sup>	0.58	-1.54	1.83	191
Unselfconsciousness	0.18 <sup>d</sup>	0.62	-3.65	2.01	189
<i>Time budget</i>					
Percentage time studying	11.08	7.91	0.00	42.30	208
Percentage time socializing	14.08	8.61	0.00	47.40	208
Percentage time TV	9.15	7.05	0.00	32.00	208
<i>GPA</i>	3.04	0.70	0.58	4.00	208

<sup>a</sup> Mean Z score significantly different from zero:  $T(189) = 12.75, p < 0.001$

<sup>b</sup> Mean Z score significantly different from zero:  $T(188) = 5.50, p < 0.001$

<sup>c</sup> Mean Z score significantly different from zero:  $T(190) = 14.00, p < 0.001$

<sup>d</sup> Mean Z score significantly different from zero:  $T(188) = 3.60, p < 0.01$

percentile of all U.S. juniors), respectively. As a group, the aptitude of students in this study was above the average of U.S. normal adolescents (College Entrance Examination Board 1987).

As can be seen in Table 22.1, the experience of studying seems to be a negative one. Students were significantly less happy when they studied in comparison with the rest of the things they did during the week. Their level of motivation when studying was half a standard deviation lower than normal. However, their concentration was significantly higher and they were less self-conscious than normal. On average, students spent 11.08 % of their waking hours studying, doing homework, and preparing for examinations.

Table 22.2 lists the zero-order correlations of work orientation, PSAT scores, ESM variables, and GPAs. For both male and female students, PSAT scores had the strongest correlation with GPAs. Work orientation and percentage of time studying also correlated significantly with GPAs. Except for unselfconsciousness, none of the experiential variables had a significant relation with GPAs. GPAs had a negative relation with happiness while studying. A closer examination reveals that concentration while studying has a positive relation with GPAs for boys,  $r(80) = 0.22, p < 0.05$ , but not for girls,  $r(108) = -0.04, ns$ . Those who had good grades tended to have a strong work orientation but did not feel more intrinsically motivated or happier while studying. Work orientation was positively correlated with percentage of time studying and unselfconsciousness for all students. However, the correlation between work orientation and the other three experiential variables—motivation, happiness, and concentration while studying—was negligible. It appears that when compared to those with a low work

**Table 22.2** Zero-order correlation coefficients

	Work orientation	PSAT	Motivation	Happiness
<i>Work orientation</i>		-0.07	0.12	0.10
<i>PSAT</i>			-0.13	-0.10
<i>Experience while studying</i>				
Motivation				0.18**
Happiness				
Satisfaction with performance				
Concentration				
Unselfconsciousness				
<i>Time budget</i>				
Percentage Time studying				
Percentage Time socializing				
Percentage Time TV				
<i>GPA</i>				

Note Pairs of  $N = 134-190$

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

orientation, students with a high work orientation were likely to study more and tended to be less self-conscious while doing their schoolwork. However, they were not necessarily more motivated or happier while studying.

### ***Relations Among Work Orientation, Experience While Studying, and Grades***

To examine the relation among personality, experience, and grades, a series of multiple regression analyses were carried out separately for boys and girls. In the first stage of analyses, work orientation and PSAT scores were used to explain each ESM measure. In the second stage of analysis, work orientation, PSAT scores, and ESM measures were used to explain GPAs.

The results of the analyses are presented in Tables 22.3 and 22.4. The most striking results were the lack of significant effects. Controlling for PSAT scores, work orientation had significant effects on only two ESM variables, percentage of time spent studying and unselfconsciousness. This is true for both the male and female students. Work orientation had a substantial effect on percentage of time studying (males,  $\beta = 0.30$ ,  $p < 0.01$ ; females,  $\beta = 0.34$ ,  $p < 0.001$ ). The relation between work orientation and unselfconsciousness was relatively small (males,  $\beta = 0.14$ ,  $p = 0.19$ ; females,  $\beta = 0.13$ ,  $p = 0.18$ ; combined,  $\beta = 0.13$ ,  $p < 0.05$ ). High work orientation students, regardless of their academic aptitude, seemed to spend more time doing schoolwork and were less self-conscious while studying. Work orientation explained satisfaction with

**Table 22.3** Régression analyses predicting experience while studying

Independent variable	Dependent variables							
	Motivation		Happiness		Satisfaction		Concentration	
	B	Beta	B	Beta	B	Beta	B	Beta
Work orientation	0.01	0.02	0.01	0.02	0.17	0.22*	-0.03	-0.06
PSAT	-0.00**	-0.25**	-0.00	-0.13	-0.00	-0.04	-0.00	-0.00
Experience while studying								
Motivation								
Happiness								
Satisfaction								
with								
performance								
Concentration								
Unselfconsciousness								
Time budget								
Percentage time studying								
Percentage time socializing								
Percentage time TV								
$R^2$	0.06		0.02		0.06		0.00	

Time spent in different contexts, and grades among male students (unstandardized and standardized regression coefficients)

<sup>a</sup>  $p = 0.17$ ;  $p < 0.05$  when analyses were computed on the whole group

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

performance for boys only. How motivated, happy, and concentrated students were while studying and how much time they spent in socializing or watching TV were not affected by their work orientation.

Satisfaction	Concentration	Unself consciousness	Percentage time studying	Percentage time socializing	Percentage time TV	GPA
0.18	-0.03	0.15	0.34***	-0.08	-0.08	0.33***
-0.03	0.09	0.05	0.03	-0.08	0.09	0.51***
0.17**	0.03	0.07	0.16*	-0.02	0.01	-0.02
0.25***	0.01	-0.13	0.06	-0.25***	-0.07	-0.16*
	0.22***	0.20**	0.03	-0.10	0.01	0.03
		0	-0.13	0.01	0.02	0.07
			-0.03	0.11	-0.17*	0.26***
				-0.27***	-0.11	0.26***
					-0.21***	-0.05

Similar to work orientation, PSAT scores to a large extent did not predict any ESM measure. Controlling for work orientation, PSAT scores were negatively related to intrinsic motivation among boys, and there was no relation for girls. In



**Table 22.4** Regression analyses predicting experience while studying. Time spent in different contexts, and grades among female students (Unstandardized and standardized regression coefficients)

Independent variables	Dependent variables							
	Motivation		Happiness		Satisfaction		Concentration	
	B	Beta	B	Beta	B	Beta	B	beta
Work orientation	0.07	0.14	0.07	0.11	0.06	0.10	-0.00	-0.01
PSAT	0.00	0.04	-0.00	-0.05	0.00	0.04	0.00	0.12
Experience while studying								
Motivation								
Happiness								
Satisfaction with performance								
Concentration								
Unselfconsciousness								
Time budget								
Percentage time studying								
Percentage time socializing								
Percentage time TV								
$R^2$	0.02		0.02		0.01		0.02	

<sup>a</sup>  $p = 0.17$ ;  $p < 0.05$  when analyses were computed on the whole group

<sup>b</sup>  $p = 0.12$

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

other words, the higher the PSAT scores, the lower the boys' motivation while studying.

In the second stage of the analyses, work orientation, PSAT scores, and experiential variables were used to predict GPAs. Together they accounted for more than 40 % of the variance in both male and female groups. For all students, GPAs were most significantly explained by PSAT scores, followed by work orientation. Unselfconsciousness while studying also significantly predicted GPAs. Other experiential variables such as happiness, intrinsic motivation, and satisfaction about one's performance did not have any effect on GPAs. Percentage of time spent in informal social interaction and watching TV was also unrelated to GPAs.

Some gender differences were found. Among boys, concentration while studying had a significant positive effect on GPAs. Among girls, percentage of time while studying had a significant positive relationship with GPAs, even when work orientation was controlled.

Dependent variables									
Unselfconsciousness		Percentage time studying		Percentage time socializing		Percentage time TV		GPA	
B	Beta	B	Beta	B	Beta	B	Beta	B	Beta
0.11 <sup>a</sup>	0.14 <sup>a</sup>	2.81 <sup>**</sup>	0.30 <sup>**</sup>	-1.29	-0.15	0.03	0.00	0.25 <sup>***</sup>	0.31 <sup>***</sup>
0	0.03	0.02	0.05	-0.03	-0.07	0.03	0.07	0.02 <sup>***</sup>	0.45 <sup>***</sup>
								-0.14	-0.12
								-0.08	-0.06
								-0.05	-0.05
								0.35 <sup>**</sup>	0.26 <sup>**</sup>
								0.20 <sup>*</sup>	0.19 <sup>*</sup>
								0.01	0.12
								-0	-0.06
								0	0.01
0.02		0.08		0.02		0		0.44 <sup>***</sup>	

Combining the results from the first and second stages of the regression analyses, we found that controlling for academic aptitude, work orientation had both direct and indirect effects on GPAs. For all students, unselfconsciousness mediated the effect of work orientation on GPAs. The percentage of study time mediated the effect of work orientation on GPAs only for female students. One experiential variable, concentration, had a significant direct effect on GPAs for male students.

### Relations Among Work Orientation, Experience while Studying and the Difficulty Level of Mathematics Courses

In order to understand how the difficulty level of courses was related to personality and experience while studying, students talented in mathematics ( $N = 64$ ) were selected for further regression analyses. The difficulty level of mathematics courses in the second, third, and fourth years of high school was separately regressed on work orientation, experiential measures while doing mathematics, and ability. We decided to perform these analyses on all students instead of performing separate analyses for boys and girls because otherwise we would have to split the already small sample (making statistical tests less powerful) and also because the results were largely the same for both sexes when analyses were done separately for each group.

Dependent variables									
Unselfconsciousness		Percentage time studying		Percentage time socializing		% Time TV		GPA	
B	Beta	B	Beta	B	Beta	B	Beta	B	Beta
0.07 <sup>a</sup>	0.13 <sup>a</sup>	2.78 <sup>***</sup>	0.34 <sup>***</sup>	-0.36	-0.04	-0.94	-0.13	0.16 <sup>**</sup>	0.22 <sup>**</sup>
0.00	0.10	0.03	0.06	-0.03	-0.05	0.03	0.07	0.02 <sup>***</sup>	0.42 <sup>***</sup>
								0.07	0.05
								-0.17 <sup>b</sup>	-0.14 <sup>b</sup>
								-0.06	-0.05
								-0.04	-0.03
								0.24 <sup>*</sup>	0.18 <sup>*</sup>
								0.02 <sup>*</sup>	0.22 <sup>*</sup>
								0	0.01
								0	0
	0.03		0.12		0		0.02		0.40 <sup>***</sup>

The mean difficulty level of mathematics courses was 4.21 (*SD* = 1.08) in the second year, 5.97 (*SD* = 1.35) in the third year, and 7.53 (*SD* = 2.28) in the fourth year. On average, mathematically talented students finished courses in geometry, advanced algebra, or advanced computer science in the second year of high school. In the third year, many of them finished advanced or college-level algebra and trigonometry. In the fourth year, most students completed courses in probability and statistics, analytic geometry, or advanced placement computer science. The average PSAT math score for these students was 61.40 (*SD* = 8.36), which put them in the 96th percentile of all juniors in the U.S. These students were significantly less motivated, mean *Z* score = -0.38, *SD* = 0.72; *t*(58) = -4.22, *p* < 0.001, and had higher levels of concentration, mean *Z* score = 0.58, *SD* = 0.64; *t*(58) = 7.25, *p* < 0.001, than usual while engaging in mathematics-related work. The level of happiness, mean *Z* score = -0.10, *SD* = 0.58; *t*(58) = 1.25, *ns*, unselfconsciousness, mean *Z* score = 0.01, *SD* = 0.63; *t*(58) = 0.13, *ns*, and satisfaction about one's performance, mean *Z* score = -0.13, *SD* = 0.65; *t*(58) = 1.44, *ns*, while doing mathematics were about the same as in other activities.

The results of the regression analyses are presented in Table 22.5. PSAT math scores had a significant positive effect on the difficulty level of mathematics courses a student chose to take in each of the three years of high school. This is not surprising, given that a certain level of aptitude is needed to continue taking advanced courses. Intrinsic motivation experienced while doing mathematics as a freshman was significantly related to the difficulty level of the courses taken subsequently, especially in the second and third years. By contrast, work orientation did not seem to affect the difficulty level of courses taken in the second (beta = -0.06, *ns*) and third years (beta = 0.17, *ns*). However, in the final year of high school, work orientation had a significant positive effect on difficulty level

**Table 22.5** Regression analyses predicting the difficulty level of mathematics

Independent variables	Dependent variables					
	2nd year		3rd year		4th year	
	B	Beta	B	Beta	B	Beta
<i>Work orientation</i>	-0.08	-0.07	0.25	0.17	0.72*	0.29*
<i>PSAT (mathematics)</i>	0.07***	0.52***	0.06 <sup>0</sup>	0.40***	0.07*	0.25*
<i>Experience while studying mathematics</i>						
Motivation	0.47*	0.31*	0.56*	0.30*	0.84	0.26 <sup>a</sup>
Happiness	-0.13	-0.07	-0.30	-0.13	-0.89	-0.22
Satisfaction with performance	-0.03	-0.02	-0	-0	-0.75	-0.21
Concentration	0.01	0.00	-0.22	-0.10	0.10	0.02
Unselfconsciousness	0.03	0.02	0.24	0.11	-0.20	-0.05
<i>Time budget</i>						
Percentage time studying mathematics	0.03	0.12	0.00	0.04	0.11	0.26
$R^2$	0.45		0.36		0.35	

Unstandardized and standardized regression coefficients

<sup>a</sup>  $p = 0.06$

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

achieved ( $\beta = 0.29$ ,  $p = 0.01$ ). Motivation while doing mathematics was strikingly independent of the student's personality characteristics or mathematics aptitude. There was no significant correlation between motivation while doing mathematics and work orientation,  $r(64) = 0.17$ , *ns*, and between motivation and PSAT scores in mathematics,  $r(64) = 0.08$ , *ns*.

## Discussion

The results seem to support the notion that there are indeed two kinds of motivation in scholastic achievement, one directed toward long-term goals (work orientation), the other directed toward the enjoyment of experience while one studies (intrinsic motivation while studying). We found no relation between work orientation and intrinsic motivation while studying. In general, work orientation did not seem to explain the different dimensions of experience while studying except that it has a small but significant positive effect on lack of self-consciousness. However, work orientation did have a strong positive effect on the amount of time spent studying. In other words, students with a high work orientation are more likely to be less self-conscious while studying and would probably study more, yet they do not necessarily feel motivated, happy, or satisfied about their performance while they study. Thus it appears that at least in high school, students study hard not so much because they are intrinsically motivated or happy

in their work, but because they want to achieve certain long-term goals such as getting good grades.

The two types of motivation in scholastic achievement appear to explain different kinds of academic outcomes: holding ability constant, work orientation affected grades, and intrinsic motivation while studying affected how far students progressed in the area of their talent. Work orientation had both positive direct and indirect effects on grades. For all students, the level of unselfconsciousness mediated the effects of work orientation on grades. Among female students, the percentage of time spent studying also mediated the effects of work orientation.

Thus the results suggest that controlling for ability, high work orientation students, who have a tendency to aspire to accomplish difficult tasks and to maintain high standards (high on achievement motivation), a willingness to work hard (high on endurance), a dislike for ambiguity (high on cognitive structure), a need to be organized (high on order), an ability to control impulses (low on impulsivity), and an ability to forgo immediate gratification (low on play) are likely to excel in school. These students typically spend more time studying and tend to be less self-conscious when they study. Being self-conscious appears to prevent people from focusing on task-relevant information and problem-solving strategies. Past research has shown that self-consciousness is usually related to lower affect and personal involvement (Csikszentmihalyi and Figurski 1982) and interferes with the enjoyment of activities (Csikszentmihalyi 1975, 1978). Self-consciousness probably leads to self-evaluation (e.g., Duval and Wicklund 1972) and since one's standard usually represents certain ideals, self-consciousness often brings along negative affect about oneself, which may have a negative effect on task performance.

Whereas a persistent orientation toward work seems to have a strong relation with grades, intrinsic motivation while studying appears to have a strong relation with the difficulty level of the courses students take over their academic careers. The analyses with mathematically talented students showed that work orientation had no significant effect on the difficulty level of courses except in the last year of high school. However, intrinsic motivation while studying seems to be strongly related to the difficulty level, especially in the early years of high school. In these years, students have more freedom to choose what they study without having to worry about preparing for college. On the contrary, many seniors might take advanced mathematics courses even if they did not enjoy them because those courses are prerequisites for many college majors. It appears that when students are relatively free of pressure, how far they want to progress in a certain field depends on how intrinsically motivated they are when studying that subject. This is understandable because advanced courses are optional and more difficult to handle, and as a result, experiential rewards become more important. Students who take more difficult courses may not necessarily be the ones who excel in high school. Yet in the long run, they are probably the ones who welcome new challenge, persist in the face of obstacles, and maintain their interest in spite of failures. All these characteristics are important for long-term achievement (Dweck and Elliott 1983).

A number of gender differences were found in this study. The two most interesting ones were also the most puzzling. First, after controlling for work

orientation and ability, the amount of time studying did not have a significant effect on the grades of male students. Work orientation was positively related to both the percentage of time studying and grades for all students. However, among female students, even after controlling for work orientation and ability, the percentage of time spent studying still had a positive effect on grades. Second, concentration while studying was significantly related to grades for boys only. The level of concentration did not seem to have any relation with grades for girls.

Intuitively, both the percentage of time spent studying and the level of concentration are important factors affecting grades. One would expect that students who get good grades study more and maintain a high level of concentration while studying. Why the two sexes differ with respect to the effects of these variables is not immediately clear. What we do know is that the two groups did not differ on the amount of time studying and the level of concentration.

Past studies have shown that girls generally have a more positive attitude toward school and value their education more than boys (Jackson 1968; Lueptow 1975; Minton and Schneider 1980). It is possible that more girls value studying and believe in the value of hard work. Those who want to perform well academically may choose working hard as a strategy, and their belief enables them to make productive use of their study time. However, boys may not necessarily hold a positive attitude toward studying, which may affect the quality of their study time. As a result, the amount of time they put in does not necessarily lead to productive results. In this case, concentration while studying may become a particularly important factor that differentiates those who do or do not get good grades. However, such an interpretation is highly speculative at this point. More work is needed to understand the possible gender differences on values, beliefs, and strategies concerning schoolwork and studying.

The fact that respondents in this study were talented may raise some concern about the generalizability of the findings. When this group was compared to a group of normal students, no major differences were found in the experiences in different activities and social contexts (Csikszentmihalyi et al. 1987). Therefore we believe that the results can be generalized to the normal adolescent population.

There were at least four limitations of this study: First, the difficulty level analysis was carried out only on the mathematics students. Second, we did not investigate how the relation among personality, experience, and performance might differ in specific domains.<sup>5</sup> Third, we focused only on the effects of motivation on academic achievement and did not investigate how level of achievement can affect subsequent motivation. Fourth, daily experience was sampled in a

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<sup>5</sup> We computed the regression analyses on the gifted scholars (talented mathematics and science students) and others (talented music, athletics, and art students) separately. The results were essentially the same as those for the whole group. However, PSAT scores do not reflect much about musical, athletic, and artistic ability. Similarly, GPAs provide little information about musical, athletic, and artistic excellence. Because we did not have good indicators of aptitude and performance in these domains, we think that the analyses are not very meaningful.

relatively short period of time (i.e., 1 week in the first year), while information concerning grades was collected over the course of 1 year (i.e., the second year).

The results of this study showed that intrinsic motivation plays an important role in a student's decision to take more advanced mathematics courses. While it is reasonable to think that intrinsic motivation is equally important in other areas, this remains an empirical question. Another important line of research concerns the relation between work orientation and achievement in less academic areas such as music, art, and athletics. Ability and achievement are defined differently and perhaps less clearly in such areas. Performance in these areas is less important for future education than it is for academic subjects such as mathematics or science unless students decide to major in these areas in college. It would be useful to examine in detail how the relations among personality, experience, and performance vary in these nonacademic subjects.

A third issue that deserves attention is the reciprocal relation between motivation and academic achievement. The level of motivation can certainly affect achievement. It is also likely that level of achievement can affect subsequent motivation. Failure experienced in activities, especially those in which others excel, would make an individual question his or her ability (Kelley and Michela 1980). Negative self-perceptions hinder performance and also lower expectations for future success (Weiner 1985, 1986). When people think that they have low ability in certain activities, they may reduce their effort so that failure can be attributed to lack of effort rather than lack of ability (Covington 1984, 1985; Jagacinski and Nicholls 1990; Snyder et al. 1978). In contrast, when people perceive themselves as competent in certain areas, they exhibit a high degree of perseverance in those areas (Bandura 1990). When confronted with difficulties, they exert greater effort to master the challenge (Bandura and Cervone 1983, 1986; Cervone and Peake 1986; Jacobs et al. 1984). It seems clear that failure and success experiences affect the level of motivation. However, it remains unclear as to when, how, and to what extent motivation and personality mutually affect one another.

Finally, there is a need to examine how the relations among personality, experience while studying, and academic performance vary when different methods of sampling experience are employed. In the present study, a random sample of daily reports was collected during 1 week through the use of an electronic pager. Although we believe that the data we collected represent a random sample of students' daily activities and moods, it might be that 1 week is too short for predicting grades in the following year. Findings may vary with different methods of sampling experience. Such methods would include using the ESM at different periods of time or using other techniques such as the Rochester Interaction Record (Reis and Wheeler 1988; Wheeler and Nezlek 1977).

A potentially important research agenda for psychologists interested in daily experience is the development of more economical and convenient ways to collect daily experience data. Unless these methods are available, many researchers will have to settle for measuring experience within a relatively short period of time. Much research is needed to identify these methods, document their psychometric properties, and systematically compare them to one another.

This study showed that students generally felt sadder and less motivated than usual when they were studying, which is in accordance with past findings (Csikszentmihalyi and Larson 1984; Csikszentmihalyi and Nakamura 1989). The situation was no different for those whose grades were better. Intrinsic motivation and happiness while studying did not predict grades. For most students, study is not something they would choose to do if given a choice, and they do not feel happy while doing it. However, students in the present study did experience high levels of concentration and unselfconsciousness, which are two important indicators of optimal experience. Over the past two decades, our work has shown that unself-consciousness and concentration are important indicators of flow (Csikszentmihalyi 1975, 1990b; Csikszentmihalyi and Csikszentmihalyi, 1988; Csikszentmihalyi and LeFevre 1989), a state in which people's skills are in accord with the challenge presented by the activity. When people are in flow, they perceive clear goals and feedback and are totally absorbed in their experience. Such absorption seems to motivate them to seek out the experience again, even if it was not necessarily perceived as a "pleasant" one. So whether students in this study were conscious of it or not, they did derive some immediate rewards from studying.

Today, educators devote a great deal of attention to improving scholastic performance by concentrating on the cognitive aspects of learning. While this is certainly justifiable, it is also important to understand what motivates students to become interested in their work. In this study, intrinsic motivation did not have a significant effect on grades, rather it predicted how advanced an academic career students were willing to pursue. Students who did not enjoy studying were less likely to take the more advanced courses. In the long run, it is enjoyment that motivates students to pursue knowledge beyond minimum requirements.

In this culture, we take for granted that work has to be separated from play. We assume that we can enjoy ourselves only when we are free from challenging obligations. Unfortunately, many educators share the view that study is inherently unpleasant and focus on setting up external controls to make sure students study. But perhaps the first step in enhancing motivation to learn is to change this preconception. By helping students to become absorbed in challenging tasks, and by allowing them to take the initiative in learning, we may help them to find out that learning can be as enjoyable as any leisure activity.

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