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ABSTRACT

Changes and continuities in adolescents' optimal experiences over two years are explored in this study, and related to the development of affective and motivational patterns. Optimal experience, or flow, occurs when people do intrinsically rewarding activities in which they feel optimally challenged relative to their level of skills. The major questions addressed by this research concern whether increasing the frequency or intensity of flow is associated with positive changes in adolescents' cognitive and affective experiences both in and out of school. As participants in the Experience Sampling Method (ESM), 281 adolescents from 12 sites across the United States each provided an average of 32 reports of their daily experiences for one week while they were in the 6th, 8th, and 10th grades, and for another week 18 months later. Results expand on earlier findings by showing that those who increased in flow also increased in intrinsic motivation, self esteem, time spent doing school work, and in the relevance of their activities to their future career goals. Two tables and two figures present data and statistical analysis. Appendix A presents a facsimile of the self-report form (ESF) used by participants in this study. Appendix B defines the five variables of interest for this study. Contains 14 references. (Author/TS)

A Longitudinal Exploration of Flow and Intrinsic Motivation in Adolescents

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Abstract

In this study, we explore changes and continuities in adolescents' optimal experiences over two years and relate these to the development of affective and motivational patterns. Optimal experience, or flow, occurs when people do intrinsically rewarding activities in which they feel optimally challenged relative to their level of skills (Csikszentmihalyi, 1990). The major questions addressed by this research concern whether increasing in frequency or intensity of flow is associated with positive changes in adolescents' cognitive and affective experiences both in and out of school. As participants in the Experience Sampling Method (ESM), 281 adolescents from 12 sites across the U.S. each provided an average of 32 reports of their daily experiences for one week while they were in the 6th, 8th, and 10th grades, and for another week 18 months later. Results expand on earlier findings by showing that those who increased in flow also increased in intrinsic motivation, self esteem, time spent doing school work, and in the relevance of their activities to their future career goals.

One of the most difficult tasks for educators of adolescents is to encourage the development of self-directed learning. In order for this development to occur, adolescents must become motivated at least in part by their feelings of enjoyment while doing learning activities. When adolescents are intrinsically motivated to learn, they not only learn more, they also experience more positive affect and self esteem (Deci & Ryan, 1985). Yet, research has also shown that adolescents are typically not intrinsically motivated to do school work (e.g. Csikszentmihalyi & Larson, 1984). The question of how to promote intrinsic motivation in school has been extensively studied. At the level of daily experiences, several studies have linked intrinsic motivation to "flow", optimal experiences in which individuals engage their skills in challenging activities (Csikszentmihalyi, 1990). Over the longer term, little is known about intra-individual changes in flow and intrinsic motivation for school work and how these changes relate to the development of self-directed learning. In this study we focus on this question by examining how changes in adolescent flow experiences over time relate to other behavioral and affective changes.

We consider people to be intrinsically motivated when they freely do what interests them simply because they enjoy doing the activity and not primarily as a means to some external reward. As Deci and Ryan (1985) pointed out, it may be unrealistic to expect that all of an adolescent's school work be intrinsically motivated. Students' individual interests and preferences play a role in determining which activities they will find intrinsically motivating. Some educational topics or activities that are necessary but not interesting to a particular student will need to be regulated externally. Even in these situations, however, self-directed learning can develop when students integrate and internalize external regulations (Deci and Ryan, 1985). Still, the most

positive cognitive and affective outcomes result from learning that is not only self-directed but also intrinsically motivated.

A key dimension of intrinsic motivation is interest, a positive affect that occurs in the interaction between a person and an activity. Deci (1992) suggested that the experience of interest results only when the needs, desires, and capacities of the person mesh with the attributes of an activity. He summarized past research on interest by naming the two characteristics of tasks that make them interesting to people: optimal challenge and novelty. Optimally challenging activities require people to stretch their existing capacities, but are not so discrepant from their prior experience as to make integration impossible. Intrinsic motivation is a force driving development because an activity that is optimally challenging requires a person to engage a high level of skills. Csikszentmihalyi (1975, 1990) has presented evidence that for any activity, the optimal level of challenges is that which balances with a person's level of skills in that activity. When such a balance occurs, people have often reported a merging of action and awareness, and many have used the word *flow* to describe the experience. In extensive studies of this type of experience, Csikszentmihalyi has shown that flow is highly associated with intrinsic motivation and enjoyment. Indeed, positive affect, intrinsic motivation, and cognitive efficiency are some of the defining elements of flow; as used throughout this paper, however, *flow* will refer to its operational definition which involves only challenge and skill.

Because a person's skills inevitably increase with practice, the balance that flow requires is not stable over time. In order to maintain the enjoyment of flow, people must continually engage in new challenges to match their increasing skills, and they must perfect their skills to meet the challenges. The motivation to seek and sustain enjoyment in life leads people to become both more open to new experiences and more focused on particular patterns of action; in short, it

propels the processes of differentiation of new interests and integration of new learning. The dynamic, spiraling nature of the relationship between challenges and skills over the course of repeated flow experiences is thus likely to foster self-directed learning. The theory linking flow to the development of knowledge and skills has been supported by empirical evidence. High-flow adolescents in Adlai-Gail's (1994) sample had a greater knowledge of the steps needed to enter their chosen careers. Csikszentmihalyi, Rathunde, and Whalen (1993) concluded that the development of talent in adolescence depends heavily on whether the use of the talent produces flow. These findings, coupled with the theory, suggest that self-directed learning will be most common among adolescents who experience flow often. In other words, if adolescents could learn to find flow in school work more often, they would probably increase in intrinsic motivation to do school work and in self-directed learning.

The phenomenology of flow has been extensively studied across a wide array of contexts and a diverse range of people. Research has focused on differences among contexts or activities in eliciting flow (e.g. LeFevre, 1988) and on differences among people in the propensity to experience flow (Adlai-Gail, 1994). Yet, no studies we know of have examined flow longitudinally, as an individual perceptual and behavioral tendency that can develop over time. Such development could occur, we believe, just as other consistent individual patterns of thought and action emerge in adolescence. To increase in optimal experiences, individuals must become increasingly able to recognize challenges in their surroundings that match their skills. The number and range of challenge-providing opportunities is obviously constrained by the resources in one's social and physical environment, but even in the best environment an individual who does not recognize the available opportunities will not experience flow. Thus, the development of a

propensity to experience flow probably involves an interaction between the developing cognitive and perceptual capacities of the person and the resources of the environment.

Formulating and testing a more specific model of this development is beyond the scope of this study. Rather, we are presently interested in the correlates of these changes. Given that flow is associated with positive affect, intense concentration, and intrinsic motivation, we expect that adolescents who increase in flow also increase in these aspects of their subjective experience. This relationship should hold not only in general, but also within the specific context of school work, an activity with great potential to be a consistent source of opportunities to pursue challenges and develop skills. Adolescents developing a propensity for flow probably spend increasing amounts of their time doing the types of activities which have given them flow in the past. If those activities included scholarship in a particular area or some other socially positive endeavor, the teens are likely to be closer to choosing a life's vocation, or at least an abiding avocation. Using Adlai-Gail's (1994) findings as a guide, we should find that teens who are developing in flow generally do more school work and identify more of their activities as having relevance to their planned future careers. If this is the case, they will probably also have enhanced self-esteem.

To summarize, we expect that flow, as measured by the interaction of perceived challenges and skills, is an experience that is dependent on characteristics of the individual and the environment which can change over time. Adolescents who develop in the frequency and intensity of their flow experiences will also have more intrinsic motivation to do school work compared to those who decrease in flow. Accordingly, they should be spending more time doing school work and feeling more positive affect and self-esteem. Our analyses will first attempt to establish that flow is a positive affective and cognitive state. Then we will examine flow, intrinsic

motivation, and other measures of affective experience while adolescents are doing school work. In our primary analyses, we will compare the experiences of three groups of adolescents: those who remained high in flow experiences, those who increased, and those who decreased.

Method

Sample

Students in grades six, eight, ten, and twelve from twelve sites across the United States participated in the first year of an ongoing longitudinal study of adolescent social development (see Bidwell, et al., 1992, for the pilot study and an outline of the full-scale study). Potential participants were chosen with the aim of obtaining representative samples of their respective schools from those whose parents consented to their involvement. The sample includes students representing a diverse range of racial/ethnic and socio-economic backgrounds. The sites they come from represent urban, suburban, and rural community contexts in major regions of the U.S. In the most recent data collection wave, 18 months after the initial contact, the three youngest cohorts were in grades eight, ten, and twelve. From the original sample of 877 in the three youngest cohorts, 281 who met the selection criteria (outlined below) will be included in the sample of interest for this study. The oldest cohort did not participate in the Experience Sampling Method in the second wave and will not be studied.

Instruments

Data were collected using multiple methods, including a questionnaire and the Experience Sampling Method (ESM). The questionnaire included an item pertaining to the relevance of the participants' current activities to their future goals. It was completed in both the waves of the study. Before use in the study, all instruments were pilot tested.

In the ESM, pre-programmed wristwatches were used to signal the participants eight times each day for a week. The watches were set to beep at a random time during every two hour block from 7:30 AM to 10:30 PM daily, with the restriction that no two signals would be less than 30 minutes apart. The respondents were asked to keep the watch and a self-report booklet with them whenever possible and to respond to as many signals as possible. Upon hearing the signal, respondents were to complete a self-report form (ESF) which requests information about their location, activities, companions, and psychological states at that moment. As used in this study, the ESF included both open and closed questions (See Appendix A). The participants' free responses on the items pertaining to their location, thoughts, and activities were coded by trained coders using a detailed scheme. Items eliciting affective and cognitive states used Likert-type scales. Participants in the three youngest cohorts completed a week of ESM in both the first and second waves of the study. Csikszentmihalyi and Larson (1987) have provided a detailed description of this methodology as well as several indications of its validity and reliability.

As in past ESM studies (e.g. Csikszentmihalyi, Rathunde, & Whalen, 1993), only those participants who completed at least 15 ESM self-reports will be included in the final sample. In 1993 (the first wave of data collection), 74% of the ESM sample completed enough valid self-reports to be included. This proportion is comparable to that achieved in other studies of high school students (Csikszentmihalyi & Larson, 1987). In 1995 (the second wave of data collection), 62% of those who had completed at least 15 reports in 1993 participated again in the ESM; 69% of those completed at least 15 valid self-reports in 1995. Thus the final sample includes the 281 students who returned sufficient data in both years of the study. These students each completed an average of 35 responses in 1993 and 29 responses in 1995, for a total of 18,035 responses from all participants over the two years.

Measures and Analyses

Flow. In previous studies of flow using the ESM, flow has nearly always been measured as some relationship between the challenges and skills that the respondent indicates are associated with his or her immediate activity. This is in accord with the Csikszentmihalyis' (1988) theoretical argument that flow should be measured independently of the positive cognitive and affective states that are predicted to accompany it. The relationship between challenge and skill that is thought to characterize flow is one of balance (Csikszentmihalyi, 1975). This theoretical expectation has been validated empirically. Moneta and Csikszentmihalyi (in press) tested the relationships between four dimensions of experience and raw-scored challenge, skill, and the difference between challenge and skill. The relationship between the magnitude of the challenge-skill difference and quality of experience was consistently negative. Many other studies have shown that the most positive experiences are associated with levels of challenge and skill that are not only balanced but also high, relative to a person's average levels (e.g. Massimini & Carli, 1988). Thus, two factors are important in the relationship between flow and challenge and skill: balance of challenges and skills and their perceived intensity.

This relationship can be represented by any one of a whole class of mathematical formulations. One of the most commonly used approaches designates as flow all of those instances when an individual's challenges and skills are both above his or her own average levels for the week (see, e.g., LeFevre, 1988). For the purposes of the present study, however, a different measure was needed that would have a constant scale across individuals and across time; also desired was a way to measure the intensity of flow. One formulation that satisfies these criteria is the geometric mean (i.e., the square root of the product) of raw-scored challenge and skill. This provides a continuous flow measure that is proportional to both challenge and skill and

has their same range of values. Because challenge and skill are not additive but interactive in this measure, its numerical value also depends on the degree of balance between challenge and skill. As challenge and skill become more discrepant, the value of the flow measure decreases. In short, the geometric mean provides a measure of flow that captures all of the theoretically proposed and empirically validated aspects of the relationship between challenge, skill, and flow. To establish the validity of this measure, we conducted several analyses that show that it correlates highly with other measures and indicators of flow. This measure of flow at the response level is then averaged within each year for each person to produce an individual-level flow measure that indicates both the amount and intensity of flow experienced by the individual.

A measure of change in flow is created by subtracting the individual's mean flow raw score in 1993 from his or her mean flow raw score in 1995. Then, this difference is divided by the pooled standard deviation of the individual's flow scores from both years. The result corresponds to an effect size, which allows for comparisons across studies. Conventionally, an effect size of 0.2 has been defined as a "small" effect, while 0.5 and 0.8 are medium and large effects, respectively (Cohen, 1992). An effect size is similar to a z-score, in that it expresses the magnitude of the difference in standard deviation units and thus controls for individual differences in response scale usage.

Defining the comparison groups. Of most interest in this study are adolescents who experienced a meaningful increase in flow over the two years and those who did not. Based on an examination of each distribution, we concluded that a change of at least one-quarter of the individual's own pooled standard deviation would be considered meaningful. In order to ensure that any increase could not be explained by statistical regression toward the mean, we also restricted the Increase Group ($N = 56$) to those whose first year flow scores were not in the

lowest fifth of the distribution. Similarly, the Decrease Group ($N = 47$) was comprised of those whose first year flow scores were not in the highest fifth of the distribution. The Increase and Decrease groups began in 1993 with similar flow levels (Increase $M = 4.29$, Decrease $M = 4.25$), and they diverged in 1995 (Increase $M = 5.32$, Decrease $M = 3.32$, $t = 13.1$, $p < .001$). Hence, any other differences found between these groups cannot be attributed to differences in initial flow level. The mean change in flow experienced by the adolescents in these two groups was .6 of a standard deviation, which is between a medium and large effect. For comparison purposes, we also defined a "Stable High" Group ($N = 34$) as those who did not change appreciably in flow and who remained in the upper third of the distribution (1993 Flow $M = 5.46$, 1995 Flow $M = 5.42$, Change $M = -.02$).

Other ESM variables. The ESM provides many scaled measures of affective and cognitive aspects of experience (See Appendix A). Each of these was labeled and coded such that higher numbers refer to more positive experiences. Besides flow, the five variables of interest for our current study are mood, self-esteem, intrinsic motivation, concentration, and importance to future goals. These are defined in Appendix B. The three items used to measure intrinsic motivation are interest, enjoyment, and wishing not to do something else. For each of the ESM variables, each individual's responses for the week are averaged to form an aggregated person-level measure within each year.

Types of activities. The coded responses on the ESM question "What was the main thing you were doing as you were signaled?" will be used to measure whether the groups spent their time in different ways in either year, and how their activities changed over the two years. In our analyses, the detailed codes are grouped together into broader categories. The categories we will examine are school work, active leisure, and passive leisure (See Appendix B). It should be noted

that school work includes only those times when the participant reported actually doing school work as a main activity, whether he or she was in school or not. Homework is included while socializing or daydreaming while in class is not. The percentage of an individual's responses within any category is taken as an indication of the proportion of time the person spends doing activities in that category.

Relevance of activities to career goals. On the questionnaire, participants were asked "Are you doing anything now that relates to these jobs?" (jobs they had just listed as future career possibilities). The responses were coded into two categories: no or very basic relevance, and more than a basic relevance. Examples of the latter would be a budding architect taking drafting class, or a future teacher teaching Sunday School.

Analyses. In preliminary analyses, the correlation of flow with the other ESM measures was computed on both the signal and person level over all contexts and for school work. For the group analyses, we employed repeated measures multivariate analysis of variance (MANOVA) to test for group differences on the dependent variables. Assuming the hypotheses are correct, we expected to find interaction effects between group and year. Such effects would reveal differences between the groups in the pattern of change over time.

Results

Flow and Quality of Experience

Zero-order correlations of flow with the other ESM variables were significantly positive at both the signal and person level, and over all contexts as well as during school work. Table 1 shows the person-level correlations, which can be interpreted to mean that a person's overall amount or intensity of flow is associated with his or her overall quality of experience. The signal-

level correlations were similar (data not shown), and can be interpreted to mean that the momentary state of flow is associated with more positive qualities of experience. The relationship between flow and these variables appears to be weaker in the context of school work, although all are still positive. Concentration and importance to future goals were the most strongly related to flow, while mood was the least. Finally, the relationship between flow and quality of experience appears to be stable over time. Although most coefficients were lower in 1995 than in 1993, the overall pattern was consistent over time.

An Experiential Profile of School Work

One of the advantages of using the ESM is the ability to examine subjective experiences within particular contexts. In this type of analysis, we use within-subject standardized z-scores for each variable within each year. These scores have a mean of zero which is anchored at the individual's mean score for the week, and they have a standard deviation of one. By using z-scored variables, we minimize the problem of individual differences in response scale usage. Person-level average z-scores within a particular context, such as school work, allow us to compare subjective experience in that context to the overall average. Figure 1 illustrates how adolescents in our sample experienced school work in each of the years of the study. Most striking in this graph is the contrast between flow and mood and motivation. Although these dimensions of experience are positively related, even during school work, they show opposite patterns in this context. School work provides a highly positive experience of flow while it simultaneously brings mood and motivation far below their weekly averages. Not surprisingly, students also experience school work as being highly important to their future goals and requiring much concentration. Self-esteem during school work is only slightly positive. The overall

experiential profile of school work was consistent across the two years; none of the year contrasts was significant.

Comparing the Groups

On the whole, the participants were fairly consistent in their flow scores over the two years. The mean flow score in 1993 was 4.44 (SD = 1.35), and in 1995 it was 4.48 (1.08). Flow in 1993 was correlated with flow in 1995, $r = .39$, $p < .001$. At the same time, great change in flow did occur for some adolescents; the measure of change ranged from near 0 to more than one standard deviation. Changes were distributed evenly between those who increased and those who decreased, and were not associated with demographic factors. Our three groups did not differ in composition by gender, grade, minority status, or SES (as measured by parental education). All chi-square tests on the distribution of these categories across the groups were not statistically significant (data not shown).

To compare the three groups in how they changed over time, we examined mean raw scores on the ESM measures. We used raw scores rather than z-scores in these analyses because we are more interested in comparing the groups to each other than in how their experience in any one context compares to their average experience. Also, the use of z-scores in a longitudinal analyses can be confusing because the anchor of the score, the raw score mean, changes from one year to the next. By looking at changes in raw scores first overall and then within the context of school work, we gain the clearest picture of how subjective experience changed over time for members of the three groups.

Over all contexts. In 1993, adolescents who had the most flow experiences also reported the highest levels of mood, motivation, self-esteem, concentration, and future importance (See Figure 2 and Table 2). This main effect of group was significant on every measure. Those in the

Increase and Decrease Groups had similar means on these variables in 1993, but diverged in 1995 in each case except mood. All three groups declined in overall mood, and there was no group by time interaction. On the other measures, the pattern of change differed by group. Those who increased in flow increased in motivation, self-esteem, concentration, and future importance, whereas those who decreased in flow decreased on these measures. The Stable-High Group also increased in self-esteem, concentration, and future importance. Thus, the group by time interaction was significant for these three measures, but not for motivation. However, a comparison of just the Increase and Decrease Groups did reveal a significant group by time interaction on this measure as well.

While doing school work. Restricting the analysis to only those instances in which the participants reported doing school work yielded patterns of means similar to the overall results, though with fewer significant differences (See Table 2). As illustrated in Figure 3, the positive experiential correlates of flow are sustained even during school work. The Stable High Group had the highest means on every measure, in a group main effect that was significant on all but motivation. The pattern of change over time also paralleled the overall results on every measure except future importance. The Increase and Decrease Groups diverged in intrinsic motivation, self-esteem, and concentration, but the group by time interaction was significant only for self-esteem.

How they spend their time. Increasing in flow not only involves changes in how activities are experienced, it also involves changes in the amount of time one devotes to different types of activities. As shown in Figure 4, adolescents who increased in flow did more school work and less passive leisure, such as watching TV. Although all three groups increased in the proportion of time they spent doing school work, the Increase group had the most dramatic rise, resulting in

a significant group by time interaction. They spent 9% more of their day doing school work in 1995 than they did in 1993. There was no interaction effect on active leisure activities (e.g. sports and hobbies), which declined for both groups. By contrast, the groups diverged in time spent doing passive leisure activities. Adolescents who decreased in flow spent more of their time in passive leisure, whereas those who remained high or increased did these activities less often.

Relevance of activities to future goals. We now turn to the questionnaire item to asses independently of the ESM whether our participants recognized any of their activities as having relevance to their own career goals. In 1993, 35% of the Increase Group, 28% of the Stable High Group, and 14% of the Decrease group reported doing things that were relevant to their future career goals. By 1995, well over half of the Increase Group (62%) was now doing career-relevant activities, while 50% of the Stable High and 43% of the Decrease Group was. Chi-square tests of these proportions within each year were not significant, but one compelling significant difference did emerge: Of the 24 students in the Increase Group who listed no relevant activities in 1993, two-thirds did report relevant activities in 1995. In the Decrease Group, there were also 24 who listed no relevant activities in 1993, but only 38% of these reported relevant activities in 1995 (Chi-Square = 4.1, $p < .05$).

Discussion

Our first conclusions regard the adequacy of the flow measure and the replication of previous findings. The use of the geometric mean of challenge and skill to measure flow has not to our knowledge been tried before, so this study serves as a first test of this measure. Given its strong correlation with the qualities of experience which are integral to the theoretical definition of flow, we suggest that the measure can serve as a useful alternative when other methods are

deemed less desirable. These correlations also serve to replicate previous findings by Massimini and Carli (1988), Adlai-Gail (1994), and others that flow, as measured with perceived challenge and skill, is a very desirable state. Further, our findings confirm that individual variation in the amount or intensity of flow is related to variation in overall quality of experience.

This relationship was shown both in our correlational analyses and in the group comparisons. The results provide support for our contention that flow is an experiential state that varies not only across activities, but also across people. In other words, we concur with Adlai-Gail (1994) that certain people tend to experience flow consistently more often than others. Those who do, like those in our Stable-High Group, have a significant affective advantage even while doing tasks most people would not enjoy. Others, however, are not necessarily destined to a less than optimal existence. As we have found, adolescents can change over time in the frequency or intensity of their optimal experiences. Indeed, many adolescents in our sample changed dramatically in less than two years, though they were as likely to decrease in flow as increase. The longitudinal examination of flow scores provides this picture of both intra-individual consistency and change. The results of the group comparisons showed further that intra-individual change in flow is meaningfully related to other changes.

We must be somewhat cautious in interpreting our longitudinal results, because we have only two time points and no results from prior research to compare directly to ours. Of the five dimensions of experience we examined over all contexts, mood had the most unexpected pattern. Although overall mood was correlated with flow in each year, increasing in flow did not appear to affect mood appreciably. Increasing was related to greater concentration, however, as well as to more positive self-esteem. Perhaps most important among these findings is the increasing sense of the Increase Group that their activities were important to their future goals. This finding fits

together with the findings on time use and relevance of activities to career goals. Adolescents who increase in flow do more school work, build stronger links between their current activities and their career goals, and feel more strongly that their daily activities are important to their future goals. The close, nearly overlapping relationship of these three findings suggests that they are all pointing to the same underlying process of development.

That process appears to involve a movement toward becoming more intrinsically motivated to engage in self-directed learning. As these students begin to have more optimal experiences, they devote more time to their school work and less time to passive leisure activities. This change in itself is rather unusual, in light of how most adolescents experience school work. Not surprisingly, we found that adolescents are generally not in a positive mood while doing school work and do not feel intrinsically motivated to do school work. Yet, students who begin to find engaging challenges in their daily routine not only do more school work, they also feel better about themselves while doing it. Clearly, however this development occurs, it is desirable and should be promoted.

Helping teenagers to find the right balance of challenges and skills in their daily activities is necessary because the growth of optimal experiences in adolescence is by no means inevitable. On the contrary, adolescents can just as easily slip into the unstructured and unchallenging mode of passivity. When this happens, school work becomes a chore leading to boredom and anxiety, and not to self-fulfillment and enjoyment. Before these adolescent behavior patterns become hardened into adult habits, these teens should have an opportunity to learn a better way. Our findings show that, at least in adolescence, positive change is possible.

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TABLE 1: Correlation of Flow with Quality of Experience Measures

	Overall		While Doing School Work	
Measure	**1993**	**1995**	**1993**	**1995**
Mood	.29	.22	.21	.14
Intrinsic Motivation	.51	.34	.36	.20
Self-Esteem	.44	.40	.44	.38
Concentration	.60	.56	.58	.55
Importance to Future	.60	.54	.44	.44

Person-level Pearson correlation coefficients.
All overall correlations, $p < .001$. All School correlations, $p < .05$. Minimum $N = 276$.

TABLE 2: F-values of Group by Year MANOVAs, Overall and While Doing School Work

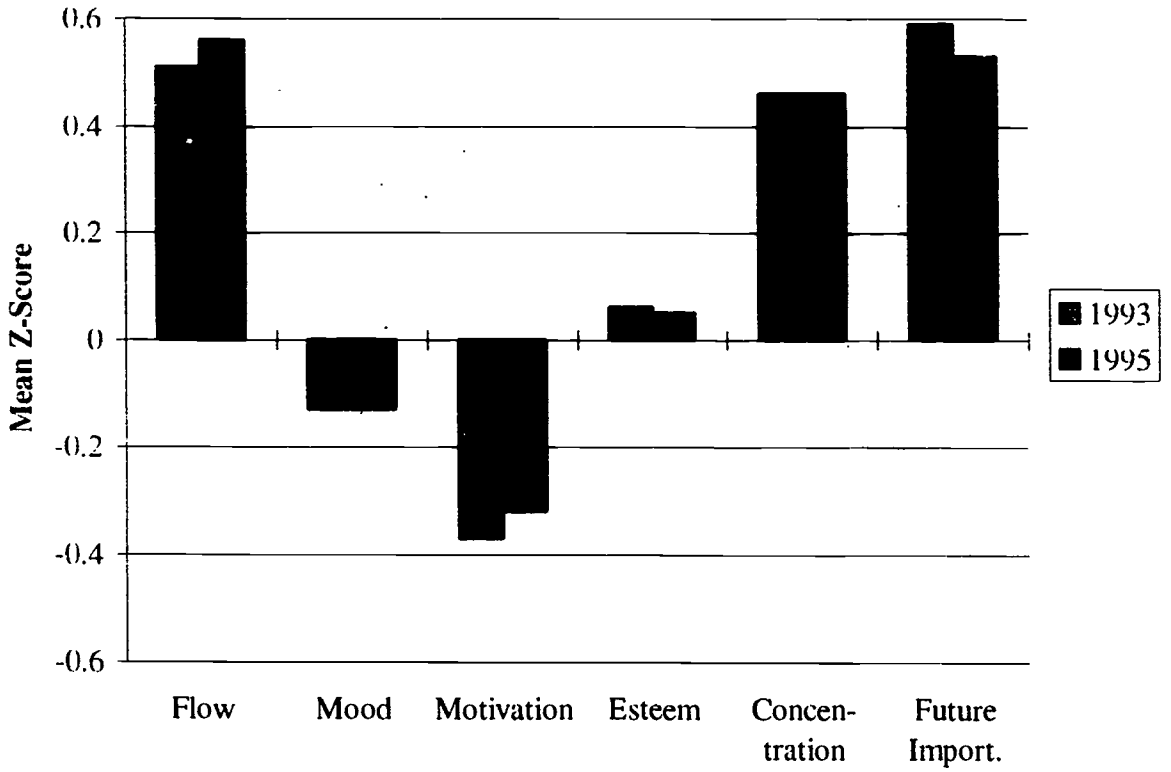
Effect	Mood	Motivation	Self-Esteem	Concent.	Fut. Import
			Over all Contexts		
Group	5.37**	8.22***	7.82**	12.8***	11.9***
Time	26.0***	0.00	9.52**	0.08	1.96
Group X Time	1.93	2.26[a]	8.54***	13.3***	7.02**
			While Doing School Work		
Group	3.49*	2.16	4.75*	8.83***	7.31**
Time	11.6**	0.11	7.94**	0.17	0.71
Group X Time	2.23	1.19	7.25**	1.70	0.06

* $p < .05$ ** $p < .01$ *** $p < .001$. Degrees of freedom: 2 for Group, 1 for Time, 2 for interaction, 130 to 134 within cells.

[a] Interaction is significant with only the Increase and Decrease Groups, $F(1,101) = 4.37$, $p < .05$.

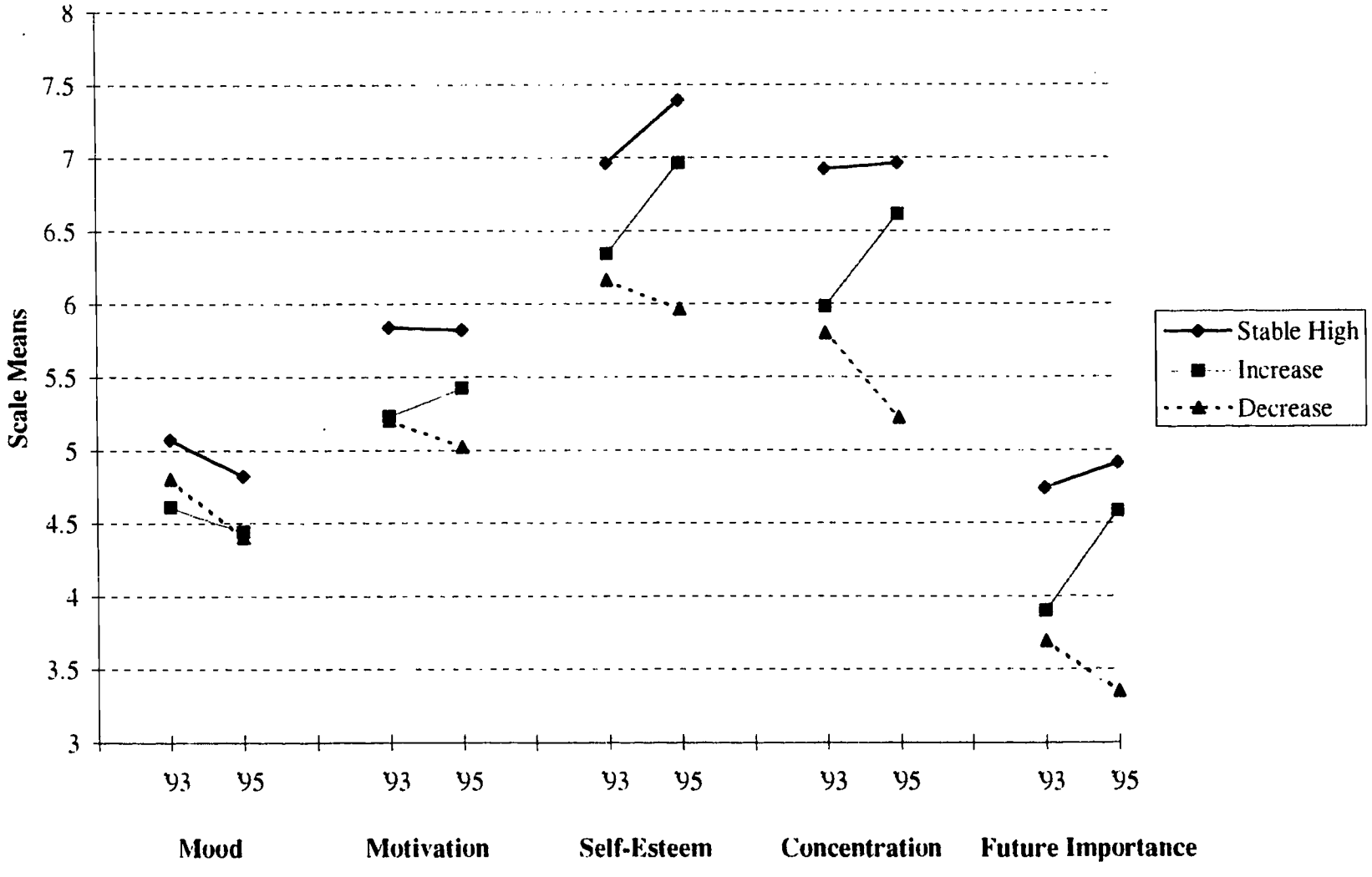
Note: See Figures 2 and 3 for the patterns of means.

FIGURE 1: Z-Scored Quality of Experience Measures in Each Year While Doing School Work



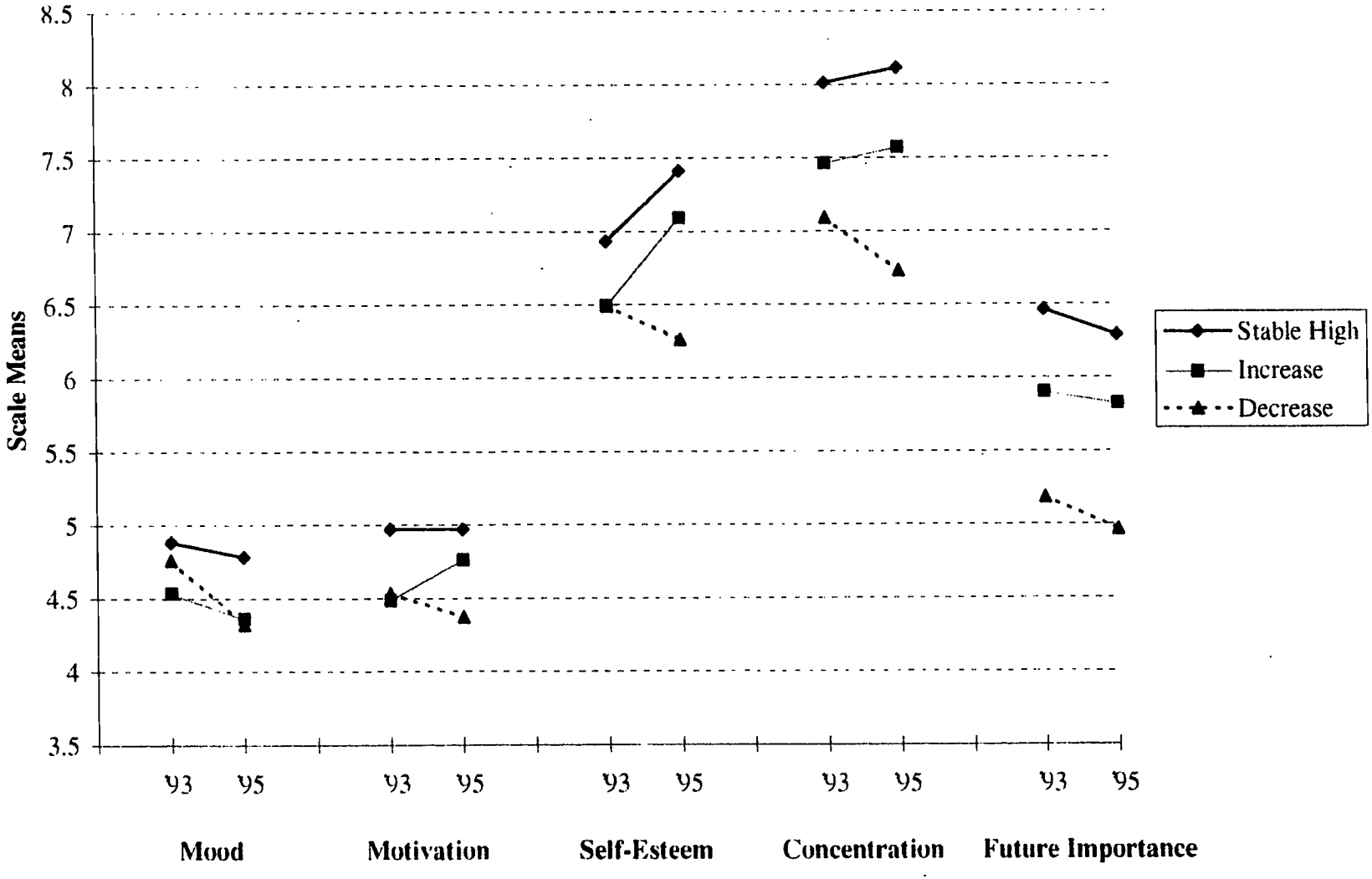
Note: All Year contrasts nonsignificant in repeated measures t-tests.

FIGURE 2: Quality of Experience Overall, by Group and Year



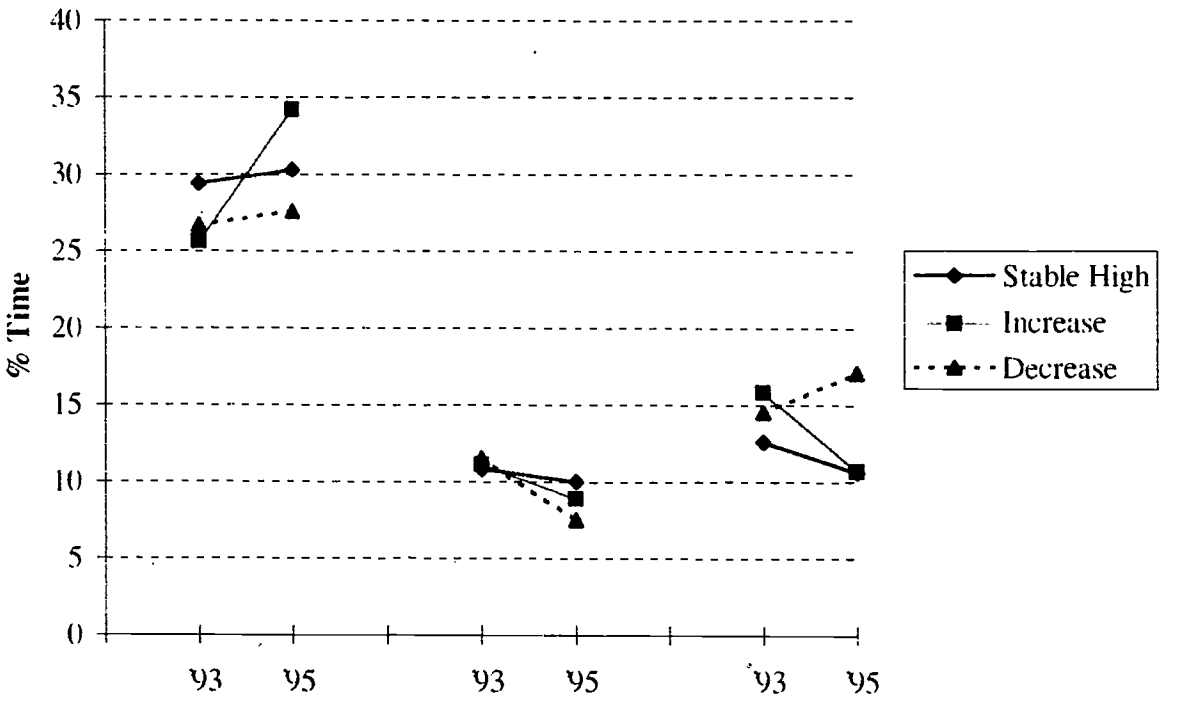
Note: See Table 2 for F-values.

FIGURE 3: Quality of Experience While Doing School Work, by Group and Year



Note: See Table 2 for F-values.

FIGURE 4: How Time Was Spent, by Group and Year



	School Work	Active Leisure	Passive Leisure
Group $F(2,134)$	1.38	0.23	3.36*
Time $F(1,134)$	6.97**	10.3**	2.36
G X T $F(1,134)$	4.33*	1.50	6.09**

* $p < .05$ ** $p < .01$

...e _____ Time you were beeped _____ am/pm Time you answered _____ am/pm

As you were beeped . . .

Where were you? _____

_____

What was on your mind? _____

_____

What was the main thing you were doing? _____

_____

What else were you doing? _____

_____

Was the main thing you were doing . . .

More like work ( ) More like play ( ) Both ( ) Neither ( )

	not at all								very much
How well were you concentrating?	0	1	2	3	4	5	6	7	8	9
Were you living up to expectations of others?	0	1	2	3	4	5	6	7	8	9
Was it hard to concentrate?	0	1	2	3	4	5	6	7	8	9
Did you feel self-conscious or embarrassed?	0	1	2	3	4	5	6	7	8	9
Did you feel good about yourself?	0	1	2	3	4	5	6	7	8	9
Did you enjoy what you were doing?	0	1	2	3	4	5	6	7	8	9
Were you living up to your expectations?	0	1	2	3	4	5	6	7	8	9
Did you feel in control of the situation?	0	1	2	3	4	5	6	7	8	9

Were you doing the main activity because . . .

You wanted to ( ) You had to ( ) You had nothing else to do ( )

Describe your mood as you were beeped:

	very	quite	some	neither	some	quite	very	
Happy	O	o	.	-	.	o	O	Sad
Weak	O	o	.	-	.	o	O	Strong
Passive	O	o	.	-	.	o	O	Active
Lonely	O	o	.	-	.	o	O	Sociable
Ashamed	O	o	.	-	.	o	O	Proud
Involved	O	o	.	-	.	o	O	Detached
Excited	O	o	.	-	.	o	O	Bored
Clear	O	o	.	-	.	o	O	Confused
Worried	O	o	.	-	.	o	O	Relaxed
Competitive	O	o	.	-	.	o	O	Cooperative

Who were you with?

( ) alone
( ) mother
( ) father
( ) sister(s) or brother(s)
( ) other relatives
( ) others _____

( ) teachers
( ) classmates, peers
( ) strangers
( ) friend (s) How many? ____
female ( ) male ( )

( ) If you were with friends, what were their names?

_____
_____
_____
_____

Turn over 29

Indicate how you felt about the main activity:

	low								high
Challenges of the activity.	1	2	3	4	5	6	7	8	9
Your skills in the activity.	1	2	3	4	5	6	7	8	9
	not at all								**very much**
Was this activity important to you?	1	2	3	4	5	6	7	8	9
How difficult did you find this activity?	1	2	3	4	5	6	7	8	9
Were you succeeding at what you were doing?	1	2	3	4	5	6	7	8	9
Did you wish you had been doing something else?	1	2	3	4	5	6	7	8	9
Was this activity interesting?	1	2	3	4	5	6	7	8	9
How important was it in relation to your future goals?	1	2	3	4	5	6	7	8	9

If you had a choice . . .

Who would you be with? _____

What would you be doing? _____

Since you were last beeped, did you do any: (estimate to nearest quarter/hour) (Please circle "0" if you haven't done the activity.)

TV watching	**0**	1/4	1/2	3/4	**1**	1 1/4	1 1/2	1 3/4	**2** Hours
Chores, errands	**0**	1/4	1/2	3/4	**1**	1 1/4	1 1/2	1 3/4	**2** Hours
Paid work	**0**	1/4	1/2	3/4	**1**	1 1/4	1 1/2	1 3/4	**2** Hours
Hanging out with friends	**0**	1/4	1/2	3/4	**1**	1 1/4	1 1/2	1 3/4	**2** Hours
Homework	**0**	1/4	1/2	3/4	**1**	1 1/4	1 1/2	1 3/4	**2** Hours

. . . has anything happened, or have you done anything which could have affected how you feel?

Any comments?

APPENDIX B: ESM Measures

Flow: Geometric mean of
"Challenges of the activity"
"Your skills in the activity"

Quality of Experience
Mood, Intrinsic Motivation, and Self-Esteem are composite variables constructed from the arithmetic means of their respective component variables. Following a factor analysis, only items loading above a cutoff criterion of .6 were included in defining these composites.

Mood: Cronbach's alpha = .86
"Describe your mood as you were beeped:"
active-passive, sociable-lonely, strong-weak, excited-bored, involved-detached, proud-ashamed, happy-sad

Intrinsic Motivation: Alpha = .72
"Did you wish you had been doing something else?" (Reversed)
"Was this activity interesting?"
"Did you enjoy what you were doing?"

Self-Esteem: Alpha = .79
"Were you living up to the expectations of others?"
"Did you feel good about your self?"
"Were you living up to your expectations?"
"Did you feel in control of the situation?"
"Were you succeeding at what you were doing?"

Concentration: "How well were you concentrating?" (Single item)

Future Importance: "How important was [the main activity you were doing] in relation to your future goals?" (Single item)

Activities
School work: includes homework, listening to teacher, taking notes, doing group work, doing lab work, taking tests or quizzes, academic and nonacademic subjects

Active leisure: includes playing sports, jogging, cycling, hobbies (including reading for fun), playing games (including card games and video games)

Passive leisure: includes thinking, watching television or a movie, listening to radio or stereo, smoking, drinking alcohol