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Reviewed work(s):
Source: *American Journal of Education*, Vol. 111, No. 3 (May 2005), pp. 341-371
Published by: The University of Chicago Press
Stable URL: http://www.jstor.org/stable/10.1086/428885
Accessed: 12/12/2011 02:30

Middle School Students' Motivation and Quality of Experience: A Comparison of Montessori and Traditional School Environments

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This study compared the motivation and quality of experience of demographically matched students from Montessori and traditional middle school programs. Approximately 290 students responded to the Experience Sampling Method (ESM) and filled out questionnaires. Multivariate analyses showed that the Montessori students reported greater affect, potency (i.e., feeling energetic), intrinsic motivation, flow experience, and undivided interest (i.e., the combination of high intrinsic motivation and high salience or importance) while engaged in academic activities at school. The traditional middle school students reported higher salience while doing academic work; however, such responses were often accompanied by low intrinsic motivation. When engaged in informal, nonacademic activities, the students in both school contexts reported similar experiences. These results are discussed in terms of current thought on motivation in education and middle school reform.

The difficulties that many young adolescents encounter in middle school have been well documented (Carnegie Council on Adolescent Development 1989, 1995; Eccles et al. 1993; U.S. Department of Education 1991). During this precarious transition from the elementary school years, young adolescents may begin to doubt the value of their academic work and their abilities to succeed (Simmons and Blyth 1987; Wigfield et al. 1991). A central concern of many studies is motivation (Anderman and Maehr 1994); a disturbingly consistent finding associated with middle school is a drop in students' intrinsic motivation to learn (Anderman et al. 1999; Gottfried 1985; Harter et al. 1992).

Such downward trends in motivation are not inevitable. Over the past

American Journal of Education 111 (May 2005)

0195-6744/2005/11103-0003$05.00

decade, several researchers have concluded that the typical learning environment in middle school is often mismatched with adolescents' developmental needs (Eccles et al. 1993). Several large-scale research programs have focused on the qualities of classrooms and school cultures that may enhance student achievement and motivation (Ames 1992; Lipsitz et al. 1997; Maehr and Midgley 1991). School environments that provide a more appropriate developmental fit (e.g., more relevant tasks, student-directed learning, less of an emphasis on grades and competition, more collaboration, etc.) have been shown to enhance students' intrinsic, task motivation (Anderman et al. 1999).

The present study explores the issues of developmental fit and young adolescents' quality of experience and motivation by comparing five Montessori middle schools to six "traditional" public middle schools. Although the Montessori educational philosophy is primarily associated with early childhood education, a number of schools have extended its core principles to early adolescent education. These principles are in general agreement with the reform proposals associated with various motivation theories (Anderman et al. 1999; Maehr and Midgley 1991), developmental fit theories (Eccles et al. 1993), as well as insights from various recommendations for middle school reform (e.g., the Carnegie Foundation's "Turning Points" recommendations; see Lipsitz et al. 1997). In addition, the Montessori philosophy is consistent with the theoretical and practical implications of optimal experience (flow) theory (Csikszentmihalyi and Rathunde 1998). The present study places a special emphasis on students' quality of experience in middle school. More specifically, it uses the Experience Sampling Method (ESM) (Csikszentmihalyi and Larson 1987) to compare the school experiences of Montessori middle school students with a comparable sample of public school students in traditional classrooms.

Transforming the Middle Grades: What Can Be Learned from Investigating Montessori Middle Schools?

Middle schools lie at a crossroads in adolescent development when many things can go wrong (Eccles et al. 1991). The curricular choices made at this time can affect the educational path of young people (Anderman and Maehr 1994). For example, Sternberg (2001) suggests that middle schools are ripe

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for the development of "unbalanced" and piecemeal habits of thought that can undermine lifelong learning. From an experiential perspective—more central to the concerns of the present study—Csikszentmihalyi and Schneider (2000) add that habits formed in adolescence can set the tone for adult habits of attention that can affect future experience and career success.

What can be learned from research that compares Montessori and traditional middle schools? There are two main benefits. First, there has been an absence of empirical research in Montessori schools; this is especially true in adolescence, but it is also true with respect to early childhood education (Loeffler 1992). Despite the fact that the Montessori model is associated with thousands of schools worldwide and has been incorporated into approximately 250 middle schools (including charter schools), little is known about its effectiveness (see Chattin-McNichols 1992).[1] Therefore, one benefit of the present study is that it provides useful information about the Montessori community.

A second benefit of this comparison is more relevant for developmental thought and educational research. Over the last 15 years, a great deal of effort has been invested in diagnosing and designing classroom and schoolwide interventions that may enhance adolescents' motivation (Ames 1992; Felner et al. 1997; Maehr et al. 1992). These efforts are time and resource intensive, and it is often difficult to assess whether relatively permanent changes are being incorporated into the "cultures" of the schools. In contrast, the Montessori middle schools in this study provided an opportunity to study long-established school cultures that reflected some of the key insights of current thought on adolescent motivation and the problems students often encounter in middle school. Given this fact, and the use of the ESM to explore adolescents' daily experiences at school, much can be learned from this comparison about how the student-context fit in middle school can affect the quality of student experience. This is a topic that has been ignored by many education studies and is potentially important for conceptualizing and implementing middle grades reform.

Eccles and her colleagues (1993) have written extensively on the poor fit between adolescents' developmental stage and many middle schools. Young adolescents are beginning to think more abstractly (Piaget 1952), providing a greater flexibility of thought and metacognitive skills that allow more cognitive integration (Sternberg 2001). These same skills also increase the capacity for self-evaluation, and the resulting self-consciousness can open a window of vulnerability for school self-esteem (Covington 1992). Young adolescents want to exercise more choice and autonomy, and they increasingly look to peer relationships to define the self (Erikson 1968; Simmons and Blyth 1987; Steinberg 1990). Middle schools, however, often provide a context that does not fit well with these emerging characteristics. Despite the capacity for more integrated and independent thought, the typical middle school environment

is more rigid, with tighter rules, an emphasis on control, and few opportunities to exercise freedom of choice and self-direction (Eccles et al. 1991). Although adolescents are more peer oriented and at a stage crucial for the development of interpersonal skills, middle schools disrupt peer relations and make it difficult for positive, collaborative work to occur (Wentzel 1998). Sources of adult support, crucial at any age, but especially so during times of rapid developmental change (Lerner 2003), decrease in middle school environments, and teachers are seen as more remote and impersonal (Feldlaufer et al. 1988). At a time of increasing self-consciousness, middle schools begin to emphasize public evaluation and grades more strongly (Anderman et al. 1999). Finally, at a time of emergent identity, when passions might be invested in lofty ideals and goals, students have difficulty finding meaning and intrinsic motivation in their schoolwork (Gottfried 1985; Harter et al. 1992).

Although the rhetoric of school reform outpaces existing empirical research that can inform teachers and policy makers, a number of studies document the fact that meaningful school reform can benefit students (Felner et al. 1997). For example, several large studies have been informed by the eight core principles of the Carnegie Foundation's report on adolescent development (Carnegie Council on Adolescent Development 1989). These recommendations provide testable hypotheses and a rubric for middle grades reform, and hundreds of schools in several midwestern states have participated in longitudinal studies to assess their implementation (e.g., smaller communities for learning, connecting schools and communities, etc.; see Lipsitz et al. 1997). Using multidimensional measures that capture the extent and quality of reform implementation (i.e., its intensity or "dosage"), results have shown that schools at more mature phases in the transformation process have higher student achievement and fewer behavioral problems (see Felner et al. 1997).

The present study of Montessori and traditional schools does not look at student achievement or behavioral outcomes, nor does it attempt to explore a complex set of reform-inspired ideas. Rather, the focus here is on a few classroom practices that are in line with current motivation theory (discussed below) and a subset of the Carnegie principles of reform (i.e., those concerned with enhancing each student's success by creating a more personalized context for learning). This study, therefore, is best conceptualized as exploratory with respect to what Montessori schools can add to the vigorous and ongoing debate about how to reform middle schools. Nevertheless, Sarason (1990) notes that many reform efforts fail due to the lack of a central, "big idea" that organizes and attracts other ideas. The Montessori schools benefit from such conceptual integration because of a tradition of emphasizing a student's self-direction and intrinsic motivation.

Montessori Ideas and Contemporary Motivation Theory

Motivation is key at any level of education, but understanding how it can be enhanced in the middle grades when school attitudes are being formed is especially critical (Eccles et al. 1993; Maehr and Midgely 1991). The extent to which Montessori ideas can meaningfully contribute to this search for understanding has largely gone unrecognized because the majority of Maria Montessori's writings have dealt with early childhood education (Montessori 1965, 1981). Nevertheless, the transposition of her educational philosophy to middle schools has retained the main theme that runs through all of Montessori's work: creating an environment for intrinsic motivation. Futhermore, Montessori's insights about motivation are in line with contemporary perspectives on motivation, including goal theory (Anderman and Maehr 1994) and optimal experience theory (Csikszentmihalyi and Rathunde 1998).

Connections to Goal Theory

Goal theory suggests how students' goals mediate the quality of their engagement at school. Two qualitatively different kinds of goals are distinguished: task and performance (Anderman and Maehr 1994). Task-focused students are intrinsically motivated; they are drawn to novelty and the desire to master challenging tasks (see also Deci and Ryan 1985). Performance-focused students, in contrast, are worried about public evaluations of their ability, and this can disrupt learning by diminishing risk taking and effort (Dweck and Leggett 1988). Since the characteristics and structure of middle schools appear to reinforce and socialize performance goals (Anderman et al. 1999), attempts to change classrooms and school cultures have focused on strategies that presumably reinforce a student's task focus. These strategies have been summarized with the acronym TARGET (i.e., task, authority, recognition, grouping, evaluation, and time).

The five Montessori middle schools in this study reflected the practices outlined in the TARGET proposals (see Ames 1992; Anderman et al. 1999). For example, they shared a school culture that emphasized intrinsic motivation and, therefore, a task focus. The teachers were trained in a Montessori perspective that emphasized, from early childhood onward, attention to the individualized interests of students. Students had freedom to select projects and improvise on themes introduced by the teacher (e.g., students at all the schools had several hours per day for self-directed projects). As is common in Montessori schools, teachers utilized field trips, experts from the community, and hands-on experiences to augment the curriculum. Authority was not rigidly

hierarchical in the classrooms; students often planned details of field trips, made decisions about topics to study, and were called upon in "leadership groups" to help maintain the classrooms and the school (e.g., perform daily maintenance, purchase of equipment, etc.). Recognition of students was done in ways that avoided achievement competition. For instance, one frequently used strategy was to have students identify a topic of personal interest, research it, and then be responsible for presenting the information to the class. Ability grouping was not practiced, and student groups were typically based on shared student interests. Because a significant amount of daily time was unstructured, students had ample time for peer interaction and were encouraged to collaborate with others. In terms of evaluation, only about one-third of the Montessori students received grades, and those who did, did so voluntarily (i.e., it was not mandatory). The use of "progress reports" was standard practice. Finally, time was managed in flexible ways. For instance, block scheduling at some of the schools allowed teachers to expand or contract contact time with students depending upon what was happening at the moment in the classroom. Students, with the help of teachers, were responsible for budgeting time to complete projects.[2]

Connections to Optimal Experience (Flow) Theory

Optimal experience theory explores the role of subjective experience in the development of a person's skills and talents. The central concept in the theory is flow: an intrinsically motivated, task-focused state characterized by full concentration, a change in the awareness of time (e.g., time passing quickly), feelings of clarity and control, a merging of action and awareness, and a lack of self-consciousness (Csikszentmihalyi 1990). The experience is triggered by a good fit between a person's skills in an activity and the challenges afforded by the environment. Flow has been shown to promote learning and development because experiences of deep and total concentration are intrinsically rewarding, and they motivate students to repeat an activity at progressively higher levels of challenge (Csikszentmihalyi et al. 1997).

The strongest link between optimal experience theory and Montessori education is the centrality of the flow experience to learning, or what Montessori called spontaneous concentration. She believed that children's spontaneous concentration revealed the essence of being human, and there is little doubt that what Montessori had in mind when speaking about concentration was something akin to flow. According to Standing's (1984) biography of Montessori, a key turning point in the development of her method occurred after observing a 3-year-old child who was so engaged with wooden cylinders that she could not be distracted. She frequently commented on the single-mind-

edness of children's powers of concentration: "It has been revealed that children not only work seriously but they have great powers of concentration. . . . Action can absorb the whole attention and energy of a person. It valorizes all the psychic energies so that the child completely ignored all that is happening around him" (Montessori 1946, 83–84). Witnessing this episode evolved into the main theme of the Montessori method: creating a school environment that fostered deep engagement and concentration.

According to optimal experience theory, a school or family context enhances flow experience by (*a*) supporting students' interests and (*b*) challenging students to work at developing those interests (Csikszentmihalyi and Rathunde 1998; Rathunde 1996). In this way, a dynamic interrelation of involuntary and selective modes of attention is initiated (see James 1890), or what Dewey (1997, 218) once referred to as being "playful and serious at the same time." Such a combination is thought to provide an efficient use of attention that generates the momentum necessary to trigger flow experiences. For example, if a school context were only supportive, children would be susceptible to "fooling," or jumping haphazardly from one interest to the next without focus and concentration. Conversely, if a context were only challenging—the more typical condition in most middle schools and high schools—children would be susceptible to "drudgery," or being told what to concentrate on without an emotional investment in what they were doing.

The Montessori schools in this study attempted to create environments that enhanced students' concentration through affective and cognitive involvement. For example, all of them emphasized the Montessori theme of keeping body and mind united through the integration of acting and thinking in the classroom (Montessori 1976, 24–25). The teachers expressed the desire to avoid overtly didactic methods that would separate thinking from its experiential context and result in excessive abstraction. In addition, all of them attempted to create a "prepared environment" that incorporated freedom with discipline.[3] Although the most widely recognized element of a prepared environment is the freedom a student has to choose an activity and explore his or her interests, Montessori also recognized the need for discipline: "You must not imagine that liberty is something without rule or law" (quoted in Standing 1984, 286). In these two ways, the Montessori schools employed strategies that were expected to enhance student concentration and flow.

In summary, Montessori educational philosophy has much in common with the insights of contemporary motivation theories. By thinking experientially and putting the child's concentration at the forefront, Montessori developed her method and educational philosophy along lines that are consistent with the insights of optimal experience theory. By emphasizing the need for a school culture that emphasizes intrinsic motivation and task focus, Montessori environments have come to reflect the reform ideas that have emanated from

goal theory. By taking advantage of an established cluster of Montessori middle schools and comparing them to a matched sample of traditional middle schools, the present study explores the hypothesis that Montessori students will report more intrinsic motivation and a higher quality of experience while academically engaged at school.

Method

Selection of Schools and Students

The Montessori and traditional schools selected for study were similar in terms of important demographic characteristics, but different with respect to key aspects of the school context. The selection procedure and steps taken to compare and differentiate the two sets of schools are summarized next.

After consulting with officers of the North American Montessori Teachers Association (NAMTA), five Montessori schools from four U.S. states were selected to participate. The selection of schools was not random; well-established middle school programs were selected that incorporated aspects of the Montessori model that would clearly differentiate the Montessori schools from traditional public schools. The selection criteria were informed by some of the Carnegie Foundation's Turning Points criteria (i.e., those emphasizing developmentally sensitive, smaller, and more personalized communities for learning) but were more directly related to ideas from optimal experience theory and the TARGET reform proposals. Montessori schools were selected that (1) had an explicit philosophy of intrinsic motivation that emphasized spontaneous concentration and freedom within discipline (i.e., the school was based on Maria Montessori's extensive writings), (2) provided students with significant portions of unstructured time for self-directed work (average equals approximately two hours per day) and did not utilize the typical block period organization (e.g., 45 or 50 minutes per subject), (3) did not utilize mandatory grading or standardized testing for comparative purposes and student placements, (4) allowed students to play a significant role in daily decisions that affected the school (e.g., curriculum choices, school purchases, destination of field trips, etc.), and (5) discouraged whole class, lecture formats and encouraged students to work in smaller groups.

Five Montessori schools that met the above criteria were contacted and agreed to participate. Approximately 150 sixth- and eighth-grade students (60 percent female and 40 percent male) attended the five schools and filled out the background questionnaire; about 140 students provided valid ESM information (see the "Measures" section). European Americans comprised 72.6 percent of the sample, 10.2 percent were Asian Americans, 12.7 percent were

African American, 1.9 percent were Latino, and 2.6 percent of students were from other ethnic backgrounds. The majority of the students were from four suburban schools in middle- or upper-middle-class communities; eight of the students (all eighth graders) attended a rural school. All of the schools were private except one.

The traditional middle schools and students were selected from a larger study involving 20 middle schools and approximately 400 students in grades 6 and 8 (see Csikszentmihalyi and Schneider 2000). The full sample encompassed all social class levels, and approximately half of the students were from ethnic minority families. Since previous research has shown that family characteristics, socioeconomic status (SES), and ethnic background are strongly related to students' engagement in the classroom (Becker 1990; Finn 1993; Lee and Smith 1993; Marks 2000; Wentzel 1998), a subset of schools was first selected that matched the primarily European American and higher SES status of the Montessori middle school students.

Six of the 20 middle schools in the sample satisfied these demographic matching criteria. These middle schools included approximately 160 students (55 percent female, 45 percent male); about 150 students provided valid ESM information (see "Measures"). European Americans comprised 74.9 percent of the sample, 7.8 percent were Asian Americans, 12.6 percent were African American, 3.6 percent were Latino, and 1.2 percent of students were from other ethnic backgrounds. Further empirical analyses confirmed the similarity of the sample with respect to other important background variables (e.g., parental education; ethnic background; family resources; parental monitoring, discussion, and involvement in education; family size; parental marital status; and job status and employment—see the section titled "Preliminary Analyses" below).

After selecting a set of comparison schools that fit the demographic profile of the Montessori schools, the next step was to verify that the schools differed with respect to the five selection criteria outlined above. A variety of qualitative sources were used to verify differences, including observations by the research staff; teacher and parent interviews; school newsletters, information packets, mission statements, and parent-teacher handbooks; summaries from board of education and school council meetings; and a review of class schedules and textbook choices discussed in strategic plans. These sources also provided information about the level of middle grades reform that may or may not have been implemented by the schools and whether the adjective "traditional" was an appropriate moniker.

The profile of the traditional middle schools that emerged from these various materials was, in most ways, a very positive one. Consistent with the higher SES status of the communities, the selected schools were modern, attractive, and had excellent resources to offer a full range of educational and extracurricular activities; all of them had relatively small class sizes and excellent

teacher-student ratios (e.g., average teacher-student ratio for five of the six schools was 15 : 1; no size information was available for one school, but ethnographic descriptions confirmed that the sixth- and eighth-grade classes were divided into "small sections"). Furthermore, two of the midwestern school districts participating in the study (five of the six schools) were in the beginning phases of participation with the U.S. Department of Education study of middle grades reform. School committees were being formed to discuss the major dimensions of reform (e.g., reflective review and self study, small learning communities, distributed leadership, interdisciplinary teaching; see Middle Start National Center 2003), and implementation plans were being drawn up.

Despite the trajectory toward reform, however, the fact that these schools were in the initial phases of discussion supports the decision to label them as traditional. Research shows that several years of implementation are needed before a school reaches a "mature" level of reform implementation and organizational changes become institutionalized (Felner et al. 1997). That the schools still operated in a traditional fashion was confirmed by some of the teachers' comments about the curriculum. For example, one teacher explained how a new math curriculum was being planned where "kids will no longer be doing just math work sheets and computations" and teachers would rely less on "drill and kill" methods. In other words, the fact that a new "hands-on" approach was still in the planning stages for math and other areas of study suggested that instruction at the schools could reliably be called traditional.

The traditional schools that were selected also differed with respect to the five selection criteria that characterized the Montessori schools. First, although student initiative was encouraged in student handbooks and school mission statements, none of the traditional schools emphasized intrinsic motivation and spontaneous concentration as the central guiding principle for education. Second, the traditional schools followed block schedules of 45–50 minute class periods, interspersed with time for lunch and homeroom, and did not provide elongated periods of time for student self-direction. Third, the traditional schools provided feedback to students through report cards and grades, and standardized tests were used to provide "benchmarks" for student progress and validation for student placements in groups. Fourth, the traditional students did not have formalized opportunities (e.g., councils or leadership groups) for participating in daily decision making. Finally, rather than minimizing lecture formats for the presentation of material, several of the student handbooks from the traditional schools emphasized the skills of attentive listening and note taking during lectures. This fact corresponded to the teacher comments (summarized above) about the current orientation of instruction. Time use comparisons using the ESM responses also confirmed that the Montessori students

reported spending approximately 17 percent less time in lecture/note-taking formats (unpublished findings).

In summary, the two sets of schools being compared were remarkably similar with respect to the relatively advantaged demographic profile of their students and families. In addition, teachers and administrators in the traditional middle schools had an active orientation and desire to continually improve their schools. However, the traditional schools had not yet embarked on their plans of reform, and their school contexts differed from the Montessori contexts in several key ways that would presumably affect student experience and motivation.

Procedure

Data collection at the Montessori schools.—Preliminary information explaining the research project was mailed to the schools and distributed by the teachers. A meeting was set up at the schools for those students who agreed to participate (over 95 percent). Members of the research team explained the study, distributed questionnaires, and provided the materials for the ESM (i.e., students were given watches that were programmed to signal the students approximately eight times per day between the hours of 7:30 a.m. and 10:30 p.m. for seven consecutive days; see Csikszentmihalyi and Larson 1987). During this meeting, students were instructed on how to respond to the signals (i.e., by filling out a short response form), and they had a chance to practice filling out the ESM forms. Students were informed that a member of the research team would give them a background questionnaire to be completed during a designated class period later in the week. Students were also given a questionnaire to bring home to their parents, along with a preaddressed, stamped envelope that parents could use to return their questionnaires. At the end of the week students returned their ESM materials in a brown paper envelope.

Data collection at the traditional middle schools.—Data collection at the traditional middle schools occurred approximately 9 years before data collection at the Montessori schools (see Csikszentmihalyi and Schneider 2000).[4] Approximately 86 percent of the target sample of students across the six schools participated in the study. The main data collection procedures (described above) were replicated across the two studies. The ESM student orientation meeting, the timing schedule of the daily signals, and the formatting of questions on the ESM forms and the background questionnaires were the same across the two studies.

Middle School Experience

Motivation and Quality-of-Experience Measures

Selection of ESM signals.—All of the ESM measures used in this study were measures of student experience at school. Two items on the ESM response form were used to select the signals for analysis: Where were you as you were beeped, and what was the main thing you were doing?[5] First, all of the signals for times when students were at school were selected. Then, the "what were you doing" variable was used to select two kinds of activities—academic work and nonacademic work.[6] Academic work (62 percent of all school signals, or about 2,500 beeps) included all activities occurring in class (e.g., listening to a teacher, discussion, presentations, etc.), doing homework, taking tests, and participating in extracurricular activities; nonacademic signals (38 percent of the school signals, or about 1,500 beeps) included all other activities occurring at school. The major activities in this group were eating/maintenance (22.5 percent), socializing (8.2 percent), various leisure activities (5.5 percent), miscellaneous errands (2 percent), and media (1 percent).

All of the outcome variables reported in this study were based on aggregated measures. In other words, if a student responded to 10 ESM signals while doing academic work at school, the particular experiential measure reported was based on the average of those 10 signals. In addition, as is conventional in ESM studies (see Csikszentmihalyi et al. 1997), students' experiential reports were standardized around their own means to eliminate response bias, and only those students who responded to at least 15 signals were included in the analyses.

ESM composite measures of experience.—The present study replicated the five main ESM measures used in the study of traditional public schools (see Csikszentmihalyi and Schneider 2000): affect, potency, salience, intrinsic motivation, and flow. The first four were composite ESM variables based on factor analyses performed in the original study. The composites were recomputed in the present study, and reliability analyses (Cronbach's alpha) were done to reassess the measures. Affect (alpha = .85) was based on the average of four semantic differential items (range 1–7): happy (vs. sad), relaxed (vs. worried), sociable (vs. lonely), and proud (vs. ashamed). Potency (alpha = .85) was based on the average of three semantic differential items (range 1–7): strong (vs. weak), active (vs. passive), and excited (vs. bored). Intrinsic motivation (alpha = .79) was based on the average of three questions on 10-point scales: Did you enjoy what you were doing? Was this activity interesting? Did you wish you had been doing something else (reverse coded)? Salience (alpha = .71) was based on three items on 10-point scales: Was this activity important to you? How important was this activity to your future goals? How challenging was the activity?

Percent of flow experience.—Flow is more likely to occur when the challenges

of an activity and a student's skills in the activity are perceived to be high and in balance (Csikszentmihalyi 1990). Flow was computed in both samples using two variables, "challenges of the activity" and "skills in the activity." First, individual *z*-scores were computed for each student, setting their average level of skill and challenge to zero. Second, an ESM signal was categorized as a flow signal when skills and challenges were both above the student's own average. Third, the ratio of flow signals to the total number of signals in a particular context was considered the percent of flow. For example, if a student responded to 10 signals while doing academic work at school, and three of those signals indicated that a student's skills and challenges were above average, the percent of flow for that student would equal 30 percent.[7]

Undivided and divided interest.—Using the two composite variables "intrinsic motivation" and "salience," four motivation quadrants were created that described qualitatively different ways of experiencing schoolwork. Undivided interest was defined as times when students' intrinsic motivation (i.e., enjoyment, interest, and their wish to be doing the activity) was above average and their salience (i.e., challenge level and importance of the activity to themselves and their future) was above average. Disinterest was the opposite: intrinsic motivation and salience were both below students' own average. Finally, two kinds of "divided interest" were designated: fooling described times when intrinsic motivation was above average but salience was below average, and drudgery described times when salience was above average and intrinsic motivation was below average. For example, if a student responded to eight signals while doing academic work at school, and two signals indicated above-average intrinsic motivation and salience, the percent of undivided interest would be 25 percent. The other three quadrants were computed in a similar fashion. The assumption underlying this classification was that the ideal mental state for learning, as Dewey (1997, 218) suggested, is "playful and serious at the same time"; Dewey referred to divided states that were overly playful or overly serious as "fooling" and "drudgery," respectively.

A second indicator of undivided interest was computed by correlating students' intrinsic motivation and salience scores, adjusting for gender, parental education, and ethnicity. Higher positive correlations would indicate a stronger association between feelings of interest and importance while academically engaged at school.

Background variables.—Previous research demonstrates that gender, family SES, and ethnicity can affect student engagement (Finn 1993; Gentry et al. 2002; Lee and Smith 1993; Marks 2000). Therefore, these three variables were used as covariates in all of the multivariate analyses (see "Analysis Plan"). Gender and ethnic background were based on single items from the student questionnaires. Ethnicity was collapsed into two categories—European American and minority (i.e., all other ethnicities combined). Parental education was

computed from student responses about how far their parents went in school (1 = did not finish high school, 2 = graduated from high school, 3 = attended two-year school; 4 = went to college (did not complete degree), 5 = graduated from college, 6 = master's degree or equivalent, 7 = PhD, MD, or other professional degree). Over 80 percent of the families in both samples were intact with mothers and fathers living at home. When information was available for both parents, parental education was computed as the average of mother and father education. For the small number of students (less than 10 percent) who did not supply information about either parent, parental education was computed based on responses from parental questionnaires (when available) or census track information (i.e., estimated based on the social class of the community).

A number of other background variables were used to test whether the Montessori and traditional samples were similar on key variables. Of particular concern were family variables that could influence student motivation and engagement at school (Gottfried et al. 1998; Meece 1997). All of the background variables were based on items from the *National Education Longitudinal Study of 1988* (*NELS: 88*; National Center for Education Statistics 1994, 1997), and students in both samples responded to the same items. In addition to parental education and ethnicity, nine other background variables were used to compare the samples. Family resources was a 16-item checklist (1 = do not have, 2 = have) that asked about resources at home (e.g., encyclopedia, computer, over 50 books, etc.). Parent-child discussion was a three-item scale (alpha = .67; 1 = not at all to 3 = three or more times) assessing the amount of recent family discussion about school (e.g., selecting courses, activities of interest, things studied). Parental monitoring was a seven-item scale (alpha = .62; 0 = never to 3 = often) that assessed parental monitoring of school activities and limit setting (e.g., completion of homework, amount of time watching TV, etc.). Parental involvement was a four-item scale (alpha = .65; 1 = never to 3 = more than twice) assessing recent parental involvement at their child's school (e.g., volunteering, attending school events, etc.). Family size indicated the number of younger or older brothers and sisters a student reported. Intact homes was the percentage of time students reported that both mother and father were living at home. Mother employment and father employment were based on student reports on the employment status of each parent (e.g., working, unemployed, etc.). Finally, grade point average (1 = mostly As, 2 = half As and half Bs, 3 = mostly Bs, etc.) was a self-report item indicating the average grades a student received on his or her last report card. Approximately one-third of the Montessori students received grades.

Analysis Plan

Preliminary analyses compared the two samples on a range of background variables to help ensure that any differences in experience at school could not be traced to family or individual student differences. Preliminary analyses also compared schools within the Montessori and traditional samples on key dependent variables to assess whether it was appropriate to consider each block of schools as a relatively unified group (i.e., motivation and experience did not differ across the schools).

The main analyses used two-way multivariate analysis of covariance (MANCOVA) with school type (Montessori vs. traditional) and grade level (sixth vs. eighth) as the two factors. Gender, ethnicity, and parental education were covariates in all of the analyses. Overall multivariate *F*-tests (Wilks's lambda) were performed first on related sets of dependent variables (e.g., ESM composites). If an overall *F*-test was significant, univariate ANOVAs were performed as follow-up tests to the MANCOVAs. If necessary, post hoc analyses were done using Bonferroni corrections to control for Type I errors. Only students with at least 15 ESM signals were included in the multivariate analyses, and follow-up ANOVAs used students who had valid scores on all of the dependent variables.

The main analyses explored students' motivation and quality of experience in academic work at school. It was hypothesized that students in Montessori middle schools would report more positive motivation and experience. No predictions were made with regard to sixth- or eighth-grade students or the interaction between type of school context and grade level. Finally, to assess whether any student differences associated with academic work were also evident during nonacademic activities at school (e.g., leisure, maintenance, socializing, etc.), the MANCOVA analyses were repeated using ESM signals that captured the students doing other activities besides schoolwork. It was expected that students from Montessori and traditional middle schools would report similar experiences in these circumstances.

Results

Preliminary Analyses

Before selecting the six schools that matched the SES and ethnic composition of the Montessori sample, there were substantial differences between the Montessori students and students from the larger sample of 20 public middle schools

TABLE 1

Comparison of Montessori and Traditional Middle School Samples on Various Background Variables

BACKGROUND VARIABLE	SCHOOL CONTEXT	
	Montessori	Traditional
Ethnicity (%):		
European American	72.6	74.9
Asian American	10.2	7.8
Latino	1.9	3.4
African American	12.7	12.6
Other	2.6	1.2
Parental education	5.5	5.4
Home resources	29.6	29.5
School-related:		
Parental discussion	2.41	2.49
Parental involvement	2.11	2.10
Parental monitoring	1.69	1.66
Number of siblings	1.8	2.0
Mother employment (%)	71.6	74.1
Father employment (%)	83.7	88.1
Intact (two-parent) family (%)	81	84
Grade point average	1.97	1.93

NOTE.—None of the differences reported in the table was statistically significant.

(see Csikszentmihalyi and Schneider 2000). As expected, the Montessori and traditional samples were significantly different on all of the background variables (unpublished data). For instance, the Montessori students reported higher average grades; came from smaller families; were less ethnically diverse; more often came from two-parent homes; had greater resources at home; and their parents were more highly educated, discussed school-related issues more often, monitored school activities more closely, and had higher rates of employment. After selecting the demographically matched subset of schools, the two samples did not differ on any of these background variables. Table 1 summarizes this comparison. The ethnic diversity of the samples was almost identical. Both shared similar advantages in terms of high parental education (baccalaureate degree or higher), high rates of two-parent families, high family resources, and other indicators of strong parental involvement in their children's education. Although only one-third of the Montessori students received grades, *t*-tests indicated that both samples were comprised of good students (i.e., they received about half As and half Bs).

A second set of preliminary analyses looked at whether the schools within each sample differed on the main outcome variables or whether they repre-

sented a unified group of schools. One-way ANOVAs and post hoc contrasts using the main set of ESM variables (i.e., affect, potency, intrinsic motivation, salience, flow, and undivided interest) were used to look across the schools within each sample. Only the ANOVA for salience was significant ($p < .05$) in both samples. In the Montessori sample, one school had higher salience scores than two others; in the traditional sample, one school had higher scores than one other. Thus, only two of the potentially 60 contrasts across the six dependent variables and five schools (less than 4 percent) were significant in the Montessori sample; only one of 90 potential contrasts across the six dependent variables and six schools (less than 2 percent) was significant in the traditional sample. Since students within each set of schools reported a similar quality of experience at school, and site descriptions showed that the schools in the two samples were similar in size and resources, the decision was made not to control for any school effects in further analyses.[8]

Motivation and Quality-of-Experience Differences: Academic Activities at School

The first analysis compared the main motivation and quality-of-experience variables across school type (Montessori vs. traditional) and grade level (sixth vs. eighth) using a two-way MANCOVA with parental education, gender, and ethnic background as covariates. Significant differences were found for school context (Wilks's lambda = .84, $F(5, 275) = 10.84$, $p < .001$), indicating that students in the two school contexts reported differences in motivation and quality of experience. After adjusting for the covariates, the multivariate eta squared indicated that 17 percent of the variance of the dependent variables was associated with the school context factor. The omnibus test for grade level was not significant (Wilks's lambda = .99, $F(5, 275) = .68$, $p = .64$), indicating that students in sixth and eighth grade reported similar motivation and quality of experience. Finally, the omnibus test for the interaction of school context × grade level was not significant (Wilks's lambda = .97, $F(5, 275) = 2.02$, $p = .08$). None of the multivariate tests for the covariates—parental education, gender, and ethnic background—reached the .05 level.

Based on the multivariate findings, follow-up ANCOVAs were done on each of the five ESM variables. Only the findings for school context are reported here because of the significant omnibus test in the MANCOVA. Table 2 summarizes the means, standard errors, and significance levels for each of the variables. Results showed that all of the composites were significantly different for the two school contexts. Montessori students reported more flow, higher affect, potency, and intrinsic motivation while doing schoolwork. The traditional students, however, reported higher salience. The means in table 2 are based on *z*-scores.[9] Thus, the scores reveal that Montessori students

TABLE 2

Univariate F-Tests for Quality of Experience in Academic Activities at School by School Context

	SCHOOL CONTEXT			
ESM MEASURE	Montessori ($N = 135$)	Traditional ($N = 151$)	*F*-TEST	*p*
Flow (%)	37.0 (2.2)	30.1 (2.1)	5.14	.024
Affect	−.03 (.04)	−.16 (.04)	7.20	.008
Potency	.00 (.04)	−.19 (.04)	11.27	.001
Motivation	−.12 (.04)	−.44 (.04)	37.10	.000
Salience	.36 (.04)	.48 (.04)	4.25	.040

NOTE.—Means are *z*-scores (i.e., zero is average experience for the entire week) and are adjusted for the covariates gender, parental education, and ethnicity. Standard errors appear in parentheses. Flow percent indicates the amount of time students indicated above-average challenge and skill while doing productive activities.

reported about average levels of affect and potency while working at school; the traditional students, on the other hand, reported affect and potency below their weekly average. Both groups found schoolwork to be less motivating than the rest of their weekly activities, but the Montessori kids reported more intrinsic motivation than the students in the traditional schools.

A second MANCOVA was done for the set of interest quadrants created using the intrinsic motivation and salience variables (i.e., undivided interest, divided interest [two types], and disinterest). Significant differences were found for school context (Wilks's lambda = .83, $F(3, 289) = 19.20$, $p < .001$), indicating that students in the two types of schools reported differences in how they perceived the balance of interest and importance in their school activities. After adjusting for the covariates, the multivariate eta squared indicated that 17 percent of the variance of the four dependent variables was associated with the school context factor. The omnibus test for grade level was not significant (Wilks's lambda = .99, $F(3, 289) = 1.32$, $p = .27$), and neither was the omnibus test for the interaction of school context × grade (Wilks's lambda = .99, $F(3, 289) = 1.30$, $p = .27$). Finally, the omnibus test for ethnicity was significant (Wilks's lambda = .96, $F(3, 289) = 3.65$, $p = .013$) and so was the multivariate F for parental education (Wilks's lambda = .97, $F(3, 289) = 2.91$, $p = .029$). There was no effect for gender.

Based on the multivariate findings, follow-up ANCOVAs were performed on each of the four interest quadrants. Only the findings for school context, ethnicity, and parental education are reported here due to the significant omnibus tests associated with these variables. Results of the ANCOVAs showed

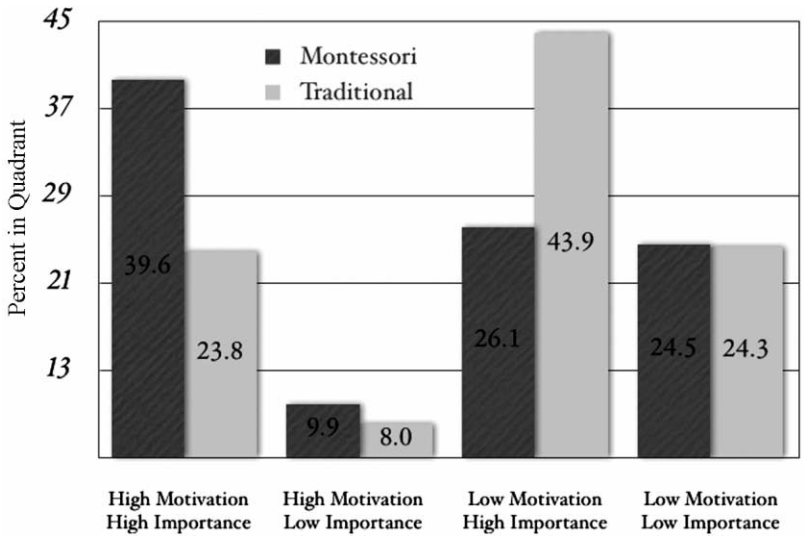

FIG. 1.—Percentage of students' time in four interest quadrants while doing academic work

that students in the two school contexts reported differences in two of four quadrants: undivided interest (high motivation and high importance) ($F(1, 291) = 35.37$, $p < .001$) and the "divided interest" of drudgery (low motivation and high importance) ($F(1, 291) = 45.92$, $p < .001$). The Montessori students' mean percent of undivided interest (40 percent, SE = 1.9) was higher than the traditional students' mean (24 percent, SE = 1.8). That is, when the Montessori students were engaged in academic school activities, they more often reported above-average intrinsic motivation while perceiving their activities as having above-average challenge and importance. The Montessori students' mean percent of divided interest/drudgery (26 percent, SE = 1.9) was lower than the traditional students' mean (44 percent, SE = 1.8). In other words, the traditional students more often perceived their school activities as having high importance and low intrinsic motivation. Students in both school contexts reported similar levels of divided interest/fooling ($F(1, 291) = 1.43$, $p = .23$, Montessori $M = 9.9$ percent, SE = 1.1; traditional $M = 8.0$ percent, SE = 1.0) and disinterest ($F(1, 291) = .01$, $p = .92$, Montessori $M = 24.5$ percent, SE = 1.8; traditional $M = 24.3$ percent, SE = 1.7). These findings are illustrated in figure 1.

The follow-up ANCOVAs also indicated that ethnicity was significantly related to two of the quadrants: divided interest/fooling ($F(1, 291) = 4.81$, $p = .029$) and disinterest ($F(1, 291) = 6.67$, $p = .010$). Students from ethnic

minority families reported a higher percentage of fooling and a lower percentage of disinterest than white students. Students with more highly educated parents reported higher levels of drudgery.

A second test of the hypothesis that Montessori students would report more undivided interest used the correlations of students' intrinsic motivation scores with their salience scores. While controlling for gender, ethnicity, and parental education, partial correlations were computed for the two school contexts while students were engaged in academic work at school (Montessori Pr = .49, $N = 138$, $p < .001$; traditional Pr = .18, $N = 150$, $p = .03$). Both groups showed a significant, positive correlation between intrinsic motivation and salience in school activities. However, the Montessori students reported a stronger correlation as indicated by Fisher's test of the differences between the correlations ($z = 2.97$, $p < .01$); in the Montessori sample, in other words, intrinsic motivation was more strongly correlated with the importance of schoolwork.

Motivation and Quality-of-Experience Differences: Nonacademic Activities at School

If the motivational and experiential differences in academic activities reflect differences in the organization and operation of the school contexts, as is hypothesized here, then these differences should disappear or be diminished in nonacademic pursuits that have less to do with the mission of the schools (e.g., maintenance, eating, socializing, etc.). To test this assertion, all of the analyses reported above were repeated, this time aggregating ESM signals at school that captured students engaging in a variety of miscellaneous, nonschoolwork activities.

The two-way MANCOVA for the motivation and quality-of-experience variables was repeated for nonacademic activities. Significant differences were again found for school context (Wilks's lambda = .92, $F(5, 270) = 4.90$, $p < .001$), indicating that students in the two types of schools reported differences in motivation and quality of experience in nonacademic activities. After adjusting for the covariates, the multivariate eta squared indicated that 8 percent of the variance of the dependent variables was associated with the school context factor. The omnibus test for grade level was not significant (Wilks's lambda = .97, $F(5, 270) = 1.83$, $p = .11$), and neither was the omnibus test for the interaction of school context × grade level (Wilks's lambda = .98, $F(5, 270) = 1.29$, $p = .27$). Finally, none of the multivariate tests for parental education, gender, or ethnic background reached the .05 level.

Follow-up ANCOVAs were done on each of the five ESM variables. Table 3 summarizes the means, standard errors, and significance levels for each of

TABLE 3

Univariate F-Tests for Quality of Experience in Nonacademic Activities at School by School Context

	SCHOOL CONTEXT			
ESM MEASURE	Montessori ($N = 131$)	Traditional ($N = 150$)	*F*-TEST	*p*
Flow (%)	11.0 (1.7)	17.3 (1.6)	7.19	.008
Affect	.32 (.05)	.14 (.05)	6.87	.009
Potency	.22 (.05)	.16 (.05)	1.90	NS
Motivation	−.03 (.05)	−.12 (.05)	1.70	NS
Salience	−.38 (.04)	−.19 (.04)	11.14	.001

Means are *z*-scores (i.e., zero is average experience for the entire week) and are adjusted for the covariates gender, parental education, and ethnicity. Standard errors appear in parentheses. Flow percent indicates the amount of time students indicated above-average challenge and skill while doing nonacademic activities.

the variables. Consistent with the relaxed nature of the activities, students in both school contexts reported higher levels of affect, potency, and intrinsic motivation in nonacademic activities, as well as lower levels of salience and flow (see table 2). In contrast to the findings for academic work, students in both groups reported similar levels of intrinsic motivation and potency. In addition, students in the traditional group reported significantly more flow in nonacademic activities, although the overall percentage of flow was low. Similar to the findings for academic activities, the Montessori students reported better overall affect, and despite the fact that levels of salience were below average for both student groups, the traditional students reported that their activities were more important.

A second MANCOVA explored the four interest quadrants in nonacademic school activities. No significant differences ($p < .05$) were found for school context, grade, context × grade, or any of the covariates. On the key variable undivided interest, students in the traditional group reported a slightly higher percent of high motivation and high importance activities; this noteworthy change from academic activities is illustrated in figure 2. Furthermore, a repeat of Fisher's *z*-test between the intrinsic motivation and salience correlations in the two groups (Montessori Pr = .35, $N = 135$, $p < .001$; traditional Pr = .30, $N = 148$, $p < .001$) was not significant in nonacademic activities ($z = .46$, NS). Thus, students in the two groups perceived similar connections between intrinsic motivation and salience in nonacademic work. Moreover, while the Montessori students reported a higher partial correlation between intrinsic motivation and salience in academic activities, the traditional students' partial correlation was higher in nonacademic activities.

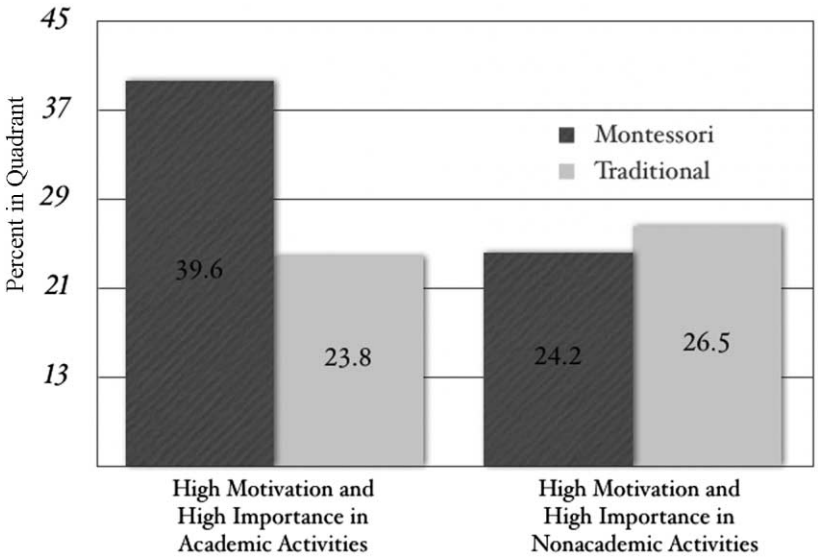

FIG. 2.—Percentage of undivided interest in academic and nonacademic activities

Discussion

Given the well-documented decline in students' motivation and engagement in middle school, and the ongoing emphasis on middle school reform (Cross 1990; Eccles et al. 1993; Lipsitz et al. 1997), an increasing number of studies have explored how to change classroom practices and school cultures in ways that provide a healthier fit for young adolescents (Ames 1992; Eccles et al. 1993; Felner et al. 1997; Maehr and Midgley 1991). The present study adds to this area of research by comparing the motivation and quality of experience of students from five Montessori middle schools and six traditional middle schools. The Montessori school contexts selected for study exemplified several key insights from motivation theories and calls for school reform (e.g., emphasis on intrinsic motivation, time for self-direction, no mandatory grading, etc.; see Anderman et al. 1999; Carnegie Council on Adolescent Development 1989; Csikszentmihalyi and Rathunde 1998; Eccles et al. 1993; Maehr and Midgley 1991). The positive set of experiential findings associated with the Montessori schools offers useful information for conceptualizing and implementing middle grades reform.

Results from the study showed that while engaged in academic work at school, Montessori students reported higher affect, potency (i.e., feeling alert and energetic), intrinsic motivation (i.e., enjoyment, interest), and flow experience than students from traditional middle schools. The traditional students did report higher salience (i.e., perceptions of importance for their futures), however, this finding must be interpreted within the context of the other experiential differences that characterized the two samples. For example, when looking at the students' undivided interest (above average intrinsic motivation and salience), or the times when students said they were feeling high interest while doing something with high relevance for their futures, the Montessori students' experiences were far more positive. Almost 40 percent of their schoolwork was intrinsically motivating and important; in contrast, the traditional students felt this way only 24 percent of the time. One way to gauge the practical effect of these percentages is in terms of time. Since the ESM sampled about 23 hours of academic schoolwork (i.e., 62 percent of about 37.5 total hours sampled at school), this meant that Montessori students spent approximately three and a half hours more per week than traditional students doing schoolwork they felt was interesting and important. Over the course of a year, this time difference is likely to have a significant impact on students' perceptions of school.

The traditional students' higher salience levels and their significantly higher feelings of drudgery (i.e., perceiving schoolwork as important but not motivating) are consistent with research showing that traditional middle school contexts often emphasize performance goals (Eccles et al. 1993). Goal theory suggests that the psychological environment of classrooms and schools determines students' perceptions of goals (Maehr and Midgley 1991). Reports of high salience and low intrinsic motivation reflect the dulled attitudes that one might expect from students in a context where the future importance of what they are doing is emphasized at the expense of immediate engagement. The differences students reported in terms of flow experience have similar implications. Flow is a high-challenge condition, but high challenge is not important in itself. In other words, it is only when students feel they have skills equal to the task at hand that optimal experience is likely to occur. Montessori students reported about 7 percent more flow experience, or about one and a half hours more per week.

Were these differences in student experience due to differences in the educational practices of the school contexts? Given the Montessori educational philosophy, a good case can be made that this was the case. Maehr and Midgley (1991, 404) suggest that students' intrinsically motivated task focus is likely to

be less when "students are provided little choice concerning tasks, competition and social comparison are emphasized, ability grouping and tracking are used, public evaluation of performance and conduct are common, grading is based on relative ability, and cooperation and interaction among students is discouraged." The Montessori contexts differed from the traditional contexts on these dimensions: students were provided at least two hours per day to exercise choice and self-regulation; none of the students received mandatory grades; student grouping was primarily based on shared interests, not standardized tests; and students collaborated often with other students. Other aspects of the TARGET reforms (see Anderman and Maehr 1994) also distinguished the two school contexts (see "Method"): block scheduling was used, field experiences and experts from the community supplemented curriculum, and students were given a great deal of responsibility to participate in the life of their school in "leadership groups."

The policies and practices that create a school personality or culture are more important to student motivation than what goes on in specific classrooms, especially in middle school when students start moving from class to class (Maehr and Midgely 1991). The Montessori schools apparently created a school personality that placed a central emphasis on spontaneous student concentration. Consistent with the educational philosophy, the teachers tried to facilitate the absorbed states of intrinsic motivation and flow (Rathunde 2001), and they did so with some success. The teachers provided ample student choice and freedom, a motivation-enhancing practice that has been validated by research for many years (Deci and Ryan 1985). In addition, by consistently trying to unite body with mind and acting with thinking, they apparently created an environment that combined affective and cognitive engagement, the hallmark of deep engagement and flow (Csikszentmihalyi 1990; Dewey 1913; Renninger et al. 1992).

The present study did not look at whether such experiential differences translated into positive achievement and behavioral outcomes for the students. This is an important topic for future research. Nevertheless, the close connection between the quality of experience and effective education has been recognized since the writings of William James and John Dewey. Many past studies—both naturalistic and laboratory based—would suggest that deep engagement translates into more efficient learning (see Deci and Ryan [1985] and Renninger et al. [1992] for reviews of the intrinsic motivation and interest literatures, respectively). In addition, some of the experiential variables used in this study have predicted superior development and achievement in other teenage samples (Csikszentmihalyi et al. 1997; Csikszentmihalyi and Schneider 2000; Larson 2000).

The present study also did not explore differences in the social context and classroom activities in the Montessori and traditional schools; that was the

subject of another recent study (Rathunde and Csikszentmihalyi forthcoming). The results of that study, however, supported the assumption that the Montessori philosophy translated into clear differences in the school environments. For instance, the Montessori students reported more positive perceptions of their teachers and classmates, more time spent in active group and individual work, and less time spent listening to lectures or watching media. Recent studies confirm that student interest and engagement are related to (*a*) more supportive teachers (Goodenow 1993; Juvonen and Wentzel 1996; Marchant et al. 2001; Wentzel 1998, 2002), (*b*) more positive peer relations (Ryan and Patrick 2001), and (*c*) more active group work and discussion, as opposed to the standard practices of lecturing, seat work, and watching movies (Marks 2000). The results of this parallel study of the school environments, therefore, add convergent validity to the experiential differences observed in the present study.

Limitations and Conclusions

It is inherently difficult to rule out confounding variables in comparative education studies (Watson 2001). For example, Larson and Richards (1991) found that individual student dispositions are an important contributor to boredom in middle school. The present study did not look at such individual factors that may have differentiated the students. In addition, despite the fact that care was taken in this study to statistically control for SES, gender, and ethnic differences, and time was spent matching the samples and verifying that the students came from families with similar levels of education, number of siblings, parental employment, incidence of divorce, home resources, and school-related parental discussion and involvement, there could be other family variables affecting the findings. Likewise, the two sets of schools appeared similar with respect to the modern and attractive school environments, small-to-moderate size, favorable teacher-student ratio, and strong communities in which they were located, but these appearances could hide other important differences. The two most plausible alternative explanations for the findings, however, have nothing to do with potentially hidden individual, family, or school variables.

First, the Montessori middle schools did not present students with as abrupt a transition as most middle schools require. Three of the six traditional middle schools were housed in buildings that were separate from the students' elementary schools; only one of the five Montessori schools required such a transition. If the experiential differences observed in this study were simply the result of school transition differences, however, then the analyses would have shown some grade level effect (e.g., Montessori students reporting more

positive experience in sixth grade but less so by eighth grade, as the students adjusted to the transition). This was not the case; Montessori students in sixth and eighth grades reported more positive motivation and experience. A second alternative explanation is also reasonable. Research has shown that a sense of "belonging" can have a positive impact on student engagement (Goodenow 1993; Hagborg 1998). Perhaps the student differences in motivation and quality of experience arose because the Montessori students identified with their schools, regardless of whether or not their policies and practices supported intrinsic motivation. Furthermore, because the Montessori parents enrolled their children in the Montessori programs, they were likely to be lending support to that sense of belonging and identification. This fact could also be reflected by the high participation rate of the Montessori students (i.e., 95 percent). This alternative explanation suggests, therefore, that the Montessori students simply wanted to make their schools look better and were biased in their responses.

The bias explanation, however, is countered by other information. First, the ESM measures were standardized around the students' own means for the week; using *z*-scores in this way reduces the threat of simple response bias. In order for students to intentionally inflate school averages, they would also have to change their habits of reporting in other contexts (e.g., intentionally making their family life seem less positive is one way to make experience at school seem more positive). It is unlikely that the Montessori students were this invested in their schools, and it is extremely unlikely that they could have understood the statistical implications of using standardized scores. More important, the fact that the significant differences in intrinsic motivation, flow, potency, and undivided interest disappeared in nonacademic activities at school diminishes the plausibility of a bias explanation. Students were not aware of what school experiences were being targeted; as far as they knew, a negative response while eating lunch, walking to class, or talking to a friend in the halls could just as easily have made their schools look "bad." The fact that students in both samples reported similar experiences during their down time suggests that a general school bias was not a major factor confounding the results.

Given the evidence accumulating about the problems of middle schools, it is more likely that differences in the school contexts (i.e., the five selection criteria that were used to distinguish the two sets of the schools) had something to do with the positive motivation and experience reported by the Montessori students. Public schools have great pressure to employ transmission models of top-down education and standards-based testing; the Montessori schools may have been able to avoid some of this pressure because of their long-standing philosophy of intrinsic motivation. However, the reform ideals of intrinsic motivation, student self-direction and initiative, and so on are part of many different pedagogic approaches and are not the province of any

particular philosophy. The importance of these findings does not lie in assigning blame to the public educational system or in promoting Montessori schools; rather, their importance should be seen in the context of the narrowing of perspective in the United States and other societies in the West that increasingly equate intellectual skills with a thin set of cognitive skills (Johnson 1987; Lakoff and Johnson 1999; Sternberg 2001). As Sternberg notes, it might be worthwhile for more middle schools to broaden their approach and emphasize the development of student wisdom, an active process of education that focuses more on "knowing how" than on "knowing that."

Notes

This research could not have been conducted without the help of many people. We would like to thank the students, parents, teachers, and administrators who enthusiastically participated in this study. Annette Haines put in an enormous amount of time and passion as a research associate and was essential to the success of the project. The O'Shaughnessey Foundation, Dekko Foundation, and Hershey Foundation provided essential financial support. Barbara Schneider and Lisa Hoogstra at NORC and the University of Chicago helped provide access to the Sloan Project archives. Finally, we would like to thank David Kahn and NAMTA for recognizing the connections between Montessori philosophy and optimal experience theory and for helping to get the study off the ground.

1. This information comes from the National School Directory Data Base (North American Montessori Teachers' Association [NAMTA]). Not all of the existing elementary and middle school programs, however, are affiliated with national Montessori organizations. The two major Montessori organizations are the Association Montessori Internationale (AMI), the oldest and most closely aligned with the original thought of Maria Montessori, and the American Montessori Association (AMS), a larger and more eclectic group that integrates other educational approaches along with Montessori principles. The five schools participating in this study are associated with AMI and the North American Montessori Teachers' Association.

2. The above observations are based on (*a*) site visits made by the author to all five schools and (*b*) interviews with the teachers and administrators. Schools varied in specific practices; however, they were consistent on these principles.

3. Montessori also referred to the prepared environment as the "revealing" environment (*ambiente rivelatore*) because such a context revealed a child's true nature (i.e., the capacity for spontaneous concentration).

4. Although the length of time between the points of data collection is not ideal, it would be more of a problem if comparing nonschool activities that might be influenced by current fashion. The nine-year gap with respect to education actually helped to ensure that the traditional schools were, in fact, "traditional." In other words, some of the schools initiated reform practices shortly after data collection.

5. Coding of these open-ended ESM variables is straightforward. Numerous studies have reported over 90 percent agreement (see Csikszentmihalyi et al. 1997); that was also the case in this study. The same coding scheme was used for both samples of students.

6. Academic work is meant to include the growth-oriented, productive activities of

the students that were engaged at school. Extracurricular activities, therefore, were placed in this category. The decision was made not to contrast productive vs. nonproductive because this would have implied that nonacademic activities such as socializing were not productive for young adolescents.

7. It is worth noting that the other quality-of-experience variables—affect, potency, intrinsic motivation, and salience—can be interpreted as phenomenological measures of flow. In other words, these variables more directly indicate the qualitative state of student engagement.

8. Eight students in the Montessori sample (all eighth graders) attended a rural school that was different in terms of physical environment and size in comparison to the other suburban schools in the study. However, these students did not report any experiential or motivation differences in comparison to their peers at the other Montessori schools. Therefore, including them in the sample did not distort the findings reported here.

9. Each student's ESM scores were standardized around their own averages for the week (e.g., a score of zero indicates average affect for each student). Using *z*-scores (*a*) helps to control for individual biases in ESM reporting and (*b*) allows interpretations of experience within a context (e.g., school) relative to a student's entire week.

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