Chapter 9
The Social Context of Middle School: Teachers, Friends, and Activities in Montessori and Traditional School Environments

Kevin Rathunde and Mihaly Csikszentmihalyi

Early adolescence is a crucial developmental period; the habits of thought crystallized during this time can have long-term effects on lifelong learning, quality of life, and career success (Csikszentmihalyi and Schneider 2000; Sternberg 2001). Unfortunately, young adolescents encounter many difficulties in the transition to middle school (Carnegie Council on Adolescent Development 1989, 1995; Eccles et al. 1993; U.S. Department of Education 1991). Middle school students may start to doubt their abilities to succeed (Simmons and Blyth 1987; Wigfield et al. 1991), and their intrinsic motivation to learn often declines (Anderman et al. 1999; Gottfried 1985; Harter et al. 1992). A growing number of scholars have suggested that these academic risks emerge in response to a mismatch between adolescents' developmental needs and the nature of middle school classrooms and cultures (Andaman and Maehr 1994; Eccles et al. 1993; Felner et al. 1997; Hicks 1997; Maehr and Midgley 1996).

Much is known about the type of school context that is likely to benefit students, and a number of studies have explored ways to transform middle schools to enhance student learning and intrinsic motivation (Ames1992; Lipsitz et al. 1997; Maehr and Midgley 1996; Sternberg 2001). However, implementing comprehensive reform and transforming an entire school is a complex process. If a researcher is not trying to change a school, it is hard for her/him to find schools that have incorporated the insights of current motivation theory and are willing to allow

Reprinted with permission from the Elementary School Journal, vol. 106, No. 1, pp. 59–79, 2005, Chicago University Press.

K. Rathunde
University of Utah, Salt Lake City, UT, USA

M. Csikszentmihalyi (✉)
Claremont Graduate University, Claremont, CA, USA

M. Csikszentmihalyi, *Applications of Flow in Human Development and Education*,
DOI: 10.1007/978-94-017-9094-9_9, © Springer Science+Business Media Dordrecht 2014

research (Mac Iver et al. 2002). Therefore, it is often difficult to assess whether reforms discussed in the literature would enhance student engagement.

The present study offered a unique way to assess suggestions for reforming middle school environments. It explored five well-established middle schools that are based on the thought of Maria Montessori. Although the Montessori philosophy is primarily associated with early childhood education, approximately 250 middle schools incorporate some aspect of it (D. Kahn, personal communication, July 9, 2003). Due to the central focus on students' intrinsic motivation and the required teacher training, Montessori schools have a shared culture that reflects some of the educational reforms associated with contemporary motivation theories (see Anderman et al. 1999; Eccles et al. 1993; Hickey 1997; Maehr and Midgley 1996; Rathunde and Csikszentmihalyi 2006). A recent study showed that students from these five Montessori schools reported higher intrinsic motivation, interest, and flow experience in academic work than students from a demographically matched set of traditional middle schools (Rathunde and Csikszentmihalyi 2005). The focus of the present study, in contrast, was on the social context differences that accompanied the positive motivation outcomes. More specifically, in this study we used the Experience Sampling Method (ESM) (Csikszentmihalyi and Larson 1987) and questionnaires to assess (a) how the Montessori and traditional middle school students viewed their schools, teachers, and classmates; (b) who the students were spending time with while doing their academic work; and (c) what activities the students were doing in school.

Importance of Social Context in Middle School

A growing amount of research has revealed how important the classroom context is for student engagement (Anderman and Maehr 1994; Brophy 1998; Maehr and Midgley 1996; Stipek 1998); unfortunately, there are often problems with the contexts that students encounter in middle school (Eccles et al. 1993; Felner et al. 1997; Hicks 1997). Three main areas of concern were the focus of this study. First, at a precarious developmental time when adult support is crucial to young adolescents, students may see teachers as more remote and focused narrowly on student achievement and social comparison (Brophy 1998; Feldlaufer et al. 1988; Wentzel 1998). Second, at a time when peers are becoming more highly valued (Brown 1990; Csikszentmihalyi and Larson 1984; Savin-Williams and Berndt 1990), there can be fewer opportunities for students to collaborate with peers on meaningful activities (Eccles et al. 1991; Felner et al. 1997; Hicks 1997; Stipek 1998. Finally, just as young adolescents are becoming capable of complex and integrative thought (Piaget 1952; Sternberg 2001), the educational setting often involves a heavy dose of lecture and seat work that students find tedious and confining (Guthrie and Davis 2003; Hickey 1997; Mac Iver et al. 2002). Research in all three areas has suggested that, when these conditions occur in middle schools, they can negatively affect student motivation, experience, and achievement.

Schools are inherently social places, and their interpersonal dynamics have a great potential to influence student motivation and interest (Deci 1992; Juvonen and Wentzel 1996). Of central importance to students' motivation is the quality of teacher–student relations and teacher support (Fraser and Fisher 1982; Goodenow 1993; Harter 1996; Midgley et al. 1989; Wentzel 1998, 2002). Wentzel (1998, 2002) drew on parental socialization models (e.g., Baumrind's construct of authoritative parenting) to help understand teacher influence; her findings suggested that teacher nurturance and expectations for maturity were strong predictors of student motivation and achievement. Teachers also influence student motivation by the way they structure opportunities for student autonomy (Brown 1997; Grolnick and Ryan 1987; Skinner and Belmont 1993) and by what they communicate about the goals of the learning environment (Ames and Ames 1984; Deci et al. 1999). For example, when a teacher creates an environment that emphasizes public performance instead of task engagement or mastery, student motivation suffers (Anderman et al. 1999; Brophy 1998; Maehr and Midgley 1996). The enhanced competition and evaluation brought on by performance goals often promote self-consciousness and risk aversion at this sensitive developmental stage (Harter 1990).

Perhaps the most neglected topic of research on the social context in middle school is peer relations. The influence of the peer group is especially high in early adolescence (Steinberg and Silverberg 1986). Although the relation of peer interaction to the development of important social skills is widely acknowledged (Brown 1990), much less is known about how peers provide a context for the socialization of adolescent motivation in middle school (Eccles et al. 1998; Magnusson and Statin 1998; Ryan 2000, 2001). Research thus far, however, has suggested that successful peer relationships and opportunities for interaction are important for student engagement, use of successful cognitive strategies, adjustment to school, and academic achievement (Berndt and Keefe 1995; Brown 1990; Hicks 1997; Nichols and Miller 1994; Ryan and Patrick 2001; Wentzel 1998). Positive interactions may also be important for students' self-regulation; when discussion is promoted and students can draw on information from other perspectives, it improves their ability to strategize and plan a task (Dimant and Bearison 1991; McCaslin and Good 1996).

Classroom activities are another important influence on student motivation and the social dynamics of a school. After leaving the elementary grades, students report a steady decline in interest, choice, and enjoyment of classroom activities (Gentry et al. 2002). Part of this decline might be related to the greater use of textbooks; textbooks often formalize instruction, eliminate student choice, reduce the variety of information, and minimize real-world applications (Guthrie and Davis 2003; Mac Iver et al. 2002; Shernoff et al. 2003). In addition, the organization of activities in a classroom can affect interpersonal relations at school (Pintrich and Schunk 2002; Ryan and Patrick 2001). Students report that active and authentic tasks, such as doing an experiment, help them to learn (Hickey 1997; Singer et al. 2000); in contrast, passive activities like listening to a lecture or

watching educational videos are less often perceived as helpful (Freeman et al. 2002). When tasks are more collaborative, students also report a stronger mastery goal orientation (Nichols and Miller 1994).

Montessori Ideas, Motivation Theory, and the Social Context at School

The extent to which Montessori ideas might contribute to current debates about reforming middle schools has gone unrecognized, likely because Maria Montessori's writings primarily addressed early childhood education (Montessori 1965, 1981). However, the transposition of her educational philosophy to middle schools, although less specific in terms of pedagogy, retains the main theme of creating an environment for intrinsic motivation. Furthermore, in several key aspects, the Montessori approach has much in common with two current motivation theories: goal theory (see Anderman et al. 1999) and optimal experience (flow) theory (Csikszentmihlayi 1990; Rathunde 2001; Rathunde and Csikszentmihalyi 2006).

School reform strategies based on goal theory have focused on ways to reduce students' performance anxiety and reinforce their intrinsically motivated task focus; these strategies have been summarized with the acronym TARGET (i.e., task, authority, recognition, grouping, evaluation, and time; see Ames 1992; Anderman et al. 1999). The five Montessori middle schools in this study reflected several of the practices suggested by the TARGET proposals (see the Method section). For example, the schools shared a culture that emphasized a *task focus.* Teachers were trained in a Montessori perspective that emphasized paying attention to students' interests; to facilitate interest, teachers provided students with several hours per day for self-directed projects. *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 coordinate basic school maintenance. *Recognition* of students was done in ways that avoided achievement competition; one frequently used strategy was to have students research a topic of personal interest and then be responsible for presenting the information to the class. Ability *grouping* was avoided; classrooms were multiage (i.e., more than one grade level), and student groups were typically based on shared interests. Because much daily time was unstructured, students had ample time for peer interaction and collaboration, and teachers strongly encouraged this practice. In terms of *evaluation,* only about one-quarter of the Montessori students received grades; however, grades were not mandatory. The use of "progress reports" was the standard practice. Finally, *time* was managed in flexible ways. For instance, block scheduling allowed teachers to increase or decrease contact time with students depending on what was happening at the moment in the classroom.

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). Maria Montessori believed that children's deep 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, the turning point in the development of her method occurred after she observed a 3-year-old child who was so engaged with wooden cylinders that she could not be distracted. Montessori commented: "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, pp. 83–84). After witnessing this episode with the young child, Montessori apparently became dedicated to creating a school environment that fostered deep engagement and concentration.

The policies and practices of the five Montessori schools in this study emphasized the quality of student experience. According to optimal experience theory, flow experience involves a dynamic affective-cognitive combination that sustains attention and generates the momentum necessary to trigger flow experiences (Rathunde and Csikszentmihalyi 2006). Therefore, education reform ideas based on the theory advocate integrating feeling and thinking rather than separating them, as is often the case in middle school and high school curricula (e.g., the often rigid dichotomy of the arts and sciences) (see Csikszentmihalyi et al. 1997; see also Dewey 1934/1980). Montessori also recognized that separating cognition from its experiential and meaningful context would result in excessive abstraction and a poor quality of school experience. She tried to reinforce an affective-cognitive combination by stressing the importance of integrating acting and thinking in the classroom (Montessori 1976). Thus, hands-on tasks played a central role in the five Montessori environments in this study. Teachers avoided overtly didactic lessons (i.e., lecturing) whenever possible and instead provided more active learning opportunities (i.e., group or individual projects, activities or field trips outside of the classroom, etc.).

In summary, Montessori educational philosophy has much in common with the insights of contemporary motivation theories in terms of creating social contexts in middle school that are likely to lead to positive student motivation. We hypothesized that the social contexts in the Montessori and traditional middle schools would differ with respect to teachers, peers, and the activities that connected them. More specifically, we predicted that the Montessori students would have more favorable views of their schools and teachers, report more positive peer interaction, and spend less time in passive educational tasks (e.g., listening to a lecture) and more time in active pursuits (e.g., group or individual projects).

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 in detail below.

After consulting with officers of the North American Montessori Teachers Association (NAMTA), we selected five Montessori schools from four U.S. states to participate. The selection of schools was not random; well-established middle school programs were chosen that incorporated aspects of the Montessori model that would clearly differentiate them 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 chosen that (1) had an explicit philosophy of intrinsic motivation that emphasized spontaneous concentration and freedom within discipline (i.e., the school was clearly based on Maria Montessori's extensive writings); (2) provided students with significant unstructured time for self-directed work (an average of approximately 2 h per day) and did not use the typical block period organization (e.g., 45 or 50 min per subject); (3) did not employ mandatory grading or standardized testing for comparative purposes and student placements; (4) had formalized opportunities for students to play a role in daily decisions that affected the school (e.g., curriculum choices, school purchases, destination of field trips, etc.); and (5) infrequently used whole-class lecture formats and instead encouraged students to work individually or collaboratively in smaller groups.

Five Montessori schools that clearly met the above criteria were contacted and agreed to participate. Approximately 150 students (60 % female and 40 % male) comprised the sixth- and eighth-grade classes at these schools and filled out the background questionnaire; about 140 students provided valid ESM information (see Measures). European Americans comprised 72.6 % of the sample, 10.2 % were Asian Americans, 12.7 % were African American, 1.9 % were Latino, and 2.6 % 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. Four of the schools were private. The teacher-student ratio was approximately 20:1.

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. Because 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), we first selected a subset of schools that matched the primarily European American ethnicity and higher SES 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 % female, 45 % male); about 150 students provided valid ESM information (see Measures). European Americans comprised 74.9 % of the sample, 7.8 % were Asian Americans, 12.6 % were African American, 3.6 % were Latino, and 1.2 % of students were from other ethnic backgrounds. To confirm that the two samples were similar and allowed a fair comparison of schools that was not confounded by community, familial, or individual differences, we compared the samples on numerous background variables based on items from the National Education Longitudinal Study of 1988 (NELS: 88) (National Center for Education Statistics 1994, 1997). Results showed that students from both sets of schools were similar in terms of the size of families, ethnic diversity, two-parent homes, resources at home, parental education, discussion at home about school-related issues, parental monitoring of school activities, and parental rates of employment (Rathunde and Csikszentmihalyi 2005).

After verifying that the demographic profile of the two sets of schools was similar, the next step was to determine if the schools differed with respect to the five selection criteria outlined above. We used a variety of qualitative sources to verify contextual 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 grade reform that may or may not have been implemented by the schools and whether the label "traditional" was appropriate.

The profile of the traditional middle schools that emerged from these materials was, in most ways, a very positive one. Consistent with the higher SES 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 in the study of middle grades reform. School committees were being formed to discuss the major dimensions of reform.

Despite the movement toward reform, however, the fact that these schools were in the initial phases of discussion supported our decision to label them as traditional. Research has shown 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 also differed with respect to the five selection criteria that characterized the Montessori schools. First, although they encouraged student initiative in student handbooks and school mission statements, none of the traditional schools emphasized intrinsic motivation as a guiding principle for education. Second, the traditional schools followed block schedules of 45–50-min 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.

In summary, the two groups 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 contexts differed from the Montessori contexts in several key ways that would presumably affect student time use and social experience.

Data Collection

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 students who agreed to participate (over 95 %). Members of the research team explained the study, distributed questionnaires, and provided the materials for the Experience Sampling Method (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 7 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 pre-addressed, 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.

Traditional middle schools. Data collection at the traditional middle schools occurred several years before data collection at the Montessori schools (see Csikszentmihlayi and Schneider 2000). Approximately 86 % 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 in the two studies.

Measures

Students' perceptions of their schools and teachers. The school/teacher measure was based on a 15-item scale (1 = strongly disagree to 4 = strongly agree) from the National Education Longitudinal Study of 1988 (NELS: 88) (National Center for Education Statistics 1994, 1997). Principal components analysis of the items (varimax rotation) revealed four factors with eight values greater than 1 accounting for 55 % of the total variance. The *support* scale contained seven items (e.g., Students get along well with teachers; Teachers are interested in students; Most of my teachers really listen to what I have to say; Cronbach's alpha = 0.87); the *order* scale contained three items (e.g., Other students often disrupt class (reverse coded); Disruptions by other students get in the way of my learning (reverse coded); alpha = 0.55); the *safety* scale contained three items (e.g., In class I often feel "put down" by my teachers (reverse coded); In school I often feel "put down" by other students (reverse coded); alpha = 0.54); finally, the *fairness* scale contained two items (e.g., Rules for behavior are strict; Students make friends with students of other racial and ethnic groups; alpha = 0.22). Because of the low alpha for the latter scale, it was dropped from further analysis.

Time use at school. All of the ESM measures used in this study were measures of student time use at school. Two items on the ESM response form were used to select the signals for analysis: Where were you as you were beeped? What was the main thing you were doing? First, all of the signals for times when students were at school were selected (approximately 4,000 total signals). Then, the "What were you doing?" The variable was used to sort signals into seven basic categories: academic work (approximately 60 % of school signals), extracurricular (3 %), chores (2 %), socializing (8 %), leisure/games (5 %), TV/media (1 %), and eating/maintenance (22 %). These summary categories were based on a more detailed

coding of each ESM signal that occurred at school. For example, academic work included all activities where students responded that they were listening to a teacher, participating in a discussion, doing work related to a particular subject (e.g., math, English), working on homework, taking a test, and so on; extracurricular activities included signals in various after-school pursuits (e.g., music, art); chores included signals capturing school jobs (e.g., cleaning a floor); socializing included talking with a friend or classmate, hanging out, and so on; leisure/games included playing a game, using the computer for fun, various diversions, and so on; TV/media captured times watching videos or other programs; finally, eating/maintenance was a fairly large category that included signals capturing eating lunch or a snack, walking in the halls, looking for something, and so on.

All of the time comparisons reported were based on aggregated measures. First, we used each student's set of signals to create percentages within the activity categories (e.g., if a student responded to 20 ESM signals while at school, 10 doing academic work, 5 socializing, and 5 eating/maintenance, that student would have 50 % academic, 25 % socializing, 25 % eating/maintenance, and 0 % in the remaining four categories). For time-use comparisons between the Montessori and traditional samples, these individual percentages were aggregated to reveal overall group percentages in each category. As is conventional in ESM studies (see Csikszentmihalyi and Larson 1984), only students who responded to at least 15 signals for the week were included in the analyses.

Classroom activities. A subsection of the codes for academic work dealt with classroom activities; these codes provided an opportunity to compare the two samples on classroom instructional practices. In addition to an "unspecified" category for times when students responded generally to the "What were you doing?" question (e.g., "working in class" or "taking a test"), 12 additional codes provided detail about classroom instruction. We recoded these 12 categories into four different instructional practices: *passive listening* (i.e., listening to a lecture, listening and taking notes, listening to a discussion); *collaborative work* (i.e., participating in a discussion, lab work in a group, group work/activity, group presentation, and talking to the teacher); *individual work* (i.e., individual lab work, individual work/activity, solo presentation); and *media* (i.e., watching TV, film, or video). After selecting this group of detailed classroom signals, we calculated percentage variables for each student. For example, if a student responded to four signals while doing classroom activities, and one fell in each of the four categories, the corresponding percentage would equal 25.

These percentage variables are less reliable than the overall school activity codes because they are based on a smaller number of signals. In addition, these codes depended on the detail voluntarily provided by students; if students responded with a general phrase (e.g., "in class") and did not specify what they were doing, we could not code it in one of the more detailed classroom practice categories. However, all students had an equal chance to report what they were doing, and both samples received the same instructions for responding to the ESM; therefore, these measures provided useful information about classroom practices.

Time with friends, classmates, teachers, and alone. In addition to the various activity/time estimates, we also used the ESM responses to estimate the amount of time students spent with others while academically engaged at school. In other words, for each signal received when working at school, a student filled out a section entitled "Who were you with?" Students placed a check in one or more of 10 boxes to indicate who they were with when they received the ESM signal: alone, mother, father, sister/brother, relatives, teacher(s), classmates/peers, friends, strangers, others. Because the study focused on time in school, only four categories were of interest: alone, teacher(s), classmates/peers, and friends. Aggregating the ESM signals produced a percentage score for each student describing whom the student was with (e.g., if a student responded to 20 signals at school, and indicated she was with a teacher 15 times, time with teacher would equal 75 %). We used the same approach to compute time spent alone, with classmates/peers, and with friends.

Classmates and friends. The students' ESM responses were used to provide an indirect measure of how students felt about their classmates. Because students were instructed to check multiple boxes to indicate whom they were with, in addition to the singular choices of "classmates/peers" or "friends," students were free to indicate the combined choice of classmates/peers *and* friends if that was how they perceived the social environment. Three categories (i.e., classmates [only], friends [only], and class-mates-and-friends) were used in this study as indicators of how the students perceived their working environment. In other words, as students were working in class, doing homework, and so on, did they perceive others around them as simply classmates, or also as friends? If a student responded to 10 signals while engaged in academic work, and four signals indicated with classmates, two with friends, and four with classmates and friends, the corresponding percentages would equal, 40, 20, and 40, respectively.

Background variables. Previous research has demonstrated that gender, family SES, and ethnicity can affect student experience at school (Finn 1993; Gentry et al. 2002; Lee and Smith 1993; Marks 2000). Therefore, we used these three variables 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 students' responses about how far their parents went in school (1 = did not finish high school, 2 = graduated from high school, 3 = attended 2-year college, 4 = went to college (did not complete degree), 5 = graduated from college, 6 = master's degree or equivalent, 7 = Ph.D., M.D., or other professional degree). Over 80 % of the families in both samples were intact with mothers and fathers living at home. Therefore, parental education was computed as the average of mother and father education. For the small number of students (less than 10 %) 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., estimates based on average education for parents living in a similar community).

Analysis Plan

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. If an overall F test was significant, we performed univariate ANOVAs 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 what students were doing at school, who they were spending time with, and how they perceived their schools, teachers, and classmates. We hypothesized that students in Montessori middle schools would report more positive perceptions of their school environment and their teachers, more often perceive their classmates as friends, and spend more time in collaborative and/or individual work rather than didactic educational formats such as listening to a lecture. We made no predictions with regard to sixth- or eighth-grade students or the interaction between type of school context and grade level.

Results

Students' Perceptions of Their Schools and Teachers

The first analysis compared students' reports about the support, order, and safety they perceived at their schools. These three variables were compared across school type (Montessori vs. traditional) and grade level (sixth vs. eighth) using a 2×2 MANCOVA with parental education, gender, and ethnic background as covariates. Significant differences were found for school context, Wilks's lambda $= 0.77$, $F(3, 232) = 23.73$, $p < 0.001$, indicating that students in the two school contexts reported different perceptions of support, order, and safety. After adjusting for the covariates, the multivariate eta squared indicated that 24 % 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 $= 0.99$, $F(3, 232) = 1.08$, $p = 0.36$, indicating that students in sixth and eighth grade reported similar perceptions of their school contexts. Finally, the omnibus test for the interaction of school context and grade level was not significant, Wilks's lambda $= 0.98$, $F(3, 232) = 1.57$, $p = 0.20$. None of the multivariate tests for parental education, gender, or ethnic background reached the 0.05 significance level.

Based on the multivariate findings, we performed follow-up ANCOVAs on the three school variables. Only the findings for school context are reported here

Table 9.1 Univariate *F* tests for students' perceptions of their schools and teachers

Classroom measure	School context					
	Montessori ($N = 125$)		Traditional ($N = 116$)			
	M	*SE*	*M*	*SE*	*F*	*p*
Teacher support	3.2	0.05	2.7	0.05	62.01	0.000
Classroom order	3.7	0.06	3.3	0.06	23.28	0.000
Emotional safety	4.3	0.05	4.1	0.05	7.48	0.007

Note Means are adjusted for the covariates gender, parental education, and ethnicity

because of the significant omnibus test in the MANCOVA. Table 9.1 summarizes the means, standard errors, and significance levels for each of the variables. Results showed all of the school variables were significantly different for the two school contexts. Montessori students reported more support from teachers (i.e., teachers were interested in students, they listened to what they had to say, etc.), more order in the classroom (i.e., fewer disruptions from students), and a greater feeling of emotional/psychological safety (i.e., not being put down by teachers or students).

Time Use at School and Classroom Activities

A second MANCOVA was used to assess time use at school using the seven activity estimates: academic work, extracurricular, chores, socializing, leisure/games, TV/media, and eating/maintenance. Results showed a significant difference for school context, Wilks's lambda = 0.72, $F(6, 289) = 18.77$, $p < 0.001$, indicating that students in the two school contexts reported differences in how their time was used. After adjusting for the covariates, the multivariate eta squared indicated that 28 % 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 = 0.99, $F(6, 289) = 0.72$, $p = 0.64$, nor was the omnibus test for the interaction of school context and grade level, Wilks's lambda = 0.98, $F(6, 289) = 1.15$, $p = 0.33$. Finally, none of the multivariate tests for parental education, gender, or ethnic background reached the 0.05 significance level.

Results of the follow-up ANCOVAs for school context are summarized in Table 9.2. Students in the Montessori and traditional schools reported significant differences in five of the seven time-use categories. We found no differences for extracurricular activities, and a near-significant difference ($p < 0.06$) for maintenance activities (traditional students reported more time doing such activities). Montessori students engaged in higher percentages of academic work and chores; traditional students spent more time socializing, engaged in leisure activities, and watching TV or other media.

The academic work category was subdivided to compare the classroom practices students reported. Time percentages were computed for four instructional

Table 9.2 Univariate *F* tests for time use at school, by school context

ESM time estimate	School context					
	Montessori ($N = 143$)		Traditional ($N = 158$)			
	M	*SE*	*M*	*SE*	*F*	*p*
Academic work	65.3	1.5	52.6	1.4	38.94	0.000
Extracurricular	3.4	0.5	2.4	0.5	1.93	0.17
Chores	2.1	0.3	0.5	0.2	13.52	0.000
Socializing	6.3	0.9	10.1	0.9	8.82	0.003
Leisure/games	2.0	0.7	9.0	0.7	53.11	0.000
TV/media	0.2	0.2	1.2	0.2	10.76	0.001
Maintenance/eating	20.8	1.3	24.3	1.2	3.66	0.057

Note Means are percentages adjusted for the covariates gender, parental education, and ethnicity

practices: passive listening, collaborative work, individual work, and watching media. The MANCOVA for this set of variables resulted in a significant effect for school context, Wilks's lambda = 0.81, $F(3, 238) = 19.14$, $p < 0.001$, indicating that students in the two school contexts reported differences in the instructional practices in their classrooms. After adjusting for the covariates, the multivariate eta squared indicated that 19 % of the variance was associated with the school context factor. The omnibus test for grade level was also significant, Wilks's lambda = 0.85, $F(3, 238) = 14.07$, $p < 0.001$; that is, sixth and eighth graders reported differences in classroom activities (15 % of the variance). Finally, the omnibus test for the interaction of school context and grade level was not significant, Wilks's lambda = 0.98, $F(3, 238) = 1.35$, $p = 0.26$, nor were the multivariate tests for the covariates.

We performed follow-up ANCOVAs on the classroom variables. Based on the significant multivariate findings, we only report results for school context and grade here. Results of the ANCOVAs are summarized in Table 9.3. For the times when students reported enough detail on the ESM for us to code their activities into categories of classroom practices, the Montessori students reported less time in passive listening (i.e., lecture and note-taking) activities, more time in collaborative or group work, more time working on individual projects, and less time watching media. Instructional practices also differed in the sixth and eighth grades. Students in sixth grade spent less time listening to lectures, more time working on individual projects, and less times watching media.

Time with Friends, Classmates, Teachers, and Alone

The next MANCOVA assessed the set of ESM variables measuring who the students were with while productively engaged at school: time with friends, classmates, teachers, and alone. Results of the MANCOVA showed significant differences for

Table 9.3 Univariate *F* tests for classroom practices, by school context and grade

Classroom practice	M	SE	F	p
Passive listening				
Montessori	24.4	3.1	16.37	0.000
Traditional	41.7	3.0		
Sixth graders	25.5	2.8	12.64	0.000
Eighth graders	40.7	3.2		
Collaborative work				
Montessori	32.1	2.8	23.78	0.000
Traditional	13.0	2.7		
Sixth graders	23.5	2.6	0.24	0.63
Eighth graders	21.6	2.9		
Individual work				
Montessori	37.6	3.1	7.83	0.006
Traditional	25.6	3.0		
Sixth graders	43.4	2.8	30.23	0.000
Eighth graders	19.8	3.2		
Watching media				
Montessori	5.9	2.2	19.33	0.000
Traditional	19.7	2.2		
Sixth graders	7.7	2.0	10.80	0.001
Eighth graders	17.9	2.3		

Note Means are percentages adjusted for the covariates gender, parental education, and ethnicity. The percentages do not reflect all classroom activities, only the times when students reported classroom activities in some detail (i.e., many classroom activities were "unspecified")

the school context factor, Wilks's lambda = 0.72, $F(4, 288) = 28.21$, $p < 0.001$, indicating that students in the two types of schools reported differences in who they were with while doing academic work. After adjusting for the covariates, the multivariate eta squared indicated that 28 % of the variance was associated with the school context factor. The omnibus test for grade level was not significant, Wilks's lambda = 0.97, $F(4, 288) = 0.31$, $p = 0.87$, and neither was the omnibus test for the interaction of school context and grade, Wilks's lambda = 0.97, $F(4, 288) = 1.92$, $p = 0.10$. Finally, the omnibus test for ethnicity was significant (Wilks's lambda = 0.96, $F(4, 288) = 2.97$, $p = 0.02$), and so was the multivariate F for parental education (Wilks's lambda = 0.94, $F(4, 288) = 4.49$, $p = 0.002$). There was no effect for gender.

Based on the multivariate findings, we performed follow-up ANCOVAs on the variables for time with friends, classmates, teachers, and time alone. Only the findings for school context, ethnicity, and parental education are reported here due to the significant multivariate results associated with these variables. Results of the ANCOVAs showed that students in the two school contexts reported differences in three of four categories. Table 9.4 summarizes the means, standard errors, and significance levels for each variable. Montessori students spent more time with teachers, friends, and alone; students in both contexts reported spending the same amount of time with classmates. With respect to the background variables, the

Table 9.4 Univariate *F* tests for time with others while academically engaged at school, by school context

ESM estimate	School context					
	Montessori ($N = 143$)		Traditional ($N = 155$)			
	M	*SE*	*M*	*SE*	*F*	*p*
With teacher	71.7	2.7	61.0	2.6	7.99	0.005
With classmates	84.9	1.8	87.4	1.7	1.07	0.30
With friends	75.9	2.8	40.0	2.7	82.57	0.000
Alone	3.7	0.6	1.1	0.6	9.36	0.002

Note Means are percentages adjusted for the covariates gender, parental education, and ethnicity

results of the ANCOVAs showed that minority students reported spending less time with teachers ($F(1, 291) = 10.17$, $p = 0.002$), and students of more highly educated parents reported spending more time with classmates ($F(1, 291) = 15.80$, $p < 0.001$).

The ESM estimates for students' time with others reflected social perceptions as well as factual reporting of who was around when students received the ESM signal (e.g., a student's report that she was "with" a teacher could have indicated that she was aware of his or her presence, even though the teacher may have been across the room). In addition, students were free to choose more than one category (e.g., one can be with classmates *and* with friends). We used this subjective aspect of the measures in a follow-up MANCOVA that looked more closely at the large differences students reported with respect to time with friends. We entered three variables into a second MANCOVA: time with classmates *and* friends, time with classmates (not friends), and time with friends (not classmates). Results of the MANCOVA showed significant differences for the school context factor, Wilks's lambda = 0.75, $F(2,290) = 49.42$, $p < 0.001$, indicating that students in the two types of schools reported differences in their perceptions of friends and classmates.

After adjusting for the covariates, we found that the multivariate eta squared indicated that 25 % of the variance for the three variables was associated with the school context factor. The omnibus test for grade level was not significant, Wilks's lambda = 0.997, $F(2, 290) = 0.48$, $p = 0.62$, and the omnibus test for the interaction of school context and grade was nearly significant, Wilks's lambda = 0.98, $F(2, 290) = 2.56$, $p = 0.08$. Finally, the multivariate test for parental education was significant (Wilks's lambda = 0.95, $F(2, 290) = 7.29$, $p = 0.001$). There were no significant effects for gender or ethnicity.

Follow-up ANCOVAs were performed on the friend-and-classmate, only-classmate, and only-friend time percentages. Based on the multivariate findings, only the results for school context, the interaction of context and grade, and parental education are reported here. Results of the ANCOVAs showed that students in the two school contexts reported differences in two of the three categories. Montessori students more often reported being with classmates and friends ($F(1, 291) = 87.67$, $p < 0.001$, Montessori M = 70.9 %, $SE = 3.0$; traditional $M = 32.1$ %, $SE = 2.8$). Traditional students more often reported being with

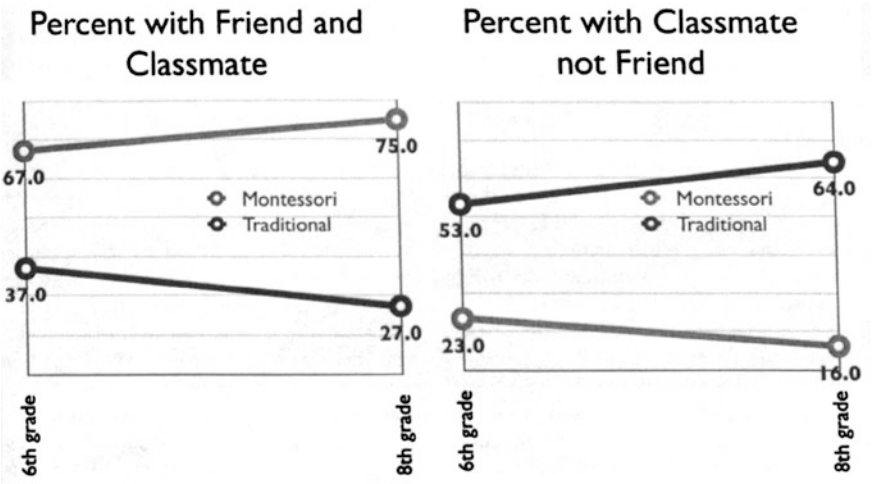

Fig. 9.1 Percentage of time with friends and classmates, and classmates not friends, by grade and school context

classmates only (F(l, 291) = 94.82, $p < 0.001$, Montessori $M = 19.4$ %, $SE = 2.9$; traditional $M = 58.5$ %, $SE = 2.8$). There were no differences with respect to time with friends only ($F(1, 291) = 0.03$, $p = 0.86$, Montessori $M = 9.7$ %, $SE = 1.6$; traditional $M = 9.3$ %, $SE = 1.6$). The ANCOVAs for the interaction between school context and grade were significant for classmates and friends, $F(1, 291) = 4.61$, $p = 0.03$, and for classmates not friends, $F(1, 291) = 4.87$, $p = 0.03$. These patterns are illustrated in Fig. 9.1. There was no interaction of context and grade for the friends-only variable, F(l, 291) = 0.0, $p = 0.99$. Both interactions indicated a trend from sixth to eighth grade: Montessori students were more likely in eighth grade to see their classmates as friends, and traditional students were more likely by eighth grade to perceive their peers as classmates and not friends.

Discussion

Early adolescence is a crucial developmental period that can influence students' future attitudes about school and their orientation toward lifelong learning (Csikszentmihalyi and Schneider 2000; Sternberg 2001). Unfortunately, research has shown negative changes in the social context of middle schools: teachers can become more distant and narrowly focused on student achievement (Brophy 1998; Feldlaufer et al. 1988; Wentzel 1998); students have a more difficult time interacting with their classmates and friends (Eccles et al. 1991; Felner et al. 1997; Hicks 1997; Stipek 1998); and academic work often takes a turn toward drudgery

with a strong dose of seat-work and lecture (Guthrie and Davis 2003; Hickey 1997; Mac Iver et al. 2002). In the present study we compared the social contexts of five Montessori and six traditional middle schools. Montessori students reported more favorable impressions of their schools and teachers. In addition, time-use estimates suggested that the Montessori students spent more time on academic tasks, had more positive perceptions of classmates, and spent more time in active learning pursuits.

Improving the Social Context of Middle School

Although the Montessori philosophy is known primarily for early childhood education, Maria Montessori also wrote about the education of adolescents. Like Erik Erikson and many other commentators, Montessori (1976) thought that what distinguished adolescence was the exploration of the self in the context of others. She commented (cited in Standing 1984, p. 116): "There is born within him a new 'sensitive period' which reveals itself in a greatly increased sensitiveness to all facts and experiences which related to his life as a social being." Because the adolescent was becoming a "socially conscious individual," educational contexts needed to accommodate this developmentally appropriate change. Montessori thought that many high schools treated adolescents "like babies" in that students were tied all day to the classroom and directed to pay attention to good or bad marks in class; she believed that social adjustment, not simply the passing of examinations, should be a focus when educating adolescents (Montessori 1976). In practical terms, this meant supporting the need for adolescents to explore their interests independently and actively in a supportive, collaborative community.

Several of the results from the study suggest the Montessori middle schools were more successful than the traditional schools in creating such a community. At the broadest level, Montessori students perceived their schools and teachers as more supportive of their individual interests. Classrooms were seen as more orderly and operating with more respect for the concentration and work of other students. Also of great importance, the Montessori students felt safe from the put-downs of teachers and other students. Adolescents often experience increased self-consciousness and a drop in confidence due to the increased public evaluation that occurs in many middle schools (Covington 1992; Eccles et al. 1993). Feeling safe from being put down, therefore, is an important component of a school culture that supports students' risk-taking and active exploration (Brophy 1998).

Perceiving teachers as supportive is crucial for students' motivation and achievement (Fraser and Fisher 1982; Goodenow 1993; Harter 1996; Wentzel 1998, 2002). The influence of teachers, however, also operates in how they structure the environment (i.e., the goals they emphasize and the activities they select) (Ames and Ames 1984; Brown 1997; Grolnick and Ryan 1987; Skinner and Belmont 1993). We hypothesized that the Montessori schools would be structured

differently than the traditional schools, and students would be engaged in different kinds of activities.

The ESM time estimates confirmed that the structure of activities in Montessori and traditional schools was indeed different. Montessori students spent more time doing academic work and chores; the traditional students spent more time socializing, engaging in leisure activities, and watching TV or other media. That the Montessori students reported doing more chores is not surprising; participating in classroom maintenance is a long-established Montessori tradition. However, that they reported doing more academic activities and fewer non-academic activities (i.e., socializing, leisure, and media) was unexpected. In other words, we predicted that the kinds of activities would be different, not that the overall balance of academic work and "downtime" would be different. Perhaps the traditional students, because they were in more structured environments that clearly delineated what was and was not academic work, were more able or more willing to report the times they were not on task. However, an explanation more consistent with the other motivation and time-use findings in the study is that the Montessori students were more often engaged in their school tasks and, therefore, less distracted by other opportunities to act (e.g., talking with friends).

Spending less time socializing did not mean that the Montessori students spent less time interacting and collaborating with friends. On the contrary, the breakdown of classroom activities demonstrated that, for those times when clear differentiations could be made with respect to classroom practices, the Montessori students reported spending less time in passive listening (e.g., lecture and note-taking) and more time working with others on projects. Other researchers have found that such active and collaborative tasks, in contrast to activities such as watching educational videos, are more enjoyable and motivating (Freeman et al. 2002; Hickey 1997; Nichols and Miller 1994; Singer et al. 2000).

The stereotype of a Montessori classroom, at least in early childhood, is that children pursue individual activities at the expense of working in groups (Santrock 1999). The finding that the Montessori students spent more time working in groups, therefore, might seem surprising. However, Maria Montessori stressed that, in adolescence, exploring the self in the context of others was crucial. Although the Montessori students also reported spending more time alone and doing more individual work, they also had ample unstructured time to collaborate with their peers. The overall results suggested that the time the Montessori students "saved" by spending less time listening to lectures or watching videos was invested in more individual *and* group work. It is worth noting, however, that these measures of classroom activities were based on a limited number of signals and on voluntary student reporting (i.e., specificity about their school activities). Therefore, they are less reliable than other measures in the study. In future ESM work, such shortcomings might be addressed by including specific questions about classroom practices on the ESM form.

The last set of findings supports those on collaborative work and further illustrates a key difference in the social contexts of the Montessori and traditional schools. The Montessori students more often reported being with friends and were

more likely to perceive their classmates as friends. Based on the amount of variance explained, these findings were the strongest in the study. One way to gauge the practical effects of these differences is to turn the time percentage measures into real-time estimates. For example, the ESM sampled about 23 h of academic work (i.e., 62 % of about 37.5 total hours sampled at school was school related). This means that the 40 % difference reported by the Montessori students in seeing classmates as friends (and, conversely, the 40 % difference reported by the traditional students in seeing classmates not as friends) represented about 9 h per week, or almost 2 h per day.

Given that successful peer interaction at school has been associated with student engagement, useful cognitive strategies, problem solving, adjustment to school, academic achievement, and self-regulation (Berndt and Keefe 1995; Brown 1990; Dimant and Bearison 1991; McCaslin and Good 1996; Ryan and Patrick 2001; Wentzel 1998), spending 9 additional hours per week in the presence of friends is likely to be an advantage for the Montessori students. In fact, there was a small but significant positive correlation between time with friends while doing academic work and higher student grades for both of these samples of students, although only one-quarter of the Montessori students received grades. More research is needed to understand the relative importance of the peer context for student motivation and experience in comparison to the proven importance of parents and teachers (Eccles et al. 1998; Magnusson and Statin 1998; Ryan 2000, 2001); however, whatever the relative effect, perceiving classmates as friends is likely to be a positive and desirable outcome. Moreover, the significant interaction between school context and grade level for this variable suggests that Montessori students' perceptions of friends among classmates increased over time and grew stronger by eighth grade. In contrast, by the eighth grade the traditional students more often perceived their peers as classmates and not friends.

Limitations and Implications of the Study

The present study statistically controlled for SES, gender, and ethnic differences; in addition, we were careful to match the samples and verify that the students came from (a) families with similar levels of parental education, number of siblings, parental employment, incidence of divorce, home resources, and school-related parental discussion and involvement; and (b) schools that were similar with respect to available resources, small to moderate size, favorable teacher-student ratios, and strong communities. Nevertheless, there are inherent difficulties in conducting comparative school research (see Watson 2001), and it is impossible to control for all of the individual and contextual differences that make each school and student unique. Furthermore, the study is based on a limited sample, and care should be taken before generalizing the results to other schools.

Despite the fact that alternative explanations cannot be entirely ruled out, the consistency of the findings discussed here, along with the findings reported

elsewhere on the Montessori students' greater intrinsic motivation and quality of experience (Rathunde and Csikszentmihalyi 2005), provide convergent evidence that the Montessori and traditional middle school cultures were associated with different student outcomes. The most reasonable explanation of the positive findings associated with the Montessori schools appears to reside in the different policies and practices of these schools (e.g., an emphasis on intrinsic motivation, providing unstructured time without block period organization, no mandatory grading, and so on). Maehr and Midgley (1991, p. 404) have also reported negative student outcomes 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 environments in this study did not fit this description; however, in comparison, the traditional school environments did.

Our findings should not be interpreted as blaming the public education system or promoting Montessori schools. No one pedagogy can lay claim to the social context ideas discussed in this study. Rather, the wider importance of the findings should be seen in relation to the widely documented problems of middle schools, the continuing drift of public schools toward transmission models of top-down education and standards-based testing, and the narrowing of perspective that increasingly equates intellectual skills with a thin set of cognitive skills that ignore affect and take the "body" out of the mind (Johnson 1987; Lakoff and Johnson 1999; Sternberg 2001). Given these circumstances, it becomes increasingly important to understand how characteristics of school contexts affect the quality of student experience.

One reason why the Montessori schools studies here may have been successful is that they were bolstered by a century-old philosophy of intrinsic motivation that laid the conceptual foundation for teacher training and set the tone for the school culture. Having such a foundation and supportive culture is likely to bolster a teacher's confidence in the importance of intrinsic motivation and the active learning disposition of children and adolescents. In contrast, many competing philosophies of education operate in public schools, and not all of them are attuned to student experience and motivation. Many public schools are also under external pressure to focus on student achievement and test scores. Under these conditions, administrators and teachers may be less ready to trust an adolescent's intrinsic motivation to learn. Adding to this hesitancy is the unfortunate fact that approaches that emphasize intrinsic motivation are perceived by some to be "easy," laissez-faire forms of education that promote student "fun." The contemporary focus on raising student test scores is therefore presented as a more sober and realistic alternative for school improvement that emphasizes students' concentration and hard work.

It is a misunderstanding, however, to think that school contexts designed to facilitate intrinsic motivation are permissive, just as it is a mistake to think that schools that emphasize student achievement must be authoritarian. Maria Montessori, for example, was clear on the point that education contexts should

contain the combination of freedom and discipline, not student freedom at any cost (Standing 1984). It is precisely this kind of multifaceted or complex social context that facilitates deeply engaging experiences that unite immediate enjoyment with concentrated work (Rathunde and Csikszentmihalyi 2006). Seeing beyond the false dichotomies that often come up in discussions of school improvement may allow a wider adoption of some of the reform ideas discussed in this study and elsewhere in the education literature. Such reforms, in turn, could improve the social context in middle school and enhance student engagement.

Note

This research could not have been conducted without the help of many people. We would like to thank to 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. Julie Carmalt played a key role in organizing and coding the data. The O'Shaughnessey Foundation, Dekko Foundation, and Hershey Foundation provided essential financial support. Barbara Schneider and Lisa Hoogstra at the National Opinion Research Center and the University of Chicago helped provide access to the Sloan Project archives. Finally, we would like to thank David Kahn and the North American Montessori Teachers' Association for recognizing the connections between Montessori philosophy and optimal experience theory and for helping to get the study off the ground.

References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261–271.

Ames, C., & Ames, R. (1984). Systems of student and teacher motivation: Toward a qualitative definition. *Journal of Educational Psychology, 76*, 535–556.

Anderman, E., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64*, 287–309.

Anderman, E., Maehr, M., & Midgley, C. (1999). Declining motivation after the transition to middle school: Schools can make a difference. *Journal of Research and Development in Education, 32*(3), 131–147.

Becker, H. J. (1990). Curriculum and instruction in middle-grade schools. *Phi Delta Kappan, 71*(6), 450–457.

Berndt, T., & Keefe, K. (1995). Friends' influence on adolescents' adjustment to school. *Child Development, 66*, 1312–1329.

Brophy, J. (1998). *Motivating students to learn*. New York: McGraw-Hill.

Brown, A. (1997). Transforming schools in communities of thinking and learning about serious matters. *American Psychologist, 52*, 399–413.

Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 171–196). Cambridge: Harvard University Press.

Carnegie Council on Adolescent Development. (1989). *Turning points: Preparing American youth for the 21st century*. New York: Carnegie Corp.

Carnegie Council on Adolescent Development. (1995). *Great transitions: Preparing adolescents for a new century*. New York: Carnegie Corp.

Covington, M. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. New York: Cambridge University Press.

Csikszentmihalyi, M. (1990). *Flow*. New York: Harper & Row

Csikszentmihalyi, M., & Larson, R. (1984). *Being adolescent*. New York: Basic.

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience-sampling method. *Journal of Nervous and Mental Disease, 175*(9), 526–536.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1997). *Talented teenagers: The roots of success and failure*. New York: Cambridge University Press.

Csikszentmihalyi, M., & Schneider, B. (2000). *Becoming adult*. New York: Basic.

Deci, E. (1992). The relation of interest to the motivation of behavior: A self-determination-theory perspective. In K. A. Renninger, A. Krapp, & S. Hidi (Eds.), *The role of interest in learning and development* (pp. 43–70). Hillsdale: Erlbaum.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*, 627–668.

Dewey, J. (1934/1980). *Art as experience*. New York: Perigee

Dimant, R., & Bearison, D. (1991). Development of formal reasoning during successive peer interactions. *Developmental Psychology, 27*, 277–284.

Eccles, J., Lord, S., & Midgley, C. (1991). What are we doing to early adolescents? The impact of educational contexts on early adolescents. *American Journal of Education, 99*(4), 521–542.

Eccles, J., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., et al. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experience in schools and families. *American Psychologist, 48*, 90–101.

Eccles, J., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In N. Eisenberg (Ed.) & W. Damon (Series Ed.), Handbook of child psychology: Vol. 3. Social, emotional, and personality development (5th ed., pp. 1017–1095). New York: Wiley

Feldlaufer, H., Midgley, C., & Eccles, J. S. (1988). Student, teacher, and observer perceptions of the classroom environment before and after the transition to junior high school. *Journal of Early Adolescence, 8*, 133–156.

Felner, R., Jackson, A., Kasak, D., Mulhall, P., Brand, S., & Flowers, N. (1997). The impact of school reform for the middle years: Longitudinal study of a network engaged in Turning Points-based comprehensive school transformation. *Phi Delta Kappan, 78*, 428–432.

Finn, J. D. (1993). *School engagement and students at risk*. Washington, DC: National Center for Education Statistics.

Fraser, B., & Fisher, D. (1982). Predicting students' outcomes from their perception of classroom psychosocial environment. *American Educational Research Journal, 19*, 498–518.

Freeman, J., McPhail, J., & Berndt, J. (2002). Sixth graders' views of activities that do and do not help them learn. *Elementary School Journal, 102*, 335–347.

Gentry, M., Gable, R., & Rizza, M. (2002). Students' perceptions of classroom activities: Are there grade-level and gender differences? *Journal of Educational Psychology, 94*(3), 539–544.

Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *Journal of Early Adolescence, 13*, 21–43.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology, 77*, 631–645.

Grolnick, W., & Ryan, R. (1987). Autonomy support in education: Creating the facilitating environment. In N. Hastings & J. Schwieso (Eds.), *New directions in educational psychology* (Vol. 2, pp. 213–231)., Behavior and motivation London: Falmer.

Guthrie, J., & Davis, M. (2003). Motivating struggling readers in middle school through an engagement model of classroom practice. *Reading and Writing Quarterly, 19*, 59–85.
Harter, S. (1990). Causes, correlates, and the functional role of global self-worth: A lifespan perspective. In R. J. Sternberg & J. Kolligan (Eds.), *Competence considered* (pp. 67–97). New Haven: Yale University Press.
Harter, S. (1996). Teacher and classmate influences on scholastic motivation, self-esteem, and level of voice in adolescents. In J. Juvonen & K. Wentzel (Eds.), *Social motivation: Understanding children's school adjustment* (pp. 11–42). New York: Cambridge University Press.
Harter, S., Whitesell, N., & Kowalski, P. (1992b). Individual differences in the effects of educational transitions on young adolescents' perceptions of competence and motivational orientation. *American Educational Research Journal, 29*(4), 777–807.
Hickey, D. (1997). Motivation and contemporary socio-constructivist instructional perspectives. *Educational Psychologist, 32*, 175–193.
Hicks, L. (1997). How do academic motivation and peer relationships mix in an adolescent's world? *Middle School Journal, 28*, 18–22.
Johnson, M. (1987). *The body in the mind*. Chicago: University of Chicago Press.
Juvonen, J., & Wentzel, K. (Eds.). (1996). *Social motivation: Understanding children's school adjustment*. New York: Cambridge University Press.
Lakoff, G., & Johnson, M. (1999). *Philosophy in the flesh*. New York: Basic.
Lee, V. E., & Smith, J. B. (1993). Effects of school restructuring on the achievement and engagement of middle-grade students. *Sociology of Education, 66*, 164–187.
Lipsitz, J., Jackson, A., & Austin, L. (1997). What works in middle-grades school reform? *Phi Delta Kappan, 78*, 517–556.
Mac Iver, D., Young, E., & Washburn, B. (2002). Instructional practices and motivation during middle school (with special attention to science). In A. Wigfield & J. Eccles (Eds.), *The development of achievement motivation* (pp. 333–351). San Diego: Academic.
Maehr, M., & Midgley, C. (1991). Enhancing student motivation: A schoolwide approach. *Educational Psychologist, 26*, 399–427.
Maehr, M., & Midgley, C. (1996). *Transforming school cultures*. Boulder: Westview.
Magnusson, D., & Statin, H. (1998). Person-context interaction theories. In R. Lerner (Ed.) & W. Damon (Series Ed.), Handbook of child psychology: Vol. 1. Theoretical models of human development (pp. 685–740). New York: Wiley
Marks, H. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal, 37*, 153–184.
McCaslin, M., & Good, T. (1996). *Listening in classrooms*. New York: Harper Collins.
Midgely, C., Feldlaufer, H., & Eccles, J. (1989). Student/teacher relations and attitudes toward mathematics before and after the transition to junior high school. *Child Development, 60*, 981–992.
Montessori, M. (1946). *Unpublished lectures*. London: AMI.
Montessori, M. (1965). *Spontaneous activity in education*. New York: Schocken.
Montessori, M. (1976). *From childhood to adolescence* (2nd ed.). New York: Schocken.
Montessori, M. (1981). *The secret of childhood*. New York: Ballantine.
National Center for Education Statistics. (1994). *National education longitudinal study of 1988: Second follow-up: Student component data file user's manual*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
National Center for Education Statistics. (1997). *NELS: 88 Survey Item Evaluation Report*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
Nichols, J., & Miller, R. (1994). Cooperative learning and student motivation. *Contemporary Educational Psychology, 19*, 167–178.
Piaget, J. (1952). *The origins of intelligence in children*. New York: International Universities Press.

Pintrich, P., & Schunk, D. (Eds.). (2002). *Motivation in education* (2nd ed.). Upper Saddle River: Merrill Prentice-Hall.

Rathunde, K. (2001). Montessori education and optimal experience: A framework for new research. *NAMTA, 26*, 11–43.

Rathunde, K., & Csikszentmihalyi, M. (2005). Middle school students' motivation and quality of experience: A comparison of Montessori and traditional school environments. *American Journal of Education, 111*(3), 341–371.

Rathunde, K., & Csikszentmihalyi, M. (in press). The developing person: An experiential perspective. In R. M. Lerner (Ed.) & W. Damon (Series Ed.), Handbook of child psychology: Vol. 1. Theoretical models of human development (6th ed.). New York: Wiley

Ryan, A. (2000). Peer groups as a context for the socialization of adolescents' motivation, engagement, and achievement in school. *Educational Psychologist, 35*, 101–111.

Ryan, A. (2001). The peer group as a context for the development of young adolescent motivation and achievement. *Child Development, 72*, 1135–1150.

Ryan, A., & Patrick, H. (2001). The classroom environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal, 38*, 437–460.

Santrock, J. (1999). *Life-span development* (7th ed.). New York: McGraw-Hill.

Savin-Williams, R., & Berndt, T. (1990). Friendship and peer relations. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 277–307). Cambridge: Harvard University Press.

Shernoff, D. J., Csikszentmihalyi, M., Schneider, B., & Shernoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly, 18*, 158–176.

Simmons, R. G., & Blyth, D. A. (1987). *Moving into adolescence*. Hawthorne: Aldine de Gruyter.

Singer, J., Marx, R., Krajcik, J., & Chambers, J. (2000). Constructing extended inquiry projects: Curriculum materials for science education reform. *Educational Psychologist, 35*, 165–178.

Skinner, E., & Belmont, M. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*, 571–581.

Standing, E. M. (1984). *Maria Montessori: Her life and work*. New York: Penguin.

Steinberg, L., & Silverberg, S. (1986). The vicissitudes of autonomy in early adolescents. *Child Development, 57*, 841–851.

Sternberg, R. J. (2001). Why schools should teach for wisdom: The balance theory of wisdom in educational settings. *Educational Psychologist, 36*, 227–245.

Stipek, D. (1998). *Motivation to learn: From theory to practice*. Boston: Allyn & Bacon.

U.S. Department of Education, Office of Educational Research and Improvement. (1991). *Preparing young children for success: Guideposts for achieving our first national goal, an America 2000 education strategy*. Washington, DC: Author.

Watson, K. (Ed.). (2001). *Doing comparative education research: Issues and problems*. Oxford: Symposium Books.

Wentzel, K. (1998). Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology, 90*, 202–209.

Wentzel, K. (2002). Are effective teachers like good parents? Teaching styles and student adjustment in early adolescence. *Child Development, 73*, 287–301.

Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: Changes in children's self-esteem across the transition to junior high school. *Developmental Paychology, 27*, 552–565.