

Classroom Context, School Engagement, and Academic Achievement in Early Adolescence

Aryn M. Dotterer · Katie Lowe

Received: 2 December 2010 / Accepted: 28 February 2011 / Published online: 13 March 2011
© Springer Science+Business Media, LLC 2011

Abstract Classroom context and school engagement are significant predictors of academic achievement. These factors are especially important for academically at-risk students. Grounded in an ecological systems perspective, this study examined links between classroom context, school engagement, and academic achievement among early adolescents. We took a multidimensional approach to the measurement of classroom context and school engagement, incorporating both observational and self-reported assessments of various dimensions of classroom context (instruction quality, social/emotional climate, and student–teacher relationship) and school engagement (psychological and behavioral engagement). Using data from the NICHD Study of Early Child Care and Youth Development, we tested whether school engagement mediated the link between classroom context and academic achievement among 5th grade students, and whether these pathways were the same for students with previous achievement difficulties identified in 3rd grade. Participants included 1,014 children (50% female) in 5th grade (mean age = 11). The majority of the participants were white (77%) and 23% were children of color. Results indicated that psychological and behavioral engagement mediated the link between classroom context and academic achievement for students without previous achievement difficulties. However, for students

with previous achievement difficulties psychological and behavioral engagement did not mediate the link between classroom context and academic achievement. These results suggest that improving classroom quality may not be sufficient to improve student engagement and achievement for students with previous achievement difficulties. Additional strategies may be needed for these students.

Keywords School engagement · Academic achievement · Classroom climate · Student–teacher relationship · At-risk students

Introduction

School engagement, adolescents' school-related behaviors, thoughts and feelings, has received attention in recent years because of its connection to adolescent well-being. Previous research has demonstrated links between school engagement and adolescent outcomes, such as school drop out (Finn and Rock 1997), substance use (Bond et al. 2007), mental health (Bond et al. 2007), and academic outcomes (Marks 2000; Patrick et al. 2007; Wang and Holcombe 2010). School engagement is presumed to be malleable and therefore recent research also has explored predictors of school engagement. With some important exceptions (Wang and Holcombe 2010), the correlates and consequences of school engagement are rarely examined within the same model. The present study contributes to this growing body of research by exploring the mechanisms that underlie the antecedents and consequences of school engagement. Specifically, we test whether school engagement mediates the link between classroom context and academic achievement. Students with early academic problems are at an increased risk for later problems in

This study was conducted by the NICHD Early Child Care Research Network supported by NICHD through a cooperative agreement that calls for scientific collaboration between the grantees and the NICHD staff.

A. M. Dotterer (✉) · K. Lowe
Department of Child Development and Family Studies,
Purdue University, 1200 W. State St., West Lafayette,
IN 47906, USA
e-mail: dotterer@purdue.edu

school and early school drop out (Alexander et al. 1997; Barrington and Hendricks 1989). Therefore, we also explore whether the connections among classroom context, school engagement, and academic achievement operate in the same manner for students with previous academic difficulties.

This study draws upon a developmental ecological model concerned with the dynamic interplay of person characteristics and ecological conditions (Bronfenbrenner and Morris 1998). The microsystem describes aspects of the environment that directly influence the individual, such as the student–teacher relationship and the classroom. The ecological systems perspective emphasizes the importance of social relationships for youth across key microsystems such as home and school. Development occurs as result of active participation in progressively complex, reciprocal interactions with persons, objects, and symbols in the individual's immediate environment. Bronfenbrenner referred to these interactions in the immediate environment as proximal processes (Bronfenbrenner and Morris 1998). Proximal processes vary systematically as a function of the characteristics of the developing person and of the environment in which the processes are taking place. In the present study, we draw on Bronfenbrenner's concepts of person, process, and context in which we view previous achievement difficulty as a characteristic of the adolescent (person) and classroom climate, classroom quality, and student–teacher relationships as important environments (context) that will interact with person characteristics to influence student engagement and academic achievement (process).

Classroom Context

A growing body of research suggests that the social, instructional, and organizational climate of schools influences both students' engagement and their academic achievement (e.g., Eccles et al. 1998; Patrick et al. 2007; Ryan and Patrick 2001). Motivational and self-systems theories (Connell 1990) posit that children's learning behavior and achievement is partially influenced by the extent to which the social context satisfies the need for being socially connected. Previous research indicates that children who feel a sense of belonging and social support are more likely to be engaged and participate in school (Deci and Ryan 1985; Wentzel 1997). Children who have conflictual relationships with their teachers may not feel connected or supported and may disengage from classroom activities (Connell 1990).

Previous research has indicated that children who have negative relationships with their teachers are more likely to have problems related to school engagement and academic achievement (Baker 2006; Birch and Ladd 1997; Hamre and Pianta 2001; Stipek and Miles 2008). For example,

Ladd and Burgess (2001) found that when teacher–child conflict was greater, students were less engaged in the classroom, were less likely to enjoy school, and were at increased risk for poor academic performance. Further, Baker (2006) found that teacher–child conflict was associated with lower report card grades and standardized test scores. Early relationship problems with teachers also appear to have lasting effects. Hamre and Pianta (2001) reported that students who had more conflict with their teachers in kindergarten had lower academic achievement and more behavioral problems, including poor work habits and discipline problems through eighth grade.

Connecting student–teacher relationship quality to academic engagement and performance, researchers have endorsed an indirect effects model of student–teacher relationship quality on academic performance, as mediated by academic engagement (Decker et al. 2007; Furrer and Skinner 2003; Hughes et al. 2008). For example, Furrer and Skinner (2003) found evidence for the maintenance of academic engagement from 3rd to 6th grade through student's sense of relatedness to teachers, as well as parents and peers. Most importantly, the researchers found that both student-report and teacher-report of engagement mediated the relationship between relatedness and academic performance over and above student's perceived academic control.

Student–teacher relationship quality may be particularly important for at-risk students (Decker et al. 2007; Hughes et al. 2008; Rimm-Kaufman et al. 2002). Hughes et al. (2008) examined academically at-risk children from 1st through 3rd grade to determine if teacher–student relationship quality at year 1 affected academic achievement at year 3 and was mediated by academic engagement at year 2. Overall, the authors' findings confirmed their predictions and provided strong evidence for the mediational pathway of engagement. However, there were two weaknesses of this study: (1) only teacher-reports were gathered, which implies the problem of shared method variance, and (2) no observational measures were used. We improve upon these limitations in the current study by including both children's reports of engagement and an observational assessment of engagement.

Considering the findings aforementioned, there seems to be a moderately strong amount of evidence to support engagement as a mediator for the relationship between student–teacher relationship quality and academic achievement. This has important implications for research as well as intervention, especially for at-risk students. As Pianta et al. (1995) suggested, positive student–teacher relationships may serve as a protective mechanism to promote resiliency within the academic environment for at-risk students. This implication becomes especially critical when one considers research indicating a significant decrease in students' sense of relatedness and student–teacher relationship quality

following the transition to middle school (Furrer and Skinner 2003; Lynch and Cicchetti 1997). Thus, a strength of the current study is that it aims to examine differences between struggling and non-struggling students regarding the influence of student–teacher relationship quality (and the two other facets of the classroom context discussed below) on academic achievement, through two different types of academic engagement (i.e., behavioral and psychological).

Extending beyond the individual level of the student–teacher relationship quality, global assessments of the socioemotional classroom climate and overall instructional quality of the teacher also have been associated with academic engagement and performance. Generally speaking, high-quality classrooms are not only warm, child-centered, and supportive of autonomy, but also are marked by teachers who offer constructive feedback, ask open-ended questions, and provide multimodal activities to cater to differing learning types and sustain interest (Pianta et al. 2002). Pianta et al. (2002) found that children in high-quality (combining socioemotional classroom climate and teacher instructional quality) kindergarten classrooms demonstrated more on-task behavior, social competence, and literacy and math competence while controlling for maternal education and income. Downer et al. (2007) extended this research on classroom quality by investigating the influence of classroom quality (combined indicator for climate and instruction) for third-grade children at-risk for school problems (determined by 3 indicators: externalizing behaviors, conflict with the teacher, and achievement scores 25% below average). Findings indicated that high-quality classrooms were especially beneficial for high-risk children. Further, Hamre and Pianta (2005) found that at-risk children, as defined by demographic risk (i.e., mothers with less than a 4-year college degree) and functional risk (i.e., low social skills, academic competence, and sustained attention, and high levels of externalizing problems), placed in first grade classrooms with teachers who exhibited high instructional and emotional quality had reduced levels of conflict with teachers and increased academic achievement. It is clear that student–teacher relationship quality is a necessary and important element for all children to be successful in the classroom; however, student–teacher relationship quality seems to be particularly salient for at-risk children to be successful in the classroom.

Researchers studying third-grade classrooms in the NICHD Study of Early Child Care and Youth Development (SECCYD) found that classrooms rated as having a positive climate were associated with children being more engaged in classroom activities (NICHD ECCRN 2005). In this study, a positive classroom climate was operationalized as the composite of high ratings for richness of instructional methods, teacher sensitivity, productive use of instructional time, and low ratings for classroom

overcontrol, classroom chaos, teacher detachment, and negative classroom climate. Similarly, another NICHD ECCRN (2002) study found that students in first-grade classrooms exhibiting high levels of emotional support (i.e., a composite of high ratings for positive emotional climate, teacher sensitivity/responsivity, management, and low ratings for overcontrol, negative emotional climate, intrusiveness, and detachment) were more frequently observed as engaged in assigned activities, less negative or disruptive with the teacher, and more positive with their peers and the teacher. Classrooms rated high in instructional quality (i.e., a composite of high ratings for literacy instruction, evaluative feedback, instructional conversation, and encourages responsibility) also had students who were observed to be more positive with teachers and peers and displayed less disruptive behaviors toward the teacher.

Thus, the social and emotional environment of the classroom is important for students' engagement and achievement in school. Students will be more engaged when classroom contexts meet their needs for relatedness, which is likely to occur in classrooms where teachers and peers create a caring and supportive environment (Fredricks et al. 2004). For example, Greene et al. (2004) found strong support for a path analysis model indicating high school students' reports of English classroom climates that supported autonomy and a task-focused (vs. performance) orientation predicted students' reports of self-efficacy, which in turn predicted their achievement goals, perceived instrumentality, and grades in their English classes. Moreover, students' self-efficacy (as predicted by the components of the classroom climate mentioned above) had the strongest positive correlation ($r = .47$) with students' percentage grade in their English classes. Integrating the research previously discussed, there seems to be a relationship between students' perceptions of a positive classroom climate, their corresponding engagement in classroom activities, and their academic performance. The present study extends this research by examining differences in this pattern for students with previous achievement difficulties.

School Engagement

School engagement describes students' feelings, behaviors, and thoughts about their school experiences and is an important construct given its links to academic outcomes such as achievement and high school completion. There is growing interest in the construct of school engagement because it is presumed to be malleable and responsive to variations in the environment (Fredricks et al. 2004). In their review of the literature, Jimerson et al. (2003) identified three dimensions of school engagement: affective, behavioral, and cognitive. Thus, school engagement is a multifaceted phenomenon.

The affective dimension reflects an emotional link to school and refers to students' sense of belonging to school. The affective component of school engagement has been conceptualized as school attachment (Johnson et al. 2001) and reflects the extent to which students feel close to people at their school, feel a part of their school, and are happy to be at their school. Voelkl (1997) referred to the affective bond between students and their schools as "identification with school." The behavioral dimension of school engagement includes students' observable actions or performance. Behavioral assessments of school engagement include: completing homework (Connell et al. 1994; Finn and Rock 1997), school attendance, paying attention (Connell et al. 1994; Johnson et al. 2001), and school grades (Jordan 2000; Manlove 1998). Finally, the cognitive dimension includes students' perceptions and beliefs related to self, school, teachers, and other students. Examples of this dimension include students' sense of self-efficacy as well as their academic motivation and aspirations (Jimeron et al. 2003).

Engagement is an important component of students' school experience because of its relationship to achievement. Connell et al. (1994) employed a combined measure of emotional engagement (e.g., being bored, being happy) and behavioral engagement (e.g., paying attending, completing school work) and found that engagement was associated with higher scores on standardized achievement tests among African American early adolescents. Shernoff and Schmidt (2008) used a composite measure of engagement comprised of enjoyment, concentration, and interest. Although alpha reliability of the school engagement composite was low (.64), engagement was positively related to high school students' self-reported grades. The use of combined measures, however, makes it hard to disentangle the independent contribution of different types of engagement to achievement (Fredricks et al. 2004).

A growing body of research has begun to link school/classroom environments, school engagement, and academic achievement. Patrick et al. (2007) examined relationships among classroom social environment, engagement, and achievement among early adolescents in 5th grade. The researchers found that classroom social environment including teacher support, student support, and promotion of interaction was positively related to cognitive (self-regulated learning) and behavioral (classroom participation) engagement. In turn, behavioral engagement was positively related to math grades. Further evidence of the connections between social environment, school engagement, and academic achievement comes from a recent study of middle school students (Wang and Holcombe 2010). In their short-term longitudinal study, Wang and Holcombe (2010) found that school social environment (autonomy, teacher support, performance goals, mastery goals, and discussion) in 7th

grade predicted affective (school identification), behavioral (school participation), and cognitive (self-regulation strategies) engagement in 8th grade, and engagement in turn was significantly related to 8th grade GPA. These studies provide support for the mechanism linking school environment to academic achievement such that classroom context is related to school engagement which, in turn, is related to academic achievement.

The Current Study

In the present study, we assess behavioral and psychological engagement. We use the term psychological engagement because our measure encompasses aspects of both affective and cognitive engagement. We improve upon previous research by taking a multi-method approach to the study of engagement. In addition to self-reports of psychological engagement, we utilize observational assessments of adolescents' behavioral engagement in the classroom. The use of multiple methods reduces mono-reporter bias and inflated responses due to social desirability.

We hypothesize that school engagement (behavioral and psychological engagement) will mediate the association between classroom context and academic achievement. That is, we expect that classroom context (conflict with teacher, classroom social/emotional climate, and instructional quality) will predict the extent to which adolescents are engaged and school engagement, in turn will predict academic achievement. We also explore whether these associations are similar or different for students with previous achievement difficulties. Given the limited research on classroom context and school engagement among adolescents with achievement difficulties, no *a priori* hypotheses regarding the direction of effects were made.

Methods

Participants

Data were drawn from the NICHD Study of Early Child Care and Youth Development (SECCYD). The NICHD SECCYD, which began in 1991, is a comprehensive longitudinal study including 1,364 children from 10 locations (Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI) across the United States. Families were recruited through hospital visits to mothers shortly after the birth of a child (see <http://secc.rti.org> for more details regarding the recruitment, the sample, and the study). The current study utilizes data from Phase III of the study, which was conducted

between 2000 and 2005 and includes 1,014 children in 5th grade. The sample consists of 50.4% girls and 49.6% boys. The majority of participants were white (77%) although the sample did include a small proportion of child of color (23%). Maternal education averaged 14.4 years.

Procedures

The present study used multiple methods for data collection, including standardized assessments, observations, and self-report. Standardized assessments of achievement (reading and math) took place in a laboratory setting between January and April of 5th grade. Classroom observations were conducted by trained observers and took place between January and April of 5th grade. Observers from all 10 sites trained on practice videotapes using a standardized manual that provided extensive descriptions of codes and anchor points. Observers also attended a centralized training workshop. After the central training workshop, coders returned to their sites, conducted pilot observations, and trained on two more videotaped cases. All observers then had to pass a videotaped reliability test involving six cycles of observational ratings. Criteria for passing were at least an 80% match on the rating scales. All coders passed at these levels on a reliability test before being certified to conduct observations in the field. Reliability was estimated as within 1 scale point on the 7-point rating scales. Average reliability for the child and classroom observations on the videotaped test was .793. Observers each also conducted a minimum of two paired visits scheduled randomly during the data collection window for the purposes of estimating live reliability. Average live reliability across all global ratings was .714. All observations occurred at the official start of the school day and took approximately 6 h to complete. Adolescents were also interviewed in their homes and teachers completed self-reported questionnaires.

Measures

Social/Emotional Climate

Classroom social/emotional climate was derived from the Positive Social/Emotional Classroom Climate Composite and was computed as the sum of 6 teacher/classroom ratings: classroom over-control (reverse coded), chaos (reverse coded), all teacher detachment (reverse coded), positive classroom climate, negative classroom climate (reverse coded), and teacher sensitivity. Social/Emotional climate was assessed using the Classroom Observation System-5th Grade (NICHD ECCRN 2005, 2006). The classroom observation included eight 10-min observational cycles during which observers made time-sampled recordings of

discrete codes. Observations were scored on a scale that ranged from 1 to 7. A rating of 1 was assigned when that code was *uncharacteristic* of the classroom, a 3 was assigned when the description was *minimally characteristic*, a 5 was assigned when the description of the code was *very characteristic*, and a 7 was assigned under circumstances in which the code was *extremely characteristic*. Higher scores indicate a more positive social/emotional classroom climate. The items used to create this composite had moderate internal reliability (6 items, Cronbach's $\alpha = .76$).

Instructional Quality

Classroom instructional quality was derived from the Classroom Instructional Quality Composite and was computed as the sum of 3 classroom ratings: richness of instructional methods, productive use of instructional time, and evaluative feedback. Instructional quality was assessed using the Classroom Observation System-5th Grade (NICHD ECCRN 2005, 2006). The classroom observation included eight 10-min observational cycles during which observers made time-sampled recordings of discrete codes. Observations were scored on a scale that ranged from 1 to 7. A rating of 1 was assigned when that code was *uncharacteristic* of the classroom, a 3 was assigned when the description was *minimally characteristic*, a 5 was assigned when the description of the code was *very characteristic*, and a 7 was assigned under circumstances in which the code was *extremely characteristic*. Scores on this composite range from 5.25 to 18.50 with higher scores indicating higher classroom instructional quality. The raw items used to create this composite had moderate internal reliability (3 items, Cronbach's $\alpha = .77$).

Teacher–Student Conflict

Teacher-student conflict was obtained from teachers' report of conflict using the Student–Teacher Relationship Scale: Short Form (<http://secc.rti.org>). This scale is comprised of seven items scored on a five-point Likert scale that ranged from 1 = “Definitely does not apply” to 5 = “Definitely applies”. Sample items include: *this child easily become angry at me*; *dealing with this child drains my energy*. Scores on this scale range from 7 to 35, with higher scores indicating more conflict between the teacher and child. The items used to create this variable had high internal reliability (7 items, Cronbach's $\alpha = .90$).

Psychological Engagement

Psychological engagement was assessed with the What I Think About School Questionnaire (<http://secc.rti.org>). This scale is comprised of 20 items designed to tap

students' perceived competence, motivation, and feelings of connectedness. Because this construct contains items related to both affective engagement (connectedness, belonging) and cognitive engagement (perceived competence, motivation), we refer to this construct as psychological engagement. Sample items include: *I do well in school, even in hard subjects; I try hard in school; I feel like I belong at school*. Scores on this scale range from 1 to 4, with higher scores indicating greater school engagement. The items used to create this scale had moderate internal reliability (Cronbach's $\alpha = .76$).

Behavioral Engagement

Behavioral engagement was assessed with the Classroom Observation System-5th Grade (NICHD ECCRN 2005, 2006). The behavior scales record the frequency of behaviors in the areas of setting (e. g., whole class, small group, or individual instruction/activity), content (e. g., language arts, math, science, social studies, etc.), teacher behavior (e. g., displays positive/negative affect, monitoring/checking work), child academic behavior (e. g., on-task, engaged in learning), and child social behavior (e. g., positive/negative affect, disruptive). For the purposes of this study, observations of academic behavior were used via the Study Child Engaged in Academics Composite, which assesses the degree to which students are actively engaged in learning (i.e., paying attention, on-task). We termed this construct behavioral engagement. Observations were coded in a series of eight 10 min cycles that consisted of 30-s observe/record segments. Observations were scored on a scale that ranged from 1 to 7. A rating of 1 was assigned when the code of actively engaged in learning was *uncharacteristic* of the child, a 3 was assigned when the description was *minimally characteristic*, a 5 was assigned when the description of the code was *very characteristic*, and a 7 was assigned under circumstances in which the code was *extremely characteristic*. Scores range from 11.25 to 59 with higher scores indicating more child engagement in academics. The two individual behavior items used to create this variable had high internal reliability (Cronbach's $\alpha = .97$).

Academic Achievement

The Woodcock Johnson Psychoeducational Battery-Revised (WJ-R; Woodcock and Johnson 1989) Broad Reading and Broad Math subtests were used to assess academic achievement. The Broad Reading subtest included Letter-Word Identification and Passage Comprehension which assesses reading skills (Cronbach's $\alpha = .91$). The Broad Math subtest included Calculation and Applied Problems, which measures analytic and problem

solving skills (Cronbach's $\alpha = .91$). Items are presented in order of increasing difficulty and are scored 0 = incorrect or no response; or 1 = correct response, with basal and ceiling levels established. The mean of Broad Reading and Broad Math was used as the indicator of academic achievement.

Because we were interested in the extent to which the relations among classroom context, school engagement, and academic achievement were similar or different for students with previous achievement difficulties, we created a grouping variable based on adolescents' performance on the Woodcock Johnson tests of achievement in 3rd grade. A struggling learner was defined as 1 standard deviation below the mean on the 3rd grade WJ-R tests of achievement. Fifteen percent of the sample was classified as struggling learners ($n = 151$) and 85% of the sample was classified as not struggling ($n = 863$).

Demographic Background and Control Variables

Maternal education, child gender, and child race were controlled in the structural equation model.

Results

Gender was split evenly in the struggling and non-struggling groups. In both groups children averaged 11 years of age. In the struggling group, maternal education averaged 12.83 years of education ($SD = 2.16$) and in the non-struggling group, maternal education averaged 14.72 years of education ($SD = 2.35$). Descriptive statistics and correlations among study variables by group are presented in Table 1. Student–teacher conflict was related negatively to social/emotional climate and instructional quality for both groups of students (see Table 1). As shown in Table 1, student–teacher conflict, social/emotional climate, and instructional quality were not related to psychological engagement among struggling learners; however, student–teacher conflict and social/emotional climate were related to psychological engagement among non-struggling learners. These three classroom factors were significantly related to behavioral engagement among both groups of students (see Table 1). Psychological and behavioral engagement were significantly and positively associated with academic achievement among non-struggling learners; however only psychological engagement was positively associated with academic achievement among non-struggling learners (see Table 1).

We were interested in exploring the extent to which psychological and behavioral engagement mediated the effects of classroom factors (classroom climate, quality, and relationship with teacher) on academic achievement.

Table 1 Classroom context, engagement and academic achievement: correlations and descriptive statistics ($N = 1,014$)

Variables	1	2	3	4	5	6
<i>M</i>	11.00	35.36	11.90	3.51	41.47	113.12
<i>SD</i>	5.36	2.86	2.48	.34	8.08	10.95
1. Teacher-student conflict	–	–.17**	–.11**	–.25**	–.26**	–.15**
2. Social/emotional climate	–.24**	–	.54**	.09*	.21**	.14**
3. Instructional quality	–.19*	.57**	–	.07	.42**	.18**
4. Psychological engagement	–.07	.02	.13	–	.16**	.20**
5. Behavioral engagement	–.36**	.34**	.50**	.14	–	.23**
6. Academic achievement	–.16	.05	.21*	.20*	.09	–
<i>M</i>	13.54	34.55	11.42	3.38	38.05	89.24
<i>SD</i>	6.79	3.29	2.57	0.37	9.04	13.22

Struggling students' correlations, means, and standard deviations are below the diagonal and non-struggling students' correlations, means, and standard deviations are above the diagonal

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

That is, we tested whether classroom factors predicted student engagement, which in turn predicted academic achievement. We were also interested in whether these associations were similar or different for students who had previous achievement difficulties.

Given our goal of assessing mechanisms that underlie academic achievement, we conducted a multi-group structural equation model that was estimated in AMOS 18. The model was estimated using full information maximum likelihood (FIML), which uses information from all cases including those with missing values (Arbuckle 1996; Schafer and Graham 2002). Mediation was evaluated with the Sobel test (MacKinnon et al. 2002). Model fit was assessed by the obtained chi-square and significance test, Confirmatory Fit Index (CFI), Normed Fit Index (NFI), and root mean square error of approximation (RMSEA). CFI values above .95, NFI values above .95, and RMSEA values below .05 are generally considered to indicate good fit (Bentler and Bonett 1980; Browne and Cudeck 1993). Adolescent's gender and mother's education were controlled.

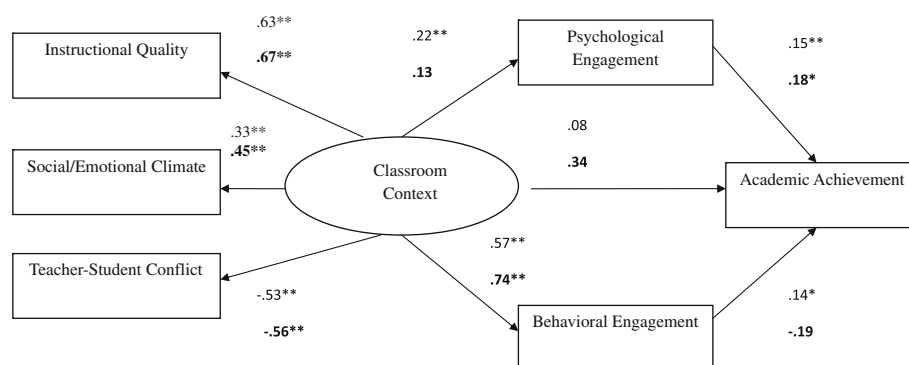
A model in which paths were free among the two groups (struggling learners vs. not struggling) was compared to a model in which the paths were constrained to be equal. The model in which the paths were free to vary fit the data well. The χ^2 for this model was significant, χ^2 ($df = 20$) = 62.01, $p < .01$. However χ^2 is known to be sensitive to sample size, such that with sample sizes as large as that used in the present study ($N = 1014$), even minor deviations from a perfect model are statistically significant. For that reason, we used three indices of practical fit to make our main judgments about model fit: CFI = .96, NFI = .94, RMSEA = .04; indicating good fit. The model in which the paths were constrained to be equal in the two groups provided a poor fit to the data, χ^2 ($df = 43$) = 331.61, $p < .001$. Practical fit indices were also poor:

CFI = .67, NFI = .65, RMSEA = .08. The two models were compared by calculating the χ^2 difference statistic, which can be used to compare nested models, in which the models are the same but differ because of adding a constraint or freeing a constraint. The χ^2 difference is calculated by subtracting the χ^2 fit statistic of the first model from the χ^2 fit statistic of the second model. The degrees of freedom for the χ^2 difference statistic are calculated by subtracting the degrees of freedom in the first model from the degrees of freedom in the second model. The χ^2 difference statistic was 269.6 ($df = 23$), $p < .001$, which indicated that the second model was a worse fit. Therefore, we retained the most parsimonious model in which paths between the two groups were free to vary.

Among adolescents without a previous history of achievement difficulties, classroom context was related significantly and positively to psychological engagement (see Fig. 1). Adolescents who were in classrooms that were rated as being higher on instructional quality and positive social/emotional climate but lower on teacher-child conflict were more likely to report feeling positive toward their school and trying hard in school. Psychological engagement, in turn, was related to academic achievement such that adolescents, who were more engaged, were more likely to have higher scores on the Woodcock Johnson Tests of Achievement. Further, psychological engagement mediated the link between classroom context and academic achievement, Sobel test = 2.16, $p < .05$.

As expected, classroom context was also related significantly and positively to behavioral engagement (see Fig. 1). Adolescents who were in classrooms that were higher in instructional quality, had a more positive social/emotional climate, and were lower in student-teacher conflict were more likely to be engaged in learning. Behavioral engagement was related to academic

Fig. 1 Standardized SEM estimates of classroom context, engagement, and academic achievement. *Note.* Standardized estimates for students with previous achievement difficulties are in **bold**. * $p < .05$; ** $p < .01$



achievement such that adolescents who were engaged in learning were more likely to have higher scores on the Woodcock Johnson Tests of Achievement. Further, behavioral engagement mediated the link between classroom context and academic achievement, Sobel test 2.18, $p < .05$.

Among the struggling learners, classroom context was related significantly and positively to behavioral engagement (see Fig. 1). Struggling students who were in classrooms characterized by high instructional quality, positive social/emotional climate, and less conflict with teachers, were observed as being more attentive during class and engaged in learning. However, behavioral engagement was not in turn related to academic achievement. Further, behavioral engagement did not mediate the association between classroom context and academic achievement. Turning to psychological engagement, classroom context was not related significantly to psychological engagement. Psychological engagement was significantly and positively related to academic achievement (see Fig. 1), such that adolescents who reported feeling like they belonged at their school and who tried hard in school, had higher academic achievement. Psychological engagement did not mediate the link between classroom context and academic achievement.

Discussion

Early adolescence is a time when many youth experience declines in academic achievement. School engagement has attracted growing attention as a way to promote academic competence and classroom context appears to play an important role (Fredricks et al. 2004; Patrick et al. 2007). This study contributed to the research on adolescent school engagement and academic achievement in at least three ways. First, we built upon previous research by exploring both antecedents and consequences of school engagement by testing whether school engagement mediated the link between classroom context (antecedent) and academic achievement (consequence). Second, we built upon

previous research by examining whether the links between classroom context, school engagement, and academic achievement operated in a similar way for a unique group of students, those with previous academic difficulties. Because students with previous academic difficulties are at an increased risk for problems with school engagement and subsequent achievement, we tested whether the mechanisms linking classroom context, school engagement, and academic achievement were similar for students with previous academic difficulties. Third, we contributed to the study of adolescent school engagement by using a multi-dimensional measure of school engagement and by incorporating both observational assessments and self-reported school engagement. Our measures of school engagement included affective, behavioral, and cognitive dimensions. We also used an observational assessment of behavioral engagement, in addition to self-reported psychological engagement, which assessed the affective and cognitive dimensions. This is an important improvement upon previous school engagement research that has relied on self-reports. The use of multiple methods reduces mono-reporter bias and inflated responses due to social desirability. In short, the present study advanced previous work on school engagement and academic achievement by including conceptual and methodological improvements that allowed for stronger tests of the antecedents and consequences of school engagement for all students, but especially at-risk students.

In general, findings from this study indicated that classroom context is an important predictor of school engagement. We focused on three aspects of classroom context: instructional quality, socioemotional climate of the classroom, and student–teacher relationship quality because these aspects have been found to be related to both school engagement and academic achievement (Fredricks et al. 2004; Hughes et al. 2008). Further, these aspects of the classroom environment seem to be particularly important for at-risk students (Downer et al. 2007; Hamre and Pianta 2005), although most of this research has focused on younger elementary school students (K–3rd grade). A strength of this

study was the inclusion of objective, observational assessments of classroom climate and instructional climate as well as teachers' reports of student–teacher relationship.

Consistent with previous research, we found that when students without previous achievement difficulties who were in classrooms characterized as high in instructional quality, and positive social/emotional climate, and student–teacher conflict was low, students demonstrated greater behavioral engagement (e.g., time on task, paying attention) and reported more psychological engagement (e.g., feelings of belonging, trying hard in school). These findings support the notion that classroom context is an important predictor of school engagement. When students feel they are in an environment that is enriching and supportive, they may be more likely to engage mentally and behaviorally in the learning environment. Further, this type of environment also might be more enjoyable, which may contribute to adolescents' desire to pay attention and engage in learning.

Previous research has demonstrated that low-achieving students are less psychologically and behaviorally engaged in school (Finn 1993; Roeser et al. 2000; Shernoff et al. 2003). However, our results showed that when students with previous achievement difficulties are in classrooms characterized as high in instructional quality, social-emotional quality, and low student–teacher conflict, they are more likely to be behaviorally engaged in classroom activities. This finding is consistent with previous research focused on academic outcomes (Downer et al. 2007; Hamre and Pianta 2005) and underscores the importance of classroom context for at-risk students. Struggling students who are in low quality classrooms may be less behaviorally engaged because the social context of the classroom does not fulfill their needs to feel supported and socially connected, but when struggling students' needs for support and social connection are met through high quality classrooms they may be more likely to be behaviorally engaged in school. Thus, high quality classroom contexts may serve as a protective factor. The finding that classroom context was related to struggling students' behavioral engagement also may reflect teachers' ability to set appropriate standards for behavior and have those standards met by students. Children who feel a sense of belonging and social support are more likely to internalize the goals and values of their teachers, which may include active engagement and participation in school work (Connell 1990; Osterman 2000).

Interestingly, classroom context was not related to psychological engagement of students with previous achievement difficulties. It may be that for students with previous achievement difficulties, high quality classroom contexts are not sufficient to increase student's psychological engagement. Recent research also has highlighted the importance of classroom activity structure on

achievement motivation and engagement (Kelly and Turner 2009). Classroom activities that emphasize whole-class methods of instruction may foster social comparisons and low-achieving students may become disengaged in an effort to avoid negative evaluations. Future research should also consider the role of instructional method (whole-class vs. small group) as an aspect of classroom context when exploring connections between classroom context, school engagement, and academic achievement of at-risk students. In addition, this finding points to the need for early intervention as achievement difficulties in elementary school may have lasting effects on students' affective and cognitive engagement. Although interventions typically may target behavioral aspects of engagement such as time on task and attendance, school psychologists may be well-positioned to not only identify at-risk students but also provide services that may bolster feelings of belongingness and competence which tap affective and cognitive engagement.

Findings from the present study support previous research indicating that school engagement is an important predictor of academic achievement. For students without previous achievement difficulties, both psychological engagement (which encompassed affective and cognitive components of engagement) and behavioral engagement were significantly related to academic achievement. This is consistent with research by Wang and Holcombe (2010), who found that affective, behavioral, and cognitive dimensions of school engagement were significant predictors of adolescents' GPA. Importantly, our results showed that among students without previous achievement difficulties, school engagement mediates the link between classroom context and academic achievement. These findings support the assertion that enhancing classroom context with high quality instruction, positive social/emotional climate, and reducing student–teacher conflict can increase students' engagement which, in turn, enhances academic achievement. Thus, in order to reduce or prevent disengagement, schools might focus on enhancing overall classroom climate and quality to promote school engagement and academic achievement.

Our findings also showed that, among students with previous achievement difficulties, psychological engagement was related significantly to academic achievement, but behavioral engagement was not related to academic achievement. Behavioral and psychological school engagement did not mediate the link between classroom context and academic achievement for students with previous achievement difficulties. Much of the recent work on school engagement has not considered whether antecedents and consequences of school engagement operate in a similar manner for students with previous achievement difficulties (Ladd and Dinella 2009; Patrick et al. 2007;

Wang and Holcombe 2010). As such, these findings make a new contribution to the school engagement literature and suggest that different mechanisms may be important for at-risk students. Although our findings indicate that enhancing classroom context via instructional quality, positive social/emotional classroom climate, and positive relationships with teachers can foster student engagement and academic achievement, we cannot assume that this will work for all groups of students. For students with previous achievement difficulties, other factors may be more important in enhancing engagement, such as method of instruction. It also may be that there are other behavioral aspects of engagement that are important, but which we were not able to study. For example, our measure of behavioral engagement focused on engagement in the classroom, such as time on task and paying attention. Other measures of behavior engagement include non-classroom behaviors, such as completing homework.

Although our findings contribute to the literature on school engagement, our study is not without limitations. The existing literature led us to frame our research to study the antecedents and consequences of school engagement, but our design does not allow for such causal inferences. Additional longitudinal research also is needed to examine the potential long-term effects of classroom context and school engagement on academic achievement. Given previous work documenting declines in adolescents' academic achievement and motivation through adolescence (Dotterer et al. 2009), a direction for future research is to examine whether declines in school engagement and academic achievement can be prevented by enhancing classroom context. Our study was focused on classroom context as an antecedent of school engagement; however, other antecedents also may be important such as, peers and family relationships. Peers and family are also important environments in youth's lives and contribute to developmental outcomes via proximal processes (Bronfenbrenner and Morris 1998). Future research should incorporate these contexts in the study of adolescent school engagement and academic achievement because they may make differential contributions to engagement, which would help clarify the complex relationship between engagement and achievement.

Despite these limitations, this study makes an important contribution to the study of adolescent school engagement, by including both antecedents and consequences of school engagement and exploring how these associations vary for at-risk students. We found that psychological and behavioral school engagement mediated the link between classroom context and academic achievement for students without previous achievement difficulties. For students with previous achievement difficulties, classroom context was related to behavioral engagement, but not psychological engagement. Interventions for at-risk students should not

only address behaviors such as paying attention and time on task, but should also try to address psychological engagement by incorporating strategies to improve feelings of belonging/support and competence, which are important for academic achievement. As students' sense of relatedness and student–teacher relationship quality tend to decrease following the transition to middle school (Furrer and Skinner 2003; Lynch and Cicchetti 1997), it will be especially important to monitor these factors for at-risk students who may have more achievement problems.

References

- Alexander, K. L., Entwisle, D. R., & Horsey, C. S. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education*, 70, 87–107.
- Arbuckle, J. L. (1996). Full information estimation in the presence of incomplete data. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: Issues and techniques* (pp. 243–277). Mahwah, NJ: Erlbaum.
- Baker, J. A. (2006). Contributions of teacher–child relationships to positive adjustment during elementary school. *Journal of School Psychology*, 44, 211–229. doi:10.1016/j.jsp.2006.02.002.
- Barrington, B. L., & Hendricks, B. (1989). Differentiating characteristics of high school graduates, dropouts, and nongraduates. *Journal of Educational Research*, 82, 309–319.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606. doi:10.1037/0033-2909.88.3.588.
- Birch, S. H., & Ladd, G. W. (1997). The teacher–child relationship and the children's early school adjustment. *Journal of School Psychology*, 35, 61–79. doi:10.1016/S0022-4405(96)00029-5.
- Bond, L., Butler, H., Thomas, L., Carlin, J., Glover, S., Bowes, G., et al. (2007). Social and school connectedness in early secondary school as predictors of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health*, 40, 357.e9–357.e18. doi:10.1016/j.jadohealth.2006.10.013.
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Denton (Series Ed.), & R. M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol. 1: Theoretical models of human development* (5th ed., pp. 993–1028). New York: Wiley.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Beverly Hills, CA: Sage.
- Connell, J. P. (1990). Context, self, and action: A motivational analysis of self-system processes across the life span. In D. Cicchetti & M. Beeghly (Eds.), *The self in transition: Infancy to childhood* (pp. 61–97). Chicago: University of Chicago Press.
- Connell, J. P., Spencer, M. B., & Aber, J. L. (1994). Educational risk and resilience in African American youth: Context, self, action, and outcomes in school. *Child Development*, 65, 493–506. doi:10.2307/1131398.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Decker, D. M., Dona, D. P., & Christenson, S. L. (2007). Behaviorally at-risk African American students: The importance of student–teacher relationships for student outcomes. *Journal of School Psychology*, 45, 83–109. doi:10.1016/j.jsp.2006.09.004.
- Dotterer, A. M., McHale, S. M., & Crouter, A. C. (2009). The development and correlates of academic interests from

- childhood through adolescence. *Journal of Educational Psychology*, 101, 509–519.
- Downer, J. T., Rimm-Kaufman, S. E., & Pianta, R. C. (2007). How do classroom conditions and children's risk for school problems contribute to children's behavioral engagement in learning? *School Psychology Review*, 36, 413–432.
- Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology: Vol. 3: Social, Emotional, and personality development* (5th ed., pp. 1017–1095). Hoboken, NJ: Wiley.
- Finn, J. D. (1993). Parental engagement that makes a difference. *Educational Leadership*, 55(8), 20–24.
- Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, 82, 221–234. doi:10.1037/0021-9010.82.2.221.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74, 59–109. doi:10.3102/00346543074001059.
- Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, 95, 148–162. doi:10.1037/0022-0663.95.1.148.
- Greene, B. A., Miller, R. B., Crowson, H. M., Duke, B. L., & Akey, K. L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology*, 29, 462–482. doi:10.1016/j.cedpsych.2004.01.006.
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development*, 72, 625–638. doi:10.1111/1467-8624.00301.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development*, 76, 949–967. doi:10.1111/j.1467-8624.2005.00889.x.
- Hughes, J. N., Luo, W., Kwok, O., & Loyd, L. K. (2008). Teacher–student support, effortful engagement, and achievement: A 3-year longitudinal study. *Journal of Educational Psychology*, 100, 1–14. doi:10.1037/0022-0663.100.1.1.
- Jimerson, S. R., Campos, E., & Greif, J. L. (2003). Toward an understanding of definitions and measures of school engagement and related terms. *The California School Psychologist*, 8, 7–27.
- Johnson, M. K., Crosnoe, R., & Elder, G. H. (2001). Students' attachment and engagement: The role of race and ethnicity. *Sociology of Education*, 74, 318–340.
- Jordan, W. J. (2000). Black high school students' participation in school-sponsored sports activities: Effects on school engagement and achievement. *Journal of Negro Education*, 68, 54–71. doi:10.2307/2668209.
- Kelly, S., & Turner, J. (2009). Rethinking the effects of classroom activity structure on the engagement of low-achieving students. *Teachers College Record*, 111, 1665–1692.
- Ladd, G. W., & Burgess, K. B. (2001). Do relational risks and protective factors moderate the linkages between childhood aggression and early psychological and school adjustment? *Child Development*, 72, 1579–1601. doi:10.1111/1467-8624.00366.
- Ladd, G. W., & Dinella, L. M. (2009). Continuity and change in early school engagement: Predictive of children's achievement trajectories from first to eighth grade? *Journal of Educational Psychology*, 101, 190–206. doi:10.1037/a0013153.
- Lynch, M., & Cicchetti, D. (1997). Children's relationships with adults and peers: An examination of elementary and junior high school students. *Journal of School Psychology*, 35, 81–99. doi:10.1016/S0022-4405(96)00031-3.
- MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods*, 7, 83–104. doi:10.1037/1082-989X.7.1.83.
- Manlove, J. (1998). The influence of high school dropout and school disengagement on the risk of school-age pregnancy. *Journal of Research on Adolescence*, 82, 187–220. doi:10.1207/s15327795jra0802_2.
- Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal*, 37, 153–184. doi:10.2307/1163475.
- NICHD Early Child Care Research Network. (2002). The relation of global first-grade classroom environment to structural classroom features and teacher and student behaviors. *The Elementary School Journal*, 102, 367–387. doi:10.1086/499709.
- NICHD Early Child Care Research Network. (2005). A day in third grade: A large-scale study of classroom quality and teacher and student behavior. *The Elementary School Journal*, 105, 305–323. doi:10.1086/428746.
- NICHD Early Child Care Research Network. (2006). Infant–mother attachment classification: Risk and protection in relation to changing maternal caregiving quality over time. *Developmental Psychology*, 42, 38–58. doi:10.1037/0012-1649.42.1.38.
- Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, 70, 323–367. doi:10.3102/00346543070003323.
- Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology*, 99, 83–98. doi:10.1037/0022-0663.99.1.83.
- Pianta, R. C., La Paro, K. M., Payne, C., Cox, M. J., & Bradley, R. (2002). The relation of kindergarten classroom environment to teacher, family, and school characteristics and child outcomes. *The Elementary School Journal*, 102, 225–238. doi:10.1086/499701.
- Pianta, R. C., Steinberg, M. S., & Rollins, K. B. (1995). The first two years of school: Teacher–child relationships and deflections in children's classroom adjustment. *Development and Psychology*, 7, 295–312. doi:10.1017/S0954579400006519.
- Rimm-Kaufman, S. E., Early, D. M., Cox, M. J., Saluja, G., Pianta, R. C., Bradley, R. C., et al. (2002). Early behavioral attributions and teachers' sensitivity as predictors of component behavior in the kindergarten classroom. *Journal of Applied Developmental Psychology*, 23, 451–470. doi:10.1016/S0193-3973(02)00128-4.
- Roeser, R. W., Eccles, J. S., & Sameroff, A. J. (2000). School as a context of early adolescents' academic and social-emotional development: A summary of research findings. *The Elementary School Journal*, 100, 443–471. doi:10.1086/499650.
- Ryan, A. M., & Patrick, H. (2001). The classroom social environment and changes in adolescents' motivation and engagement during middle school. *American Educational Research Journal*, 38, 437–460. doi:10.3102/00028312038002437.
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7, 147–177.
- Shermoff, D. J., Csikszentmihalyi, M., Schneider, B., & Shermoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly*, 18, 158–176. doi:10.1521/scpq.18.2.158.21860.
- Shermoff, D. J., & Schmidt, J. A. (2008). Further evidence of an engagement–achievement paradox among US high school students. *Journal of Youth and Adolescence*, 37, 564–580. doi:10.1007/s10964-007-9241-z.
- Stipek, D., & Miles, S. (2008). Effects of aggression on achievement: Does conflict with the teacher make it worse? *Child Development*, 79, 1721–1735. doi:10.1111/j.1467-8624.2008.01221.

- Voelkl, K. E. (1997). Identification with school. *American Journal of Education*, 105, 294–318. doi:[10.1086/444158](https://doi.org/10.1086/444158).
- Wang, M., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal*, 47, 633–662. doi:[10.3102/0002831209361209](https://doi.org/10.3102/0002831209361209).
- Wentzel, K. R. (1997). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology*, 89, 411–419. doi:[10.1037/0022-0663.89.3.411](https://doi.org/10.1037/0022-0663.89.3.411).
- Woodcock, R. W., & Johnson, M. B. (1989). *Woodcock-Johnson psycho-educational battery—revised*. Itasca, IL: Riverside.

received her Ph.D. in Human Development and Family Studies from The Pennsylvania State University. Her major research interests include the development of and changes in school engagement and academic achievement among ethnic minority and low income youth from childhood through adolescence with an emphasis on parenting and family-school linkages.

Katie Lowe is a Ph.D. student in the Department of Child Development and Family Studies at Purdue University. She earned a B.A. and Masters Degree in Psychology from the University of West Florida in Pensacola, Florida. Her research interests include academic achievement, academic engagement, parenting, and adolescence.

Author Biographies

Aryn M. Dotterer is an assistant professor in the Department of Child Development and Family Studies at Purdue University. She

Copyright of Journal of Youth & Adolescence is the property of Springer Science & Business Media B.V. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.