Dimensions of Children's Motivation for Reading and Their Relations to Reading Activity and Reading Achievement

Linda Baker and Allan Wigfield

Much of the research on children's reading has focused on cognitive aspects such as word recognition and comprehension. Major syntheses published in the 1980s and 1990s devoted considerable attention to cognitive processes in reading (Barr, Kamil, Mosenthal, & Pearson, 1991; Pearson, Barr, Kamil, & Mosenthal, 1984; Ruddell, Ruddell, & Singer, 1994). Yet because reading is an effortful activity that children often can choose to do or not to do, it also requires motivation. In reading literature, much of the work relevant to readers' motivation has been framed in terms of attitudes toward reading. Reading attitudes typically are defined as readers' affect toward reading (Alexander & Filler, 1976; Mathewson, 1994; McKenna, Kear, & Ellsworth, 1995). The motivational consequences of reading attitudes are that children with more positive attitudes are more motivated to read. A substantial body of work also exists on reading interest, defined as either a characteristic of the person or of the text (Renninger, Hidi, & Krapp, 1992; Schiefele, 1996). Interest relates to text comprehension and other important reading outcomes.

Our approach to reading motivation differs from that of researchers studying reading attitudes or reading interest. The approach is grounded in two theoretical positions, the engagement perspective and achievement motivation theory. The engagement perspective on reading integrates cognitive, motivational, and social aspects of reading (Baker, Afflerbach, & Reinking, 1996; Guthrie & Alvermann, 1999; Guthrie, McGough, Bennett, & Rice, 1996; Oldfather & Wigfield, 1996). As Baker et al. (1996) put it, "the engagement perspective views

readers as motivated, strategic, knowledgeable, and socially interactive" (p. xv). Engaged readers are motivated to read for different purposes, utilize knowledge gained from previous experience to generate new understandings, and participate in meaningful social interactions around reading.

In conceptualizing reading motivation, we adapted constructs defined and developed by researchers in the achievement motivation field. Currently, many motivation theorists propose that individuals' competence and efficacy beliefs, intrinsic and extrinsic motivation, and purposes for achievement play a crucial role in their decisions about which activities to do, how long to do them, and how much effort to put into them (Bandura, 1997; Eccles, Wigfield, & Schiefele, 1998; Pintrich & Schunk, 1996; Wigfield, Eccles, & Rodriguez, 1998). Motivated readers thus will engage more in reading (Guthrie, Van Meter, et al., 1996; Oldfather & Wigfield, 1996) and will have positive attitudes toward reading (Athey, 1982; Greaney & Hegarty, 1987; Mathewson, 1994; McKenna et al., 1995).

Drawing on this work, Wigfield and Guthrie (1997) conceptualized 11 different dimensions of reading motivation, and Wigfield (1997) created a theoretical taxonomy consisting of three categories (see the Appendix for a listing of the categories, dimensions, and sample items). One category of dimensions is based on the competence and efficacy belief constructs. This category includes *self-efficacy*, the belief that one can be successful at reading, and *challenge*, the willingness to take on difficult reading material. When individuals believe they are successful at an activity they are more likely to engage in it (Bandura, 1997; Schunk & Zimmerman, 1997). A third dimension in this category is *work avoidance*, or the desire to avoid reading activities. When students lack a sense of efficacy, they likely wish to avoid challenging reading activities.

The second category concerns the purposes children have for reading. The particular dimensions in this category comprise several constructs from the motivation field, including intrinsic and extrinsic motivation, achievement goal orientations, and achievement values. Intrinsic motivation refers to being motivated, curious, and interested in an activity for its own sake, rather than for extrinsic reasons such as working for a reward or grade (Deci & Ryan, 1985). A learning goal orientation means the individual is focused on mastery and improvement, rather than outperforming others (Ames, 1992; Nicholls, Cheung, Lauer, & Patashnick, 1989). *Curiosity* is defined as the desire to read about a particular topic of interest to the child, and so is closely related to the literature on reading interest mentioned earlier (e.g., Renninger et al., 1992). *Involvement* is the enjoyment experienced from reading certain kinds of literary or informational texts; this construct is grounded in Schallert and Reed's (1997) reading involvement notion, as well as conceptions of intrinsic motivation. *Importance* of reading is a dimension taken from Wigfield and Eccles' (1992) work on subjective task values.

Three dimensions in this category reflect the constructs of extrinsic motivation and performance goal orientation. A performance goal orientation means working primarily to perform well in the eyes of others (Ames, 1992; Nicholls et al., 1989). The dimensions capturing these constructs include *recognition*, the pleasure in receiving a tangible form of recognition for success in reading, reading for *grades*, the desire to be favorably evaluated by the teacher, and *competition*, the desire to outperform others in reading. These different dimensions of motivation reflect the fact that children do much of their reading in school, where their reading performance is evaluated and compared to others' performance. Thus, recognition, grades, and competition may figure prominently in their motivation for reading.

The third category addresses social purposes of reading, based on the engagement perspective's premise that reading is inherently a social activity (Baker et al., 1996; Guthrie, McGough, et al., 1996) and that social aspects of classrooms have an important impact on student achievement (Wentzel, 1996). One aspect is *social* reasons for reading, or the process of constructing and sharing the meanings gained from reading with friends and family. The second aspect is *compliance*, or reading to meet the expectations of others.

Wigfield and Guthrie (1997) developed a questionnaire called the Motivation for Reading Questionnaire (MRQ) to assess these 11 dimensions, and they administered it to 100 fourth- and fifth-grade students. Exploratory factor analyses of the individual item sets, item-total correlations, and reliability analyses showed that eight of the proposed dimensions could be clearly identified and had good internal consistency reliabilities. These eight dimensions were self-efficacy, challenge, work avoidance, curiosity, involvement, recognition, competition, and social. Importance, compliance, and grades did not emerge empirically as distinct dimensions. Twenty-eight of the original items were dropped to improve the psychometric properties of the 11-scale instrument, resulting in a revised MRQ of 54 items.

Instruments for assessing related constructs have recently been developed by other researchers. Gambrell, Palmer, Codling, and Mazzoni (1996) developed the Motivation to Read Profile, for use with elementary school students. This 20-item instrument taps two dimensions of reading motivation, children's perceptions of their reading competence (called self-concept as a reader by Gambrell et al.), and value of reading, which contains items measuring how much children like to read. These dimensions are similar to the self-efficacy, curiosity, and involvement dimensions of reading motivation defined by Wigfield and Guthrie (1997).

Chapman and Tunmer (1995) developed a reading self-concept questionnaire containing items assessing three dimensions of reading self-concept: perceptions of competence at reading, perceptions of reading difficulty, and attitudes or feelings toward reading. These dimensions are somewhat akin to the self-

efficacy, challenge, and curiosity dimensions conceptualized by Wigfield and Guthrie (1997), although Chapman and Tunmer did not use the term *motivation* in conceptualizing their measure.

McKenna et al. (1995) developed a 20-item scale to measure reading attitudes, with items assessing how much children like to read in school and for recreation. This scale thus is related conceptually to Gambrell et al.'s (1996) value of reading subscale, and to the curiosity and involvement dimensions defined by Wigfield and Guthrie (1997).

In comparison to these other measures, the MRQ assesses a wider variety of possible dimensions of reading motivation and thus is more comprehensive than the other measures. As discussed earlier, its theoretical grounding is different than that of the other measures. However, the different dimensions of reading motivation that Wigfield and Guthrie (1997) identified need substantiation through further research. The small sample size in that study limited the psychometric validation of the MRQ because the sets of items for each proposed dimension had to be analyzed separately.

A major goal of the present study was to assess more systematically the proposed dimensions of reading motivation with a larger sample using confirmatory factor analyses (CFA). This procedure allows the researcher to test directly proposed models of the structure of relations obtained in a set of variables. The failure to find empirical support for three of the proposed dimensions in the Wigfield and Guthrie (1997) study may have been an artifact of the limited sample size; it was predicted that all 11 dimensions would be clearly identifiable in the present study.

In addition to assessing dimensions of reading motivation, Wigfield and Guthrie (1997) examined how the dimensions related to children's reading activity. They assessed children's reading amount and breadth using the Reading Activities Inventory (Guthrie, McGough, & Wigfield, 1994), a measure that asks children to list titles of different kinds of books they recently read and to indicate how often they read different kinds of books. They also measured reading frequency in a school-based program that encouraged children to read books. The dimensions of reading motivation that related most strongly to reading activity were social, self-efficacy, curiosity, involvement, recognition, grades, and importance. Thus, both intrinsic and extrinsic reasons for reading related to children's reading activity, although, overall, the intrinsic reasons for reading related more strongly than did the extrinsic reasons.

A second goal of the present study was to extend this research on the relations of reading motivation to reading behavior by examining links with reading achievement as well as reading amount. We expected to replicate the motivation-activity links reported by Wigfield and Guthrie (1997). With the theoretically grounded MRQ, we have the opportunity to determine whether some dimensions of motivation are more strongly implicated in reading achievement than others.

Three measures of reading performance were collected, as was a measure of reading activity. Relations with reading motivation were examined correlationally, for the full sample as well as for subgroups based on gender and ethnicity. The subgroup analyses were conducted because of evidence that the relations between reading motivation and reading achievement are not consistent across cultural groups (Graham, 1994; Stevenson, Chen, & Uttal, 1990).

A third goal of this study was to examine whether students' motivation on the different dimensions varied with gender, grade, ethnicity, and family income. We examined gender differences because previous researchers have found that girls often have stronger competence beliefs in reading than do boys, and they value it more (e.g., Eccles, Wigfield, Harold, & Blumenfeld, 1993; Marsh, 1989; Wigfield et al., 1997). Wigfield and Guthrie (1997) also found gender differences favoring girls on these two dimensions of reading motivation (Self-efficacy and Importance) as well as in social reasons for reading. Boys had higher mean scores on the Competition dimension. Researchers studying the related issue of attitude toward reading consistently report that girls hold more positive views than boys (Greaney & Hegarty, 1987; Kush & Watkins, 1996; McKenna et al., 1995). Accordingly, we expected to find that girls would be more positive than boys on at least some dimensions of reading motivation.

We examined grade differences because previous work suggests children's motivation becomes less positive as they go through elementary school (see Eccles et al., 1998; Wigfield et al., 1998, for reviews). Wigfield and Guthrie (1997) found statistically significant grade differences between fourth and fifth graders favoring fourth graders on three motivation scales (Self-efficacy, Recognition, and Social) in their fall questionnaire administration of the MRQ, but no grade differences at the spring administration. Because the present sample consisted of fifth and sixth graders, we had the opportunity to test whether there are age differences in motivation in students who are slightly older. Results from the reading attitude literature converge in showing age-related declines in students' attitudes about reading (Chapman & Tunmer, 1995; Kush & Watkins, 1996; McKenna et al., 1995).

We examined ethnicity and family income differences in reading motivation because research on motivation in children from different ethnic and income groups still is limited (Graham, 1994; Oakes, 1990). The popular public view that the historically poor achievement of minority students is related to low levels of motivation has not been empirically supported. In fact, studies have shown that African American children express more positive views about reading and their reading competence than white children (e.g., McKenna et al., 1995; Stevenson et al., 1990). Further, Graham criticized the frequent confounding of ethnicity and socioeconomic status that makes it difficult to determine which factor might be implicated in any observed differences. Because the sample in this study included urban African American and white children from different

socioeconomic backgrounds, we were able to look at how both of these factors related to children's reading motivation. The study thus fills an important gap in our knowledge about reading motivation in children from diverse backgrounds.

The final goal in this study of the multifaceted nature of reading motivation was to examine whether there were different groups of students who had distinctively different motivational profiles and whether these profiles were differentially related to reading activity and reading achievement. We used cluster analysis to address this issue, a statistical technique that classifies individuals into groups based on their similarity on a set of variables. We did not have strong expectations for what groupings would emerge, given the large number of motivation dimensions on the MRQ. However, we expected that there would be groups of individuals with high motivation on a number of the variables and groups of individuals with low motivation or lack of motivation on several of the dimensions. Of particular theoretical interest was whether there would be groups defined by higher motivation on some of the dimensions and lower motivation on others. One such group could be high in intrinsic motivation for reading but low in extrinsic motivation, for example. Evidence for such profiles and of their differential relations with reading activity and achievement would clearly demonstrate the importance of recognizing motivation as a multidimensional construct.

Method

Participants

Participants in the study were fifth- and sixth-grade students attending six elementary schools in a large mid-Atlantic U.S. city. One of the schools was in the inner city, with almost 100% of the students of African American descent and qualifying for free or reduced-price lunch. The remaining five schools were located within a mile or two of the inner city and served students of varying income levels and ethnicities. The six schools had agreed to participate in an evaluation of a reading curriculum that emphasizes interpretive responding to literature. The schools were selected for inclusion in the 3-year longitudinal project because they were all in the process of converting from a K–5 model to a K–8 model. The data reported in this article were collected as baseline assessments in the fall of the first year, prior to implementation of the curriculum in the treatment classes. The regular reading program varied from school to school, but most teachers used a combination of basal and literature-based approaches.

Because it is advisable to use complete data for confirmatory factor analysis (Joreskog & Sorbom, 1989), students who did not respond to all MRQ items were excluded from consideration in this report. This exclusionary criterion resulted in a sample size of 371, down from 576. The main reason the number

dropped was that time limits had to be imposed for completion of the MRQ within the allotted class period. We examined frequencies of students completing each item, which indicated there was a gradual drop-off in the completion rate.

One school experienced staffing problems that led to its withdrawal from the program evaluation, so reading achievement measures were not obtained from the 55 students attending this school. In addition, some students from the other schools were absent for one or more assessments. Thus, for analyses involving reading achievement, the sample size ranged from 270 to 277, depending on the assessment in question. This strategy of using different sample sizes for different analyses was selected over listwise deletion; if only those students who had completed all tasks were included in the analyses, the sample size would have been reduced to 230.

The primary sample of 371 students comprised 192 girls (52%) and 178 boys (48%); there were 140 fifth graders (38%) and 230 sixth graders (62%) (one student did not provide the requested grade and gender information on the MRQ cover sheet). Information about ethnicity and income level (indexed by lunch ticket status) was provided by the city school administration, but it was not available for 75 students, including the 55 attending the school that withdrew from the program evaluation. This particular school overall has a low minority enrollment and a low percentage of students receiving free or reduced-price lunch. For the remainder of the sample, 52% of the children were white (153), 46% were African American (136), and 2% were other ethnicities (6); 54% of the children received free or reduced-price lunch (161) and 46% paid in full for their lunch (135).

Measures

The Motivation for Reading Questionnaire. This 54-item questionnaire is designed to assess the 11 different aspects of reading motivation described earlier. The items and the motivational dimension each measures are presented in the Appendix. Children answered each item on a 1 to 4 scale, with 1 = very different from me, 2 = a little different from me, 3 = a little like me, and 4 = a lot like me.

Reading Activity. Two questions assessing self-reported reading activity were included at the end of the MRQ. These questions were adapted from the Reading Activity Inventory developed by Guthrie et al. (1994). One asked if children had read a book for fun in the last week and, if so, to give the title or author. The second asked children to say how often they read a book for fun; this question was answered on a 1 to 4 scale, with 1 = almost never, 2 = about once a month, 3 = about once a week, and 4 = almost every day. Although it would have

been desirable to use the full Reading Activity Inventory, time limitations precluded its use.

The question asking if the child read a book for fun in the last week was initially scored 0 if no, 1 if yes, and 2 if a real title or author was provided. Because only 4% of the children received a score of 1, we decided to dichotomize the data to allow for parametric analyses. Thus, scores of 1 and 2 were recoded to 1. The mean score on this item was 0.62 ($SD = 0.49$, $N = 361$). The mean score on the question asking how frequently the child reads for fun was 2.78 ($SD = 0.95$, range $= 1–4$, $N = 355$). A correlation of .49 was found for responses to these two questions. A composite Reading Activity score was created by converting each separate score to a z-score and then summing the two scores ($M = .00$, $SD = 1.72$, range $= –3.17$ to 2.06, $N = 353$). This composite measure was used in all subsequent analyses.

Gates-MacGinitie Reading Test. The Level 5/6 version of the Gates-MacGinitie Reading Test, 3rd edition, was used as a standardized measure of reading achievement. The fifth graders completed Form K and the sixth graders the alternate Form L. The Vocabulary subtest is a 45-item multiple-choice test of children's reading vocabulary. The Comprehension subtest contains 14 narrative and expository passages and 48 multiple-choice questions about those passages. This test is a frequently used assessment instrument that has excellent reliability (Cooter, 1989). The test was scored using the key provided in the testing manual.

The mean score on the Vocabulary subtest of the Gates-MacGinitie was 21.48 ($SD = 9.51$, range $= 3–45$, $N = 292$). Based on the normative data, this raw score corresponds to a grade equivalent of 4.4. The mean score on the Comprehension subtest of the Gates-MacGinitie was 23.29 ($SD = 9.48$, range $= 0–47$, $N = 282$). The grade equivalent is 4.2. A correlation of .78 was found for responses to these two subtests. The scores on the two subtests were summed for a Total Gates-MacGinitie score ($M = 44.87$, $SD = 17.81$, range $= 10–91$, $N = 277$). The Total score grade equivalent is 4.3. It is clear from these data that a substantial proportion of the students in the study were reading below grade level. (The results section includes disaggregated means by gender, ethnicity, grade, and income level. See pp. 10–30.)

Performance Assessment. A performance measure of reading was developed specifically for the program evaluation in consultation with the publisher of the reading curriculum. This measure was designed to be sensitive to outcome goals of the curriculum, in recognition of the evidence that standardized multiple-choice tests are not particularly sensitive to classroom interventions (Paris, Wasik, & Turner, 1991). Two short stories appropriate for Grade 5 and two for Grade 6 were selected from children's literature anthologies, with the criterion

that they allow for multiple interpretations of character motives and events. Two types of open-ended questions were generated for each story, an interpretive question and an evaluative question. Interpretive questions were based on material in the story, but they had no right or wrong answers. Students could give several plausible answers based on information available in the story, but they were expected to provide evidence from the text in support of their answers. Evaluative questions required children to go beyond the information given in the story to draw conclusions or state their opinions. Once again there were no right or wrong answers, but students were expected to provide support. For example, for the short story, "Manka and the Judge," the interpretive question was, "If the judge admires Manka's wisdom, why does he tell her not to interfere with his cases?" The evaluative question was, "Should you test someone before choosing that person as a friend? Why or why not?"

A scoring rubric was developed for the performance assessments using the Maryland State Performance Assessment Program rubric as a model (Kapinus, Collier, & Kruglanski, 1994). The written responses to the evaluative and interpretive questions were scored holistically, using a 6-point scale for the interpretive questions and a 5-point scale for the evaluative questions. Because scoring of performance assessments is somewhat subjective, even with a good rubric (Pearson, 1994), two independent scorers coded all student responses and checked for agreement. Interrater reliability was good for this type of task (Garcia & Verville, 1994), .73 for the interpretive question and .76 for the evaluative question. Disagreements were resolved through discussion.

The mean score on the interpretive question was 1.52 ($SD = 0.84$, range = 0–4, $N = 272$). The mean score on the evaluative question was 1.32 ($SD = 0.86$, range = 0–4, $N = 272$). A correlation of .43 was found for responses to the two questions. Scores were summed for a Total Performance Assessment score ($M = 2.84$, $SD = 1.44$, range = 0–7, $N = 272$).

Comprehensive Test of Basic Skills. The city school system administers the Comprehensive Test of Basic Skills (CTBS) to all students under standardized testing procedures. The CTBS was administered in the spring prior to data collection, and raw scores were provided to us by the school system. We used the total reading score, a sum of the scores on the Vocabulary and Comprehension subtests, as an additional measure of reading achievement ($M = 55.52$, $SD = 17.04$, range = 13–90, $N = 270$). The CTBS taps skills comparable to those assessed on the Gates-MacGinitie, but the contexts of administration were quite different.

Procedure

All measures were administered in late September and early October. Intact classes were tested, usually during their regularly scheduled language arts period.

The measures were given over a 3-day period; the performance assessment was given on day one, the MRQ/reading activity measure and the Gates-MacGinitie Vocabulary test on day two, and the Gates-MacGinitie Reading Comprehension Test on day three. The measures were administered by project staff.

For experimental rigor it would have been desirable to counterbalance the order of administration, but pragmatic considerations precluded this. Because the performance assessment was the most critical measure from the standpoint of the program evaluation, it was administered first so it would be free from potential influences of other measures. The administration instructions for the Gates-MacGinitie Reading Test specify that the Vocabulary subtest be given prior to the Comprehension subtest, preferably on separate days. Because teachers did not want us to extend testing into four days, we decided to combine administration of the MRQ with the Vocabulary subtest on the second day. The decision to administer the MRQ first was based on the concern that students might respond differently if they had just completed a reading test.

For the performance assessment, children read one story and answered an interpretive and evaluative question about it. Because the larger evaluation project would involve posttesting, stories were counterbalanced, such that half of the children in each grade read one story and half read the other. Preliminary analyses revealed no differences in scores across the four stories. Children were given 45 minutes to read their assigned story and answer their two open-ended questions. The answer sheets allowed for a full-page response to each question. All children had had at least some previous experience with this challenging type of assessment because similar tasks are used in a statewide performance assessment program administered in Grades 3 and 5.

For the MRQ, children were told they were going to answer questions about their reading and that the questions had no right or wrong answers. They were given three practice items before beginning the actual questionnaire. Children were allowed to read the questions on their own; the project staff were available to answer questions the children had about wording of the items. The MRQ and reading activity questions took approximately 20 minutes for the children to complete.

For the Gates-MacGinitie Reading Test, the standardized instructions provided in the test manual were used to guide subtest administration. Students were given 20 minutes to work on the Vocabulary subtest and 35 minutes to complete the Comprehension subtest.

Results

The results are reported in three main sections. In the first section, we report the results of the confirmatory factor analyses of the Motivation for Reading Questionnaire. In the second section, we present data on the different dimensions

of children's motivation for reading, considering the relations among the dimensions, differences in reported levels of motivation as a function of gender, grade, ethnicity, and income level, and correlations of the dimension scores with reported reading activity and reading achievement. In the third section, we report cluster analyses of students based on the motivation scales. We characterize the motivation profiles of students falling within each of seven clusters and examine how reported reading activity and reading achievement differ as a function of cluster membership.

Confirmatory Factor Analyses of the Motivation for Reading Questionnaire

Overview of the Analytic Strategy. Because the proposed dimensions of reading motivation have a strong theoretical base as well as some empirical support from the Wigfield and Guthrie (1997) study, we used confirmatory factor analyses (CFA) to assess the dimensionality of children's reading motivation. Before doing the CFAs, two descriptive analyses were conducted on the items. First, tests for skewness and kurtosis were done to look at the distribution of the data. These analyses indicated that the univariate distributions of the items were satisfactory; skewness and kurtosis were not problems. We also used maximum likelihood estimation in running the CFAs; this estimation procedure gives reliable parameter estimates when univariate normality is present (Bollen, 1989). Because the items were normally distributed, all 54 items were retained in the confirmatory factor analyses.

Second, to see how the different items related to the dimension to which they were proposed to belong, item-total correlations of the item to a total scale score were computed for all 11 of the original scales. For all the scales except Compliance, each item showed moderately positive to highly positive correlations with the scale score. The lowest of these item-total correlations was .47 for one of the social items and the Social scale score, and the highest was .89 for one of the importance items and the Importance scale score. For Compliance, the first two items related to each other, and the next three items related to one another. Our inspection of the content of the items led us to retain the latter three items as the indicators of Compliance because all were more clearly focused on reading to meet the expectations of others.

We then ran CFAs on the MRQ using LISREL VII (Joreskog & Sorbom, 1989). CFA allows the researcher to test theoretically derived models for the structure of the relations in a set of variables. It provides statistical information about the models, including overall goodness of fit indices and modification indices that show where problems with the model are located (e.g., items that load on more than one factor).

CFA allows the researcher to specify exactly the factor model to be tested. In designing the models, we specified that the items would load on only one factor (the theoretical dimension they were designed to measure) and estimated all the factor loadings. The variances of the latent variables were set to one, and the relations among the latent variables and the measurement error variances for each variable were estimated.

Various goodness-of-fit indices are used in CFA to assess how well a given model fits the data; unfortunately, there still is not one generally accepted index (see Marsh, Balla, & McDonald, 1988). We report five frequently used indices. The first three are overall fit indices: chi-square, chi-square divided by degrees of freedom, and Joreskog and Sorbom's (1989) Goodness-of-Fit (GFI) index. Chi-square and chi-square divided by degrees of freedom give indications of overall model fit. Nonsignificant chi-squares mean the overall model fits well, and a chi-square to degree of freedom ratio less than 2.0 also indicates good model fit. However, Marsh et al. (1988) showed that as sample size increases, the chi-square value for the same model increases, making it more likely the model will be rejected. Samples such as the one in the present study are considered relatively large, and so it is likely the chi-square would be significant. Marsh et al. (1988) compared how different goodness-of-fit indices for the same model varied with different sample sizes. They concluded that the GFI was one of the least affected overall indices. A GFI of .90 or better indicates good fit.

The fourth and fifth indices are used to compare models to one another. The Tucker-Lewis index (TLI) (Tucker & Lewis, 1973) is used to compare the fit of a theoretically derived model to a *null* model positing no relations among the variables. We chose this particular kind of null model because we wanted to use the TLI. Marsh et al. (1988) showed that this index is less affected by sample size than are some other comparative indices. As with the GFI, values of .90 or better indicate good fit. Finally, we also examined the significance of the factor loadings.

Although the sample for this study was relatively large, it was not large enough to do confirmatory factor analyses on all 54 of the MRQ items at once (see Fornell, 1983). Because there was a theoretical rationale for grouping the motivation dimensions into different categories (Wigfield, 1997), we did three separate sets of CFAs. In one set of analyses we examined the structure of the Self-efficacy, Challenge, and Work Avoidance scales. We first tested the theoretically derived three-factor model against the null model positing no relations among the variables. We also compared the fit of the theoretically derived three-factor model against three alternative models. First was a one-factor model in which all the items were proposed to load on one factor. There also were two two-factor models. In one, the Self-efficacy and Avoidance items were combined, and the Challenge items formed a separate factor. In the other, the Challenge and Avoidance items were combined, and the Self-efficacy items

formed a separate factor. To compare these different factor models, we used chi-square difference tests (Long, 1983). In these tests a significant chi-square difference indicates that a given model fits better than the alternative model.

In the second set of analyses we used similar procedures to examine the structure of the six goals-related scales (Curiosity, Involvement, Importance, Grades, Recognition, and Competition). We first examined the fit of the theoretically derived six-factor model and tested it against a null model. We also compared its fit to three alternative models. The first was a one-factor model in which all the items were proposed to load on one factor. The second was a two-factor model in which the items assessing the intrinsic motivation/learning goals dimensions (Curiosity, Involvement, and Importance) were grouped together, and the items assessing the extrinsic motivation/performance goals dimensions were grouped together (Recognition, Grades, and Competition). The third was a four-factor model in which Curiosity and Involvement were grouped, Grades and Recognition were grouped, and Importance and Competition were proposed as individual factors.

In the third set of analyses we examined the structure of the social scales (Social and Compliance). We tested the fit of the theoretically derived two-factor model against a null model. We also compared it to a one-factor model in which all the items were proposed to load on one factor.

Tests of the Models. Table 1 presents the goodness-of-fit indices (GFIs) for the null, one-, two-, and three-factor models for the *Self efficacy–Challenge–Avoidance* items. The null model fit very poorly, and all the other models had better fit indices. The one- and two-factor models fit the data reasonably well using the criterion of a GFI of .90, although the TLI indices were relatively low for these models. The theoretically derived three-factor model had a GFI and TLI above .90. Further, the chi-square difference tests showed that this model fit statistically significantly better than the one- and two-factor models. Therefore, it is the preferred model for these items. The standardized factor loadings for this model are presented in Table 2. All factor loadings were statistically significant beyond the .001 level.

Initial analyses of the set of items in the *Goals* models showed that two of the items written to be part of the Competition scale (items 18 and 22) loaded on several other scales as well; therefore, these items were dropped from the subsequent analyses. The GFIs for the various models of the relations among the 27 remaining goals items are presented in Table 1. The null model fit very poorly, and the one- and two-factor models fit much better than did the null model. However, overall, the one- and two-factor models did not fit the data very well; their GFIs were .80 and .81, respectively, and the TLIs were lower. The four-factor model fit the data much better than either the one- or two-factor models. The theoretically derived six-factor model showed a statistically significant

TABLE 1
Goodness–of–Fit Indices for the Factor Models

	df	χ^2	χ^2/df	GFI[a]	TLI[b]
Self-efficacy - Challenge - Avoidance models					
Null model	78	892.60	11.44	.61	
One factor	65	244.51	3.76	.90	.73
Two factor A	64	220.88	3.45	.91	.77
Two factor B	64	230.37	3.61	.90	.75
Three factor	62	114.04	1.83	.96	.92
Goal models					
Null model	351	3135.22	8.93	.37	
One factor	324	1088.16	3.36	.80	.70
Two factor	323	1034.15	3.20	.81	.72
Four factor	318	672.36	2.11	.88	.86
Six factor	309	612.10	1.98	.89	.88
Social – Compliance models					
Null model	45	797.37	17.71	.56	
One factor	35	120.07	3.43	.93	.85
Two factor	34	45.75	1.34	.98	.97

[a]GFI = Joreskog and Sorbom's Goodness-of-Fit Index. [b]TLI = Tucker - Lewis Index

TABLE 2

Standardized Factor Loadings for the Motivation Scales

<u>Self-efficacy – Challenge – Avoidance scales</u>

	Self-efficacy	Challenge	Avoidance
Item 3	.52		
Item 9	.43		
Item 15	.61		
Item 50	.56		
Item 2		.60	
Item 7		.68	
Item 26		.47	
Item 44		.60	
Item 48		.57	
Item 23			.54
Item 27			.58
Item 28			.84
Item 52			.39

Goals-related scales

	Curiosity	Involvement	Importance	Recognition	Grades	Competition
Item 5	.48					
Item 8	.50					
Item 13	.52					
Item 16	.59					
Item 35	.41					
Item 45	.56					

TABLE 2 (continued)
Standardized Factor Loadings for the Motivation Scales

Goals-related scales

	Curiosity	Involvement	Importance	Recognition	Grades	Competition
Item 10		.39				
Item 24		.47				
Item 30		.69				
Item 33		.32				
Item 41		.64				
Item 46		.56				
Item 53			.78			
Item 54			.65			
Item 14				.14		
Item 17				.46		
Item 29				.71		
Item 31				.55		
Item 36				.63		
Item 19					.50	
Item 37					.47	
Item 39					.56	
Item 40					.49	
Item 12						.44
Item 43						.80
Item 49						.84
Item 51						.78

(continued)

TABLE 2 (continued)
Standardized Factor Loadings for the Motivation Scales

Social – Compliance scales

	Social	Compliance
Item 1	.35	
Item 11	.46	
Item 20	.70	
Item 21	.69	
Item 34	.79	
Item 38	.70	
Item 42	.76	
Item 25		.48
Item 32		.62
Item 47		.66

Note. Loadings are standardized loadings from the maximum likelihood solution.

improvement in fit over the alternative four-factor model. It also fit the data the best in an absolute sense, as indicated by the chi-square/*df* and the GFI and TLI indices, both of which approached .90. Therefore, this is the preferred model for this set of items. Table 2 presents the standardized factor loadings for this model. All factor loadings were statistically significant beyond the .001 level.

The GFIs for the null, one-, and two-factor *Social–Compliance* models for these items are presented in Table 1. As before, the null model fit very poorly, and the one-factor model fit better than the null model. The chi-square difference tests showed that the two-factor model fit statistically significantly better than the one-factor model and also fit the best overall. Therefore, it is the preferred model for these items. Table 2 presents the standardized factor loadings for this model. All factor loadings were statistically significant beyond the .001 level.

Dimensions of Children's Motivation for Reading

Scale Development and Description. Based on the results of the CFAs, we created scale scores for each of the dimensions of reading motivation by summing the scores on each item on the scale and then computing the mean. We also computed internal consistency reliabilities for the scales, shown in Table 3. Reliabilities greater than .70 indicate reasonably good internal consistency. Five of the scales had internal consistency reliabilities greater than .70, and five had reliabilities closely approaching .70. The Work Avoidance scale was the only one with questionable reliability.

Table 3 shows that the mean scores on each of the dimensions of reading motivation were generally above the midpoint of 2.5, indicating that students characterized themselves as motivated with respect to most of these dimensions. Nevertheless, it appeared that some dimensions were stronger than others, an observation confirmed by conducting paired *t* tests. All means were statistically significantly different from one another, with the exception of Importance and Compliance, Recognition and Curiosity, and Self-efficacy and Challenge. All but three of the 52 statistically significant differences in pairs of means had *p* values of .001; the remaining three had *p* values less than .05. Dimensions with the highest mean scores fell into the goals for reading category; it is noteworthy that both intrinsic and extrinsic goals were strongly endorsed (e.g., Importance and Grades). Social and Work Avoidance had the lowest scores. Thus, relative to the other motivation scales, children did not seem to be as motivated to read for social reasons, and more positively, they did not express a desire to avoid work in reading.

Correlations among these scales are presented in Table 4. In general, the correlations are positive and in the moderate range, with all of the positive correlations statistically significant at the .01 level or better. The Work Avoidance scale related negatively to all of the other scales except Competition, although only

TABLE 3
Reliabilities and Means and Standard Deviations for the Motivation Scales

Scale	Number of items	Alpha	M	SD
Self-efficacy	4	.66	3.09	0.65
Challenge	5	.72	3.08	0.66
Work avoidance	4	.55	2.43	0.76
Curiosity	6	.69	3.20	0.61
Involvement	6	.66	3.14	0.62
Importance	2	.76	3.40	0.79
Recognition	5	.74	3.25	0.66
Grades	4	.68	3.58	0.59
Competition	4	.72	2.93	0.83
Social	7	.75	2.62	0.71
Compliance	3	.68	3.37	0.67

five of these correlations were statistically significant. The negative relations were expected given the content of the Work Avoidance items. The intercorrelations are consistent with the theoretical groupings of the scales tested in the CFAs, but they do not rule out other possible groupings.

Children's Reading Motivation in Relation to Gender and Grade Level. A series of 2 (gender) x 2 (grade) analyses of variance were used to assess gender and grade differences in children's reading motivation. The full sample of students was included in this analysis, minus the one student for whom gender and grade information was not available ($N = 370$). The 11 motivation scales served as dependent variables in separate analyses.

The analyses revealed statistically significant gender differences for all of the scales except Competition and Work Avoidance. The means, standard deviations, and F values are presented in Table 5. On all scales for which there were statistically significant differences, girls had higher mean scores than did boys. Note that the Table does not reflect a correction for inflation of the Type I error rate from multiple tests; a conservative alpha level of .005, created by dividing the number of tests by .05, would yield statistically significant differences on all but one of these same dimensions (i.e., Importance).

The analyses revealed two reliable main effects of grade level, on the Social scale, $F (1, 366) = 8.88$, $p = .003$, and on the Recognition scale, $F (1, 366) = 4.47$, $p = .035$. Fifth graders had higher mean scores than sixth graders on the Social scale ($M = 2.68$, $SD = 0.68$ vs. $M = 2.49$, $SD = .75$) and on the Recognition scale ($M = 3.33$, $SD = 0.58$ vs. $M = 3.20$, $SD = 0.72$). The interaction of grade by gender was not statistically reliable in any of the analyses.

TABLE 4
Intercorrelations of the Motivation Scales

	1	2	3	4	5	6	7	8	9	10
Self-efficacy	1.0									
Challenge	.54	1.0								
Work avoidance	-.09	-.17	1.0							
Curiosity	.47	.62	-.09	1.0						
Involvement	.46	.65	-.09	.57	1.0					
Importance	.48	.43	-.03	.42	.35	1.0				
Recognition	.58	.51	-.04	.54	.51	.53	1.0			
Grades	.52	.49	-.01	.51	.47	.57	.61	1.0		
Competition	.38	.25	.19	.18	.27	.31	.33	.31	1.0	
Social	.48	.49	-.07	.55	.58	.37	.58	.47	.15	1.0
Compliance	.32	.43	-.01	.44	.41	.56	.53	.58	.29	.32

Note. Correlations with absolute values of .15 and above are statistically significant at the .01 level or better. Correlations with absolute values of .09 are statistically significant at the .05 level.

TABLE 5
Gender Differences in Children's Reading Motivation

Motivation scale	Girls		Boys		
	M	SD	M	SD	F
Self-efficacy	3.22	0.58	2.95	0.71	15.39***
Challenge	3.20	0.65	2.96	0.71	10.94***
Work avoidance	2.34	0.78	2.45	0.76	1.85
Curiosity	3.30	0.55	3.11	0.68	9.80**
Involvement	3.22	0.59	3.03	0.65	10.41***
Importance	3.50	0.74	3.28	0.88	5.06*
Recognition	3.37	0.59	3.11	0.73	16.14***
Grades	3.59	0.50	3.37	0.69	12.09***
Competition	2.87	0.84	3.01	0.81	2.87
Social	2.80	0.67	2.31	0.71	49.79***
Compliance	3.51	0.59	3.21	0.78	15.47***

Note. Degrees of freedom are 1 and 366. Girls' $n = 192$, boys' $n = 178$.
*$p < .05$ **$p < .01$ ***$p < .001$

Children's Reading Motivation in Relation to Ethnicity and Income Level.
A series of four-way analyses of variance including the factors of gender, grade,
ethnicity, and family income level (free or reduced-price lunch status) were used
to examine ethnicity and income differences in children's reading motivation.
Information about ethnicity and lunch ticket status was not available for
75 children. Children from ethnic groups other than African American or white
were excluded because there were only 6 such children. The sample size in these
analyses was thus 289. Gender and grade were included in the analyses only to see
if they interacted with the factors of interest, ethnicity, and family income level.
None of the interaction effects were statistically significant in the four-way analy-
ses. Because grade and gender effects were reported above for the larger sample,
we focus here on the main effects of ethnicity and family income level.

The analyses revealed statistically significant ethnicity differences on all
scales except Curiosity, Social, and Work Avoidance. Results of these analyses
are reported in Table 6. In every case, African American children had higher
mean scores than did white children. If the more stringent alpha level of .005 is
adopted, the differences would reach statistical significance on Self-efficacy,
Importance, Recognition, and Competition.

The analyses revealed one statistically significant main effect of family
income level, on Work Avoidance, $F(1, 273) = 5.70$, $p = .018$. Middle-income
students had higher mean scores on Work Avoidance than low-income students

TABLE 6
Ethnicity Differences in Children's Reading Motivation

Motivation scale	African American		White		F
	M	SD	M	SD	
Self-efficacy	3.32	0.58	2.97	0.64	15.38***
Challenge	3.25	0.61	3.00	0.67	6.14*
Work avoidance	2.44	0.84	2.41	0.72	2.15
Curiosity	3.32	0.57	3.17	0.58	3.02
Involvement	3.21	0.62	3.06	0.60	5.28*
Importance	3.64	0.65	3.28	0.81	14.56***
Recognition	3.46	0.58	3.16	0.67	10.87***
Grades	3.63	0.54	3.44	0.58	5.92*
Competition	3.14	0.79	2.87	0.81	9.86**
Social	2.65	0.77	2.48	0.69	2.42
Compliance	3.50	0.62	3.30	0.72	5.09*

Note. Degrees of freedom are 1 and 273. African American $n = 136$, white $n = 153$.
*$p < .05$ **$p < .01$ ***$p < .001$

($M = 2.49$, $SD = 0.73$ vs. $M = 2.35$, $SD = 0.81$). The interaction of ethnicity and family income level was not statistically reliable in any of the analyses.

Relations of Children's Reading Motivation to Reported Reading Activity. Correlations of children's reports of their reading activity with their motivation on the different dimensions are presented in Table 7. All of the correlations were statistically significant and positive, with the exception of Work Avoidance, which was negative as one would expect, but still statistically significant. The scales that related most strongly to reported reading activity, with values of .51, were Challenge and Involvement. Social, Curiosity, and Self-efficacy had values above .40.

We examined whether the patterns of correlations between reading motivation and reading activity differed as a function of gender or ethnicity. Because there were more African American students in the low-income group and more white students in the middle-income group, the effects of income were statistically controlled in this and subsequent subgroup analyses. The correlations were very similar when African American and white students were examined separately; on some scales the latter students had slightly higher correlations, and on other scales the former students did. Two substantive changes in results from the full sample were that the correlation for African American students on Competition was not statistically significant, nor was the correlation for white students on Work Avoidance.

22

TABLE 7
Correlations Between Motivation Scale Scores and Reading Activity

Self-efficacy	.43
Challenge	.51
Work avoidance	−.24
Curiosity	.43
Involvement	.51
Importance	.33
Recognition	.38
Grades	.35
Competition	.14
Social	.46
Compliance	.35

Note. N = 353. All correlations are significant at the .000 level except Competition, which is statistically significant at *p* = .007.

The subgroup analyses based on gender yielded consistently larger correlations for males than females (mean difference = .15), with the exception that Work Avoidance was larger for females (−.29 vs. −.17). Nevertheless, all but one of the correlations for females was statistically significant. The correlation of reading activity with Competition for females was only .02, whereas the correlation was .33 for males.

To examine the subgroup patterns further, a four-way analysis of variance was conducted to determine whether self-reported reading activity varied as a function of grade, gender, ethnicity, or family income. The analysis revealed that African American students reported statistically significantly greater reading activity (reported here as *z* scores) than white students, $F(1, 258) = 4.90$, $p = .028$ ($M = .36$, $SD = 1.68$ for African Americans and $M = -.36$, $SD = 1.63$ for whites), and females reported statistically significantly greater reading activity than males, $F(1, 258) = 6.67$, $p = .01$ ($M = .49$, $SD = 1.52$ for females, $M = -.54$, $SD = 1.77$ for males). A statistically significant grade by family-income-level interaction, $F(1, 258) = 4.94$, $p = .027$, is attributable to the fact that fifth graders had similar amounts of reading activity regardless of income level, but sixth-grade low-income students reported higher levels than middle-income students.

Relations of Children's Reading Motivation to Reading Achievement. Children's scores on the MRQ scales were correlated with their scores on the Gates-MacGinitie, the CTBS-Reading, and the performance assessment composites. The only motivation scale to correlate statistically significantly with the Gates-MacGinitie and the CTBS was Work Avoidance, r = −.26, r = −.24; respectively, *p*s = .000. However, four scales were statistically significantly correlated with the performance assessment: Work Avoidance, $r = -.13$, $p = .032$;

Compliance, $r = .21$, $p = .000$; Grades, $r = .14$, $p = .025$; and Recognition, $r = .14$, $p = .026$.

Subgroup correlational analyses were conducted to determine whether there were different patterns in the relation of motivation to achievement for students of different ethnicities and genders. Results on the Gates-MacGinitie for both sets of analyses did not yield patterns that differed substantially from the full sample. Work Avoidance was the only statistically significant correlate for African American students ($n = 109$) and white students ($n = 116$), $rs = -.38$, $p = .000$ and $-.25$, $p = .027$, respectively. Work Avoidance was also the only statistically significant correlate for girls ($n = 145$), $r = -.28$, $p = .001$. For boys ($n = 132$), Work Avoidance was statistically significant, $r = -.25$, $p = .004$, but in addition, the social dimension of reading motivation was negatively related to achievement, $r = -.19$, $p = .032$. Almost all other correlations had an absolute value less than .10.

The subgroup correlational analyses by ethnicity for the other two reading measures revealed substantial differences from the full-sample analyses. Table 8 presents the correlations between the MRQ scale scores and the CTBS-Reading and the performance assessment separately for African American and white students. Whereas only the correlation between the CTBS and Work Avoidance was statistically significant for the full sample, the subgroup analyses revealed three statistically significant correlations for the African American students and eight for the white students. Challenge and Involvement, as well as Work Avoidance, were related to achievement for both groups of students. In addition, Self-efficacy, Curiosity, Recognition, Grades, and Compliance were related to achievement for the white students only.

On the performance assessment, none of the dimensions of reading motivation correlated statistically significantly for the African American students. However, five dimensions were statistically significant correlates for the white students: Self-efficacy, Recognition, Competition, Compliance, and Work Avoidance. Of these, three (Recognition, Compliance, and Work Avoidance) also were statistically significant in the full-sample analysis.

The subgroup analyses by gender did not reveal a substantially different pattern from the full-sample analysis on the CTBS-Reading. Work Avoidance was the only statistically significant correlate for the boys, $r = -.21$, $p = .016$. For the girls, Involvement was a statistically significant correlate, $r = .21$, $p = .014$, as well as Work Avoidance, $r = -.28$, $p = .014$. The pattern of correlations on the performance assessment for girls was similar to that for the full sample, with statistically significant correlations for Recognition, $r = .20$, $p < .021$ and Compliance, $r = .28$, $p = .001$. However, the dimension of Involvement was also statistically significantly correlated with performance, $r = .17$, $p = .047$, whereas Work Avoidance was no longer statistically significant. For boys, on the other hand, none of the correlations were statistically reliable.

TABLE 8
Correlations Between Motivation Scale Scores and Reading Achievement for
Students of Different Ethnicities

Motivation scale	CTBS-Reading		Performance assessment	
	African American	White	African American	White
Self-efficacy	.01	.25**	−.05	.26**
Challenge	.22*	.20*	−.05	.11
Work avoidance	−.34***	−.25**	−.12	−.20*
Curiosity	.06	.23**	−.13	.04
Involvement	.20*	.21*	.04	.05
Importance	.07	.10	.11	.06
Recognition	.09	.23**	.04	.25**
Grades	.09	.25**	.15	.18
Competition	.02	.10	−.14	.25**
Social	−.03	.04	−.07	.06
Compliance	.06	.23**	.17	.25**

Note. N = 109 for the African American students, 116 for the white students.
*p < .05 **p < .01 ***p < .001

To examine the subgroup patterns further, four-way analyses of variance were conducted to determine whether students differed in their performance on the three achievement measures as a function of grade, gender, ethnicity, or family income. On the Gates-MacGinitie test, performance differences favored sixth graders, $F(1, 253) = 23.31$, $p = .001$, ($M = 39.53$, $SD = 16.08$, mean grade equivalent = 3.9 for fifth graders, $M = 48.13$, $SD = 18.08$, mean grade equivalent = 4.5 for sixth graders); white students, $F(1, 253) = 11.88$, $p = .001$ ($M = 38.88$, $SD = 15.64$, mean grade equivalent = 3.7 for African Americans, and $M = 50.15$, $SD = 18.17$, mean grade equivalent = 4.6 for whites); and middle-income students, $F(1, 253) = 4.43$, $p = .036$ ($M = 39.64$, $SD = 16.72$, mean grade equivalent = 3.9 for low-income students, and $M = 51.12$, $SD = 17.17$, mean grade equivalent = 4.7 for middle-income students). A statistically significant ethnicity by grade interaction qualified interpretation of the main effects, $F(1, 253) = 5.41$, $p = .021$, such that the ethnicity differences in fifth grade were smaller than they were in sixth grade. Males and females did not differ in performance on the Gates-MacGinitie Test.

On the CTBS-Reading, white students had higher scores than African American students, $F(1, 247) = 16.62$, $p = .000$ ($M = 61.74$, $SD = 15.61$ for white students, $M = 48.92$, $SD = 16.33$ for African American students). On the performance assessment, middle-income students had higher scores than low-income students, $F(1, 250) = 5.22$, $p = .023$ ($M = 2.58$, $SD = 1.44$ and $M = 3.16$,

$SD = 1.38$, respectively), and girls had higher scores than boys, $F (1, 250) = 10.67$, $p = .001$ ($M = 3.07$, $SD = 1.49$ and $M = 2.60$, $SD = 1.35$, respectively).

Cluster Analyses of Students Based on the Motivation Scales

Overview of the Analytic Strategy. The confirmatory factor analyses demonstrate quite clearly that there are many distinguishable dimensions of motivation for reading. Furthermore, the mean differences among the scales indicate that, overall, students are more motivated in some areas than in others. The next set of analyses examines whether there are individual differences among students in their motivational profiles. Cluster analysis is a statistical procedure that identifies groups of individuals who cluster together because they have similar values or scores on a set of variables, in this case the dimensions of reading motivation.

The K-Means Cluster Analysis procedure of SPSS 6.1 was selected rather than the hierarchical agglomerative procedure because it deals most effectively with large data files (Norusis, 1994). In this procedure, the algorithm to determine cluster membership is called nearest centroid sorting. Thus, a case is assigned to the cluster with the smallest Euclidean distances between the case and the centers of the cluster. Solutions were not calculated from seed points because we had no a priori assumptions about the number of clusters or their magnitude. Instead, we set the program to estimate the centers iteratively from the data, that is, from the scores for each student on each of the 11 motivation scales. Because all variables were measured on the same scale and the standard deviations were similar, standardization was not necessary (Milligan & Cooper, 1988).

In K-means cluster analysis, unlike hierarchical analysis, the user must specify the number of clusters to be created. We explored the solutions that were yielded in separate analyses that specified from 3 to 11 clusters. Cluster analysis is largely a heuristic process, with no fixed criteria for determining how many clusters are appropriate. However, numerous heuristic procedures or stopping rules have been proposed to help determine the correct number of clusters. Milligan and Cooper (1985) demonstrated wide variability in how well 30 such procedures recovered true cluster structure; all rules showed some error in specifying either too few or too many clusters. We adopted a procedure that performed well in their simulation (Davies & Bouldin, 1972, cited in Milligan & Cooper, 1985) that involves comparing the ratio of the mean within-cluster distance to the mean between-cluster distance for each solution. Within-cluster distance is the distance of a case from its cluster centroid. Between-cluster distance is the distance between cluster centroids. The minimum value across the solutions is taken to indicate the number of clusters in the data. This procedure is inversely related to that used by Wade, Trathen, and Schraw (1990) in their cluster analysis of study strategies and yields comparable results.

In our analyses, the lowest ratio was obtained for the 8-cluster solution, with the next lowest ratio for the 7-cluster solution. However, the number of cases in three of the clusters of the 8-cluster solution was too small to permit statistical analysis using cluster membership as a grouping variable. Therefore, we used an additional heuristic decision rule to give us large enough clusters to conduct the planned analyses of group differences in reading achievement and reading activity. Accordingly, the 7-cluster solution was selected.

Further validation of the 7-cluster solution was provided through analyses of variance, which revealed that the between-cluster variability on each motivation scale was greater than the within-cluster variability on each scale. This indicates that all 11 scales played a role in the separation into clusters. However, because clusters were specifically created to minimize within-cluster variability and to maximize between-cluster variability, this outcome should not be taken to mean that the null hypothesis of no differences between groups can be rejected, as in the conventional usage of analysis of variance (Milligan & Cooper, 1987).

Description of the Clusters. Table 9 presents the final cluster centers for each cluster on each motivation scale, as well as the number of students in each cluster. The cluster centers represent the average scale scores and can best be interpreted with respect to the means and standard deviations reported in Table 3.

TABLE 9
Final Cluster Centers (or Average Scores) on Each Motivation Scale

Motivation scale	Cluster						
	1	2	3	4	5	6	7
Reading efficacy	1.68	2.32	2.50	3.23	3.09	3.21	3.56
Challenge	1.63	2.29	3.19	3.21	2.84	3.19	3.57
Work avoidance	1.96	2.70	2.22	2.24	2.97	1.88	2.29
Curiosity	1.99	2.51	3.30	3.17	3.00	3.34	3.64
Involvement	1.93	2.52	3.10	3.14	2.93	3.12	3.61
Importance	1.54	2.43	3.41	2.20	3.51	3.93	3.85
Recognition	1.70	2.43	2.71	3.24	3.20	3.53	3.71
Grades	1.88	2.84	3.23	3.41	3.55	3.66	3.84
Competition	1.70	2.48	1.89	2.43	3.51	2.50	3.42
Social	1.23	1.80	2.43	2.86	2.21	2.53	3.18
Compliance	1.69	2.58	3.10	3.16	3.40	3.71	3.74
n	14	40	28	28	80	58	123

Note. Cluster 1 = Very Low Reading Motivation; Cluster 2 = Low Reading Motivation; Cluster 3 = Uncompetitive−Low Efficacy; Cluster 4 = Low Importance; Cluster 5 = Competitive and Work Avoidant; Cluster 6 = Low Competition−Work Avoidance, High Importance−Compliance; Cluster 7 = High Reading Motivation

For example, the center for Cluster 1 on Involvement was 1.93, more than two standard deviations below the overall mean of 3.14 on that scale. We next offer a narrative characterization of the profiles of the students falling within each cluster and descriptive labels for the clusters.

(a) *Cluster 1: Very Low Reading Motivation*: The 14 students in this cluster were extremely unmotivated across the board. They had scores approximately 2 standard deviations below the mean on all of the motivation scales except Work Avoidance, where the cluster center was about ½ standard deviation below the mean. Recall that the Work Avoidance scale was negatively correlated with most of the other scales; a higher score means that the student is more motivated to avoid an activity, whereas on other scales, a higher score means that the student is more positively disposed toward an idea or an activity. It is possible that these students simply adopted a response set to give every item a low rating.

(b) *Cluster 2: Low Reading Motivation*: The 40 students in this cluster were consistently low in reading motivation across dimensions, with cluster centers about 1 standard deviation below the mean on nine of the scales and ½ standard deviation below the mean on a tenth, Competition. They scored ½ standard deviation above the mean on Work Avoidance, as one would expect of students who are generally unmotivated. Their profile is less extreme than those in Cluster 1. The Work Avoidance data suggest students in this cluster may have been responding more reflectively than those in Cluster 1.

(c) *Cluster 3: Low Competition, Efficacy, and Recognition*: The 28 students in this cluster had scores near the mean on seven scales and below the mean on four. The score on Competition was particularly low, 1¼ standard deviations below the mean; Self-efficacy was 1 standard deviation below, Recognition was ¾ standard deviation below, and Compliance was ½ standard deviation below.

(d) *Cluster 4: Low Importance*: The 28 students in this cluster had scores near the mean on eight scales, but were about ¼ standard deviation above the mean on Social and ½ standard deviation below the mean on Competition. The exceptional characteristic of students in this cluster is that the score on Importance was 1½ standard deviations below the mean.

(e) *Cluster 5: Competitive and Work Avoidant*: The 80 students in this cluster had scores near the mean on eight scales. Their scores were about ¾ standard deviation above the mean on Competition and Work Avoidance and about ½ standard deviation below the mean on Challenge.

(f) *Cluster 6: Low Competition and Work Avoidance; High Importance and Compliance*: The 58 students in this cluster had scores near the mean on seven of the scales, but they were almost a mirror image of those in Cluster 5 with respect to Work Avoidance and Competition. That is, their scores were about ¾ standard deviation below the mean on Work Avoidance and ½ standard deviation

below the mean on Competition. They had scores about ½ standard deviation above the mean on Compliance and Importance.

(g) *Cluster 7: High Reading Motivation*: The 123 students in this, the largest, cluster can be characterized as highly motivated across all dimensions except Work Avoidance. Students in this cluster scored about ¾ standard deviation above the mean on five scales (Involvement, Challenge, Curiosity, Self-efficacy, and Social) and ½ standard deviation above the mean on five scales (Competition, Compliance, Grades, Recognition, and Importance). Their scores on Work Avoidance were about ½ standard deviation below the mean.

Cluster Membership in Relation to Reading Activity. We hypothesized that students showing different motivational profiles would differ in their out-of-school reading activity. A one-way analysis of variance with post hoc comparisons tested this possibility, with cluster membership as the between-subject independent variable and the reading activity score as the dependent variable. Differences among the groups were substantial, as indicated by the statistically significant main effect, $F (6,346) = 21.13$, $p = .000$.

The first column of Table 10 shows the mean reading activity scores (expressed in *z*-scores) and the standard deviations for students in each cluster. A Student Newman-Keuls test revealed which differences among groups were statistically significant at the $p < .05$ level. Students with very low or low motivation (Clusters 1 and 2) had statistically significantly lower activity scores than any of the other groups. The highly motivated students (Cluster 7) had statistically significantly higher activity scores than any of the other groups.

Students in Clusters 3 through 6 were in the middle range of reading activity scores, higher than 1 and 2 but lower than 7. The one statistically significant difference among these groups in reading activity was that Cluster 6 was more active than Cluster 5. Recall that Cluster 5 had the highest score of all clusters on Work Avoidance, whereas Cluster 6 had the lowest score of all clusters on this dimension. The analysis of variance of between-cluster to within-cluster variability revealed that the clusters did differ in Work Avoidance. Thus, it appears that Work Avoidance is an important differentiating motivational dimension in reading activity. Students in Cluster 6 also had higher scores in Compliance and Importance, comparable to the highly motivated students (Cluster 7), suggesting these may also be differentiating dimensions. Students in Cluster 5 had the next lowest scores in Challenge after the unmotivated students (Clusters 1 and 2) and as high a score in Competition as the highly motivated students (Cluster 7).

Cluster Membership in Relation to Reading Achievement. The second column of Table 10 shows the mean Gates-MacGinitie score for students in each cluster, the third column shows the mean CTBS-Reading scores, and the fourth

TABLE 10
**Mean Reading Activity and Reading Achievement Scores (With Standard
Deviations) as a Function of Cluster Membership**

Cluster	Activity		Gates-MacGinitie		CTBS-Reading		Performance Assessment	
	M	SD	M	SD	M	SD	M	SD
1	−2.20	(1.45)	45.12	(17.60)	49.83	(12.70)	2.11	(0.78)
2	−1.35	(1.75)	47.39	(16.81)	54.38	(17.77)	2.54	(1.50)
3	0.01	(1.62)	45.95	(18.10)	59.37	(20.71)	2.32	(1.20)
4	−0.07	(1.70)	47.28	(22.41)	53.56	(17.87)	2.94	(1.43)
5	−0.60	(1.63)	41.28	(17.18)	53.23	(15.71)	3.09	(1.40)
6	0.21	(1.46)	50.32	(16.10)	59.90	(16.29)	3.29	(1.20)
7	1.01	(1.21)	43.37	(18.05)	55.43	(17.23)	2.73	(1.57)

Note. The numbers of students in Clusters 1–7 on the reading activity measure are, respectively, 13, 38, 27, 27, 77, 56, and 115. The numbers in Clusters 1–7 on the Gates-MacGinitie are, respectively, 8, 28, 19, 18, 65, 44, and 95. The numbers in Clusters 1–7 on the CTBS-Reading are, respectively, 6, 29, 19, 18, 62, 41, and 95. The numbers in Clusters 1–7 on the performance assessment are, respectively, 9, 28, 19, 18, 56, 45, and 97. Because students in one school did not take the reading achievement tests, the numbers of students in each cluster are lower for achievement than activity.

column shows the mean performance assessment scores. Three analyses of variance were conducted with cluster membership as the independent variable and the three reading achievement measures as the dependent variables. Some of the differences among groups were fairly large, but the main effect of cluster membership on the Gates-MacGinitie was not statistically significant, $F(2, 270) = 1.41$, $p > .10$, nor was it statistically significant on the CTBS, $F(6, 273) < 1.0$. However, the main effect was statistically significant on the performance assessment measure, $F(6, 265) = 2.19$, $p = .044$, with post hoc comparisons revealing that Cluster 6 differed statistically significantly from Clusters 1, 2, 3, and 7. Thus, students in Cluster 6 scored higher on the performance assessment than students in both of the two low-motivation clusters (1 and 2) and students in the high-motivation cluster (7).

None of the other clusters differed statistically significantly from one another. Notice in Table 10 that students in Cluster 6 had the highest mean scores on the other two achievement measures as well, although these scores were not statistically significantly higher. The Cluster 6 profile of low Competition and Work Avoidance coupled with high Importance and Compliance again seems to be of particular consequence.

Discussion

To become lifelong literacy learners, children must be motivated to engage in literacy activities. It is not sufficient only to possess the cognitive skills necessary

for reading. This study provides important new information about the nature of children's reading motivation and how it relates to reading activity and reading achievement. We organize our discussion of the findings around the issues of the multidimensionality of reading motivation, relations of children's reading motivation to reading activity and achievement, and group differences in children's reading motivation.

The Multidimensionality of Reading Motivation

Wigfield and Guthrie (1997) reported data on the MRQ suggesting that there are different dimensions of reading motivation that can be measured reliably. However, their sample size was too limited to yield conclusive evidence. The confirmatory factor analyses in the present study provided stronger support for the proposed dimensions of reading motivation. The scales developed from the CFAs showed good internal consistency reliabilities, with the exception of the Work Avoidance scale. The low internal consistency reliability for the Work Avoidance scale may reflect the fact that the items tap several different aspects of reading, only some of which particular students might or might not like to avoid.

Indeed, there is converging evidence for the multidimensionality of children's reading motivation and sense of themselves as readers. Gambrell et al. (1996) distinguished two aspects of reading motivation, self-concept as a reader and value of reading. Chapman and Tunmer (1995) distinguished three aspects: perceptions of reading competence, perceptions of the difficulty of reading, and attitudes toward reading. McKenna et al.'s (1995) factor analysis of their reading attitudes survey showed that children had distinct attitudes for school-related and recreational reading. The results of these studies indicate that even children as young as 5 years of age have multifaceted senses of themselves as readers.

Another indication that reading motivation is multidimensional comes from the analysis of the mean scores on the different scales, which showed that children endorsed some dimensions of reading motivation more strongly than they did others. Both intrinsic (e.g., Importance) and extrinsic (e.g., Grades) dimensions were included among the most strongly-endorsed scales. The least endorsed dimensions were Social and Work Avoidance. Thus, most children do not seem to be highly motivated to read for social interaction, and most reportedly do not shy away from difficult reading activities. The patterning of means at the high and low extremes is virtually identical to that reported by Wigfield and Guthrie (1997).

The cluster analyses in this study provided further evidence for the multidimensionality of reading motivation; students could be placed into seven groups characterized by different motivational profiles. Thirty-three percent of the students fell into one cluster characterized by consistently high levels of motivation on all dimensions. Another 15% fell into two clusters characterized by

consistently low (or still lower) levels of motivation on all dimensions. These three clusters portray stark differences in children's reading motivation.

The remaining 52% of the students belonged to clusters in which the cluster centers on a number of the motivation scales were close to average, but their centers on the other motivation scales were either higher or lower than the overall mean scores on the scales. These mixed clusters can be conceptualized from the perspective of different motivation theories. Children in Cluster 3 had average scores on most of the scales but were relatively low on Competition, Self-efficacy, and Recognition. Bandura (1997) argued that individuals low in Self-efficacy will not seek challenging activities. Competing with others may be seen as challenging for children, and so perhaps because the children in this cluster did not believe they were successful in reading, they did not like to compete with other children in reading activities and did not seek recognition.

Children in Cluster 4 had quite low scores on Importance, meaning they did not value reading highly. Perhaps these children do not see much purpose in reading and so will begin to read less than other children as they continue through school. Individuals' valuing of activities has been shown to relate to their continued pursuit of them. When students see activities as important to them, they are more likely to continue doing them; if they do not see the importance of the activity they will not persist (Meece, Wigfield, & Eccles, 1990; Wigfield & Eccles, 1992).

Clusters 5 and 6 had contrasting patterns; Cluster 5 was higher on both Competition and Work Avoidance, whereas Cluster 6 was lower on both of these dimensions. Nicholls and his colleagues (e.g., Nicholls et al., 1989) have written that children who have ego-oriented goals, such as liking to compete with others, often will avoid competitions they do not think they can win. This may help explain why children who like to compete in reading also stated they avoid work in reading; perhaps they avoid work that is too difficult, which could make them look bad. The fact that children in Cluster 5 also had scores below the mean on Challenge lends weight to this interpretation.

Children in Cluster 6 showed a very different pattern; they do not like to compete but rarely avoid work in reading. Their goals for reading may be characterized more as mastery rather than ego goals, which is why they work hard at reading. This is further supported by the strong importance they attach to reading, and the extent to which they report complying with their teachers to get their reading done. Although these children did not score as highly on every motivation dimension as the children in Cluster 7, they reported reading almost as frequently. Thus, this pattern of motivation translates into active reading.

That there are clusters of children with different motivational characteristics has important implications for teachers. We highlight two implications. First, rather than thinking of children as either high or low in motivation, it is important to understand that many children have a mixture of motivational characteristics, some

of which may facilitate their engagement in reading and others that could lead them to disengage. Second, different groups of children in the classroom will respond differentially to various motivation strategies teachers use. For instance, children like those in Cluster 5 will respond positively to competitive reading activities, whereas those in Cluster 6 likely will not. Children like those in Cluster 3, who reported low reading self-efficacy, may benefit from teaching practices that increase their sense of reading efficacy. Teachers will need to work with children like those in Cluster 4 to increase the importance they attach to reading. Finally, children like those in Clusters 1 and 2, who reported little motivation for reading, pose the biggest challenges for teachers. Recognizing who these children are may be the most important first step in attempting to foster their reading motivation.

Relations of Children's Reading Motivation to Reading Activity and Achievement

All of the dimensions of reading motivation were statistically significantly correlated with children's reported reading activity. The dimensions most strongly related included Self-efficacy and Challenge, two intrinsic goal-related dimensions, Curiosity and Involvement, and social reasons for reading. Thus, children who believe they are capable of reading well and are intrinsically motivated to read report that they read more frequently. Work Avoidance related negatively to children's reading activity, as would be expected. The child who seeks to avoid reading-related work is not likely to seek outside reading opportunities. These correlations are remarkably similar to the correlations reported by Wigfield and Guthrie (1997), providing assurance that the 2-item measure of reading activity used here and the broader array of reading activity measures used in the previous study tapped similar constructs.

Children in the various clusters differed in their reports of how much they engaged in reading. The strongest differences in reported reading activity were between the clusters highest and lowest in all dimensions of motivation; children highest in motivation said they read the most, and children lowest in motivation said they read the least. Nevertheless, it is clear that some dimensions are more predictive of independent reading than others. The children in Cluster 6, who were low in Work Avoidance and Competition but high in Importance and Compliance, reported higher levels of reading activity than did children in Cluster 5, who were high in Work Avoidance and Competition but low in Challenge. These differences, coupled with the fact that Clusters 5 and 6 were relatively similar to one another and close to the overall mean in the other dimensions, suggest that there are individual differences in which aspects of motivation relate to reading activity.

Turning to the relations of motivation to reading achievement, we found that correlations were not as strong as those with reading activity. For the Gates-MacGinitie and CTBS, Work Avoidance was the only dimension that related. For

the performance assessment, Work Avoidance as well as Compliance, Grades, and Recognition related to students' scores. We did not anticipate that relations of motivation to achievement would be stronger on the performance assessment than on the two standardized tests. This may have occurred because the performance assessment requires higher levels of self-regulation and self-direction for completion, characteristics that Guthrie and Alao (1997) suggested relate more strongly to students' reading motivation than do comprehension test scores.

Work Avoidance may have related consistently to performance because it is the clearest indication of student disengagement; students who score high on these items care little for reading, and so it is not surprising that they perform less well than other students. Quite likely, these students' general propensity to avoid work carried over to the tasks administered in this study. As Paris et al. (1991) suggested, avoidance may be a tactic of students who are not achieving well. This would result in their having less exposure to print and fewer opportunities for growth in reading comprehension (Stanovich, West, Cunningham, Cipielewski, & Siddiqui, 1996).

Students in the various clusters also differed somewhat in their reading achievement. As in the correlational analyses, these differences were more subtle than those for reading activity and appear to reflect children's goals and values for reading. In particular, students who were less likely to avoid work in reading, were not particularly competitive in reading, and thought reading was important (i.e., students in Cluster 6) performed the best on the achievement measures in this study, although the advantage was statistically reliable for the performance assessment only. These results provide support to motivation theories emphasizing students' goals and values as crucial mediators of their performance on different activities (Ames, 1992; Nicholls et al., 1989; Wigfield & Eccles, 1992).

The relations between motivation and achievement that were statistically significant were frequently small in magnitude. The limited amount of variance accounted for may indicate limited practical significance. However, the results should not be taken to mean that motivation and achievement are not meaningfully related. It is important to bear in mind that the majority of the students in the present study were reading considerably below national grade-level norms. Although there was a great deal of variability among the students in the sample, the range was from several years below grade level to grade level. It may be that the relations between motivation and achievement are more variable for lower achieving students. Another possibility is that the relations differ depending on whether the measure of reading performance is classroom grades or reading achievement tests. As Helmke and van Aken (1995) argued, grades are communicated to the students and can be used for social comparison within the classroom, whereas standardized test scores may not be conveyed or understood. The children in this study attended schools in a district where standardized

reading test performance is well below national norms, yet many of these students earn grades of A or B that indicate to them and to their parents that they are making good progress. The objective information available to the students may in fact be fully consistent with their positive views of themselves as readers. An important direction for future research is to examine relations of the MRQ scales to other measures of reading achievement.

Several explanations are plausible for the weaker relations of motivation to achievement, as compared to motivation and reading activity. Motivation theorists propose that choice of activities and persistence at them indicate high motivation (Eccles et al., 1998). Reading for pleasure is a choice the individual makes from among other activities, whereas taking the reading tests was something the individual had to do. This difference in choice versus required activity could explain why children's reading motivation related more strongly to their reading activity. A second explanation is that the motivation and reading activity measures both were self-report measures, and so they may have shared more method variance. A third explanation follows from Carver and Leibert's (1995) evidence that students may read widely and frequently but if they read books that are below their instructional level, they may not show gains in achievement. Thus, even though the more motivated students in this study had higher levels of reading activity, the books they selected may not have posed sufficient challenge to promote reading growth.

The subgroup analyses revealed that the strength of the relations between motivation and achievement varied not only depending on the particular assessment instrument that was used but also with gender and ethnicity. It was the girls who were responsible for the statistically significant correlations of motivation with achievement on the performance assessment. None of the relations were significant for boys. For girls, Work Avoidance was not related to achievement, but Compliance, Recognition, and Grades were. In addition, the intrinsic goal of Involvement appeared as a statistically significant correlate for girls here as well as on the CTBS. Girls in the intermediate grades have been shown to be more extrinsically motivated than boys and more influenced by adult feedback (Boggiano, 1991), characteristics consistent with our data as well. Perhaps these motives contributed to girls being more compliant with the task demands that were set for them by the researchers who administered the performance assessment. Boys were perhaps less motivated to put forth the effort for a challenging task that was not going to have any impact on school grades, a suggestion further supported by their lower scores on this task.

The subanalyses for ethnicity revealed that on the performance assessment, none of the dimensions of reading motivation correlated statistically significantly for the African American students, but five dimensions were statistically significant correlates for the white students: Recognition, Compliance, Work Avoidance, Competition, and Self-efficacy. On the CTBS-Reading test, there

were three statistically significant correlations for the African American students and eight for the white students. Challenge and Involvement, as well as Work Avoidance, were related to achievement for both groups of students. In addition, Self-efficacy, Curiosity, Recognition, Grades, and Compliance were related to achievement for the white students only. These patterns are consistent with predictions of motivation theorists (Bandura, 1997; Deci & Ryan, 1985) in that the efficacy-based scales and the scales tapping intrinsic reasons for reading related to achievement. However, extrinsic reasons for reading also related to achievement, providing evidence that extrinsic goals are not necessarily counterproductive, at least as long as they co-exist with intrinsic goals (Gambrell & Marinak, 1997).

Why were scores on the CTBS-Reading related to motivation, especially for white students, whereas those on the Gates-MacGinitie were not? One plausible explanation is that students took the task demands more seriously. The CTBS was administered by the classroom teachers, and the students knew their scores would become part of their permanent records, with potentially important long-term consequences. In contrast, the Gates-MacGinitie was administered by the research assistants for this project. The students knew it did not count and so even the most highly motivated students may not have been inclined to put forth the effort to do well on the test.

The evidence that relations between motivation and achievement were stronger for white students than African American students is not new to this study. Stevenson et al. (1990) correlated several measures of fifth graders' reading-related beliefs with their reading comprehension scores and found that none of the correlations were statistically significant for African American children but they were statistically significant for the white children. Graham (1994) reported several comparable findings in her review of the literature on motivation in African Americans. Does this mean that African American students are less likely to receive or incorporate reliable and appropriate feedback about their performance in school, as suggested by Stevenson et al. (1990)? If achievement norms are low, perhaps children are led to overestimate their competencies. The inner-city school attended by more than half of the African American students in our sample is in fact one of the lowest achieving schools in the city, according to test scores published in the local newspaper. Clearly, more research is needed to help us better understand these complex ethnicity differences in motivation-achievement relations (see also Graham, 1994; Oakes, 1990) and the factors that do help explain the poorer performance of African American students. The results of this study can be interpreted as indicating that motivational differences are not a key factor. Differences in achievement expectations, background knowledge, and home support for reading are possible factors for further exploration (Baker, 1999; Baker, Scher, & Mackler, 1997).

Clearly, the connections between motivation and achievement are not simple and direct. Students in the consistently high motivation cluster did not exhibit the highest reading scores, nor did those in the consistently low clusters exhibit the lowest scores. The fact that the correlations between the motivation scales and the achievement measures differed with gender and ethnicity may provide a partial explanation for the lack of conclusive evidence that students' motivational profiles relate to their reading performance. In addition, the advantage of students in Cluster 6 on the performance assessment may be an important clue. Their motivational characteristics are likely important for putting forth the effort to read a short literature selection and respond to open-ended questions calling for critical reflection and many alternative correct answers. The task demands of the performance assessment are characteristic of the authentic reading and writing activities that are advocated by literacy educators and are becoming increasingly common in classrooms. It may be that such tasks are more closely related to students' motivational profiles than traditional multiple-choice assessments such as the CTBS and the Gates-MacGinitie.

Group Differences in Reading Motivation

Analyses of grade, gender, ethnicity, and family income differences in children's reading motivation revealed consistent differences related to gender and ethnicity but not to grade and family income. Grade differences were apparent in only two dimensions: Social and Recognition. The fifth graders were more motivated to read for social reasons and to earn recognition than were sixth graders. Interestingly, Wigfield and Guthrie (1997) also found grade differences in these two dimensions of reading motivation. It is not clear why these two dimensions were the ones on which grade differences appeared in these two studies. As children get older they apparently have fewer opportunities to interact with family and friends around reading, whether by choice or circumstance. Recognition for reading may be more important to younger children who rely more on external feedback about their performance, whereas older children recognize their own strengths and weaknesses (Eccles et al., 1998). Age-related declines in motivation may well have been more apparent had we been able to sample across a wider age range. Wigfield et al. (1997) found the largest declines in reading competence beliefs and interest in reading among students younger than those in the present study.

Girls expressed more positive views than did boys on all but two of the dimensions, Work Avoidance and Competition. These results provide compelling evidence of gender differences in children's reading motivation, stronger than in Wigfield and Guthrie (1997) where girls scored higher than boys in just three dimensions. The results are also consistent with other studies showing that girls have higher competence beliefs in reading compared to boys, value it more (e.g., Marsh, 1989; Wigfield et al., 1997), and have more positive attitudes

toward reading than boys (Kush & Watkins, 1996; McKenna et al., 1995). These gender differences may reflect the internalization of cultural expectations that girls will be more positive about reading than boys (Eisenberg, Martin, & Fabes, 1996; McKenna et al., 1995).

A strength of this study was that we had information on students' family income and ethnicity; these effects often have been confounded in previous research on motivation (Graham, 1994). We found no interaction of family income and ethnicity on children's reading motivation, and minimal evidence of income differences. The only income effect was for Work Avoidance, with middle-income children more motivated to avoid work than low-income children. Thus, it is clearly not the case that students who may lack material resources and opportunity because of low income are less motivated with respect to reading.

Ethnicity differences were evident, however. African American students reported more positive reading motivation than white students on all but the Curiosity, Work Avoidance, and Social dimensions. Our results are consistent with the limited empirical research on this issue. Stevenson et al. (1990) found that, relative to white students, African American fifth graders reported liking reading more, and when asked to compare themselves to others, they viewed their reading ability as being greater, they believed reading was easier for them, and they reported they worked harder. McKenna et al. (1995) reported that African American students in Grades 1–6 held more positive attitudes toward academic reading than white students, but not toward recreational reading. The African American students in our study did appear to be positively disposed toward recreational reading, however, as indicated not only by their higher scores on relevant motivation scales such as Involvement, but also by their higher levels of reported reading activity.

The possibility exists that African American students may have a general tendency to respond positively on self-report measures like the MRQ, a pattern observed in previous research (Graham, 1994). Graham discussed a variety of possible mechanisms to explain this pattern, including self-protective factors, social comparison processes, or social desirability. She noted, however, that the evidence for these mechanisms is weak. In the present study, the means on the various MRQ scales did differ from one another for the African American subsample, and the patterning was similar to that of the full sample. Clearly, then, these students were not simply giving the most positive rating to every item, but rather were responding reflectively, a conclusion also drawn by Stevenson et al. (1990). However, further research is needed to understand ethnicity differences in motivation.

Limitations

This study has a number of limitations that should be acknowledged. First is the sample. Although it was a relatively large and diverse sample, limiting inclusion

in the statistical analyses to those with complete data on the MRQ means that the sample may not be representative of the populations from which children were drawn. Because of the time constraints, students who worked more slowly did not complete the items at the end of the questionnaire. Students who skipped items may have been careless or did not take the task seriously. Therefore, care must be taken in generalizing the results.

Second, self-report measures have inherent limitations. A major concern is that social desirability might influence children's responses; perhaps participants complete the measures in such a way to make themselves look good or to please the survey administrators. Although this is a possibility with the MRQ and the reading activity questions, there are several aspects of the results that alleviate this concern. First is that the cluster analyses showed that there are quite different patterns in children's responses to the MRQ items, suggesting that with the possible exception of students in the High Motivation cluster (Cluster 7), most children did not rely exclusively on the high end of the answer scale. Second is that the means on the various motivation scales varied substantially, and third is that the self-report measures correlated with the more objective measures of reading performance. So although social desirability may have played a role, we are confident that many of the children responded to the measures openly and honestly (see Wigfield & Guthrie, 1997, for further discussion of this issue).

Another limitation of the study concerns the particular set of items that were included in the MRQ. We have argued strongly that the results of this study can be interpreted as indicating motivation is multifaceted. However, we do not mean to suggest that the motivation dimensions we have identified are the only ones. Questionnaires containing other kinds of items could potentially uncover other aspects of reading motivation. We believe it is important for researchers to extend the search for additional dimensions of reading motivation.

Similarly, our cluster analyses suggest seven different motivational profiles for students that can be interpreted in light of motivation theory. However, as noted, cluster analysis is a heuristic procedure, and there may well be alternative solutions. Attempts to replicate these motivation profiles in other samples are clearly warranted. Generalizability would provide important evidence of external validity (Milligan & Cooper, 1987).

In sum, the present study demonstrated conclusively that there are different dimensions of reading motivation and that these dimensions relate differentially to children's reported reading activity and performance on tests of reading achievement. It further demonstrated that students vary in their motivational profiles and that these profiles also relate to reading activity and achievement. The most important implication of these results is that they show we must think about children's reading motivation as multifaceted, rather than as a single thing. That is, children should not be characterized as either motivated or not motivated to

read. Instead, they are motivated to read for different reasons or purposes, and it is important to distinguish among them.

The Motivation for Reading Questionnaire promises to be a valuable tool in helping us understand individual differences among children in their reading motivation and how these might relate to home and school literacy experience. Our use of the MRQ with a very different sample than the one used by Wigfield and Guthrie (1997) provides a good indication that it is appropriate for students from diverse backgrounds and for students in a range of intermediate grades.

Authors' Note

References

Alexander, J.E., & Filler, R.C. (1976). *Attitudes and reading*. Newark, DE: International Reading Association.

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

Athey, I. (1982). Reading: The affective domain reconceptualized. In B.A. Hutson (Ed.), *Advances in reading/language research* (Vol. 1., pp. 203–218). Greenwich, CT: JAI Press.

Baker, L. (1999). Opportunities at home and in the community that foster reading engagement. In J.T. Guthrie & D. Alvermann (Eds.), *Engagement in reading: Processes, practices, and policy implications* (pp. 105–133). New York: Teachers College Press.

Baker, L., Afflerbach, P., & Reinking, D. (1996). Developing engaged readers in school and home communities: An overview. In L. Baker, P. Afflerbach, & D. Reinking (Ed.), *Developing engaged readers in school and home communities* (pp. xiii–xxvii). Mahwah, NJ: Erlbaum.

Baker, L., Scher, D., & Mackler, K. (1997). Home and family influences on motivations for literacy. *Educational Psychologist*, *32*, 69–82.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.

Barr, R., Kamil, M.L., Mosenthal, P., & Pearson, P.D. (Eds.). (1991). *Handbook of reading research* (Vol. 2). White Plains, NY: Longman.

Boggiano, A. (1991). Mastery motivation in boys and girls: The role of intrinsic versus extrinsic motivation. *Sex Roles: A Journal of Research*, *25*, 511–520.

Bollen, K.A. (1989). *Structural equations with latent variables*. New York: Wiley.

Carver, R.P., & Leibert, R.E. (1995). The effect of reading library books at different levels of difficulty upon gain in reading ability. *Reading Research Quarterly*, *30*, 26–48.

Chapman, J.W., & Tunmer, W.E. (1995). Development of young children's reading self-concepts: An examination of emerging subcomponents and their relationship with reading achievement. *Journal of Educational Psychology*, *87*, 154–167.

Cooter, R.B. (1989). Test review: Gates-MacGinitie Reading Tests, Third Edition, Levels 5/6, 7/9, and 10/12. *Journal of Reading*, *32*, 656–658.

Deci, E.L., & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Eccles, J.S., Wigfield, A., Harold, R.D., & Blumenfeld, P.B. (1993). Age and gender differences in children's self- and task perceptions during elementary school. *Child Development*, *64*, 830–847.

Eccles, J.S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In N. Eisenberg (Ed.), *Handbook of child*

psychology (Vol. IV, 5th ed., pp. 1017–1095). New York: John Wiley.

Eisenberg, N., Martin, C.L., & Fabes, R.A. (1996). Gender development and gender effects. In D. Berliner & R.C. Calfee (Eds.), *Handbook of educational psychology* (pp. 358–396). New York: Macmillan.

Fornell, C. (1983). Issues in the application of covariance structure analysis: A comment. *Journal of Consumer Research*, *9*, 443–448.

Gambrell, L.B., & Marinak, B.A. (1997). Incentives and intrinsic motivation to read. In J.T. Guthrie & A. Wigfield (Eds.), *Reading engagement: Motivating readers through integrated instruction* (pp. 205–217). Newark, DE: International Reading Association.

Gambrell, L.B., Palmer, B.M., Codling, R.M., & Mazzoni, S.A. (1996). Assessing motivation to read. *The Reading Teacher*, *49*, 2–19.

Garcia, M.W., & Verville, K. (1994). Redesigning teaching and learning: The Arizona Student Assessment Program. In S.W. Valencia, E.H. Hiebert, & P.P. Afflerbach (Eds.), *Authentic reading assessment: Practices and possibilities* (pp. 228–246). Newark, DE: International Reading Association.

Graham, S. (1994). Motivation in African Americans. *Review of Educational Research*, *64*, 55–118.

Greaney, V., & Hegarty, M. (1987). Correlates of leisure-time reading. *Journal of Research in Reading*, *10*, 3–20.

Guthrie, J.T., & Alao, S. (1997). Designing contexts to increase motivations for reading. *Educational Psychologist*, *32*, 95–105.

Guthrie, J.T., & Alvermann, D. (Eds.). (1999). *Engagement in reading: Processes, practices, and policy implications*. New York: Teachers College Press.

Guthrie, J.T., McGough, K., Bennett, L., & Rice, M.E. (1996). Concept-oriented reading instruction to develop motivational and cognitive aspects of reading. In L. Baker, P. Afflerbach, & D. Reinking (Ed.), *Developing engaged readers in school and home communities* (pp. 165–190). Mahwah, NJ: Erlbaum.

Guthrie, J.T., McGough, K., & Wigfield, A. (1994). *Measuring reading activity: An inventory* (Instructional Resource No. 4). Athens, GA: National Reading Research Center.

Guthrie, J.G., Van Meter, P., McCann, A., Wigfield, A., Bennett, L., Poundstone, C., Rice, M.E., Faibisch, F., Hunt, B., &

Mitchell, A. (1996). Growth in literacy engagement: Changes in motivations and strategies during concept-oriented reading instruction. *Reading Research Quarterly*, *31*, 306–333.

Helmke, A., & Van Aken, M.A.G. (1995). The causal ordering of academic achievement and self-concept of ability during elementary school: A longitudinal study. *Journal of Educational Psychology*, *87*, 624–637.

Joreskog, K.G.., & Sorbom, K. (1989). LISREL VII: *Analysis of linear structural relationships by maximum likelihood and least squares methods*. Chicago: National Educational Resources.

Kapinus, B.A., Collier, G.V., & Kruglanski, H. (1994). The Maryland School Performance Assessment Program: A new view of assessment. In S.W. Valencia, E.H. Hiebert, & P.P. Afflerbach (Eds.), *Authentic reading assessment: Practices and possibilities* (pp. 255–276). Newark, DE: International Reading Association.

Kush, J.C., & Watkins, M.W. (1996). Long-term stability of children's attitudes toward reading. *Journal of Educational Research*, *89*, 315–319.

Long, J.S. (1983). *Confirmatory factor analysis*. Beverly Hills, CA: Sage.

Marsh, H.W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of Educational Psychology*, *81*, 417–430.

Marsh, H.W., Balla, J.R., & McDonald, R.P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, *103*, 391–410.

Mathewson, G.C. (1994). Model of attitude influence upon reading and learning to read. In R.B. Ruddell, M.R. Ruddell, & H. Singer (Eds.), *Theoretical models and processes of reading* (4th ed., pp. 1131–1161). Newark, DE: International Reading Association.

McKenna, M.C., Kear, D.J., & Ellsworth, R.A. (1995). Children's attitudes toward reading: A national survey. *Reading Research Quarterly*, *30*, 934–955.

Meece, J.L., Wigfield, A., & Eccles, J.S. (1990). Predictors of math anxiety and its consequences for young adolescents' course enrollment intentions and performances in mathematics. *Journal of Educational Psychology*, *82*, 60–70.

Milligan, G.W., & Cooper, M.C. (1985). An examination of procedures for determining the

number of clusters in a data set. *Psychometrika*, *50*, 159–179.

Milligan, G.W., & Cooper, M.C. (1987). Methodology review: Clustering methods. *Applied Psychological Measurement*, *11*, 329–354.

Milligan, G.W., & Cooper, M.C. (1988). A study of standardization of variables in cluster analysis. *Journal of Classification*, *5*, 181–204.

Nicholls, J.G., Cheung, P., Lauer, J., & Patashnick, M. (1989). Individual differences in academic motivation: Perceived ability, goals, beliefs, and values. *Learning and Individual Differences*, *1*, 63–84.

Norusis, M.J. (1994). *SPSS professional statistics 6.1*. Chicago: SPSS.

Oakes, J. (1990). Opportunities, achievement, and choice: Women and minority students in science and mathematics. In C. Cazden (Ed.), *Review of research in education* (Vol. 16, pp. 153–222). Washington, DC: American Educational Research Association.

Oldfather, P., & Wigfield, A. (1996). Children's motivations to read. In L. Baker, P. Afflerbach, & D. Reinking (Eds.), *Developing engaged readers in school and home communities* (pp. 89–113). Mahwah, NJ: Erlbaum.

Paris, S.G., Wasik, B.A., & Turner, J.C. (1991). The development of strategic readers. In R. Barr, M.L. Kamil, P. Mosenthal, & P.D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 609–640). White Plains, NY: Longman.

Pearson, P.D. (1994). Commentary on California's new English-language arts assessment. In S.W. Valencia, E.H. Hiebert, & P.P. Afflerbach (Eds.), *Authentic reading assessment: Practices and possibilities* (pp. 218–227). Newark, DE: International Reading Association.

Pearson, P.D., Barr, R., Kamil, M., & Mosenthal, P. (Eds.). (1984). *Handbook of research in reading*. New York: Longman.

Pintrich, P.R., & Schunk, D.H. (1996). *Motivation in education: Theories, research, and application*. Engelwood Cliffs, NJ: Merrill/Prentice Hall.

Renninger, K.A., Hidi, S., & Krapp, A. (1992). *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum.

Ruddell, R.B., Ruddell, M.R., & Singer, H. (Eds.). (1994). *Theoretical models and processes of reading* (4th ed.). Newark, DE: International Reading Association.

Schallert, D.L., & Reed, J.H. (1997). The pull of the text and the process of involvement in reading. In J.T. Guthrie & A. Wigfield (Eds.), *Reading engagement: Motivating readers through integrated instruction* (pp. 68–85). Newark, DE: International Reading Association.

Schiefele, U. (1996). Topic interest, text representation, and quality of experience. *Contemporary Educational Psychology*, *21*, 3–18.

Schunk, D.H., & Zimmerman, B.J. (1997). Developing self-efficacious readers and writers: The role of social and self-regulatory processes. In J.T. Guthrie & A. Wigfield (Eds.), *Reading engagement: Motivating readers through integrated instruction* (pp. 34–50). Newark, DE: International Reading Association.

Stanovich, K.E., West, R.F., Cunningham, A.E., Cipielewski, J., & Siddiqui, S. (1996). The role of inadequate print exposure as a determinant of reading comprehension problems. In C. Cornoldi & J. Oakhill (Eds.), *Reading comprehension difficulties: Processes and interventions* (pp. 15–32). Mahwah, NJ: Erlbaum.

Stevenson, H.W., Chen, C., & Uttal, D.H. (1990). Beliefs and achievement: A study of black, white, and Hispanic children. *Child Development*, *61*, 508–523.

Tucker, L.R., & Lewis, C. (1973). The reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, *38*, 1–10.

Wade, S.E., Trathen, W., & Schraw, G. (1990). An analysis of spontaneous study strategies. *Reading Research Quarterly*, *25*, 147–166.

Wentzel, K.R. (1996). Social goals and social relationships as motivators of school adjustment. In J. Juvonen & K. Wentzel (Eds.), *Social motivation: Understanding school adjustment*. (pp. 226–247). New York: Cambridge University Press.

Wigfield, A. (1997). Children's motivation for reading and reading engagement. In J.T. Guthrie & A. Wigfield (Eds.), *Reading engagement: Motivating readers through integrated instruction* (pp. 14–33). Newark, DE: International Reading Association.

Wigfield, A., & Eccles, J.S. (1992). The development of achievement task values: A theoretical analysis. *Developmental Review*, *12*, 265–310.

Wigfield, A., Eccles, J.S., & Rodriguez, D. (1998). The development of children's motivation in school contexts. In P.D. Pearson & A. Iran-Nejad (Eds.), *Review of research in education* (Vol. 23, pp. 73–118). Washington, DC: American Educational Research Association.

Wigfield, A., Eccles, J.S., Yoon, K.S., Harold, R.D., Arbreton, A., Freedman-Doan, C., & Blumenfeld, P.B. (1997). Change in children's competence beliefs and subjective task values across the elementary school years: A three-year study. *Journal of Educational Psychology*, *89*, 451–469.

Wigfield, A., & Guthrie, J.T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology*, *89*, 420–432.

APPENDIX

Categories, Dimensions, and Items Included in the Motivation for Reading Questionnaire

_____

Competence and efficacy beliefs

Self-efficacy
  3. I know that I will do well in reading next year
  9. I am a good reader
15. I learn more from reading than most students in the class
50. In comparison to my other school subjects I am best at reading

Challenge
  2. I like hard, challenging books
  7. I like it when the questions in books make me think
26. I usually learn difficult things by reading
44. If the project is interesting, I can read difficult material
48. If a book is interesting I don't care how hard it is to read

Work avoidance
23. I don't like reading something when the words are too difficult
27. I don't like vocabulary questions
28. Complicated stories are no fun to read
52. I don't like it when there are too many people in the story

Goals for reading

Curiosity
  5. If the teacher discusses something interesting I might read more about it
  8. I read about my hobbies to learn more about them
13. I read to learn new information about topics that interest me
16. I like to read about new things
35. If I am reading about an interesting topic I sometimes lose track of time
45. I enjoy reading books about people in different countries

Involvement
10. I read stories about fantasy and make-believe
24. I make pictures in my mind when I read
30. I feel like I make friends with people in good books
33. I like mysteries
41. I enjoy a long, involved story or fiction book
46. I read a lot of adventure stories

Importance
53. It is very important to me to be a good reader
54. In comparison to other activities I do, it is very important to me to be a good reader

Recognition
14. My friends sometimes tell me I am a good reader
17. I like hearing the teacher say I read well
29. I am happy when someone recognizes my reading
31. My parents often tell me what a good job I am doing in reading
36. I like to get compliments for my reading

Grades
19. I look forward to finding out my reading grade
37. Grades are a good way to see how well you are doing in reading
39. I read to improve my grades
40. My parents ask me about my reading grade

Competition
12. I like being the only one who knows an answer in something we read
*18. I like being the best at reading
*22. It is important for me to see my name on a list of good readers
43. I try to get more answers right than my friends
49. I like to finish my reading before other students
51. I am willing to work hard to read better than my friends

Social purposes of reading

Social
1. I visit the library often with my family
11. I often read to my brother or my sister
20. I sometimes read to my parents
21. My friends and I like to trade things to read
34. I talk to my friends about what I am reading
38. I like to help my friends with their schoolwork in reading
42. I like to tell my family about what I am reading

Compliance
 *4. I do as little schoolwork as possible in reading
 *6. I read because I have to
 25. I always do my reading work exactly as the teacher wants it
 32. Finishing every reading assignment is very important to me
 47. I always try to finish my reading on time

Note. Numbers in front of the items indicate placement in the questionnaire.
Asterisks indicate the items were not used in scale construction for that construct.