Journal of Educational Psychology
2004, Vol. 96, No. 1, 110–118

0022-0663/04/$12.00 DOI: 10.1037/0022-0663.96.1.110

Reading Motivation: Multidimensional and Indeterminate

Marley W. Watkins and Debra Young Coffey
The Pennsylvania State University

The Motivations for Reading Questionnaire (MRQ) contains 54 items that are posited to tap 11 dimensions of reading motivation. The structural validity of the MRQ was investigated with 2 samples: (a) 328 students in Grades 3–5 from 2 suburban mid-Atlantic elementary schools and (b) 735 students in Grades 3–5 in 2 suburban southwestern elementary schools. With confirmatory factor analyses (CFAs), the theoretical 11-factor structure did not adequately fit the data in either sample. Subsequently, exploratory factor analyses found 8 factors for each sample with 6 factors defined by only 3 or 4 common items. However, a double CFA cross-validation found an inadequate fit for both samples. Given these results, the authors suggest that the MRQ be revised.

Literacy research has traditionally focused on cognitive aspects of reading, such as word recognition and comprehension (Adams, 1990), and much has been learned about the development and teaching of reading skills (Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001; Snow, Burns, & Griffin, 1998). However, in order for students to develop into effective readers, they must possess both the skill and the will to read (Paris & Oka, 1986). As noted by Guthrie and Wigfield (2000), "motivation is what activates behavior" (p. 406). Consequently, even the most able or skillful students may not engage in reading if they lack motivation.

Research on academic motivation burgeoned once the affective aspects of reading were recognized as important correlates of skill development (Guthrie & Wigfield, 1997). Theorists posited a variety of constructs to explain reading motivation and how it influences students' reading engagement (Wigfield, Eccles, & Rodriguez, 1998), and teachers became interested in learning how to motivate children to read (Palmer, Codling, & Gambrell, 1994). Concomitantly, attention focused on the development of assessment tools to measure reading motivation. Although self-esteem and attitude scales have a long history, Gambrell, Palmer, Codling, and Mazzoni (1996) developed one of the first measures aimed at understanding how children acquire motivation to read and how this motivation is affected by personal and situational factors. Their Motivation to Read Profile (MRP) was designed to assess three different dimensions of reading motivation: self-concept as a reader, value of reading, and reasons for reading (Palmer et al., 1994). However, no research involving the MRP has been published empirically confirming these proposed constructs.

Another multidimensional reading motivation scale was developed by Wigfield and Guthrie (1995). The initial Motivations for Reading Questionnaire (MRQ) included 82 items that were thought to measure 11 different dimensions of reading motivation. On the basis of scale reliabilities and item characteristics among a small sample of elementary school students, 28 items were eliminated (Wigfield & Guthrie, 1995). Thus, the final version of the MRQ contained 54 items that were posited to tap 11 dimensions of reading motivation (see Table 1).

This 54-item version of the MRQ was subsequently used by Wigfield, Wilde, Baker, Fernandez-Fein, and Scher (1996) with 650 fifth- and sixth-grade students from six schools in a large mid-Atlantic city. Exploratory factor analysis was applied to MRQ scores, with Kaiser's (1960) criterion and Cattell's (1966) scree test used to determine how many factors to retain for rotation. A cut-off coefficient of .40 was used to determine whether an item loaded on a particular factor. However, the researchers failed to specify other important decisions taken during the factor analysis, such as the method of extraction used and whether and how the solution was rotated. The MRQ proved multidimensional; however, only six dimensions were reported to be distinct and reliable. Unfortunately, the items that comprised those dimensions were not identified. Nevertheless, Wigfield, Wilde, et al. (1996) concluded that the six factor-based scales of the MRQ "are in a sense more meaningful [than the 11 theoretical dimensions] because these scales reflect children's responses to the questionnaire, rather than our conceptualization of the different dimensions" and recommended "using the factor-based scales from the MRQ" (p. 20).

Inexplicably, subsequent research with the MRQ ignored the factor-based scales. For example, the Wigfield and Guthrie (1997) report appears to be based on the original Wigfield and Guthrie (1995) data, but contrary to the suggestion of Wigfield, Wilde, et al. (1996), it concluded that "it is useful to posit the 11 different aspects of reading motivation" (Wigfield & Guthrie, 1997, p. 429). Two other studies used only portions of the 11 MRQ scales as abbreviated measures of motivation, but different numbers of scales (5 vs. 6) and items (28 vs. 31) were represented without identifying which items comprised each putative dimension (Cox & Guthrie, 2001; Guthrie, Wigfield, Metsala, & Cox, 1999). Guthrie, Wigfield, and VonSecker (2000) performed several exploratory factor analyses on sets of MRQ items, but did not include all 54 items in a single analysis. For example, only the 11 items from the original Recognition and Competition scales were included in one factor analysis.

In another study, Baker and Wigfield (1999) applied confirmatory factor analysis (CFA) to the MRQ among a group of 576 fifth-

Marley W. Watkins and Debra Young Coffey, Department of Educational and School Psychology and Special Education, The Pennsylvania State University.

Correspondence concerning this article should be addressed to Marley W. Watkins, The Pennsylvania State University, 227 Cedar Building, University Park, PA 16802. E-mail: mww10@psu.edu

Table 1
Theoretical Scales of the Motivations for Reading Questionnaire

Scale	Description	Theoretical items[a]	CFA items[b]
Efficacy	Belief that one can be successful at reading	4	4
Challenge	Willingness to take on difficult reading material	5	5
Work Avoidance	Desire to avoid reading activity	4	4
Curiosity	Desire to read topics of interest	6	6
Involvement	Enjoyment received from reading	6	6
Importance	Value placed on reading	2	2
Recognition	Pleasure of receiving a tangible form of recognition for success in reading	5	5
Grades	Desire for positive school evaluations by teacher	4	4
Competition	Desire to outperform others in reading	6	4
Social	Sharing meaning gained from reading with others	7	7
Compliance	Reading to meet others' expectations	5	3

Note. CFA = confirmatory factor analysis.
[a] Wigfield, Guthrie, and McGough (1996). [b] Baker and Wigfield (1999).

and sixth-grade students. Baker and Wigfield reported that students who did not respond to all MRQ items were excluded. The primary reason students failed to complete all MRQ items was because of a time limit. This caused the loss of 205 students (36%) from the initial sample of 576, resulting in only 371 participants (140 in fifth grade and 230 in sixth grade) completing the entire MRQ. Given these methods, nonresponse appears to have been related to reading proficiency. Thus, item nonresponse was not a random process (Bernaards & Sijtsma, 1999). Further, there was no representation of students from the third and fourth grades.

Baker and Wigfield (1999) asserted that the size of their sample prohibited simultaneous analysis of the entire 54-item set. Therefore, three separate CFAs were performed. First, a CFA was conducted on the 13 items that comprise the Efficacy, Challenge, and Avoidance scales. A three-factor model was a better fit than two- or one-factor models. The next CFA involved 27 items from the Curiosity, Involvement, Importance, Recognition, Grades, and Competition scales. Compared with one- to five-factor models, the model with the best fit for these items was a six-factor model. However, model respecifications must have been conducted because two items were dropped from this analysis based on "initial analyses" (Baker & Wigfield, 1999, p. 461). For the Social and Compliance scales, a two-factor model fit 10 items better than a one-factor model. Again, two items were a priori dropped from the analysis based on Baker and Wigfield's "inspection of the content of the items" (p. 459).

Unfortunately, there were several serious methodological limitations to the Baker and Wigfield (1999) study. First, their sample was not representative of elementary school students in several respects (i.e., grade, geography), making generalizability of their results questionable. Second, the time limit seemingly selected for fluent readers, resulting in a severely biased sample (Crooks, Kane, & Cohen, 1996; Tabachnick & Fidell, 1996). Third, their factor analyses were conducted on separate sets of items, rather than the entire 54-item set. The structure of the MRQ cannot be conclusively identified unless all its items are included in the analysis. Fourth, their CFAs did not test other plausible models. On the basis of previous MRQ analyses (Guthrie et al., 1999; Wigfield, Wilde, et al., 1996), alternative six- or seven-factor solutions could have been tested (MacCallum, Wegener, Uchino, & Fabrigar, 1993). Fifth, the CFA results reported by Baker and Wigfield appear to be the culmination of a sequence of model respecifications. These data-driven changes resulted in analyses that were more exploratory than confirmatory and greatly increased the risk of making decision errors (Cribbie, 2000; Gorsuch, 1988; Van Prooijen & Van Der Kloot, 2001). Finally, CFA results were reported for overall fit indices, but "a good overall fit index does not imply lack of serious misspecifications across all parts of the model" (Raykov, 2000, p. 606). That is, residuals and standard errors might indicate misspecification in specific parts of a CFA model even though overall fit indices appear acceptable.

Validity evidence should include an accumulation of research results that support hypotheses consistent with the construct being measured (Messick, 1995). Replication of results and confirmation of findings are critical steps in validation of any instrument, including the MRQ (Gorsuch, 1988). In each of the MRQ studies (Baker & Wigfield, 1999; Wigfield & Guthrie, 1995, 1997; Wigfield, Wilde, et al., 1996), reading motivation was multidimensional. However, unequivocal support for the proposed 11-factor structure has not been demonstrated. Studies that applied exploratory factor analysis found a six- or seven-factor structure and studies that used CFA were marked by fatal methodology errors. Further, no empirical examinations of the factor structure of the MRQ have been completed independent of the test authors. Consequently, the present study is a construct validity investigation of the MRQ by independent researchers to explore the underlying dimensions of reading motivation as assessed by the MRQ.

Method

Instrument

The revised version of the MRQ consists of 54 items, tapping 11 proposed scales of reading motivation. It is a self-report measure that can be group administered to children in third through sixth grades. All items are answered on a scale from 1 to 4, with 1 (*very different from me*), 2 (*a little different from me*), 3 (*a little like me*), and 4 (*a lot like me*). As per Wigfield, Guthrie, and McGough (1996), the scoring of two items was reversed to account for their negative valence.

Analyses

CFA. Although unsupported by previous research, the original 11-factor structure proposed by Wigfield, Guthrie, and McGough (1996) and the modified 11-factor structure posited by Baker and Wigfield (1999) were submitted to CFA with the EQS program (Bentler & Wu, 2002). Fit criteria were those identified by Hu and Bentler (1999) as most likely to protect against both Type I and Type II errors: critical values of $\geq .96$ for comparative fit index (CFI) and nonnormed fit index (NNFI) combined with values $\leq .06$ for the root-mean-square error of approximation (RMSEA) index. The Satorra-Bentler scaled maximum likelihood procedure was applied to ameliorate reliance on multivariate normality (Fouladi, 2000; McDonald & Ho, 2002).

Exploratory factor analysis. These analyses were conducted with SPSS (2001) and guided by the methods recommended by Fabrigar, MacCallum, Wegener, and Strahan (1999) as well as those endorsed by Gorsuch (1988, 1997) and Comrey and Lee (1992). Accordingly, principal-axis extraction, with squared multiple correlations serving as initial communality estimates, were applied. The number of factors to extract was guided by the recommendations of Velicer, Eaton, and Fava (2000): A combination of the minimal average partials (Velicer, 1976) and parallel analysis (Horn, 1965) criteria supplemented by visual (Cattell, 1966) and regression-based (AUTOSCREE; Barrett & Kline, 1982) scree. Some evidence favors overestimating rather than underestimating the number of factors (Wood, Tataryn, & Gorsuch, 1996); therefore, experts suggest that the highest to lowest number of factors be examined until the most interpretable solution is found (Ford, MacCallum, & Tait, 1986; Gorsuch, 1988, 1997). Given the strong theoretical and empirical relationships among reading motivation constructs, we applied oblique rotation (Promax). For interpretation, three salient item loadings (pattern coefficients) were necessary to form a factor, and complex items were excluded. Salient loadings were those $\geq |.40|$ and the highest loading for that variable (Gorsuch, 1997).

Cross-validation. Both exploratory factor analyses and CFAs are efficient multivariate statistical techniques that capitalize on chance. Furthermore, all statistical models are imperfect representations of reality (MacCallum, 2003). These limitations led Briggs and Cheek (1986) to conclude that "multiple samples, therefore, should be a prerequisite for exploratory factor analysis" (p. 119). Accordingly, two samples were used in this study and results were cross-validated across samples.

Study 1

Participants. The participants were third-, fourth-, and fifth-grade students from two elementary schools in a large suburban school district in the mid-Atlantic region. Data were collected as part of school-wide assessment projects aimed at determining the needs and interests of students in the area of reading to assist in instructional planning. The final sample consisted of 328 students, including 100 third graders, 118 fourth graders, and 109 fifth graders. Girls comprised 55% and boys comprised 45% of the sample. One hundred seventy-four students were from School 1, with the remaining 154 students from School 2.

Each school represented a range of socioeconomic levels. Approximately 39% of the students at School 1 and 48% of students at School 2 were eligible for the free- and reduced-lunch program. Both schools were predominantly Caucasian, with School 1 reporting a minority population of approximately 25%, and School 2 reporting a minority population of approximately 32%. No other demographic information about these students was available.

Procedure. The MRQ was completed during the spring semester at both schools. Three practice items provided by the test authors were given prior to the actual questionnaire. Directions and test items were read aloud and verbatim for consistency and standardization of administration as per Wigfield, Guthrie, and McGough (1996). Each classroom teacher at School 1 administered the MRQ to his or her class, whereas the media specialist at School 2 administered the MRQ to each class during preassigned library times. Of the initial 332 respondents, 4 students who omitted more than three items were dropped from the final sample. Another 20 students missed one item, six students skipped two items, and 1 student omitted three items. Twenty-four different test items were missing at least one response for the entire sample. Multiple regression imputation was used for those 27 students via SPSS (2001). According to Gorsuch (1997), regression is the preferred method for data imputation when less than 20% of the data are missing.

Study 2

Participants. The participants in the second study were 735 students enrolled in third ($n = 258$), fourth ($n = 234$), and fifth ($n = 243$) grades in 31 classrooms in two suburban, southwestern elementary schools ($ns = 341$ and 394). Girls comprised 50.7% of the sample, and boys comprised 48.8% of the sample (0.5% were missing gender information). Although individual participant demographic data were not available, school district enrollment was 87.0% White, 8.0% Hispanic, 2.2% Asian, 2.1% Black, and 0.7% Native American. Eligibility for the free- and reduced-lunch program (12.6% and 17.0%, respectively) and mean performance on group reading achievement tests (62.3 and 60.7 percentile, respectively) was similar across the two schools.

Procedure. The MRQ was one component of larger school-wide improvement plans. Administration was by classroom teachers, supervised by school reading specialists, during the spring semester. As in Study 1, the MRQ was administered following standardized instructions. All identifying information was removed before MRQ data were released for analysis.

Of the initial 737 respondents, 2 students who missed more than three items were omitted from the final sample. An additional 32 students omitted one item, 3 students skipped two items, and 2 students missed three items. Twenty-eight different items were missing at least one response for the entire sample. For those 37 students who failed to respond to 1–3 items, a multiple regression imputation procedure for estimating missing data was used (SPSS, 2001).

Results

Study 1

Neither the original theoretical 11-factor structure (Wigfield, Guthrie, & McGough, 1996) nor the revised 11-factor structure (Baker & Wigfield, 1999) adequately fit the MRQ data. Both demonstrated highly significant chi-square values, precluding acceptance of the hypothesis that the models adequately explained MRQ item covariation. For the original theoretical model, the CFI index was .82, the NNFI was .80, and the RMSEA was .04. Corresponding values for the revised model were .87, .86, and .03, respectively. Thus, overall fit did not meet the combinational rule specified by Hu and Bentler (1999). Further, both models were marked by several variance estimates greater than 1.0, and numerous parameter modifications were suggested for both models by EQS's LaGrange and Wald tests. Given these results, we conducted exploratory factor analyses to better delineate the number and relationship of factors within the MRQ among these students (Bentler & Wu, 2002; Browne, 2001; Gorsuch, 1997).

On the basis of the results of minimal average partials and parallel analysis, we determined that five or six factors should be extracted. The visual scree was marked by a small discontinuation at eight factors and a more pronounced break at five factors. AUTOSCREE results verified that five or eight factors were possible. Consequently, five- through nine-factor solutions were

examined. When nine factors were extracted, there were no salient pattern coefficient loadings on the ninth factor. Gorsuch (1988) recommended that extraction be stopped and only the major factors retained when singlet or doublet factors are first encountered. Following this guideline, the eight-factor solution appeared most appropriate. Pattern coefficients and scale reliabilities for the eight-factor solution are presented in Table 2. Factor intercorrelations are presented in Table 3. Although three of these factors were composed of only three salient pattern coefficients, all factors were identified and accounted for 36.8% of the total variance. Theoretical convergence was also acceptable for the eight-factor solution. Improved fit was confirmed by a CFA that produced a CFI index of .90, a NNFI of .89, and a RMSEA of .03. Latent variables were more highly related than was apparent in the exploratory factor analysis (i.e., $5 \geq .70$), weakening the discriminative validity of the eight-factor solution.

Study 2

Neither the original theoretical 11-factor structure (Wigfield, Guthrie, & McGough,1996) nor the revised 11-factor structure (Baker & Wigfield, 1999) adequately fit the data. As in Study 1, both models demonstrated highly significant chi-square values, inadequate fit indices, and several out-of-bounds variance esti-

Table 2
Pattern Coefficients, Communalities, and Reliabilities for the Eight-Factor Structure of the Motivations for Reading Questionnaire Among 328 Students in Grades 3–5

Factor	1	2	3	4	5	6	7	8	h^2	α
1. Social										.75
I sometimes read to my parents.	**.58**	.12	−.05	−.02	−.07	−.05	−.03	.09	.37	
I talk to my friends about what I am reading.	**.55**	−.11	.25	.07	.11	.04	−.01	−.12	.51	
I often read to my brother or my sister.	**.53**	.02	.00	−.13	−.08	.09	.01	−.01	.23	
I like to tell my family about what I am reading.	**.49**	.21	−.03	.02	.17	.04	−.04	.00	.44	
I feel like I make friends with people in good books.	**.48**	−.04	.27	−.01	.01	.03	.02	.04	.42	
My friends and I like to trade things to read.	**.43**	.04	.06	−.07	.03	.06	.13	−.03	.28	
2. Grades–Compliance										.79
I want to see my name on a list of good readers.	−.01	**.59**	.00	.08	.00	−.03	−.01	.18	.46	
I read to improve my grades.	.06	**.56**	.06	.16	−.05	−.11	−.15	.04	.41	
Grades are a good way to see how you are doing.	.04	**.55**	−.14	−.07	.06	.00	−.02	.05	.28	
Finishing every reading assignment is very important.	.02	**.54**	.14	−.08	−.03	.15	.13	−.10	.41	
I like to get compliments for my reading.	−.11	**.53**	.02	.02	.27	.03	−.03	.23	.51	
I look forward to finding out my reading grade.	.12	**.52**	−.09	−.02	−.03	−.05	−.05	.16	.32	
In comparison, it is very important to be a good reader.	.06	**.49**	.11	−.05	.03	.05	.07	−.03	.35	
I always try to finish my reading on time.	−.17	**.47**	.22	.13	−.02	−.05	−.07	−.11	.30	
3. Curiosity										.70
I read to learn new information about topics of interest.	.00	.06	**.58**	−.07	.08	.06	.05	−.01	.42	
I read about my hobbies to learn more about them.	.09	−.08	**.54**	−.01	−.11	.01	.08	−.11	.28	
If my teacher discusses something interesting, I might read it.	−.02	.06	**.52**	−.03	−.01	−.05	−.12	.04	.26	
I like to read about new things.	.16	−.02	**.51**	−.11	.02	−.06	−.06	.18	.43	
I like it when the questions in books make me think.	.21	.09	**.48**	−.13	−.01	−.03	.08	.03	.47	
4. Competition										.72
I like to finish my reading before other students.	−.02	−.06	−.15	**.72**	.01	.13	.07	.04	.51	
I try to get more answers right than my friends.	−.05	.06	−.09	**.70**	−.10	−.06	−.10	.10	.46	
I am willing to work hard to read better than my friends.	.02	.15	.09	**.63**	.02	−.01	−.09	.03	.54	
I like being the only one who knows an answer.	−.12	−.03	.04	**.50**	−.01	.12	.14	.06	.28	
5. Involvement										.60
I enjoy a long, involved story or fiction book.	.19	−.02	.08	.05	**.59**	−.06	−.19	.11	.54	
I like mysteries.	.14	.06	−.07	−.07	**.56**	.14	−.01	.01	.34	
If a book is interesting, I don't care how hard it is to read.	−.10	−.08	.26	.16	**.42**	−.11	.11	−.06	.45	
6. Reading Work Avoidance										.63
I don't like vocabulary questions.	−.01	−.12	.10	.04	−.02	**.67**	.05	.20	.41	
Complicated stories are no fun to read.	.04	.05	−.10	.04	.03	**.59**	−.09	.07	.39	
I don't like reading something with difficult words.	−.01	.10	.05	.02	.06	**.57**	−.10	−.04	.34	
7. Efficacy										.68
I am a good reader.	−.12	−.07	−.14	−.05	.28	−.02	**.65**	.25	.57	
I learn more from reading than most students.	.09	−.10	.06	.26	.01	−.08	**.47**	.00	.42	
My friends sometimes tell me I am a good reader.	.33	−.03	−.04	−.03	−.08	.02	**.46**	.01	.35	
I know I will do well in reading next year.	.00	.08	.19	−.02	−.17	−.07	**.43**	.20	.37	
I always do my reading work exactly as teacher wants.	.04	.27	.00	−.02	−.27	−.05	**.41**	.07	.31	
8. Recognition										.63
I am happy when someone recognizes my reading.	.09	.13	.01	.05	.13	.02	.06	**.49**	.46	
I like hearing the teacher say I read well.	−.02	.24	−.05	.04	−.03	.09	.15	**.48**	.39	
I like being the best at reading.	−.15	.03	.09	.39	−.06	.05	.20	**.45**	.47	

Note. Salient coefficients ($\geq |.40|$) are in bold. Scale items taken from *A Questionnaire Measure of Children's Motivations for Reading,* by A. Wigfield, J. T. Guthrie, & K. McGough, 1996, Athens, GA: National Reading Research Center, University of Georgia and University of Maryland. In the public domain.

Table 3
Factor Intercorrelations for Eight-Factor MRQ Structure Among 328 Students in Grades 3–5

Factor	1	2	3	4	5	6	7	8
1. Social	—							
2. Grades–Compliance	.40	—						
3. Curiosity	.50	.40	—					
4. Competition	.29	.40	.27	—				
5. Involvement	.47	.33	.54	.25	—			
6. Reading Work Avoidance	−.21	−.07	−.31	−.02	−.32	—		
7. Efficacy	.41	.51	.43	.28	.44	−.24	—	
8. Recognition	.22	.25	.24	.09	.24	−.22	.22	—

Note. MRQ = Motivations for Reading Questionnaire.

mates. For the original theoretical model, the CFI index was .85, the NNFI was .83, and the RMSEA was .04. Corresponding values for the revised model were .88, .87, and .04, respectively. Given these results, exploratory factor analyses were conducted to better delineate the number and relationship of factors within the MRQ for these 735 students.

After a review of minimal average partials and parallel analysis results, we concluded that either four or six factors should be extracted. The visual scree was marked by small elbows at six and eight factors and a more pronounced bend at four factors. AUTOSCREE results were congruent with the visual scree. Thus, four, six, or eight factors were probable. Consequently, nine factors were extracted and analyzed for interpretability. The nine-factor solution was rejected because of lack of salient pattern coefficient loadings: Only three factors had three or more salient loadings. The eight-factor solution was examined next and resulted in two doublet factors. The seven-factor solution produced a singlet factor, and both the six-factor and five-factor solutions had one factor with no salient loadings. Consequently, the four-factor solution was the first to meet a priori criteria for acceptability. However, it accounted for only 27.9% of total scale variance, contained bipolar loadings, and was theoretically incongruent with previous MRQ analyses. Consequently, the salient loading criterion was relaxed to .35. Using this criterion, the nine-factor solution exhibited only six salient factors. The eight-factor solution, however, was marked by eight factors with three or more salient loadings and accounted for 43.4% of total variance. Theoretical convergence was also adequate for this solution (see Table 4). Factor intercorrelations are presented in Table 5.

Cross-Validation

An inadequate fit was found when the eight-factor solution of Study 1 was applied to the participants in Study 2 (CFI = .88, NNFI = .87, and RMSEA = .04). Likewise, the exploratory factor analysis solution from Study 2 did not closely fit the data from Study 1 (CFI = .85, NNFI = .84, and RMSEA = .04). In both cases, the chi-square was highly significant. That is, the proposed model was not statistically consistent with the observed data. Further, several intercorrelations between latent constructs were ≥ .80, suggesting a lack of distinctiveness between the factors measured by different sets of items (R. B. Kline, 1998).

Discussion

The underlying dimensions of reading motivation, as assessed by the MRQ, were examined in two geographically diverse samples of elementary school students to determine if there was support for the multidimensional model posited by Wigfield and Guthrie (1995). Factor analytic solutions supported a multidimensional model of reading motivation. However, consistent with Wigfield, Wilde, et al. (1996), when all 54 items were analyzed collectively, the 11 theoretical dimensions were not clearly or distinctly identified. In contrast, eight factors emerged across both samples: Grades–Compliance, Social, Competition, Involvement, Curiosity, Recognition, Efficacy, and Work Avoidance.

Factors

Grades–Compliance. This factor was a combination of items from the Compliance, Grades, Recognition, and Importance scales proposed by Wigfield and Guthrie (1995) and represents performance concerns and extrinsic sources of motivation. Six items replicated across samples and clearly represented a focus on grades and compliance with reading work demands.

Social. Consistent with the proposal of Wigfield and Guthrie (1995), there was a factor reflecting social aspects of reading. A desire to connect with others through the activity of reading was common among the six items loading on this factor in both samples. The social aspects of motivation are not as predominant in the motivation literature as such constructs as self-efficacy (e.g., Bandura, 1977) or achievement goals (e.g., Dweck & Leggett, 1988). However, Wentzel (1989, 1991) has established relationships among academic achievement and social goals, social competence, and social responsibility.

Competition. Consistent with the description presented by Wigfield and Guthrie (1995), a distinct factor reflecting a desire to outperform others in reading was detected in both samples. The four competition items that emerged in both samples are theoretically related to extrinsically oriented items, such as those in the Grades–Compliance factor, yet they did not cross load in any of the extractions or rotations.

Involvement. The Involvement factor contained items from the Involvement and Challenge scales proposed by Wigfield and Guthrie (1995). Only three items replicated across samples. Two of those items were clearly related to general involvement, but the third was specific to enjoying mystery stories.

Curiosity. Items that loaded on this factor came primarily from the Curiosity scale proposed by Wigfield and Guthrie (1995). However, one item from the original Challenge scale migrated to this factor. Depending on the sample, this scale was composed of four or five items, but only three items replicated across samples.

Table 4
Pattern Coefficients, Communalities, and Reliabilities for the Eight-Factor Structure of the Motivations for Reading Questionnaire Among 735 Students in Grades 3–5

Factor	1	2	3	4	5	6	7	8	h^2	α
1. Grades–Compliance										.80
Finishing every reading assignment is very important.[a]	**.67**	.00	−.02	−.05	.08	.11	−.04	−.08	.46	
I always try to finish my reading on time.[a]	**.55**	.07	−.13	.00	.00	.03	.11	.02	.39	
It is very important to be a good reader.	**.54**	.09	.04	.02	.09	−.19	.17	.08	.53	
I read to improve my grades.[a]	**.53**	−.17	.01	.08	−.06	.13	−.07	.07	.28	
Grades are a good way to see how you are doing.[a]	**.51**	.09	−.08	−.03	−.12	−.09	.13	−.03	.27	
I look forward to finding out my reading grade.[a]	**.50**	−.04	.03	−.02	−.04	−.03	−.03	.20	.29	
My parents ask me about my reading grade.	**.46**	−.07	.19	.11	−.09	.05	−.32	.05	.27	
I always do my reading work exactly as my teacher wants.	**.45**	−.09	.00	−.10	−.06	.08	.07	.22	.29	
My parents often tell me what a good job I'm doing.	**.43**	−.11	.27	−.05	.05	−.02	−.06	.23	.40	
In comparison, it is very important to be a good reader.[a]	**.40**	.05	.05	.08	.01	−.11	.19	.12	.40	
2. Involvement										.71
I enjoy a long, involved story or fiction book.[a]	−.10	**.61**	.01	.02	.00	−.03	−.01	.17	.41	
I make pictures in my mind when I read.	.02	**.56**	.02	−.10	−.17	.07	−.09	.08	.28	
I read a lot of adventure stories.	−.04	**.54**	.11	.05	−.08	.01	−.11	.12	.32	
I read because I have to.	.00	**.53**	−.09	−.20	.10	−.17	−.04	.06	.24	
If I am reading about an interesting topic, I lose track of time.	.02	**.48**	.04	.09	−.04	.05	.02	−.11	.29	
I read stories about fantasy and make-believe.	−.13	**.45**	.09	−.01	−.13	−.03	.04	.13	.22	
I like mysteries.[a]	.02	**.36**	.00	.05	−.02	.12	−.04	−.08	.16	
If a book is interesting, I don't care how hard it is to read.[a]	−.04	**.36**	−.06	.18	.21	.03	.05	.08	.36	
3. Social										.73[b]
My friends and I like to trade things to read.[a]	−.07	−.03	**.53**	−.05	.01	.00	.12	.08	.33	
I sometimes read to my parents.[a]	.15	−.12	**.49**	−.09	−.02	.08	.06	−.04	.31	
I talk to my friends about what I am reading.[a]	−.08	.31	**.48**	.01	.02	.05	−.10	−.04	.39	
I like to tell my family about what I am reading.[a]	.12	.29	**.41**	.05	−.05	.12	−.11	−.10	.44	
My friends sometimes tell me I'm a good reader.	−.02	.01	**.40**	−.11	.10	−.11	.12	.31	.39	
I often read to my brother or sister.[a]	−.05	.03	**−.36**	−.03	.03	−.02	−.03	.14	.14	
I feel like I make friends with people in good books.[a]	−.08	.21	**.35**	−.04	.07	.06	.06	.05	.32	
4. Competition										.71
I am willing to work hard to read better than my friends.[a]	.14	.02	.00	**.70**	.12	−.02	−.02	−.09	.55	
I try to get more answers right than my friends.[a]	−.02	.00	−.03	**.69**	−.01	−.02	.02	−.04	.45	
I like to finish my reading before other students.[a]	.00	−.07	−.08	**.66**	−.02	.02	.04	.01	.43	
I like being the only one who knows an answer.[a]	−.18	−.04	.00	**.40**	−.11	.06	.25	.07	.26	
5. Reading Work Avoidance										.54
I don't like reading something with difficult words.[a]	.07	.08	.01	−.08	**−.71**	.02	.07	−.04	.43	
Complicated stories are no fun to read.[a]	.05	.02	−.01	.00	**−.67**	−.01	.05	.05	.39	
I don't like vocabulary questions.[a]	−.09	.01	−.09	.04	**−.35**	−.04	−.03	.13	.16	
6. Curiosity										.61
I read about my hobbies to learn more about them.[a]	−.05	−.10	.11	.06	.02	**.52**	−.15	.00	.23	
I read to learn new information about topics of interest.[a]	.17	.11	−.04	−.08	.02	**.47**	.02	−.03	.38	
I enjoy reading books about people in different countries.	.02	.04	.18	.03	.04	**.39**	.05	−.08	.30	
I like it when the questions in books make me think.[a]	.08	.06	.02	−.08	.16	**.39**	.12	−.02	.38	
7. Recognition										.77
I like hearing the teacher say I read well.[a]	.02	−.15	.02	.04	−.01	.01	**.63**	.11	.41	
I like to get compliments for my reading.	.28	.07	.08	.04	.02	−.09	**.51**	−.15	.51	
It is important to see my name on a list of good readers.	.21	−.10	.04	.06	−.04	.03	**.49**	.00	.38	
I like being the best at reading.[a]	−.01	−.08	.07	.32	−.02	−.06	**.46**	.21	.50	
I am happy when someone recognizes my reading.[a]	.17	.20	.06	.02	−.01	−.06	**.44**	−.10	.44	
8. Efficacy										.67
I am a good reader.[a]	.14	.27	−.17	−.09	−.04	−.11	.02	**.59**	.45	
I know I will do well in reading next year.[a]	.27	−.08	−.06	−.05	.01	.14	.06	**.43**	.37	
I learn more from reading than most students.[a]	.12	.14	−.03	.16	−.06	.17	−.10	**.41**	.38	
In comparison to other subjects, I do best at reading.	.09	.18	.17	.09	.00	−.12	−.02	**.35**	.32	

Note. Salient coefficients ($\geq |.35|$) are in bold. Scale items taken from *A Questionnaire Measure of Children's Motivations for Reading*, by A. Wigfield, J. T. Guthrie, & K. McGough, 1996, Athens, GA: National Reading Research Center, University of Georgia and University of Maryland. In the public domain.
[a] Items that replicated from Sample 1. [b] With negative loading item deleted.

Items on this factor reflected a desire to read and learn about a topic of interest.

Recognition. The Recognition factor was formed by items from the Recognition and Competition scales proposed by Wigfield and Guthrie (1995). Only three items replicated across samples. Those three items focused on satisfaction in being recognized for one's reading.

Efficacy. The three items that loaded on this factor and replicated across both samples were proposed by Wigfield and Guthrie (1995). Other, nonconsistent items migrated from the original

Table 5
Factor Intercorrelations for Eight-Factor MRQ Structure Among 735 Students in Grades 3–5

Factor	1	2	3	4	5	6	7	8
1. Social	—							
2. Grades–Compliance	.51	—						
3. Curiosity	.52	.51	—					
4. Competition	.32	.21	.19	—				
5. Involvement	.26	.49	.22	−.03	—			
6. Reading Work Avoidance	.47	.59	.44	.16	.40	—		
7. Efficacy	.55	.58	.37	.34	.32	.40	—	
8. Recognition	.32	.44	.37	.22	.43	.38	.43	—

Note. MRQ = Motivations for Reading Questionnaire.

Recognition and Compliance factors. This factor reflected the sense that one can be successful in reading.

Work Avoidance. The Work Avoidance factor was the most clearly and consistently identified factor. The same three items loaded on this factor across sample, rotation method, and number of factors extracted. However, this factor contained only three salient items. These items represented three of the four negatively worded items on the MRQ. Consequently, it is unclear whether this factor is a distinct, meaningful dimension of reading motivation or whether it is merely a technical factor. As described by Comrey (1988), "if all items are phrased in the same direction, the respondent's oppositional or acquiescent tendencies may cloud the assessment of the desired construct" (p. 758). Some authors cautioned against negatives in test construction because of the confusion they present to respondents (Kubisyn & Borich, 1987) and resultant reduction in reliability of scales (Barnette, 2000). Comrey suggested that the word *not* creates ambiguity in item response and should therefore be avoided in developing negatively phrased items. Two of the three items loading on the Work Avoidance factor included *don't.* Thus, the wording of these items may have been unclear, possibly distorting results and/or leading to the emergence of a technical factor.

Implications

Revision. The present study found a lack of support for the proposed structure of the MRQ. In scale development, "one of the chief considerations should always be the replicability of the factor structure. Factors that do not replicate are of little value" (Briggs & Cheek, 1986, p. 120). Although eight factors were independently identified using exploratory factor analysis for both samples, several factors were composed of only three or four items (see Tables 2 and 4). A minimum of five items is preferable (Comrey & Lee, 1992; Fabrigar et al., 1999). Unfortunately, the communalities were low, suggesting that factors should be overdetermined with more than five items to ensure accurate factor pattern recovery (MacCallum, Widaman, Preacher, & Hong, 2001). Related to the low item to factor ratio, the internal consistency reliability of several scales fell below recommended levels for screening or individual decision-making purposes (Salvia & Ysseldyke, 1997). Additionally, a sizable number of items failed to load on any factor, and many other items loaded on multiple factors. Factorial complexity makes it difficult to understand what constructs are tapped by the items and how to interpret each factor (Streiner, 1994). These symptoms point to the need for further development of the MRQ. Although a thorough discussion of scale development is beyond the scope of this article, detailed recommendations are outlined in Clark and Watson (1995), Comrey and Lee (1992), Floyd and Widaman (1995), Gorsuch (1997), Reise, Waller, and Comrey (2000), and Smith and McCarthy (1995).

Validation. Replication of factor structure is vital in scale development. Even so, identifying a replicable factor structure does not ensure the importance or utility of those factors (Briggs & Cheek, 1986). A second level of validation is then necessary to examine the relationships between factors and other measures. Further research should examine the question of how the MRQ is related to "measures that bear conceptual resemblance" (Briggs & Cheek, 1986, p. 120).

The MRQ represents one model of reading motivation. Other instruments are intended to assess reading motivation specifically or conceptually related constructs, such as reading attitudes and reading self-efficacy. The self-efficacy subscales of the Reader Self-Perception Scale (Henk & Melnick, 1995) may relate to the proposed self-efficacy scales of the MRQ (Efficacy, Curiosity, and Involvement). The aspects of reading attitude assessed by the Elementary Reading Attitude Scale (McKenna & Kear, 1990) may be associated with the Curiosity and Involvement scales of the MRQ (Baker & Wigfield, 1999) and the value of reading component of the MRP (Gambrell et al., 1996). Comparisons with these instruments could improve understanding of reading motivation and its underlying constructs. In addition, such correlational studies would further examine the technical properties (i.e., convergent validity) of the MRQ.

Conclusions

In this study, we generated evidence for a multidimensional model of reading motivation. However, the 11-factor structure of the MRQ posited by Wigfield and Guthrie (1995) was not supported. As observed by Williams (1999), "although higher-order cognitive constructs have much surface appeal, their utility is tied to the clarity and fidelity of their definitions and assessment procedures" (p. 411). Lack of support for the proposed MRQ factor structure raises questions regarding the soundness of the 11 scales as measures of discrete aspects of reading motivation (Edwards & Bagozzi, 2000). Nevertheless, the MRQ has been called "a valid and reliable questionnaire" (Guthrie & Wigfield, 1999, p. 200), and its 11 scales have been described as important "facets of student motivation that can affect reading" (Pressley, 2002, p. 289). Further investigation of the underlying factor structure of the

MRQ and its place in the nomological net (Cronbach & Meehl, 1955) is needed to clarify these disparate results (P. Kline, 1998). Until such clarification has been achieved, neither the MRQ nor its scales should be used as dependent variables in reading motivation research (see Meehl, 1990, for a discussion of the corrosive influence of invalid measurement on research conclusions) or as measures of affective change in high-stakes educational evaluations.

References

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their relations to reading activity and reading achievement. *Reading Research Quarterly, 34,* 452–477.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215.

Barnette, J. J. (2000). Effects of stem and Likert response option reversals on survey internal consistency: If you feel the need, there is a better alternative to using those negatively worded stems. *Educational and Psychological Measurement, 60,* 361–370.

Barrett, P. T., & Kline, P. (1982). Factor extraction: An examination of three methods. *Personality Study and Group Behaviour, 3,* 84–98.

Bentler, P. M., & Wu, E. J. C. (2002). *EQS 6 for Windows user's guide.* Encino, CA: Multivariate Software.

Bernaards, C. A., & Sijtsma, K. (1999). Factor analysis of multidimensional polytomous item response data suffering from ignorable item nonresponse. *Multivariate Behavioral Research, 34,* 277–313.

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality, 54,* 106–148.

Browne, M. W. (2001). An overview of analytic rotation in exploratory factor analysis. *Multivariate Behavioral Research, 36,* 111–150.

Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research, 1,* 245–276.

Clark, L. A., & Watson, D. (1995). Construct validity: Basic issues in objective scale development. *Psychological Assessment, 7,* 309–319.

Comrey, A. L. (1988). Factor-analytic methods of scale development in personality and clinical psychology. *Journal of Consulting and Clinical Psychology, 56,* 754–761.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cox, K. E., & Guthrie, J. T. (2001). Motivational and cognitive contributions to students' amount of reading. *Contemporary Educational Psychology, 26,* 116–131.

Cribbie, R. A. (2000). Evaluating the importance of individual parameters in structural equation modeling: The need for Type I error control. *Personality and Individual Differences, 29,* 567–577.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52,* 281–302.

Crooks, T. J., Kane, M. T., & Cohen, A. S. (1996). Threats to the valid use of assessments. *Assessment in Education, 3,* 265–285.

Dweck, C. S., & Leggett, E. L. (1988). A social–cognitive approach to motivation and personality. *Psychological Review, 95,* 256–273.

Edwards, J. R., & Bagozzi, R. P. (2000). On the nature and direction of relationships between constructs and measures. *Psychological Methods, 5,* 155–174.

Fabrigar, L. R., MacCallum, R. C., Wegener, D. T., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4,* 272–299.

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7,* 286–299.

Ford, J. K., MacCallum, R. C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. *Personnel Psychology, 39,* 291–314.

Fouladi, R. T. (2000). Performance of modified test statistics in covariance and correlation structure analysis under conditions of multivariate nonnormality. *Structural Equation Modeling, 7,* 356–410.

Gambrell, L. B., Palmer, B. M., Codling, R. M., & Mazzoni, S. A. (1996). Assessing motivation to read. *The Reading Teacher, 49,* 518–533.

Gorsuch, R. L. (1988). Exploratory factor analysis. In J. R. Nesselroade & R. B. Cattell (Eds.), *Handbook of multivariate experimental psychology* (2nd ed., pp. 231–258). New York: Plenum Press.

Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment, 68,* 532–560.

Guthrie, J. T., & Wigfield, A. (1997). *Reading engagement: Motivating readers through integrated instruction.* Newark, DE: International Reading Association.

Guthrie, J. T., & Wigfield, A. (1999). How motivation fits into a science of reading. *Scientific Studies of Reading, 3,* 199–205.

Guthrie, J. T., & Wigfield, A. (2000). Engagement and motivation in reading. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 403–420). Mahwah, NJ: Erlbaum.

Guthrie, J. T., Wigfield, A., Metsala, J. L., & Cox, K. E. (1999). Motivational and cognitive predictors of text comprehension and reading amount. *Scientific Studies of Reading, 3,* 231–256.

Guthrie, J. T., Wigfield, A., & VonSecker, C. (2000). Effects of integrated instruction on motivation and strategy use in reading. *Journal of Educational Psychology, 92,* 331–341.

Henk, W. A., & Melnick, S. A. (1995). The Reader Self-Perception Scale (RSPS): A new tool for measuring how children feel about themselves as readers. *The Reading Teacher, 48,* 470–483.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30,* 179–185.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.

Kaiser, H. F. (1960). The application of electronic computers to factor anlaysis. *Educational and Psychological Measurement, 20,* 141–151.

Kline, P. (1998). *The new psychometrics: Science, psychology, and measurement.* London: Routledge.

Kline, R. B. (1998). *Principles and practice of structural equation modeling.* New York: Guilford Press.

Kubisyn, T., & Borich, G. (1987). *Educational testing and measurement: Classroom application and practice* (2nd ed.). Glenview, IL: Scott, Foresman.

MacCallum, R. C. (2003). Working with imperfect models. *Multivariate Behavioral Research, 38,* 113–139.

MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in application of covariance structure analysis. *Psychological Bulletin, 114,* 185–199.

MacCallum, R. C., Widaman, K. F., Preacher, K. J., & Hong, S. (2001). Sample size in factor analysis: The role of model error. *Multivariate Behavioral Research, 36,* 611–637.

McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods, 7,* 64–82.

McKenna, M. C., & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher, 43,* 626–639.

Meehl, P. E. (1990). Why summaries of research on psychological theories are often uninterpretable. *Psychological Reports, 66,* 195–244.

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50,* 741–749.

Palmer, B. M., Codling, R. M., & Gambrell, L. B. (1994). In their own

words: What elementary students have to say about motivation to read. *The Reading Teacher, 48,* 176–178.

Paris, S. G., & Oka, E. R. (1986). Self-regulated learning among exceptional children. *Exceptional Children, 53,* 103–108.

Pressley, M. (2002). *Reading instruction that works: The case for balanced teaching* (2nd ed.). New York: Guilford Press.

Raykov, T. (2000). On sensitivity of structural equation modeling to latent relation misspecifications. *Structural Equation Modeling, 7,* 596–607.

Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest, 2,* 31–74.

Reise, S. P., Waller, N. G., & Comrey, A. L. (2000). Factor analysis and scale revision. *Psychological Assessment, 12,* 287–297.

Salvia, J., & Ysseldyke, J. E. (1997). *Assessment.* Boston: Houghton Mifflin.

Smith, G. T., & McCarthy, D. M. (1995). Methodological considerations in the refinement of clinical assessment instruments. *Psychological Assessment, 7,* 300–308.

Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

SPSS. (2001). SPSS 10.0 for Macintosh [Computer software]. Chicago: Author.

Streiner, D. L. (1994). Figuring out factors: The use and misuse of factor analysis. *Canadian Journal of Psychiatry, 39,* 135–140.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). New York: Harper Collins College.

Van Prooijen, J.-W., & Van Der Kloot, W. A. (2001). Confirmatory analysis of exploratively obtained factor structures. *Educational and Psychological Measurement, 61,* 777–792.

Velicer, W. F. (1976). Determining the number of components from the matrix of partial correlations. *Psychometrika, 41,* 321–327.

Velicer, W. F., Eaton, C. A., & Fava, J. L. (2000). Construct explication through factor or component analysis: A review and evaluation of alternative procedures for determining the number of factors or components. In R. D. Goffin & E. Helmes (Eds.), *Problems and solutions in human assessment: Honoring Douglas N. Jackson at seventy* (pp. 41–71). Boston: Kluwer Academic.

Wentzel, K. R. (1989). Adolescent classroom grades, standards for performance, and academic achievement: An interactionist perspective. *Journal of Educational Psychology, 81,* 131–142.

Wentzel, K. R. (1991). Social competence at school: The relation between social responsibility and academic achievement. *Review of Educational Research, 61,* 1–24.

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

Wigfield, A., & Guthrie, J. T. (1995). *Dimensions of children's motivations for reading: An initial study* (Reading Research Rep. No. 34). Athens, GA: National Reading Research Center, University of Georgia and University of Maryland.

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.

Wigfield, A., Guthrie, J. T., & McGough, K. (1996). *A questionnaire measure of children's motivations for reading* (Instructional Resource No. 22). Athens, GA: National Reading Research Center, University of Georgia and University of Maryland.

Wigfield, A., Wilde, K., Baker, L., Fernandez-Fein, S., & Scher, D. (1996). *The nature of children's motivations for reading, and their relations to reading frequency and reading performance* (Reading Research Rep. No. 63). Athens, GA: National Reading Research Center, University of Georgia and University of Maryland.

Williams, R. L. (1999). Operational definitions and assessment of higher-order cognitive constructs. *Educational Psychology Review, 11,* 411–427.

Wood, J. M., Tataryn, D. J., & Gorsuch, R. L. (1996). Effects of under- and overextraction on principal axis factor analysis with varimax rotation. *Psychological Methods, 1,* 354–365.

Received April 7, 2003
Revision received July 15, 2003
Accepted July 21, 2003 ■