Reliability and Stability of Elementary Reading Attitude Survey (ERAS) Scores Across Gender, Race, and Grade Level

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Abstract

The reliability and stability of Elementary Reading Attitude Survey (ERAS) scores were examined for the recreational and academic subscales and for the total scale. The responses of 718 students in fourth, fifth, and sixth grades were included in the analyses. A seven-day interval between testings was used. The recreational and academic subscale scores and the total scale scores of the ERAS were analyzed by gender, ethnicity, and grade level.

The alpha coefficients suggested adequate internal consistency across gender, ethnicity, and grade level, with all coefficients exceeding .75. The stability coefficients associated with gender and ethnicity were below .70 level, ranging from .48 to .67. Except for grade six students, the stability of the ERAS scores over the seven-day interval tended to be low.

Evaluation of elementary students' reading attitudes is an important component of a comprehensive reading program. Knowledge of students' attitudes about reading, whether found to be favorable or unfavorable, is useful to educators and researchers in planning and evaluating instructional programs designed for individual students as well as programs for groups of students. In general, educators and researchers agree that a student's reading attitude plays a central role in whether or not he or she becomes a competent reader (e.g., Anderson, Hiebert, Scott, & Wilkinson, 1985; Athey, 1985; Csikszentmihalyi, 1991; Guthrie & Wigfield, 2000; Guthrie, Wigfield, Metsala, & Cox, 1999; Ley, Schaer, & Dismukes, 1994; Lipson & Wixson, 1991; Smith, 1988; Wigfield & Asher, 1984). In fact, several theoretical models showing connections between affective dimensions of reading and reading development are presented in the literature (e.g., Athey, 1985; Cambourne, 1995; Guthrie, 1996; Matthewson, 1976, 1985, 1994; McKenna, 1994).

A number of instruments are available to measure elementary students' attitudes, motivation, and interests related to reading, such as the Conversational Interview (Gambrell, Palmer, Codling, & Mazzoni, 1995), the Measuring Reading Activity Inventory (Guthrie, McGough, & Wigfield, 1994), the Reader Self-Perception Scale (Henk & Melnick, 1995), and the Motivations for Reading Questionnaire (Wigfield, Guthrie, & McGough, 1996). One of the most-frequently used instruments, however, is the Elementary Reading Attitude Survey (ERAS) which was developed by McKenna and Kear (1990) as a public-domain instrument that would "enable teachers to estimate attitude levels efficiently and reliably" (p. 626). During the past decade, the ERAS has been included in various studies designed to examine relationships between reading attitude, reading habits and selected cognitive variables (Allen, Cipielewski, & Stanovich, 1992); reading attitude and approaches to literacy instruction by grade level (Bottomley, Truscott, Marinak, Henk, & Melnick, 1999; McKenna, Stratton, Grindler, & Jenkins, 1995; Walker-Dalhouse & Dalhouse, 1997); reading attitude and reading achievement across grade level, gender, ethnicity, and socioeconomic status (Diamond & Onwuegbuzie, 2001); reading attitude, reading ability, gender, and

ethnicity (McKenna & Kear, 1990; McKenna, Kear, & Ellsworth, 1995); language arts achievement and reading attitude survey format (Smith & Ryan, 1997); and computerized self-assessment of reading and gender (Vollands, Topping, & Evans, 1999).

Only minimal evidence of the reliability of the ERAS scores is presently available. In the standardization study to establish norms for the ERAS (McKenna & Kear, 1990), alpha reliability coefficients were reported, but stability of the scores over time was not investigated. Only one study has been located which examined the stability of the ERAS scores (Kush & Watkins, 1996). Using an exceptionally long three-year interval between test administrations, Kush and Watkins reported very low (high of .36) stability coefficients for males, females, and the total sample.

Diamond and Onwuegbuzie (2001) used Magnusson's (1967) formula, as recommended by Vacha-Haase, Kogan, and Thompson (2000), to obtain predicted reliabilities for a sample of 1,968 students in first through fifth grades that was predominantly African American. All predicted reliabilities were high ranging from the upper .80s to the low .90s. However, for these predicted reliabilities to be appropriate, the error variance for the Diamond and Onwuegbuzie sample is assumed to be the same as that found in the sample reporting the original reliabilites. This is a strong assumption that may or may not have been met.

Numerous writers have emphasized reliability coefficients can vary across subgroups (Crocker & Algina, 1986; Huck, 2000; Sandeval, Frisby, Geisinger, Scheuneman, & Grenier, 1998; Thompson & Vacha-Haase, 2000; Worther, White, Fan, & Sudweeks, 1999). Additonally, Thompson and Vacha-Haase (2000) cautioned against relying on reliablities provided only from the norming sample and stress the importance of obtaining reliability estimates from a variety of populations.

It was felt that additional reliabliity data was needed because so few published studies have examined either the stability or the internal consistency of ERAS scores, and the reliability data presently available is based on samples which were predominantly European American. Both the McKenna and Kear (1990) and the Kush and Watkins (1996) samples were primarily European American. Eighty-four percent of the McKenna and Kear sample was European American and 94 percent of the Kush and Watkins sample was European American. The Diamond and Onweguizie (2001) sample was primarily African American (77%), but their reported values were, as indicated earlier, estimates based on strong assumptions. Little reliability data is available for non-European American respondents.

In an attempt to provide a broader base of reliability data for the ERAS, the present study obtained estimates of alpha reliabilities, not only by grade level as provided by McKenna and Kear (1990), but by gender and race as well. Additionally, the present study examined score stability over a more realistic time interval than that provided by Kush and Watkins (1996).

Method

Participants

A total of 718 students in grades four through six responded to the ERAS. The students represented four school districts and 11 schools located in a southern state. The sample consisted of 374 boys and 344 girls representing 52% and 48% of the total sample, respectively. Of those indicating their race, 349 (49%) were European American and 367 (51%) were African American. Two of the participants did not identify their race. Of those for which grade level was identified, 112 were in grade four, 108 were in grade five, and 61 were in grade six. Unfortunately, grade level was not designated for the remaining participants. The reading abilities of the students ranged from very poor to very good. The reading program in 10 of the 11 schools was a basal reading program, and in the remaining school the reading program was a structured, direct-instruction reading program that emphasized reading subskill acquisition.

Instrument

The Elementary Reading Attitude Survey (ERAS), developed by McKenna & Kear (1990), measures two aspects of reading attitude: recreational reading (10 items) and academic reading (10 items). A total reading attitude score may also be obtained by summing scores for the two subar-

eas. As a public-domain instrument, the ERAS is a frequently used instrument which may be used by teachers and school administrators to "(a) make possible initial conjecture about the attitudes of specific students, (b) provide a convenient group profile of a class (or a larger unit), or (c) serve as a means of monitoring the attitudinal impact of instructional programs" (McKenna & Kear, 1990, p. 628).

"Recreation items focus on reading for fun outside the school setting and the academic subscale examines the school environment" (Kush & Watkins, 1996, p. 316). For example, two recreation items ask: "How do you feel when you read a book on a rainy Saturday? and "How do you feel about reading during summer vacation?", and examples of academic items are: "How do you feel about learning from a book?" and "How do you feel when it's time for reading class?"

The ERAS was designed to be administered to groups of students, with the teacher reading aloud each item." After each question, the comic-strip character Garfield is shown in four different facial expressions ranging from a very positive expression to a very negative expression. Students are told that the Garfield illustrations represent the following moods: very happy, a little happy, a little upset, and very upset. Students circle (or mark) the picture of Garfield that most closely represents their feelings about the question. To avoid a neutral, central category, an even number (four) of scale points is used. The ERAS is scored using a Likert scale, with four points assigned to the very happy Garfield face, three points to the slightly happy Garfield face, two points to the mildly upset Garfield face, and one point to the very upset Garfield face. Scores for each student may be obtained by summing item responses. The scores on each subscale can range from ten to 40 with a possible total composite score range of 20 to 80 (McKenna, Stratton, Grindler, & Jenkins, 1995).

Norms for interpreting ERAS scores were created by administering the instrument to a sample of 18,138 students in grades 1-6 from 95 school districts, representing 38 U.S. states. The sample was balanced for gender, with only five more females than males, and included 84.3% European American students, 9.5% African American students, and 6.2% Hispanics. Reliability of the ERAS was obtained by measuring the internal consistency (Cronbach, 1951) of the two attitude scales, and the alpha coefficients ranged from .74 to .89 (McKenna & Kear, 1990). These coefficients suggest adequate levels of internal consistency for the scores and also that the item format using Garfield appears appropriate even for grades five and six.

A number of procedures were used to gather evidence of the construct validity of the ERAS. Comparisons were made between the ERAS means (recreational subscale) of students based on: library card holders versus noncardholders (means of the two groups differed statistically ($p<$ .001) with the cardholders having the higher mean), students who currently had library books checked out versus those who did not (means of the two groups differed statistically ($p<$ .001) with the students who had books checked out having the higher mean), and the students who watched an average of less than one hour of television per night versus those who reported watching more than two hours of television per night (means of the two groups differed statistically ($p<$ .001) with the low-television group having the higher mean). For the academic subscale, comparisons were made between the ERAS mean scores of students categorized by teachers as having high, average, or low ability overall reading ability (means of the high-ability and low-ability readers differed statistically ($p<$ .001) with the high-ability readers having the higher mean). The relationship between the subscales was examined by calculating an intersubscale correlation coefficient; the coefficient of .64 indicated that approximately 41% of the variance in one set of scores could be attributed to the other, suggesting that while the two subscales are related, they reflect dissimilar factors. Also, based on results of factor analyses, using the unweighted least squares method of extraction and varimax rotation, the authors concluded that the factor analyses produced strong evidence that the two subscales of the ERAS reflect discrete aspects of reading attitude (McKenna & Kear, 1990).

Procedures

Permission was granted through the participating school districts' central offices to administer the ERAS to students in grades 4, 5, and 6. The ERAS was administered to classes of students as a group by university faculty and graduate students in the area of literacy who had been trained to administer the instrument. The ERAS was administered on two occasions with a seven-day interval between administrations. Anonymity of student responses was achieved by pre-assigning numbers to students on class rosters and distributing the ERAS instruments to students using the class roster, so that absent students' forms were not distributed; students were instructed not to write their names on the ERAS instrument. The proctors explained that the purpose of the survey was to study students' thoughts and feelings about reading and that in no way was it a test with correct or incorrect responses. The meaning of each Garfield "face" was explained from left to right as: "very happy," "a little happy," "a little upset," and "very upset." The students were instructed to mark with an "X" the Garfield face that corresponded to their feelings when considering each question. A sample question was read aloud and the possible face choices were reviewed and discussed, with students' questions related to clarification being answered. The proctor read aloud each question, proceeding to the next question after all students had marked their responses on the ERAS instrument. The same procedures were followed for the retest administration of the survey with a reminder from the proctor to the students that they should answer the questions based on their feelings at the present time.

Analyses of Data

Internal consistency reliability was estimated using Cronbach's coefficient alpha, and score stability was examined using Pearson product-moment correlation between the scores from the first and second administrations of the ERAS. The interval between testings was seven days. Coefficient alpha was calculated using scores for the first testing. Cronbach's alpha and stability coefficients were obtained by gender, race, and grade level.

Results

Means and standard deviations associated with ethnicity, gender, and grade level for the ERAS recreational and academic subscales and total scale are presented in Table 1. For the recreational subscale, the means ranged from 26.28 to 30.29; for the academic subscale, the means ranged from 25.65 to 29.74; and for the total scale the means ranged from 52.50 to 59.93. In general, the mean values were comparable to those reported by McKenna and Kear (1990) for grades four through six. Only the grade four mean scores for the recreational scale and the total scale were notably different from those reported by McKenna and Kear. The grade four mean scores for the present sample tended to be lower. It should be noted that there was only minimal change in mean levels of the scores across the two test administrations. Mean levels differed by only about one scale point for the recreational and academic subscales and by only about two scale points for the total scores. Mean level stability is apparent.

Table 1
Group Means and Standard Deviations for First and Second Administrations of the ERAS

	Recreational Reading		Academic Reading		Total Reading	
	1st Adm.	2nd Adm.	1st Adm.	2nd Adm.	1st Adm.	2nd Adm.
European American (n = 349)						
Mean	30.08	29.48	29.21	28.97	59.29	58.45
S.D.	6.12	6.49	7.16	7.00	12.30	12.68
African American (n = 367)						
Mean	28.97	28.10	29.08	28.49	58.05	56.59
S.D.	6.48	6.62	6.70	6.82	11.93	12.18
Males (n = 374)						
Mean	28.80	27.80	28.64	28.09	57.44	55.90
S.D.	6.40	6.71	7.14	7.30	12.38	11.64
Females (n = 344)						
Mean	30.29	29.81	29.64	29.35	59.93	59.15
S.D.	6.14	6.29	6.70	6.46	11.73	11.64
Grade 4 (n = 112)						
Mean	26.82	27.37	25.86	25.65	52.50	53.02
S.D.	6.02	6.83	7.45	7.33	12.36	13.06
Grade 5 (n = 108)						
Mean	28.81	28.11	27.47	27.15	56.31	55.26
S.D.	5.88	5.47	6.70	6.37	11.24	10.63
Grade 6 (n = 61)						
Mean	27.43	26.28	29.74	29.69	57.16	55.97
S.D.	5.55	6.58	4.57	5.40	9.07	10.93

Across ethnicity, gender, and grade level the alpha coefficients tended to be in the .80's (Table 2). Only the alphas for the recreational subscale for fourth-grade students (alpha = .78) and for the academic subscale for sixth-grade students (alpha = .76) were less than .80. In general, the alpha coefficients were adequate across all groups examined.

Table 2
Cronbach's Alphas and Stability Coefficients by Ethnic Group, Gender, and Grade Level

	Recreational		Academic		Total	
Group	Alpha	Stability	Alpha	Stability	Alpha	Stability
Ethnic Group						
African American (n = 367)	.83	.62	.83	.65	.89	.67
European American (n = 349)	.80	.55	.86	.57	.90	.60
Gender						
Males (n = 374)	.81	.57	.84	.62	.89	.64
Females (n = 344)	.82	.59	.84	.59	.89	.62
Grade Level						
4 (n = 112)	.78	.52	.85	.58	.89	.59
5 (n = 108)	.82	.48	.85	.65	.89	.59
6 (n = 61)	.82	.77	.76	.77	.87	.80

The stability coefficients across ethnicity, gender, and grade level tended to be much lower than the corresponding alpha coefficients (Table 2). Except for the grade six sample, all stability coefficients were below .70. For the two ethnic groups, the stability coefficients ranged from the mid .50s to the mid .60s, with the coefficients being somewhat higher for the African American sample. For the gender groups, the coefficients were generally in the upper .50s to the lower .60s. The grade level coefficients exceeded .70 only for the sixth-grade sample. For the fourth- and fifth-grade samples the coefficients varied from a low of .48 on the recreational subscale for the fifth grade sample to .65 on the academic subscale for the same group. In general, the stability coefficients for the fourth- and fifth-grade samples were rather low, suggesting considerable instability in the reading attitude scores over the one-week time period.

The similarity in mean scores and alpha reliabilities across grade levels, between this study's results and those reported by McKenna and Kear (1990), suggest that the missing grade level indications for some of the students does not present a serious limitation in the present findings.

Discussion

The alpha coefficients across ethnic group, gender, and grade level were in the .80s, with the exception of the recreational subscale for fourth-grade students which was .78, and the academic subscale for sixth-grade students which was .76. In general, the alpha coefficients indicated that the subscale and total scale scores of the ERAS possess adequate levels of internal consistency for the groups included in this study.

While results of this study corroborate the findings of McKenna and Kear (1990) about the internal consistency of the ERAS subscales and total scale, the stability coefficients suggest instability of ERAS scores over a short period of time, particularly in grades below grade six. The stability coefficients found in the present study are notably higher than those reported by Kush and

Watkins (1996), but this is not surprising since the time interval between testings used by Kush and Watkins was three years, a very large interval for examination of score stability. Although considerable fluctuation in reading attitude scores of individual students was found within groups, group mean levels remained similar across administrations. The finding of score instability within groups indicates that individual student score interpretations need to be made with caution. Classroom teachers and reading specialists must be aware that changes in reading attitudes can be quite notable even over a short period of time. Such attitude changes may occur when an individual student feels that he/she was not very successful in a recent reading activity such as retelling a story. Also, a change in reading attitude may occur when a student has been reprimanded by a parent for his/her reading performance. Conversely, a student who just received a good grade, or a compliment, for their reading performance in a language arts activity may exhibit a more positive reading attitude than prior to such positive feedback. Additional studies are needed, especially those designed to identify possible factors, or conditions, that are connected with home and/or school events and activities that may influence reading attitude changes. Nevertheless, in order to obtain an indication of a student's reading attitude devoid of short-term fluctuations, it appears that reading attitudes may need to be assessed more than just once. Assessments at periodic intervals would likely provide a better estimate of reading attitude.

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